PATENTS FOR INVENTIONS.

ABRIDGMENTS OF SPECIFICATIONS.

CLASS 22,

CEMENTS AND LIKE COMPOSITIONS.

PERIOD—A.D. 1901–4.

LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
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PRICE ONE SHILLING.

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EXPLANATORY NOTE.

The contents of this Abridgment Class may be seen from its Subject-matter Index. For further information as to the classification of the subject-matter of inventions, reference should be made to the *Abridgment-Class and Index Key* (price 1*s.*, by post 1*s.* 6*d.*), and the *Appendix to Key* (price 1*s.*, by post 1*s.* 4*d.*), published at the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C.

It should be borne in mind that the abridgments are merely intended to serve as guides to the Specifications, which must themselves be consulted for the details of any particular invention. Printed Specifications, price 8*d.*, may be purchased at the Patent Office, or ordered by post, no additional charge being made for postage.

SUBJECT-MATTER INDEX.

Abridgments are printed in the chronological order of the Specifications to which they refer, and this index quotes only the year and number of each Specification.

Slags, Treatment of—*cont.*

Excepting Casting substances other than metals; Grinding, crushing, pulverizing, and the like, [*Abridgment Class* Grinding, crushing, &c.]; Iron and steel manufacture, [*Abridgment Class* Iron &c.]; Moulding plastic &c. substances, [*Abridgment Class* Moulding &c.]; Sifting or screening apparatus, [*Abridgment Class* Sifting &c.]; Slagwool, Preparation of;

for which see those headings.

furnaces and kilns. *See Abridgment Class* Furnaces &c.

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Slate refuse, Utilizing. *See* Cements for general building purposes; Stone, Artificial &c.

Slurry. *See* Cements for general building purposes.

Sound-deadening coverings and compositions. '*01.* 977. 8282. 12,724. 15,802. 16,588. 25,589. 25,776. '*02.* 2742. 24,359. '*03.* 10,393. 11,855. '*04.* 12,888. 18,265.

Statuary. '*79.* 1422, [*Appendix, page* 110]. 3927, [*Appendix, page* 110]. '*82.* 4671, [*Appendix, page* 113]. '*01.* 7583. 15,204. '*02.* 16,854. 18,476, 18,561. '*03.* 832. 2490. 27,426. '*04.* 12,277. 23,449.

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compositions. *See* Casting substances &c.; Cements for general building purposes; Plastic compositions &c, [*Abridgment Class* India-rubber &c.].

electroplating. *See Abridgment Class* Electrolysis.

facilitating the production of by photography. *See Abridgment Class* Photography.

imitation by photography. *See Abridgment Class* Photography.

moulding. *See Abridgment Class* Moulding &c.

plasters for. *See* Cements for general building purposes.

preservative compositions for. *See Abridgment Class* Paints &c.

reproducing by copying-machines. *See Abridgment Class* Stone &c.

stone, artificial and imitation, for. *See* Stone, Artificial &c.

Stone, Artificial and imitation. '*77.* 3703, [*Appendix, page* 109]. '*82.* 4281, [*Appendix, page* 113]. '*01.* 457. 1479. 2860. 3101. 3475. 4202. 5336. 7081. 8282. 8556. 8691. 9376. 9892. 10,084. 12,073. 12,272. 12,589. 13,452. 14,981. 15,214. 15,554. 16,508. 16,640. 16,794. 17,510. 18,163. 18,744. 19,045. 19,283. 19,474. 24,393. 24,683. 24,923. 26,258. 26,259. 26,437. '*02.* 383. 2522. 3364. 3402. 3493. 3518. 3555. 4644. 4914. 4917. 5392. 5710. 6378. 6400. 7647. 7836. 9431. 10,184. 10,218. 10,399. 12,861. 15,318. 15,768. 16,100. 16,665. 16,854. 17,369. 17,552. 17,579. 17,580. 17,618. 18,476. 18,829. 20,150. 20,188. 20,423. 20,492. 20,534. 20,841. 20,878. 23,558. 23,664. 23,680. 24,023. 24,359. 25,222. 25,732. 25,736. 25,806. 25,807. 25,850. 26,758. 27,812. 28,679. 28,718. '*03.* 1231. 2011. 2370. 2371. 2372. 2458. 3294. 3378. 3483. 4048. 6849. 7622. 7976. 9508. 17,812. 20,421. 22,376. 25,393. 26,478. 26,568. 27,241. 28,733. '*04.* 512. 564. 3769. 4130. 4557. 6007. 6631. 7736. 8504. 9680. 9765. 9769. 10,040. 11,523. 11,830. 12,940. 14,527. 15,795. 16,857. 17,870. 17,968. 18,804. 21,233. 23,364. 24,712. 25,289. 25,884. 26,516. 27,991.

Excepting Concretes; Gems, [*Abridgment Class* Fastenings, Dress]; Printing, Lithographic and like, (*stones for*), [*Abridgment Class* Printing, Letterpress &c.];

for which see those headings.

building and paving blocks. *See Abridgment Class* Moulding &c.

casting. *See* Casting substances &c.

cements for. *See* Cements for general building purposes.

colouring. *See* Stone, Colouring.

furnaces and kilns for. *See Abridgment Class* Furnaces &c.

grinding and polishing wheels and tools. *See Abridgment Class* Grinding or abrading &c.

hones and oilstones. *See Abridgment Class* Grinding or abrading &c.

millstones. *See Abridgment Class* Grinding, crushing, &c.

mixing materials. *See Abridgment Class* Mixing &c.

mosaics. *See Abridgment Class* Buildings &c.

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preserving. *See* Stone, Preserving.

slabs. *See Abridgment Class* Moulding &c.

stucco-work, artificial. *See* Stonework, Ornamental.

surfaces, ornamenting. *See* Stonework, Ornamental.

Stone, Colouring. '*82.* 2277, [*Appendix, page* 113]. '*01.* 3475. 4316. 15,929. '*02.* 4914. 7836. 16,665. 17,552. 25,736. 27,804. '*03.* 5594. '*04.* 22,547. 23,292. 26,516.

Stone, Hardening or preserving. *See* Stone, Preserving.

Stone, Ornamenting. *See* Stonework, Ornamental.

NAME INDEX.

The names in *italics* are those of persons by whom inventions have been communicated to the applicants for Letters Patent.

ERRATA.

Page 75. Abridgment No. **17,156** should be *deleted.*

„ 81. Abridgment No. **28,212** should be *deleted.*

„ 85. Abridgment No. **2102.** *For* italic opening "*Cements*" substitute "*Asphalts.*"

„ 90. In Abridgment No. **8503,** line 21, *for* "$\frac{1}{2}$" *read* "$\frac{1}{32}$."

„ 94. In Abridgment No. **11,830,** line 5, *for* "cellulose sulphite" *read* "sulphite cellulose.'

In the volume of this Class for the period A.D. 1897–1900 :—

Page vi. *Under* **Stone, Artificial and imitation** *add '97.* 27,877.

In the volume of this Class for the period A.D. 1877–83 :—

Page iv. *Under* **Cements for general building purposes**—materials and compositions *add '79.* 1089. 3489. 4806. *'80.* 5365 ; *and under the same heading add* special methods of making. *'79.* 1089. *'80.* 5365.

CEMENTS AND LIKE COMPOSITIONS.

Patents have been granted in all cases, unless otherwise stated. Drawings accompany the Specification where the abridgment is illustrated and also where the words *Drawings to Specification* follow the date.

A.D. 1901.

12. Page, S. E., [*Davies, R. W.*, and *Hartman, H. W.*]. Jan. 1.

Casting.—Relates to apparatus for casting various substances, and especially for casting iron into pigs. The apparatus is of the kind described in Specification No. 19,029, A.D. 1898, [*Abridgment Class* Iron &c.], and comprises a series of rotary moulds *h*, mounted upon the periphery of a horizontally-rotating wheel, or upon any other suitable carrier. The wheel is secured to a central shaft *d*, and its arms *e* carry a rail *f*, which travels upon fixed rollers f^1; the wheel is driven by means of a pinion g^1 and rack *g* secured to the arms *e*. The moulds *h*, which may have four mould recesses, are each carried by trunnions h^1, the outer of which carries four radial arms *m*, which strike against three vertical rods p, p^1, p^{11}, as the carrier rotates so as to rotate the moulds for the purpose of discharging the pigs and bringing the next mould recesses into position for receiving the molten metal &c. The flow of metal &c. is directed by hoods *l*, mounted upon vertically-movable rods *r*, which slide within tubes r^1. The hoods *l*, which normally fall freely into their lowest positions, rest upon the adjacent moulds and prevent them from overturning during the casting operation and while they are travelling towards the point of discharge. An inclined bar *s* is provided at the place of discharge, and the rods *r* travel along this incline and lift the hoods so as to allow the moulds to be rotated by means of the arms *m* and rods p, p^1, p^{11}, acting successively.

FIG. 2.

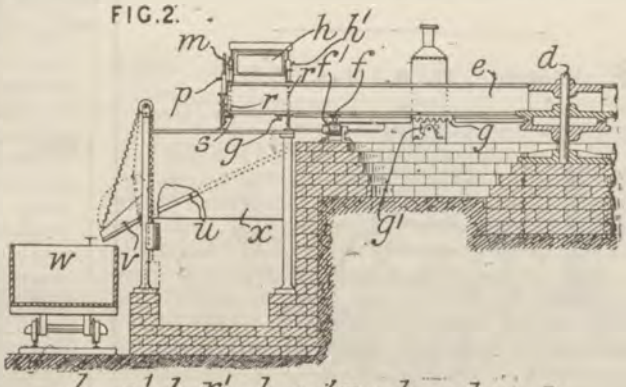
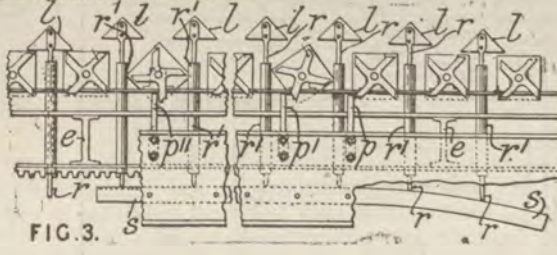


FIG. 3.



Before reaching the rod p^{11}, the uppermost mould recess is coated with slurry in the usual way. The pigs &c. discharged from the moulds pass into a receptacle *x*, having an inclined openwork bottom *u* and a counterbalanced hinged door *v*. This receptacle serves to hold a number of pigs &c., which may be cooled to any desired extent by circuits of air ascending through the receptacle, before being dumped into a wagon *w*.

457. Brookes, A. G., [*Hörisch, C.*]. Jan. 8.

Stone, artificial; stone, preserving.—Relates to a process for hardening artificial stone &c. by treatment with gases or vapours. Carbonic-acid gas, exhaust or waste gases, air, steam, or air or steam laden with silicate of soda &c., may be the hardening-medium employed. The gas &c. may be forced into the moulded blocks through pipes terminating in mouthpieces, which are pressed firmly against the surface of the stone, or the gas may be supplied

to cavities formed in the blocks. A vacuum may be employed to facilitate the permeation of the stone by the gas. A number of blocks may be arranged in tiers, the cavities communicating with one another. Closed rings may, in this case, separate the stones, to avoid the necessity of absolute register of the openings which communicate with the cavities.

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977. Matthews, C. W. Jan. 15.

Fireproof and sound-deadening coverings and compositions. — Equal parts by measure of fine or granulated iron slag, sawdust, cork, and Portland, Roman, or other hydraulic cement, with or without colouring-matter, are thoroughly mixed in a dry state, and water is added just before the composition is used. The mixture is applied in the same manner as cement, and the floor produced is stated to be proof against fire, sound, vermin, and dirt, and soft to the tread.

1367. Weimer, E. A. Jan. 21.

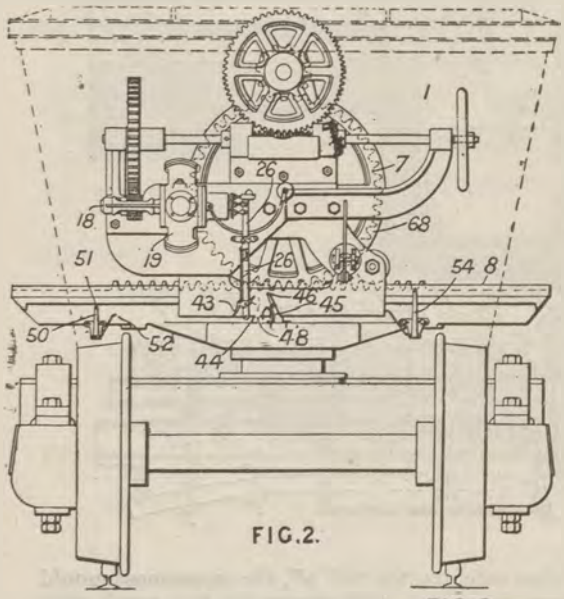


FIG.2.

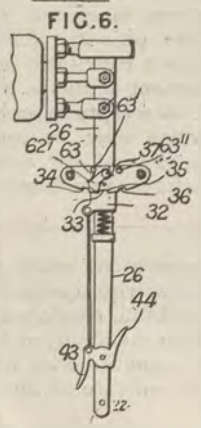
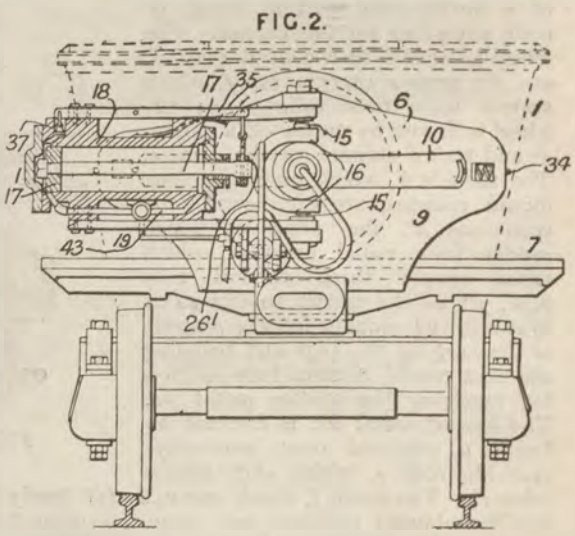


FIG.6.

Casting slags. Relates to tip-wagons for carrying molten cinder or metal from blast furnaces. The body 1 is connected to spur-wheels 7 gearing with horizontal racks 8 fitted with a reversible stop 45 and fixed stops 50, 54 to limit lateral motion while tipping. The wheels 7 are rotated by means of the spur and worm gearing shown from the shaft 18 of the air or steam motor 19, which is controlled by the lever 26, shown to an enlarged scale in Fig. 6. When the tooth 33 of the spring slide 32 engages in the notch 35 of the rack 37, the motor is stopped. Assuming the contents of the body are to be tipped on the left side of the track, the pawl 62^1 is placed as shown, with the spring 63 bearing against it and the stud 63^1, and the lever 26 is moved by hand until the tooth 33 engages the notch 34. The body then moves to the left and is completely tipped, and, at this instant, the pin 51 engages the finger 43 and releases the latch 32 from the notch 34, but the spring 52 causes the tooth 33 to engage the notch 36, being prevented from engaging the notch 35 by the pawl 62^1, and the motor is reversed, and, when the ladle is upright, the pin 46 on the stop 45 strikes the finger 44 and releases the latch 32, the tooth 33 of which is forced, after the spring 48 causes the lever 26 to assume its central position, into the notch 35, and the engine is stopped. The same operations may be performed to the right by reversing the position of the lever 45 and causing the spring 63 of the pawl 62^1 to bear against the stud 63^{11}. A pin (not shown), operated by levers, is inserted through a hole in the flange 68 of the wheel 7 to lock it when the car is travelling.

1368. Weimer, E. A. Jan. 21.

FIG.2.



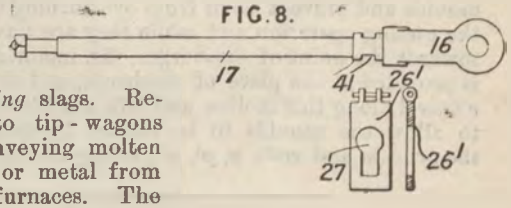


FIG.8.

Casting slags. Relates to tip-wagons for conveying molten cinder or metal from blast furnaces. The body 1 is connected to spur-wheels 6 gearing with the racks 7, to which is secured a plate 9 having a slot 10 to receive a pin projecting from, and bolted to, the hub of one of the wheels 6 and having studs 15, which are engaged by the fork 16 of the piston-rod 17 normally locked by the plate 26^1 carried by the spring lever 35. Fig. 2 shows the parts arranged for

tipping the ladle to the right. A quantity of compressed air or steam is first admitted through the port 43 to cushion the piston, after which the fluid is admitted to the other side of the piston, first lifting the small piston 37, causing the lever 35 to depress the plate 26¹, releasing the collar 41 on the piston-rod from the slot 27, Fig. 8, and then forcing the piston 17¹ out to dump the ladle, which is returned to its central position by admitting fluid to the other end of the cylinder and is locked automatically by the plate 26¹. The ladle is tipped to the left by swinging the cylinder 18 with the pivoted bars 19 to the reverse position to that shown in Fig. 2, a catch on the lever engaging with the stop 34. A pin, operated by levers, is inserted through a hole in the flange of a wheel 6 to lock it when the car is travelling.

1479. Lake, H. H., [*Wachtel & Co., D.*]. Jan. 22.

Stone, artificial.—Relates to a process for the production of completely-slaked lime, more particularly for subsequent mixing with sand to form an artificial sandstone. Lime slaked into paste is mixed in a pug-mill with dry calcium hydrate in a proportion sufficient to give the excess of moisture required to form a sufficiently-plastic mass when subsequently mixed with the sand. The mixture of the pasty and dry limes is placed in iron cases, closed but not hermetically sealed, and the cases are then subjected to the action of high-pressure steam in a chamber such as is used in the manufacture of artificial stone. The steam completes the hydration by virtue of its temperature only, the water contained in the lime being more than sufficient to form the hydrate.

1491. Sudre, C. G., and **Thierry, C. V.** Jan. 22. *Drawings to Specification.*

Refractory substances.—Pure vitreous, amorphous, and homogeneous products for various purposes are obtained from natural or artificial oxides or mixtures of compounds of oxides with fusing-points not less than that of pure alumina, by fusion in a vacuum or inert atmosphere under the radiant heat of an electric furnace with one or more arcs, and out of contact with the electrodes. The materials treated include silica, alumina, lime, magnesia, glucina, rare earths, ferric oxide, zinc oxide, &c., chromite, aluminium, calcium, magnesium, &c. silicates, iron, magnesium, aluminium, calcium, &c. aluminates, calcined dolomite, bauxite, &c. After fusion, solidification is effected by sudden cooling as with cast iron or steel, and the cooled mass may be re-heated as with glass or malleable cast iron. The fused matters may be cast, rolled, stamped, forged, welded, blown, or drawn. Articles produced from these are almost insensible to temperatures below the fusing-point of iron, and some of them acquire transparent and reflecting properties. The products may replace glass, crystal, porcelain, faience, earthenware, stoneware, and all the products of the glass-making and ceramic arts. Metals also may be replaced when high temperatures, chemical action, or mechanical effects are to be resisted. Metallic skeletons or frameworks may be embedded in the fused products for strength. Applications include fused silica for refractory materials in metallurgical operations by the Bessemer and Siemens acid processes, hearths of reverberatory furnaces for making ultramarine &c., millstones, chemical vessels, carboys, retorts, crucibles, flasks, mortars, &c., gas &c. retorts, and fireproof structures, decorations, &c.; fused alumina for neutralizing refractory materials, and making pivots and other parts of spinning-machinery; fused lime and magnesia, separately or mixed, for refractory materials in basic metallurgical operations, hearths of basic reverberatory furnaces, and crucibles in place of those made of plumbago; and fused rare earths to be drawn into threads either alone or as a coating over threads of common oxides for making incandescent mantles, filaments, &c.

2279. Beau, P. Feb. 1. *Drawings to Specification.*

Fireproof coverings and compositions.—The walls of a safe are formed by metal skeletons separated by an insulating-sheet of asbestos, and round which skeletons are formed panels of fireproof material. This material is composed of a mixture of Portland cement and volcanic lava or other fireproof sand. The mixture is pressed in layers in iron frames to form panels, which are afterwards treated with double fluosilicate of soda or potash for hardening the same, and may afterwards be coloured.

2409. Riisager, H. E. Feb. 4.

Cements.—In the manufacture of Portland cement, the raw materials are subjected in their natural and undried condition to a preliminary reduction, and are then finely ground together in tube mills, with the addition of the least possible quantity of water, so as to produce a thick sludge, which is charged into rotary kilns, where it is dried or burnt into clinker. The clinker is ground to form cement. Should one of the raw materials be soluble in water, it may be dissolved in the water to be used in the tube mill.

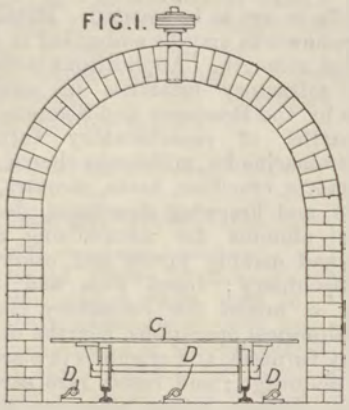
2860. Barreto, Baron V. Feb. 9.

Stone, artificial.—Ovens for hardening bricks made of lime and sand, by the action of steam, are made in the form of an arch or tunnel of metal plates lined with brickwork, through which trucks C, carrying the bricks to be treated, are run on rails. Steam is supplied through perforated pipes D.

(*For Figure see next page.*)

2860.

FIG. 1.



3101. Howett, F. Feb. 13.

Stone, artificial; stonework, ornamental.—Relates to the production of inlaid ornamental designs in artificial stone. Patterns or designs in wood, metal, earthenware, glass, concrete, &c. are laid or fixed in position, and the intervening spaces are filled up with the material, so as to produce an inlaid pattern. The patterns may be removed, the cavities being filled up with coloured material.

3211. Erlwein, J., Bandschapp, O., and **Muller, L.** Feb. 14. *Drawings to Specification.*

Fireproof coverings.—A fireproof material for making garments is obtained by impregnating with any suitable fireproofing-solution a compound fabric consisting of a layer of paper and a layer of fabric attached together, or of a layer of fabric enclosed between two layers of paper.

3282. Bromhead, S. S., [*Möller, P. G.,* and *Pfeiffer, P.*]. Feb. 15.

Cements.—In the manufacture of cement, the slurry is formed into blocks, for subsequent burning in the kiln, in the following manner:—By means of a suitable drying-apparatus, cylindrical or other, small pieces of dried slurry are produced. The small blocks are then brought into contact with a fresh supply of slurry, and are again dried, the process being repeated until blocks or balls of sufficiently-large size have been produced. The dried slurry may be brought back to the entrance of the same drying-apparatus, and fed into it, together with the fresh supply of slurry, a sieve or screen being employed to separate those blocks which are sufficiently large. As an alternative, several drying-cylinders &c. may be arranged in series, the blocks entering each with a fresh supply of slurry; or the same apparatus may be adapted to receive charges of slurry at several different points. In another modification, the slurry is dried on a flat surface, movable or otherwise, further supplies of slurry being poured on to the dry blocks. The drying may be effected by currents of hot air or otherwise.

3475. Schirra, J., Diffin, F. G., and **McDowell, D. C.** Feb. 18. *Drawings to Specification.*

Stone, artificial and imitation; stone, colouring.—In covering surfaces, an outer layer is used consisting of pulverized cement and oyster shells, suitably moistened, which may be made to imitate stone &c. by mixing coloured sand &c. with it, and may be ornamented by impressing designs on it while plastic.

3768. Michaelis, W. Feb. 21.

Cements.—Relates to cements which differ from Portland cement in that they are very resistant to the action of sea-water, the sulphates in which exert a deleterious influence on the calcium aluminate of Portland cement. In the improved cement, the alumina is replaced by oxide of iron, manganese, or chromium. Finely-divided calcareous stone, especially silicious calcareous marl, or burnt lime is intimately mixed with ground brown hæmatite, calcareous ironstone, bog-iron ore, spathic iron ore, or red hæmatite. Instead of these ores, a manganiferous oxidized iron ore may be used, or bye-products, such as spent pyrites or chrome iron ore residues. When the calcareous material is poor in silicious matter, silica is added to the mixture. The mixed materials are burnt at a clinkering or sintering temperature, and are then finely ground. The materials may be mixed in any proportions with those used for Portland cement, or the finished cements may be mixed. The Provisional Specification mentions puddling-furnace slag and finery slag as constituents of the cement.

3853. Mack, A. Feb. 22.

FIG. 5.

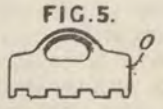


FIG. 6.

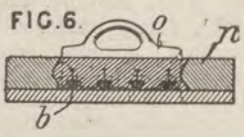
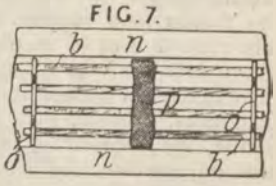


FIG. 7.



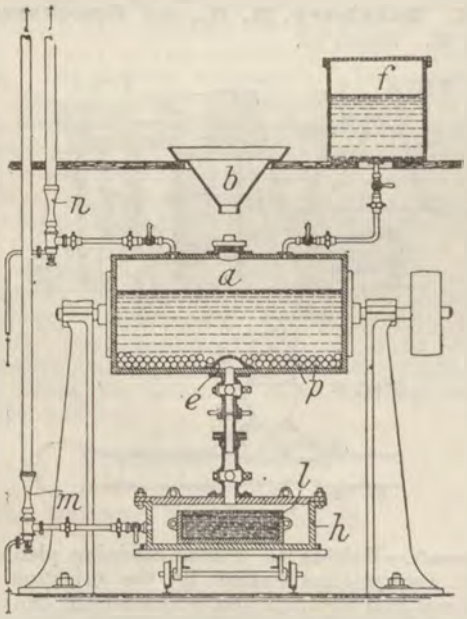
Casting cements, gypsum, &c. Plates, slabs, or blocks of gypsum, cement, &c., for use in the construction of walls, ceilings, floors, &c., are prepared with wooden bars embedded therein at equal distances apart, so as to be directly visible on one side. The bars are, preferably, of inwardly-widening section, so as to dovetail into the gypsum, and they may be provided with nails, screws, &c. partially driven into the wood, so that the heads are embedded in the gypsum. Figs. 5, 6, and 7

illustrate the method of casting the slabs. The wooden bars *b* are placed in a channel in a mould-plate *n*, and are properly spaced by notched adjusting-plates *o*. A strip or bar *p* is clamped across the bars *b*, so as to hold them in place, the plates *o* are removed, and the channel is filled in with gypsum &c. To indicate the position of the bars when the slabs are placed in position with the bars inwards, grooves or slots are formed on the outer surface of the slabs immediately opposite the centres of the bars.

4125. Lake, H. H., [*National Package Co.*]. Feb. 26.

Fireproof compositions.—Compositions for casks and other vessels and articles are formed by mixing in a dry state finely-reduced fibrous matter and a powdered fusible cementing-agent, such as resins or resinous materials, with plaster of Paris, the whole being then heated under pressure. When a fireproof composition is required, asbestos or mica, or these mixed with vegetable fibre, may be used.

4202. Marx, F. Feb. 27.



Stone, artificial; casting.—Relates to the manufacture of artificial stone free from pores, and specially adapted for lithographic purposes. The materials employed are finely-ground calcium carbonate (marble or limestone), and burnt magnesite, together with a solution of magnesium chloride. In certain cases, the burnt magnesite is reconverted into carbonate by means of carbonic acid. The commercial magnesium chloride is purified by exposing the solution to the open air for ten or twelve days, whereby the sodium chloride, magnesium sulphate, &c. crystallize out, and the clay &c. are deposited. The dry materials are fed into the drum *a* through the funnel *b*, and the solution of magnesium chloride is placed in the vessel *f*. The drum contains mixing and grinding balls *p*, which are prevented by a grating *e* from passing out when the materials are discharged. The drum is closed, and the air is partially exhausted by a suitable appliance *n*. Liquid is then admitted from the vessel *f*, and the pipes are disconnected and the drum rotated. A mould *l* is placed in a casing *h*, which is then exhausted by an appliance *m*, so as to produce a still greater vacuum than that in the drum *a*. Communication is then established between the drum and the casing *h*, the materials being transferred to the mould *l*, which can then be removed from the casing. The stone is allowed to solidify in the open air.

4234. Boult, A. J., [*Soc. Anon. pour l'Industrie de la Magnésite*]. Feb. 27. *Drawings to Specification.*

Refractory substances.—Sinter or calcined magnesite is employed in making blast-furnace or like tuyères.

4316. Kessler, J. L. Feb. 28.

Cements and plasters; stone, colouring.—Relates to processes for hardening plaster and gypsum, and for producing fixed colours on the surface. If it is merely required to produce a washable surface on plaster, it is treated with a solution of an alkaline silicate well saturated with silica, but, if plaster or gypsum is to be hardened to any appreciable depth, the solution of alkaline silicate should contain a much larger proportion of alkali than is usually employed. To facilitate impregnation of the plaster, it may be washed at intervals with either caustic potash or dilute hydrofluoric acid, to clear the pores from silicious deposits. The requisite porosity may be obtained by mixing with the plaster one or more of the following materials:—Chalk, dead plaster (plaster deprived of its fine dust), over-burnt gypsum, lime, cement, sand, infusorial silica, volcanic ash, wood pulp, sawdust, or an excess of water. Thus a plaster may be made of three parts of burnt gypsum, ½ to 2 parts of Spanish white (calcium carbonate), and 2 to 2½ parts of water, or 20 per cent. of gypsum may be added to Spanish white. A surface which has become choked by silicious deposits may be treated with pumice or glass paper, after which the impregnation can be proceeded with. A too-absorbent surface may be moistened with a nearly-neutral alkaline silicate to cause the precipitation of silicious deposits. The above-described treatment prepares the plaster perfectly for receiving ordinary paints. Plaster containing coal ashes, cements, or scoria can be hardened by saturating it with a solution of hydrofluosilicic acid, or of salts of ammonia, lime, magnesia, zinc, or aluminium, and subsequently impregnating it with basic compounds, such as ammonia, alkaline silicates, &c. Water colours may be painted on fresh or dry plaster, the surface being subsequently

sprayed with an alkaline silicate solution to fix them. If the colours are applied upon impervious plaster, they should be mixed with a little plaster to ensure fixing. Spanish white may be fixed by applying it diluted with a solution of an alkaline silicate, and afterwards impregnating it with a solution of aluminium, ammonium, or magnesium sulphate. The alkaline silicate solution may be applied by a brush or sponge, if a mineral or vegetable glue is mixed with the water colours. White or coloured plasters employed for covering walls and other surfaces may be mixed with solutions of alkaline silicates immediately before application. They may also be impregnated subsequently, if necessary.

4630. Hitchins, C. March 5.

Fireproof coverings and compositions.—Sheets of asbestos paper are backed by a mixture of granulated asbestos and plaster or cement, strengthened by wire netting embedded in the plastic composition. The slabs thus produced may have a plain, keyed, or ornamental surface, and may be nailed or screwed to the joists or studding.

4657. Steiger, J. March 5.

Cements. — Relates to improvements in the manufacture of magnesian cements, such as that described in Specification No. 18,483, A.D. 1898. The water-glass is used in a solid form, or silicious materials, such as iron or other slags, trass, Puzzuolana earth, lava, granite, basalt, &c. are employed instead. The silicious material is crushed, or mixed with a hot concentrated solution of magnesium chloride. Heat is applied so that the temperature reaches about 130° C The mass is evaporated nearly to dryness, and is cooled, crushed, and ground to a fine powder, which is mixed with powdered calcined magnesite to form cement. The cement may be mixed with filling-material to form artificial stone, or it may be used as a binding-material for artificial-fuel blocks or briquettes.

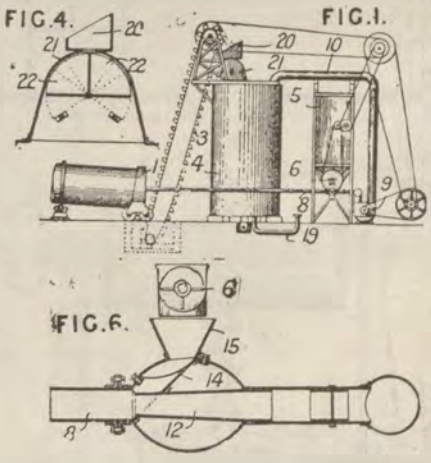
5234. Prest, S. F., and **Cabot, J. W.** March 12.

Slags, treatment of.—Relates to the treatment of slags resulting from the manufacture of iron and steel, for the purpose of recovering bye-products. The slag is crushed or ground, or granulated in water, and the particles of iron contained in it are removed by a magnetic separator. The remainder is treated with dilute acid, preferably sulphuric acid, so as to produce a solution of soluble salts of manganese, iron, alumina, or magnesia, together with phosphates or some soluble silica. The soluble silica is separated by concentrating the solution, or the solution may be evaporated to dryness, and the residual solid mass heated to such a temperature as to dehydrate the silica. The soluble salts can then be dissolved out and separated by crystallization. The insoluble silica may be employed in the manufacture of glass, &c.

5336. Stocker, J., and **Zander, H.** March 13.

Fireproof coverings and compositions; stone, artificial and imitation.—A substance which insulates against electricity and heat, serves as steam-joint packing, and is fire, water, acid, and damp resisting, is made by dissolving caustic potash in water, adding borax, and then dissolving finely-ground soap-stone until a thick liquid paste is formed, which is kept for some hours in a hermetically-closed vessel. After removing the superfluous liquid, calcined or feather alum is added, together with calcined magnesia, calcium chloride, and some greasy material, preferably Brazilian wax having a high melting point. The compound may be coloured, run into moulds, heated in a stove, and pressed, or treated with layers of paper, canvas, or the like, and may be worked into plates, tubes, or bars, or fashioned into imitation marble, granite, slate, and the like for covering walls or roofs.

5346. Lathbury, B. B., and **Spackman, H. S.** March 13.



Cements.—Relates to cement-calcining plant in which rotary kilns heated by the injection of powdered fuel are employed. The cement clinker, discharged at the lower end 1 of the kiln, is carried by an elevator 3 to a hopper 20, Figs. 1 and 4, from which it is fed by a distributer 21 into a cooler 4. The distributer consists of a double tumbling bucket, which alternately tips the material from the two quadrant-shaped compartments 22 and at the same time prevents the passage of heated air from the cooler. The cooler 4 is of any suitable construction in which air forms the cooling-medium. Cold air is drawn into it through the pipe 19, and the hot air proceeding from it passes by a trunk 10 to the fan 9, which creates the fuel-feeding blast through the pipe 8 to the kiln. Pulverized fuel

is stored in bins 5, and is fed by a screw conveyer 6 to a hopper 15, Fig. 6. A diaphragm 14 deflects the stream of fuel over the mouth of the nozzle 12, from which the blast of hot air issues, carrying the fuel with it through the pipe 8.

5819. Hillyer, N. March 19.

Casting; castings.—Relates to the production of relief maps and other objects applicable for educational purposes. A relief map is first produced in modelling clay or other suitable material. After setting, hard negatives are cast in plaster of Paris or metal. From these negatives, which may be electroplated, the map &c. is cast in a light fibrous composition composed of cotton, hemp or other fibres, tissue paper or paper pulp, pipe clay, fullers' earth, or flour paste. Several papers are pasted over the bottom to support the composition and to give it rigidity. The dry cast is coloured and marked in any suitable manner.

6058. Zimmer, C. L. V. March 22.

Fireproof compositions.—A water-proof protective coating for wood, stone, or metal, &c. surfaces is obtained by oxidizing a fat or oil, or treating it with sulphur, or with alkalies, and the thickened matter thus obtained is treated with bituminous or like matter, preferably at a temperature of 200° C.; or, according to a specified method, 3 or 4 parts of cotton-seed oil are mixed with 1 part of bitumen, and to this is added a quantity of caustic-soda solution sufficient to saponify the glycerides, the temperature being gradually raised to about 200° C. It is then aërated for 40 or 50 hours, or for a less time if the air is enriched with oxygen. The order or manner of treatment of the elements forming the composition may vary. For the material thus produced, solvents, such as light tar oil, or oil of turpentine &c., may be used. This composition not only resists the action of water, but also acids, alkalies, and fire.

6115. Brodie, J. A. March 23.

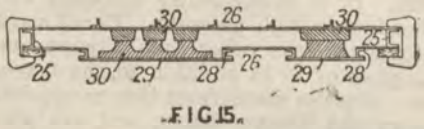


FIG. 15.

Concretes; casting.—Concrete for slabs is made of ground clinker from a refuse destructor mixed with cement. Fig. 15 shows a mould for producing wall slabs with projections and apertures for fireplaces, windows, doors, &c. Sheet-metal sides 26 are clamped to channel-iron bars 25, and carry additional bars 28, plates 29, and tapered cores 30 for producing the apertures. For the ornamental fronts of buildings, the slabs are made by pouring semi-fluid concrete into a mould.

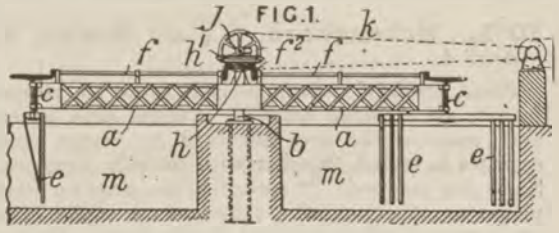
6166. Chatwood, S. March 23. *Drawings to Specification.*

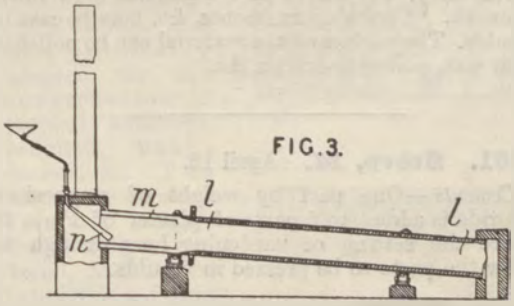
Refractory substances for safes and strong-rooms. Between the outer and inner plates of a safe &c. door is inserted a slab of refractory material, such as magnesium millboard, or a slab formed of wood pulp, magnesia, and mica, in which is embedded wire netting. The slab may be formed by placing the materials together with the netting in a mould and subjecting them to hydraulic pressure.

6241. Koslowsky, I. March 25.

Fireproof coverings and compositions.—Relates to means for protecting constructional ironwork against the effects of fire. The ironwork is first coated with a solution of borax, alum, sodium tungstate, and ammonium, magnesium, and ferrous sulphates in water, and a paste is then applied consisting of the above solution together with sodium silicate, asbestos, wood-ash, and chalk. A metallic fabric may be embedded in the protective coating.

6800. Butchard, G. W., Butchard, A. A., Butchard, J. A., and **Gibson, H.,** [executors of *Butchard, G.*]. April 1.





Cements.—In order to prevent the slurry to be supplied to rotary kilns from settling, it is continuously agitated in an annular tank *m*, Fig. 1, by means of vertical rakes or stirrers *e*. The stirrers are carried by shafts *c* mounted at the ends of arms *a* of a frame which turns on the central pivot *b*. A belt *k* drives a pulley on a shaft carrying a bevel-pinion *j* engaging with a large bevel-wheel h^1. Integral with the wheel h^1 is a wheel *h*, which gears with pinions f^2 on the shafts *f*. The power transmitted by the belt serves

partly to rotate the stirrers on their own axes and partly to rotate the arms *a* about their pivot *b*. Fig. 3 shows a rotary kiln *l*, in which a tubular lining *m* inserted at one end receives the slurry from a conical supply pipe *n*. The lining is heated by the hot gases passing round it, and serves to dry the slurry rapidly.

6881. Speer, E. D., and **Speer, H. N.** April 2.

Fireproof coverings and compositions. — Ducts or pipes for electric and other purposes are formed of two layers *a*, *c* of woven or other material, such as paper, saturated with fireproof solution, such as ammonium phosphate, and separated by a layer *b* of waterproofing-material, such as rubber or gum. The yarn may be fireproofed before the tube or material is woven. In a modified form, a sheet of fireproofed fabric may be coated with the layers of waterproofing-material and then rolled into a tube. Both outside and inside may be protected with fireproof paint.

FIG.1.

7081. Schougaard, S., and **Evans, J.** April 4.

Stone, artificial; casting.—Relates to the manufacture of artificial marble. Animal glue, alum, and gum arabic are dissolved in water, and gypsum is added, together with suitable pigments. Slabs are prepared by spreading the mass on glass plates or other smooth surfaces, from which they are removed when set and finally dried. Coarse canvas may be inserted in the slabs to give them strength. Capitals, ornaments, &c. may be cast in moulds. The surface of the material can be polished with wax, polishing-spirits, &c.

7561. Storp, M. April 12.

Cements.—One part by weight of magnesium chloride is added to 5 parts of plaster of Paris to retard the setting or hardening long enough to allow the paste to be pressed in moulds.

7583. Eaton, F. E. April 13.

Statuary.—Casts and busts of individuals produced in dental enamel are allowed to harden, and the eyes, lips, nostrils, &c., are then painted in ordinary artists' colours. The hollow at the back is subsequently filled up with suitable material. When white dental enamel is used, a colouring-mixture of rouge or bloom-de-ninon is rubbed into the material, while in a plastic state, to produce a flesh tint.

8068. Parsons, H. D. April 19.

FIG.2.

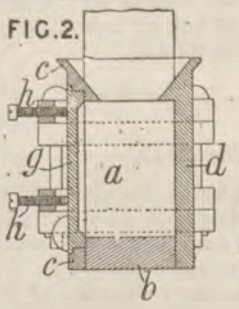
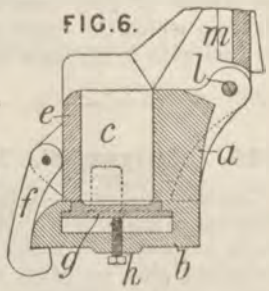


FIG.6.



Casting.—Relates to the construction of moulds for casting slag blocks. In the mould shown in Fig. 2, the back *a* and bottom *b* are made in one piece, and the two sides *c*, *d* are hinged to the back. The front is formed in one piece with the slide *c*, and is provided with a latch, which secures it to the side *d* when the mould is closed. A removable panel *g* is secured by set-screws *h* in an opening in the side *c*, and is obliquely recessed so as to form a chamfer on the edges of one side of the block. Letters or designs may also be formed on the panel, so as to reproduce them on the block. In the mould shown in Fig. 6, the back *a*, bottom *b*, and one side of the mould are formed in one piece, which is hinged at *l* to a casting comprising the support *m*, side *c*, and front *e*. A latch *f* secures the hinged portion in place when the mould is closed. The panel *g* slides into a recess in the mould-bottom and is then secured in place by set-screws *h*.

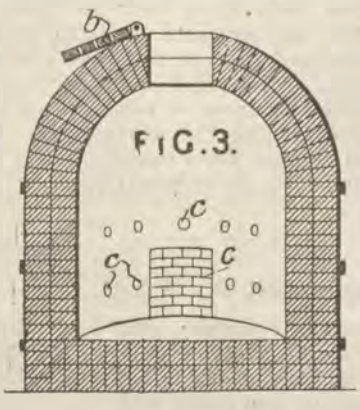
8282. Boas, F. April 22.

Stone, artificial; refractory substances; sound-deadening compositions.—Relates to an artificial building-material adapted to be used as a substitute for stone, bricks, tiles, slabs, roofing-material, &c. The material consists of sand and lime, together with magnesium silicate, which may be in the form or chrysolite or olivine, serpentine-asbestos or chrysotile, hornblende-asbestos, or serpentine or hornblende rock or material. Colouring-agents may be added. The lime may be slaked and stored before use. The mass is rendered plastic with water, and is moulded under pressure. It is subsequently hardened by steam at either low or high pressure. Burnt magnesite, or magnesium salts other than silicates, may be used in place of, or in addition to, the magnesium silicate. Articles made from this composition are refractory and frost-resisting, and are also bad conductors of sound and heat.

8333. Elbers, A. D. April 23.

Slags, treatment of.—Blast-furnace slag, when allowed to cool very gradually, disintegrates into a powder which is applicable for use as a manure. The invention relates to kilns specially adapted for the slow cooling of the slag. Fig. 3 shows

such a kiln in section. It is lined with composite firebrick, (made of fireclay, coke or coal dust, or tar), and is provided with a discharge door C, air holes *c*, and perforated cover *b*. The air holes *c*

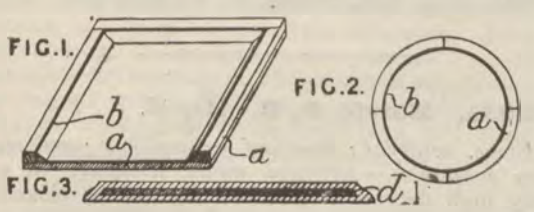


are first plugged from the inside with balls of composite fireclay, and, after having been filled up from the outside with pieces of calcined firelay, they are closed with cast iron covers. The kiln is then heated by a fire lighted within it, and the door C is bricked up and luted. Slag from the blast furnace is poured into the kiln from a car running on an elevated track until the kiln is about three-fourths full. After two or three hours, an iron bar is passed through one of the openings in the cover *b*, and the crust on the surface of the slag is broken, this being done repeatedly. After disintegration has commenced, the air holes *c* are opened one by one, and finally the discharge door C is opened. It is stated that the air pressure above the cooling slag is less than atmospheric pressure.

8431. Brown, L. A. *Nov. 28.*

Castings.—Sand, cement, sulphur, lampblack, and colouring-matter are combined to form a fusible composition for casting or moulding statuary, the bodies of seals, and other articles. The cement may be Portland, Acme, or other hydraulic cement.

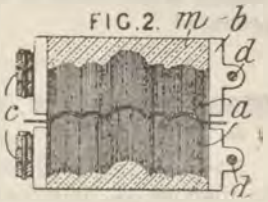
8556. Weber, G. April 25.



Stone, artificial; casting.—Relates to the production of imitation stone or marble for facing walls and floors, washstands, ornaments for furniture, &c., or for columns, profiles, pieces for façades, &c. The articles are cast from "sorel" or magnesia cement &c., in metal moulds lined or coated with a layer of hard lac or enamel capable of resisting the heat produced in setting. Fig. 1 shows a mould *a* for producing a flat plate, *b* representing the lining. Fig. 2 shows a segmental mould for a column, and Fig. 3 shows a section through a flat plate provided with a strengthening-skeleton *d* of wood, cement, glazed board, &c., which is forced into the mass before it sets.

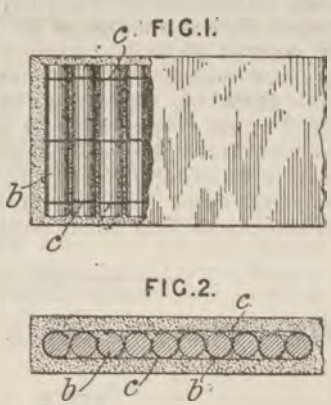
8622. Michaelis, K. April 26.

Casting.—A number of bars *a*, of circular or polygonal section, are held in a divided ring *b*, hinged at *c*, and tightened up at *d*. The bars can be displaced endwise to give any desired configuration by setting them on an embossed or concave surface, and are then held by tightening the ring *b*. Further security may be obtained by pouring in molten metal *m* to fill up the space inside the ring. The bars then form a matrix or mould for casting &c. Fig. 2 shows a punch and matrix as applied to stamping a metal plate, but the metal *m* may be omitted for light work, or may itself form the matrix. The surface produced by the ends of the bars may be smoothed in any suitable way.



8691. Boenke, F. April 27.

Stone, artificial; fireproof coverings and compositions.—Relates to fireproof and non-conducting artificial-stone blocks and tiles, specially adapted for the construction of tropical buildings, hospitals, bath-houses, &c. The blocks are moulded from any suitable heat-resisting material, and in the interior is a fabric made up of pieces of bamboo *b*, laced together by cords *c*. The composition may be as follows:—Dry sawdust, preferably fir, is sifted, impregnated with hot carbolineum (preferably antinonin carbolineum), and again dried. To this is added well-burnt and finely-sifted wood ash, burnt and ground magnesite, powdered heavy spar, and magnesium chloride. Soft water is added to make a fluid mass which can be poured into the moulds. The moulds are exposed to heat for two or three days, and the blocks &c. are then removed and slowly dried.



9376. Czermak, J. May 6.

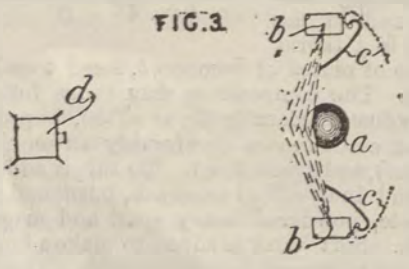
Stone, artificial.—A thin layer of liquid or pasty cement, plaster of Paris, &c., coloured to match the ground colour of natural marble, is applied to a glass plate and allowed to set. The plate of cement is then broken, and the fragments slightly shifted. A liquid cement having the colour of the marble veins is poured on the fragments so as to fill up the fissures, and cement is then applied until a plate of the desired thickness is produced. In order to produce strongly-curved veins, the thin layer of cement should be of unequal thickness, to effect which the cement may be squirted on the glass plate. The plate of cement may be repeatedly broken when veins of various colours are to be produced.

9695. Perkin, W. H., and **Whipp Bros. & Tod.** May 9.

Fireproof coverings and compositions.—In order to diminish the inflammability of raw cotton, and cotton goods, especially flannelette, the materials are soaked for an hour in a machine containing a soluble tungstate, such as sodium tungstate, a soluble aluminium salt, and an organic acid, such as acetic or formic acid, the organic acid being subsequently removed from the material by passing it over heated tins or cylinders or by drying or steaming. Four examples are given of solutions which may be used, viz. :—(1) 100 parts of aluminium-sulphocyanide solution of 33° Tw. are mixed with 25 parts of acetic acid of 11° Tw. and 200 parts of sodium-tungstate solution of 56° Tw. ; (2) 100 parts of aluminium-acetate solution of 26° Tw. are mixed with 10 parts of acetic-acid solution of 11° Tw. and 200 parts of sodium-tungstate solution of 56° Tw. ; (3) 100 parts of aluminium-sulphate solution of 25° Tw. are mixed with 30 parts of acetic-acid solution of 11° Tw. and 150 parts of sodium-tungstate solution of 60° Tw. ; (4) 100 parts of aluminium-sulphate solution of 26° Tw. are mixed with 40 parts of formic-acid solution of 11° Tw. and 150 parts of sodium-tungstate solution of 60° Tw. It is preferable to remove the sizing from fabrics before treating them in accordance with this invention.

9763. Ohse, W. May 10.

FIG. 3.



Casting.—Relates to a method of illuminating bodies so as to show true relief in a chromo-gelatine negative taken in a camera. Fig. 3 shows the arrangement of the apparatus in plan. The body *a* to be photographed by the camera *d*, is illuminated by lamps *b* placed on both sides. Screens *c* are turned so as gradually to cut off the illumination of the body from back to front, or *vice versâ*, while the exposure is being made. The result is that each part of the body is illuminated in proportion to its relief and this, with suitable development, produces a relief picture on the chromo-gelatine plate in the camera. Casts or copies may be taken from the negative in celluloid, gypsum, metal, &c. in the usual way.

9830. Quester, F. May 11.

FIG. 1.

Refractory substances ; fireproof compositions.—The walls of safes &c. are made up of double sheet or iron plates with a layer *a* of corundum or similar fireproof material between, so as to form a protection against heat and burglars' tools. The protective layer is, preferably, applied in the form of hydraulically-pressed blocks, plates, strips, &c., placed side by side or upon one another. The corundum &c. blocks are made of powdered corundum with the addition of argillaceous earth or alumina and water, and are highly compressed and then baked at a high temperature. Furnace slag &c. may be added to the mixture to give consistency to the blocks.

9892. Carter, H. E. May 13.

Stone, artificial ; cements.—Sand, mining tailings, broken stone, broken brick, clay, loam, &c. in a finely-divided condition are mixed with cement, sodium, potassium, or other alkaline silicate, and water. The cement may in some cases be replaced by sand. The plastic mass is moulded into the required form, and, when sufficiently dried, the blocks &c. are immersed in, or otherwise treated with, a solution of calcium chloride. The artificial stone may be used for building, paving, flooring, lining walls, or for any other purposes for which bricks, stone, tiles, cement, &c. are employed.

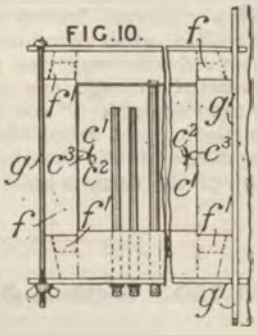
10,084. Boivie, S. E. May 15.

Stone, artificial ; fireproof compositions ; refractory substances.—Artificial stone, fireproof to a very high degree, is prepared by mixing slaked lime with quartz, quartz sand, or slate, pouring diluted nitric acid on the mixture, and moulding it into slabs, blocks, &c. The moulded blocks are subsequently subjected to the action of high-pressure steam.

10,143. Fireproof Plate Wall Co. and **Sidebotham, C. H.** May 16.

Casting slabs for walls, ceilings, &c. In order to prevent distortion of the slabs during the setting of the plaster, the ends *f* and the sides of the mould are arranged to slide outwards, and are secured together during the moulding operation by bolts *g*, slotted plates *g*¹, or the like. Bevelled tongues *f*¹ of the ends *f* bear against inclined recesses in the sides, and both sides move outwards simultaneously when the plaster expands in the mould.

FIG. 10.



10,297. Forell, C. von. May 17.

Cements; slags, treatment of.—Portland cement is prepared by granulating liquid blast-furnace slag in water, heating it to fusing or clinkering point with such a proportion of lime as will bring the amount of lime present up to 50 per cent., and finally cooling and grinding it.

10,455. Lake, H. H., [*Confalonieri, P.*, and *Confalonieri, N.*]. May 20.

Asphalts.—In order to cause wood flooring boards to adhere to a mortar foundation, they are coated with a hot bituminous mixture consisting of 100 parts of dry tar, 5 parts of pitch, (Trinidad or St. Valentine), 3 parts of resin or pitch resin, 1 part of light naphtha-oil and 0·50 parts of pulverized sulphur, and the hot coating is sprinkled with sand or fragments of glass, earthenware, metal, dross from coals or metals, or the like.

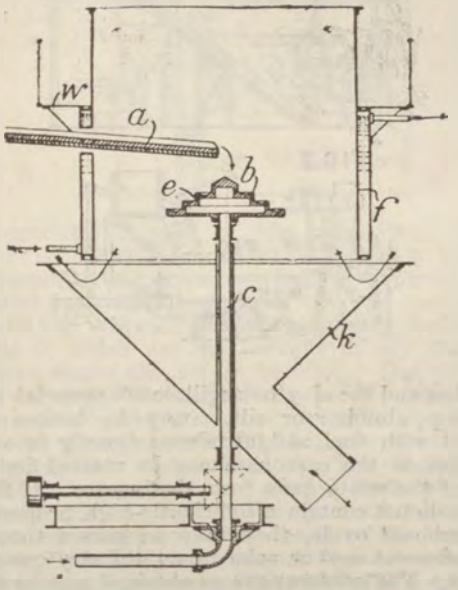
10,622. Timofeeff, P. May 22.

Cements; asphalts. — Small plates for use in paving are made of fine angular elutriated and sifted quartz sand, obtained from natural sources or by comminuting hard ore matrix, and impregnated with adhesive material, such as caoutchouc, cement, tar, or other insoluble substance. Iron, chrome-iron, or manganese ores, or cast-iron or wrought-iron shavings or filings ground and treated to prevent rusting, or shot, or mixtures of these may be used, with or without sand and other substances, such as coke and asbestos.

10,663. Daeschner, C. May 23.

Asphalts.—Relates to the separation of mineral oils and associated resinous matter, without decomposition, by dissolving the oil in fusel oil. Mineral oils for use as lubricant &c. are mixed with fusel oil, resinous matter is allowed to precipitate, and the solution of oil and fusel oil is removed and separated by distillation. The resinous residue, after the removal of any remaining fusel oil solution by a current of steam, is stated to be an easily-melted black pitch suitable for use in the asphalt industry.

10,857. Clark, A. M., [*Fellner & Ziegler*]. May 25.



Slags, treatment of; cements.—Relates to the manufacture of Portland or other cement from materials in a molten condition, as, for instance, from blast-furnace slag. The slag &c. passes from the trough *a* on to the centre of a rapidly-rotating stepped cone *b*. It is disintegrated by centrifugal force, assisted by compressed air supplied through the hollow shafts *c* and issuing through apertures *e*. The air serves also to cool the cone and to oxidize sulphur &c. in the slag. A water-jacketed casing *f* surrounds the cone, and the particles of slag are received in, and discharged from, a hopper *k*. The casing is open above and below, to allow of the passage of air. A gallery *w* is provided for the man in charge of the apparatus.

10,958. Hurry, E. H., and **Seaman, H. J.** May 28.

Cements.—Relates to processes and apparatus for the production of Portland cement by fusing the constituent materials in a vertical furnace with the aid of a blast, and comprises improvements on the invention described in Specification No. 7139, A.D. 1900. By the use of a furnace of considerable height, or by throttling the gases passing away from the furnace, an air pressure considerably above that of the atmosphere is maintained

at the point of fusion, the temperature being correspondingly increased. Any iron present in the cement materials is reduced to the metallic form, and is tapped off at an aperture below that at which the fused cement issues. The carbonate

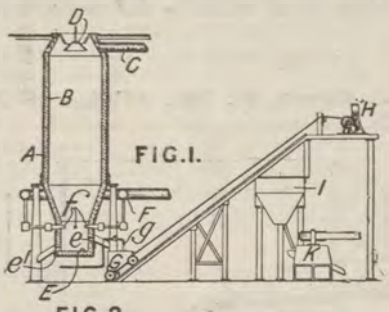


FIG.1.

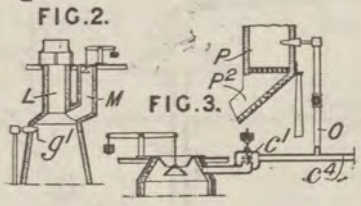


FIG.2.

FIG.3.

of lime and the clay or argillaceous material containing alumina or silica may be broken up, mixed with fuel, and introduced directly into the furnace, or the carbonate may be roasted first by aid of the waste gases from the furnace. If these gases do not contain a sufficiently-high proportion of carbonic oxide, they may be passed through incandescent coal or coke in an ordinary gas-producer. The producer-gas so obtained may be used for heating the blast, or for raising steam &c., as well as for roasting purposes. When the issuing gases are throttled as described above, the high pressure and temperature maintained throughout the furnace effect the fusion of the carbonate of lime, which collects in the hearth or crucible at the base of the furnace. The carbonic acid is there given off, the carbonate of lime being thus calcined in the fused state, and the resulting caustic lime uniting with the silica and alumina in the fused mass. The carbonic-acid gas is reduced to carbonic oxide by the incandescent fuel above, and a rich combustible gas issues at the throttle valve. Fig. 1 shows a furnace similar in construction to an ordinary blast furnace, and comprising a shell A, lining B, feeding-bell D, hearth or crucible E, upper and lower tapholes e, e^1, tuyères f, and blast pipe F. The products of combustion issue at C. The molten material is run off from the upper taphole e into a car G, where it is disintegrated by a spray of water from the nozzle g. The car is drawn up the inclined platform by an engine H, and the disintegrated material is dumped into the hopper I, whence it passes to the grinding-mill K. The top of the furnace may be modified as shown in Fig. 2. The cement materials are fed into the chamber L, and the fuel into the chamber M. Tuyères g^1 supply air to the fuel, where it mixes with the cement materials. The carbonic acid is in this case driven off at once from the carbonate of lime. Fig. 3 shows the top of the furnace with the throttling-device referred to above. It consists of a weighted fireclay valve c^1. The rich combustible gases produced pass to the hot-blast stove &c. through the pipe c^4, or may be partly diverted through the pipe O to a roasting or calcining chamber P for the purpose of removing carbonic acid from the cement materials. The contents of the chamber P are directed into the top of the furnace stack through an open shoot P^2.

11,150. Wetter, J., [*Mack, O.*]. May 30.

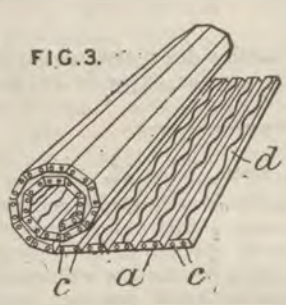


FIG.3.

FIG.5.

Fireproof coverings. — A flexible covering for protecting walls, ceilings, columns, vaults, &c. from fire and water is produced by placing prismatic or wedge-shaped moulding-strips over a woven textile backing a, and filling in the spaces with plaster of Paris, cement, mortar, or the like d. Reeds or wood cores c are embedded in the plaster. After the plaster has set, the surface is roughened, and the moulding-strips are removed. The sheet can then be rolled up, and is secured in place by nails or screws, and finished with a coating of plaster. Fig. 5 shows a method of protecting a wood column f or an iron column e. Segments g are applied to the column, the covering is wrapped round the segments, and a coating of plaster is applied over the covering. The plaster slats may be more or less convergent, as shown in Fig. 3, for covering a conical column or the like.

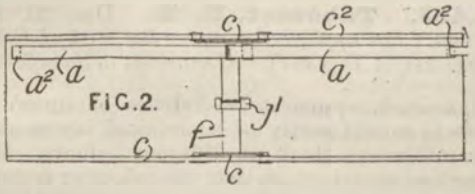
11,644. Harding, G. June 7.

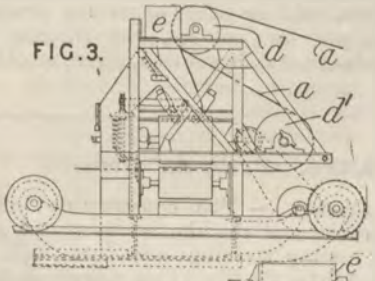
Cements; plasters; fireproof coverings or compositions.—Relates to a composition or cement applicable for covering wood, metal, or other surfaces, or for the manufacture of slabs, tiles, blocks, bars, and other articles, and possessed of fire and water resisting and acidproof qualities. The composition is prepared by mixing magnesium chloride with water, and adding an earth colour or pigment, calcined magnesite, and sawdust, wood pulp, cork, jute, rope rovings, or other waste organic matter. The composition may be rendered sufficiently thin for use as a paint by the addition of water, or it may be of plastic consistency for use as a plaster.

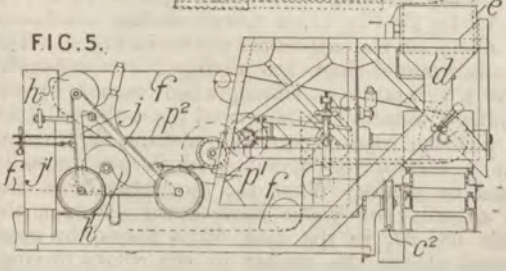
11,715. Lorenc, C. June 7.

Mortars; stone, preserving; fireproof compositions. —Relates to the production of masonry work which is free from excrescence, fireproof, durable, and of such strength as to render the use of iron in the structure unnecessary. A mortar is used which is so prepared that its tensile strength is equal to that of the stone employed. The mortar consists of a cement composed of water-glass, infusorial earth, and trass, (including all volcanic rocks, tufas, scorified lava, and trachyte), to which is added Portland cement and sand. For the Portland cement may be substituted other cements, lime, gypsum, &c. Particulars are given in the Specification as to the proportions of the above materials which will produce mortars of certain specified tensile strengths. As materials for use instead of sand, are mentioned ashes, marble, limestone, burnt clay, alum slate, iron filings, chalk, asbestos, cork meal, cellulose, animal or vegetable fibres, &c. The building stone is soaked in water and before use saturated with a solution of water-glass containing infusorial earth, and the masonry, when completed, is painted over with this solution, or with clay, or with fluorides, immediately after the mortar has become hard. Hollow flat ceilings of considerable span can be built of stone with the mortar described, and openings can also be made in the main walls, or self-supporting walls of any span can be built without using ironwork.

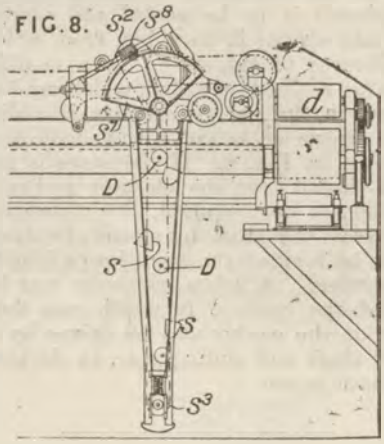
11,836. Whitworth, T. June 10.







Cements.—Relates to methods of storing, cooling, and aërating cement proceeding at a high temperature direct from the grinding-mills. Fig. 2 is



a diagrammatic plan of the apparatus. The cement is carried along an endless band *a*, and is discharged on to a transverse band *f* supported by a gantry *c* movable on rails c^3. On the gantry is a movable throw-off apparatus with discharge shoots j^1, which can be brought to any desired position within the bin or building. One of the end pulleys a^3 is turned by power, which is transmitted by the band *a* to the other operative parts of the apparatus. Fig. 3 shows the throw-off apparatus of the band *a*. The band rises towards the upper pulley *d* and discharges the material into a casing *e*, from which it passes by shoots on to the transverse band *f*. The band *a*, having discharged the materials, passes over the lower pulley d^1 and on to the further end of the store. The band *f*, which receives the materials from the casng *e*, conveys them to a throw-off apparatus comprising a carriage *j* having distributing-shoots j^1 and pulleys *h*, h^1. The band *f* is endless and passes over a pulley at the further end of the gantry. The carriage is moved to and fro on the gantry by means of ropes p^3 passing over drums p^1. Power is transmitted to the drums p^1 from the shaft of the pulley *d* through bevel gearing and spur-wheels &c., a suitable reversing-mechanism being included in the transmission gear. Power from the same source serves to propel the gantry along the rails c^3 in either direction. Instead of the band *f*, a screw conveyer may be used on the gantry, doors being opened in its casing at the point where it is desired to discharge the materials. Fig. 8 shows in side elevation one end of a gantry fitted with an elevator for removing material from the bin or returning it by means of the reversed conveyer to the feed-band *a*. The elevator consists of buckets *s* fixed on a chain &c. passing over pulleys s^2, s^3. The buckets passing up and down are prevented from catching each other by the guide-wheels D. By means of the worms s^8 and toothed quadrant s^7 the elevator can be inclined more or less so as to remove material at any required depth. The material passes into a shoot which transfers it to the reversed conveyer of the gantry. The same lever is used to start the

elevator and to reverse the conveyer. The main conveyer band *a* of the machine carries the material to an automatic weighing-machine, or, if the cement is to be cooled and aërated, the band *a* may convey it to a bin, from which it is again delivered to the store. In a modification, the elevator is fixed on a slide which can be raised or lowered in the gantry carriage, in addition to having a worm or sector tilting motion of the kind shown in Fig. 8. If the store is provided with a V-shaped floor, the elevator and reversing-mechanism are not required, the materials being removed from the store by means of valves opening at the bottom of the store into a longitudinal screw conveyer. A screw conveyer may be used instead of the band *a*, in which case the cross-conveyer or the gantry may be driven by a rope, a squared shaft and sliding gear, an electromotor, or pneumatic power.

11,856. Raphael, M. June 10.

Refractory substances. — Asbestos articles are waterproofed by coating them with water-glass; or they may be brushed over with fluxes or glass or porcelain enamels, and fired. These processes render the asbestos more resistant to high temperatures.

12,073. Sborowitz, S. June 13.

Stone, artificial.—Imitation marble is composed of red lead or other inorganic colouring-matter together with asbestos or like fibre which has previously been saturated with a solution of shellac in spirit. The asbestos fibres appear as light veins on the coloured background. The mixture is compressed in moulds, heated to evaporate the spirit, again compressed, and finally polished. Metal turnings, or pieces of mother-of-pearl, glass, &c., may be incorporated with the mixture. The asbestos may be coloured before use.

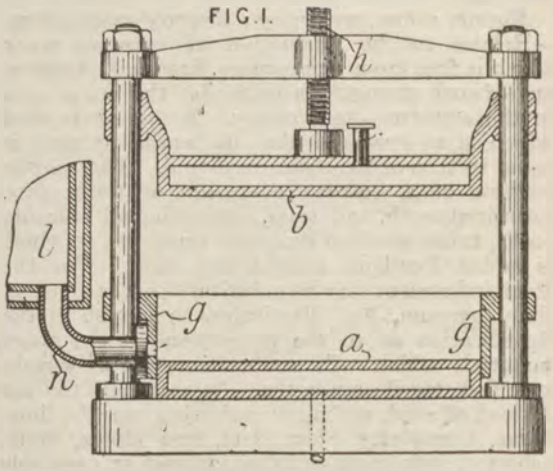
12,257. Klumpp, G. A. June 15.

Casting soap. Hot liquid soap is run from a heated hopper or tank *l* through a pipe *n* into a mould *g*, and is cooled and compressed between hollow plungers *a*, *b*, which are kept cool by the circulation of cold water. The mould may be fixed, or the upper plunger may be formed with sides adapted to fit closely round a fixed bottom plate, or the mould may be firmly connected to the bottom plate. The plungers may be formed with impressions or dividing-ribs for producing tablets or blocks, or the mould may be divided into compartments by partitions. In the arrangement shown, the upper plunger is forced downwards within a fixed mould by a screwed spindle *h*, and the lower plunger plate is raised to eject the soap slab from the mould.

(*For Figure see next column.*)

12,257.

FIG. 1.



12,272. Lake, H. H., [*Krupp Grusonwerk, F.*]. June 15. *Drawings to Specification.*

Stone, artificial.—A press is described for moulding blocks and slabs of artificial stone. The mould is nearly filled with the body material and a layer of coloured facing-material is then applied, so as to form a faced block.

12,452. Tabouret, E. E. Dec. 20, A.D. 1900, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*]. *Drawings to Specification.*

Stonework, ornamental.—Articles of stucco are made to consist partly of superposed layers about one millimetre thick of different colours. Each layer may contain more than one colour or material. Parts of one or more layers are cut away by sand blast, acid, or other engraving process, to produce designs in colours, for interior and exterior architectural decoration, signs, or other purposes.

12,494. Fric, A. June 19.

Casting. — The construction of chandeliers, coronas, and the like is cheapened and facilitated by casting the rings and parts, such as 10, 11, 12, 13, 15, 16, 17, Fig. 11, in plaster or like substances by means of the apparatus shown in Fig. 1. The annular mould-rings are arranged concentrically upon a turntable 2, which, when turned by the handles 4, rotates, by means of the pulleys 54, 57, 55, and the rope or cord 56, a drum 50, formed with a number of openings which are normally closed by bands. When the apparatus is in use, the quantity of water represented between the levels 66, 67, in the tank 63 is forced by compressed air on the plaster in the rotary mixing-chamber 50, and, as the bands are pulled, the slip

passes through the respective funnels 74 to the mould-rings. A portion of the slip can be conveyed by pipes 69 to moulds for parts, such as 16, 17, which it is not necessary to cast upon the turntable. The sheet coatings of the mould-rings are fitted with handles and with buckle or other couplings which will allow of the coatings being quickly taken off. The attachment of the cast rings to the central support is facilitated by raising the mould-rings into their approximate positions relatively to the support 75 by the engagements of the rising flange 22 with the rods 21, 23, 24 depending from the respective mould-rings, the mixing-chamber 50 being first turned aside. The parts 15, 16, 17 are shown attached to the support 75 by elastic friction grips 43, while the parts 10, 11, 12, 13 are secured in position by wires 29, which are attached to iron rings 28 embedded in the plaster cast, and are held upon pins 35 on the support 57.

FIG. I.

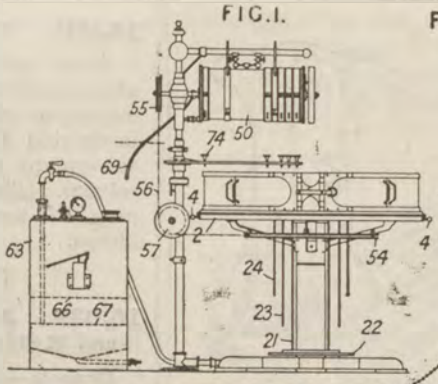
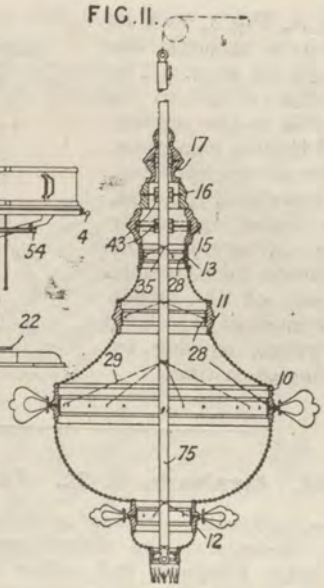


FIG. II.



12,589. Garchey, L. A. June 20.

Stone, artificial.—Relates to improvements in the manufacture of the "glass stone" described in Specifications No. 5772, A.D. 1896, No. 2003, A.D. 1898, and No. 5885, A.D. 1900. Instead of preparing the glass stone from old glass, crushed or pulverized, new glass is employed, which is poured into suitable moulds of thick metal, such as cast iron, and is transferred, as soon as it becomes tacky or pasty, to moulds of sand, lime, plaster, talc, &c. placed on the rotary hearth of a devitrifying kiln or furnace. Argillaceous or calcareous sands may be added to the glass. When the sand mould containing the devitrified glass returns to its starting point in the kiln, the slab &c. is removed and transferred to a hydraulic press, which gives it the exact form required. To ornament the surface of slabs, flags, or tiles, the bottom of the mould may be sprinkled with enamel powder or with glass fragments. The glass stone is well adapted to receive an electrolytic deposit of copper or other metal, which can be worked, polished, engraved, &c. The electrolytic process is applicable in the manufacture of electric insulators, condensers, electrodes, &c. from the glass stone.

12,724. Hindshaw, J. *Aug. 1.*

Plasters; sound-deadening compositions.—Plaster of Paris is rendered porous by the addition of whiting and the use of alum or sulphuric acid &c. in the water employed for mixing it. Bubbles or cells of carbonic-acid gas are formed in the cast or moulded plaster, which is in consequence lighter and a better non-conductor of heat and sound.

12,945. Berry, W. June 25.

Casting soap. Cores or buoyant insertions E of wood, papier mâché, wood-pulp, or the like are supported by pins D in a vertical open-ended mould A, of circular, oval, polygonal, or other shape in plan; fluid soap is run into the mould,

FIG. 3.

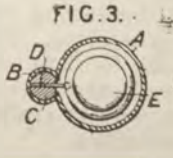
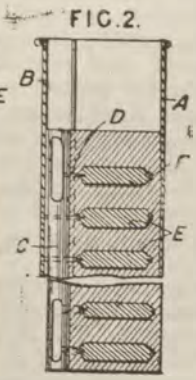


FIG. 2.



and the bar thus produced is cut up into cakes. The pins are attached to a guide-rod C adapted to slide in a tubular passage B at the side of the mould, and are made with flattened ends, which enter grooves F in the cores, and are afterwards withdrawn from the bar of soap. Pictures, advertisement cards, or designs are inserted in recesses in the cores, and may be protected from the action of the soap by transparent coverings of celluloid or the like. The lower end of the mould is inserted in a bed of hard soap or other material which will close the mould. To facilitate handling, apertures are formed in the rod C.

13,182. Deacon, H., Birkett, T., and **Faulkner, F. G.,** [*trading as* Faulkner Bronze Co.]. June 28.

Casting.—Relates, mainly, to the manufacture of glass articles with an external skeleton of perforated metal. The glass is blown in the metal

casing A, Fig. 1, so that it projects through the openings as at *c*. The process is stated to be applicable to the production of bottles, jugs, vases, caps for electric switches, fuse boxes, plaques, plates, dishes, and other articles. According to the Provisional Specification, the body of the article may be made of porcelain, potteryware, or slag by moulding or casting.

13,452. Graham, C. K. July 2.

Stone, artificial; fireproof coverings and compositions.—Relates to the manufacture of artificial stone from Portland and other cements. An excess of water is used to hydrate the cement fully before mixing it with the other materials, and the surplus water is removed in the moulding process. Disintegrated asbestos fibres, with or without brickdust or other loading-material, may be used together with the fully-hydrated cement. The mixture is run into moulds such as are used for making cardboard, and the slab or sheet so formed is pressed between wire netting and felt in a hydraulic press to expel the surplus water. The sheet &c. is finally dried in a stove. The product is fireproof and resistant to frost &c., and is applicable for roofing and other purposes. The Provisional Specification includes chalk and china clay among the loading-materials.

13,793. Passow, H. July 6.

Cements; slags, treatment of.—Relates to improvements in the cement-making process described in Specification No. 14,278, A.D. 1900, and consists in the addition of one half to five per cent. of lime to the cooled and ground slag or molten mixture of the raw materials. Hydrate water, if present, should be first removed by treating. To ascertain whether the addition of lime is required, the ground product should be mixed with water and brought into contact with carbonic acid. If no rise of temperature takes place, there is no free lime present, and it should be added.

14,085. Sefton-Jones, H., [*Feder, S.*, and *Bücken, J. van de*]. July 10. *Drawings to Specification.*

Casting.—Relates to a method and apparatus for making carpet-cleaning soap. When the soap is finished, it is passed into a series of moulds provided with pegs, which are pressed outwards when the soap has reached a certain height, thus indicating when the moulds are filled.

14,981. Franquet, H. E. July 23.

Stone, imitation.—A substitute for coral consists of casein mixed with plastic celluloid and colouring-matter, by rolling. The casein may be prepared by immersion for a day in a borax solution, and subsequent soaking in alcohol, acetone, or like solvent. The rolled sheets of the mixed materials may be heated and pressed together to form blocks.

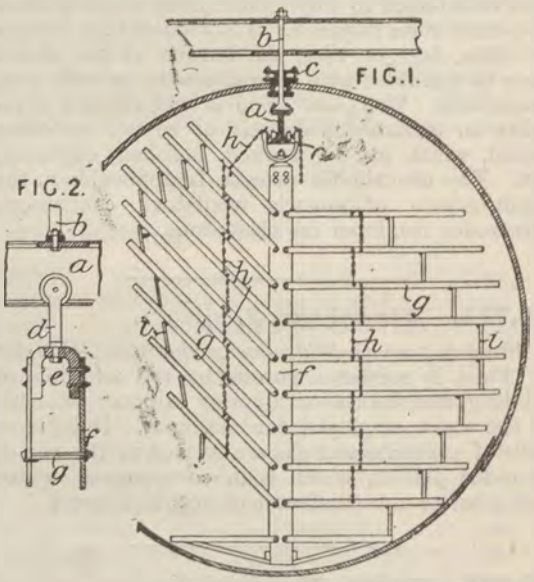
15,029. Ashton, N. T., Crompton, J., and Kelly, J. D. July 24.

Cements.—Portland or hydraulic cement is manufactured from the natural calciferous sand known in Cornwall as Towan sand. The sand is ground to powder and calcined at a high temperature in a rotary kiln. The product is re-ground to form cement. Sands analogous to Towan sand may be employed, and, where a certain standard of composition is not reached, the deficit of lime, silica, or alkali may be made up by suitable additions of lime, granite, &c.

15,204. Lean, C., [*Wolf, A.*]. July 26.

Castings; statuary.—Relates to a composition that may be used for decorating, coating, and preserving porous materials and articles, such as stone, statues or ornaments made of plaster, and the like. The composition consists of stearin and resin with the addition of bitumen, benzoin, and creosote, and, if desired, of any suitable pigment. The composition is applied, when hot, by dipping, spraying, or other coating operations. The articles are, preferably, heated before being coated.

15,214. Kreft, E. July 26.

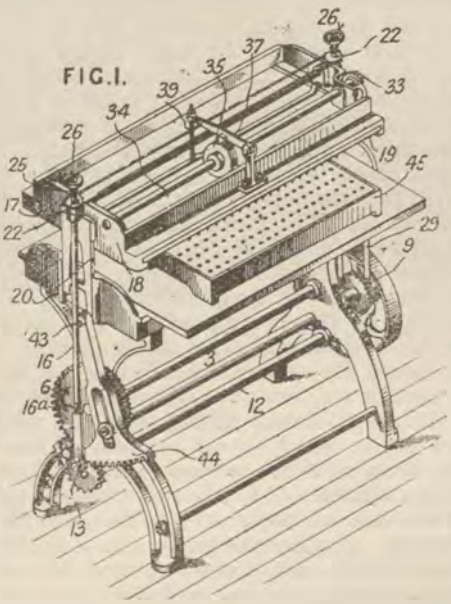


Stone, artificial.—Relates to boilers or digesters in which moulded blocks of artificial stone are

subjected to steam pressure for the purpose of hardening them. A suspended rail *a* is arranged within the boiler, and is supported by bolts *b* secured to a frame above the boiler. The bolts pass through stuffing-boxes *c*. From the rail *a* hang wagons consisting of frames *f* secured to stirrups *e*, Fig. 2, which are bolted to the suspension stirrups *d*. Platforms *g*, for the reception of the moulded blocks, are pivoted to the frames *f*, and each rests by hinged supports *i* upon the one beneath it, the lowest of all taking the whole downward strain. This construction enables all the platforms above that being filled to be lifted by chains *h*, as shown in Fig. 1, and similarly facilitates unloading, which is commenced from the top. A movable short rail outside the boiler is made to connect with the rail *a* when the boiler door is open, so that the wagons can travel into or out of the boiler.

15,472. Carlson, G. July 30.

Casting.—Relates to the production of starch and like moulds such as are employed for casting confectionery. The starch to be moulded is contained in a tray 45, above which is the vertically-reciprocating head 18. The head 18 carries a platen 19, on which the mould-forming dies are fixed. The head 18 is carried by slides 20, and is reciprocated by connecting-rods 16, which are driven by toothed crank discs 13 on a shaft 12. The connecting-rods have a screwed joint at 16^a, and pass through pivotal bearings 17, which allow of their angular movement. Sprocket-wheels 22 are splined to the rods, and are connected by a chain, so that, when the length of either rod is adjusted by the hand-wheel 26, the other is adjusted with it. A cushioning-spring 25 allows the head to yield in case the rods are shortened too much in adjustment. The toothed crank disc 13 is driven by a toothed sector 44, which swings about its pivot 43 by reason of its pin-and-slot connection with the toothed gear 6, which is itself driven from the main shaft 3. This method of driving ensures a very slow and steady movement of the platen during the actual moulding operation. A toothed wheel 9, driven from the main shaft 3, carries a bevel-wheel which gears with another wheel splined to a vertical shaft 29 which moves with the head 18. The shaft 29 drives a horizontal



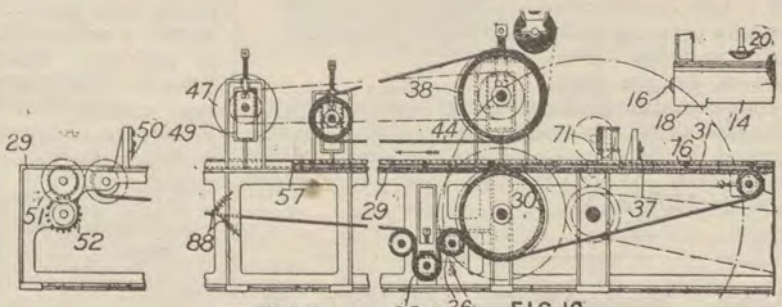
shaft 34 through bevel gearing 33, and on this shaft is mounted a toothed disc 35, which sets in vibration a pivoted arm 37 carrying a hammer 39. The hammer strikes the upper surface of the platen, and serves to clear the dies from adhering starch.

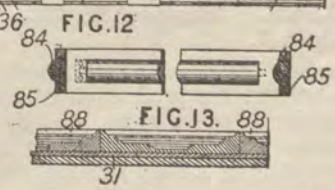
15,554. Harrisson, G. Aug 1.

Stone, artificial; stonework, ornamental.—A framework of wire netting, gauze, perforated zinc, &c. is stamped or bent into the form of a rock or stone, and is covered with a composition of cement, sand, colouring-matter, and water, so as to produce imitation rock suitable for decorative purposes. The rock &c. may be built up in sections to render it portable.

15,772. Hall, G. B. Aug. 6.

Casting.—The ingredients of a composition, such as plaster of Paris and hair or fibre, are fed by hoppers and endless-chain conveyers to an inclined mixing-trough 14 containing two shafts 16 carrying overlapping screw blades, which mix and force the material through a discharge outlet 18 on to an endless travelling band 31 on a table 29, or a series of moulds mounted on the band. The conveyers are driven by endless bands, adjustable by screws and fork-adjusting nuts on cone pulleys to vary the speed. Water is sprayed on the materials in the trough by a perforated T-pipe or rose 20. The plastic mass



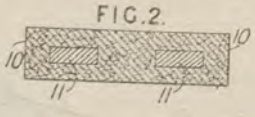


on the band 31 is levelled by a fixed gauge-bar 37, with an inclined or V-shaped acting-edge, and a bar 71, which is mounted between rollers at an angle with the line of travel of the band, and is reciprocated in the direction of its own length by a crank-pin working in a vertical slot in the bar. The levelled mass on the band passes between rollers 30, 38 and under an endless moulding-band 44, which may carry a design in relief or intaglio on its acting-surface, and remains in contact with the material until it has set sufficiently. The moulded sheet is divided into slabs by a knife mounted to work radially in a roller 47 adjustable in bearings 49. The knife is retracted by springs and forced into action by a cam or trip mechanism. The upper surface of the slab may be roughened by a stationary or longitudinally-reciprocating comb 50, and the lower surface by a revolving roller 51 clothed with card teeth cleaned by a rotary brush 52. For the production of thicker slabs, moulds are formed on the band 31 by cross-bars 57 fitting between jointed side-bars forming endless chains which travel between guides and round horizontal or vertical sprocket-wheels. Grooves are made in the edges of the slabs by ribs 76 on the bars of the moulds. To allow for the detachment of the cross-bars from side-bars in the case of the side-chains mounted on vertical sprocket-wheels, the pivot holes in the bars are rounded and the chains are caused by guides to diverge at the delivery end of the machine. The band 31 is kept clean by scrapers 88 and is maintained in contact with the driving-roller 30 by adjustable rollers 35, 36. Independent mould-frames may be constructed in two parts jointed together at opposite corners. Fig. 12 shows a mould-frame 85 fitted with flattened cylindrical pivoted bars 84 for producing recesses in the edges of the slabs, and Fig. 13 shows a mould-tray 88 for producing cornices, panels, or centre-pieces for ceilings &c. The moulds and moulding-band may be faced with rubber or the like to facilitate the detachment of the slab.

15,802. Stone, J. H. Aug. 6.

Sound-deadening coverings.—Sound-deadening and non-conducting strips for covering walls, roofs, ice-boxes, refrigerators, &c. are made of compressed moulded cork 10, with wood strips 11 embedded therein to receive nails. The strips are moulded by heat and pressure, as described in Specification No. 18,199, A.D. 1892, [*Abridgment Class* Moulding &c.].

FIG. 2.



15,929. Hippe, E. E., and **Holm, T.** Aug. 7.

Stone, colouring; stonework, ornamental.—Relates to the production of coloured designs on marble, stone, cement, &c. by a process which enables sharp contour lines to be preserved, while admitting of a deep penetration of the colour into the marble &c., so that the surface can be ground or polished. The contour lines are drawn on the surface with a pen or a fine brush moistened with a water-glass solution or a similar fluid capable of closing the pores. This solution is coloured black for the sake of distinctness. The line is painted several times over, so as to penetrate deeply into the stone, which may be heated to facilitate the penetration. Coloured fluids which will not mix, such as water, ammonia-water, glycerine, or spirits of wine on the one hand, and oil, turpentine, petroleum, ether, wax, resin, sulphur, &c. on the other, are applied simultaneously on the two sides of the contour line. The fluids limit each other's expansion below the line, which thus retains its sharpness within the body of the marble. If the pattern is applied on both sides of a thin slab, it will extend right through it. One of the fluids may contain colouring-material, and the other be uncoloured. If the latter is petroleum, benzine, ether, &c., it can be eliminated by heating the marble, or by means of a suitable solvent, and the uncoloured part may then be coloured separately. When the colour is dissolved in wax and applied to hot marble, the penetration can be increased by the use of a hot stamp or templet. The marble may be coloured throughout, portions being then protected by wax, petroleum, or an alcoholic solution of resin while a further colour is applied. One colour may be sub-coloured with another forced into the marble from the sides &c. Suction may be applied to the opposite side of a slab to increase penetration. A framework of metal strips, curved to correspond with the contour lines on the marble, can be used to facilitate the application of the colours, which are applied in the spaces enclosed by the strips.

16,508. Nobis, L., and **Wenzel, A.** Aug. 16.

Concretes; stone, artificial; fireproof coverings and compositions.—Relates to compositions for the manufacture of artificial stone, facing slabs or tiles, fire and water proof slabs, &c., and for making vessels constructed of concrete and iron, or for lining iron vessels, such as cellulose boilers &c., where a water-tight heat non-conducting lining is required. Blast-furnace slag is mixed with asbestic (the product obtained by grinding the rock usually found in intimate connection with fibrous asbestos), and Portland cement is mixed with asbestos powder. The two mixtures are then incorporated, with the addition of water, and the resulting composition is moulded to the required form. In order to strengthen the article produced, specially-prepared asbestos braids are introduced into the mass during the moulding process. The insertions are prepared as follows:—Asbestos braids 2 to 5 mm. thick and 4 to 6 metres in length are stretched on a frame and impregnated with a thin mixture of powdered glass, asbestos powder, and water-glass, a thicker mixture of the same materials being afterwards applied to coat the braids.

16,588. Herdmann, G. A. Aug. 17.

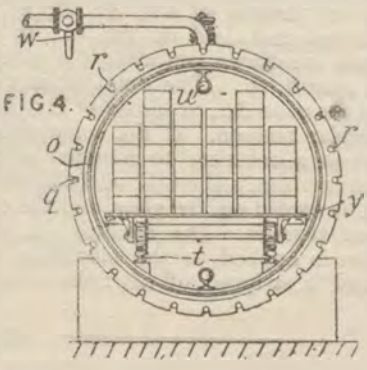
Sound-deadening coverings.—Relates to non-conducting coverings for steam pipes and other surfaces and packings for walls, partitions, and other structures for preventing the transmission of heat or sound, being mainly an improvement on the invention described in Specification No. 3443, A.D. 1900, [*Abridgment Class* Heating]. Slag-wool is treated with silicate of soda or similar adhesive material to render it coherent, and is afterwards pressed in a mould by ramming about a mandrel and within a sleeve or wrapper of muslin to form it into tubes. The mass is consolidated by stoving.

16,640. Hertwig, O., and **Liebaug, E.** Aug. 19.

Stone, artificial.—Artificial marble is prepared by intimately mixing magnesite, magnesium chloride, flint or its equivalent, and kaolin or its equivalent, together with water, and pouring the mass on to polished plates of glass or other material, from which it is removed when hard. The veins of marble may be imitated either by tracing or sprinkling with a paint brush, or by means of pigments incorporated with the materials. The artificial marble is applicable for washstand tops, table slabs, window benches, steps, wainscotting, &c.

16,794. Barreto, Baron V. Aug. 21.

FIG.4.



Stone, artificial.—Relates to apparatus for manufacturing and hardening bricks containing lime. About two parts of ground ashes, clinkers, or sand, and one part of unslaked lime are placed in a drum mounted on rails, sufficient water is added to slake the lime, and the drum is closed and rolled backwards and forwards on the rails. A steam pressure of about 40 lb. per square inch is generated by the slaking of the lime. The drum is fitted with steam-tight covers, a perforated water-supply pipe, a safety-valve, an air-vent cock, a pressure gauge, and an operating-cable. A further supply of ashes or sand is added to the slaked mixture from the drum, to produce a mixture containing about 10 per cent. of lime. This mixture is moulded into bricks or blocks, which are stacked on the perforated platform *y* of a truck which is run on to rails *t* in a steaming-cylinder *o*. The bricks are hardened by subjecting them to the action of steam at a pressure of 110 lb. per square inch for about 12 hours. The end of the cylinder is secured in place by pivoted bolts *q*, which fit in recesses *r*, and are provided with nuts. Steam is supplied to the cylinder through perforated pipes *u*, and is drawn off through a valve *w*, when the bricks are hardened, and may be passed into a second cylinder containing another load of bricks. Superheated steam may be used, and the top row of bricks may be protected from condensed vapour by a shield or baffle-plate.

17,540. Dyson, H. W. C. K. Sept. 2.

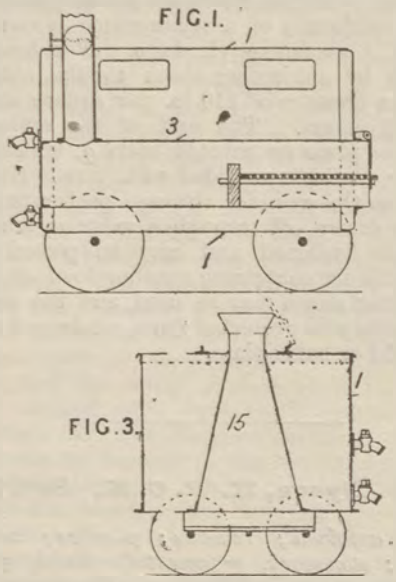
Stone, artificial; cements; plasters; mortars; concretes; stonework, ornamental.—Sand, grit, or other silicious material for use in the manufacture of artificial stone, cements, plasters, concretes, mortars, pavings, slabs, &c., or for admixture with clay in brick-making, is given a permanent red colour by the following process:—The sand &c. is moistened with an aqueous solution of a ferrous or ferric salt, or with a double salt, such as potassium-iron oxalate, and hydrated iron oxide is precipitated throughout the sand by the addition of an alkaline hydrate, hypochlorite, sulphate, &c., or of hydrogen peroxide. The mixture of sand and amorphous iron hydrates is then heated to a red heat, each grain of sand being coloured red by the iron oxide deposited on it. When the sand is moistened with certain classes of salts, such as ferric chloride, treatment with an alkaline solution is not required. Sanded decorative surfaces are produced by drawing the designs in paint, size, gum, varnish, cement, plaster, &c., and dusting the red sand on to them. The sand is also applicable for use in hour-glasses or in transparent toys.

17,582. Thwaite, B. H. Sept. 3.

Asphalts, melting-apparatus for. Cauldrons for melting snow and ice, and solid or plastic hydrocarbons, such as pitch, are constructed with a cylindrical shell 1, horizontal or vertical, with a furnace flue 3, Fig. 1, or 15, Fig. 3, running through it. The draw-off cocks or openings are so arranged that, during normal working, the cauldron always retains from one-half to one-third of the melted charge. The apparatus may be mounted on wheels, as shown, or may be stationary. Solid or liquid fuel may be used, and, according to the Provisional Specification, the vapours from combustible charges, such as pitch, may be led into the furnace. Gratings to intercept stones &c. may be fitted.

(*For Figures see next page.*)

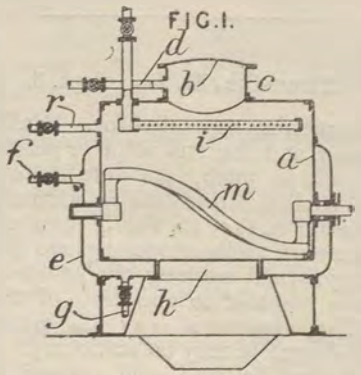
17,582.



18,077. Steinbach, J., and **Duderstadt, F.** Sept. 10.

Asphalts.—Asphalt-mastic is ground to powder, and to it are added 10 per cent. of sulphur, 5 per cent. of iron oxide, and 5 per cent. of small granular hard stone such as porphyry, syenite, or flint. The materials are placed in revolving drums over a slow fire, and the mixed material is transferred to moulds containing concrete or other hard foundation blocks, the surface of which is moistened. Considerable pressure is applied to the materials in the mould, the product being a block or slab with a concrete base and an upper layer of asphalt mixture.

18,163. Schwarz, W. Sept. 11.



Stone, artificial.—Relates to apparatus for preparing and mixing the raw materials, more particularly lime and sand, employed in the manufacture of artificial stone. The sand is introduced through the dome *c*, provided with a cover *b*, into the casing *a*, which is partially surrounded by a steam jacket *e*. Steam is admitted to the jacket through the pipe *f*, and the condensed water is discharged through the pipe *g*. The chamber is connected to an exhausting-apparatus through the pipe *d*, and the unknown and variable quantity of moisture contained in the sand is driven off. Unslaked pulverized lime is then introduced into the chamber and mixed with the sand by means of the rotary agitators *m*, and an accurately-determined quantity of moisture in the form of water or steam is introduced through the perforated pipes *i*. The materials are discharged through the aperture *h*. The pipe *r* serves to admit air and relieve the vacuum in the chamber. In an alternative method of working, the superfluous moisture in the sand is driven off by the heat produced by mixing unslaked lime with the wet sand. Exhaust is not always necessary in this case, a weighted valve being provided which is fully opened during the slaking of the lime.

18,744. Blitz, A. B. Sept. 19.

Stone, artificial.—Relates to the production of artificial or imitation marble. Gypsum, clay, gum arabic or other gum or resin, and silicate of soda or potash or other retardant are kneaded together to form the body material of the marble. On a smooth flat plate of glass, metal, cement, gelatine, &c. the colour to form the veins is spread in such a manner as to imitate the veining and mottled appearance to be represented. The composition is then spread over the surface, and absorbs the colour. When hard, the surface of the artificial marble is polished with a solution of alcohol, shellac, or collodion. The veins can be produced by means of threads of silk &c. dipped in the desired colour and laid on the smooth surface. The threads are drawn out after the composition has been spread on. The colours may also be poured on the glass &c., or blown so that they flow in an irregular fashion. If the composition is to be applied as a covering to rounded or moulded surfaces or carvings, a sheet of oilcloth, canvas, oil paper, &c. is spread on the glass, and the composition spread thereon. The oilcloth &c. with the composition is applied to the moulding or other surface, and is stripped off after the composition has set.

19,045. Lenchères, G. le R. de. Sept. 24.

Mortars; cements; stone, artificial; concretes; asphalts.—Relates to compositions applicable as mortar, concrete, artificial stone, &c., and capable of utilization in maritime work, dry docks, fortifications, canals, dykes, sluices, reservoirs, foundations of bridges, pillars, cellar walls, channels, pipes, conduits, troughs, drainage holes, water-closets, flagstones, kerbs, &c., and for joints. The composition consists of simple or double salts of alumina and potash, especially the silicates; silica; oxide of manganese; sulphate of lime and sulphate of baryta; hydrocarbons extracted from

coal ; oil of schist ; coal tar ; bog-head ; asphalt ; natural or artificial liquid bitumen ; and gravel or flint. The entire mixture is placed *en bloc* in the boiler in which it is heated. Stones may be added to form concrete. Gravel alone may be added to the salts, the product then being mortar.

19,283. Horak, J. Sept. 27.

Stone, artificial.—Sand, broken quartz, or a mixture of sand and clay, is mixed with lime or other binding-material or flux, and the mixture is moulded into bricks, blocks, or roofing-tiles, which are first subjected to a preliminary hardening-process by steam or gas under pressure, and are afterwards burnt in a kiln.

19,474. Croizier, H., and **Thomine, E.,** [*trading as* Croizier & Cie., H.]. Sept. 30.

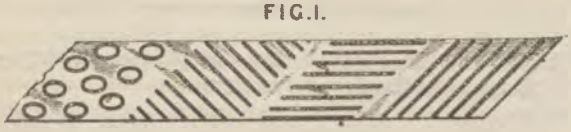
Stone, artificial; fireproof compositions; refractory substances.—Artificial stone of a light, non-conducting, and refractory nature is prepared by combining kieselgühr, quartz sand, and lime in the dry state, adding water, and moulding the mixture into blocks which are hardened by steam. The hardened blocks are dipped in a silicate solution, and are then roasted or calcined. The treatment with silicate may be omitted.

21,616. Lake, H. H., [*Portland Cement Fabrik Hemmoor* and *Valeur, P. F.*]. Oct. 28.

Refractory substances; concretes.—An improved refractory lining or facing-material for kilns and furnaces consists of cement-beton obtained by mixing granular Portland cement clinkers with ground Portland cement. The kiln is lined by stamping the moistened material down, smoothing-boards being used if necessary. The material is applicable for lining rotary cement kilns, lime kilns, smelting and reducing furnaces, china-baking kilns, &c., and also for moulding retorts, muffles, crucibles, &c.

21,847. Martin, R. H. Oct. 30.

FIG.1.



Fireproof coverings.—Non-conducting coverings for pipes, boilers, tanks, and similar structures are made from sheets of asbestos, paper, felt, or other material having applied to them finely-divided material, such as flocculent asbestos of short fibre, or shoddy, or equivalent substance of low cost and made to adhere by paste, sodium silicate, glue, or the like in various air-enclosing patterns. The sheets are rolled on a mandrel to the requisite thickness for pipe coverings ; for flat coverings the sheets are superimposed with ribs separating the layers. The sheets may be fireproof. For finishing the covering, it is preferred to have the last sheet of plain paper with a smooth surface.

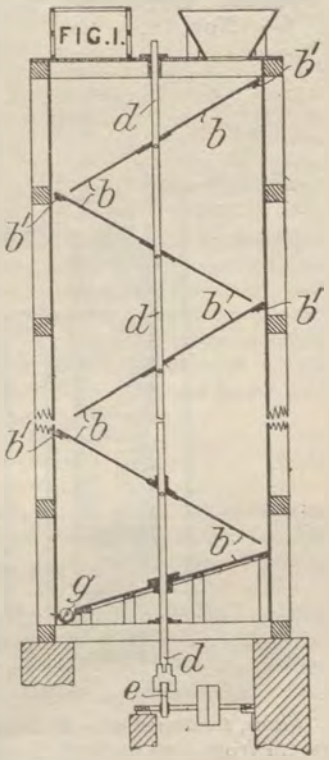
22,314. Forell, C. von. Nov. 5.

Cements ; slags, treatment of.—Relates to the manufacture of Portland cement from blast-furnace slag and lime. A mixing-furnace in the form of a horizontal or slightly-inclined rotating cylinder, heated either externally or internally, and provided with a lining of fire-resisting material, is filled to about one-third of its height with fluid slag, and lime in the form of dust is added in the proper proportion by means of a screw conveyer. The furnace is kept in rotation for a considerable time, and hot air is forced either into or over the mixture. Oxygen or other gas may be used instead of air. The material is discharged from the furnace through an outlet shoot, into which opens a series of jet tubes which supply steam for granulating purposes. The shoot opens into a rotating granulating-cylinder. The granulated material is ground to form Portland cement.

22,601. Rigby, J. S. Nov. 9.

Cements.—Relates to processes for cooling and maturing Portland cement, the free calcium oxide present being either hydrated or converted into carbonate. The hot cement coming from the grinding-mills is cooled by passing it through an air- or water-jacketed helical conveyer. The cement is then treated with carbonic-acid gas obtained from the kilns, or from rotary furnaces, the gas being cooled or moistened by passing it through towers filled with coke &c., through which water is constantly passing. The cement is subjected to the action of the gas in a

FIG.1.

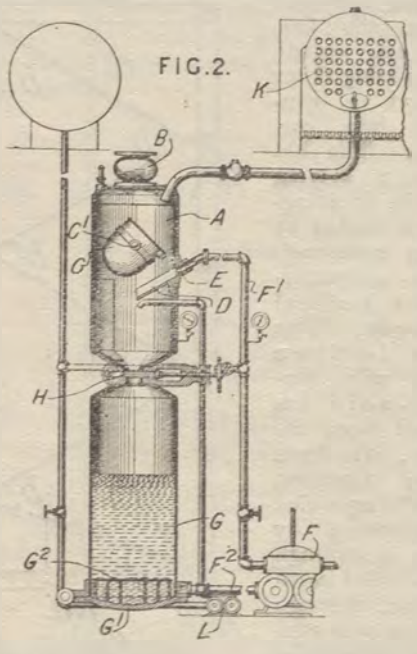


tower, such as that shown in Fig. 1. The falling cement passes over inclined shelves *b*, which are pivoted at b^1 and are oscillated by means of a vertical rod *d* and cam *e*. A worm conveyer *g* carries away the treated cement. In a modified tower apparatus, the cement passes from shelf to shelf of a horizontally-arranged series, the shelves being swept by arms or scrapers fixed on a vertical shaft. The mixture of moistened atmospheric air and carbonic-acid gas may be passed directly into the mills, so as to act on the cement while it is being ground. The air and gas may be admitted to the hydrating-tower under pressure, the escape taking place through regulated valves. The cement may in this case pass through a perforated plate or cover swept by a scraper. Stive chambers collect the cement escaping with the air &c. The mixture of moistened air and gas may be used to transport the cement through a tube by suction from one bin to another.

22,796. Jackson, I. Nov. 12.

Refractory substances; cements.—A composition for use as a lining-material for rotary kilns, or as a cement for a brick or tile lining for the same, is composed of ground flints, with or without a suitable "aggregate," made up into a plastic mass with sodium silicate, preferably in the form of water-glass solution. Various silicates, litharge, lime, magnesia, and Portland cement are mentioned as suitable "aggregates."

23,420. Copeland, L. D., and **Mitchell, G.** Nov. 19.



Slags, treatment of.—Relates to the generation of steam from heat derived from molten or hot furnace slag. The generator, Fig. 2, consists of the cylindrical vessel A, within which is mounted on the trunnions C^1 the ladle C to receive the slag introduced through the feed valve E. By working a handle on the outer end of the trunnion, the slag is poured from the ladle on to the shoot D, where it meets with water issuing from the nozzle E of the circulating-pump pipe F^1. The steam generated is conveyed to the boiler, receiver, or receptacle K to heat water and generate steam. The slag is divided or granulated and is passed, together with water, to the separating-chamber G through the valve H. The chamber G has a perforated false bottom G^2 to collect the granular slag. The suction pipe F^2 of the pump F opens into the chamber G below the false bottom. The granular slag is removed by opening the drop bottom G^1 when the valve H is closed. The water lost as steam is replaced by the feed-pump L, which discharges water under the shoot D. The molten or hot slag may also be used to generate steam by pouring it into a bath of water confined in a closed vessel.

23,443. Forell, C. von. Nov. 19.

Cements; slags, treatment of.—Molten slag is directed by a blast of steam or air against a cooled surface, which may be, for example, the exterior of an internally-cooled rotary drum. The cooled particles are ground to form cement. Mechanical propulsion may be employed instead of a steam jet, and the cooled particles may be treated with water for desulphurizing purposes.

23,556. Perkin, W. H., and **Whipp Bros. & Tod.** Nov. 20.

Fireproof coverings and compositions.—Relates to improvements on the invention described in Specification No. 9695, A.D. 1901, the object being further to fix the precipitate which has been formed in or on the material. The material, which has been treated in accordance with the prior Specification, is passed through or immersed in a solution of sodium silicate of 25° Tw., and afterwards, either with or without a preliminary drying, is treated with a solution of magnesium sulphate of 26° Tw. A solution of albumen or of tannic acid may be used in place of the sodium silicate and magnesium sulphate, the goods being subsequently heated or steamed and dried.

23,557. Perkin, W. H., and **Whipp Bros. & Tod.** Nov. 20.

Fireproof coverings and compositions.—Relates to improvements on the invention described in Specification No. 9695, A.D. 1901. A soluble zinc salt is used in place of an aluminium salt, and the goods are further treated for the purpose of fixing the precipitate in the manner described in Specification No. 23,556, A.D. 1901. Four examples are given of solutions which may be used:—(1) 100 parts of zinc-acetate solution of 26° Tw.

are mixed with 25 parts of acetic-acid solution of 11° Tw. and 100 parts of sodium-tungstate solution of 60° Tw.; (2) 100 parts of zinc-sulphocyanide solution of 24° Tw. are mixed with 20 parts of acetic-acid solution of 11° Tw. and 90 parts of sodium-tungstate solution of 60° Tw.; (3) 100 parts of zinc-sulphate solution of 26° Tw. are mixed with 25 parts of acetic-acid solution of 11° Tw. and 100 parts of sodium-tungstate solution of 60° Tw.; (4) 100 parts of zinc-sulphate solution of 26° Tw. are mixed with 35 parts of formic-acid solution of 11° Tw. and 100 parts of sodium-tungstate solution of 60° Tw. The goods are, preferably, dried slowly in a current of warm air and after about 15 hours are steamed or passed over heated cylinders &c. to remove the organic acid, and then treated in accordance with the invention described in the Specification No. 23,556, A.D. 1901.

24,393. Sangwin, J. B. Nov. 30.

Stone, artificial.—Artificial stone is prepared from Portland or other cement, gravel, sand, &c. without adding any water after the first mixing. The materials are mixed in a fine state with the necessary proportion of water, and colouring-matter is incorporated with the mixture in a sieve, edge-runner mill, perforated revolving cylinder, or other apparatus. The resultant mixture is allowed to fall into the mould from a considerable height, and is then pressed in the mould by hand or power.

24,475. Carter, H. L. Dec. 2.

Plasters.—Small quantities of althœa or marsh-mallow root and dextrin, and, in some cases, gelatine, are mixed in a mortar &c. with finely-ground or screened calcined gypsum to form a plaster applicable especially for the walls and ceilings of hospitals &c., where a smooth polished surface is required. The plaster has elastic properties, and may be used for picture frames, statuary, plaques, cornice mouldings, &c. In place of the marsh-mallow root, the leaves, flowers, &c. of certain species of althœa, malva, hibiscus, or abutilon may be employed. Calcined lime or marble dust may be substituted for the gypsum.

24,580. Wilkinson, W. S. Dec. 3.

Asphalts.—Relates to paving-materials consisting of crushed and partly-pulverized stone, or sand, very finely-divided stony material known as dust or fines, and a mixture of asphalt and residuum of petroleum or other flux, known as bituminous cement. When the composition is to be compressed in moulds into paving blocks or tiles, the body material is usually crushed and partly-pulverized stone; when it is to be laid and rolled or tamped in the form of sheet pavement, the body material is usually sand and dust or fines. The invention consists in adding as much as possible of the fines to the bituminous cement before incorporating it with the remainder of the body material, with the view of avoiding as far as possible the formation of cavities filled with pure cement in the finished product. A considerable proportion of fines can be added without destroying the liquid properties of the cement. The asphaltic cement is heated to about 320° F., and brick dust, ground sand, cement, calcareous material, or other fines is mixed with it mechanically or by the use of jets of air or steam. The remainder of the body material is heated and mixed dry in a pug-mill, the fines-impregnated cement being then gradually added to it. If the resulting mixture is to be used for blocks or tiles, it is moulded under pressure, and the exterior of the blocks is cooled rapidly in flowing water.

24,683. Berry, G. F., and **Lawes & Co., J. B.** Dec. 4.

Cements; mortars; plasters; stone, artificial; slags, treatment of.—Relates to improvements in cements, mortars, or plasters, and in the adaptation of the same in the manufacture of bricks, tiles, slabs, artificial stone, &c., and as electric insulating-compositions. In the manufacture of cements &c., the crude calcium sulphate precipitated during the manufacture of tartaric, citric, carbonic, and other acids is employed, and also the clinker and ashes resulting from combustion in gas generators or producers, or forced-draught, reverberatory, or other furnaces. The calcium sulphate is dried by means of waste heat from the open kilns in which it is subsequently dehydrated. The kilns are heated by the products of combustion from gas producers or furnaces, the temperature not exceeding 340° F. To produce Keene's cement, the dehydrated gypsum is steeped in or sprinkled with a 6 to 10 per cent. solution of alum or borax, and is then re-calcined, cooled, and ground. To produce hydraulic lime, it is ground together with blast-furnace clinker or ashes, calcined limestone, and quicklime. To produce Portland cement, the hydraulic lime is mixed with cement clinker, and is re-calcined, cooled, and ground. The Portland cement so prepared may be mixed with sand and moulded into bricks, tiles, slabs, or artificial-stone ornaments or decorations, which are dried slowly in the air. Resin or pitch may be added to the mixture of Portland cement and sand, the mixture being rendered plastic either by heat or by means of a volatile solvent. This composition is suitable for switchboard bases, and for other electric insulating purposes.

24,837. Wellman, S. T., and **Wellman, C. H.** May 22, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*]. *Drawings to Specification.*

Refractory substances.—Magnesia, either pure or with a proportion of clay or silica, is used for making firebricks to be used in the walls of coke ovens, their conductivity being greater than that of ordinary firebricks.

24,923. Bolvie, G. C. F. Dec. 6.

Stone, artificial.—Waste or scrap slate, flinty or micaceous, is reduced to powder and treated with a weak solution of hydrochloric and nitric acids, with or without alum. The mass is exposed to the action of steam, and is then moulded into blocks, bricks, &c. which are dried in air for from 6 to 12 hours, and are subsequently hardened by means of high-pressure steam. Carbonic-acid gas may be used with the steam. Water-glass may be added to the materials as a binding-agent. When moulding hard facing bricks or tiles, pulverized burnt lime is added to the slate before moistening it with the solution.

25,181. Reiche, A. Dec. 10.

FIG. 2.

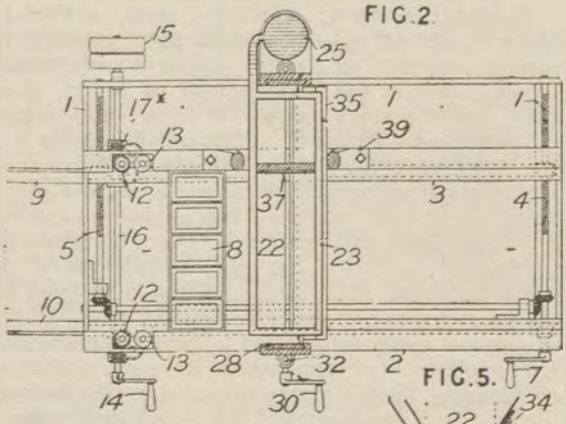
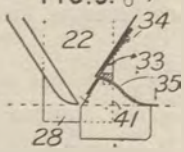


FIG. 5.



Casting.—Apparatus for filling and strickling chocolate moulds is shown in plan in Fig. 2. The frame 1 has a fixed beam 2 and a sliding beam 3, adjustable for various widths of moulds 8 by means of a crank handle 7 and screw spindles 4, 5 connected by bevel gear. The moulds are placed on inclined guide-bars 9, 10, or stacked between vertical guide-bars, adjustable with the beam 3, and are fed forward in continuous line by means of india-rubber &c. rollers 12, 13, yieldingly mounted on the beams 2, 3 and driven from a crank handle 14 or belt pulley 15. The worm 17* is made sufficiently long, or adapted to slide on the shaft 16, to drive the corresponding rollers in any position. The hopper 22 is carried by slides 28 adjusted by means of a crank handle 30, bevel gear, and screw spindles 32, and is provided with a jacket 23 communicating with heating-apparatus 25. A sliding partition, comprising a plate 37 with an asbestos backing, is pressed downwards against the walls of the hopper by a spring, and provided with pins engaging in a cross-piece between standards 39 on the beam 3. The outlet of the hopper is regulated by a slide 33, Fig. 5, adjusted by a pinion 34 or otherwise. A strickler 35, connected to the slides 28, terminates in a tinned steel spring plate, and spring-pressed plates 41 close the space on each side between the hopper and strickler.

25,239. Heap, C., and **Oddy, T.** Dec. 11.

FIG. 7a.

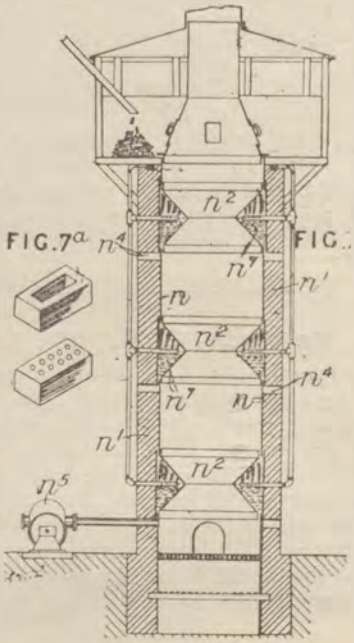
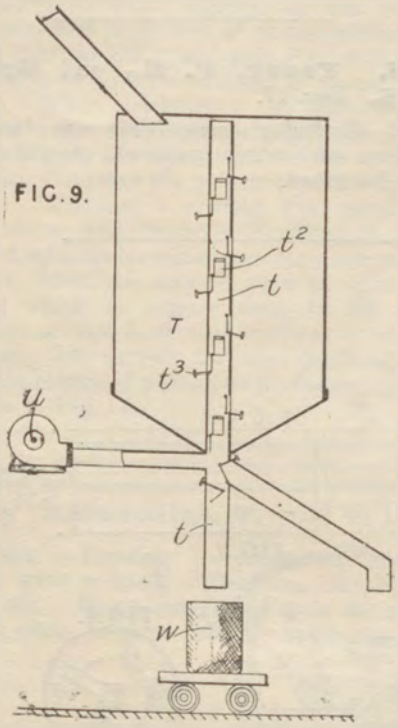


FIG.

Slags, treatment of; cements.—Relates to processes for the manufacture of Portland slag cement and hydraulic lime. In the manufacture of cement, the molten slag, as it issues from the blast furnace, is granulated by means of jets of water, steam, or air, which impinge on the stream of slag from apertures in a coil of tubing, of cylindrical, conical, or other shape, which surrounds the issuing stream. The granulated slag is received in a truck formed with perforated steel sides and bottom to drain away the water. The trucks serve to convey the slag to a pit or hopper, into which is also conveyed the limestone, hydraulic or other

lime, and roller scale, &c. to be used in making the cement. From the hopper an elevator transfers the materials to a wet grinder and mixer, from which they pass by means of another pit and

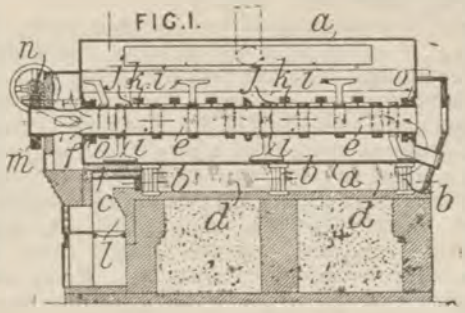
FIG. 9.



elevator to a beating or pug-mill. The aëration which takes place in this mill serves to eliminate calcium sulphide and sulphuretted hydrogen from the materials, and steam may be blown into them for the same purpose. The ground material is next formed into thin slabs or tiles in an ordinary tile-making machine, and the tiles are carried through a drying cylinder or shed through which the waste heat from the kilns circulates by forced or natural draught. The hardened slabs are transferred by an elevator to the kiln in which they are burned and clinkered. As the clinker is withdrawn from the kiln, 10 per cent. is returned to the wet grinding and mixing machine to which the raw materials are supplied. The remainder is treated or sprayed with water to eliminate any sulphur taken up during the burning, and to slake or hydrate any free lime, and is then transferred by an elevator and conveyer to a maturing-shed, where it is allowed to lie until it is sufficiently air-cooled to enable it to be ground, air under pressure being blown in periodically to assist in the maturing of the clinker. The matured clinker is conveyed by an elevator to a rough disintegrator, and thence to a roughing-ball mill and a finishing tube-mill. The powdered material is then aërated in a large silo into which air is passed by a blower, and the material is finally delivered into sacks, which are stored in a shed ready for delivery to the railway trucks. In the manufacture of hydraulic lime, the mixed and ground materials are neither formed into tiles nor calcined. Fig. 7 shows the kiln in vertical section. It is constructed with a continuous steel interior n surrounded by, and braced to, a firebrick covering n^1. Water-cooled cones n^2 break up the otherwise cylindrical kiln passage, and the firebricks of which the covering n^1 is built are hollow or perforated, as shown in Fig. 7^a, to allow water from the chambers n^7 to flow through them. The cones n^2 retain the clinker until it fuses, and the water-cooled walls prevent adherence of the clinker. A powerful blast of air enters the kiln from the blower n^5, and air may also be admitted through the inlets or sight-holes n^4. The kiln may work with ordinary fuel, or Mond or other gas. A horizontal rotary furnace may be substituted for it. Fig. 8 shows the ball mill in section. Instead of spherical balls, pounding weights s are used, provided with convex projections s^1. The grinding-plates S, S^1 are formed with sinuous grooves s^2. The plates S^1 rotate in the same direction as the plates S, but at a slightly slower speed. The silo for aërating and maturing the cement is shown in section in Fig. 9. A round, square, or other shaped pipe t extends vertically through the silo T, and is formed with internally-opening louvres or doors t^2, controlled by regulating-screws t^3. Air from a blower u passes through the pipe t into the cement, which passes by gravity into the sacks W. An automatic weighing-machine may be fixed beneath the silo.

25,400. Boult, A. J., [*Baumann, A.*]. Dec. 12.

FIG. 1.



Asphalts.—A boiler a or heating-apparatus for asphalt, bitumen, pitch, and other substances rests on brackets b and is protected against the direct action of the flames from a grate l by a refractory shield c. A longitudinal firebrick partition d is, preferably, arranged under the boiler to divide the furnace gases and ensure uniform heating of the two sides. The spent gases escape into a smoke-box f through perforations in a central metal tube e mounted in bearings o rotated by a worm n and pinion m, and carrying radial blades or paddles i to knead and stir up the mass. The outer part of the tube e is scraped by stationary scrapers j fixed to cross-bars k. In a modification, the cylinder a is carried by a portable metal casing or jacket mounted on wheels.

25,589. Zschiedrich, G. E. Dec. 14.

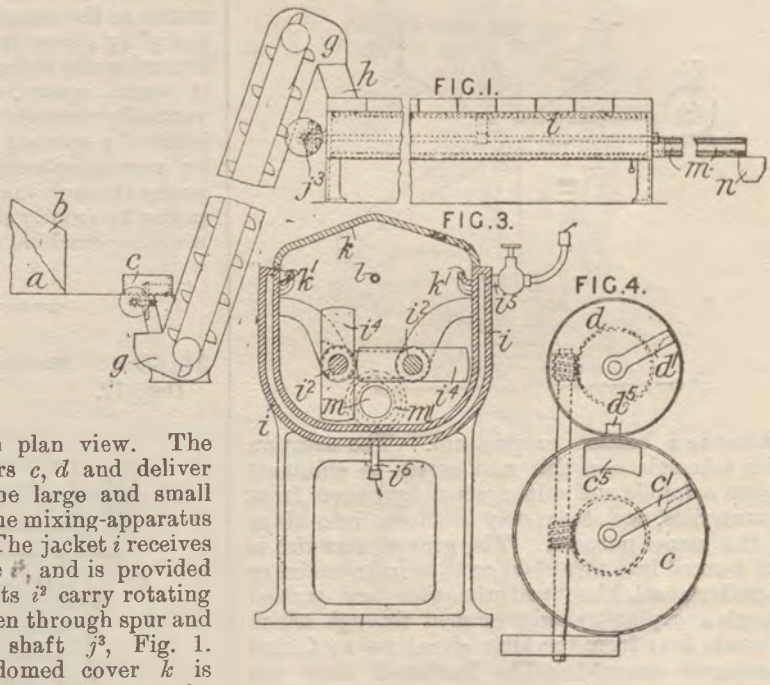
Sound-deadening coverings and compositions.—Coverings for floors, walls, and the like are produced by using as a basis peat or other fibres which are impregnated with suitable substances, such as linseed oil, caoutchouc, &c., and treating in machines, such as are used in the manufacture of millboard or strawboard, or of linoleum. The base material may be also produced by impregnating boards or lengths made of the fibre. When used for flooring coverings and the like, a suitable wearing-surface may be given to the material by subjecting it to treatment such as is employed in the manufacture of linoleum, or a veneer of wood, leather, millboard, or the like may be attached to it by a suitable adhesive.

25,776. Young, F. S., and **Griffiths, W. S.** Dec. 17.

Sound-deadening compositions are formed of magnesium carbonate, prepared according to a process described.

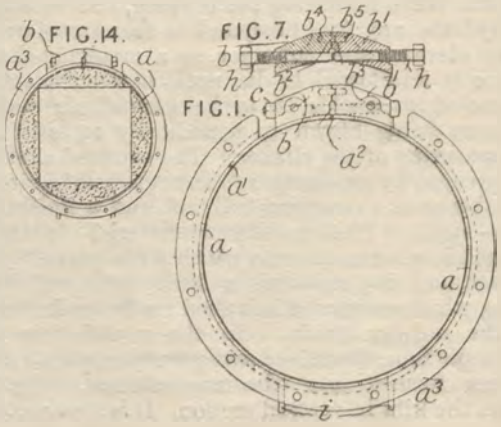
26,258. Ford, L. P. Dec. 23.

Stone, artificial.—Relates to improvements in the manufacture of artificial-stone bricks &c. Lime and sand are stored in bins *a*, *b*, Fig. 1, and are transferred by hand to measuring-devices *c*, which deliver them in definite proportions to an elevator *g*. The elevator transfers them through a shoot *h* to a steam-heated pug or mixing machine *i* from which they pass through a water-jacketed outlet *m* to the hopper *n* of a brick-making press &c. Fig. 4 shows the measuring-devices in plan view. The arms c^1, d^1 sweep over the floors *c*, *d* and deliver the sand and lime through the large and small apertures c^5, d^5, respectively. The mixing-apparatus is shown in section in Fig. 3. The jacket *i* receives high-pressure steam from a pipe i^5, and is provided with a steam trap i^6. The shafts i^3 carry rotating mixing-arms i^4. They are driven through spur and bevel gearing from a main shaft j^3, Fig. 1. Moisture condensed by the domed cover *k* is removed through the conduits k^1. Water can be supplied through a perforated pipe, and the mixed materials are discharged through an orifice *m* surrounded by a cold-water jacket m^1.



26,259. Ford, L. P. Dec. 23.

Stone, artificial.—Relates to a method of moulding artificial-stone blocks from a mixture of sand and lime, in which the expansion of the materials in a rigid mould in the presence of steam or water is utilized to compress or solidify the blocks and prevent cracks and "partings" therein. The mould comprises a strong outer shell formed with $\frac{1}{2}$-inch perforations about a foot apart, and a thin inner lining provided with $\frac{1}{16}$-inch perforations about half an inch apart. Fig. 1 shows a cylindrical mould in end elevation with the ends removed. The shell *a* is perforated at a^1, and is provided with angle-irons a^3, to which the end plates are bolted. Brackets riveted to the shell



may replace the angle-irons. A butt joint a^2 is formed in the shell so that it may be opened sufficiently to free the moulded block. Castings or forgings b, b^1 are riveted to the shell on opposite sides of the butt joint, and are bored to receive the bolts c, Fig. 1, which tighten up the joint. A wedge-sectioned projection b^2 on one casting enters a recess b^3 in the other, and pins b^4 entering sockets b^5 also serve to keep the castings in correct relative position. When discharging the moulded block, the bolts c are first removed, and the opposing bolts h, Fig. 7, are then used to force the butt joint open and relax the pressure on the expanded material. Runners i prevent the mould from rolling about, and facilitate handling it. When blocks of rectangular section are required, partitions of paper, linen, &c. may be used to separate the material which is merely used to fill up the segmental cavities from that which is to constitute the block. The cavities may also be filled up with segmental blocks of porous or perforated material, as shown in Fig. 14.

26,363. Karavodine, V. Dec. 24.

Asphalts. — Consists in producing insulating-material with a basis of resinous substances or drying oils. Powdered resin, such as bitumen, gum lac, pitch, or other similar substances which will not readily decompose at 250°–300° C., or drying oils, are mixed with 25 to 35 per cent. of powdered sulphur, and to this mixture is added by malaxation, either cold or hot, 30 to 70 per cent. of inert fibrous or pulverulent materials, such as asbestos, sand, or pumicestone. The whole mixture is then heated to 350°–400° C. in a vessel with a loaded cover while still mixing, until it becomes almost solid. The product is compressed in moulds heated to 250°–400° C., or it may be first ground and them compressed. The resins or oils employed may, prior to use in the process, be heated to 300°–350° C., for driving off a portion of their volatile constituents.

26,437. Sellars, J. C. Dec. 27. *Drawings to Specification.*

Stone, artificial.—A mixture of clay and cinders or towns' refuse is fused in a destructor or other furnace, the clinker thus produced is ground, the carbon is separated by a fan, and the residue is mixed with adhesive matter and water, as described in Specification No. 24,612, A.D. 1899. The mixture may be used in the manufacture of artificial stone, or may be moulded into blocks or slabs which are hardened by a solution applied by flannel provided with capillary cords dipping into the solution.

A.D. 1902.

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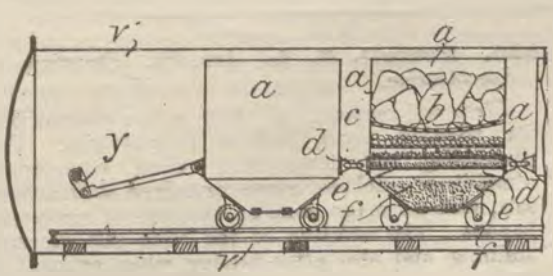
63. Steinberg, H. Schulte-. Jan. 1.

Slags, treatment of.—Consists in the conversion of Thomas slag into powder by acting upon the slag in a closed chamber with steam at a suitable pressure. The apparatus may consist of a rotating drum. In the form shown in the Figure, a stationary vessel v is employed, into which are run trucks a containing a grating b for supporting the blocks of slag, and below this grating are a number of sieves c, d, e, each one finer than the last. The trucks are connected together, and one of them is connected with a rotating crank y which gives a reciprocating motion to the trucks, whereby



choking of the sieves is prevented. The powder produced collects in the space *f*, and the unreduced pieces are subjected to a repetition of the process. If a grating of wide mesh is employed, the sieves only need be reciprocated.

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383. Brooke, N., and **Glossop, W.** Jan. 6.

Stone, artificial.—The waste material from York stone quarries is ground to powder, and the impalpable dust or flour is extracted by washing or other suitable means. The powdered stone is mixed with Portland cement or other suitable binding-material, with the addition of water, and the plastic mass is subjected to hydraulic pressure in porous moulds to form building-blocks, paving-stones, &c.

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386. Wolskel, A. Jan. 6.

Asphalts.—In the manufacture of asphalt the sand or silicious grit is roasted with constant stirring in a reverberatory furnace at a temperature of about 800° F., and is then cooled and ground to the required degree. The sand is again heated to about 350° F. before adding the melted bitumen or asphaltum. The asphalt is spread *in situ* by hand floats &c.

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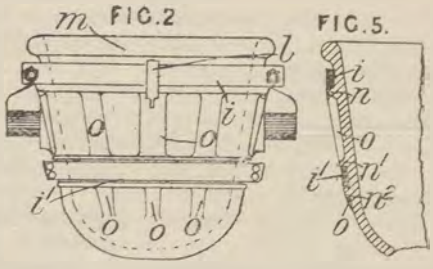
554. Dewhurst, J. H. Jan. 8.



Casting.—Relates to improvements in the slag ladles and appliances described in Specification No. 14,749, A.D. 1900. Instead of casting slinging lugs on the walls of the ladle, links *l* are attached to the band *i* clipped to the ladle between the rim *m* and the rib *n*, while a second band i^1 is clipped to the ladle between the ribs n^1, n^2. The walls of the ladle are also strengthened by vertical ribs *o*.

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830. Ferrell, J. L. Jan. 11. *Drawings to Specification.*

Fireproof compositions.—Relates to a composition for treating wood, such as railway ties. For preserving and fireproofing wood, commercial aluminium sulphate, alone or mixed with a basic salt, such as magnesium or ammonium carbonate, is used. The addition of the basic salt prevents staining and also after-flaming when exposed to fire.

1465. Wirtz, L. Jan. 18.

Slags, treatment of.—Relates to the treatment of slag, from blast furnaces and the like, to obtain a material which may be used in the manufacture of paints or for other purposes. The slag is steeped in a solution of hydrochloric acid or of chloride of iron, zinc, or copper. The filtrate obtained therefrom is mixed with a solution of sulphate of iron, zinc, or copper. The precipitate obtained is separated and dried in the usual way.

1998. Williams, L. Jan. 25.

Cements; refractory substances.—Ground magnesite is moulded into bricks or blocks, which are burnt at a high temperature, and may afterwards be used for unexposed places in furnaces not subject to heavy pressure, or may be ground into a cement or composition for making or repairing furnace bottoms and tapholes, setting magnesite bricks, and for making crucibles, tuyères, bricks, stoppers, nozzles, and sleeves for pouring molten metal out of ladles, and moulds for casting metals. The composition is mixed with crude or semi-calcined magnesite, clay water, hydrochloric acid, fluor-spar, or other binding or setting medium, and a resinous or adhesive vegetable substance may be added. The mixture is moulded into bricks or articles which are burned in a furnace or kiln at a high temperature. By this method of manufacture, the preliminary calcining of the crude magnesite is dispensed with.

2226. Bowler, J. Jan. 28.

Refractory substances.—A mixture of Stourbridge clay and ground clinker or refuse from dust destructors or other furnaces is moulded into fire-bricks and fireballs or lumps which are dried and burnt, and may be glazed.

2379. Zanner, A. Jan. 29. *Drawings to Specification.*

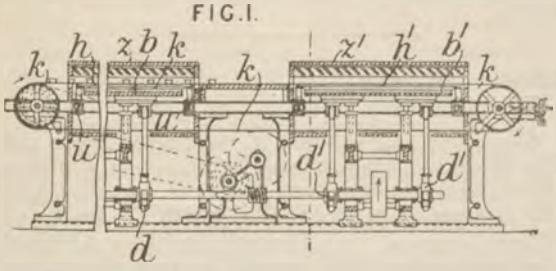
Cements.—A cement for cementing stoneware plates to cast iron, and for filling up the joints between the plates, consists of a mixture of asbestos and soluble glass.

2522. Whittaker, L., and **Whittaker & Co., C.** Jan. 31.

Stone, artificial.—Sand, lime, and water are mixed together in definite proportions, and a current of hot air is passed through the mixing-troughs to promote chemical action, and heat and dry the material, which is transferred by a shoot to a brick or block pressing machine.

2600. Franke, P. R. Jan. 31.

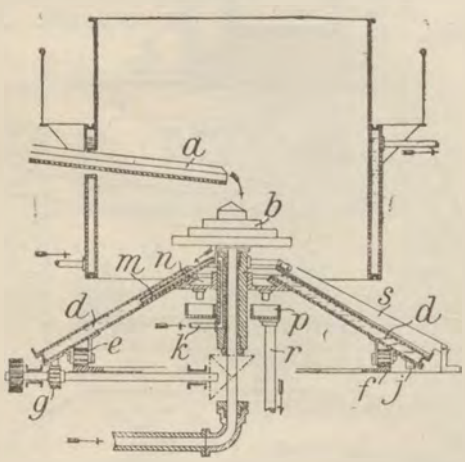
FIG. 1.



Casting chocolate. Moulds filled with plastic chocolate are carried by endless bands *k* over vibrating frames or bars *b*, b^1, which are moved up and down between gratings or stationary bars *h*, h^1 by eccentrics *d*, d^1. On the descent of the frames *b*, b^1, the endless bands come in contact with the bars *h*, h^1, and the moulds are agitated with the object of causing the chocolate to settle down and fill the moulds. In order to deaden the sound produced by the moulds jumping on the beating-tables, the latter are covered in by muffling-caps *z*, z^1. A table or bridge is arranged under the bands between the beating-tables to allow the brushing and polishing to proceed. The amount of vibration imparted to the moulds is regulated by raising or lowering the gratings *h*, h^1 by eccentrics *u* operated by handles and connecting-rods.

2671. Clark, A. M., [*Fellner & Ziegler*]. Feb. 1.

FIG. 1.



Cements; slags, treatment of.—Relates to improvements in the apparatus described in Specification No. 10,857, A.D. 1901. The molten slag falling from the shoot *a* on to the rotating stepped cone *b* is deposited in a finely-divided condition upon a rotary water-cooled table *d*, which may be internally or externally coned, or may be flat. The table is provided with rollers *e* running on a circular track *f*. It is driven by a pinion *g*, which gears with a toothed ring *j*. The cooling-water enters at *k*, passes through the pipe *m* into the space between the walls of the table, overflows into a receptacle *n*, and passes thence to the trough *p* and pipe *r*. The table rotates beneath a fixed scraper blade *s*, which ensures the discharge of the material at a fixed point.

2742. Taylor, G. A., and **Macleod, W.** Feb. 3.

Plasters; sound-deadening compositions; casting.—Relates to the production and utilization of light fibrous plasters, capable of being cut, bored, and punched with ordinary tools without the risk of cracking. Quick-setting Portland cement, Roman cement, Keene's cement, or plaster of Paris is incorporated with bagasse, which has been thoroughly shredded in disintegrating-apparatus. Water is then added, and the fibrous cement mixture is used like ordinary plaster in a mould, or applied by a trowel &c. The surface may be finished with a thin wash of pure plaster, to hide any visible fibres. The plaster is applicable for ordinary ceiling plastering, and for cornices, friezes, and high-relief work, in which case it may be cast in flexible moulds. Slabs for partitions may be made from it, and also noise-preventing linings beneath the floors. Panels, suitably moulded and ornamented, may be fastened by screws to ceiling joists, the joints being covered by mouldings of the same material, or of wood or metal, or finished off with pure plaster. The cement employed may be economized by casting the work in layers containing successively-larger proportions of bagasse, the back layer containing as much as 25 per cent. by weight. The composition used in the first layer may be suitably coloured or stained. In casting panels for ceilings, the mould may be divided off into sections by means of thin pieces of metal while the first layer is being cast, the sections being filled in with variously-coloured compositions. The backing-layers bridge over the breaks in the face layer, and make the structure continuous.

2843. Kaas, A. V. H. F. C. Clausen-. Feb. 4.

Plasters; cements.—A plaster or cement for covering walls, ceilings, floors, woodwork, &c. is obtained by mixing about 2 parts of an alkaline metal albuminate, or an albuminate of alkaline earthy metals, with 4 parts of paper pulp, and 1 part of wool-refuse, asbestos fibre, cowhair, wool flock, or the like. The use of the fibrous materials retards the setting or changing of the albuminate from a plastic to an elastic rubber-like condition.

3331. Ingham, W. P. Feb. 10.

Slagwool, preparation of.—Relates to the production of slagwool by blowing molten slag into a collecting chamber by means of a steam jet.

The slag is run from ladles through the stoppered orifice a^3 into the body a of a gas and air regenerative reversing-furnace, of the Siemens-Martin type, which is supported between the sides b of

FIG.1.

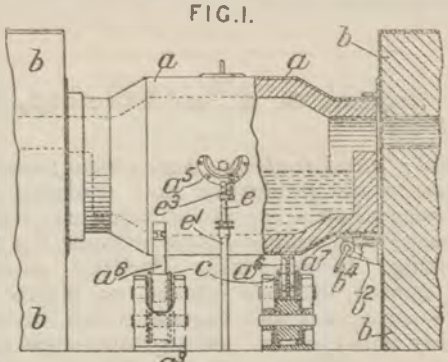
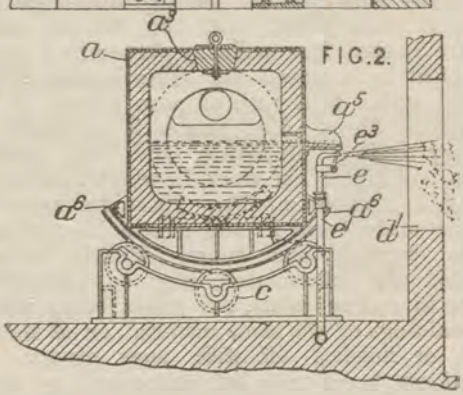


FIG.2.



the regenerators. The body consists of a wrought-iron or steel casing lined with refractory material and provided with segmental rails a^6, which rest on grooved rollers c. A segmental rack a^7 gears with a worm b^2, which can be rotated by means of a handle b^4, to rock the furnace for discharge of the slag. The discharge takes place by a spout a^5 connected by a link e^2 to the upper portion e of a telescopic steam pipe e^1. The steam jet blows the slag through the aperture d^1 into the collecting-chamber. The slag is maintained in a fluid condition by the furnace, and is suitably annealed therein. If the steam pipe is fixed instead of being telescopic, the spout is formed in two sections, of which that adjacent to the steam jet is carried by a suitable standard, and the section pivoted to the furnace has a sliding movement relatively to it. The worm-wheel and segment b^2, a^7 may be replaced by a radial arm on the furnace slotted to engage pins on a nut, which can be raised or lowered by means of a vertical screw-threaded shaft supported in suitable bearings. Reference is made to Specifications Nos. 23,670 and 25,468, A.D. 1897.

3358. Greenway, G. P. Feb. 10. *Drawings to Specification.*

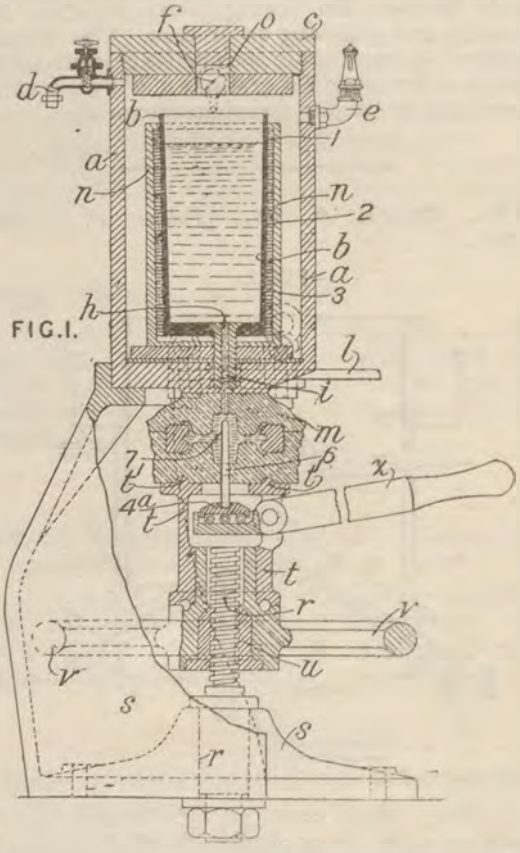
Refractory substances.—A material for making fuel-economizers for use in fireplaces is formed of a mixture of fireclay and a binding-agent, such as asbestos, magnesia, pipeclay, &c. The materials are mixed, pressed to the required shape, and baked.

3364. Marks, G. C., [*Frerichs, C.*]. Feb. 10.

Stone, artificial.—Glazed calcareous sandstone and like blocks &c. are produced by thoroughly mixing the materials, such as lime and sand, and moulding the mixture into blocks &c., which are hardened by steam, coated with glazing-material, and burned at a temperature high enough to fuse the silicate of lime. The preliminary hardening treatment by steam may be sufficient only to render the mass capable of being easily worked by hand. The blocks may be subjected to a preliminary burning process at a high temperature after treatment with steam to produce the necessary rigidity, and may afterwards be glazed and burned at a lower temperature.

3367. Cadot, A. Feb. 10.

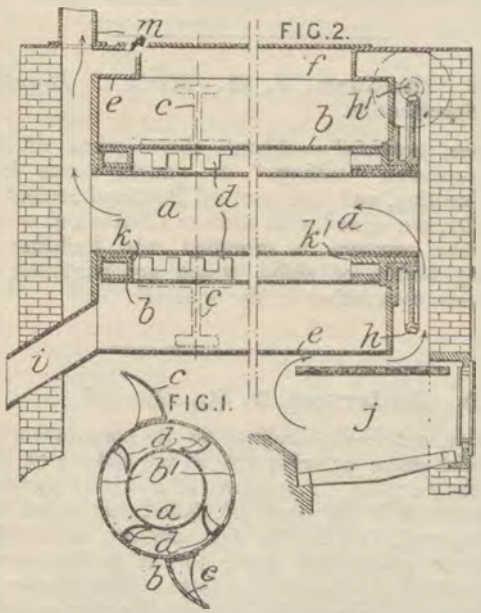
FIG.1.



Casting.—An apparatus for casting or moulding articles from metals, alloys, or other materials comprises a crucible b in an airtight casing a to which compressed air or gas, such as carbonic-acid gas, is admitted by a pipe d when the material has been melted, so that it may be discharged through a passage h into the mould m when a plug valve i has been opened by a lever l. The crucible

is heated by one or more of a set of electrical resistances 1, 2, 3 surrounding it and enclosed in a casing *n*, or, if the extremely-high temperatures are required, electrodes may be mounted in the cover *c* of the casing *a* to produce an arc. The casing is provided with a safety-valve *e*, pressure gauge *f*, and blow-off valve, and is supported on a bracket *s* having a screwed spindle *r* on which the mould-table *t* is raised and lowered by turning a hand-wheel *v* and nut *u*. The material is supplied to the crucible through a plug hole *o* in the cover *c*. In making a casting such as a grooved pulley 7, the mould is raised tightly against the casing and compressed gas admitted to the casing, the pressure being raised by the heat of the crucible. The valve *i* is then opened and the mould filled. When the material is nearly set, a rod 6 is raised by a lever *z* to expel the surplus material from the mould into the crucible. The rod is supported by a block 4*a*, mounted on rollers on the lever *z*, and passes through an aperture in the mould, projections *t*¹ being provided on the table to register the mould with the passage *h*. Instead of moulds for casting separate articles, dies, draw-plates, or the like may be used, with or without a mandrel, to produce continuous lengths of wire, rod, tubes, &c., the pressure being graduated or shut off and the crucible replenished to preserve the continuity of the article produced, the length of the dies &c. being such that the material will solidify during its passage through the same. The dies &c. may be secured to the casing *a* or the table. The heating of the crucible and the pressure of the gas are regulated to suit the fusing-point of the material and its liability to absorb gas, and to expel gases from the casting.

3401. Danzer, H. Feb. 11.



Asphalts.—Relates to the construction of bitumen and asphalt cauldrons, fixed or portable, and comprises the combination of a central horizontal heating-flue with kneading or mixing apparatus. In the fixed cauldron shown in Fig. 2, the setting of which may be of any suitable character, the central flue *a* communicates at one end with the furnace space and at the other end with a chimney or smoke-box. The course of the furnace gases from the furnace *j* to the chimney *m* is shown by the arrows. A cylindrical body *b*, Figs. 1 and 2, provided with large lateral openings *b*¹, is fixed upon end-pieces *k*, *k*¹ capable of rotating on the flue *a*. A worm and wheel *h*¹, *h* effect the rotation of the body *b* to mix the materials. The body *b* bears external and internal mixing arms or scoops *c*, *d*. The materials are supplied to the cauldron through an opening *f* in the shell *e*, and are discharged at *i*. The mixing-arms may be straight instead of curved, and external arms only may be employed, in which case the cylinder *b* is imperforate and loosely surrounds the flue *a*. The shell *e* may be adapted to rotate about the fixed flue, the mixing-arms then projecting inwards towards the flue.

3402. Newton, G. A. Feb. 11.

Stone, artificial.—A composition of sawdust, Venetian cement or magnesite, magnesium chloride, and water is placed in moulds which have previously received the colouring-material for the stone to be imitated. The composition may be moulded into blocks, flooring-slabs, wall coverings, tiles, statuary, table tops, &c. In the Provisional Specification, alum, borax, and glycerine are included among the constituent materials.

3493. Jurschina, F. Feb. 11. *Grant of Patent refused.*

Stone, artificial; refractory substances.—Relates to the manufacture of artificial stone, proof against weather and temperature influences and resistant to acids. The stone is applicable to building purposes, for ornaments, figures, facing-stones, and paving stones and tiles, and as a refractory material. To a solution of sodium silicate is added a small proportion of finely-ground augite or of an easily-fusible clay, or other fusible mineral slag or refuse. The resulting solution is added to finely-ground sand or powdered stone, and the plastic material is moulded or cast. The cast or moulded blocks are dried and burnt.

3518. Jurschina, F. Feb. 11.

Stone, artificial.—Artificial acidproof filtering-stone, suitable for chemical purposes, is prepared by moistening sharp sand or powdered stone with a solution of sodium silicate, pressing or casting the mass in moulds, and drying and baking the moulded blocks. Stone for use in filtering water is prepared by moistening a mixture of ground diorite and chalk, and proceeding in a like manner.

3555. Budd, B. Feb. 12.

Cements; plasters; concretes; stone, artificial; fireproof compositions.—Relates to the production of concrete, artificial stone, plaster, &c. for building, paving, and other purposes, or for moulding paving-slabs, door steps &c., door and window heads and sills, quoins, bricks, blocks, columns, &c., or plastering walls, ceilings, roofs, &c. Solid materials, such as pulverized granite, slag or clinker, gravel, and cement, are mixed in the desired proportions and are rendered plastic by the addition of a liquid consisting of magnesia, silicate of soda, and red oxide of iron in water. Burnt marble may be added either to the liquid or to the solid materials. When moulding paving-slabs, steps, bricks, blocks, water cisterns, &c., the mould is lined with sacking soaked in the liquid described above. The product is fireproof and damp-proof.

4137. Thompson, W. P., [*Bevilacqua, G.*, and *Bevilacqua, G.*]. Feb. 18.

Fireproof compositions.—The composition consists of fibrous silicates, such as slag wool, potassium silicate in solution, asbestos, calcined magnesia, graphite or other refractory pigment, powdered cork, and powdered puzzuolana, with or without some binding-agent, such as lime. Certain of the ingredients may, if desired, be omitted.

4298. Macfarlane, A. T. Feb. 20.

Refractory substances; fireproof compositions.—A basic refractory material is prepared by mixing absolutely-dry Portland cement with gas-tar residue or the like, which must also be in a perfectly anhydrous state. The cement may be heated, to facilitate the mixing or kneading process. The composition may be moulded into bricks, blocks, slabs, or tiles for furnace linings, fireproof flooring, &c., the bricks &c. being burnt in a kiln like ordinary firebricks. It may also be applied *in situ* in the plastic condition as a furnace lining, or as a floor or wall covering.

4644. Evans, W. E., [*Croizier & Cie., H.*]. Feb. 24.

Stone, artificial.—Relates to the manufacture of artificial stone in accordance with the process described in Specification No. 18,058, A.D. 1899. The mixture of hot sand and lime which has been slaked in the first mixing-apparatus is received in a steam-jacketed receptacle, through which it falls without settling on its way to the second mixer. When fat lime is employed, the whole of the water may be added in a single closed mixer, the second mixer being dispensed with. A high temperature should be maintained throughout, up to the time of moulding; the receptacle for the mass prior to moulding is steam-jacketed for the purpose.

4773. Smith, A. Pye-. Feb. 25.

Concretes.—Non-slipping slabs &c. are moulded from concrete composed of small graded fragments of a hard material, such as flint or glass, and a softer material, such as limestone or sandstone mixed into a paste with cement. Pieces or fragments of lead may be embedded in the face of the slab.

4914. Schwob, E. Feb. 26.

Stone, colouring; stone, artificial.—Relates to the colouring of slabs, columns, &c. of calcareous or other stone, to imitate marble. The stone is finely polished with pumicestone, and the parts which are not to be coloured are coated with a mixture of turpentine oil, spermaceti, beeswax, and stearin dissolved in a water bath. The colours employed are mineral colours, and are dissolved in water or in 90 per cent. alcohol, 5 per cent. of alum being added. The colours, having been applied to the stone and allowed to dry, are fixed by the application of a mixture of linseed oil and turpentine oil. When this is dry, any excess of colour and oil is removed with pumicestone, and a finishing polish is applied by means of an alcoholic solution of shellac.

4917. Marks, G. C., [*Frerichs, C.*]. Feb. 26.

Refractory substances; stone, artificial.—Dinas firebricks, or refractory bricks, made from a mixture of sand and lime are subjected to a preliminary steaming process to harden them sufficiently to enable them to be transported to the kilns in which they are burnt.

5392. McLean, J. H. March 4. *Drawings to Specification.*

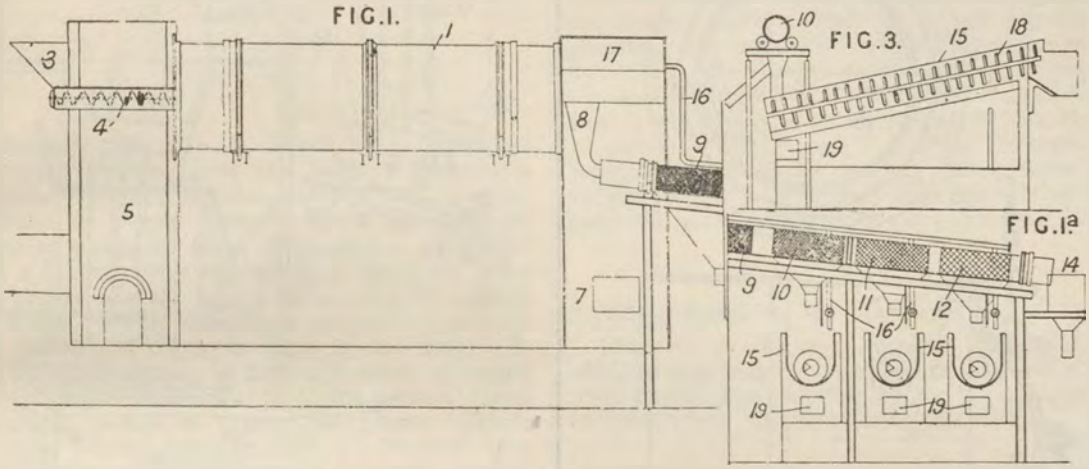
Stone, artificial.—About three parts of dry finely-ground "tailings" or quartz waste from gold mining, and one part of Portland cement or the like, are mixed with sodium silicate and water, and the mixture is moulded into building or paving blocks or slabs, which are hardened by exposure to weather in the open air.

5710. Anderson, O. H. March 7.

Stone, artificial.—Relates to the manufacture of artificial stone or brick and to the slaking of lime for the purpose. A mixture of about 95 per cent. of sand and 5 per cent. of slaked and dried lime is prepared, and to the dry mixture is added a sufficient quantity of water to enable the mass to be moulded into bricks or blocks. The blocks are hardened in a suitable chamber by the action of steam at about 100 lb. pressure, excessive humidity being thus avoided. A sufficient quantity of lime for preparing a fresh batch of blocks

is slaked in the chamber simultaneously with the hardening process, the slaking taking place entirely through the action of the steam and of the moisture which it absorbs or removes from the blocks. Dry pulverulent slaked lime is thus produced, which may be sifted or passed through a pulverizer before use. Superheated steam may be introduced into the chamber after the action of the high-pressure steam is complete. Blocks may also be produced from sand mixed with lime which has been slaked, mixed with nearly twice its weight of sand, and heated to redness. In this case diluted hydrochloric acid is substituted for the water employed in the moulding process.

5835. Ryan, T. March 10.



Asphalts. — Relates to apparatus for drying crushed stone, gravel, &c., and coating or impregnating it with tar or bituminous compound, for paving purposes. Figs. 1 and 1[a] taken together show the drying and screening apparatus, and Fig. 3 the mixing or impregnating appliances. The wet stone from the crushers passes into a hopper 3 and thence through a conveyer 4 into the rotary drying-chamber 1, which may be heated by hot air or gas, or, as shown in Fig. 1, may convey hot gases from the furnace 7 into the uptake shaft 5. Helices in the chamber 1 feed the stone forwards to the shoot 8 and revolving screen 9, 10, 11, 12. Dust is removed at 9, three separate grades of stone issue at 10, 11, and 12, and large stones tail over at 14. The screened stone is received in troughs 15, Figs. 1[a] and 3, tar being supplied to it from the heating-tank 17 through pipes 16. The troughs are inclined upwards, and the conveyer screws 18 mix and agitate the material. Furnaces 19 may heat the trough. Excess of tar drains into the pool at the lower end of the trough, and a channel containing a small screw conveyer may be formed along the bottom of the trough, to assist the downward travel of the surplus tar. Exhaust steam from the engine may pass through jackets on the drying and mixing chambers.

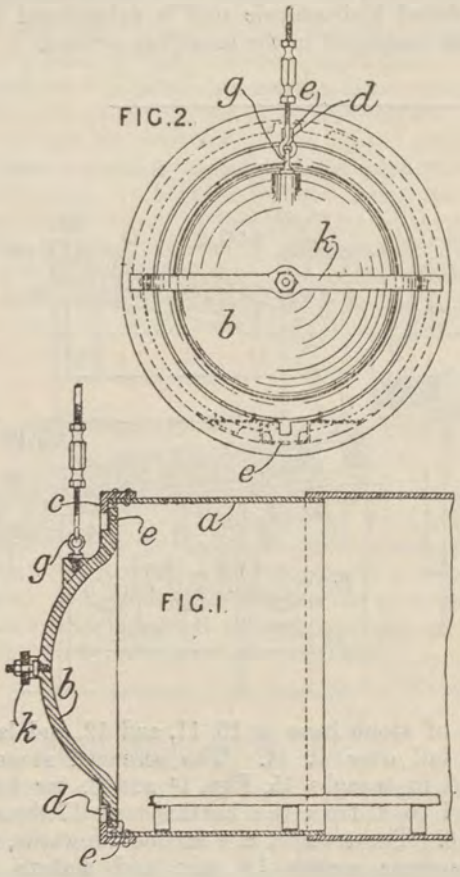
6016. British Uralite Co., and **Friswell, R. J.** March 11.

Fireproof coverings and compositions.—Relates to the manufacture of sheets of flexible fire-resisting material adapted to be sawn, or pierced with nails, screws, &c. A pulp of finely-disintegrated asbestos, with or without chalk or other filling-material, is made into sheets in a millboard machine, the superfluous moisture being forced out of the material by a roller pressing against the drum round which the sheet of pulp passes. The sheet is sparged or sprayed with a weak solution of sodium silicate and sodium bicarbonate, so as to leave from 3 to 7 per cent. of silica in the material. The solution may also be applied by means of rollers. The material is dried at a temperature of about 105° C., and is then ready for use. The sodium salts resulting from the reaction may be washed out if desired. The sodium silicate may be replaced by other alkaline silicates, and the sodium bicarbonate by ammonium, potassium, or calcium bicarbonate, &c. The sodium silicate and bicarbonate may be mixed with the pulp instead of being applied to the sheet. Slabs &c. may be moulded from the pulp.

6378. Wallis, G. P. March 15.

Stone, artificial.—Relates to the construction of chambers for hardening bricks or blocks of artificial stone by means of steam under pressure, such as are described in Specification No. 9441, A.D. 1899. To the shell *a* of the chamber is riveted, either internally or externally, an angle-ring *c* with an inwardly-directed flange. Slots *d* are cut at

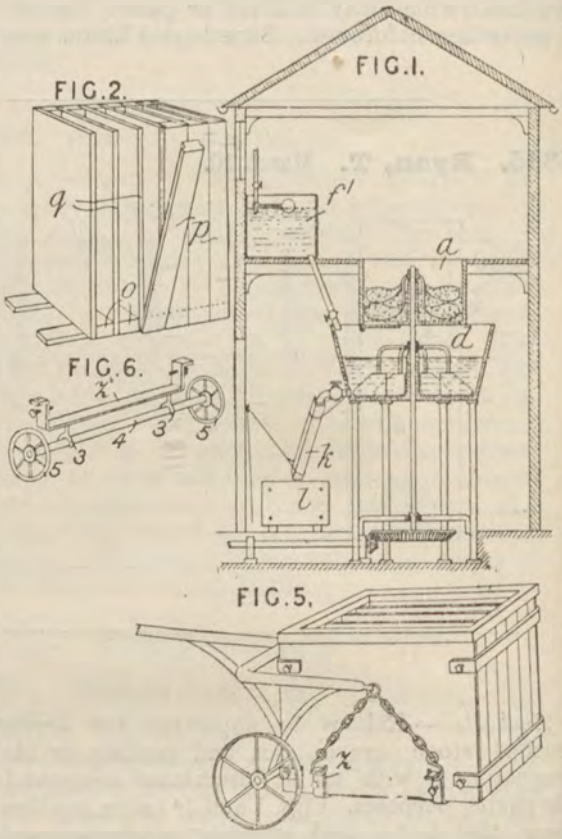
opposite points in the flange, and the domed cover-plate *b* is turned edgewise and passed through the slots. It is then brought against the inner face of the flange, and is turned on its axis



sufficiently to bring the lugs *e*, *e* over the slots *d*. A bridge-piece *k*, or its equivalent, holds the cover in place until the steam pressure is applied, the pressure itself producing a steam-tight joint. The cover is hung by an eye *g*, and the eye may be attached to a fixing moving in a segmental slot provided with antifriction rollers to facilitate the turning of the cover on its axis. When trucks are used for conveying the blocks &c. into the chamber, hinged rails preserve the continuity of the track when the cover is removed.

6400. Thomson, G. F. March 15.

Stone, artificial; concretes; casting flagstones &c. Relates to the manufacture of artificial stone, and the casting of flagstones, blocks, &c. from it. Portland or other cement is mixed dry with granite chippings, sand, blast-furnace slag, or other waste material in the mixer *a*, and water is supplied in measured quantity to the mixture from the tank f^1. The composition as mixed in the vessel *d* is of almost liquid consistency, and is supplied to the moulds *l* through a trough *k*. The moulds are built up of parts *o*, *p*, Fig. 2, and division plates *q*, and are bolted up between end-plates. The flagstones &c. are cast in the vertical position. The separate parts *p* may be replaced by side-plates grooved to receive the division plates. The moulds may be of metal or wood, and the division plates of slate, glass, metal, wood, &c. A low coaming may be placed round the top of the mould, so that the liquid material overflows from

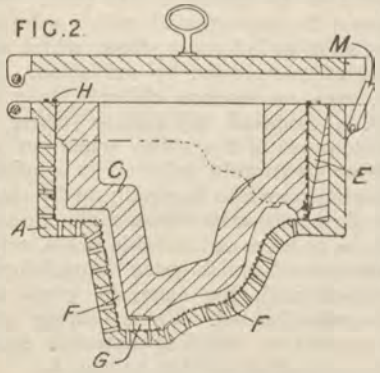


one compartment to the next. The upper surface is then levelled, and the coaming is removed to allow the surplus water to run off. Pressure is applied by means of a plunger exactly fitting one or more of the divisions in the mould. The coaming is replaced, and, after the initial set of the stone has taken place, water is poured into or on the mould. The fragments settle flatwise in the mould, so that they are more or less on edge when the flagstone is placed in the horizontal position. The larger fragments also tend to be nearer the centre of the flag, and the smaller ones at the surface. Fig. 5 shows a hand trolley for carrying the mould, to which the clamps *z* are fixed. In a modification, the clamps *z*, Fig. 6, are formed with forks 3, which are seated on the axle 4 which bears the wheels 5.

6421. Perkin, W. H., and **Whipp Bros. & Tod.** March 15.

Fireproof coverings and compositions. — Raw cotton, and cotton goods such as flannelette, are rendered fireproof by treating with a soluble ferrocyanide, such as potassium or sodium ferrocyanide, and afterwards with a solution of a metallic salt, such as zinc acetate. The ferrocyanide may have a strength of 24° Tw. and the zinc acetate one of 26° Tw.

6495. Mellor, P. H., and **Hassall, S. W.** March 17.



Casting.—Clay slip is forced by a pump or hydraulic pressure into the space F between a perforated iron or pervious mould A and a plaster-of-Paris or porous core C, which is secured in place by a plug G, metal lining-plates, wedges E, and a hinged cover secured by a clamp M. The perforations in the mould are covered by a cloth H, which allows the water to escape but prevents the passage of clay. In place of the wedges E, the lining-plates may be pressed inwards by hinged flaps or toggle-links. For moulding pedestal closet basins, a mould is formed of plaster-of-Paris sections jointed together, and a perforated iron core carries a detachable rim made of sections secured in place by screws.

6727. Joukoffsky, W., and **Strouvé, P. de.** March 19.

Refractory substances.—The elimination of sulphur from iron or steel during the Thomas, Martin, or other process, is effected by means of salt which is mixed with the materials used for making the basic linings of the converters or other furnaces. When treating highly-sulphurous pig iron, salt is added to the metal, as well as mixed with the basic lining-material of the furnace. In the Bessemer or acid process, and in the puddling-process, the salt may be introduced into the molten metal by means of a rod carrying a sieve or box containing the salt, or by means of an iron tube packed at one end with the salt to be added.

6844. Boult, A. J., [*Hülsberg & Co.*]. March 20.

Stone, preserving.—Relates to a method of impregnating wood and other porous materials, such as artificial stone &c. The material is first subjected to air at a certain pressure, say 5 atmospheres, and is then treated with the impregnating-liquid at a greater pressure, say 15 atmospheres. The pressure is then allowed to fall to atmospheric pressure or below it.

7110. Gostling, C. R. March 24.

Cements.—The chalk, together with the contained flints, is crushed or ground in the dry or natural state. The clay, before it is added to the chalk, is dried sufficiently for the mixture to pass through edge-runners, and the material is then conveyed into a revolving cylinder heated by the exhaust gases from the rotary kiln, in order to dry it. Drying-floors, heated by steam or otherwise, may be used instead of the revolving cylinder. The material is elevated into hoppers, which may contain revolving mixing-blades, and from the hoppers it passes to tube mills or other grinding-machinery, which reduce it to an impalpable powder. The powder is conveyed through a worm conveyer to the rotary kiln, and, during its passage through the conveyer, a small percentage of moisture is added by means of exhaust or live steam, or water, for the purpose of binding the materials together. Instead of burning the powder in a rotary kiln, it may be made into brick form in a powerful press and burnt in any ordinary kiln.

7550. Marson, C. March 29.

Cements.—A cement composed of ground and calcined magnesite and magnesium chloride is used with canvas, flax, asbestos, &c. for the manufacture of slabs, pipes, &c. for building purposes.

7647. Sellars, J. C. April 1.

Stone, artificial; concretes.—Waste sand or materials from glass-polishing works, lead, iron, tin, and copper mines, slate, limestone, granite and sandstone quarries or shale beds, burnt clay or ballast, and waste lime from gas and chemical works, are ground or mixed into a stiff plastic mass, with or without the addition of ordinary sand, furnace slag, refuse-destructor residue, &c., "air fallen" hydraulic or common lime, or slurried hydraulic lime. The plastic mass is allowed to stand for some time and is then pressed or moulded into bricks, building-blocks, or other articles. The articles are air-dried, and hardened and matured by supplying water to them gradually by means of wicks, or a box with a perforated bottom and a thick felt pad bottom. Chippings or fragments of rock, stone, or the like may be mixed with the plastic material, and from 5 to 10 per cent. of Portland cement may be added. The hardening of the articles may be expedited by treating them with a solution of an alkaline silicate. The bricks or articles may be toughened by dipping them in tar, pitch, resinous gum, or the like dissolved in volatile oils or spirits, an alkali, or other solvent. Grooves or flutings may be made in the bricks &c. to receive mortar, wood slats, metal bars, &c. An electric current may be passed through the articles to promote chemical action. The Provisional Specification states that the articles may be coated as described in Specification No. 3527, A.D. 1899, [*Abridgment Class* Paints &c.], and also refers to Specification No. 24,612, A.D. 1899.

7796. Hooley, E. P. April 3.

Asphalts; slags, treatment of.—Relates to the "tar-"ring" of broken slag, macadam, &c. for road-making purposes, foundations, tar concrete, &c. The coating-material consists of

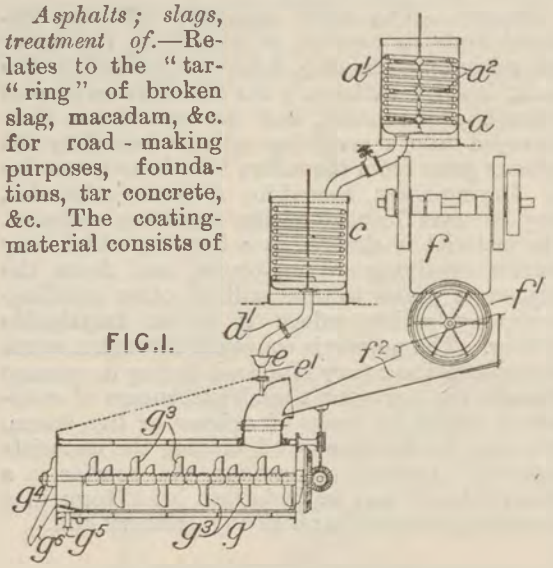


FIG. 1.

tar, pitch, Portland cement, and resin. The tar is placed in the mixer *a*, and is gradually heated by means of the steam coil a^1 to a temperature of about 212° F. The other ingredients are added, and are thoroughly incorporated with the tar by means of the mixing-arms a^2. The coating-mixture passes to the reservoir *c*, also steam-heated, and is supplied in graduated quantity by means of a valve d^1 to a trough *e*, from which the supply pipes e^1 proceed. The stone &c. broken in the crusher *f* is gauged by a revolving screen f^1 and passes down vibrating shoots f^2 to the steam-jacketed mixing-chambers *g*, which can be adjusted to any desired inclination. Helical blades g^3 mix and convey the materials, which are discharged at g^6. Surplus coating-material drains off through the grating g^4 and is discharged at g^5. Slag broken while hot from the blast furnace is preferably employed in the manufacture of the material, drying being thus rendered unnecessary.

7836. Schulthess, W. April 3.

Stone, colouring; stone, artificial; mortars.—The mortar or composition from which artificial-stone blocks are moulded may be coloured by the addition of a lake formed by precipitating a neutral or alkaline solution of an organic colouring-substance with the hydroxide of an earth alkali or metal. A moulded block of natural or artificial stone may be first impregnated with a solution of the alkali or metallic salt and then treated with an alkaline solution of the organic colouring-substance. If colouring-materials are used which are precipitated only at a high temperature, the two solutions may be mixed, the reaction taking place during the subsequent steaming. For this reaction, the most suitable colouring-matters are the "Bordeaux" colours, salts of manganese, zinc, lead, or iron being used with them. The lime used for making the mortar may be separately coloured by adding to the water used for dissolving it a solution of the organic colouring-substance, a lake being formed by reaction with the lime. An already-precipitated lake may also be added to the lime. Stones or masonry may be impregnated with a solution of a substance, such as indigogen, from which a colouring-matter is precipitated by oxidation. Metallic solutions, such as ferrous chloride, may also be employed, a coloured precipitate being thrown down in the pores of the stone when an alkaline carbonate or hydroxide solution is applied to it. The colouring may also be produced by employing solutions of metallic salts which can be decomposed by heat, so as to leave an insoluble oxide, carbonate, &c. A solution of bluish-green chromic hydroxide in sulphurous acid, for example, gives a green precipitate when heated. The colouring processes may be applied to building-materials containing lime, and to moulded articles, bricks, &c.

8071. Basenau, F. April 7.

Asphalts.—Asphalt for use in making insulating-compositions is purified by maintaining it for several days, with the exclusion of air, at a temperature exceeding its melting point.

8509. Perkin, W. H., and **Whipp Bros. & Tod.** April 11.

Fireproof coverings and compositions.—Improvements on the inventions described in Specifications Nos. 9695 and 23,557, A.D. 1901. The invention consists in treating the goods (A) with a solution of one or more soluble metallic salts such as acetate of zinc or aluminium, or sulphate of copper or nickel; (B) generally, but not necessarily, with an agent such as ammonia or an organic acid for preventing or retarding precipitation; and (C) with a solution of one or more soluble salts derived from metals, the oxides or hydroxides of which are capable of acting as acids, such as the aluminates, stannates, arseniates, and antimoniates, as well as the tungstates described in the prior Specifications. Several examples are given:—(1) The goods may be treated with aluminate of soda and dried and then with a mixture of tungstate of soda, zinc acetate, and acetic acid. (2) The first bath in (1) may be replaced by one containing equal parts of aluminate of soda and stannate of soda. (3) The goods are treated with stannate of soda and dried, and then with a mixture of sodium tungstate, zinc acetate, and acetic acid. (4) The goods are treated with a mixture of sodium arseniate, and sodium tungstate, and, after drying, with either zinc or aluminium acetate or nickel sulphate. (5) The goods are treated with sodium arseniate and dried and then with zinc-acetate or zinc-sulphate solution. (6) The goods are treated with potassium antimoniate and dried, and then with a mixture of sodium tungstate, zinc acetate, and acetic acid. (7) The goods are treated with stannate of soda and dried, and then with a mixture of sodium tungstate, zinc acetate, and ammonia. Other examples of salts in Class A are titanium chloride, potassium titanium oxalate, and stannic chloride

and tartar emetic. (8) The goods are treated with stannate of soda and dried and then with a warm bath of potassium-titanium oxalate. (9) The goods are treated with titanium chloride and partially dried and then with arseniate of soda or stannate of soda or tartar emetic. They are then washed and dried. Before washing they may be passed through a bath of caustic soda of 1·4° Bé. (10) The titanium-chloride solution in example (9) may be replaced by one of stannic chloride. (11) The goods are treated with aluminate of soda and dried and then with a warm mixture of tungstate of soda, zinc acetate, tartar emetic, and acetic acid. (12) The goods are treated with stannate of soda and dried, and then with a mixture containing zinc acetate, tartar emetic, and acetic acid. (13) The goods are treated in a mixture of stannate of soda and tungstate of soda and dried, and then with a mixture of tartar emetic and zinc acetate. (14) The goods are soaked in a bath containing tartar emetic and sodium tungstate and dried, and then in zinc-acetate solution. (15) The goods are treated in a bath containing tartar emetic, acetic acid, zinc acetate, and sodium tungstate, and are then dried and steamed. If the goods contain sizing, they may be washed before being treated. Or the goods may be passed first through a weak solution of oleine, and soap, soluble oil, or glycerine ; or when two baths are used, the soap or like material may be added to the first bath.

9303. Lake, H. H., [*Warren, F. J.*]. April 22.

Asphalts ; cements.—To enable an asphalt, cement, or composition, for use in making and laying pavements, sidewalks, foundations, gutters, floors, and the like, to be made and laid at a lower temperature than usual, a volatile liquefier and fixer, such as naphtha, benzine, or other coal-tar light oil, or a drying oil, is mixed with the hard asphalt and flux used in preparing the composition. Earthy, mineral, or stony ingredients may be added to form an asphalt mastic for surfacing pavements &c. When the composition is laid, the fixer slowly evaporates and the composition sets.

9332. Lake, H. H., [*Warren, F. J.*]. April 22.

Asphalts ; cements.—An asphalt cement or composition, consisting of asphalt and earthy or stony ingredients, for street or sidewalk paving, flooring, roofing, and the like, is rendered durable when exposed to the weather by the addition of the heavier oils obtained by distilling a liquid hydrocarbon having an asphalt base. In making a pavement, the asphalt-cement and oil, combined together and heated, are intermingled with the mineral particles, which form the base of the pavement.

9431. Weill, S. April 23.

Stone, artificial.—A composition known as marble cement, consisting of anhydrous alum or sulphate of alumina and anhydrous gypsum or anhydrite, is mixed with water to form a stiff paste, which is spread on a table and kneaded. The mass is divided up into several portions, which are separately impregnated with colouring-materials and are then kneaded together to form a veined mass, which may be moulded into slabs or objects of art, or used for covering walls &c. The surface may be polished with pumicestone, freestone, slate, &c.

9620. Perkin, W. H., and **Whipp Bros. & Tod.** April 25.

Fireproof coverings and compositions.—Relates to fireproofing processes described in Specifications Nos. 9695 and 23,557, A.D. 1901, and No. 8509, A.D. 1902. The goods are treated, preferably, without the use of salts in which the acid radicles do not contain metallic oxides. Ammonium salts and ammonia are also used. Among the salts used are tungstates, aluminates, stannates, arseniates, &c., and these are used in combination with an organic acid, such as acetic or formic acid, a salt or salts of ammonium, such as the chloride, sulphate, acetate, &c., with or without a body which will prevent or retard precipitation, such as ammonia. Ordinary metallic salts may, however, be used if desired. Six examples are given of ways in which the invention may be carried into effect : —(1) The goods are treated with stannate of soda and dried, and then with a bath containing tungstate of soda, ammonium sulphate, and ammonia. (2) Acetic acid is substituted for the ammonium sulphate and ammonia in (1). (3) The second bath in (2) may contain also ammonium chloride. (4) The stannate of soda is made somewhat stronger than in the preceding examples, and the second bath contains tungstate of soda, ammonia, and ammonium chloride. (5) A still stronger solution of stannate of soda is used in the first bath, and ammonium sulphate in the second one. (6) Stannate of soda is used as in example (1), and the second bath contains tungstate of soda, ammonia, ammonium chloride, and zinc acetate. The sizing is preferably removed from the goods before they are subjected to the treatment, and subsequently they are washed, dried, and steamed.

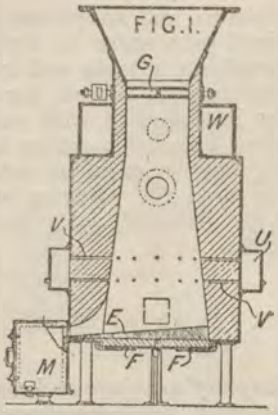
9658. Calico Printers' Association, and **Warr, W.** April 26.

Fireproof coverings and compositions.—Textile materials, such as cotton fabrics, wood, and other substances are rendered non-inflammable by impregnating them with titanium. The material is first preferably treated with sodium stannate, or its equivalent, and is then dried and saturated with a solution of salt of titanium, the material being again dried and the salt fixed by a suitable alkaline bath, such as sodium silicate or sodium tungstate and ammonium chloride. The material is afterwards washed and dried, and finished as required.

9974. Willshear, E. April 30.

Casting.—Slag from a refuse-consuming furnace is received into a box M, which has a removable front and a hinged base.

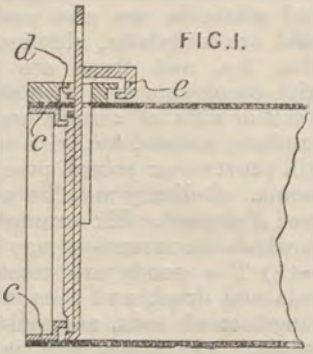
FIG. 1.



10,184. Kirgeis, P. May 2.

Stone, artificial.—The end of a steam chamber used for treating bricks, is closed by a plate inserted through an opening in the side and pressed against a suitable seating in a ring *c* by the internal pressure. The side opening is closed by a rib *d* and a projection *e* with its end turned over, both engaging seatings as shown.

FIG. 1.



10,218. Luft, A. May 3.

Stone, artificial and imitation.—Imitation meerschaum and coral are made of a non-inflammable white viscous substance, not attacked by strong acids or alkalies, and obtained by boiling a phenol or a substitution product thereof with an aldehyde and an acid; equal parts of phenol and 50 per cent. formaldehyde may thus be boiled with dilute sulphuric acid. The product is washed and dried. Other materials may be added, and the composition may be pressed in warm apparatus. The product may be boiled with a substance reacting with acids, such as a solution of an alkali or alkaline carbonate, allowed to settle, washed, and dissolved in acetone, alcohol, a mixture of formaldehyde and glycerine, or other solvent; the solution may be thickened by boiling, cast in moulds, and dried at 50° C., to give a transparent product.

10,399. Loewenthal, J. May 6.

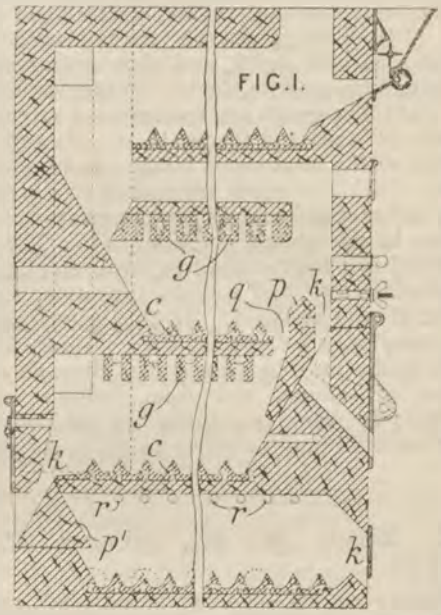
Stone, artificial; mortars; cements; fireproof compositions.—A composition applicable for use either as artificial stone or as mortar consists of fine clean quartz sand, pulverized quartz, alumite, magnesia, borax, graphite, mineral colours, heavy mineral oil, and water. The material is fireproof and waterproof, and is applicable as a cement for wood and iron as well as stone &c.

10,423. Hermes, R. May 6.

Asphalts.—An artificial asphalt is prepared by mixing 11 parts of tar with 2 parts of resin, melting the mixture, and adding 1 part of sulphur. When the reaction of the sulphur with the melted materials is complete, 11 parts of lime slaked to a powder are added.

10,853. Williams, M. May 12.

FIG. 1.



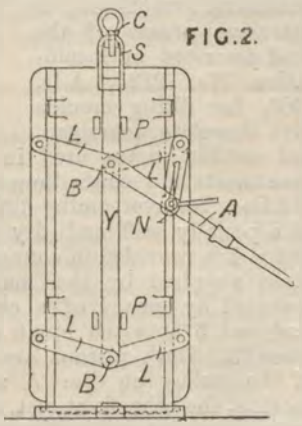
Cements.—Relates to a method of roasting or calcining cement-making materials in a crushed or powdered condition, by utilizing the incoming gaseous or finely-divided liquid or solid fuel, with air or steam, to blow it through the furnace or kiln, to mix and agitate it, and, if necessary, grade or sort it, so that the more finely-divided burnt material is removed from the furnace or kiln, while the less finely-divided, imperfectly-burnt portions are retained. Improvements in the construction of furnaces and kilns for carrying out the process are described, the arrangement being such that the air, gas, and steam supplied are heated and the interior surfaces of the kiln cooled. Fig. 1 shows in sectional elevation such a furnace or kiln adapted for burning gaseous fuel, the central portion being removed and the two ends brought close together. It consists of several superposed chambers through which the material passes in succession, though a single chamber may be employed, or any suitable arrangement of chambers may be adopted. The floors of the various chambers are formed of blocks with ridge-like projections, between which are passages *c* for the supply of gaseous fuel, the openings of these passages being so directed that the material is blown upwards and also laterally towards the outlet of the chamber, being at the same time turned over and intimately mixed with the burning gases. Close and prolonged contact of the material with the interior surfaces of the kiln is also prevented, so that the fluxing away of the lining is avoided. Poor gas may be enriched in the

kiln, by introducing powdered coal, coke, or the like with the material, or by blowing oil in a finely-divided state into the kiln. Alternate passages in the floor may serve for the supply of air, or the air may be delivered downwards from between gills or blocks *g* in the roof, which may be hollow for the passage of the air ; or it may issue through openings *r* in the side walls immediately beneath the roof. The fuel may, however, be introduced through the roof and the air through the floor, and any other suitable gas, or steam, may be delivered in the same way. For grading the partly-burnt material, an adjustable bridge wall *p* is provided, over which the lighter, completely-burnt particles are blown to the outlet *k*, while the heavier particles fall through the opening *q* to another chamber for further treatment. The entrance to the last chamber is shown provided with a movable block *p*, which, in the position shown, shuts off the chamber and opens an outlet direct from the preceding chamber. The air and gas may be previously heated by passing through jackets in the walls of the kiln, and the supply may be suitably controlled by valves and dampers to produce a uniform and continuous heat or a variable temperature or to obtain a succession of oxidizing or reducing flames as desired ; in any case they are heated by passing over the interior surfaces of the floor and roof, which are thus cooled at the same time.

10,926. Bolton, T. B., and **McNeil, J.** May 13.

Casting soaps. The sides B of the soap frame are connected by links L to bars Y, which slide between projections P on the ends, and are hung by shackles S from the lifting-bar C. One of the links L is made with a handle extension A, which may be locked in position by a hand-nut N.

FIG. 2.



11,035. Torkington, W., [*Knight, H.*]. May 14. *Drawings to Specification.*

Asphalts.—Relates to the manufacture of various articles from mixtures of maltha, asphaltum, bitumen, or the residuum of black petroleum with silicates, black moulding sand, or like material, the mixture being used either alone or combined with a sheet of paper, tissue, or other fabric. The oily or lubricating constituents, such as vaseline, are driven out from the bituminous compounds by heating them and by passing a stream of hot air through them, the oils &c. being carried away to a condenser. Fluxes, such as asphaltum, pitch, &c., may be added. When handling or working the compounds in moulding or shaping the articles produced, the tools used are heated to a greater degree than the compounds themselves. Apparatus is described for the manufacture of slabs, tubes, &c.

11,473. Palmer, N. F. May 20.

FIG. 3.

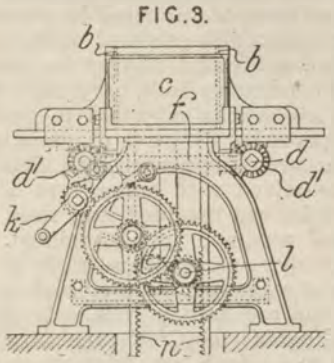
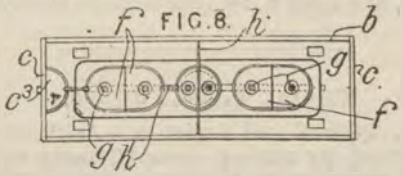


FIG. 8.



Casting concrete or artificial-stone building and paving blocks. Concrete is stamped and struck-off in a mould constructed of movable sides and ends *b*, *c*, which are withdrawn to release the moulded block by a crank shaft *d*, bevel gearing d^1, and pinions on the shafts *d*, *f*, Fig. 3, gearing with racks fixed to the sides and ends of the mould. A vertical core is arranged to slide through a loose bottom plate attached to racks *n*, and carries central racks gearing with pinions on a shaft *l*. The core and loose plate are moved simultaneously in opposite directions by a crank-handle *k* acting through toothed gearing on the racks. In order to produce quarter blocks, half blocks, or blocks of different sizes or shapes, the mould can be divided into compartments by partition plates *h*, h^1 fitted between grooved cores c^3, *f* and the sides of the mould. The cores *f* are divisible, and are secured by bolts *g* to a base-plate, which is formed with a longitudinal slot to allow for the adjustment of the bolts and cores. The loose bottom of the mould is made with apertures to pass over the cores, and covers the slot and holes in the base-plate through which the ejecting-rods pass.

12,762. Martin, W. H. June 4.

Cements.—A hard white cement, similar to Portland cement, is produced by mixing 1 part by weight of kaolin or china clay, free from iron, with 3 to 5 parts of pure white chalk, and adding to the combined weight from 2 to 5 per cent. of

gypsum, or 3 to 5 per cent. of magnesium chloride. The materials are thoroughly mixed in a wet or dry state, and burnt in a kiln.

12,796. Johnson, J. Y., [*Boehringer & Söhne, C. F.*]. June 4.

Refractory substances.—Hard, porous, refractory, non-corrosive, and non-shrinking earthenware articles for chemical or physical purposes &c. are made from a mixture of powdered or ground corundum, or aluminium oxide prepared artificially in a fused condition, and kaolin, clay, or the like. For cooling and condensing coils, covering-tubes for pyrometers, and articles subjected to great differences of temperature, 64 parts of granular corundum, 9 of fine corundum powder, and 27 of Klingenberg clay are mixed with water into a plastic mass. The articles are moulded and fired or burned in the usual way, and may be glazed. Diaphragms for electrolytic purposes are made of a mixture of 2 parts of corundum powder and 1 of levigated kaolin, and are hard, porous, only slightly permeable to liquids; they resist the action of acids and alkalies, and offer a low resistance to electricity.

12,861. Thom, T. M. June 5.

Stone, artificial and imitation.—Artificial marble is produced by mixing about 3 parts of finely-ground granular waste chips or materials from marble quarries or yards with 1 part of calcined limestone reduced to a fine powder, slaking the mixture, and moulding it into blocks which are dried and carbonated under heat and pressure as described in Specification No. 13,467, A.D. 1900. A speckled, veined, or coloured appearance in imitation of natural stone is produced by adding iron or copper salts or the like to the mixture. Artificial dolomite is obtained by mixing granulated uncalcined limestone with calcined powdered magnesia and adding a colouring-matter to produce a veined appearance.

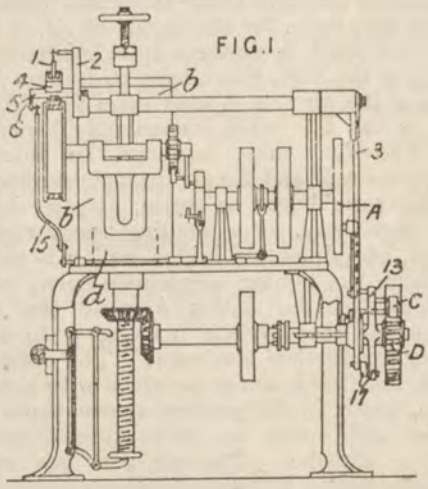
13,664. Christen, H. June 16.

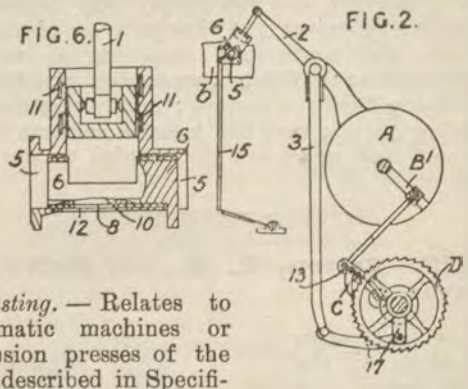
Asphalts.—A mixture of equal parts of powdered limestone and gravel is heated to 200° C. and worked up with from 10 to 15 per cent. of orinoco or other asphalt oil. From 15 to 25 per cent. of iron or steel filings is added, and the composition is pressed into slabs.

14,077. Whitfield, C. June 21. *Drawings to Specification.*

Cements.—In the manufacture of producer gas, chalk or limestone may be added to coking coal, and the clinker from the producer may then be ground and used as mortar or cement.

14,651. Gaebel, R. July 1.





Casting. — Relates to automatic machines or extrusion presses of the kind described in Specification No. 2123, A.D. 1900, for filling moulds with chocolate, marzipan, and similar pastes used in the manufacture of sweatmeats and confectionery, and particularly to additions for overcoming difficulties in the working of especially stiff and dry pastes. A subsidiary piston 1 is provided in connection with the mouthpiece supplied by the main piston *d*, and is operated by means of a connecting-rod 2 and a push-rod 3 actuated by an arm 17 of the pawl lever 13. Both pistons are controlled by means of the pulley or disc A so that, while one is moving, the other is at rest, and the stroke of the main piston is regulated by adapting the stroke of the ratchet device B¹, C, D. The mouthpiece comprises a barrel 5 formed on the vessel 4 of the piston 1 and secured to the cylinder *b* and provided with a side opening 12, and an inner half-open cylinder 6 provided with a slit 8 and adapted to be swung to and fro by means of a rod 15. A ledge 10 is provided near the slit 8, in order to prevent the formation of tongue-shaped strips by friction at the corners of the slit 8, so that the strips will fill up the corners of the moulds. The vessel 4 is provided with heating-channels 11 in connection with the heating-apparatus of the cylinder *b*. In a modified form of mouthpiece, suitable for thin paste, a wing-shaped spring-pressed cutter is provided.

15,269. Schwarz, O. H. July 8.

FIG.1.

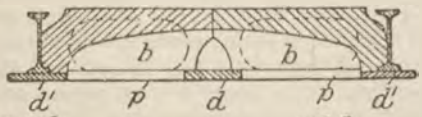


FIG.2.

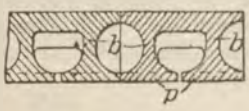


FIG.5.

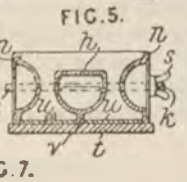


FIG.7.

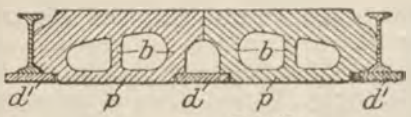
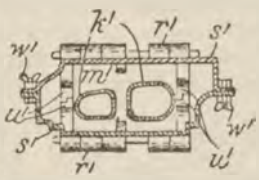


FIG.10.



Casting.—Hollow blocks of concrete, artificial stone, or the like are formed with recessed ends, and longitudinal ribs *b* and recesses, and the lower flanges *p* are recessed to receive plaster or like boards *d*, *d*^{1}, which protect the floor and joists from fire, and reduce the transmission of sound. Fig. 5 shows a mould for producing blocks of the shape shown in Figs. 1 and 2. The sides *m*, *n* of the mould are clamped to the ends by hooked bolts *k*, which are riveted to the ends, and are fitted with wing-nuts *s*. The core *h* is fixed to one end of the mould, and a web *v* of the core is arranged to slide between loose guide-plates *u* on the base-plate *t*, and is acted on by a thumb-screw to expand the mould when the plastic material has set. Fig. 7 shows a modified form of block, and Fig. 10 a mould for producing the same. Halves *s*^{1} of the mould are pivoted at *r*^{1} to the base-plate *m*^{1}, and are clamped together by thumb-nuts *w*^{1}. The cores *k*^{1} are fixed to the base-plate, and projections or cams *n*^{1} of the mould-section *s*^{1} automatically lift a loose bottom with the moulded block when the sections are turned back. The sections are connected by projections or crank-arms *u*^{1}, so as to move simultaneously, and the outward movement of the sections may be limited by chains.

15,318. Waxin, C. July 9.

Stone, artificial; cements.—Relates to the production of a material which can either be used as a cement for facing or repairing stone or can be moulded into artificial-stone building-blocks &c. Fragments of the marble, granite, or other stone to be imitated are pulverized and mixed with zinc oxide. The dry mixture is rendered semi-liquid with a solution of zinc and borax in muriatic acid, and can then be applied with a brush &c. as a cement, or can be poured into moulds. Pigments may be added to the mixture, and a composite or variegated stone may be produced by combining pieces or blocks which are about to set. The moulding may be effected under pressure.

15,528. Montupet, A. July 11.

FIG.2.

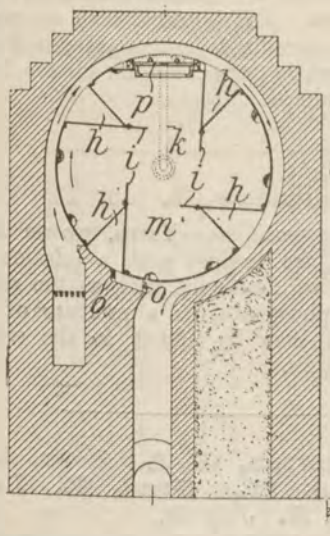


FIG.3.

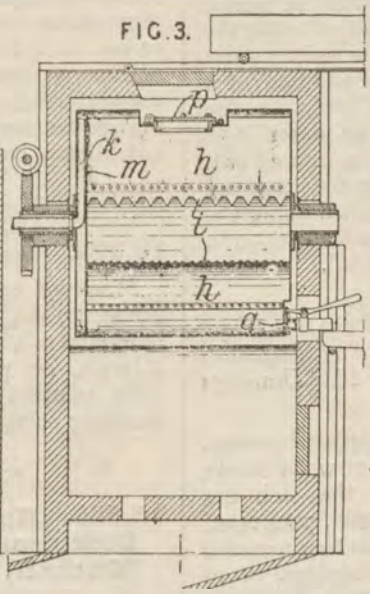
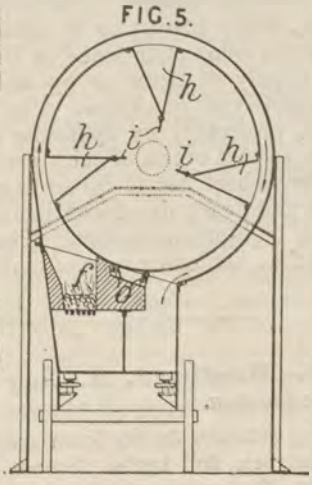


FIG.5.



Asphalts.—Relates to apparatus for use in the manufacture of asphalt for paving purposes &c., consisting of an externally-heated revoluble cylinder with hollow, inward projections *h*, having serrated edges *i*. Vapours are drawn off by the pipe *k* which passes through one trunnion and is

separated by the partition *m* from the main portion of the cylinder. A charging-door is provided at *p* and a valved aperture at *q* for withdrawing the charge. Flames and gases from the furnace *f* pass round the cylinder to the discharge flue. Brushes are provided at *o* to clean the cylinder and act as packing. The whole apparatus may be made portable, or a removable furnace may be provided, as shown in Fig. 5.

15,606. Szek, J. T. July 12.

Cements.—Relates to compositions to be cast into slabs &c. or used as plaster in urinals, stables, sheds, cattle trucks, &c. so as to deodorize and disinfect them. Peat reduced to fibre, alone or mixed with peat dust or waste peat, is mixed with infusorial earth and then saturated with crude carbolic acid, chloride of lime, &c., but preferably with oil distilled from peat tar, crude petroleum, or coal tar. Carbonate of lime, magnesium, or the like and sometimes also lime, alumina, aluminium sulphate, Portland or other cement may be added. The mixture may be coloured with iron oxide, charcoal, &c. and is made into a paste which can be moulded or used as a plaster to cover floors, walls, &c. The slabs or the coated walls &c. may from time to time be brushed over with any suitable disinfecting &c. liquid, such as carbolic acid, but especially with the previously-mentioned oil.

15,768. Sutcliffe, Speakman, & Co., and **Sutcliffe, E. R.** July 15.

Stone, artificial.—Artificial stone, bricks, paving-flags, and the like are made by mixing clinkers, ashes, slag, sand, gravel, granite chips, or the like with a hot solution of a calcareous cement, preferably Portland cement. The solution is heated by steam, either directly or by means of coils, the temperature being maintained at the boiling point by the supply of steam or by the addition of a small quantity of quicklime. The bricks &c. are moulded, preferably by hydraulic or other high pressure, so that excess of moisture is pressed out, and, after a short period for setting, are immersed in water and finally dried and hardened under the action of high-pressure steam. The immersion in water before hardening may be omitted.

16,005. Brodie, J. A. July 18. *Drawings to Specification.*

Casting cements &c. to form composite paving-slabs, channels, and kerbs. Stones or wood blocks to form the wearing-surface of the slab are assembled face downwards in a mould, perforated to allow of the escape of water, a jointing-material consisting of cement and stone chippings, or of asphalt or both, is then poured in and afterwards a backing of low-grade material with sound-deadening properties, such as that formed from pulverized destructor clinker.

16,066. Thwaite, B. H. July 19.

Cements; slags, treatment of.—Relates to means for manufacturing cement from blast-furnace slag. Pulverized lime, heated to a high temperature, is introduced into a vessel mounted preferably on horizontal trunnions and maintained at a high temperature. The vessel is then placed under the furnace to receive the molten slag. The lime and slag are mixed together by rotating the closed vessel. Instead of rotating the vessel, it may be provided with revolving paddles. The mixture is afterwards broken up and pulverized.

16,100. Heinrich, K., and **Haardt, T.** July 19.

Fireproof compositions; refractory substances; stone, artificial.—Relates to an improved fireproof material specially suited in the construction of safes, fireproof rooms and buildings, &c. The material consists of asbestos, blast-furnace dust, and Portland cement mixed with water and moulded into form. It is applicable to compound safes composed of nesting cases, as described in Specification No. 16,098, A.D. 1902, [*Abridgment Class* Fastenings, Lock &c.], and may be so applied as to leave air strata between the cases. The material is stated to be unaffected by thermite.

16,215. Collins, H. A. D. July 21.

Refractory substances.—A material for making retorts, crucibles, bricks, blocks, pottery, furnace linings, &c. is produced by mixing pulverized silica or silicious matter with one or more calcium or sodium compounds, moulding the mixture into the required form, and subjecting it to a high temperature. For bricks, blocks, and the like, the following ingredients are preferably used in the proportions stated, viz. :—Pulverized quartz, flint, or sea sand, 90 parts ; caustic soda, 2 parts ; milk of lime, 8 parts. For pottery, such as crucibles, the preferred ingredients are :—pulverized quartz, flint, or sea sand, 93 parts ; sodium silicate, 5 parts ; and calcium chloride, 2 parts.

16,372. Grimshaw, H. July 23.

Fireproof compositions.—Yarns, woven fabrics, garments, &c. are treated with a solution of an inorganic salt of ammonia, such as the sulphate, chloride, or phosphate, or a mixture of them. This solution may be added to the sizing or finishing solution.

16,665. Newton, G. A., Soar, J. W., Dickinson, M., Goad, R. J., and **Mitchell, D.** July 28.

Stone, artificial.—Relates to the manufacture of imitation marble, stone, slate, &c. Finely-powdered refuse, burnt clay, spar, quartz, gypsum, marble chippings, broken earthenware or porcelain, granite,

and the like are used, together with magnesite, magnesium chloride, water, and colouring-matter. The colouring-matter, mixed with magnesite and magnesium chloride, may be spread in the mould, then a thin layer consisting of a mixture of the materials above mentioned is placed over the colour, and finally a thick layer or backing of a similar composition is placed on the top and the whole allowed to set. To improve the surface of the block or slab after setting, it may be treated with a solution of magnesium chloride. The slabs are especially intended for forming billiard-table beds.

16,854. Gonnella, P. July 29.

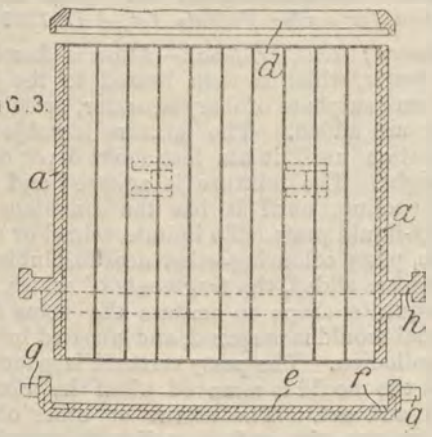
Plastic compositions; statuary; cements; stone, artificial.—A plastic composition, consisting of plaster, cement, alabaster, and the like, applicable for the manufacture of statuary and other art objects, and imitation wood and bronzes, is coloured throughout so as to produce the imitation desired. To represent wood, the composition is coloured with burnt sienna, umber, and Cologne earth; with burnt sienna and ivory green or black to represent bronze; and, for imitation ancient statuettes, earth is mixed with plaster, cement, or alabaster and coloured with red or yellow pigment. The objects are heated in a furnace, and may be hardened by immersing them in boiled linseed oil, stearin, or carnauba wax.

16,913. Krause, M. July 30.

Stonework, ornamental.—Embossed cards, stucco-work, and porcelain, celluloid, and other kinds of reliefs are sprayed obliquely with dark colour on the sides away from the light, and the effect may be further increased by spraying a bright colour obliquely on the sides towards the light.

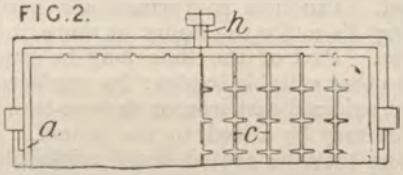
17,177. Passburg, H. Aug. 2.

FIG. 3.



Casting.—A mould for use in producing grooved or channelled slabs of sugar adapted to be readily broken into cubes or lumps has a series of recessed or indented partitions *c* fitted within a box or frame *a*. The frame is provided with a hopper-shaped cover *d*, and its lower edges rest upon india-rubber placed in dovetailed recesses *f* formed in a

FIG. 2.



base-plate *e*. Hooks, engaging with studs *g* on the base-plate, and projections *h* on the frame, hold the parts together.

17,369. Dhondy, K. S. Aug. 7.

Stone, artificial; concretes.—Relates to the manufacture of artificial stone for paving, flooring, and other purposes. Trap stone broken into small cubes is moistened with a 5 per cent. solution of sulphuric acid, and is mixed with sharp sea sand from which the salt, lime, and earth have been removed by washing with a solution of caustic soda. The mixture of sand and stone is dipped in a bath prepared by adding a solution of caustic potash to a solution of starch and heating the mixture with steam. Plaster of Paris is added to the compound, which is spread *in situ*, or moulded into tiles or bricks. To obtain a firm setting, the material may remain soaked in a solution of ferrous sulphate for from ten to fifteen days.

17,552. South, J. T. Aug. 11.

Stone, artificial; stone, colouring; cements.—Relates to artificial slate, applicable for roofing-slates, writing-slates, mantelpieces, clock cases, urinal slabs, blackboards, billiard and other table tops, counters, shop-window slabs, wall tablets, and other purposes. The following ingredients are mixed, preferably in the proportions stated:—Portland cement or its ingredients, 1 ton; ferric oxide, 2 lb.; potassium permanganate or other alkali, 1 lb.; colouring-matter as required; and blue-black, obtained by treating dried sprays of the vine or ground birchwood with tannic and gallic acids, ferrous sulphate, and aniline blue, ¼ cwt. Any one or two of the iron oxide, blue-black, or alkali may be omitted and the proportions stated may be varied. The materials are reduced to the plastic state, and the articles, moulded in layers according to the thickness required, are stacked for about three months and occasionally drenched with water.

17,579. Mills, B. J. B., [*Seigle, A.*]. Aug. 11.

Stone, artificial.—Artificial stone, formed by combining sand, 90 parts, lime 7, and metallic oxides 3 parts, under steam pressure, is moulded into building and like blocks for staircases, drains,

sewers, paving, roofing-tiles, and kennel stones. The materials are packed in the mould round a skeleton or trussing formed of metal chips or shavings interlaced with wire which has first been oxidized. Products so formed are hardened by steaming them for ten hours or more in a closed chamber. Part of the lime may be replaced by iron or other suitable oxides; for surfaces exposed to wear, oxidized cast iron or chrome-iron filings or granules may be added to the mould. The iron skeletons may be coated with oxidizable metals, and oxides, borates, or silicates of lead, potassium, or sodium, or boracic acid may be mixed with the mass to form silico-borates which are afterwards fused by heating the blocks &c. to produce vitrification.

17,580. Mills, B. J. B., [*Seigle, A.*]. Aug. 11.

Stone, artificial.—Artificial-stone building-blocks are moulded from a mixture consisting of sand 9 parts, and ground calcined calamine or zinc oxide mixed with slaked lime, 1 part. The products are hardened in closed chambers by the action of steam.

17,618. Rubitschung, C. Aug. 11.

Asphalts; stone, artificial.—Thin liquid tar, free from water, is mixed at a moderate temperature, not exceeding 200° C., with from 5 to 10 times its weight of gravel or divided stone, until a dry mortar is produced which does not stain on being touched. The mixture is then suddenly cooled and divided by allowing it to fall through cold air on to wide-meshed moving sieves, moving steps, or the like, and is collected, stored, and transported ready for use in a finely-divided granular form. In a modified process, tar at a temperature of about 150° C. is mixed with gravel or stone heated to between 200° to 300° C. Less than 10 per cent. of tar may be used, and dry binding-material, such as pitch, asphalt mastic, or the like, may be added to the granular mixture, or liquid pitch or bitumen may be added just before it is used. Sawdust may also be added. The composition may be moulded into paving-blocks, slabs, pipes, artificial stone, &c., or it may be stamped to form pavements &c.

17,744. Heany, J. A. Aug. 12.

Fireproof compositions.—An insulating fireproofing and waterproofing composition for metal surfaces and wires. A mixture of lime or its equivalent with albuminons or gelatinous material is laid on to the surface, and asbestos fibre is blown or otherwise applied. A further layer of composition may be applied and pressed into the asbestos.

17,745. Heany, J. A. Nov. 11, A.D. 1901, [*date applied for under Patents Act, A.D. 1901*].

Fireproof compositions.—Relates to a composition for rendering conductor wires or metallic surfaces fireproof. Linseed oil, from which volatile linic acid is driven off by boiling, is mixed and boiled with litharge and red lead. Gum copal may be added. The composition is applied hot to the asbestos covering of wires &c.

17,746. Heany, J. A. Nov. 9, A.D. 1901, [*date applied for under Patents Act, A.D. 1901*].

Fireproof coverings and compositions.—Relates to a method of coating wires and surfaces with a fireproof insulating-material. A wire &c., either cleaned or after having been dipped in zinc chloride, is coated with (1) a cement consisting of fish glue or gelatinous or albuminous material, water, and lime, or (2) a mixture of ammonium sulphate, boracic acid, sodium sulphate, ammonium chloride, sodium chloride, and water. Asbestos fibre is mixed to a paste with the mixture (2), and, after the coating has been applied, the wire &c. is coated with a mixture of (1) and (2).

17,748. Heany, J. A. Nov. 21, A.D. 1901, [*date applied for under Patents Act, A.D. 1901*].

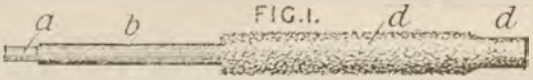


FIG. 1.

Fireproof coverings.—Wires are insulated with a fireproof covering. The wire is coated with an adhesive mixture *b* consisting of sodium silicate and manganese dioxide, upon which is blown a fluffy layer *d* of asbestos or similar material. The asbestos is conglomerated with the adhesive mixture by pressure or by heat and pressure.

18,476. Beaumel, L. A. Feb. 22, [*date applied for under Patents Act, A.D. 1901*].

Statuary; stone, artificial.—Alum is dissolved in warm water, which is then heated to the boiling point, and sulphate of baryta, water, or colouring-matter are added. The mixture is subjected to evaporation until it has lost about 3 per cent. of its weight. The mixture is agitated and stirred while cooling, until it has the consistency of a slightly-liquid paste. To imitate veined or streaky marble, pasty colouring-substances insoluble in the mixture are added, the fragments of which are of the requisite shape to imitate the veins &c. A sectional mould is prepared, and is coated internally with collodion. The pasty mixture is poured into it, and the mould is removed when the mixture is cooled and set. The statue or other object is dried in the air, and is polished or otherwise finished in any suitable manner. Imitation onyx or imitations of polychromatic objects are produced by pouring into a mould a solution of alum in water, and adding coloured fragments of alum.

18,561. Kroener, A. Aug. 23.

Castings; statuary.—Relates to an improved method of producing reproductions in wax &c. of parts of the human body, and particularly of injured or unhealthy parts. A plaster cast or hollow mould of the part or member is first taken, and a thin layer or skin coat of coloured wax or wax composition is applied to the interior wall of the cast by means of a brush. The colour should correspond as exactly as possible with the exterior of the healthy or unhealthy part to be reproduced. A representation of the veins, arteries, muscles, &c. visible through the skin is painted at the back of the thin coat aforesaid, and a second coat of suitable flesh tint is then applied. When this is sufficiently thick, the mould is filled in with composition, the colour of which is immaterial. The transparent nature of the materials causes the painted articles &c. to show through the skin in a natural manner. Unhealthy and inflammatory conditions can be reproduced in this way, blisters &c. being filled in with transparent wax or even with liquids. Compositions suitable for use are described, containing dammar resin, carnauba wax, beeswax, mastic, Japan wax, Burgundy pitch, paraffin wax, castor oil, and pigment.

18,829. Salamon, A. G., and **Williams, P.** Aug. 27.

Refractory substances; stone, artificial.—Relates to a process for removing sodium monocarbonate left by the methods of manufacturing "Uralite" described in Specifications No. 4628, A.D. 1898, Nos. 15,080 and 18,747, A.D. 1899, Nos. 18,698 and 21,496, A.D. 1900, and No. 6016, A.D. 1902. The sheets, after the final bicarbonation, are soaked in a solution of calcium chloride, and then dried, and again soaked, the process being repeated a third time, when the material is washed thoroughly and finally dried and stored. A 15 per cent. solution of calcium chloride and a drying-temperature of about 80° C. are stated to be effectual.

18,932. Schnetzer, K. Aug. 28.

Casting soap. Smooth metal moulds F are mounted in a cold-water tank A, and are fitted with suction and ejection plungers G, which are lowered to draw hot liquid soap from the supply tank B into the moulds, and are raised to eject the solidified blocks of soap from the moulds. The tank B is heated by steam or hot-water pipes R, and is fitted with slide valves S formed with perforations corresponding with the moulds. The plungers are mounted on a table, which is raised and lowered by screws operated by worm gearing. Two sets of moulds are fitted in the tank A, and the tank B is left over the moulds during half the time occupied in cooling, to allow of a subsequent inflow of soap. After the slides S are closed, the supply tank is moved over the other set of moulds.

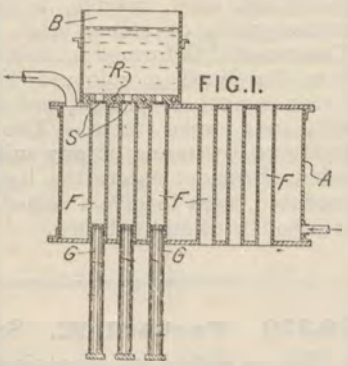


FIG.I.

18,953. Passow, H. Aug. 28.

Cements; slags, treatment of.—Relates to a process for producing cement, described, according to the Provisional Specification, in Specification No. 14,278, A.D. 1900, and consists in mixing equal parts of powdered vitreous and pumiceous slag prepared as follows:—Slag is vitrified by aërating it and cooling quickly; or slag, granulated in water, is dried at 200° C. Slag is made pumiceous by aëration and slow cooling; or slag sand is roasted at 1200° C. and cooled sufficiently quickly to prevent disintegration. 10 per cent. or less of Portland cement or lime, to bring the total lime contents up to 37 per cent., may be added.

19,305. Oates, W. Sept. 3.

Casting.—Relates to forming jointing-rings of bitumen or similar composition on the interior of the socket ends and on the exterior of the spigot ends of conduits for electric cables, and of drain pipes and the like. A base-plate *a* has a female mould *b* adjustably secured thereon by bolts *c*. A bracket a^{11} supports a vertical bar *d* carrying a slide *e*, which has a bracket supporting the male mould *f*. The bar *d* also carries an adjustable bracket *h*, to hold the pipe or conduit *g* in its correct position, and also a bracket *i* supporting a pulley *j*, over which passes a cord *k* &c. connected to a balance weight *m* and to the bracket carrying the mould *f*; or a rack and pinion, screw, &c. may be used to raise and lower the bracket. The mould *f* is first adjusted immediately above the mould *b*, after which the former is raised, the tube or conduit *g* inserted in its place, and the mould *f* again lowered so as to rest within the socket. The bitumen or other composition is then poured into the spaces between

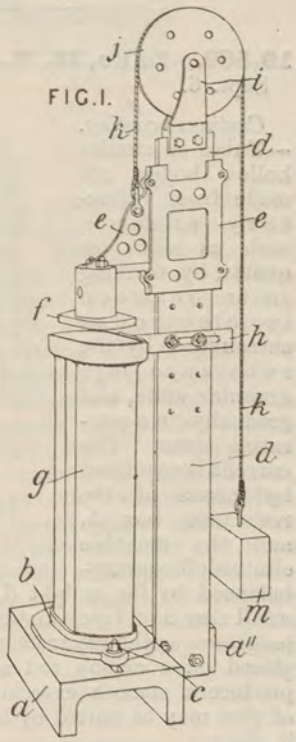


FIG.I.

the moulds and the pipes, and allowed to set. The mould *f* is then raised, and the tube removed. The Provisional Specification states that space may be left in the socket for the application of an outer layer of plastic composition or cement *in situ*.

19,493. Imray, O., [*Carborundum Co.*]. Sept. 5.

Refractory substances.—Amorphous silicon carbide, obtained in the manufacture of carborundum, or amorphous boron carbide produced in the manufacture of crystalline boron carbide, or a mixture of carbon and silica, is moulded into bricks or articles, which are subjected to an intense heat in an electric furnace to convert the amorphous material into a cellular crystalline carbide. A solution of sodium silicate, glue, or other volatile binding-substance may be added to the mixture, and carbon may be added when it is lacking in the amorphous carborundum. Any carbon in excess remains in the article. The porosity of the brick or article can be varied by mixing the charge-mixture, or materials used in making carborundum, with the amorphous carbide, in different proportions. The bricks may be used for lining furnaces, fireboxes, &c.

19,569. Lake, H. H., [*General Electric Co.*]. Sept. 6.

Castings; casting.—Tubes or similar hollow bodies are made from refractory substances, such as silica or quartz, by forming an arc between two electrodes surrounded by the substance in a granular state, and gradually separating them. The current is regulated by means of the resistance box 5, and the movable electrode 3, counterbalanced by the weight 6, is gradually raised. A small ring 9 of fused material is first formed, which lengthens as the electrode rises. The tube is then placed on a carbon rod and heated in an arc, to produce a smooth exterior surface. Two lengths of pipe may be united by heating the abutting ends in the arc.

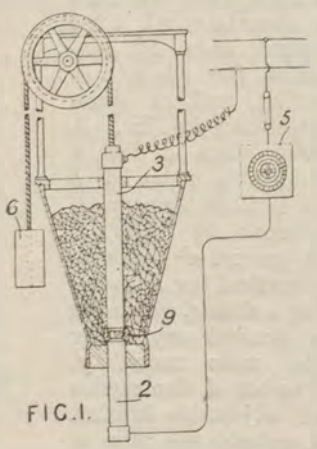


FIG.1.

19,574. Lake, H. H., [*General Electric Co.*]. Sept. 6.

Casting; castings.—Pipes, plates, and the like are made from refractory material, such as fused silica or quartz, by passing a heavy electric current through a carbon core embedded in granules of the substance. Fig. 1 shows a view of apparatus for making a tube of fused silica. The carbon

FIG.1.

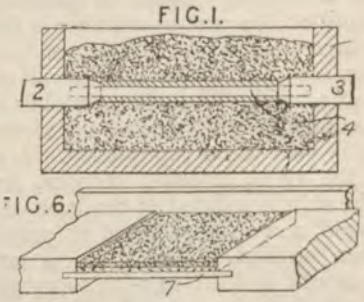


FIG.6.

rod 4 is held between the metal terminals 2, 3, and becomes so heated by the passage of the current as to fuse the adjacent particles of sand. The carbon core may be readily removed. The exterior of the silica tube is smoothed by being passed through the electric arc. For making large tubes, the core is perforated and hollow. Plates of silica are made by placing the sand on a perforated plate of carbon 7, as shown in Fig. 6. The plate is given an irregular form by similarly forming the conducting-core.

20,150. Schwanenberg, E. Sept. 15.

Stone, artificial.—A mixture of pulverized burnt lime and carbonate of lime (natural limestone), with or without mineral filling-material, such as sand, quartz, flint, emery, &c., is slaked with water and moulded into blocks, which are hardened by alternate treatment in closed vessels with carbonic-acid gas and air. The stone is specially suitable for lithographic purposes.

20,188. Kieselstein, H., and **Czermak, J.** Sept. 16.

Stone, artificial.—A suitable cement-mortar or plaster is rendered granular by the addition of pulverized sand, marble, brick, or slate, or by coarse grains of stone, brick, dried mortar, &c. The material is formed into slabs, and, when these have hardened, a coloured liquid composed of water, cement or plaster, and colouring-substance is poured upon them. The slabs are then fractured by means of any suitable tool, and the coloured cement enters the irregular fissures thus produced, so as to give a veined effect. The slabs are then dried and polished.

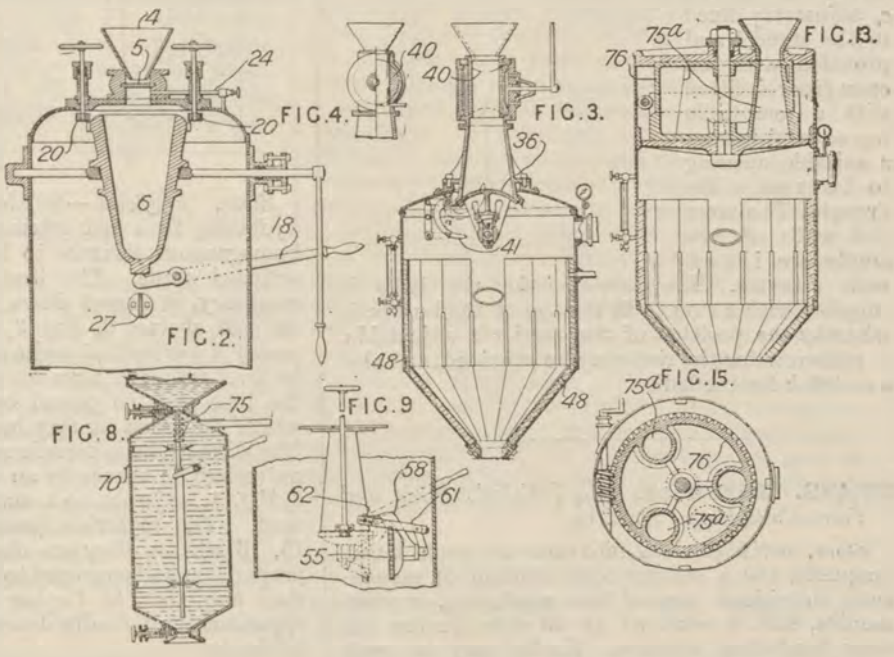
20,220. Packard, M. Sept. 16.

Mortars.—Marl, of approximately the following composition, viz., alumina, 18 per cent.; silica, 28 per cent.; and calcium oxide, 54 per cent., is mixed with about one-third its weight of sodium carbonate. The mixture is fused in a furnace.

The resulting cinder is disintegrated, and leached to obtain a solution of sodium aluminate, from which alumina is obtained. The residue consists principally of calcium silicate, which is neutralized by adding calcareous material, and is then available for making hydraulic cement.

20,225. Mitchell, G., and **Copeland, L. D.** Sept. 16.

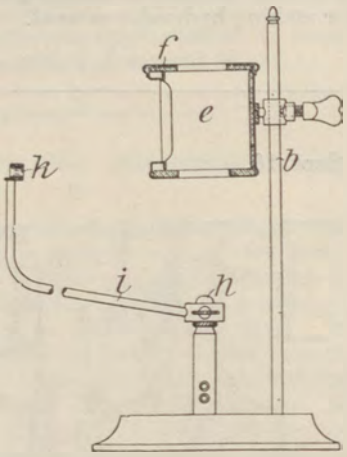
Slags, treatment of.—Consists in the utilization of slag for generating steam by feeding it intermittently into a body of water contained under pressure. The slag falls to the bottom of the generator, which is preferably conical, and may be withdrawn in a granulated condition through a valved aperture into a water chamber beneath, whence it may be withdrawn at intervals, and used as feed-water or for other purposes. Fig. 2 shows one form of apparatus for feeding the slag, consisting of a tipping receptacle 6 which is fed with hot slag through the funnel 4 when pressed tightly against a seating above it by the lever 18. The valve 5 having been closed, and steam having been admitted by the pipe 24, the receptacle 6 is lowered into the water, it being broken as it falls by the bar 27. The receptacle may be rotated, when raised, by means of the pinion 20, in order to bed it to its seat. Fig. 3 shows a modified form of feeding-apparatus, consisting of a fixed slag receptacle fitted with a rotary cylindrical supply valve 40 (see also Fig. 4) and a rocking discharge valve 36, the latter being pressed to its seat by springs. The base of the receptacle may be cleared, when the valve 36 is open, by the "drift hook" 41, which is mounted on one rocking shaft, and operated, by means of link connections, by another; or this hook may be carried on a rocking shaft with an external handle. Fig. 9 shows another form of valved feeder, with a valve 55, capable of being rotated like that shown in Fig. 2, but mounted on a rocking carrier 58. This carrier is connected by a link to a rocking "bail" 61, which is turned on its axis 62 by the hand-lever shown. In this and the preceding form of feeder, the breaking-bar for the falling slag may be attached to the side of the receptacle. Yet another form of feeder is shown in Figs. 13 and 15, consisting of a cylinder or block 76, with one or more slag receptacles 75a, mounted to rotate or oscillate on a vertical axis, so as to bring the receptacle alternately opposite the supply and discharge openings. The generator may be lined with removable sections 48, Fig. 3. Fig. 8 shows the water chamber 70 for receiving the spent slag, fitted with a reciprocating bar having a series of discs 75, to clear the aperture leading from the generator and stir up the slag. The water chamber may be of smaller size than the generator, and it may be fitted with rotary or other suitable valves.



20,423. Bröcker, H. Sept. 18. *Drawings to Specification.*

Stone, artificial.—A machine is described for moulding blocks, slabs, tiles, &c. of artificial stone. The moulded slabs &c. pass beneath a colour-strewer, consisting of a brush rotating above the sieve-bottom of a colour container or hopper. The strewed pigment is smoothed down by a spring plate, beneath which the slab &c. passes.

20,480. Jenkins, N. S. Sept. 19.



Casting.—Relates to the melting-apparatus for easily-fusible substances described in Specification No. 8775, A.D. 1897. The muffle *e*, adjustably fixed to the stand *b* and provided with an open front, is fitted with a removable top cover *f*, having a suitable opening to increase the draught. The cover and walls of the muffle are lined with asbestos. The carrier *i* for the ladle is supplied with a ring to fit the top of the burner *h*, whereby the position of the carrier is adjustable. A set-screw for the ring may be provided, and also a socket *k* for the ladle.

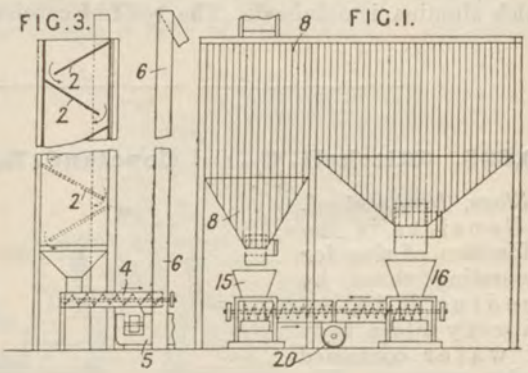
20,492. Birkbeck, H., [*Mielck's Stone and Terra-Cotta Co.*]. Sept. 19.

Stone, artificial. — A mixture of sand, burnt magnesia, and a concentrated solution of magnesium chloride is tamped into wood, iron, or other moulds, and is confined on all sides during the slow hardening reaction. Kaolin may be used together with or instead of sand, or a face layer in which pulverized marble waste replaces the sand may be tamped in the mould above a foundation of the cheaper material. Pigments and dye-stuffs may be used to produce coloured or veined effects. Zinc oxide or other white metallic oxide may be used when a clear white stone is to be produced. Vegetable fibres may be incorporated with the mixture to produce a light stone.

20,511. Sanders, S. E. Sept. 20.

Refractory substances.—A substitute for black-lead or graphite, to be called "lusterine," for use in the manufacture of crucibles and for other purposes is made from the skimmings from the molten metal used in galvanizing or from an artificial mixture having the same composition. The skimmings or refuse are heated to a temperature of about 212° F. until the contained metal is precipitated and any acid present has been given off. The removal of the acid is facilitated by dropping alum into an opening stirred in the mass when it has approached a plastic condition. A paste made from the powdered material with water &c. is shaped as required and then baked until hard.

20,534. Rigby, J. S. Sept. 20.



Stone, artificial.—Relates to apparatus for hydrating lime and mixing it with sand to form a homogeneous mixture to be made into bricks and artificial stone. The lime, broken and sifted if necessary, is passed down vertically-reciprocating inclined shelves 2, Fig. 3, in a tower, up which passes a current of moist air; or the shelves may be level and each have an opening through which the lime may be passed by revolving rakes from which the moist air may be ejected into the lime. The slaked lime is transferred by a conveyer 4 to a pulverizer 5; thence by an elevator 6 to a hopper 8, Fig. 1, adjacent to a similar hopper containing sand. The materials pass to weighing-machines 15, 16 whence they are discharged in the desired proportions and conveyed to a long screw-mixer 20; they may then be further mixed in any suitable apparatus, and finally damped and moulded into bricks &c

20,592. Baxter, A. W. Sept. 22.

Fireproof compositions.—A fireproofing-solution for impregnating wood, fabrics, &c. is made by first preparing a silica solution by fusing silica with an excess of sodium and potassium carbonates, and dissolving the fused mass in water, then mixing the silica solution with an aqueous solution of ammonium sulphate, and finally neutralizing the mixture with acid, preferably sulphuric acid. The following proportions are given in an example:—$2\frac{3}{8}$ parts of silica are fused with $5\frac{3}{4}$ parts of alkali carbonate, then boiled in $52\frac{1}{4}$ parts of water, this solution being mixed with an equal quantity of neutral ammonium sulphate containing $13\frac{3}{4}$ parts of the salt to 72 of water.

20,661. Kühl, M. Sept. 22.

Cements; mortars; plasters.—Mortar, cement, or plaster for floors, pavements, walls, or ceilings, is mixed with oil before the material is applied to the walls &c.

20,841. Ibotson, T. H., and **Meldrum, R.** Sept. 24.

Refractory substances; stone, artificial.—Relates to the preparation of material for asbestos millboards, slates, plates, or tiles. Asbestos fibre is

pulped in a solution of magnesium chloride of specific gravity from 1·15 to 1·25. Finely-divided and preferably amorphous magnesium oxide is then added to the pulp, in a proportion varying from 50 to 150 lb. for every 100 lb. of asbestos. After filtering and pressing, the soft material is allowed to dry, and is then washed and immersed in a solution of potassium or sodium silicate. The plates or other articles are then washed to remove sodium or potassium salts, and dried. In a modified process, the pulping is carried out in pure water, and, after the material has been pressed and dried, it is immersed in a solution of magnesium chloride, and air-dried; the subsequent treatment is as already described.

20,878. Quinn, J. C. Sept. 25.

Stone, artificial.—Slate dust is mixed with water to form a stiff plastic mass, which is incorporated in a pug-mill &c. first with cream of lime and then with hydrated silica or metasilicic acid. The mass is moulded under pressure into bricks, slabs, pipes, &c., which do not require burning. The ripening may be expedited by steeping in a solution of alkaline silicate, or by steam. Quicklime or lias lime is used to prepare the cream of lime. The hydrated silica is prepared by pouring a solution of sodium nitrate into hydrochloric acid, and then stirring, and washing the precipitate. The Specification also mentions alumina &c. and silica &c. in addition to lime and slate dust.

21,807. Westinghouse, G., [*Knox, W. J.*]. Oct. 7. *Drawings to Specification.*

Refractory substances.—Relates to the manufacture of linings of furnaces, converters, and other vessels used in metallurgical operations, particularly for treating mattes and refining metals. A suitable basic material, such as magnesite, chromium oxide, or other refractory basic oxide, which is not hydrated by the addition of water, is mixed in the powdered state with iron oxysulphide obtained by adding an iron oxide to a molten iron sulphide, and a small percentage of water glass is added. The mixture is then rendered slightly plastic by adding water, and is applied to the walls of the vessels, preferably by packing it by means of a pneumatic rammer between the walls of the vessels and temporary inner walls. After evaporating the excess of moisture, the inner surface of the linings is saturated with calcium-chloride solution, preferably by spraying. The linings may be applied in the form of bricks or blocks. The iron oxysulphide may be dispensed with, or the calcium chloride may be added before the water-glass. The iron oxysulphide may be obtained by oxidizing molten copper matte containing iron and copper sulphides in a basic-lined vessel by means of an air blast.

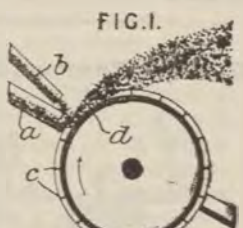
21,848. Burghardt, C. A., and **Reid, J. T.** Oct. 8.

Fireproof compositions.—Relates to means for diminishing the inflammability of cotton and linen yarns and fabrics, particularly applicable for treating flannelette. The material in a wet state is first treated in a bath containing sodium silicate of 15° Tw., and dried, and then immersed in a solution of sodium aluminate of 32° Tw., and again dried; or the order of these operations may be reversed. It is then washed, if necessary, and passed through a finishing-solution containing at least 10 per cent. of magnesium sulphate, and is then dried. A 2½ per cent. solution of ammonium carbonate may be substituted for the magnesium sulphate; or, after treatment with ammonium carbonate, the material may be passed, while still wet, into the solution of magnesium sulphate. Warps may be treated in an ordinary warp-sizing machine, and hanks may be saturated in tubs or vats, the excess of liquor being removed by hand wringing, hydro-extractors, or presses, and the yarn dried by means of a stove heated by steam or hot air. The Provisional Specification states that the sodium aluminate may be replaced by alum, aluminium sulphate or acetate, or zinc, calcium, or magnesium chlorides, and that the process may be used in conjunction with, or in lieu of, the ordinary finishing process.

22,699. Lessing, W., and **Wolff, A.** Oct. 18.

Slags, treatment of; cements. — Liquid blast-furnace cinder or slag is sprayed or granulated by a drum *d* revolving on a horizontal axis and provided with spiral or other ribs *c*. The drum may be cooled internally by water or air &c. For the manufacture of cement, slag and lime are supplied by adjustable inclined channels *a*, *b*, the lime channel being placed above, and the channels may be enclosed in a casing so that the lime is heated before admixture. The apparatus may be mounted on wheels, so as to be portable. If the mixture is to be calcined, the furnace may be placed so that the apparatus discharges directly into its feeding-funnel.

FIG. 1.



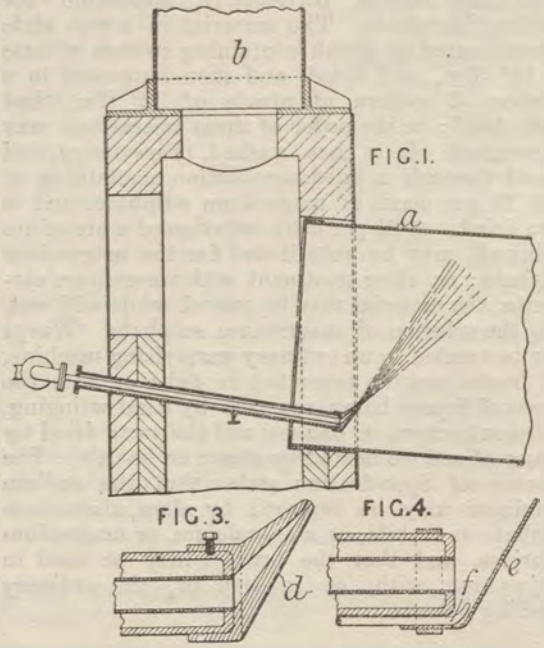
22,717. Putnam, G. A. Oct. 18.

Cements; stone, preserving.—A mixture of equal parts of spirits of salts and water is mixed with cements or is applied to cements or stone for preventing discoloration and deterioration.

22,734. Bamber, H. K. G. Oct. 18.

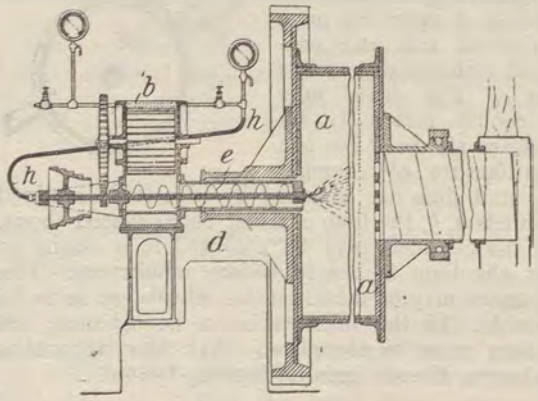
Cements.—Slurry is dried by delivering it as a

spray into the outlet end of a rotary kiln *a*, Fig. 1, at the base of a chimney *b*, by means of a nozzle *d*, Fig. 3, the supply pipe of which is preferably water-jacketed, or the slurry may be forced by a



steam or air jet *f* against a spreader *e*, Fig. 4. The escaping gases are freed from coal dust by the spray of slurry, and pass to the combustion end of the kiln.

22,735. Bamber, H. K. G. Oct. 18.

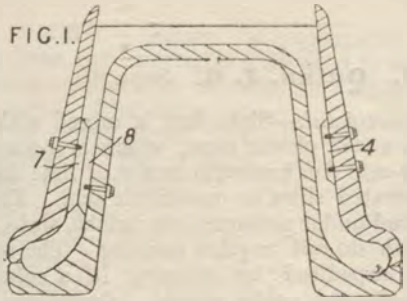


Cements.—Relates to a process for conditioning cement and regulating the setting time by the action of steam, which enters the tube or other mill *a* by the flexible tube *h* and hollow spindle *d*. The coarsely-ground cement passes in at the feed-opening *b* and through the conveyer *e* into the mill. The setting time of the cement is tested at regular intervals, and the admission of steam is regulated in accordance with the result of the tests.

22,898. Hollings, W. W., and **Hollings, J. S.** Oct. 21.

Refractory substances.—A refractory material, for making furnace linings and bottoms, bricks, blocks, shapes, stoppers, sleeves, crucibles, retorts, pots, &c., is made of a "double mineral carbide," *i.e.*, any of the oxysilicon carbides, alone or mixed with fireclay, magnesite, dolomite, tar, silicious matter, or other binding-material. The use of silicon carbide and other simple carbides is disclaimed.

23,172. Schlentheim, L., and **Diespeker, Ltd.** Oct. 23.



Casting. — In constructing ornamental baths, sinks, hand basins, urinal basins, &c. in artificial stone, an outer coating of artificial stone is laid on a body of concrete, or the whole thickness of the article is formed of artificial stone. In the former case, a wooden or other model or templet of the ornamental design is laid on the concrete, and a mixture of, say, white marble in granulated form and cement is then spread with a trowel over the concrete uncovered by the templet. When this is set, the templet is removed, and a mixture of black marble and cement is filled into the depressions left by the templet, and the whole is smoothed down. When the whole article is made of artificial stone, this is cast in a mould to the sides of which are secured fret-work or like templets 4, 7, 8, Fig. 1, of wood &c. After removal of the articles, the depressions are filled, as before, with a mastic of different colour from that of the ground. When a bath is made of the form shown in Specification No. 21,457, A.D. 1902, [*Abridgment Class* Closets &c.], a skirting is constructed rising from the margin of the top 10. Where the edge of a bath is made with a lipped edge, this edge may be hollow by moulding it round a tubular tile. To prevent slipping in baths, the bottom is left rough.

23,558 Ven, F. J. A. M. van der, and **Dreessen, H.** Oct. 28

Stone, artificial.—Artificial marble is prepared as follows:—The smooth surface of a sheet of glass, enamelled iron, &c. is coated by means of a brush with a thin layer of soft cement or of plaster of Paris and water. If several colours are used for this coat, which forms the ground colour of the marble, they are put on side by side in irregular and overlapping streaks. Before this coat is dry a

thicker mass of the same material, of different colours, is thrown on at random in small lots or heaps, which are flattened down to fill in the spaces left between them. On the rough surface thus formed a layer of uniformly-coloured material is placed. This final layer is smoothed. Marble veined throughout may be prepared by repeating the variously-coloured layers and dispensing with the layer of uniformly-coloured material.

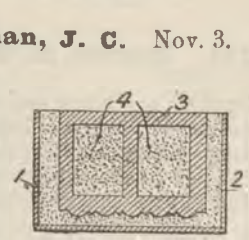
23,664. Chappell, H. W. Oct. 29.

Stone, artificial.—From 3 to 10 per cent. of lime is mixed with sand, ground slag, slate, or minerals, and the mixture is moulded into plain or ribbed tiles, perforated bricks, slabs, or articles, which are hardened by a preliminary treatment with carbonic-acid gas, and burnt at a temperature sufficiently high to fuse together the particles of quartz or other materials. The gas may be admitted through the perforations of the articles, or it may be introduced under pressure to a chamber containing the articles. Mixtures which are not hardened by steam, such as lime with sand containing clay, can be used by this process.

23,680. Rigby, J. S. Oct. 30.

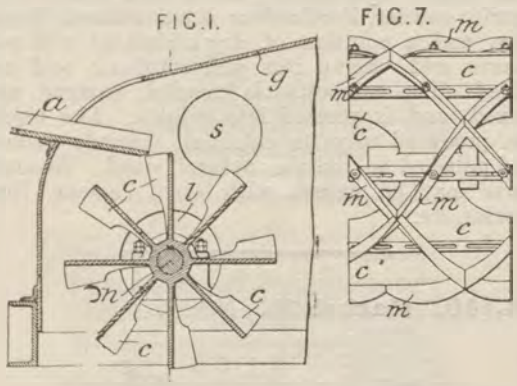
Stone, artificial.—Concrete flags, blocks, tiles, &c. are made from chippings, slag, and other broken material mixed with Portland cement or lime; cracks are prevented by the addition of puzzuolana or trass, preferably in a heated state. The mixture is subjected to a high pressure in moulds, allowed to set for a few hours, and then subjected to steam, hot water, or both under pressure in a closed chamber. Carbonic-acid gas may be introduced with the steam &c. to prevent discoloration. Plain or slotted iron or steel bars, rods, or strips may be embedded in the concrete.

24,022. McClenahan, J. C. Nov. 3.



Stone, artificial; fireproof compositions; casting.—Relates to the manufacture of a hard artificial stone, both fireproof and waterproof, and consists, essentially, in saturating the material of which the mould is prepared with a hardening-liquid which is absorbed by the stone as it sets. The moulding-material 2 is contained within a flask or mould 1, and consists of clean sharp sand saturated with a solution of sulphuric acid, alum, and lime-water. Cores 4, if used, are of the same material. The stone composition 3 consists of Portland cement and crushed stone or sharp sand, mixed dry, and brought to the consistency of a thin mortar by the addition of water. During the setting and hardening process, the facings of the mould adhere more or less to, and become incorporated with, the stone; the residual hardening-material is removed from the face of the stone after the stone has been cured. In moulding stone of large size, the exposed face or faces of the block may be of fine material backed up with coarser material consisting of cement together with sand, gravel, crushed stone, &c. Mineral pigments may be added to the hardening-solution, and are absorbed by the stone. Columns, capitals, mouldings, reliefs, statuary, &c. can be conveniently produced by this process.

24,091. Lessing, W., and **Wolff, A.** Nov. 4.



Slags, treatment of.—Liquid blast-furnace cinder or slag is sprayed or granulated by a drum or fan wheel revolving on a horizontal axis *n* mounted in bearings outside the casing *g*. Slag enters by the channel *a*, and openings *l* for air circulation and an inspection window *s* are provided. Arms or blades *c*, parallel or inclined to the axis, with straight or undulated edges, act as a centrifugal or screw fan to circulate air for cooling purposes. Openings may be made through these blades and their edges may be sharpened, or a series of adjustable inclined or spiral cutters may be attached to them, one form with two sets of cutting-ribs *m* being shown in Fig. 7.

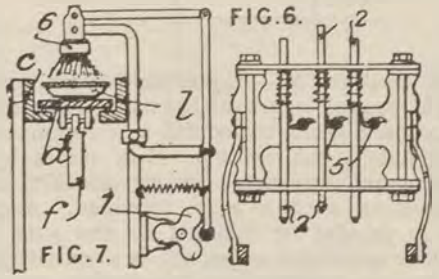
24,094. Perry, W. Nov. 4.

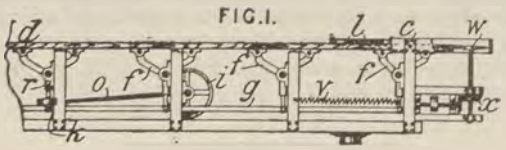
Cements.—Relates to plastic compositions for application to the rough, crude, or imperfect surfaces of iron, steel, or other metallic castings, or for making joints in furnaces and heaters, or in cast-iron or other pipes, and in general for perfecting surfaces, filling cracks, &c., or sealing joints. The composition consists of iron, plaster of Paris, and dextrin or gum Arabic, with or without ground glass and a chloride or other salt of sodium or potassium. A hard light gray charcoal iron is preferably employed. The constituents are ground and mixed in the form of a fine powder, to which water is added when the cement is required. The cement is allowed to harden for twenty-four hours after application, and the surface is then finished with emery cloth or a file.

24,359. Weber, A. Nov. 6.

Stone, artificial; fireproof compositions; sound-deadening compositions.—Relates to the manufacture of a substitute for stone, wood, cork, and the like, which is a non-conductor of heat, and is fireproof, sound-proof, and damp-proof. The material may be moulded into plates, tiles, bricks, &c., for flooring, roofing, and other building purposes, or as a non-conducting composition for chimney stacks, ice-cellars, cooling-plant, &c. It does not decay, and is proof against parasites and vermin. When treated with oxygenized linseed oil it is quite waterproof. The material is prepared as follows :—Sawdust, wood shavings, &c. are boiled in a copper, and are treated for three days with lime water. The sawdust &c. is then mixed with pumice-powder, Portland or other cement, burnt clay, and a solution of clay acidulated with sulphuric acid. Scrap iron and sulphuric acid are added. The compound is kneaded, stamped, and mixed, and is pressed into moulds. The blocks &c. produced may be coloured, ground, stained, and polished to imitate natural wood. Separate parts may be united with glue, cement, lime mortar, &c.

24,510. Gaebel, R. Nov. 8.





Casting chocolate, marchpane, and sweetmeats. In order to free the chocolate or material in the moulds *l* from air, it is acted on by small stamps 2, and the moulds are joggled and caused to travel along a vibrating table *d* which is supported between guide-bars *c* by parallel links *f*, and operated by a pulley *i*, crank and rod *o*, and coupling-rod *g*. The amplitude of vibration of the table is regulated by adjusting a coupling *k* of the rod *o* on the lever arm *r* ; a spring *v* aids in the movement of the table. In order to avoid the use of a very long table, it is made up of parts arranged alongside one another, and the moulds are carried from one part to another by rotary discs *w* driven by bevel gearing *x*. Small bridge-plates, fixed to the ends of the table sections, rest on the discs *w*. The stamps 2 are provided with porcelain or like ends, and are raised by tappets or cams 5 and depressed by springs. A swinging brush 6, operated by a cam 7, or a rotary brush, breaks any bubbles in the surface of the paste, and assists in expelling the air before the paste sets hard. The channel guides *c* of the table are heated, to prevent premature setting of the paste, by steam, hot air, water, or the like, conducted through flues or tubes in or near the guides.

24,807. Thompson, W. P. Nov. 12.

Asphalts.—Consists in the use of fine waste sand from glass works, or quartz slimes obtained in crushing gold ore &c. with pitch, and with, or without, the addition of tars, resins, lac or dissolved varnish gum, colouring-matters, lime or basic material, linseed oil, heavy oil of gas works, naphtha, benzine, or other solvents, in the manufacture of asphalts for paving roads, waterproofing roofs, walls, floors, &c., or for making black ornaments, paints, &c. For paving, a concrete may be made of equal parts of fine waste sand, pitch, fine field or sea sand and coarse sand, mixed with a suitable quantity of fine and coarse gravel. The very fine waste sand stiffens the pitch sufficiently to prevent the ordinary sand from sinking to the bottom of the kettle or heater, and the ordinary sand thickens the composition to hold gravel, and afterwards macadam, or larger stones. The material may be in blocks, or in a powdered or liquid form for transport, and may be cast on polished glass, which may be oiled to cause the composition to adhere, or moistened with caustic soda when it is desired to detach the ornamental casting. For ornaments, the inside or body may consist mainly of sand with from 10 to 20 per cent. of pitch, and the outside may be formed of a mixture of pitch with the finer qualities of sand and lac gums or resins to harden it and give it lustre.

25,221. Engels, E. W. Nov. 17.

Fireproof coverings and compositions; refractory substances.—Finely-divided carborundum and clay, gypsum, or borax are made into a paste with water and applied to the surface of the article to be fireproofed. The carborundum may also be mixed with soluble glass, or aqueous solutions of ammonium sulphate or borate, or salts of refractory oxides. Wood is subjected to pressure, after the application of the mixture, while still damp. In the case of ceilings, walls, arches, and floorings, gypsum is used as a binding-medium. The composition is used for furnaces and heating-apparatus, and for fireproofing laths, planks, joists, girders, boardings, vaultings, staircases, and other parts of buildings constructed of iron or other metals.

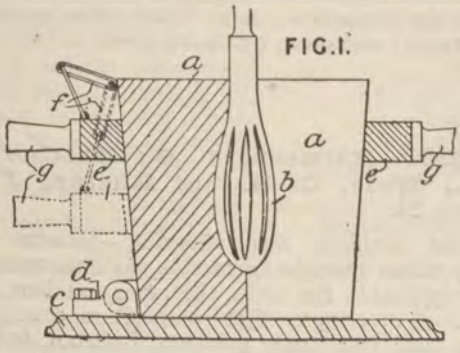
25,222. Jurschina, F. Nov. 17. *Grant of Patent refused.*

Stone, artificial; fireproof compositions; casting.—Relates to the manufacture of acidproof, weatherproof, and fireproof artificial stone suitable for the production of building-blocks and bricks, figures and ornaments for façades &c., paving-stones, flooring-tiles, utensils used in chemical industries, &c. From 5 to 10 per cent. of clay or augite is added to a solution of sodium silicate, and the liquid, after standing for a few days, is used to wet up a mixture of quartz sand or powdered stone with Portland or other cement. A semi-liquid mixture is first prepared, and is poured into a glue or other elastic mould so as to fill all cavities or recesses therein. A thicker mixture in the form of a stiff paste is then packed into the mould, the separate portions of which are then fitted and held together. When set, the cast exactly reproduces the ornamental details of the mould. The articles are dried, fired, and slowly cooled.

25,429. Kirkpatrick, J. E. Nov. 19.

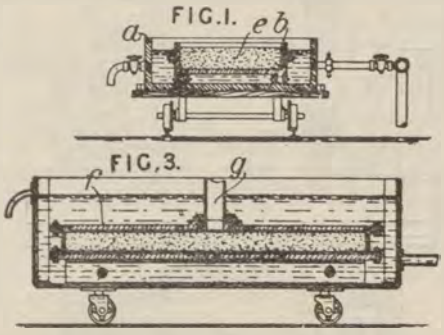
Refractory substances.—Pure magnesite, such as is found in Salem and other parts of India, and is nearly free from silicon, iron, calcium, and aluminium, is dead burnt at a temperature ranging from 1000° to 2000° C. to free it from carbon dioxide &c., and the burnt magnesite is crushed to powder, exposed to the atmosphere by turning it over, and mixed with from 1 to 10 per cent. of its weight of tincal or borax. The mixture is moistened with water and is moulded *in situ*, or into basic bricks &c. for steel furnaces &c. The bricks &c. are dried, pressed, and burnt at a high temperature, either *in situ*, or in separate furnaces or kilns.

25,724. Dowell, J. Nov. 22.



Casting.—Relates to the manufacture of glass or other moulds for use in making rubber teats with or without internal grooves, ribs, or serrations. The matrix or mould *a*, in which the teat mould *b* is blown, cast, or otherwise formed, is made in a number of sections, which are hinged &c., as at *d*, to a base *c*, so that they can be closed together to receive the glass or other material, and opened to permit the removal of the finished mould *b*. The opening and closing of the mould *a* may be effected by a ring or collar *e*, adapted to engage with the conical exterior of the sections *a*, or with inclined paths formed on the sections, so that the sections are closed by raising the collar, and opened when the collar is lowered. The collar is preferably connected to the sections by links, chains, springs, &c. *f*, and is provided with handles *g*. The collar may be replaced by a nut or ring adapted to engage with a spiral incline on the sections, or the ring or collar may have a helicoidal under surface adapted to engage with a similar helicoidal path, or a series of inclines, on the base-plate, so that, when the ring or collar is rotated, it is also moved vertically to open or close the mould-sections *a*.

25,732. Jaffé, J. Nov. 22.



Stone, artificial; casting.—Relates to the manufacture of artificial stone from Sorel and like cement, particularly that used for lithographic purposes, and comprises means for preventing excessive heating of the stone in the process of setting. For this purpose, the mould *b*, Fig. 1, which contains the moulding material *e*, is placed in a container *a* through which cold water is circulated. The mould is lined with parchment paper &c. before the moulding material, mixed *in vacuo*, is poured into it. Fig. 3 shows a mould closed by a cover *f* and wholly immersed in water. The mould is connected by a pipe *g* with the mixing or charging device, so that the whole operation of preparing the composition and charging the mould can take place *in vacuo*.

25,736. Guinet, S. Nov. 22.

Stone, artificial and imitation; stone, colouring.—Relates to the production of artificial or imitation marble by the application of a special paint on a foundation of glass or mirrors, wood, cardboard, stone, cement, plaster, &c. The paint consists of gold size, water, sodium silicate, and colouring-matter. Aniline or alizarine colours may be employed, or vegetable colours obtained by steeping wood, sawdust, shavings, &c. in acetic acid, carbonizing the product by heat so as to produce the desired shade of colouring, and washing in the ordinary manner. When glass is used as a foundation, the painting is done on the back, and a coating of similar paint together with a mineral oxide or other earthy substance, such as barium or

calcium sulphate, lime, &c. is afterwards applied. The front surface may be slightly ground or treated with acid to reduce its brilliance. The panels &c. of imitation marble may be fixed in position by cement, heavy lime, or plaster, prior to which a varnish may be applied to the inner face. The invention is applicable to ornamental panels or slabs for decorative purposes, or the material may replace porcelain or earthenware for toilet furniture &c. Shields, escutcheons, mirror or photograph frames, tables, advertising-tablets, &c. may also be prepared in the same way.

25,806. Garchey, L. A. Nov. 24.

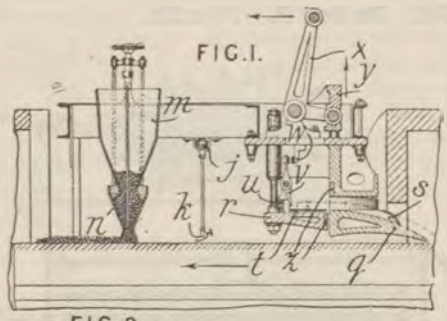
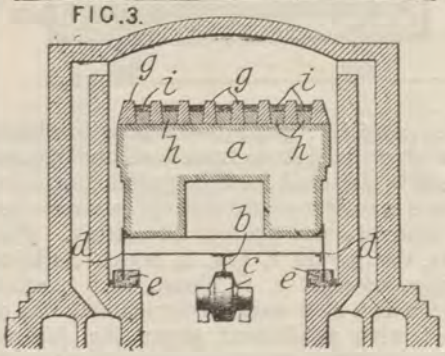


FIG.3.



Stone, artificial.—In the manufacture of devitrified glass and glass articles, such as blocks of "glass-stone," the glass is prevented from adhering to the moulds by spraying the sides of the latter with a liquid containing, in suspension, carbonate of magnesia, talc, carbonate or sulphate of lime, or other suitable refractory substance, which, on the vaporization of the liquid, forms a thin insulating-film on the surface of the moulds. Any suitable devitrifying-furnace having a movable annular bed may be employed. Fig. 3 shows a radial section through such a furnace, which at one part has an opening, shown in Fig. 1, to receive the spraying, feed, and cutting mechanisms *k*, *n*, *z*, Fig. 1 being a section along the middle line of the annular bed *a*. The bed is supported by a rail *b* on rollers *c*, Fig. 3, and is rotated in any suitable manner, cheeks *d* depending into sand troughs *e* serving to make the working chamber practically airtight. The bed proper is formed by refractory bars *g*, *h*, which form between them the channels or moulds *i* for receiving the glass. Into each mould *i* projects a nozzle *k*, through which the coating-material, supplied through the pipe *j*, is sprayed against the sides of the moulds. The broken glass or cullet is placed in the hopper *m*, and is delivered through the adjustable nozzles *n* into the moulds *i*, suitable stirring-arrangements being provided in the hopper and nozzles. Molten glass may be used instead of broken glass, the feed arrangements being in such case suitably modified. The glass supplied to the moulds *i* is devitrified and agglomerated into continuous strips in passing through the furnace, the strips so formed emerging at the cutting-apparatus, Fig. 1, which cuts them into suitable lengths. The strips are raised from the moulds by teeth *q* furnished with lateral guide-wings *s*, and pass on to the plate *t* on the cutting-platform *r*. The length to be cut off is adjusted by means of the straight-edge *u*, which carries a tappet *v*, adapted, when engaged by one of the strips, to close at the contact *w* an electric circuit for operating the cutter. The circuit may actuate the distributing-valve of a hydraulic cylinder or motor, the piston of which is connected through the lever X, the movable frame *y*, and suitable rods to the platform *r*, so that, by the upward movement of the platform, the strips are cut by the blades *z*. The plate *t* is adapted to be connected by a pin and slot to a similar plate, which is drawn into position as the attendant withdraws the plate *t* bearing the pieces cut off. When removed from the apparatus, the cut pieces are conveyed to a hydraulic press to be shaped to their final form.

25,807. Garchey, L. A. Nov. 24.

Stone, artificial and imitation.—Blocks of artificial granite are manufactured by filling with melted glass heated moulds, lined with an insulating or protective substance, such as magnesium carbonate, and allowing the glass to cool very slowly and become devitrified. Metallic oxides and powdered mica may be introduced together with the glass to give the product the appearance of natural granite. If a blast furnace be employed for producing the glass, the composition to be fused is first moistened to prevent scattering by the blast.

25,850. Klimsch, J. O., Beschorner, A., Wels, C. A., and **Ruston, J. V.** Nov. 24.

Stone, artificial and imitation.—Relates to a composition resembling marble, ceramic ware, &c. and applicable for slabs, tiles, &c., and floor, wall, and roof coverings. The composition consists of bone meal free from gelatine, beetroot residues free from sugar, lyes from distilleries, bran, and peat or cellulose material, to which flour or powdered resin is added as a binding-material. The mixture is repeatedly treated with a saturated solution of magnesium chloride until it contains one part by weight of dry material to three of the saturated solution. Colouring-matter may then be added, and finally ground burnt magnesite in the proportion of three parts to one of the dry mixture. These proportions may be

varied. The composition is moulded between polished plain or ornamented plates. The material may be strengthened by embedding it in wood, metal, or wire filaments.

25,939. Lorant, A. Nov. 25.

Casting. — Lasts for boots and shoes are modelled from the feet to which the boots &c. are to be fitted. The foot is covered with a stocking, and under the sole is placed a correspondingly-shaped plate of leather, metal, celluloid, &c. A toe-cap of leather &c., corresponding in form to the boot or shoe to be produced, is placed over the point of the foot, and may be connected to the sole-plate. while specially tender parts of the foot may be fitted with hollow pads or washers of felt, paper, &c., saturated with a liquid, such as glycerine, which will not dry in the air. An outer elastic stocking is then drawn over the foot, which, when so prepared, may be used directly as a pattern or model in a copying-mechanism for cutting the last; or, a mould of the foot may be taken and the last cast in the mould, or the cast may be employed as a pattern in the copying-mechanism. Fig. 2 shows a suitable

FIG. 2.

apparatus for taking the mould. The two cylinders 2 are hinged to the base-plate, and are closed at the outer ends by discs 3 also hinged to the base. Diaphragms 6 of india-rubber &c. are fixed to the discs 3 by means of clamping-rings, and the cylinders 2 are provided with annular packing-pieces, which fit round the leg of the person when the foot is in position in the apparatus, as shown. An easily-fusible metal, liquid gypsum cement, stearin, wax, &c. is introduced through the funnels 7, and forces the diaphragms 6 inwards against the foot, so that, when the material has set, two half-moulds of the foot are obtained, which are then used to cast the last or pattern.

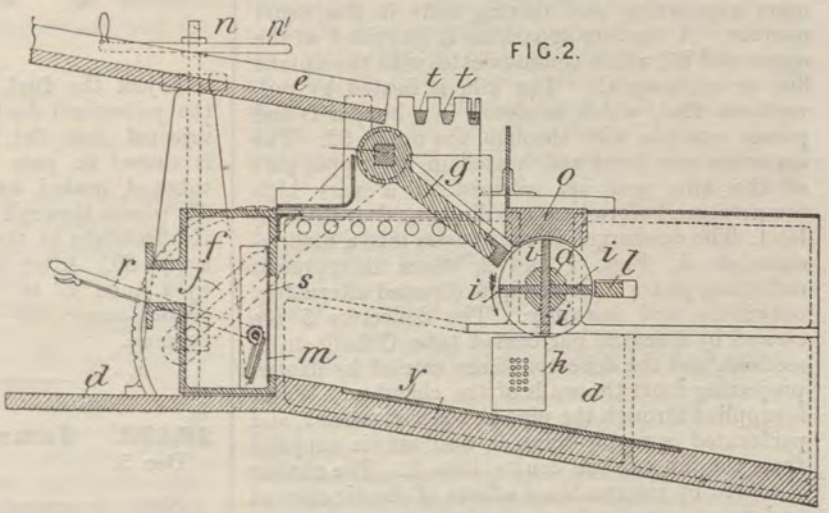
26,065. Turner, H. G. Nov. 26.

Refractory substances.—Relates to a material for coating furnace linings, or for the lining itself. Crystalline magnesia, obtained by heating magnesite in an electric furnace and allowing it to cool, is ground very fine and mixed with about 2 per cent. of a binding agent, such as boric acid, borax, magnesium chloride, or water-glass. The mixture is then made into a paste with water, and applied as a coating to the furnace walls or to the furnace lining; or it may be pressed into bricks or plates, of which the lining may be built up. The applications to metallurgical furnaces and cement kilns are mentioned.

26,089. Francois, V. Nov. 26.

Slags, treatment of.— Relates to apparatus for the reduction or granulation of blast-furnace slag, phosphate slag, metals such as tin, zinc, or lead, or other materials, which are supplied to the apparatus in a molten condition. The molten slag flows down the channel *e*, and any thick cakes which may have solidified by cooling are removed by the grating *t*. The remainder of the slag passes down the grooved distributer *g*, and is broken up and pulverized by the beaters *i*, which are slotted to intersect one another and are clamped in position on a slotted shaft *a* rotating at high speed. The scattered slag is rapidly cooled by jets and streams of water supplied through a conduit *f* and entering the basin or channel *d* through apertures *s*, lateral apertures *k*, and valve *m*. Fixed bars *l*, *o* prevent the slag from being

FIG. 2.



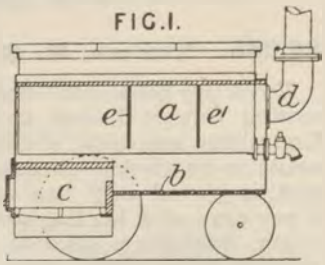
carried along round the reducer while it is in rotation. The inclination of the distributer *g* can be varied by means of a hand-wheel *n*', screw *n*, and slotted lever *j*. The opening of the valve *m* is regulated by a lever *r*. A renewable bottom *y* is provided for the channel *d*.

26,201. Naylor, W. Nov. 28. *Drawings to Specification.*

Cements.—Town refuse, before being fed to a destructor furnace, is dried in a chamber heated by tubes, through which pass the waste gases of the furnace. The refuse may first be mixed with lime or soda-lime. The clinkers from the furnace, when lime has been mixed with the refuse, is ground and used as a building cement.

26,422. Jennings, T. J., and **Pownall, P. E.** Dec. 1.

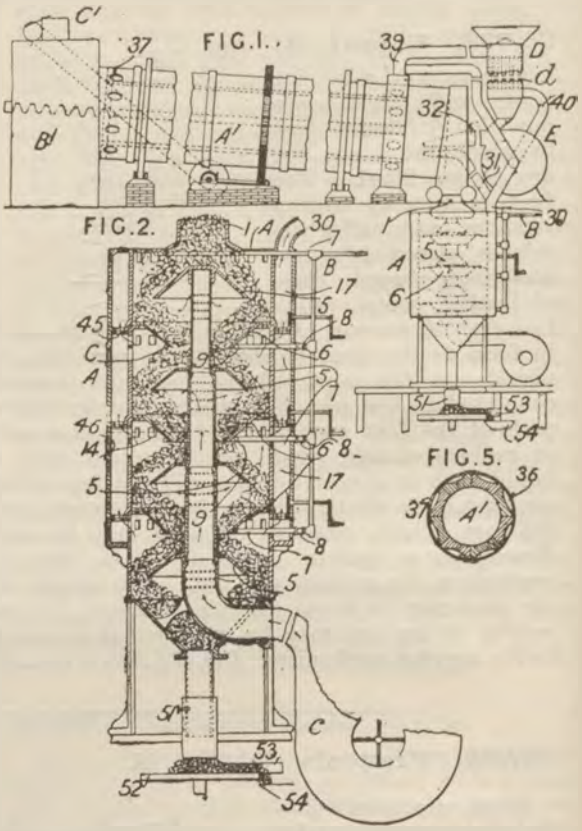
Asphalts, cauldrons for. Apparatus for boiling tar, pitch, bitumen or other similar material comprises a casing *b* having a chimney *d* and a fire-grate *c*, and containing a pan *a* in which the material is placed.



To secure more even heating of the pan and more complete consumption of the gases from the fire, one or more baffle-plates *e*, *e*¹ are placed in the space between the casing and the pan.

26,558. Wentz, R. F. Dec. 2.

Cements.—An inclined rotary kiln A¹ is mounted upon supporting and driving rolls in the usual manner. A feeding-apparatus is provided at the upper end B¹, which communicates with the uptake flue or chimney C¹. The kiln is heated by pulverulent fuel, which is stored in a hopper D and passes into the kiln through the nozzle 32. The materials are dried and heated in the upper part of the kiln, and are calcined at a very high temperature before they are discharged at the outlet 1. The discharged clinker passes into a cooling-chamber A, Figs. 1 and 2, where it traverses deflecting plates or cones 5, 6 directed alternately outwardly and inwardly. The deflectors 5 are carried by a central perforated tube C built up in sections, and the deflectors 6 are carried by flanges projecting from the walls of the chamber. Water is supplied through the pipe B, cocks 8, tubes 7, and perforated spraying-rings 9, and air is supplied from the fan *c* to the central tube C. The clinker is cooled by the combined effects of the air current and water spray, and passes out through a telescopic tube 51 to the surface of a rotary table 52, from which it is guided to the shoot 54 by a fixed scraping-blade 53. The hot air and steam pass out through apertures 14 into an outer jacket 17, from which they issue by a pipe 30. By closing the annular hit-and-miss dampers 45, and opening external doors 46, the hot air and steam can be allowed to issue into the atmosphere instead of passing away by the pipe 30. From the pipe 30 the hot air and steam pass by the duct 31 to the interior of the kiln, where they are delivered in close proximity to the blast of air from the fan E, which introduces the pulverulent fuel into the kiln. They may also be led to the fan E and used



to inject the fuel. To raise the temperature of the pulverized fuel before use, it is not merely injected into the kiln by means of hot air, but is caused to pass through or around a nest of tubes *d*, heated by air which enters at apertures 37, passes through channels 36, Fig. 5, formed in the firebricks of the furnace lining, and issues by a pipe 39. After heating the fuel, the air passes by a tube 40 to the fan E. Hot air from the cooling-apparatus can be used for the same purpose.

26,683. James, R. W., [*Passou, H.*]. Dec. 3.

Slags, treatment of; cements.—Blast-furnace or other slag containing not less than 38 per cent. of lime is quickly cooled and granulated by mechanical devices, or air jets, or by water, in which case it is dried at a temperature not exceeding 200° C. When cool and dry, it is ground with from 5 to 15 per cent. of clinkered Portland cement containing 60 to 70 per cent. of lime.

26,758. Harrison, G., [*Black, W.*, and *Richards, H. S.*]. Dec. 4.

Stone, artificial.—A natural appearance is given to the surface of artificial stone consisting of sand or particles of limestone or granite united by cement by treating the stone at a temperature of about 80° F. with hydrochloric or other acid, and afterwards neutralizing the acid remaining on the surface with sodium carbonate or other alkali. The treatment removes the cement from around the particles of sand &c. on the surface of the stone.

27,345. Gautsch, C. Dec. 11.

Fireproof compositions.—A mixture of ammonium sulphate and borate is used for impregnating wood to render it fireproof. The mixture is obtained either by dissolving the salts in water, and then adding liquid ammonia, or, preferably, by dissolving ammonium sulphate and boracic acid in an excess of ammonia. The ammonia dissolves the fats and resins in the wood, so that more of the mixture may be absorbed, and also reduces the viscosity of the mixture at the impregnation temperature, which is not above 100° C., but, preferably, below 60° C.

27,786. Heany, J. A. Dec. 16.

Fireproof coverings and compositions. — In a method of fireproofing sheets, boards, tubes, electric conductors, &c., the material is first covered with asbestos, and is then treated with a preparation made by mixing alumina and lime products with boric acid or borates and adding cohesive material, such as animal or vegetable albumens, or gluey and gummy materials. The asbestos may also be applied after the composition, and the alumina may be omitted.

27,804. Mills, B. J. B., [*Boyeux, A.*, and *Mora, A.*]. Dec. 16.

Stone, colouring.—Relates to processes for dyeing or colouring either the external surface or the entire mass of calcareous stones, marble, onyx, natural and artificial sandstone, earths, either unbaked, baked, or vitrified, porcelain, faience, &c. with colours which will resist acids or other corroding-agents. Colours are employed which are not attached by alkaline matters, and alkaline materials, such as potash, soda, ammonia, soap, &c., are mixed with the colours. The most suitable colours are diamine colours, orchil, cochineal, arnotto, permanganate of potash, yellow chromate of potash, and logwood. The stone &c. is immersed in a cold or warm bath of the required dye, which may, for example, consist of water, diamine blue, and caustic potash. The material may be previously immersed in a solution of caustic potash or soda, or ammonia. On removal from the dye bath, the objects are washed either in pure water, acidulated water, or calcareous water, and are then dried. Parts of the surface may be temporarily coated with a "resist" of Jewish bitumen, paraffin wax, india-rubber, gum lac, &c., and successive baths may be used for different colours. A framework of metal strips corresponding with the desired colour-contours may be placed on the stone, and the colours applied by filling the spaces with tow &c. saturated with the dye.

27,812. Wallis, G. P. Dec. 16.

FIG. 1.

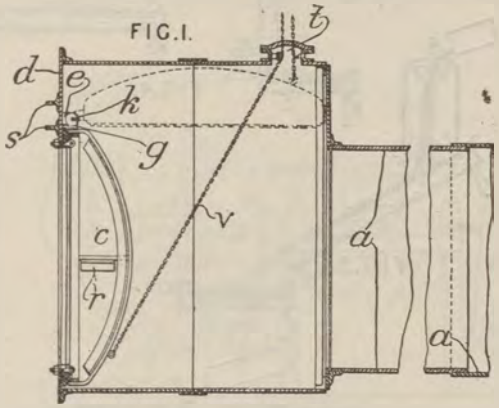
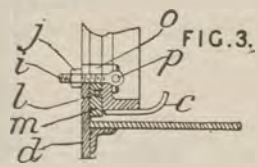


FIG. 3.

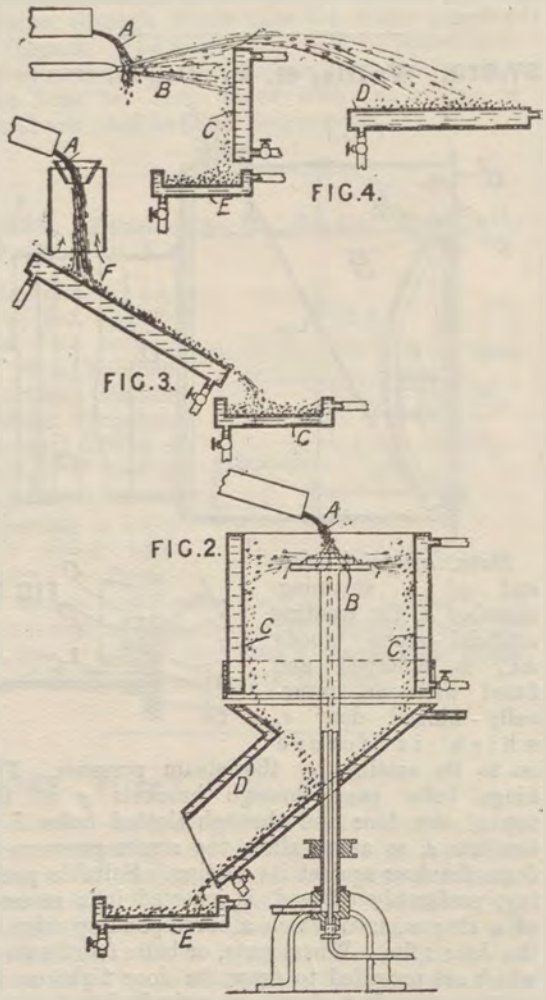


Stone, artificial.—One end of a steaming-chamber *a*, for treating artificial-stone goods &c., is enlarged and fitted with an internally-hinged door *c*, which is forced on to its seating by the steam pressure. The hinge bolts pass through brackets *g* at the top of the door and through slotted holes *k* in brackets *e*, so as to allow the steam pressure to force the door against its seating. Suitable packing, preferably of lead, is inserted in a recess *l* of a ring *m*, into which a corresponding ridge of the door *c* fits. Wheel nuts, or bolts *i* and nuts *j*, which are provided to draw the door tight on its seating when first closed, are swivelled on a pin *p*, Fig. 3, so that they can be turned round through slots *o*. To strengthen the end-plate *d* and the door *c*, stays *s* and ribs *r* are provided. The door is raised by a windlass and chain *v* passing through a hand-hole *t*. To allow it to pass through the aperture, the door is made of oval or rectangular shape; or its edge is made from a plate, so that it may pass through slots in the side of the aperture.

28,256. Passow, H. Dec. 22.

Slags, treatment of; cements. — Relates to the treatment of blast-furnace or other slags for the production of granulated or pulverized slags, which are chemically and physically suitable for the production of cements as described in Specifications No. 14,278, A.D. 1900, No. 13,793, A.D. 1901, and No. 18,953, A.D. 1902. The granulated slag is made in a chemically-active form in relation to carbonic acid, or in a chemically-inert form, or both kinds may be produced at the same time by regulating all the variable elements of the apparatus. The chemically-inert form is produced by

breaking the molten slag into spherules or thin sheets, and cooling it as rapidly as possible below a visible heat without contact with water. The chemically-active form is produced by cooling the



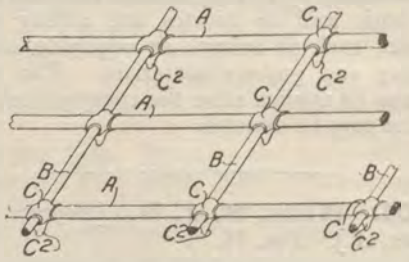
granulated slag rapidly to the plastic state, and then more slowly to a point below visible heat; preferably also the pulverizing should be arranged to produce irregular spongy or blistered particles or masses, and this may be done by admitting some water and air to the acting surface of a revolving apparatus. The nature of the product may be determined by regulating one or more of the following items:—the flow of the slag; the pressure, temperature, &c. of the air, gas, or steam blast in spraying-apparatus; or the velocity, temperature, &c. of the acting surface in revolving or other mechanical apparatus; or the height of fall, if the granulation is produced in that way; the disposition and temperature of the cooling or collecting surfaces; and the temperature of the air and the distance through which the slag or granulated slag falls or is thrown. As shown in the diagrams, the slag falling from the spout A is granulated by a blast B, Fig. 4, by a revolving disc B, Fig. 2, or by falling through an air current F, Fig. 3, and is caught by collecting-surfaces and conveyers, such as C, D, E, placed in various positions and cooled by water circulation. Adjustments may be made in any one or more parts or stages of the apparatus.

28,679. Laidet, C. G. May 29, [*date applied for under Patents Act, A.D. 1901*].

Stone, artificial.—Relates to the manufacture of substitute or artificial building-materials such as stone, wood, and similar products, and consists, essentially, in incorporating lead acetate with the ingredients to prevent exudation or oozing therefrom. An artificial stone may be prepared from calcined magnesia, aluminium sulphate, crushed stone, sand, felspar, and solutions of magnesium chloride, magnesium sulphate, and lead acetate. The crushed stone may be replaced by dust or waste of stone or bricks, or by sawdust or wood waste. In the latter case, the product may be rendered fireproof by any known process.

28,718. Lyon, W. C. Dec. 29.

FIG.1.

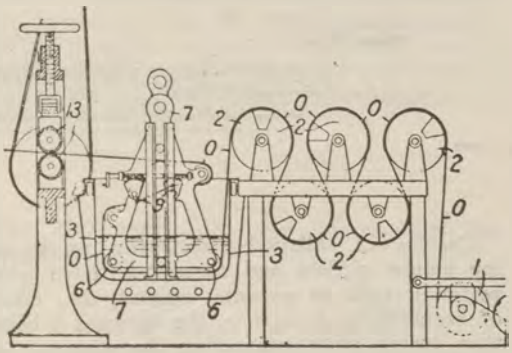


Stone, artificial.—Relates to the production of metallic strengthening-devices for blocks of artificial stone or cement, the blocks or slabs being moulded so as to contain the framework or skeleton of metal. The framework consists of wires or rods A of round or square section crossed by lighter stay-wires B. Castings C of soft metal, preferably lead, unite the wires at their intersections, and each casting is formed with a downwardly-extending lug C^2. These lugs rest on the surface on which the block or slab is moulded, and prevent sagging of the metal skeleton while the material is still plastic.

A.D. 1903.

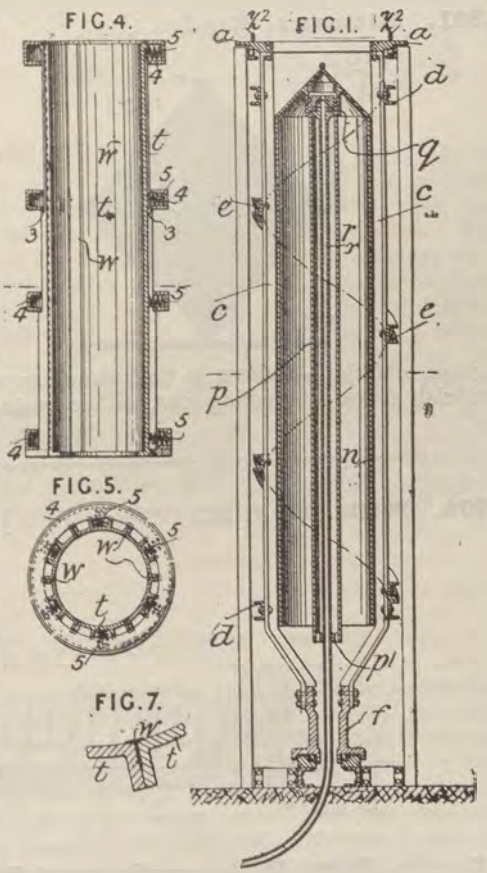
218. Mackintosh, W. M., and **Smith, A.** Jan. 5.

Fireproof coverings and compositions.—Waterproof and non-inflammable material for the manufacture of tents, tarpaulins, cart sheets, wagon covers, haystack covers, balloons, and other articles is formed by uncoiling woven cloth, felt, or other fabric O from a roller I, and leading it round internally-heated cylinders 2 into a vat 3, in which waterproofing-composition is heated. Within the vat is a vertically-adjustable frame 7 provided with rollers 6, which lead the fabric to adjustable scrapers 9 for removing any excess of the composition. The fabric then passes between internally-heated cylinders 13, which draw the waterproof material through the machine. The composition is formed by heating to 200° C. about 25 parts of either a carbonate, such as calcium carbonate, or an oxide of manganese, zinc, or calcium, with 100 parts of linseed or other vegetable oil, and adding about 27 parts of resin, starch, or the like.



385. Hall, J. Jan. 7.

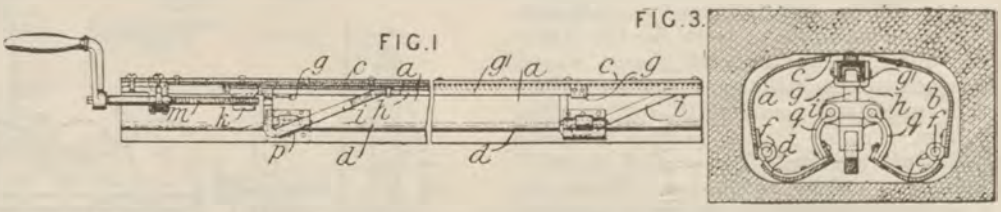
Concretes; casting.—Relates to the manufacture of concrete pipes with steel wire embedded in the interior. The concrete used is formed of crushed stone, brick, burnt earth, burnt clay, waste pottery, furnace clinker, cinder, or slag, mixed with cement or lime and water. The mould, which is mounted on a rotating plate, is built in sections, which are forced out against spring pressure by centrifugal force to allow the water in the concrete to run off. When the pipe is nearly finished, the plate is stopped and the concrete is thus further compressed by the springs. The core is moved up gradually into the body of the mould as the tube is built. Fig. 1 shows a sectional view of the core *n* and the frame carrying the rotating plate *a*. This frame consists of T-irons *c* held by rings *d* and a spiral strip *e*. At the bottom of these irons is mounted a belt pulley *f*. The core *n* is raised by means of fluid under pressure flowing into the cylinder *p* through the tube *r*, which is attached to the piston *q*. This tube is made of flattened section and fits into a similarly-shaped eye p^1 to prevent rotation of the core *n*. On the plate *a* and fastened to it by bolts z^2 is the structure shown in sectional elevation in Fig. 4, and in plan in Fig. 5. The pieces *t* are held together by rings 4, which contain springs 5. Between these pieces are placed T-irons *w*, as shown in Fig. 7, so that the openings between the sections *t* are covered when these pieces are separated by centrifugal force. Slots in the bottom flanges of the pieces *t* permit of this radial movement. When the moulding of the concrete is completed, the core is taken out, and the mould and pipe are taken away, a new mould being provided for the next pipe. The sections of the mould may be bolted together, and the core may be raised by a rod connected to a separate hydraulic cylinder.



832. Thompson, D. R. Jan. 13. *Drawings to Specification.*

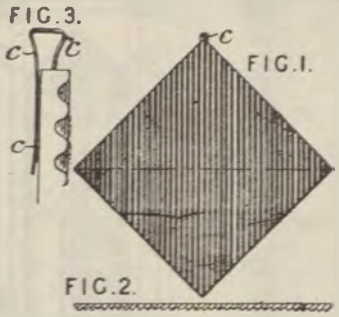
Statuary.—An automatic musical instrument is contained in the interior of the base of a piece of bronze or imitation-bronze statuary or other ornament, which may also carry a clock, barometer, or thermometer. The clock may be connected with the works of the musical instrument, so that the latter plays at stated times.

983. Siegwart, H. Jan. 14.



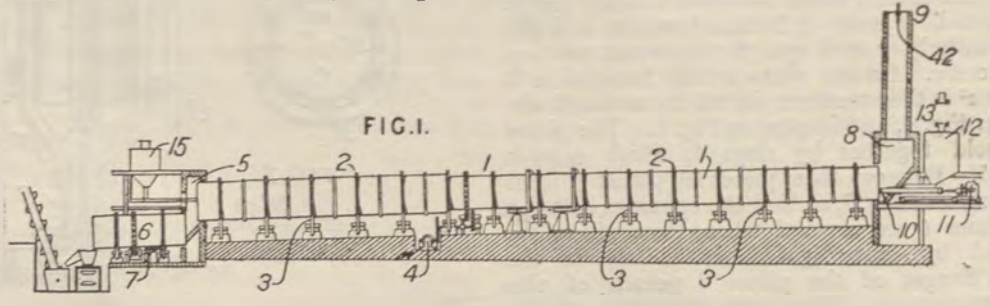
Casting.—A collapsable core for use in casting hollow girders and structures from plastic material, such as gypsum, cement, &c., consists of segments *a*, *b*, *c*, *d*, *e*, the segment *c* being a thin spring plate connecting the segments *a*, *b*, to which the segments *d*, *e* are pivoted at *f*. The segments *d*, *e* are connected by arms *q* to blocks *p* resting on inclines *i* carried by a bar *h*, which can be traversed in guides *g*, *g*¹ on the plate *c* by a screw *m* and nut *k*, to extend or collapse the core. The core is placed on a plate of the required thickness in the mould, and the plastic material cast round it, the plate forming part of the finished girder.

1231. Illemann, R. Jan. 17.



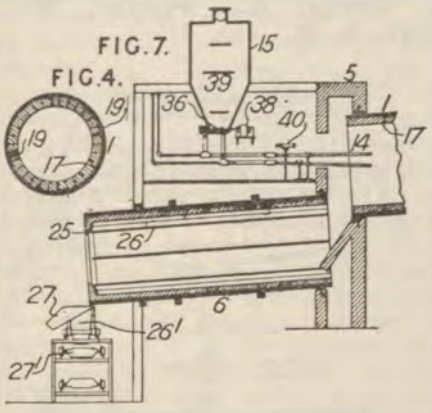
Stone, artificial.—Relates to the manufacture of artificial slates or roofing-tiles, either plain or corrugated. The tiles are moulded from a mixture of Portland or other cement with coke breeze, tufa, ground clinkers, or sharp sand. The moulds employed for the production of the tiles preferably consist of frames provided with loose plates of metal, wood, or glass, either plain or corrugated. The plates are oiled or greased before being inserted in the frames. The composition is pressed in the moulds so formed, and is trowelled off. The tiles are then removed and allowed to set and dry. Hemp, canvas, or wire netting may be inserted to strengthen the tiles, which may be dipped when dry in hot tar or bitumen to render them non-porous. Hooks or clips *c*, Fig. 3, may be embedded in the tile to hold it in position, or perforations for nails may be used for the same purpose.

1404. Mills, B. J. B., [*Edison, T. A.*]. Jan. 20.



Cements.—Relates to the manufacture of Portland cement in rotary kilns. A kiln built up of cast-iron sections is employed, and the diameter of the kiln as well as the length both of the kiln and of the clinkering-zone are much greater than in existing kilns. A much larger quantity of

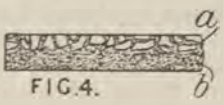
material is passed through the kiln than is customary in kilns of the normal lengths. The sections 1 are bolted together by means of flanges 2, and are supported on rollers 3. An electric



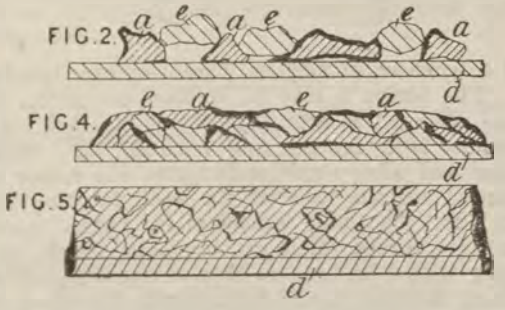
motor 4 drives the kiln. The upper end of the kiln opens into a chamber 8 from which leads a stack 9. A damper 42 controlled by a hand-lever moving over a notched segment regulates the draught. The material is fed in the dry state to the kiln by means of a conveyer 13, hopper 12, and motor-driven screw conveyer 10. The lower end of the kiln opens into a chamber 5, Fig. 7, the clinkered material being discharged into a cooling-cylinder 6 driven by a motor 7. Pulverulent coal from the hopper 15 is projected with different velocities through the nozzles 14 so as to form an extended clinkering-zone. A motor 38 and screw conveyer 36 supply the fuel to the low-pressure nozzle. The hopper 15 is provided with partitions 39 to prevent packing of the materials. The streams of fuel are so directed as to take a spiral course within the kiln. A telescope 40 with a darkened glass enables the boundary line of the clinkering-zone to be observed. The firebricks which line the kiln are separated from the outer shell by a layer of asbestos, as shown at 17, Fig. 4. Angle-irons 19 prevent circumferential shifting of the firebrick lining. The cooling-cylinder 6 is formed with a lip 25 at its lower end to contract the discharge opening, and is provided with radial wings 26 for elevating and showering the clinkered material through the air passing upwards to the kiln. The material discharges normally through a hopper 26^1 to a conveyer 27^1, but can be diverted, if defective, through a shoot 27 to the boot of an elevator which carries it to a suitable dump. The electrical connections of the motors 4, 11, 38 are as follows:—The series motor 4 drives a pair of small generators, the fields of which are connected across the supply circuit and are furnished with suitable controllers. The armatures of the two generators are connected in series with the armatures of the motors 11, 38, the fields of which are excited from the supply circuit. Regulation of the fields of the generators thus varies the speeds of the motors. In order to render the current produced by this process slow-setting, one or two per cent. of dry hydrated lime is added to the cement in addition to the usual proportion of burned gypsum.

1998. Mooney, T. H. Jan. 27.

Casting.—Tiles are cast face downwards from semi-liquid compositions in moulds which are vibrated to cause the cement and marble fragments to settle to the bottom and the water to rise to the surface. A facing-layer *a* of marble and cement is first introduced into the moulds and subjected to quick vibrations for from 3 to 5 mins., and a backing *b* of cement and sand is afterwards applied and subjected to slower vibrations for about 15 to 20 mins.



2011. Czermak, J., and **Buxbaum, A.** Jan. 28.

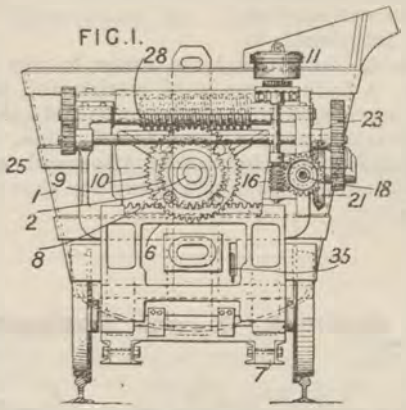


Stone, artificial.—Portions of a stiff pulp or mass of white cement, plaster of Paris, or other material are taken up by a spatula &c., and dipped into vessels containing liquid paints. The lumps *a* are placed in an irregular manner on a sheet of glass &c. *d*, and the spaces between them are filled up with soft masses *e* of inferior cement or plaster to which sand has been added. A mass built up in one or more layers in this way is spread out and subjected to pressure. Fig. 4 shows an intermediate stage, and Fig. 5 the finished veined plate. The lumps may be distributed over the plate and the colouring-matter poured over them, and streaks or bands of paint may also be formed on the plate itself.

2089. Weimer, E. A. Jan. 28.

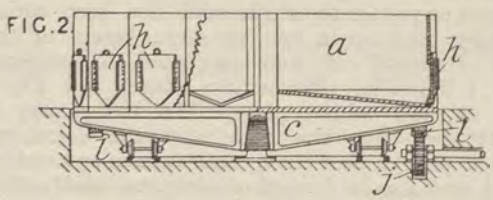
Casting.—Relates to the tipping ladles, described in Specifications Nos. 1367 and 1368, A.D. 1901, for conveying molten cinder &c. from blast and smelting furnaces. The ladle or body 1 is supported on pivots 2 which rest on flat bearing-surfaces on the upper parts of the end frames 6. The frames 6 are connected by bars 7, and one frame carries the tipping-mechanism. An electric or other motor 11 drives worm gearing 16, and the motion is transmitted through bevel gearing 21 and toothed gearing 23, 25 to a worm 28,

which gears with a pinion 10 on the pivot 2. As the ladle is tipped, it is moved laterally on the frames 6 by pinions 9, mounted on the pivots 2 and shown by dotted lines, engaging with racks 8 on the upper parts of the frames 6. The worm gearing 16 may be replaced by toothed gearing,



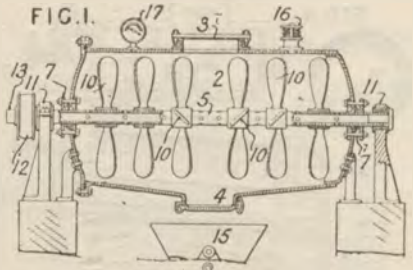
and a hand-wheel may be placed on the spindle 18. The pinion 9 may be omitted, the pinion 10 being arranged to gear with a suitable rack. In a smaller ladle for carrying hot slag &c. from copper and other smelting-furnaces, the motor is mounted on the end of the shaft carrying the worm 28. The ladle is held in its normal position by a forked latch on a rocking shaft engaging with a lug on the body of the ladle. The rocking shaft is moved by a handle 35, which is notched to hold the latch upon or off the lug. The tipping-mechanism may be applied to ladles with trunnions in bearings.

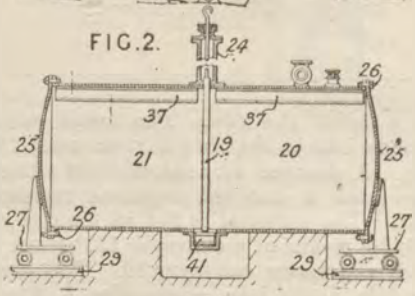
2370. Eaton, E. Jan. 31.

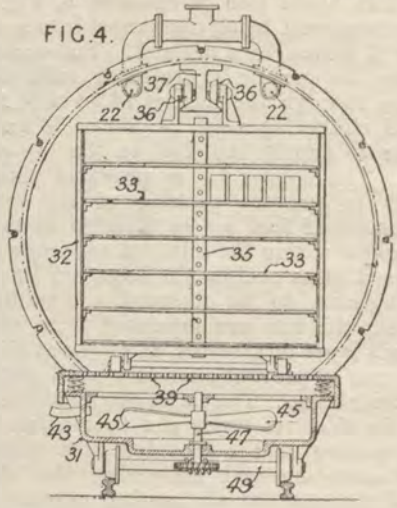


Cements; stone, artificial.—About 5 per cent. of caustic unslaked lime dust is mixed with 95 per cent. of sand, and the mixture is matured in radial compartments *a* supported by a turntable *c* rotated continuously or intermittently on circular rails by a pinion *j* gearing with a crown-wheel *l*. The floors of the compartments slope downwards to outer discharging-apertures, which are closed by hinged or sliding doors *h*. The mixture is sprayed with a measured quantity of water as it is introduced into the chambers *a*, and is matured for 24 to 30 hours to ensure the thorough slaking of the lime; it is then transferred to a second mixer, where colouring-matters and more water may be added. After leaving the second mixer, the material is moulded into bricks and blocks in a press. Ground quicklime, sand, ashes, clinkers, &c. may be used.

2371. Eaton, E., Pfeifer, W., and **Briggs, C. H.** Jan. 31.







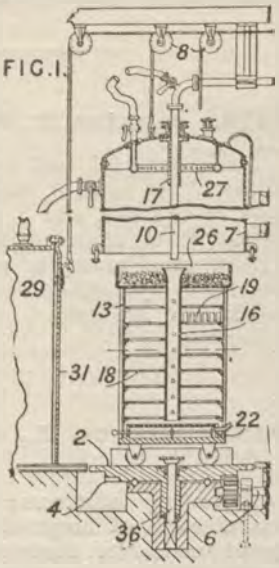
Stone, artificial.—Relates to apparatus for slaking lime and mixing it with sand &c., and to the manufacture of bricks &c. from the mixture. About 5 parts of lime, 5 parts of sand, and 5 parts of clay earth, or loam, ground clinkers, ashes, silica, or the like, are introduced into a fixed drum 2 into which water or steam is admitted through a perforated hollow shaft 5. This shaft carries mixing-blades 10, and is rotated by a pulley 12, or other mechanism. The drum is formed with a sloping bottom and is fitted with a safety-valve 16, a pressure gauge 17, and manhole covers 3, 4, for the introduction and removal of the materials. The shaft rotates in stuffing-boxes 7 and bearings 11, and an open end 13 can be connected to a flexible steam or water supply pipe, and closed before the shaft is

set in motion. The slaked mixed material is sifted or screened as it is discharged through the lower manhole 4 into a truck 15, and is afterwards mixed with 85 parts of sand. The resulting mixture is moulded under high pressure into bricks or blocks, which are hardened in a steam or drying chamber 20, and annealed in an adjacent chamber 21. The moulded bricks are placed on perforated shelves 33 arranged to slide within a frame or cage 32 on opposite sides of a central perforated steam pipe 35, and may receive a preliminary heating or steaming from vapour given off by the slaking of lime within a truck 31, which is fitted with a perforated spring platform 39, a water or steam supply pipe 43, and mixing-blades 45 on a spindle 47 driven by worm gearing from the axle 49. Two pairs of bevel-wheels 36 at the top of the cage are arranged to run on an upper rail 37 of the chambers 20, 21. A partition plate or door 19 between the chambers is arranged to slide into a casing 24, and carries a section 41 of the rail 37 for the cage to run on when it is moved from one chamber to the other. Steamtight ends or covers 25 are mounted on carriages 27 on rails 29, and are secured to the ends of the vessel by pivoted eye-bolts 26 fitting in slotted flanges of the vessel and cover. The chamber 20 is provided with perforated steam pipes 22, a safety-valve, and a pressure gauge, and may be heated by waste furnace gases or steam passing through flues under the chamber. After heating or steaming the bricks under pressure in the chamber 20 for 12 to 16 hours, they are transferred to the chamber 21, and may be sprayed with water, or a weak solution of alkali, or treated with steam, and are gradually cooled down.

2372. Eaton, E., Pfeifer, W., and **Briggs, C. H.** Jan. 31.

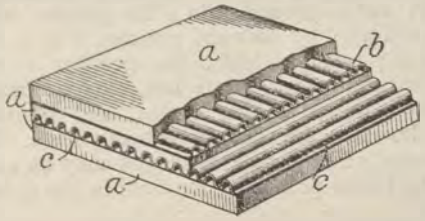
Stone, artificial.—Relates to apparatus for slaking lime, mixing it with sand &c. and manufacturing blocks &c. from the mixture. Fig. 1 shows a steamtight casing 7 arranged to be raised and lowered on a central steam pipe 10 by tackle 8 and secured to a turntable 2 by pivoted bolts fitting in slots in the edge of the turntable. The casing can be lowered over a slaking and mixing cylinder or over a wheeled frame or cage 13, fitted with sliding shelves 18 for supporting bricks 19 during

FIG. 1.



the hardening process, and is fitted with a safety-valve, pressure gauge, guide-sleeve 17, perforated steam coil 27, and pipes or couplings with cocks for connecting it with the steam supply pipe and a cooling or annealing chamber 29. The wheeled frame is adapted to run between retaining-bars of the turntable, which is rotated by a shaft 6 and a pinion gearing with a crown-wheel 4. The cage 13 has a central perforated bell-mouthed steam pipe 16 and a lower heating-chamber 22, into which lime and steam are introduced for preliminary heating and drying purposes, and to prevent the bricks from becoming suddenly chilled when the casing is raised. Superheated steam is forced through the coil 27 through alkali placed in a perforated receptacle to impregnate, dry, and harden the bricks. The annealing-chamber 29 is fitted with sliding doors 31 suspended by lifting-tackle, and is heated by exhaust steam from the casing 7. Instead of using a movable casing, the turntable or platform 2 may be raised with the mixer or cage up to a fixed overhead casing by a vertical hydraulic ram, or screw-and-bevel nut arrangement.

2458. Krause, C. Feb. 2.



Stone, artificial.—Sheets *b*, *c* of corrugated cardboard are embedded in slabs or blocks *a* of artificial stone, which may consist of plaster of Paris, lime, peat, pulp, vegetable fibres, &c. Air channels are thus formed through the stone.

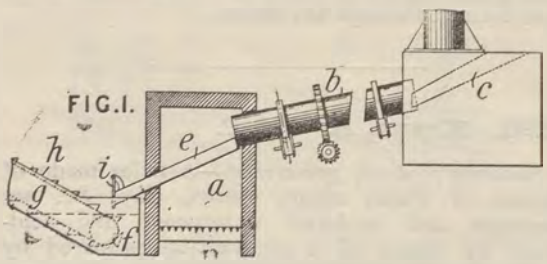
2490. Kraus, A. Feb. 2.

Statuary; stone, preserving.—Articles made of plaster of Paris, stone, stucco, clay, &c. are hardened and rendered waterproof and acid-proof by means of a composition prepared by fusing together the following ingredients:—Carnauba wax, 3000 grammes; colophony, 2800 grammes; stearin, 2150 grammes; copal resin, 1000 grammes; white resin, 950 grammes; wood tar, 700 grammes; ceresin, 350 grammes; silicated soap, 300 grammes. The article to be coated is heated, and the composition is used while hot. Large articles, such as statuary, are heated by lamps, and the composition is applied by means of a brush. The resinic acids and the silicates of the soap re-act, liberating silicic acid, which combines with the material of the article treated and hardens the surface. Reference is made to Specification No. 7691, A.D. 1899, [*Abridgment Class* India-rubber &c.].

2695. Lucas, O. D. Feb. 4.

Cements, which are stated in the Provisional Specification to be suitable for paving floors. Three classes of substances are employed, viz. :— (1) bodies forming the base of the new material and consisting of cheap earthy fibrous substances, as peat &c., and, as stated in the Provisional Specification, of chemical or mechanical pulp, asbestos, or silicate wool ; (2) bonders, such as China or other clay, chalk, or powdered talc ; (3) cementing-materials capable of withstanding a moderately-high temperature, for instance, india-rubber, shellac, and the colloids, as gelatine or glue, mixed in the case of rubber with sulphur, and in the case of colloids with materials which render the same insoluble, *e.g.*, potassium bichromate, tannin, &c. ; in the Provisional Specification the employment of casein mixed with lime, is mentioned. A substance of the third class is treated with a suitable solvent (mineral naphtha for india-rubber and shellac, and water for colloids) and the whole rendered fluid by heating. Into this emulsion a powdered mixture of substances of the first and second classes is added, and the whole thoroughly incorporated. If mineral naphtha is used, heating &c. is continued until all is vaporized. When shellac and india-rubber are employed, the resulting product is granular, and is ground into a fine powder, which may be solidified by heat and pressure into a compact mass ; with colloids, the product is of a plastic nature, which, while hot, may be pressed into the required shape, cooled, and gradually dried, allowance for shrinkage being made. The proportions of materials employed may be varied according to the properties required in the finished product.

2726. Ellison, H. Feb. 5. *Grant of Patent refused*



Asphalts.—Tar macadam is made by supplying stone from a shoot *c* to a rotary inclined tube or flue *b* heated by gases from a furnace *a*, the hot stone passing by a shoot *e*, provided with a self-closing hinged or pivoted disc *i* to a tar-well *f*, whence it is removed by an elevator *g* having perforated buckets. A trough *h* carries excess of tar back to the well. The tube *b* may be provided internally with pegs, plates, or projections ; or it may be stationary and contain a spiral or other conveyer.

3294. Purvis, J., and **Rouse, T.** Feb. 11.

Concretes ; stone, artificial. — Artificial-stone blocks, bricks, and slabs are made of cement concrete, or of lime concrete, or of the latter faced with the former material. The cement concrete consists of Portland cement and sand or broken granite &c. wetted with a dilute solution of sodium silicate. The lime concrete is prepared by mixing unslaked lime with sand, pulverized quarry waste, stone, gravel, slag, &c. in a closed vessel into which steam is passed to moisten the materials. To prepare faced blocks, a layer of cement concrete is first placed in the mould, which is then filled with lime concrete and subjected to pressure. The moulded blocks are hardened by the action of saturated steam.

3308. Imray, O., [*Carborundum Co.*]. Feb. 11.

Refractory substances. — Bricks, blocks, and crucibles are made from gannister, alumina, bauxite, chrome ore, magnesite, or the like, ground to a granular form and consolidated by means of powdered carborundum. A preferred composition consisting of equal parts of gannister or the like, and carborundum, is mixed with water, pressed in moulds, and fired in a kiln.

3331. Westphal, C. Feb. 12. *Drawings to Specification.*

Cements.—In a furnace with a vertical retort for burning limestone or magnesite, in which the lime produced is discharged into a tube below, containing a screw conveyer ; sand or other constituents of mortar may be fed to the conveyor tube to mix with the lime discharged from the retort.

3378. Jenkins, F. W. Feb. 12.

Stone, artificial and imitation.—A mixture of about 97 per cent. of sand, such as sea-sand, tailings, or the like, and 3 per cent. of molasses or refuse from sugar refineries, is moulded into bricks, grindstones, or artificial-stone blocks in moulds by hydraulic pressure, and the compressed blocks &c. are heated or burnt in an oven, or otherwise.

3483. Krüger, F., and **Denkelmann, J.** Feb. 13.

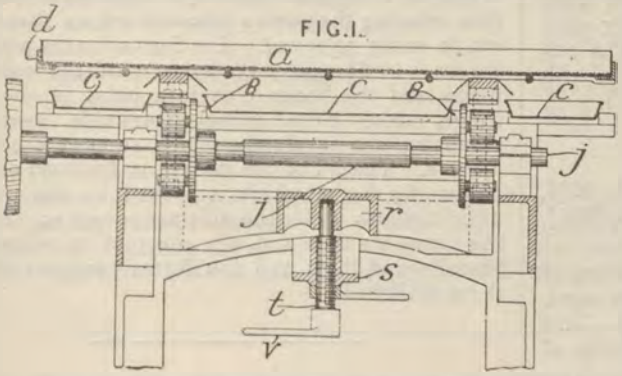
Refractory substances ; stone, artificial.—In the manufacture of fireproof artificial stone, or fireproof materials, finely-ground specular gypsum waste or other unburnt gypsum, and finely-ground

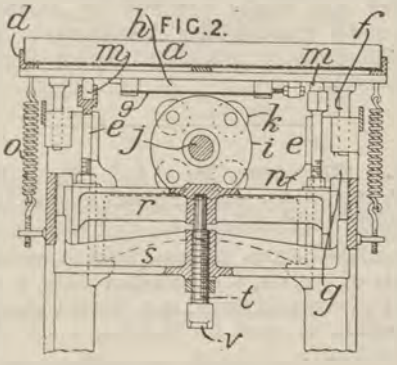
asbestos, or talc, or soapstone, or the like, preferably in the proportion of 10 parts by weight of gypsum to 1 part by weight of asbestos &c., are added to fused sodium or potassium silicate. After completely mixing the ingredients, the mixture is pressed into moulds, which are then slowly heated to a red-heat to harden it.

3629. Justice, P. M., [*Acheson Co.*]. Feb. 16. *Drawings to Specification.*

Refractory substances.—A refractory material, to be termed "siloxicon," which is self-binding, unaffected by alkalies or acids (other than hydrofluoric), and insoluble in molten iron, is applicable for making crucibles, tuyères, bricks, muffles, furnace linings, &c., and has the approximate composition Si_2C_2O, is prepared by heating a mixture of two parts of powdered silica and one of powdered carbon in an electric or other furnace. An excess of carbon may be employed in the charge, when carbon remains in the compound in a free state, and the mixture may consist of carbonaceous and silicious materials, such as coke and carbonaceous shale, or solely of carbonaceous shale containing the required amounts of carbon and silicon. A little sawdust may be added to increase the "porosity" of the charge. The powder resulting, when ground, moistened, moulded, and fired, forms a strong coherent mass. Binding-agents, such as tar, molasses, clay, &c., may be added to the compound.

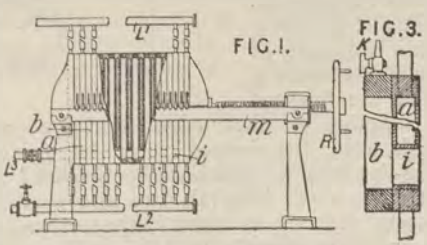
3748. Rowntree, B. S. Feb. 17.





Casting.—In a shaking-machine, applicable for shaking chocolate or confectionery into moulds, the moulds with the chocolate are placed on a wirework or other pervious and somewhat elastic table or tray *a*, Figs. 1 and 2, resting on a framework *d* having legs *f* fitting in vertical guides *g*. The frame *d* is agitated by means of rollers *k* carried by cams *i* on the horizontal driving-shaft *j*, bearing against a steel plate 9 on the bottom of an india-rubber or pneumatic pad *h* carried by the frame *d*. Adjustable spiral springs *o* are preferably employed for effecting the downward motion of the frame. Any small loose pieces of chocolate are received in trays *c* resting on leather blocks 8 below the table *a*. Instead of pads *h* and rollers *k*, steel springs or flexible steel bands may be struck by beaks or the like carried by the cams *i*. Or the pads &c. may be attached to an oscillating or reciprocating arm, one end of which is attached, either directly or by means of an adjustable link, to the frame *d*. The weight of the table and its frame is taken by columns *e*, having india-rubber pads *m* fitted in sockets at their upper ends and mounted on a cross-piece *r*, which can be moved up and down in frames *n*, by means of a screw *t* working through a fixed nut *s* and actuated by a handle *v*. In a modification, the table has four lugs on its underside, which fit on pins projecting from the face of a plate at the upper end of a central vertical shaft. A plate at the lower end of the shaft rests on rubber pads at the upper ends of adjustable columns, and is actuated by the cams on the driving-shaft. The Provisional Specification states that the cams may be fixed in bearings in the table, and work against springs or buffers carried by the frame.

3774. Fischer, F., and **Fischer, E.** Feb. 17.



Casting.—A number of open-ended moulds *b* are arranged on cross-bars *m* alternately with hollow

cells *a* each having a passage *i* to connect up adjacent moulds *b*. When the moulds &c. are in position, they are pressed together by a hand-screw R, as in a filter-press, to make the joints fluid-tight. The liquid to be cast into slabs, as soap or glue, is led into the moulds *b* by a pipe L^3 while the cooling-liquid circulates through the cells *a* from the pipe L^2 to the pipe L^1. Cocks K allow of the escape of air as the moulds fill.

4048. Mills, B. J. B., [*Seigle, A.*]. Feb. 20.

Stone, artificial.—Artificial stone for building-blocks is formed by mixing from 5 to 8 per cent. of ground quicklime and analogous oxides and from 92 to 95 per cent. of sand, preferably dry, with a solution of calcium chloride containing from 30 to 60 grammes of the salt per litre. Heat may be applied by means of a jacket or steam circulation; from 15 to 20 per cent. of powdered calcined calamine or zinc oxide is also added to increase the plasticity. The mixture is then moulded and finally petrified by treating with steam under pressure in a closed vessel. The calcium chloride may be replaced by or diluted with zinc chloride.

4441. Stevens, P. Feb. 26, A.D. 1902, [*date applied for under Patents Act, A.D. 1901*] *Drawings to Specification.*

Cements.—Relates to a composition consisting of 14 parts of gas tar, 8 of crushed slate, 8 of sand, and 0·1 of creosote mixed in a heated state. This composition is used for bedding wood blocks of parquet floors.

4675. White & Co., J. G., and **Fisher, I. H.** Feb. 27.

Casting.—Relates to apparatus or forms for the casting, *in situ*, conduits and pockets or boxes, and especially of those for the conductors of electric traction systems. Fig. 1 shows an isometric view of the apparatus in position. The walls of the form or mould are made of sheet-metal sections *a*, *b*, which are adapted to fit together at their edges, and are pressed outwards into the desired form by means of wedging-devices *e*, *f*. The insulator pockets *l*, which are placed at short intervals, are also formed by sheet-metal sections, as shown in the sectional view, Fig. 7, and have detachable lids *n*. The sections are provided with loops *d*, whereby they can be withdrawn through the slot of the rail or the pockets when the concrete has solidified. The wedging-devices are formed of three parts, the centre wedge *f*, which is forced downwards until the conduit is of the desired width, and the sides *e*, which are connected together by the plates *g* having slots *i* in which the bolts *h* loosely fit.

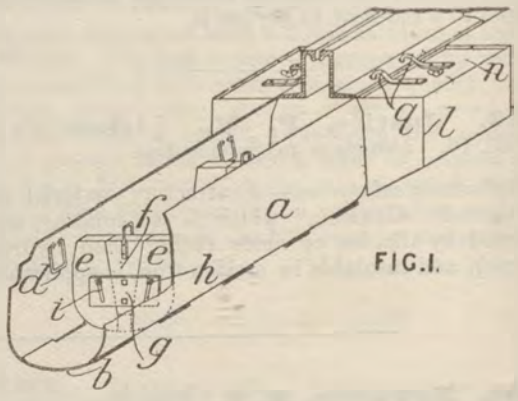


FIG. 1.

When the wedge *f* is removed, the plates *g* are raised, thus bringing the parts *e* into contact, so that they can be easily removed. The forms for the pockets are made to fit against the sides *a* of the conduit forms, and the hooks *q* fit into holes in the rail flange, these holes being afterwards used for mounting the insulators which support the conductors. The lid of the pocket is fastened on by means of a bar *o*, which is turned by the nut *p* until it passes under the side angle-bars *m*. After the forms are thus laid, the concrete or cement is placed round them, and the forms removed when it has solidified.

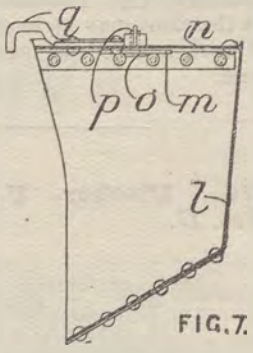
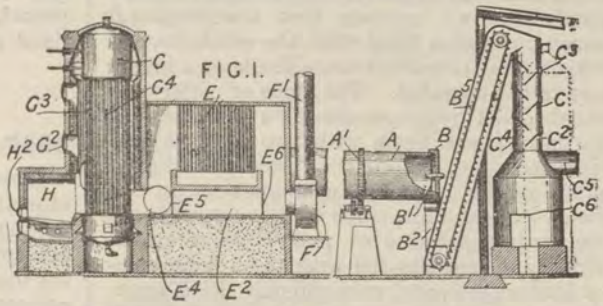


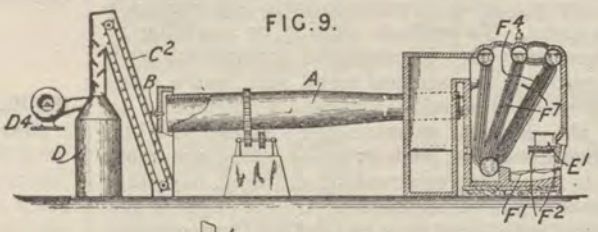
FIG. 7.

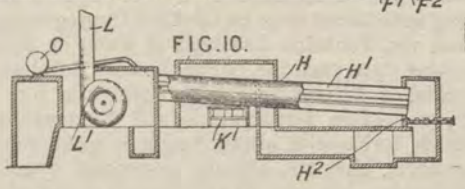
4821. Carpenter, R. C. March 2.

Cements.—Relates to rotary apparatus for making cement. In the apparatus shown in Fig. 1, two cylindrical kilns A, inclined to the delivery end B, are rotated by the usual gearing A^1, and are heated by oil, gas, or powdered fuel, supplied by burner tubes B^1. The hot waste gases from the kiln are drawn by a fan F through a steam generator G and a superheater or an economizer E, and escape through the stack F^1. The boiler G is fitted with widely-spaced vertical water tubes G^3, doors G^2, and a central partition G^4, and can be heated by an independent auxiliary furnace H. When desired, the gases can be drawn directly from the kiln into the smoke-stack through flues E^4 and a passage E^3, fitted with dampers E^5, E^6, which can be half closed to direct a portion of the gases through the economizer; or the gases may pass through the boiler only, or the economizer. The cement clinker from the kilns passes down inclined shoots B^2, lined with refractory material, and is elevated by an endless chain of buckets B^5 to a cooling-tower C fitted with inclined plates or slides C^2 to form a staggered passage. Air for combustion in the kilns is heated by forcing it through a pipe C^5, the tower C, elevator, and shoots B^2, in a direction opposite to the motion of the cement. The cement accumulates at the bottom of the cooling-chamber, and is removed through apertures closed normally by a

horizontal slide operated by a rack and pinion. Doors C^3, C^4, C^6, H^2 are provided for the admission of air &c. In a modification, shown in Figs. 9 and 10, air for combustion is forced by a fan D^4 through the cooling-chamber D and elevator casing C^2 into a pair of rotary kilns A, and powdered coal or other fuel is supplied by blasts of air through double burners B, which are fitted with flexible joints, and can be directed to any part of the kiln. The hot gases from the kilns are conducted through side passages E^1 to a water-tube boiler F^7 fitted with fireproof partitions F^4 for directing the gases in a zig-zag manner between the tubes. An auxiliary furnace F^1 is provided under a combustion-arch F^2, and the waste gases from the boiler casing are conducted to rotary dryers H, for drying liquid cement, and are drawn off by a fan L^1 and stack L. The liquid cement is heated by passing it in a zig-zag manner through parallel tubes of a condenser O heated by exhaust steam from engines, which operate the plant, and may be supplied by the boiler F^7. The hot liquid cement is conducted by pipes to the upper ends of the dryers, which are provided with longitudinal stirring-ribs H^1 and may be heated by auxiliary furnaces K^1. The gases from these furnaces pass round the drying-drums and through passages to the lower ends of the drums, through which they are drawn by the fan. The dried cement falls from the lower ends of the drums, and is removed by screw conveyers H^2.







4876. Oates, W. March 3.

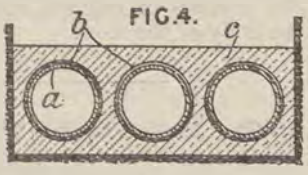
Cements.—An acid-proof and alkali-proof joint-making composition for fireclay, and like glazed goods, is made by heating to 250° F., 35 parts of ground fireclay, 60 parts of sulphur, and 5 parts of red lead. The composition is applied hot by means of moulds.

4907. Briggs, W. March 3.

Asphalts; cements.—A bituminous cement, capable of adhering to iron and steel surfaces and used chiefly for marine purposes, is prepared by mixing together 10 parts of commercial magnesium chloride, dissolved in sufficient water to give the solution a specific gravity *f* 1·2, 70 parts of ground artificial or natural asphalt, 20 parts of calcined magnesite, and 5 parts of commercial sodium silicate in solution. The Provisional Specification states that zinc chloride may be substituted for the magnesium chloride, and that the composition may be used to prevent fouling.

4944. Wilhelmi, O. March 3.

Casting.—Underground single or multiple conduits for cables and other purposes are formed by employing temporary tubes or cores *a* coated with fat or other easily-fusible material *b*. These are supported in the desired position, and cement, concrete, plaster of Paris, clay, or other plastic mineral matter *c* is stamped into the space between the tubes and the trench or an outer casing. Several layers of these tubes may be arranged above one another. When the cement &c. has hardened, hot water, hot air, steam, or other heating-medium is passed into the tubes to melt the fat &c., after which the temporary tubes are removed one by one.



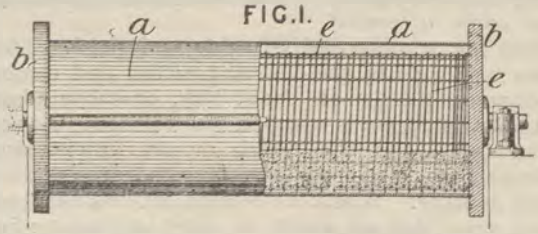
5594. Lake, H. H., [*Chemisch Technische Fabrik Dr. A. R. W. Brand & Co.*]. March 10.

Stone, colouring; stone, preserving; stonework, ornamental.—Marble, limestone, or other natural stone, or organic material, such as ivory, is impregnated throughout its substance with colouring or

hardening solutions by first freeing it from moisture at a gentle heat in a vacuum, then transferring it to a vacuum chamber filled with the solutions, and afterwards admitting air at atmospheric or a higher pressure to the chamber. The stone or material is afterwards dried by evaporation in a vacuum, and may be impregnated again with two or more solutions in succession, in order to produce coloured precipitations or chemical combinations in the material. For example, stone may be impregnated with an aqueous solution of potassium chromate, then dried, and impregnated with an alcoholic solution of lead acetate, and subsequently dried again, and impregnated with water to form lead chromate in the stone. To produce veining or marbling in the stone, it is first impregnated throughout with a concentrated ammoniacal metal salt, and a solution of an alkaline salt is afterwards introduced to form the streaks or markings. Veined marble, stratified limestone, and irregular stone are most suitable for producing streaking, graining, mottling, and marbling ornamentations. One or more of the following substances may be used for impregnating the stone, viz., fuchsine dissolved in water or alcohol, coal-tar dyes, carmine, copper acetate, sulphate, or chloride, or ammoniacal salts, potassium ferrocyanide, potassium ferrocyanide and ferricyanide compounds, ferric salts, alkaline salts or compounds of phosphoric, chromic, arsenic, arsenious, cyanic, and antimonic acids, and all ammoniacal metal salts with the exception of sulphates and oxalates which form insoluble compounds with calcium. For hardening stone, soluble glass, potassium borate, or the like is used. In the Provisional Specification, a method of improving the colour and grain of coarse, crystalline, bluish marble is described, consisting in treating it with a weak (1 per cent.) solution of carbonic acid, or a bicarbonate of magnesium or an alkali, and gently heating the stone, when the bicarbonate is decomposed, and fine crystals of calcium carbonate are formed in the body of the stone.

5978. Hennebique, F. March 14.

FIG. 1.



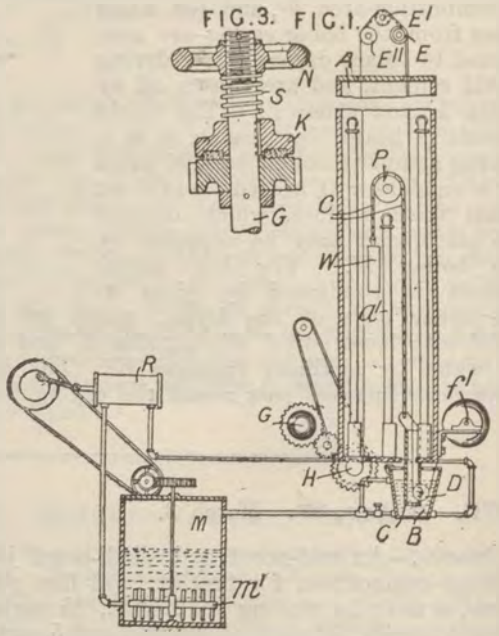
Casting.—Comprises a process or method of making pipes, conduits, columns, casings, or the like of cement, béton, or other agglomerate material, with or without a metal skeleton. A suitable quantity of cement béton slurry is placed in a rotary mould *a* of the kind shown in Fig. 1, together with the metal skeleton *e*, if one is to be used, and the mould, after being closed at the ends by discs *b* which are mounted in bearings, is rapidly rotated. After a suitable time, the rotation is stopped, and the mould, which is in halves connected by a longitudinal hinge, is opened and the pipe removed. An alternative construction of mould, perforated to allow water to escape and lined with felt cloth, is also described.

6247. Magens, J. H. March 18.

Cements; concretes; mortars.—Cement, concrete, mortar, or the like is frozen to prevent it from setting when made, so that it may be stored or transported. The material is thawed when ready for use, and may be applied as a substitute for ordinary mortar.

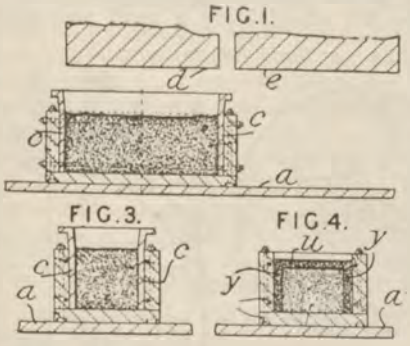
6499. Carolan, E. A., [*General Electric Co.*]. March 20.

FIG. 3. FIG. 1.



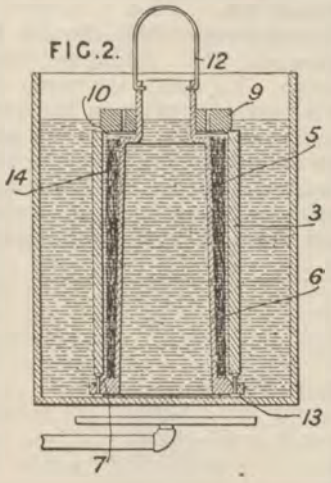
Fireproof coverings.—Relates to apparatus for coating muslin, paper, or other supporting-material with a film of some hardening-compound to render it heat-resisting &c. The fabric is passed from a roller f^1, under a roller D in a trough B of the coating-material, twice through a stove A heated by steam pipes a^1, and then under a roller H to a winding-up roller G or to another apparatus for giving the fabric another coat. In order to prevent the coated fabric from coming into contact with the air before entering the stove, it is surrounded by a jacket C hung from a pulley P in the stove by a rope *c* and a weight W. In order to prevent sagging of the middle of the fabric, it is passed over three rollers E, E^1, E^{11}, above the stove, of which the first E is made slightly convex, and the second E^1 slightly concave. The winding-up roller G is driven by a friction clutch K, Fig. 3, regulated by a screw nut N and a spring S. In order to prevent the formation of a skin on the substance in the trough B, fresh material is constantly supplied to it by a pump R from a reservoir M, in which it is kept stirred by rotating stirrers m^1.

6849. Haddan, H. J., [*Crozier, A. O.*]. March 24.



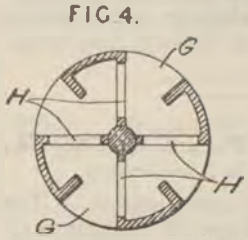
Stone, artificial.—A mixture of about 7 parts of sand to one part of liquid cement is formed into a partially-compacted porous mass in the mould *a* by the plunger *d*. The mould-lining *c* is then removed, and a facing-composition *y* is filled into the space left by the lining ; a layer *u* of the same composition is then spread on the top of the partially-compacted mass. Pressure is applied by a second plunger *e*, and water and cementitious matter are forced into the porous mass, which is then allowed to harden.

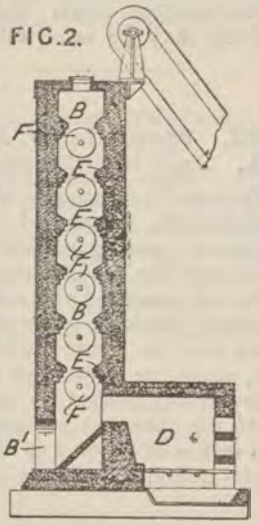
7441. Mills, B. J. B., [*National Phonograph Co.*]. March 31.



Casting wax &c. Cylindrical or disc-like duplicates of sound records for phonographs and the like, and similar blanks for receiving these records, are cast upon layers of fibrous materials, which render them less fragile while leaving an outer surface free from fibre. A layer 14 of cottonwool or the like is wound upon the hollow core 5, which is then inserted in the mould 3. The apparatus is then placed in a tank of molten wax or the like, which passes between the lower parts of the mould and the core, and is absorbed by the fibrous materials. The apparatus is then withdrawn by a handle 12, the shoulder 7 on the core closing against the lower edge of the mould and preventing the wax &c. from flowing away. The core and mould are then dipped in cold water to set the wax, and the core, upon which a spiral groove 6 is cut, is removed by unscrewing it. The blank or record is then withdrawn from the mould, and is finished. The core is guided in the mould by pins 13 and by the conical edge 10 of the covering.

7622. Lowden, J. April 2.





Stone, artificial ; cements ; mortars.—A material for making bricks, slabs, and other moulded articles is obtained by treating gas lime or other spent lime, alone or mixed with clinker, with hot furnace gases and an excess of heated air, then mixing with clinker and fuel, such as coal breeze, and afterwards burning in a kiln, steam being preferably passed through the kiln. Bricks or the like made from these materials are further hardened by exposure to hot waste gases containing carbon dioxide. One form of apparatus consists of a vertical shaft B, Fig. 2, formed with contracted portions E and provided with rotary drums F, each of which is provided with circumferential longitudinal grooves G, Fig. 4, and with radial perforated partitions H. The gases from a furnace D, Fig. 2, and air admitted through an opening B^1, pass up the shaft B, and come in contact with the spent lime &c. fed in at the top of the shaft. According to the Provisional Specification, the product may be used for making mortar or cement.

7976. Sundell, F. R. A. April 6.

Cements ; stone, artificial and imitation.—A brick, wood, or other wall is plastered by applying a facing-layer of thin plaster or cement to a horizontal glass or other plate, sprinkling dry cement or plaster of Paris on the facing-layer, or drying the layer, raising the glass plate against the wall, and running in cement or plaster between the wall and facing-layer. When the plaster has solidified, the plate is removed. For ceilings, one or more backing-layers are applied to the facing-layer on the horizontal plate, with or without lagging, and may be consolidated by stamping before the compound plastic sheet is applied to the ceiling. The composition may consist of 10 parts by volume of Keene's cement and 1 to 12 parts of powdered alum mixed with the glue water ; sugar may be added to produce a polished washable surface and prevent the formation of blotches. When it is desired to imitate marble or other stone or wood, a design is applied by crayons or brushes to the facing-layer on the plate. For walls, the facing-layer may be dispensed with, and the material may be poured in between the glass plate and the wall. The material forms a hard surface which does not

absorb much oil when painted. The surface mass may consist of a colour composition with a transparent surface layer. For cheaper work, plaster of Paris may be used, with or without lime water.

8682. MacAlister, A. P., and **Gibbs, R. R.** April 16. *Drawings to Specification.*

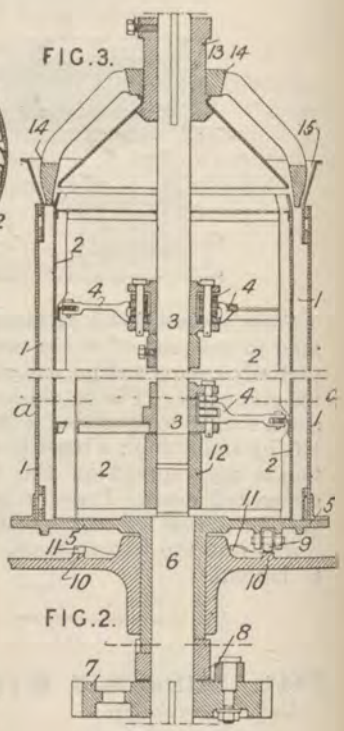
Fireproof coverings and compositions. — The linings, walls, floors, and ceilings of refrigerating-chambers, heating-chambers, safes, strong rooms, receptacles for keeping food hot, and other structures, are insulated and rendered fireproof by soot, vegetable black, or other carbon deposit or residue, which may be treated with sodium silicate, china clay, alum, or powdered asbestos. The material is preferably placed in sealed boxes placed one above the other. Cardboard boxes with adhesive lids, or flexible cotton or like boxes with lids which can be pasted down, may be used.

9030. Rozier, F. April 21.

Casting.—Relates to the manufacture of béton or cement mortar pipes, joints, elbows, sleeves, and branches, strengthened with insertion and compressed. The apparatus used consists of an outer cylinder, which is rotated, and an inner cylinder formed in segments, so that its diameter may be slightly increased, this inner cylinder being also rotated. The cement is poured in the annular space between the cylinders and shaken down. Figs. 2 and 3 show a sectional elevation of the apparatus; Fig. 5 shows a plan of a section along the line *a–a*. The outer cylinder 1 is mounted on the rotating platform 5 carrying rollers 9 and moving over the table 10, which has shoulders 11 so that the platform 5 receives a jerking movement in rotating. The inner cylinder 2 is formed in parts connected to the vertical shaft 3 by eccentrics 4 carrying weights if desired, so that the diameter may be slightly increased, the edges of the parts being so shaped as to prevent them ceasing to fit together as the cylinder 2 enlarges. The shaft 6, driven by the wheel 7 by a pawl arrangement 8,

FIG. 5.

FIG. 3.



actuates the platform 5 and rotates the shaft 3 through the sleeve 12. The shaft 3 carries a screwed ring 13, on which is fitted the lid 14. In operating, a metallic armature is placed between the cylinders, and the cement mortar is fed in through the hopper 15, the whole being slowly rotated. The mould being filled, the lid 14 is brought down between the cylinders and compresses the béton. To finish the pipe, the internal cylinder 2 is rotated rapidly in the reverse direction, thus compressing the béton by centrifugal force, and smoothing the inside of the pipe. The pipe may be lined with cement by reducing the diameter of the cylinder 2, pouring in the cement between the pipe and the cylinder, and rotating the apparatus rapidly.

FIG. 2.

9175. Southern, G. April 23.

FIG. 8.

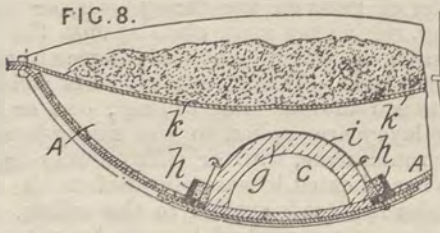
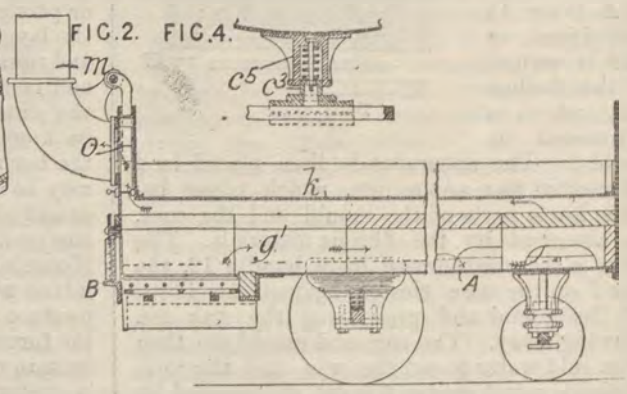


FIG. 2. FIG. 4.



Asphalts.—Relates to a portable apparatus for heating asphalt, more particularly for use in making and repairing roads &c. The material to be heated, melted, or dried is placed on the plate *k* forming the top of a long shell A, which is mounted on wheels and provided at one end with a firebox B. The furnace gases pass to the back end of the shell through a flue C, and return to the front

underneath the plate *k*, finally escaping to the chimney *m*. A sliding damper *o*, fitted in a separate chamber passing across the front end of the shell, controls the outlet opening. The flue C is composed of arch-shaped firebricks *g*, resting on a lining on the bottom of the shell A, and secured by metal bands *i*. These are connected by long bolts with angle-irons *h* laid along the outside of the flue. The bearers of the grate may be notched to receive the firebars. Fig. 4 shows a swivelling arrangement for the front bogie-axle. The axle-bearing is made in two parts, and is provided at the top with an extension c^3, which fits in the open-ended cylinder c^5. A spring is interposed between the top of the extension c^3 and the upper end of the cylinder. Springs are also placed in the axle-boxes of the back bogie.

9385. Wale, A. E. April 25.

Fireproof coverings.—An inelastic fabric, applicable as a fire-resisting medium &c., is constructed with a series of helical wire coils arranged side by side transversely to the length of the fabric, and engaging one another, the interstices being afterwards filled in with asbestos, silicates, cement, &c. A wire fabric, composed of two single woven fabrics crossing one another at right angles as described in Specification No. 20,826, A.D. 1891, [*Abridgment Class* Weaving &c.], or a double or treble woven wire fabric, may be employed in place of the helical coil fabric. The coils may be flattened to reduce the thickness, and the filling is omitted when a connection is to be made, such connection being effected by engaging other helical coils with both parts.

9412. Oliver, H., and **Bevan, W.** April 25.

Cements; fireproof coverings and compositions.—The lime waste of alkali works and also lime-sulphate waste are worked up into fireproof compositions &c. The waste is lixiviated and the sludge that settles, after drying on hot plates, is desiccated in kilns, and then ground or otherwise reduced to impalpable powder. Shells, preferably oyster, are ground to powder and mixed with the other powder in varying proportions, the inside shell only being used if the result is to be white or artificially coloured; or the shell dust may in some cases be dispensed with. The mixture is mixed with a solution of magnesium salt, preferably chloride, or other agglutinant, such as sodium silicate, glue, or a mixture of these, with or without magnesia. The material rapidly becomes a hard fireproof and damp-proof mass.

9508. Lilienthal, G. April 27.

Stone, artificial; plasters.—Artificial marble, for covering a floor or wall, consists of ordinary or magnesia cement, gypsum and glue or the like, or mortar, which is coloured as desired and may contain wood, paper, stone dust, &c. The material is applied in lumps to the surface, and is spread into a thin mass by means of a wooden roller soaked in castor or other heavy oil and dressed with petroleum or other light oil to prevent the composition from sticking to it.

9835. Geissler, G., and **Geissler, G.** April 30.

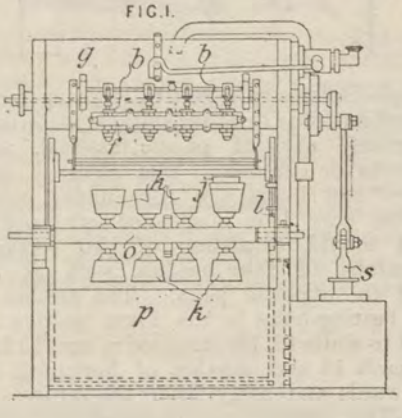
Cements.—In the manufacture of cement, oxygen is employed for burning the raw materials in a kiln or furnace. The molten product is run from the kiln into water, and the granulated mass obtained is afterwards pulverized. The waste heat from the kiln or furnace may be employed for drying or heating the raw materials, or for drying the granulated mass.

10,393. Mack, C. May 7.

Sound-deadening compositions.—A fireproof, waterproof, and sound-deadening composition, for jointless floors of dwelling rooms, is made of a mixture of pulverized calcined gypsum and granulated cork, stirred with water into a semi-liquid paste. As an example, 1 part of cork may be mixed with 50 parts of calcined gypsum.

11,177. Kinsey, J., and **Kinsey, J. T.** May 16.

FIG. 1.

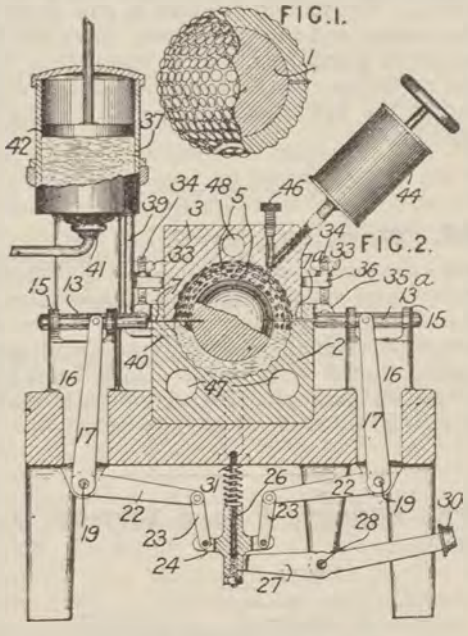


Casting.—Tea-cups, tea-pots, jugs, basins, vases, and other hollow-ware are formed by running slip from a tank *g*, Fig. 1, into plaster moulds *j* carried by "churns" *k* mounted on spindles on a shaft *o*. The slip, which is controlled by valves *b* fitted in a casing *f* and actuated singly or collectively by hand, passes by troughs to the moulds. When the slip has settled, the shaft *o* and moulds are rotated by releasing a spring catch *l*, and discharge the surplus slip into a tank *p*, whence it is raised by a pump *s* to a strainer in the tank *g*. The moulds now uppermost are next filled in the same manner, and the castings fired when dry. The "churns" and valves may be fitted on each side of the apparatus, and the whole may be portable. According to the Provisional Specification, the valves may be mounted on a pipe instead of in the casing *f*.

11,324. Timm, F. C. W. May 18.

Cements.—In the manufacture of Portland cement, the raw material is first calcined in shaft or ring kilns, then reduced to fine powder, and placed in rotatable reverberatory furnaces.

11,656. Richards, F. H. June 10, A.D. 1902, [*date applied for under Patents Act, A.D. 1901*].

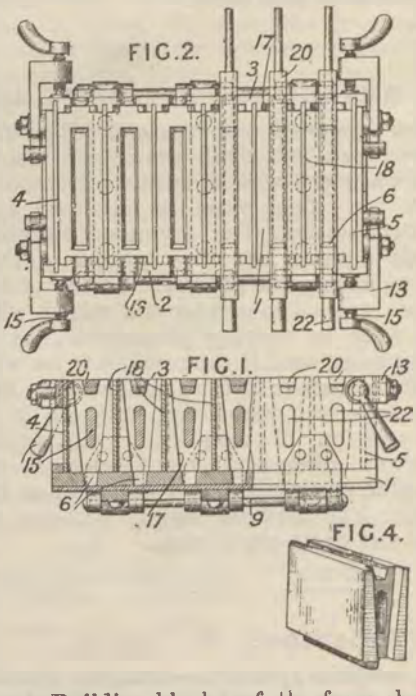


Casting.—Relates to a golf ball having a core 1 of soft india-rubber or other suitable material, and a compressed shell of plastic material, usually gutta-percha or celluloid. The shell is cast in one piece and holds the core under compression. The core 1 is suspended centrally in a spherical mould, consisting of two sections 2, 3, by means of four needles, such as 7, 7ª, arranged in opposite pairs. The needles pass through bearing-holes in the lower section 2 and are fixed to slides 13, 13ª mounted in ears 15 formed on standards 16 and capable of horizontal movement towards and away from the centre of the mould. The needles are operated by arms 17 pivoted at 19 and rigidly fixed to levers 22 connected by drop links 23 to a slider 24, which is mounted on a vertical stem 26 and driven upward by a lever 27 pivoted at 28 and carrying a handle 30. A spring 31 acts on the slider 24 in a direction to press the needles towards the centre of the core. The mould-sections are clamped together by wing-nuts 33 working on vertical rods 34 pivoted to lugs 35 on section 2. These nuts bear on ears 36 on section 3, which are slotted so that the clamping-rods may be thrown off. The shell material is contained in a cylinder 37, and kept hot and fluid by a gas burner 41. The fluid material is forced through a pipe 39 into the mould at 40, the pressure, which is applied by a piston 42, being maintained during the cooling, so as to feed material to the mould as the ball shrinks. Before casting the shell, the mould may be heated by passing hot water or steam through passages 47, 48, and air is exhausted from the mould by a pump 44 connected thereto by a valve 46. When the mould is filled with the plastic material, the valve 46 is closed and the whole ball is submitted to great pressure by the piston, cold water being circulated through the channels 47, 48. When the shell has cooled sufficiently to hold the core under compression, the needles are withdrawn, the upper section of the mould removed, and the ball taken out; the holes left by the needles may be plugged if desired. The moulds are provided with pits 5 for embossing the ball.

11,657. Richards, F. H. May 26, A.D. 1902, [*date applied for under Patents Act, A.D. 1901*]. *Drawings to Specification.*

Casting.—Relates to the manufacture of golf and other playing balls, and particularly to balls having a core of soft india-rubber or other suitable material and a shell of gutta-percha or other plastic substance, which is cast in one piece and holds the core under compression. One object of the invention is to avoid the production of air bubbles. The method and apparatus used are the same as those described in the preceding Abridgment, No. 11,656, A.D. 1903. In some cases the exhaust apparatus may be dispensed with. Parts of the invention may be applied to produce solid balls of gutta-percha &c. without cores.

11,748. Levi, E. June 27, A.D. 1902, [*date applied for under Patents Act, A.D. 1901*].



Casting.—Building-blocks, of the form shown in Fig. 4, are cast in a moulding-box constructed with a bottom 1, Figs. 1 and 2, back and front walls 2, 3 turning about pins 9 attached to the bottom, and

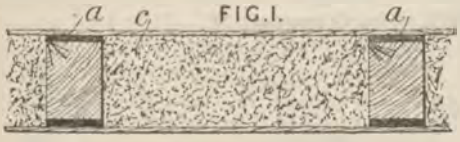
removable side-walls 4, 5 provided with upwardly-turning straps or bows 13, which carry screws 15 for holding together the front and back walls. The box is divided into compartments by removable partitions 18, a block being moulded in each compartment. At the bottom of each compartment is a channel 6, and, at the top, a cross-bar 20 for forming the rectangular noses and corresponding grooves in the block; the central hollow is formed by the bar 22 and the end projections and grooves by recesses 17 in the back wall and projections 16 in the front wall 2. After the composition has set, the bars 20, 22 are removed and the bows 13 loosened so that the back and front walls can be turned down.

11,802. Staab, W. May 23.

Cements; concretes; mortars; plasters.—A quick-setting hydraulic cement or concrete is produced by mixing from 2 to 3 parts of dry cement with 1 part of gravel and adding a hardening-solution obtained by dissolving 50 parts by weight of potassium carbonate and 17 parts of common salt in 1000 parts of pure water at a temperature of 35° to 40° C. The plastic composition may be applied as a mortar or plaster in the construction of underground water-resisting walls, or for preventing the entrance of water into mines or underground rooms.

11,855. Archibald, J. May 25.

FIG. 1.

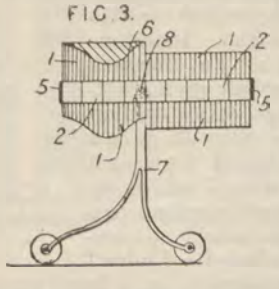


Sound-deadening coverings.—Relates to the application of cork for deadening sound in buildings. Cork strips *a* are inserted between the joists and floorboards, the spaces between the joists being filled with granulated cork *c*. Similar material may be used in the walls and between the joists and columns or stanchions.

12,512. Haddan, R., [*Rolland, C.*, and *Ström, G. A.*]. June 2.

Casting.—Adjustable apparatus for reproducing busts &c., or for taking measurements for the use of corset-makers, tailors, orthopædists, &c., is composed of a number of bundles of rods, plates, or elements 1, adjustable longitudinally in rectangular frames 2, which are grouped in a main frame 5 carried by trunnions 8 of a carriage or support 7.

FIG. 3.



The rods are moved within the frames until they are in contact with the bust or other surface, and are clamped within the frames 2 by admitting compressed air to pneumatic linings within the frames. To reproduce a bust in plastic material, the apparatus is turned into a horizontal position, as shown in Fig. 3, and a lining 6 of rubber or elastic material is applied over the ends of the rods to form a mould. In adjusting the rods to the shape of the body, a sheet of paper or muslin is interposed between the rods and body. A pattern can be cut directly by using this apparatus without tracing or measurement.

12,584. Mack, L. June 3.

Plasters.—Consists in a composition for use as a plaster, obtained by calcining powdered gypsum in metal vessels with stirring-apparatus or revolving calcining-drums, about 2 per cent. of colophony being added. The internal temperature is not allowed to exceed 150° C., to prevent the decomposition of too much colophony. If the gypsum contains calcium carbonate, a small quantity of alum or aluminium sulphate is also added, to decompose it, and the resulting composition is used in making a porous type of plaster, and also for light porous building-materials.

12,645. Stempel, O. A. June 4.

Fireproof coverings and compositions.—Relates to a composition and method of applying the same to wood, metal, or other surfaces to protect them from the destructive influences of the weather, fire, water, rodents, and insects. The composition consists of asphalt, asbestos, and sand or similar body material, ground and mixed cold. The coating is applied by first dusting the surface with powdered asphalt and melting it by a hot fusing plate to form a priming coat, and then dusting on the composition and again fusing it to form the protective coating.

13,095. Stidder, J. G. June 11.

Asphalts.—A mixture of equal parts of pitch, sulphur, bitumen, tar, oil, and sand is applied as a flexible waterproof backing for glass and other tiles.

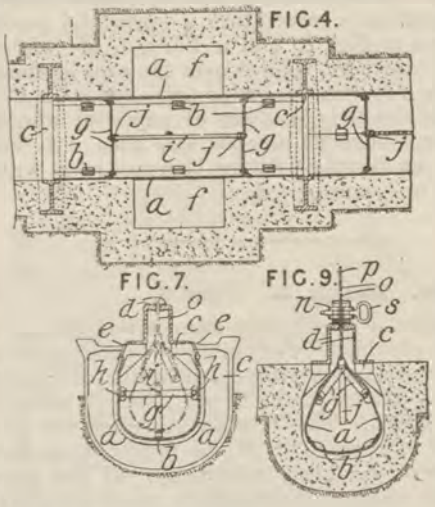
13,115. Lake, H. H., [*Spangher, U.*]. June 11. *Drawings to Specification.*

Asphalts.—Wood parquet plates are backed with an asphalt consisting of 80 parts by weight of dry tar, 5 parts of Trinidad bitumen, 2 parts of resin (pitch), and 100 parts of calcareous powder.

13,565. Hall, J. E. June 17.

Casting.—Consists of a combined mould and centering for conduits, such as those intended for

enclosing electric conductors. The use of the mould is illustrated in connection with a conduit for systems of electric traction in which yokes or frames *c* are used for supporting the slot rails *d*,

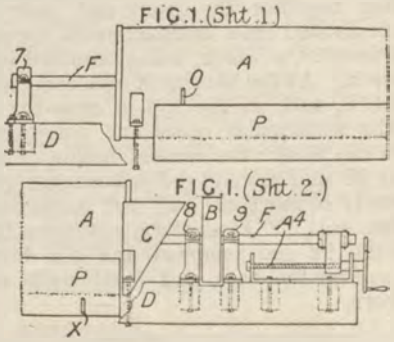


longitudinal bars *e* being usually employed between adjacent yokes for strengthening the concrete, except where enlargements *f* of the conduit occur for receiving the conductor supports. The mould *a*, in two parts, Fig. 7, or three parts, Fig. 9, which are hinged at *b*, has its sides pivoted to toggle-levers *g*, and these are connected with an operating-rod *j*, which rests on the bottom when the mould is open and maintains the levers *g* in alignment. When the concrete has been rammed round the mould, the lever *j* is pulled up by means of a rod *o*, causing the mould to collapse, as shown in Figs. 7 and 9. It is then slightly raised and locked by means of pins *s* to bars *n* connecting a series of trolleys running on the rails *d*, so that the mould can be moved along between the next two yokes *c* and again placed in position for continuing the casting of the conduit, the mould being of such a length that its ends are supported by adjacent yokes, Fig. 4. Two-part moulds are employed in the parts of the trench where the bars *e* occur, the sides of the mould extending to the lower edges of the bars, Fig. 7, while the three-part ones are used in the parts where the enlargements occur, the sides then being of such a height as to be in close proximity to the under surface of the slot rails *d*.

14,366. Wirtz, L. June 27.

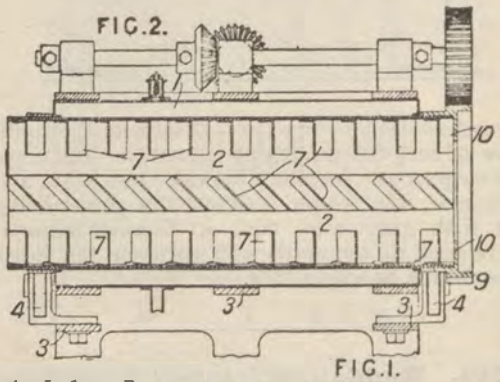
Slags, treatment of.—Blast-furnace slag, containing a fair proportion of alumina, is soaked in hydrochloric acid or in solutions of chlorides, such as those obtained as waste liquor when stripping galvanized, tinned, or other scrap iron. The resulting liquid is boiled down, with or without the addition of sodium or other chlorides, and is calcined at a high temperature and washed to separate out a substitute for emery, and other heavy crystals. The colouring-matter and lighter crystals may be used as a cleaning-powder.

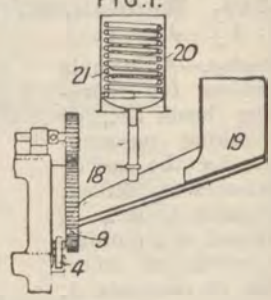
15,342. Mylrole, W., and **Mylrole, J. H.** July 11.



Asphalts.—Relates to a machine for mixing tar and stones to form asphalt and the like. A cylinder A, open at one end and provided with a feed-hopper C at the other, is mounted in a suitable bed D and provided with a heating pan or jacket P with inlet and outlet pipes at X, O for hot water or steam. A rotary shaft F, driven by the pulley B, is mounted in the bearings 7, 8, 9. The shaft F is provided within the cylinder A with a number of agitating-blades. The pulley B is provided with a key fitting into a groove in the shaft F, so that the latter may be moved longitudinally by means of the screw shaft A^4 and the connections shown, to facilitate the complete discharge of the contents of the cylinder A.

15,653. Parkinson, H. July 15.

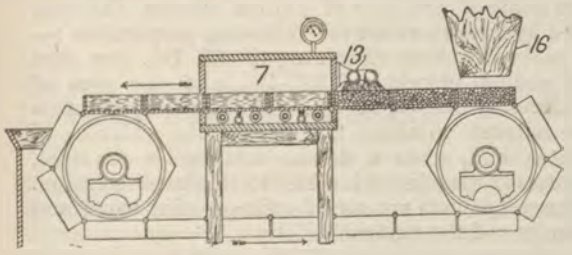




Asphalts.—In an apparatus for mixing melted tar with broken limestone &c. in forming asphalt roads, roofings, &c., a mixing-cylinder 2, with internal spaced blades 7 set at an angle, revolves in a concentric steam-jacketed cylinder 1 supported on a framework 3. The cylinder 2 is supported on adjustable antifriction rollers 4, and is rotated by means of an annular spur-wheel 9,

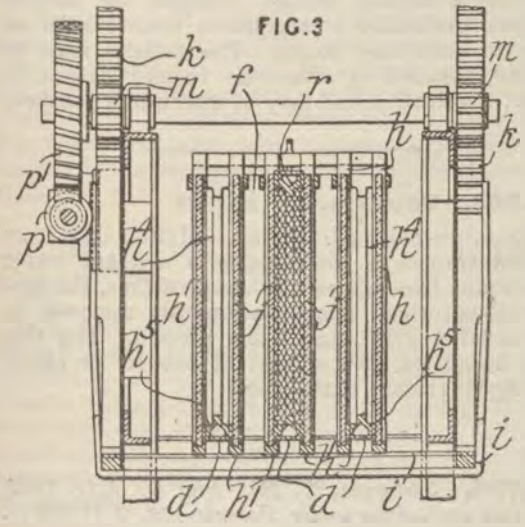
the material being gradually worked through the cylinder by the action of the blades. The flange 10 of the wheel 9 prevents the material from escaping at the feeding end. The broken limestone is conveyed from a hopper 19 on to a steam-jacketed feeding-shoot 18, on which the melted tar falls from an open cistern 20 with internal steam heating-pipes 21, or from a jacketed boiler.

16,412. Winstanley, T. July 25.



Cements.—Consists in a process and apparatus for conveying and preparing lime and cement for use in the manufacture of lime-sand bricks, hollow building-blocks, artificial stone, &c. The lime to be slaked is delivered into a tray, push-plate, or other endless conveyer, through a spout 16, and is moistened by water from sprays 13. The conveyer carries the lime thus moistened into a chamber 7, where the heat due to the slaking produces enough steam to effect the proper slaking of the lime. Additional steam may be supplied, if necessary. The conveyer on leaving the chamber tips the lime on to a screen. Cement is treated in a similar way. The trays may form the floor of a lime or cement preparing chamber.

17,029. Waller, W. A. C. Aug. 5.



Casting slabs and blocks. Fig. 3 shows in vertical section three moulds constructed of parallel sliding side plates *j*, *h*, secured in grooved U-shaped frames h^1, end fillets h^4 secured to hinged end-plates *f*, bottom fillets h^5, supported by loose plates *d* resting on the frame, and loose covers or fillets *r*. When the cement in the moulds has set sufficiently, the covers *r* are removed, the end plates *f* with the fillets h^4 are turned down, the sides *j*, *h* are lowered by worm gearing, *p*, p^1, rack-and-pinion mechanism *k*, *m*, and a sliding frame *i*, and the slabs are left standing on the plates *d*. For producing hollow or perforated slabs, core rods are attached to the frame h^1, and slide through the stationary plates *d*. The side-plates *j*, *h* are preferably of glass, and their upper edges may be roughened or serrated to score the slabs for the reception of plaster. The hinged plates *f* are secured to the mould-frame by turn-buttons, the plates *h*, *j* may dip into a tank, when lowered, and end brackets and rails may be provided to facilitate the removal of the slabs. The frame *i*, with plates *j*, *h*, may be arranged to slide upwards or sideways instead of downwards. The fillets are mitred at the ends, and may be plain, or formed with ribs, for producing plain or grooved slabs for partitions &c.

17,156. Frankenburg, Ltd., I., Frankenburg, R. J., and **Betteridge, F. H.** Aug. 7.

Fireproof compositions.—Non-inflammable solutions are produced by mixing rubber with carbon tetrachloride, dichlor-methane, trichlor-ethane, tetrachlor ethane, or trichlor-benzol, alone or together. The rubber may be softened with coal-tar naphtha or other solvent before the above-mentioned solvents are added. The solutions are used for repairing rubber tubes or pipes or other goods, for manufacturing garments, and for electrical purposes.

17,183. Steinberg, H. Schulte-. Aug. 7.

Slags, treatment of.—Blast-furnace slag, particularly white slag, is powdered and submitted to the action of high-pressure steam. The slag so treated is mixed with an equal amount of powdered untreated slag or top-dust. The mixture, which may be further treated with steam, is pressed into blocks and submitted to metallurgical treatment. For making building-blocks, the slag, after treatment as above, is mixed with a silicious material, such as sand or powdered blast-furnace slag. The mixture is pressed, and the blocks hardened, by allowing them to stand, or by submitting them to the action of high-pressure steam.

17,812. Klefisch, L., [*Klefisch, J.*]. Aug. 17.

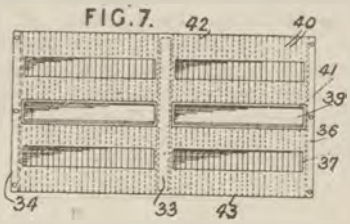
Stone, artificial.—A mixture of ground slate waste and lime is moistened with a small quantity of water, and moulded into bricks, which are hardened by heating in a closed chamber to a temperature just below 100° C., for from 3 to 5 days, and are then cooled slowly. If the bricks are too dry, a vessel containing water is placed in the chamber. A hard insoluble surface layer of

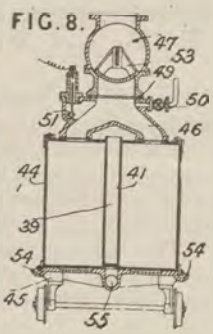
lime silicate or calcium-hydro-silicate is formed on the surface of the brick by the drying and indurating process. Bricks, for use in baking-ovens, are exposed in the open air for a few days, and subjected to a dry heat of over 120° C.

17,984. Dean, M. Aug. 20. *Drawings to Specification.*

Refractory substances.—Fireballs are made of a mixture of 4 parts fireclay and one of dry or wet sand to render them porous.

18,044. Krivánek, J. Aug. 20.





Casting.—Moulds for sugar are constructed so that they can be filled *in vacuo*, and so that the sugar can be completely freed from the mother-liquor. The mould-bottom has a fixed vertical wall 33, Fig. 7; its side plates 34 are mounted so as to be capable of a slight movement; and the lid 36 has filling openings 37 and a central opening into which a box 41 is pushed to prevent the masse-cuite from entering the cleansing-chamber 39. Thin sheet-iron insets 40 are inserted into slits on the bottom and lid, and the sides 42 and 43 of the mould are hermetically closed with side lids 44, Fig. 8. The mould is placed on the wagon 45, the upper lid connected to a filling-funnel 46, the whole run under the filling-device 47, and the joints made airtight with hydraulic tubes 49. The mould is exhausted through the valve 50 and filled with the masse-cuite. When the mould is full, the float 51 completes the circuit of an electric bell. The slide 53 is then closed, the seal of the tube opened, and the wagon and mould run into the cooling-chamber. When the mould has cooled, the side walls 44 and the boxes 41 are removed, and the sugar drained and washed in a suitable apparatus. Moulds of alternative forms with corresponding cleansing-chambers are also described.

18,064. Williams, J. E. Aug. 21.

Cements; refractory substances. — Fireproof cements for repairing retorts and crucibles, and for similar purposes consist of magnetite, china clay, barytes, sodium silicate, water, and borax, the proportions preferred being 25 parts of magnetite and 75 of the remainder, which may consist of 200 cwt. of china slag, 100 cwt. of barytes, 40 gallons of sodium silicate (100° Tw.), 24 gallons of water, and 28lb. of borax.

18,090. Ferrell, J. L. Aug. 21.

Fireproof coverings and compositions.—Mixtures are made of solutions of sodium silicate, chloride, and hydrate in about the following proportions:—4 parts of sodium silicate of 40°-53° Bé., one part of sodium chloride of 24° Bé., and one part of sodium hydrate of 26° Bé. The resulting solution is reduced to about 20° Bé. by the addition of water, and, when a denser solution is required, more sodium silicate is added to this latter solution. The compounds are used for fireproofing wood and similar cellular materials.

18,092. Ferrell, J. L. Aug. 21.

Fireproof coverings and compositions.—Relates to the invention described in Specfication No. 830, A.D. 1902, and consists in the addition of a dibasic organic acid, such as oxalic acid, to low-grade aluminium-sulphate solutions, so that, after mixture in an iron vessel, the wood or similar cellular substance is not stained by the composition.

18,284. Mershon, S. L. Aug. 29, A.D. 1902, [*date applied for under Patents Act, A.D. 1901*].

Refractory substances.—A refractory substance for making firebricks, building-blocks, furnace linings, crucibles, and other articles is formed by heating a natural fibrous foliated, or similar silicate, preferably a magnesium silicate such as talc, in successive stages. The articles may be carved, abraded, or otherwise formed before, or after, vitrification, and may be afterwards polished.

18,623. Canaris, C. Aug. 29.

Slags, treatment of; cements.—Molten slag from a blast furnace is conducted into agitated water containing two to three per cent. of lime, the product thus formed being continuously removed by an elevator, dried, and finely ground. The slag may be treated with a blast of hot air or steam during its passage to the water.

18,736. Joseph, T. B. Aug. 30, A.D. 1902, [*date applied for under Patents Act, A.D. 1901*].

Cements.—Stucco or powdered calcined calcium sulphate is stirred into water which contains arsenic acid, in the proportion of 30lb. to the

ton. When a thick mortar is obtained, it is run into moulds and air-dried after setting. The blocks are soaked in water containing 6lb. of barium peroxide to the ton. The cement is again air-dried and soaked in water containing 1½lb. of ammonium chloride to the ton. After being air-dried again the cement is soaked in paraffin. Colouring-matter may be added to the water into which the stucco was first placed, or it may be applied afterwards with brushes. When used as a plaster for walls, the different solutions are applied to the surface with brushes.

19,016. Gresly, J. Jan. 28, [*date applied for under Patents Act, A.D. 1901*].

Cements.—Hydraulic cement is made by burning, at a temperature below the sintering temperature, a mixture of calcium carbonate or lime and aluminium silicate, such as kaolin or other clays, puzzuolana, or slags, the number of lime molecules in the mixture being greater than the sum of the number of silica and alumina molecules, but not greater than twice that sum. Gypsum, sodium sulphate, or other sulphate may be added to the mixture before burning.

19,367. Pinching, E. L., and **Walton, W. H.** Sept. 8.

Fireproof coverings and compositions.—Electric conductors, either bare or covered with a fibrous or porous material such as cotton, wool, or paper, are insulated by means of a non-inflammable compound of gelatine and tannin obtained by precipitating gelatine with a solution of tannin in water. The conductor may be steeped in succession in gelatine and tannin baths, or *vice versâ*, or the fibrous covering may be treated before its application to the conductor and, if desired, after prior treatment with any known non-inflammable solution. The precipitate may otherwise be obtained separately and applied to the conductor or its covering, either alone or in combination with other substances. The use of the gelatine-tannin compound renders the insulation fire-resisting and less absorbent of moisture.

19,676. Magens, J. H. Sept. 12.

Concretes; cements; mortars.—The setting of cement concrete, cement, or cement mortar is retarded to allow storage &c. by cooling the constituent parts before mixing by sprinkling them with very cold water and retaining them at that temperature by any convenient means, such as the evaporation of the water with which the stones are sprinkled.

20,421. Howett, F., [*trading as* Patent Artistic Stone Co.]. Sept. 22.

Stone, artificial.—The deleterious effects of sulphur in artificial stone formed from cement and refuse-destructor ashes and clinkers, is prevented by first washing the ashes with a solution consisting of 1 part of calcium chloride, 12 parts of soda or potash, or a mixture of both, and 25 to 50 parts of water. The washing may be performed by packing the ashes and clinkers in towers down which the solution falls, or by agitation in sieves or baskets immersed in the solution. The surface of the stone, when formed into slabs or other articles and dried, may be hardened and improved by brushing or spraying it with the above-described solution. Other chemical solutions may be employed to neutralize the effects of the sulphur.

20,921. Heany, J. A. Sept. 29. *Drawings to Specification.*

Fireproof compositions.—A fireproof and waterproof cement for insulating electric conductors is formed by mixing a clay, like kaolin, a lime product, such as the sulphide, a metallic oxide, such as alumina, an aluminium product, such as the sulphate, an acid product, such as boracic acid, and gummy or gluey material, such as fish glue, commercial glues, or a mixture of gummy and gluey substances heated to the required consistency with water.

21,371. Macfadyen, W. A. Oct. 5.

FIG 6.

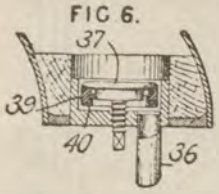
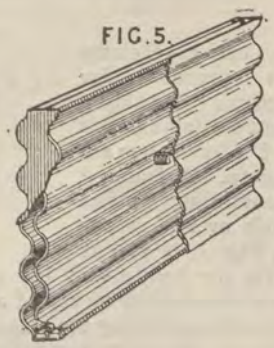


FIG. 5.



Fireproof coverings.—In a method of heat-jacketing, applicable to fireproof safes and armour plates, a chamber containing a vapour with adiathermic properties, preferably aqueous vapour, is combined with a vacuum chamber so as to form a jacket or screen. Where one of the chambers already exists, the other chamber may be combined therewith. A chamber containing a vapour with adiathermic properties, preferably tow-tension aqueous vapour, may be used alone. A wall of a chamber may be formed by the walls of the safes or plates. Fig. 5 shows a triple-walled plate for constructional purposes, in which three iron plates are joined together by leaden end-plates and

wooden side-pieces faced with lead. The chambers, each of which is fitted at the top and bottom with the apparatus shown on an enlarged scale in Fig. 6, are exhausted through the pipe 36, Fig. 6. The pipe 36 is afterwards closed by screwing down the mushroom head 37, which carries an india-rubber ring 39 stiffened by a metal ring 40.

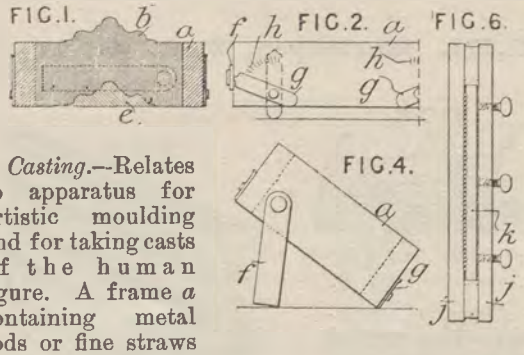
21,799. Justice, P. M., [*Aktieselskabet Venezuela-Asfalt Kompagnie*]. Oct. 9.

Asphalts.—Artificial asphalt is made by heating powdered limestone and lime or lime flour to 200° C., and adding Orinoco asphalt oil while well mixing. The mixture may then be moulded into plates, or mixed with broken granite and used for paving-blocks, or slabs, and for roadway purposes.

21,947. Höcke, C. Oct. 12.

Cements.—In manufacturing Portland cement, the raw materials are mixed with low-grade fuel, such as slack, or powdered or other coal, the mixture being pressed into bricks and built into a kiln. The distillation products from the coal maintain the heat in burning, and the escaping gases from moisture &c. render the bricks porous and easily pulverized.

22,292. Granjon, J. B. Oct. 15.

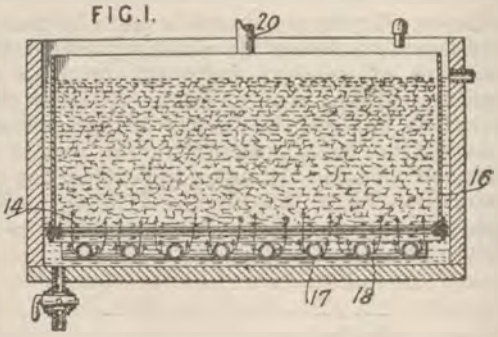


Casting.—Relates to apparatus for artistic moulding and for taking casts of the human figure. A frame *a* containing metal rods or fine straws *b*, Fig. 1, is placed over the body *e*, and the rods are then depressed and clamped by means of a sliding bar and thumb-screws, carried by the frame. Two pivoted legs *f*, Fig. 4, placed on opposite sides, allow the frame to be held in a slanting position; and it can be supported at any required angle by other pivoted legs *g*, Fig. 2, two of which are placed on each of the other sides. Graduations *h*, Fig. 2, allow the legs *g* to be adjusted. The upper surface of the frame is also graduated. A hinged back is also provided to serve as a supporting-surface for the frame. To produce profiles, a single row of rods is placed in a frame *j*, Fig. 6, each rod sliding in grooves in the frame and pressure plate *k*, the latter sliding in grooves cut in the small sides of the frame.

22,376. Hearson, T. A., [*practising as* Phillips & Leigh], [*Schröder, O.*]. Oct. 16.

Stone, artificial. — An artificial-marble mass, which can be smoothed or rolled out, consists of a mixture of magnesite, magnesium chloride, stone, leather, paper or wood dust, and an animal or vegetable binding-matter. One variety consists of 1 part of rye meal or the like, 6 parts of calcined pulverized magnesite and 12 parts of powdered quartz or stone dust stirred with magnesium chloride of 20–25° Bé. to form a dough. Colouring-matter may be added in addition to, or in place of, part of the stone dust.

22,676. Hall, C. C. Dec. 20, A.D. 1902, [*date applied for under Patents Act, A.D. 1901*].



Fireproof coverings; mineral wool.—An incombustible felt is produced by mixing mineral wool, rock wool, silicate cotton, or rock cotton with a binding-material. The binding-material consists of boiling water, dry wood pulp, flour, and an antiseptic salt, such as alum, borax, mercury chloride, &c., which are mixed together and allowed to cool. The mineral wool, together with water or other medium, is placed in a bottomless box 16 resting on a sieve 14 supported above perforated air pipes 17 in a tank 18, and air is blown by a fan along a pipe 20 to the pipes 17, and escapes through the mineral wool and water, thus separating the fibres. The binding-material is then added, and air is again forced through the mass for a short time, after which the sieve and box are removed from the tank, and the mass or felt allowed to drain prior to drying. "Shot" or little glass particles in the mineral wool separate out by the air treatment, and settle in the bottom of the tank. Other glutinous or adhesive material may be used in place of the flour, and paper stock, straw pulp, &c. in place of the wood pulp.

23,213. Bond, J. Oct. 27. *Drawings to Specification.*

Cements.—Gas-lime or other calcium compounds are utilized for making cements, bricks, tiles, or slabs by mixing them with clinker, slag, or other silicious or aluminous material, grinding and drying the mixture, and then subjecting it to the action of furnace gases in a special kiln, when chemical reactions take place. If formed into moulded articles, the materials are further treated with steam and carbon dioxide under pressure.

24,041. Bach, J. Nov. 5.

Refractory substances. — Firebricks, crucibles, muffle-furnaces, retorts, and other refractory articles are made as follows :—Chrome-ore, washed or otherwise separated from easily-fusible admixtures, is pulverized, mixed, and burned with powdered fireclay, aluminium hydrate or hydrate of other refractory oxide which does not fuse with chrome-ore, and a little resin, sugar, coal, or other substance rich in carbon.

24,062. Feeny, V. F., [*Rubber Balloon Co.*]. Nov. 5.

Casting.—Relates to a mould for manufacturing seamless toy balloons or expansible bags of rubber or the like, described in Specification No. 8593, A.D. 1903, [*Abridgment Class* Moulding &c.]. A small conical &c. extension is formed on the bottom of an egg-shaped mould A, which, together with its stem B, is preferably made of glass, but hard rubber &c. may be used. When the mould A is dipped into a solution of rubber &c., the extension enters the solution first and facilitates the displacement of air which would otherwise cause bubbles. It also allows superfluous material to drip from the mould, thereby ensuring a more even distribution of the material on the surface of the mould.

FIG.1.

24,222. Perkin, W. H., and **Whipp Bros. & Tod.** Nov. 7.

Fireproof compositions.—Cotton and flax fibres and fabrics are treated with sodium stannate in aqueous solution of strength 30° Tw. The materials are then dried and exposed to warm air, instead of being treated as described in Specifications Nos. 8509 and 9620, A.D. 1902.

24,292. Illemann, R. Nov. 9.

Casting.—Cements and plasters are moulded into the blocks described in Specification No. 10,206, A.D. 1903, [*Abridgment Class* Moulding &c.], in moulds or frames, Fig. 1, provided with projections a, a^1, the latter forming semicircular recesses having helical threads. The mould is constructed of separate pieces held together by a bolt and screw d, and a bolt g carried by the hinged top bar e, the joint being completed by tongues f. The moulds are clamped together with smooth, roughened, or ornamented aluminium plates in a frame, Fig. 7, the front part n of which is movable. Screwed or smooth rods i^1 are inserted

FIG.1.

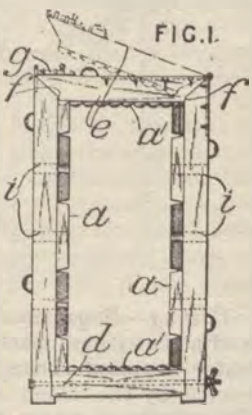
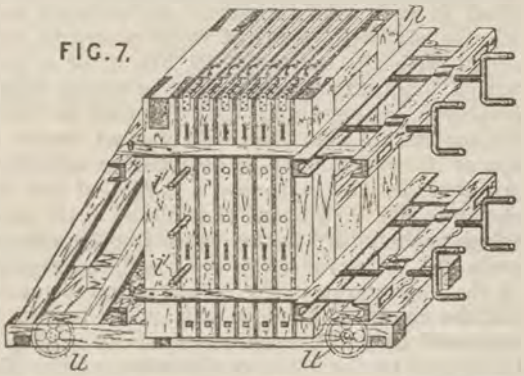


FIG.7.

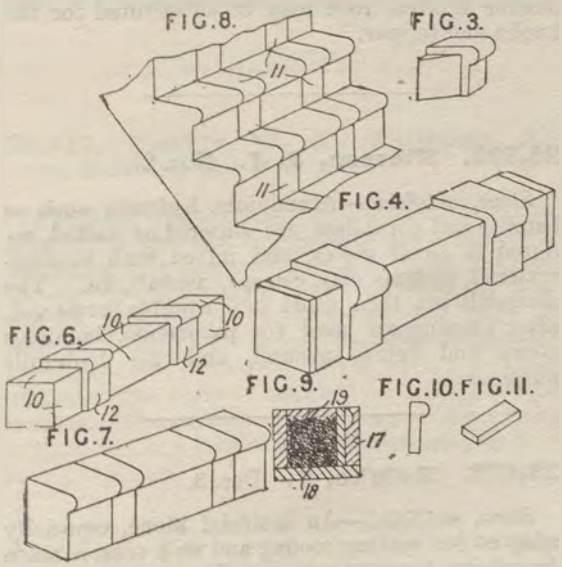


in the holes i before the cement is poured in at the top, and are removed when the material is set. The frame may be mounted on wheels u.

24,472. Ruhstrat, E., and **Grimmer, W. E.** Nov. 11. *Drawings to Specification.*

Casting.—Quartz tubes are made by fusing sand between a carbon helix and a carbon rod or an inner helix, in a special electric furnace.

24,510. Schlentheim, L., and **Diespeker, Ltd.** Nov. 11.



Casting.—Relates to improvements in mosaic steps, particularly in the forms with continuous ornamentation described in Specification No. 21,840, A.D. 1902, [*Abridgment Class* Buildings &c.]. In the case where the ornamentation consists of two continuous black lines 11, as shown in Figs. 7 and 8, with a white ground,

black segments in the shape of a slice of an ordinary step, preferably as shown in Fig. 3, are first formed and placed in moulds, as shown in Fig. 4, which are filled in with cement to form a block of the form shown in Fig. 6, the spaces 10 being then filled in with white mastic. An ordinary mould may be used with pieces of wood placed to correspond with the spaces 10, 12, Fig. 6, or a mould with a longitudinal recess for the nosing may be employed, the segments being inserted as before; the moulds are then filled with ground mastic, the spaces 10 not requiring to be filled in afterwards. Another method is to use a mould of the form shown in Fig. 9; a board 17 is placed in the mould, which is then filled to the dotted line 19 with concrete 18. After removing the board, two segments of the form shown in Fig. 10, are placed in position, and the mould is filled in with white mastic, two segments of black mastic shaped as in Fig. 11 being used to form the continuation of the black band on the tread. It is stated that mosaics of any colour may be employed, and that any continuous ornamentation, sinuous or other, may replace the two parallel lines. Other than continuous ornamentation may also be carried out.

24,911. Earle, H., [*Trachsler, H.*]. Nov. 16.

Cements.—White cement is made by mixing white chalk and kaolin with felspar, or sodium or potassium carbonate in such proportions that, after the resulting mixture is burnt, the mixture shall contain from about 28 to 30 per cent. of silica, 61 to 63 per cent. of lime, 4 to 6 per cent. of alumina, and 2 to 3 per cent. of alkalies. Granite, gneiss, or similar igneous rock may be substituted for the kaolin and felspar.

25,393. Niessen, J. J. Nov. 21.

Stone, artificial.—Aluminium hydrates such as bauxite and corundum are sintered or melted, reduced to small pieces, and mixed with binding-material, such as clay, cement, asphalt, &c. The materials are then made into suitable forms and, after burning, are used for pavements, buildings above and below ground, and for hydraulic purposes.

26,478. Reinke, C. Dec. 3.

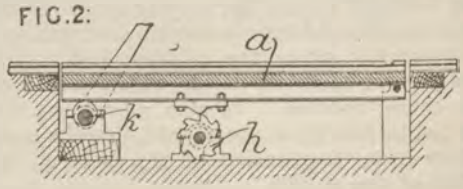
Stone, artificial.—An artificial stone, especially adapted for making roofing and wall tiles, is made by mixing together one part of cement, four parts of Permian limestone, a small quantity of magnesium oxide, and water, and moulding the plastic mixture obtained.

26,568. Dumas, H. J. P. Dec. 4.

Stone, artificial; cements.—Relates to the production of statuary and other works of art, stoneware, imitation marble mantelpieces, &c. Scrap or broken white marble in fine powder is added to pure white lime, preferably made from statuary marble, or to a cement compound in which the silica, and sometimes the clay, is replaced by marble dust. The mixture is made into a paste with water and cast in moulds, preferably having polished surfaces. Natural scrap marble is used for coloured marble, and white sand, fragments of marble, stone, &c., or pigments, such as graphite or other form of carbon, or the protoxide or peroxide of iron, chrome, &c. are sometimes added. The proportions of a composition given are:—58–63 parts of white lime, 20–24 parts of marble dust, 5 to 10 parts of alumina, and enough water to form a pasty mass.

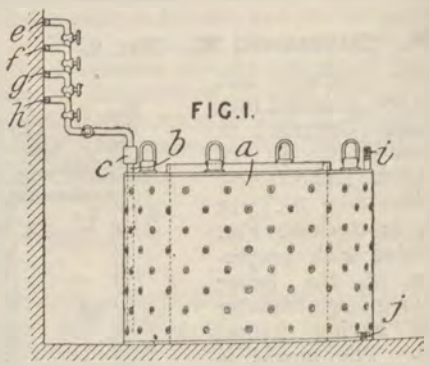
26,655. Robottom, C. H. Dec. 5.

FIG.2.



Casting.—In order to avoid ramming in the manufacture of artificial-stone blocks, the moulds are placed in trolleys, which are run on to a hinged platform *a* vibrated by a cam *h*, the amount of vibration being regulated by eccentrics *k* supporting the platform at one end.

26,779. Lafeuille, J. C. F. Dec. 7.



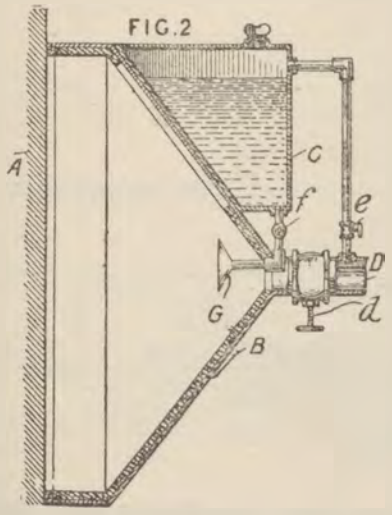
Casting.—Sugar moulds, contained in the chamber *a* of a centrifugal machine, are cooled by means of water supplied through the pipe *b*, which is connected by the union *c* to the pipes *e*, *f*, *g*, *h*, for the supply of water at the various temperatures

required. The cooling of the sugar prior to the clarifying operation is thus accelerated. The water overflows by means of a pipe *i*, and may be discharged through the valve *j* after the cooling is complete. Baffles may be placed in the chamber *a* to ensure a uniform circulation.

27,241. Little, J. R. Dec. 12. *Drawings to Specification.*

Concretes; refractory substances; stone, artificial.—Hollow blocks are made of concrete formed of (*a*) cement 1 part, lime 1, sand 1, diatomite 1, and ashes 2; (*b*) cement 1 part, sand 1, ashes 2, and clinker, shale, or crushed brick 2; (*c*) cement 1 part, and crushed granite or clinker 3. The proportions may be varied.

27,426. Caffall, E. M. Dec. 15.



Stone, preserving.—For preserving surfaces of stone, plaster, and other materials in statuary &c., the surface is heated by compressed air, sprayed with the treating-material, and then again treated with heated compressed air. Heated air under pressure is introduced through a pipe D to an oven B, which has an open face placed against the surface A. When the surface is sufficiently heated, the valve *d* is closed, and valves *e*, *f* opened. The compressed air then forces material in a tank C through a spraying-nozzle G upon the surface, and this is continued until it is saturated, when the valve *f* is closed and the hot air turned on again through the valve *d*. For heating the air, it may be passed through a spiral pipe within a stove, or it may be passed up through coals placed on a grate in an enclosure.

27,626. Herschbach, H. Dec. 16.

Slags, treatment of.—Porous bricks and building-blocks are made by mixing three parts of volcanic sand with one part of powdered blast-furnace slag and one of water, the mass being compressed in iron moulds. The bricks are dried for two or three weeks on boards, and are then stacked and exposed to the atmosphere for several months. In dry weather, the bricks are sprayed with water.

27,918. Blanc, J. Dec. 19. *Drawings to Specification.*

Asphalts.—Relates to a composition for making pipes, hollow vessels, sanitary apparatus, tiles, and the like, by saturating tubes of wood fibre, pasteboard, leather, or paper. The tubes &c. are plunged into a hot mixture consisting of about 80 parts of coal tar, previously submitted to a high temperature, or mineral resin, and about 20 parts of plaster or cement. This mixture hardens by cooling, and when re-heated becomes liquid. The pipes &c., after cooling and drying, acquire stiffness and solidity and will stand great pressure.

27,928. Farnham, N. Dec. 19.

Stone, preserving.—Stone surfaces are waterproofed by melted paraffin or the like applied to them while hot. The superfluous waterproofing-agent is removed by sand applied by an air blast.

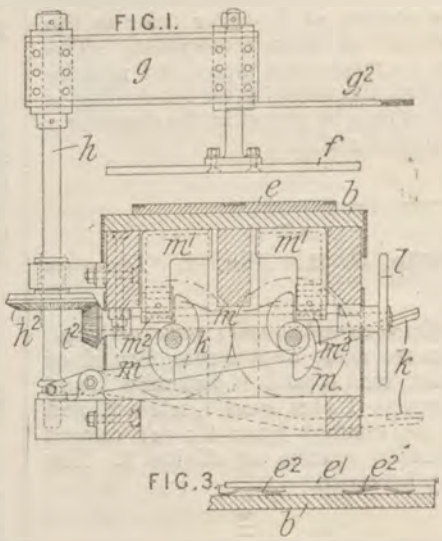
28,212. Parkin, W. C., Williams, A., and Casson, T. Dec. 23.

Fireproof compositions.—Celluloid for combs, handles, or the like is rendered non-inflammable by mixing it in acetone solution with an alcoholic solution of one or more of the chlorides of magnesium, aluminium, or calcium; one part of chloride is dissolved in two parts of methylated spirits, and the solution is mixed with a solution of one or two parts of celluloid in three parts of acetone. This mixture is reduced to a powder by evaporation in a still, and subsequent heating in a rotary machine.

28,317. Cuttell, J. H. Dec. 24.

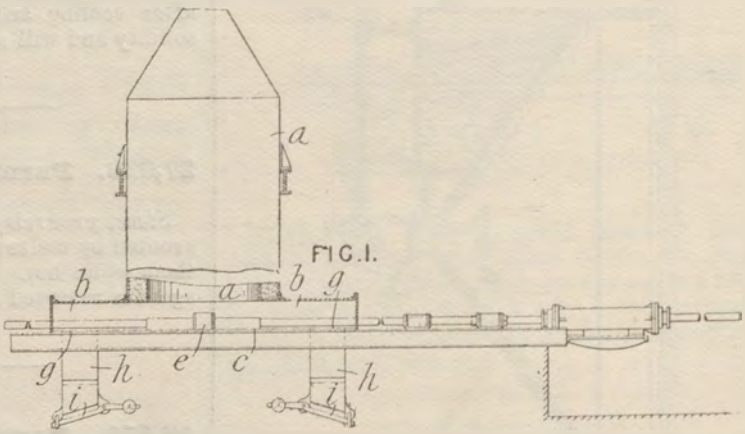
Casting.—Relates to apparatus for causing fluid or plastic artificial stone to settle in the mould when casting paving-slabs and the like. The mould is placed on a table *e*, Fig. 1, resiliently

mounted on a table *b*, Fig. 3, by means of a central bar e^1 and springs e^2, and a heavy metal plate *f*, carried by an arm *g* and free to move vertically, is brought over the mould. The table *b* is then jigged, with or without tipping, by cams *m* acting on bearers m^1 fitted with renewal blocks m^2. The plate *f* may be moved over the surface of the material by a lever g^2 or gearing h^2, l^2 operated by a hand-wheel *l*, and is raised off the mould by a foot-lever *k* acting on the shaft *h*. Lifting-tackle may be fitted to the arm *g*, and the moulds may be conveyed mechanically to the machine.



28,602. Mackenzie, J. W., [*Fas, H.*]. Dec. 29.

Refractory substances. — Relates to cupolas or kilns for the production of basic material which is used for the linings of converter and other furnaces, and consists in providing means whereby the continuous removal of material from the hearth of the cupola or kiln is affected to prevent the tendency of the material to form a block within the cupola. Fig. 1 shows an arrangement in which the cupola *a* is in connection with a closed chamber *b* having a hearth plate *c*, the whole being supported upon girders. As the material falls from the cupola on to the hearth *c*, it is pushed by a reciprocating pusher-bar *e* through openings *g* into hoppers *h* closed at the bottom by counterbalanced doors *i*. By the above arrangement, it is not necessary to shut off the blast for any length of time while the discharge is being effected. In the case of a kiln in which blast is not used, the material may be discharged from the hearth on to the floor below or other convenient place. The pusher-bar may be replaced by contiguous revolving rollers, or an endless conveyer chain or the like. According to the Provisional Specification, the chamber *b* may be dispensed with, in which case openings are formed opposite to one another in the wall of the cupola, extending from the hearth to the required height, or the kiln may be supported upon piers. The hearth plate may be conical with an annular space around it, and may revolve beneath fixed scrapers, which push the material off the edge of the plate.



28,731. Middleton, R. Dec. 31.

Cements; refractory substances. — Refractory bricks, tiles, or the like, are made by mixing together Portland cement and starch, say 5 to 8 per cent. of the latter, which is preferably used hot. These materials are then moulded, dried, and heated.

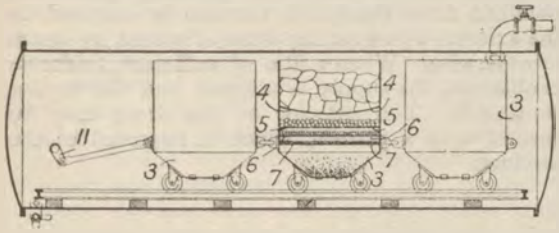
28,733. Thompson, C. H. Dec. 31.

Stone, artificial; refractory substances.—Waste glass, alone or mixed with furnace slag, broken potsherds, earthenware, porcelain, sand, clay, &c. is pulverized and moulded, with or without damping, into bricks, tiles, slabs, coves, mouldings, &c. for building and decorative purposes, and is

heated at a temperature of 900°–1200° C. A flux, such as English flint glass, lead borate, felspar, or suitable soda or potash salts, may be used. The following proportions are given as an example :— 500 kilogs. of broken opal and window glass, 250 kilogs. of glazed china, and 10¼ kilogs. of lead borate. The moulded articles are supported on refractory bats or in fireclay boxes coated with ground flint or the like, and are separated from each other by a refractory powder, preferably consisting of equal parts of anhydrous plaster of Paris and sand.

A.D. 1904.

199. Mathesius, W. Jan. 4.



Cements ; slags, treatment of.—Hydraulic cement is made from slag by treating it in the solid state in a closed chamber with steam under pressure, with the addition of lime, if necessary. The apparatus shown in the Figure may be used, the carriages 3 being provided with sieves 4, 5, 6, and 7. A crank 11 may be used for shaking.

218. Forell, C. von. Jan. 4.

Cements ; slags, treatment of.—Granulated basic slag, after being mixed, if desired, with powdered slag and pressed into blocks, is strongly heated in an oxidizing-flame, and is then suddenly cooled by a dry method and powdered. A small quantity of water or steam may be added to the heated slag mixture before cooling, to complete oxidation. Lime, milk of lime, alkalies, or the like may be added to the water used in granulating the slag.

388. Gogler, E., and **Seinfeld, H.** Jan. 6.

Cements.—A white cement is made by burning lime, sand, and silicic acid free from iron, with a large quantity of alkaline carbonate to increase the fusibility. Thus, 65 parts by weight of caustic lime are mixed and melted with 35 of arenaceous quartz, and with 35 to 105 parts of alkaline carbonate, or the equivalent of this, if not calcined. The mass is granulated in water, lixiviated in boiling water, dried at a low red heat, and powdered. A mixture, the composition of which is 70 parts of calcium oxide, 30 of silica, and 70 of sodium carbonate gives a cement the composition of which is represented by calcium oxide 64·4 per cent., silica 30 per cent., and sodium carbonate 5·5 per cent.

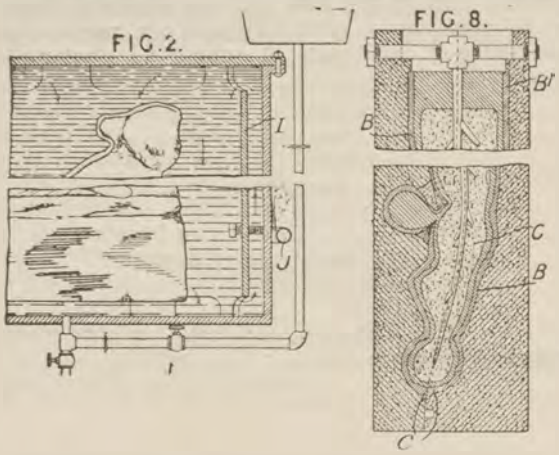
512. Blowes, P. Jan. 8. *Drawings to Specification.*

Stone, artificial.—Treads for stairs, passages, paving, &c. are formed of artificial-stone tiles, preferably composed of two parts of crushed granite and one part of Portland cement.

564. Quijano, P. P. G. de. Jan. 8.

Stone, artificial. — Celluloid for buttons is coloured to imitate stone.

615. Spencer, J. F. Jan. 9.



Casting; castings.—Works of art and other intricate patterns are reproduced by covering them with plastic or sheet caoutchouc or the like, or rubber fabric, which is then vulcanized while still on the pattern, and is afterwards surrounded by a plaster-of-Paris casing made in two or more parts. The elastic coating is then removed from the pattern, and re-formed as a lining for the casing or mould, as shown in Fig. 8, for casting wax or other fusible substance. The coating B is made in separable pieces for undercut and recessed parts, and is formed with a bead *c* on each dividing edge. For hollow castings, a core C with a metal stem may be supported as shown. One or more pouring-heads B^1 may be provided. To produce a casting in a material having a fusing-point too high for the rubber mould, a second mould may be formed in suitable material round a wax, soft metal, or other reproduction obtained as described above, and the wax &c. afterwards melted out. For hollow articles, the interior may be used as a mould to produce a core.

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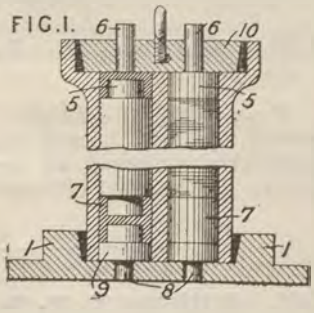
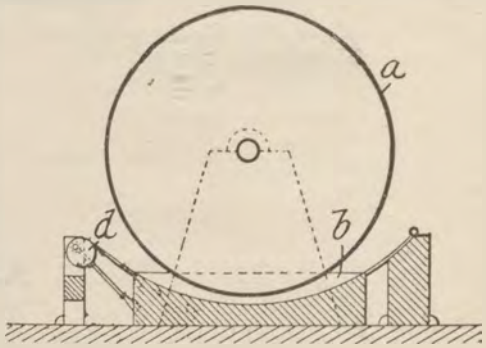
786. Sutton, J. H., and **Gregson, L.** Jan. 12.

Casting.—Relates to means for casting conical rings of bitumen or other suitable composition upon, or in the ends of, electric conduits having spigot-and-socket ends, so that, when fitted together, the conduits are self-aligning. Fig. 1 shows the invention as applied to an oval casing having two conduits. In each conduit is inserted a plug covered with textile material and fitting loosely in the conduit. At the socket end each plug has a cap 5 formed with a pin 6 adapted to engage in a hole formed in a mould-plate 10 inserted in the socket. The spigot end of each plug terminates in a cap 7, which is recessed to receive studs 9 secured by pins 8 in a base-mould 1, in which the spigot end of the casing is placed. The composition is poured into the spaces between the moulds 1, 10 and the casing. The plugs may be of smaller diameter in their centre, and may be formed in two parts.



1144. Parkes, C. H. Jan. 16.



Casting. — In evaporating gelatinous or like solutions and drying the gelatine, gum, &c. obtained from them, the solution is supplied to the exterior of a rotating drum *a*, heated by steam or otherwise. When a film of sufficient thickness is obtained, the supply is stopped and the drying continued. The exterior of the drum may be formed with a pattern, which is imparted to the product.

1400. Eymer, F. A., and **Eymer Ges.** Jan. 19.

Fireproof compositions.—Fatty oils, petroleum, or any fatty or oily substance is added to sodium silicate and asbestos or similar fireproof compositions in proportions varying from 1 to 8, to 1 to 2, to render them adhesive to surfaces previously coated with oil, colour, or varnish.

1568. Llewellin, L. Jan. 21.

Fireproof compositions.—A fireproof composition for soaking paper curtains consists of a solution of ammonium sulphate, borax, and boric acid.

1776. Butterfield, J. C. Jan. 23.

Asphalts.— Consists in means for producing

compact and dustless macadamized or like roads with asphalt surfaces. Texas oil is heated by steam to 180° or 190° F., and is oxidized and agitated by blowing air through it, whereby the volatile compounds are removed. To this is added a solution of asphalt or pitch in Texas oil or benzene until the mixture contains from 10 to 20 per cent. of asphalt, after which it is agitated again by the air blower. 15 to 20 per cent. of water is then added, with 6 per cent. of resin, 4 per cent. of olein, 4 per cent. of soda, and 10 per cent. of a sodium-silicate solution at 120° Tw. After 30 minutes' blowing, 1 per cent. of ·880 ammonia solution is added, and the blowing is continued gently, frothing being avoided. A solution of this emulsified asphalt compound is used in place of water during the making of the road.

1978. Mackay, F. N. Jan. 26.

FIG. 3.

Concretes; fireproof compositions.—The floors, walls, and doors of cold-storage chambers are constructed partly of a concrete formed of granulated or powdered cork, charcoal, &c. mixed with Portland cement, lime, plaster of Paris, &c. and water, and either moulded or used as a concrete, and partly of a mixture of granulated or powdered cork &c. with silicate cotton, asbestos, or other similar finely-divided and fluffy substance, so that the chamber is easily cleaned and affords protection against heat, moisture, fire, and vermin. The bricks used are preferably of the shape shown in Fig. 3, having vertical cells *c* extending nearly through and united on the other side by shallow recesses *d*. The cells may form air spaces or be partly filled with loose cork or the loose insulating-material above described; a key of cement or mortar in the cells may bind the bricks.

2102. Coulson, S. G. Jan. 28.

Cements.— Gas or coal tar is rendered capable of being solidified, in order to permit of its being granulated and used as a cement in the manufacture of road-making material by heating with sulphuric acid. The tar is first heated to a temperature of 140°–150° F., and concentrated acid is then stirred in at intervals, so that the temperature of the whole, which is increased by the action of the acid, does not exceed 250° F. Lime or fine sand and pitch may be incorporated with the compound while it is still hot, and the mixture may finally be ladled out or run into moulds.

2347. Starke, R. Jan. 30.

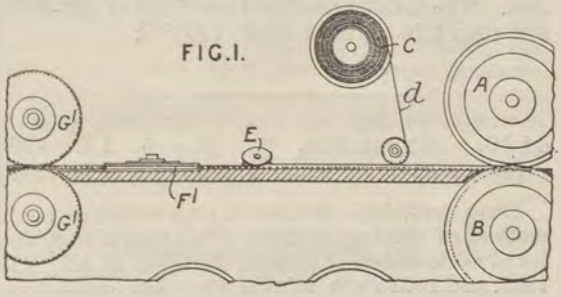
Casting.—Electric conduits are made by coating a metallic tube with a mixture of paraffin wax, graphite, and powdered talc or soapstone and covering this with concrete. When the concrete has set, the tube is heated by steam or other means and is then withdrawn. The graphite may, if desired, be omitted, and asbestos or other substances added to the mixture.

2923. Winklarek, F., and **Missik, A.** Feb. 5.

Mortars.—Mortar for use in building walls and ceilings is composed of equal quantities of gypsum and ground slag, mixed with water and glue.

3444. Heinrich, M. Favre-. Feb. 11.

FIG. 1.



Fireproof coverings and compositions. — A plastic cord, specially applicable for packing the joints of pipes, cylinder covers, &c., is constructed with a continuous central core covered with a waterproof, fire-resisting, inoxidizable, plastic material, composed of a mixture of equal parts of resin and slate with a small proportion of asbestos flock or waste and tallow or other fatty substance. The core preferably consists of a ductile metal, such as lead or copper, in the form of a single wire, or several fine wires which may be twisted together, but it may be formed of fibrous material. The plastic material is rolled out, and cut into strips of the required width to envelop the core completely, such strips being then passed, one after another, between a pair of discs A, B, which bring them to an angular section. The core *d* from a reel C is then laid in the angle thus formed longitudinally in the strips, the edges of which are bent over to cover the strip completely by passing between a pair of inclined grooved discs E. A complete junction of the free edges is finally made by passing the covered core first between a pair of horizontal grooved rollers F^1 and afterwards between a pair of vertical grooved rollers G^1, or by drawing it through a die.

3676. Lake, H. H., [*Braun, Gebr.*]. Feb. 13.

Cements. — Cement pipes and tubes are made from a mixture of one part of cement and one part of powdered slag.

3769. Howorth, F. W., [*Jurschina, F.*]. Feb. 15.

Stone, artificial; refractory substances. — Relates to an artificial stone, which is fireproof up to certain temperatures, and can be used for ornaments, statuary, façade stones, paving slabs and bricks, and chemical apparatus. One hundred parts by weight of porphyry, basalt, or granite are ground up with five to ten parts of Portland cement, which has stood for eight days in a dry place. The mixture is then added to a paste of five to ten parts by volume of clay or clayey material, felspar, or an aluminous silicate, with a hundred parts of waterglass of 27°–35° Bé. and allowed to stand for some days. Burnt clay is ground before using, and augite is ground and added, mixed with sand or granite poor in hornblende. Cement is only added when the ornaments &c. are to be cast. The articles produced are dried at 25°–30° C. and then kiln-burnt at 1000°–1400° C.

4130. Ahrendts, C. May 5, A.D. 1903, [*date applied for under Patents Act, A.D. 1901*].

Stone, artificial.—Relates to improvements in the method of treating artificial-stone blocks manufactured as described in Specification No. 16,307, A.D. 1900, and consists in mixing the alkali waste, lime, and sand or powdered slag with water, so as to make the mixture workable, and subjecting the blocks formed from this mixture to a temperature of 30°–40° C. in a hardening-vessel heated by steam pipes, a cover being hung loosely over the blocks. The vessel is then tightly closed and superheated steam is admitted.

4275. Nelson, G. A., [*trading as* McNeill & Co., F.]. Feb. 20. *Drawings to Specification.*

Slagwool, preparation of; mineral wool.—In the manufacture of slagwool, silicate cotton, or mineral wool, the shot is separated, and the various grades of fibres are mixed, by allowing the wool, as it is blown by the jet, to deposit on a vibrating travelling-band sieve, rotating perforated cylinder, or vibrating inclined riddle.

4391. Weber, E. Feb. 22.

Casting; refractory substances.—Relates to materials for casting thick articles of pottery, such as pots, crucibles, stove tiles, troughs, retorts, tuyère stones, &c. Fatty clays, up to 50 per cent. of the material, are used as the binding-substance, and soda, soda lye, ammonia, potash, waterglass, molasses, soap, or other alkaline substance may be employed. Refractory material, partly in the form of grains up to one centimetre or more in size, is added, and may consist of quartz, graphite, emery, carborundum, &c.

4409. Feely, J. J. March 5, A.D. 1903, [*date applied for under Patents Act, A.D. 1901*].

Mortars; plasters.—A substitute for ordinary quicklime in making mortars and plasters is obtained by slaking quicklime with a solution of acetic acid and water to a granular or powdered condition, and, after standing, exposing it to the action of air by any suitable means to dry and partially pulverize it. The pulverizing is completed in the usual manner.

4433. Williams, L., and **Tomkins, H.** Feb. 23.

Refractory substances.—In the manufacture of refractory bricks, blocks, and the like, raw or calcined magnesite, with or without water, is used with silica instead of lime, the proportion being three parts of magnesia to 97 of gannister or similar silicious material. The Provisional Specification states that the material may be employed as a refractory cement.

4478. Bach, J. Feb. 23.

Refractory substances.—Pure aluminium hydrate is mixed with pulverized quartz or fireclay, moulded into bricks or slabs, crucibles, muffle-furnaces, retorts, and the like, and finally burned. In an example given, 100 parts by weight of the hydrate are mixed with 12 of quartz or 8 of fireclay. Other hydrates, giving refractory oxides, may be used.

4557. Twynam, T. Feb. 24.

Slags, treatment of; cements; mortars; stone, artificial.—Relates to the manufacture of bricks, blocks, tiles, and other moulded objects, and cement, mortar, and artificial stone from blast-furnace and other slags or silicates. The ground material is moulded with or without chippings or lumps of similar material, and subjected, while moist and in the moulds, to the action of carbon dioxide at a temperature of 100° C. to prevent disintegration. For this purpose, waste furnace gases, cooled to that temperature, may be used,

the removal of part of the carbonic-acid gas rendering the gases suitable for use in gas engines, boiler furnaces, &c.: the exhaust from furnace-gas engines, Mond gas, or the gases from lime kilns may also be utilized for the supply of carbon dioxide. According to the Provisional Specification, the powdered slag is treated in a stream or otherwise with carbon dioxide in the presence of water vapour.

4606. Liebold, R. Feb. 24.

Cements.—Cement for artificial stone and other purposes is formed by adding to 100 kilogs. of calcined but unground cement, about 10 litres of boiling water containing 245 grammes of stearin, 12 grammes of potash, and 10 grammes of colophony; the mass is then dried and ground.

4939. Weiss, L. Feb. 29.

Cements; refractory substances.—A binding-agent or cement, which consists essentially of calcium and magnesium sulphates, and is stated to be weather-proof and not to corrode iron, is prepared from dolomite. The product is suitable for uniting into hard pieces in the cold such pulverulent materials as brown coal, pit coal, charcoal, coke-dust, sand, broken stones, pounded ore, and fireproof materials. The dolomite, together with added limestone or magnesite to make the quantities of calcium and magnesium carbonates equal, is converted into calcium and magnesium sulphates with sulphuric acid. The waste of soda-water works, consisting of the mixed sulphates, may be utilized. The solid is separated from the liquid portion, and, after being dried at a high temperature, a portion is made red hot and then mixed with the remainder again, the whole being ground to a fine powder. This powder is mixed dry, in suitable proportions, with the material to be united, and the mixture is moistened with water, steam, or the previously-separated liquid. The liquid, alone or mixed with the ground oxides obtained by burning magnesite, may be used as a binding-agent. In making fireproof materials, the elementary or ground materials to be set are previously annealed.

5648. Stringfellow, J. H. W. March 8.

Slagwool, preparation of; slags, treatment of; cements; plasters; asphalts.—Relates to the preparation from any kind of iron slags of slagwool or silicious matter and to the separation therefrom of shot or non-silicious matter, which is applied to many industrial purposes. Slagwool is blown in the ordinary way, and both it and the precipitated granular matter are collected. The crude wool is pounded, disintegrated, and jigged to separate still more shot or other foreign matter, which is then added to that previously separated, and, if desired, the whole is graded. The resulting wool is much lighter than that prepared in the ordinary manner, has a curly appearance, and is less readily affected by water, acids, &c. It may be used, dry or wet, as a non-conductor, also for strengthening plasters, cements, and the like, and with pitch, tar, asphalt, rubber, or the like, with or without other silicious matter, such as asbestos, pumice, grit, and sodium silicate for producing waterproof and acidproof insulators like asphalts, vulcanite, and ebonite. The shot &c. may be used as ballast, in place of emery, "as the active oxidizing and hydrogen pro-" ducing elements in electric batteries," and for many other purposes. Thus by treating it with dilute sulphuric acid, gas is generated, and the residual calcium, aluminium, and other compounds may be separated. The sulphur in these compounds may be driven off and collected, or may be neutralized and combined, so that the compound formed may be used as a substitute for gypsum and gas lime, or the lime and aluminium hydrate may be dried and used for agricultural and other purposes. With dilute acid, the shot may be used for blasting or for converting the ammonia in sewage into sulphate, the residue being employed for precipitating the solid matter. This granular matter may be prepared by the usual process of making slag sand by running slag into water. The gas, formed during the blowing of the wool, and also by reaction with acid, may be collected and used alone or with other gases for many purposes, *e.g.*, to fire forges, and heat boilers, to calcine ores or drive gas engines and to heat the blast of furnaces.

5711. Bidtel, E., Bidtel, G. J., and **Nutz, G. K. N.** March 8.

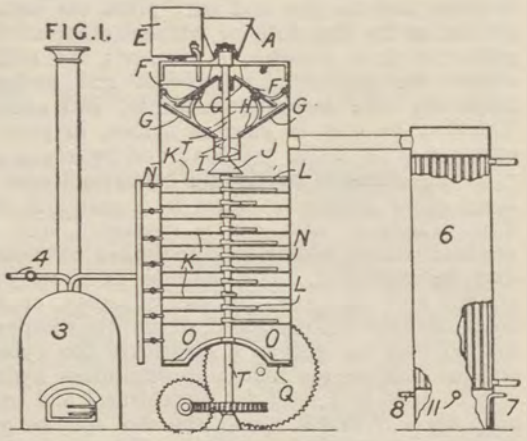
Cements.—Magnesian cements are made by mixing with water crystalline magnesium sulphate, barium chloride, and magnesia obtained from magnesite, or dolomite calcined at 600° to 800° C. The proportions used are about 200 parts of calcined magnesite or 400 parts of calcined dolomate, 245·84 parts of crystallized magnesium sulphate, and 243·56 parts of crystallized barium chloride. One or more molecules of water are removed by heat from the magnesium sulphate when the cement is to be shipped. The cement may be used for fireproof floors, walls, and artificial stone generally.

5712. Shedlock, J. J. March 8.

Asphalts.—In making an asphalt for paving &c., finely-comminuted lime, in one or other of its forms, together with silica or similar material, is mixed with liquid tar or other suitable hydrocarbon in the proportion of about 3 to 1, and the mixture is then subjected in a divided state to the action of superheated steam or heated inert gas in an airtight chamber. The volatile constituents separate out and are drawn off. As shown, the lime is fed from the hopper A and the tar from the

receptacle E on to a revolving cone C, from which they are removed by fixed scrapers F. Revolving scrapers H then feed them from the inner surface of the cone G on to a worm I, whence they fall

FIG. 1.

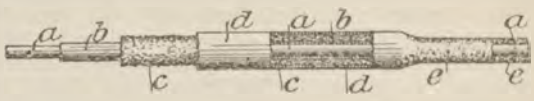


over a cone J on to the upper tray K of a series in the airtight chamber N. Gas or steam passes from the superheater 3 between, and sometimes into, the trays. The material is fed down through holes, preferably placed spirally in the trays, by means of revolving beaters L fitted, by means of square holes in their ends, to the shaft T. There may be more than one beater and one hole for each tray, and some of the extra beaters may have serrated lower edges to stir up the mass. The revolving scraper O forces the material out at the bottom through a hole Q, the shelf or other receptacle on to which it falls being so placed as to keep the chamber airtight. The gases and volatile constituents pass away into the condenser 6, from which condensed water and distillates pass out through pipes 7, 8, respectively. If steam is not used, the inert gases from the condenser may be taken round by pipes 11, 4 to the superheater 3 and used again. The steam or inert gases are at a temperature of about 300°–500° F. Air forced through red-hot coke is sometimes employed.

6007. Steger, V. March 11.

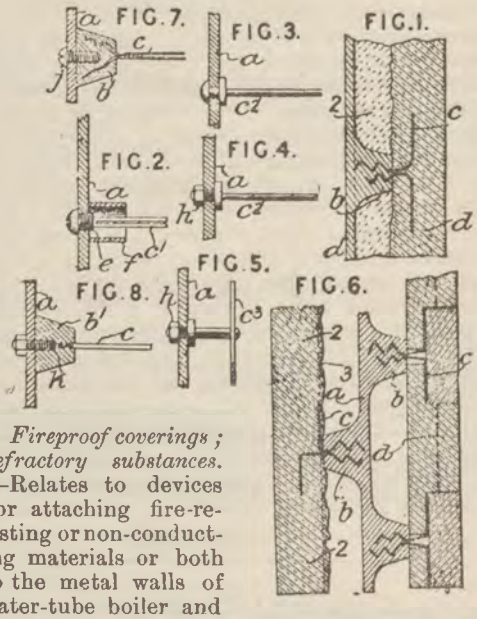
Stone, artificial.—Artificial stone, especially for making bricks and blocks, is made by mixing together sand, lime, and sodium-carbonate solution, and then subjecting the mixture, after being shaped, for about 10 hours to the action of steam, previously treated with caustic potash and flowers of sulphur. The sand and lime are preferably in the proportion of 93 parts of sand to 7 parts of unslaked lime; the sodium-carbonate solution preferably consists of 8 lb. of soda dissolved in 100 gallons of water, and the steam is preferably treated with 9 parts of caustic potash and 8 parts of flowers of sulphur. The mixture may be coloured by adding a mineral paint to the sodium-carbonate solution, or otherwise.

6319. Heany, J. A. March 15.



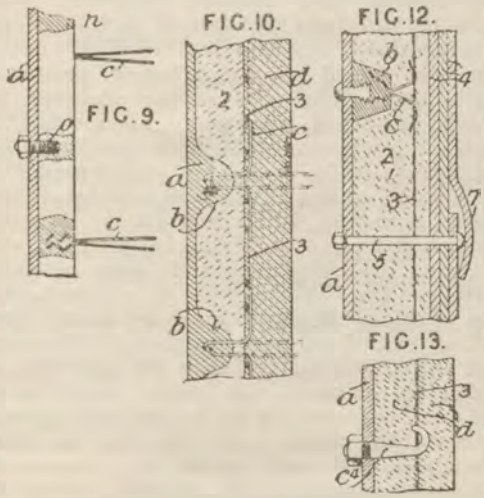
Fireproof coverings and compositions.—Relates to insulating-coverings for electric conductors, which are also proof to acid, water, and fire. To the bare wire *a* is applied a waterproof adhesive mass *b* consisting of an aqueous solution of ordinary glue, fish glue, and gum tragacanth, mixed with an acid, such as boracic or sulphuric acid. A covering of flocculent asbestos *c* is twisted on and into the adhesive mass, being enclosed by a fireproof and waterproof paste or cement *d*, containing the above-mentioned adhesive substances together with kaolin, alumina, and calcium sulphide. The coatings are caused to intermingle thoroughly by heat and pressure, as shown at the part *e*. It is stated that the insulating-material does not crack or peel off when the wire is bent or twisted.

6548. Brooke, R. G. March 17.



Fireproof coverings; refractory substances.—Relates to devices for attaching fire-resisting or non-conducting materials or both to the metal walls of water-tube boiler and other furnaces. In the method shown in Fig. 1, wires *c* are cast in bosses on the furnace plate *a*, and the fire-resisting material *d* is spread, while plastic, upon the non-conducting material 2, and is secured by bending over the wires. Fig. 2 shows an arrangement in which are used screws *e* with split ends c^1, the ferrules *f* serving as distance-pieces. Fig. 3 shows a flanged pin c^2 secured by upsetting its end, and Figs. 4 and 5 show similar flanged studs secured by nuts *h*. The ends of the pins or studs are bent over or are split, or are fitted with flanged heads c^3 which are embedded in

the materials. Fig. 6 shows an arrangement in which the plate *a* is formed with bosses *b* on both sides, so as to secure on one side a non-conducting layer 2 and on the other side a fire-resisting



layer *d*, which is formed by embedding a plate or sheet of openwork material in the fire-resisting material. The apertures for the passage of the wires *c* are filled up with fireclay. The layer 2 is spread upon and forced through the sheet or plate 3, which is secured by some of the wires *c*. The bosses b^1, Figs. 7 and 8, for carrying the wires or studs *c* are secured by set-screws *j* or studs *k*, or the wires *c*, Fig. 9, are cast in strips *n* attached to the wall *a* by studs *e*. Fig. 10 shows an arrangement in which the non-conducting layer 2 is spread upon the plate *a*, covering the bosses *b*. An openwork sheet 3 is then secured upon it by the wires *c*, and a fire-resisting layer *d* is spread upon it and is thus secured. In a similar arrangement, the wire-netting 3, Fig. 12, is embedded in the non-conducting layer 2, which is covered with sheets 4 of asbestos millboard. The heads of the bolts 5 are protected by the edges 7 of the sheets 4. Fig. 13 shows a similar arrangement, the sheet 3 being secured by the hook bolts c^4.

6568. Lindsay, M. March 18.

Fireproof coverings.—A solution for fireproofing woollen fabrics, flannelette, muslin, canvas, wadding, curtains, draperies, clothing, &c. consists of saltpetre, 8 oz.; borax, 8 oz.; alum, 16 oz.; and ammonium chloride, 4 oz.; dissolved in 3 gallons of water. The material is impregnated with the solution after each time of washing.

6631. McFarlane, S. March 18.

Cements; stone, artificial.—Tiles are formed of Portland cement and calcareous spar, obtained from various lead mines, according to the colour effect required. For white tiles, white Belgian cement and white Derbyshire spar are used, while ivory-black, lampblack, &c. may be incorporated.

7028. Levie frères. March 30, A.D. 1903, [*date applied for under Patents Act, A.D. 1901*].

Cements.—Cement, ores, and similar materials are intimately mixed with powdered inexpensive fuel. The dry mixture is then placed in the kiln and burnt without further addition of fuel, except in the case of intermittent kilns, where a layer of large coal is placed on the floor of the kiln.

7068. Mahieux, G. March 26, A.D. 1903, [*date applied for under Patents Act, A.D. 1901*].

Fireproof compositions.—A substance to be used for fireproofing electric or hempen cables, ropes, sails, canvas, wagon and rick cloths, masts, wood, &c., and known as Syracuse tar, consists of animal, mineral, or vegetable tar, heated and kneaded up with powdered boracic acid, borax, and alum. For a non-fluid composition, 5 to 20 per cent. of waste asbestos is added, and the alum is sometimes omitted. For cables &c., the proportions preferred are 60 to 75 parts of vegetable tar, 8 to 4 of alum, 20 to 15 of commercial boracic acid, and 12 to 6 of commercial borax. For canvas, rick cloths, &c., 40 to 50 parts of tar are added to 38 to 30 of boracic acid, 20 to 12 of borax, and 2 to 8 of alum. The borates are replaceable by alkaline phosphates, silicates, tungstates, &c. The composition is applied by dipping or otherwise.

7343. Nusch, F., [*Westdeuschen Thomasphosphat-Werke Ges.*]. March 28.

Asphalts.—Powdered slag is mixed with melted asphalt, with the addition of binding-materials, such as tar, resin, oil, &c., and the usual filling-materials, as sand, gravel, &c. The percentage composition preferred is:—slag 80, asphalt 10, binding and filling media 10; the composition may, however, vary with the class of asphalt used, and also with the nature of the oil or other binder. The mixture is boiled and continually stirred, and then allowed to cool.

7371. Cater, H. E., and **Bell, H. P.** March 28.

Cements.—Glass facing tiles and slabs are backed with a mixture of a mineral substance, a varnish gum, and a non-drying oil, together with colouring-

matter, if desired. A suitable mixture consists of 5 to 10 parts of whiting, 2 to 3 of manilla copal, and 1 of castor oil.

7372. Cater, H. E., and **Bell, H. P.** March 28.

Cements.—A mixture for backing glass facing-tiles consists of a mineral substance, such as whiting, a metallic resinate, such as calcium resinate, and either a non-drying oil, such as castor oil, or a liquid or viscous soap, such as aluminium oleate, together with asbestos, colouring-matter, &c., if desired. The material is melted, or dissolved in benzene, naphtha, or petroleum, and spread over the glass.

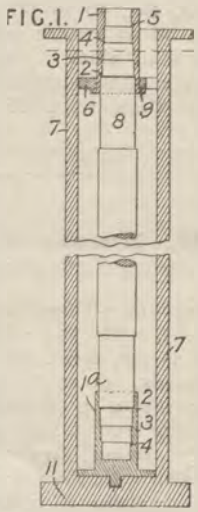
7736. Spatz, H. March 31.

Stone, artificial; refractory substances; mortars.—A mixture of lime and chemical wood-cellulose lye is used as a binding-medium in making mortar and fireproof stone for firebricks, crucibles, drain-pipes, foundry funnels, &c., from quartz or other silicious materials, thereby reducing the amount of lime required and increasing the plasticity of the raw material and the strength and fire-resisting properties when dried. Dinas stones are made from crushed and calcined quartzite, mixed, preferably by a light edge-runner, with 1·5 per cent. of concentrated lye, dissolved in 6 per cent. of water and stirred up with 0·5 to 0·7 per cent. of caustic lime. When the mixture thickens, it is moulded and baked, if necessary. In a similar way stones or bricks are made from quartz. Quartz sandstone is made by mixing quartz sand 75 per cent, crushed quartz 15 per cent., powdered crystal quartz 10 per cent., with a solution in 7 per cent. of water, of 2 per cent. of concentrated lye, and 1 per cent. of quicklime, and then uniformly moistening the mixture with 10 per cent. of the same solution. Mortar is made by mixing quartz sand, or crushed quartzite or quartz, with lime and dried and pulverized lye, each 0·6 per cent., and stirring the mixture into water. Otherwise, a mixture of concentrated lye 1·8 per cent., lime 0·6 per cent., and water 7 per cent. may be used to form a paste with sand, quartz, &c. Concentrated cellulose lye, about 2 to 2·5 per cent., mixed with 10 to 12 per cent. of water, is used to bind highly-basic materials, such as dolomite, magnesite, &c.

8503. Allison, H. E. April 13.

Casting. — Relates to means for securing the stocks of inking-rollers centrally in the casting-mould, for the purpose of re-clothing with composition. The stock 8, Fig. 1, is provided at the upper end with a sleeve 1, adapted to receive the three-pronged centre piece 6, which rests against a flange 9, and at the lower end with a similar sleeve 1^a, having a flange fitting the mould 7. The sleeves 1, 1^a are stepped internally, the diameter of each successive section diminishing by $\frac{1}{16}$, $\frac{1}{8}$, or $\frac{1}{64}$ of an inch, thus forming shoulders 2, 3, 4, 5, against which the end of the stock abuts. When new, the stocks rest against the first shoulder, but, as the diameter is decreased by wear, it passes farther into the sleeve and is still held concentric with the mould. The sleeves may also be made telescopic, with the different sections capable of sliding over one another, so that the section required to fit the stock may be placed adjacent thereto, the centre-piece 6 being carried by the larger section.

FIG. 1.



8504. Glossop, W. April 13.

Cements; concretes; stone, artificial.—A disinfectant or antiseptic is mixed with the usual materials in making a sanitary artificial stone for floors or staircases or paving, and for general constructive and sanitary purposes, or when making concrete floors and pavements. The lime, mortar, cement, or other binding-agent may be similarly treated.

8542. Goddard, R. J. April 13.

Asphalts.—An asphaltic-mosaic flooring or paving is made by mixing pieces or blocks of marble, limestone, spar, slag, or the like, with hot asphalt, in a cauldron, and laying them while hot. The material known as "white asphalt," consisting of resin, resin oil, and limestone, is preferred. The composition may be coloured, and designs formed.

8837. Lewis, N. J., Lewis, C., and **Bowie, J.** April 18. *Drawings to Specification.*

Concretes.—Slabs for walls, partitions, baths, water-closets, urinals, wall linings, panels, shelving, table tops, &c. are made from marble chippings, water, cement, and colouring-material, or the

marble chippings may be replaced by granite or stone chippings, or ground stone, sand, spar, clinkers, &c.

8859. Windholz, J. April 18.

Refractory substances.—A substance, consisting of an intimate mixture of boron carbide and corundum, is used as a refractory substance in making or lining tuyères, bricks, crucibles, muffles, &c. The substance also resists the action of acids and alkalies. A mixture of one or more boron compounds, such as borax or boric acid, with coal, coke, or distilled anthracite, and with either alumina or glucina is melted in an electric furnace in a bath, the temperature being about 3000° C., so that boron carbide is formed. The bath may consist of silicic acid, aluminium silicate, iron silicate, or the like. The ingredients of the bath may be quartz, or quartz iron ore, with calcium borate and common or sea salt.

8869. Stidder, J. G. April 18.

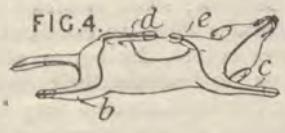
Cements.—A composition used for backing glass, opal, and other facing-tiles consists, in an example given, of sulphur 1 oz., sand 4 oz., sawdust treated with an alum or other fireproofing-solution 2 oz., copal varnish 1 pint, boiled oil ½ pint, and linseed oil ¼ pint. The varnish may be replaced by shellac or other resin, and the sand may be omitted.

9024. Pfarr, W. April 19.

Casting.—The moulds for figures representing walking animals are made in two pieces instead of in several. The pattern is placed on a mass of plastic material, prepared so as to set hard afterwards, and partly encased therein, the excess of material above the desired section-line being removed by a spaddle. The other half of the mould is prepared in a similar manner above that already made, and the two sections are separated, so that one part comprises the outer halves of the legs *b*, *c*, Fig. 1, and the inner halves of the legs *d*, *e*, and the other part comprises the outer halves of the legs *d*, *e*, and the inner halves of the legs *b*, *c*. The section-line passes from the head, through the leg *c*, Fig. 4, across the body and through the leg *e*, along the centre of the body, and through the leg *d*, whence it passes across the body and through the leg *b*.

FIG. 1.

FIG. 4.



9128. Henderson, H. G. April 20.

Casting.—Relates to the production of relief maps and the like by moulding and casting operations. Thin slabs of clay traced with contour lines are cut along the lines, and, the superfluous pieces having been removed, the slabs are then built up above one another to form a mould. The step-like edges of the mould are finished off with a luting of clay. The mould is filled with a core of cinders and placed in an adjustable frame, another frame covered with wire netting or perforated zinc being placed in an inverted position over the mould, and a cast produced by pouring in plaster and allowing it to set over the perforated frame. The cast is finished off in the usual way. The Provisional Specification states that the backing-frame may be a board perforated with holes, which may be countersunk or provided with cross-wires, and also that the clay used for luting may be rendered plastic by mixing with vaseline.

9195. Bickley, J. April 21.

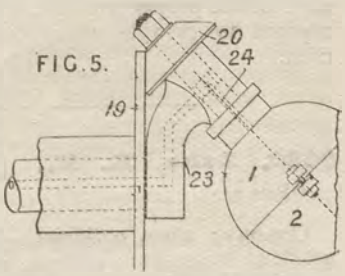
Casting.—A mould for forming tongued and grooved slabs composed of coke breeze and Portland cement is divided into compartments by sliding boards *e*, and is rendered adjustable by means of bolts and nuts *f*. Matrices *g* are used to form the tongues and grooves, the upper edge being moulded by the use of a separate matrix. The matrices are first covered with a mixture of cement and sand to strengthen the edges of the slab.

FIG. 2.

9201. Justice, P. M., [*Voelke, F. A.*]. April 21.

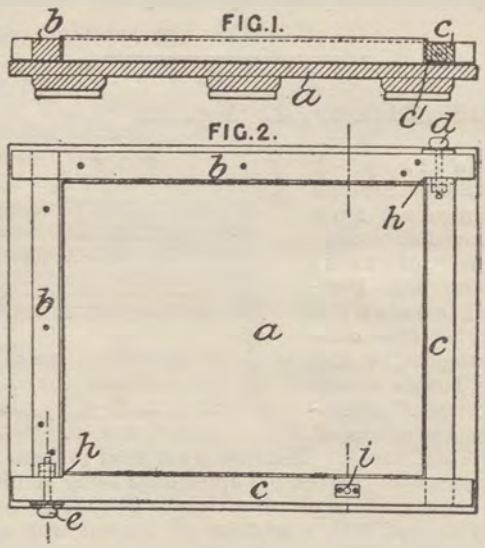
Casting.—In making hollow seamless articles, a core of fusible metal is formed on which metal is deposited electrolytically, the core being afterwards removed by heating. The manner of making is described in connection with a spherical float braced to withstand external pressure. The apparatus for forming the spherical core consists of a mould formed in two parts 1, 2 and

FIG. 5.



mounted to rotate about a horizontal and an inclined axis, the latter rotation being produced by the bevel-wheel 20 and the fixed friction disc 19. The strengthening-plates and the brace-bar are placed in position in the heated mould together with a quantity of molten wax, fusible metal, or other substance. The mould is then rotated and allowed to cool, and, at the same time, air under pressure is admitted through the passages 23, 24 and through an aperture in the brace-bar. The compressed air prevents the core from contracting as it cools, and remains enclosed in the core owing to the sealing of the aperture by the wax. To produce a core of other than spherical shape, the mould is rotated or tumbled in a suitable manner.

9292. Patent Victoria Stone Paving Co., and **Laws, F. W.** April 22.



Casting paving-slabs. A mould, shown in section in Fig. 1 and in plan in Fig. 2, has two adjacent sides *b* fixed to the bottom *a*, while the other two sides *c* are removable. The latter are fixed together, and are secured to the sides *b* by thumb-screws *d*, *e* and to the bottom by a screw *i*. Shoulders *h* ensure the fixing of the removable part in the proper position, and the underside c^1 is tapered to provide clearance. A zinc lining is used.

9680. Lake, H. H., [*Jencquel & Hayn*]. April 27.

Cements; stone, artificial.—Instead of asbestos, artificial magnesium silicate, prepared from magnesium chloride or other salt, is used in the manufacture of artificial stone &c. Kieselguhr is mixed with organic substances leaving little ash on combustion, such as chaff, cork waste, wood dust, rice hulls, paper, &c., and a little clay, and is then kneaded with the artificial silicate and water-glass, from which silicic acid is produced. The silicate and silicic acid form a cement in the body of the composition, which is afterwards burnt to sintering or till glazing occurs. The materials used in a composition given consist of kieselguhr 170 parts, clay 40 parts, rough-ground cork 110 parts, water-glass 9 parts, and magnesium chloride 9 parts.

9734. Marshall, W. A., and **Marshall, J. E.** April 28.

Casting.—In apparatus for casting plaster, the mould can be held in any position and at any required angle while being filled. An outer circular frame turns on trunnions *d*, and is provided with rollers *c*, which run in a channel in a ring *b* and enable it to be rotated together with the inner frame of which it forms a part. The mould is attached to the inner frame by means of chains, passing through holes in uprights *e*, and having adjustable links, which enable the chains to be tightened by means of a screw and nut. The outer frame is held at any angle by a pin, passing into a perforated plate *g*.

9765. Denaeyer, A. April 28.

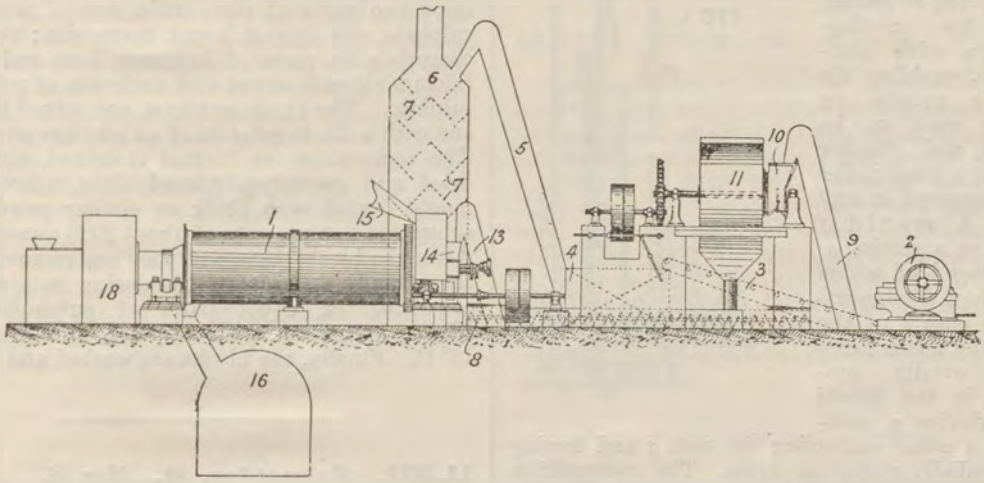
Cements; stone, artificial.—Potassium or sodium silicate is added to Portland or other cement or to limes before, during, or after the burning operations, to increase their resistance. A substitute for Portland cement may be prepared by mixing alkaline silicate powder with fat, slaked lime or hydraulic lime, and water. The alkaline silicate is prepared by melting alkaline salts with sand, grit-stone, or other impure silica, and a small quantity of charcoal.

9769. Lefranc, L. April 28.

Cements; stone, artificial.—Relates to the manufacture of artificial marble, granite, and the like from a fused mixture of calcium fluoride and calcium sulphate or chalk. Silica or clay up to

25 per cent. of the whole may be added. Good results are obtained from a mixture of calcium fluoride, plaster of Paris, chalk, clay, and sand, with or without a small quantity of ferric or other oxide, and magnesia or any other alkaline or earthy base.

9944. Ducastel, F. J. M. M. April 30.



Cements; mortars.—Pulverized substances, such as silica, silicates, and carbonates, are caused to react on lime or cement at suitable temperatures. The reacting substances are powdered in a crusher 2, and carried by a conveyer 3, to a washing-apparatus 4. They are then raised by an elevator 5 to the top of a drying-chamber 6, with sloping shelves 7; hot gases from the furnace 1, rising in the chamber meet and dry the descending material, which is then fed into the hopper 10 by the conveyer 8 and elevator 9, and thence into the ball-mill 11, where it is further pulverized. A conveyer and elevator 13 feed the material into the hopper 14, where it is mixed with the cement or lime, also pulverized, which enters by the pipe 15. An endless screw transfers the mixed substances into the gas-heated rotary furnace 1 lined with flint masonry, and containing flint rollers, which further intermix and pulverize the substances, and facilitate their chemical reactions. The heated gas, consisting largely of carbonic acid, enters the furnace from the combustion chamber 18, and also reacts with the mixed material. The product, which is collected in chambers 16, and cooled out of contact with the air, forms a rapidly-setting cement; but if exposed to the air it forms a slow-setting Portland cement. Three examples are given of suitable mixtures for treatment. (1) Slaked lime, 16 to 22 per cent.; grit or material containing silicate of lime, 78 to 84 per cent. (2) Quicklime, 10 to 18 per cent.; crushed brick, 42 to 50 per cent.; Portland cement, 40 per cent. (3) Residue from stone cutting, 50 per cent.; crushed brick, 10 per cent.; Portland cement, 40 per cent.

9963. Imray, O., [*Carborundum Co.*]. April 30.

Refractory substances.—Carborundum, in the powdered, granular, or amorphous form, is rendered coherent without the use of a binding-agent, by heating in an oxidizing-atmosphere to a high temperature, say 2500° F. Bonding is due to superficial oxidation. Bricks, furnace linings, crucibles, and other refractory articles may thus be made by moulding the damped material and burning in a kiln; or less refractory articles may be faced with carborundum by applying it as a wash or mortar, drying, and burning.

10,040. Devillers, O. May 2.

Stone, imitation.—Scales from small burst bubbles of coloured glass, which has been refined in a liquid condition in an earthenware vessel, are applied to the surface of panes or sheets of window or other glass, and fixed on by cement. Liquid or powdered enamel, with or without sand, is then sprinkled on, and the whole fired at about 800° C., and then cooled gradually. The imitation marble slabs formed are used for walls, chimneys, washstands, bricks, &c.

10,170. Grau, B. May 3.

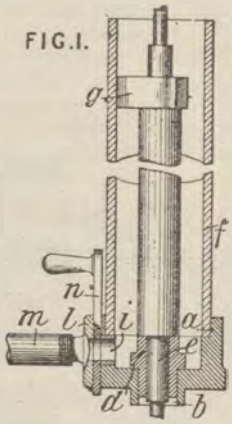
Cements; slags, treatment of.—In making Portland cement from blast-furnace slag, the slag as it flows from the furnace is granulated by high-pressure steam, allowed to fall into a heap, and

there to cool. The mass is then ground, either alone or with a more calcareous cement or cement clinker.

11,242. Battey, A. F. May 16.

Casting.—Relates to the covering of inking-rollers for printing-machines with composition, enabling the ordinary moulds in general use to be utilized, and further allowing a single roller to be covered at any time. A mould *f* stands on a casting *a*, in the step *b* of which fits a bush *d* supporting the core *e* of the roller, the latter being also centrally supported in the mould by a device *g* comprising a collar embracing the core *e* and having three radially-projecting arms. The composition is forced through a flexible pipe *m* into the mould. The nozzle plate *l* of the pipe *m* is attached to the casting *a* by sliding it in vertical guide-bars secured to the latter, a sliding plate *n* being provided in the plate *l* for shutting-off the supply of composition. A laterally-sliding plate *i* with a central hole may be adjusted either to admit the flow of composition or completely to close the bottom end of the mould, and is so contrived that, when the composition has set, the roller may be drawn from the mould without any obstruction being offered. The mould *f* and casting *a* may be made in one piece, if desired.

FIG. 1.



11,258. Stöffler, E. May 16, A.D. 1903, [*date applied for under Patents Act, A.D. 1901*].

Refractory substances.—Magnesia is used as the binding-agent in fireproof quartz bricks. The quartz or sand is preferably heated before mixing, and the brick is hardened in steam under pressure, and is then burnt.

11,523. Stöffler, E. May 19.

Stone, artificial.—Bricks or building-blocks are moulded from a mixture of sand and caustic lime ground together in the presence of water or steam in open or closed vessels. The steam may be under pressure, and the vessels may be steam-jacketed, the material being thus partially hardened before moulding.

11,830. Kauffmann, N. G. H. von, and **Medberg, C. E. H.** May 24.

Stone, artificial.—In the manufacture of artificial stone, for paving, decorative, and other purposes, from slate waste, three mixtures are used. The first consists of 55·80 parts of finely-powdered slate, five of cellulose sulphite, and five of blue clay, mixed with a solution of alum; the second contains two parts of zinc oxide, one of aluminium sulphate, and one of burnt magnesite; the third comprises six parts of hydraulic lime and ten of calcium chloride mixed with a solution of potassium sulphite. The three mixtures are mixed together and with a dilute solution of an alkaline phosphate. The composition so formed is mixed with well-dried and coarsely-powdered slate, placed in a mould dusted with chalk or similar powder, and submitted to a pressure of about 2000 atmospheres. After the blocks have set, they are removed from the press and hardened by placing in a solution consisting of equal parts of sulphuric acid, silicate of potash, and saltpetre, and heating to 18° C. Finally, the blocks are washed and dried.

11,981. Schneider, H. May 26.

FIG. 5.

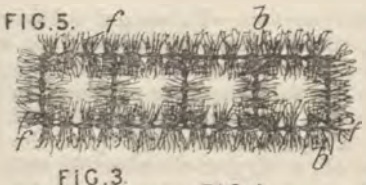
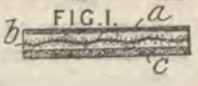


FIG. 3.

FIG. 4.

FIG. 1.



Fireproof coverings and compositions; cements for slabs, walls, ceilings, &c. A layer *a* of mortar, composed of lime, sand, and water, mixed with 10 per cent. of plaster of Paris, is applied to one side of wire netting *b*, with fibres *f* woven or twisted between the wire strands, and an external coating or layer *c* of fireproof cement, composed of 8 parts by weight of hydraulic lime, 90 of ashes, and 56 of plaster of Paris, mixed with water, is applied to the other side.

12,277. Pfarr, W. May 30.

Statuary.—Models are made by casting a mixture, consisting of porcelain earth, clay, paper-pulp, glue, and formalin, in a gypsum or like mould, the articles being dried after their removal from

the moulds. Sodium carbonate, alum, &c. may be used instead of formalin for hardening the glue, or the cast article may be treated with formalin vapours.

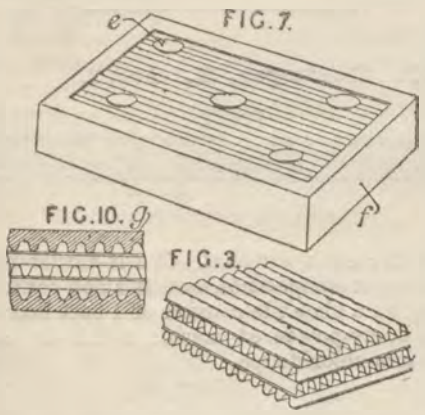
12,518. Watson, W. L. June 2.

Asphalts.—Relates to a material and composition for damp-courses in buildings, for covering roofs, surfaces of bridges, viaducts, arches, sewers, and the like, for coating and preserving iron and wood, for preventing the access of damp to iron girders, for insulating electric conductors, and for like purposes. Sheet lead is covered on both sides with an asphalt, consisting preferably of 50 per cent. of bitumen, 45 of powdered pumice, and 5 of shale or other oil. Outside this is placed a layer of asphaltic felt, consisting of paper pulp, tar, and pitch. Sometimes the lead or the inner coating is omitted. The coating and preserving composition consists of bitumen and powdered pumice, with or without oil.

12,874. Entwistle, W. June 7. *Drawings to Specification.*

Asphalts. — In constructing roads, tramways, foot-paths, floors, and the like, spaces between the paving-blocks are filled up with hot asphalt consisting of bitumen, granite, limestone, and slag chippings or sand.

12,888. Thiébaut, C. June 13, A.D. 1903, [*date applied for under Patents Act, A.D. 1901*].



Sound-deadening coverings.—A number of layers of corrugated paperboard are fastened together so as to form a compound sheet. Each layer may be covered on one or both sides with smooth paper or board, and the corrugations in the various layers may be arranged parallel, or at right-angles as shown in Fig. 3. The finished block may be strengthened by a metal frame and rivets *e*, Fig. 7, by plaster *g*, Fig. 10, or may be covered with a veneer of wood, cardboard, metal, or celluloid, and the component sheets may be impregnated or covered with varnish, paint, waterproof, fireproof, or antiseptic material, or asbestos, or tar.

12,940. Vokes, H. June 8.

Stone, artificial. — Artificial granite is manufactured from marble or granite chips and cement. The preferred proportions are about 2½ stones of marble or granite chips or a mixture of the two, ¾ stone good, preferably Portland, cement, and 2½ stones marble or granite dust or a mixture of both. If required, colouring-matter may be added; for imitating red granite, about 1 lb. of red colouring-matter to each stone of the mixture may be added. The composition is mixed with water and placed in moulds until set; when set, the stone is removed from the mould and placed in water to harden.

13,332. Beaver, C. J., and **Claremont, E. A.** June 13.

Fireproof coverings and compositions.—Electric cables are wrapped in fabrics impregnated with sodium tungstate and glue, or other solutions, and then varnished over with similar compounds. Tapes, lappings, or braidings are used made of jute, cotton, or hemp yarn or other suitable material. The impregnating-solution is preferably a mixture of equal parts of a 10 per cent. sodium-tungstate solution and a 25 per cent. glue solution. After this treatment with solutions, and either before or after drying, the materials are served with a solution of tannin. The tapes &c. are applied by an ordinary lapping-machine, and, after each layer is put on, it is given a coating of a fire-resisting paste or varnish, preferably consisting of sodium tungstate and glue, together with talc or metallic oxide or other inert powder. The cable is finally dried *in vacuo*.

14,427. Snelling, J. C. June 27. *Drawings to Specification.*

Concretes. — Partition slabs are made from a mixture of Portland cement and furnace slag, ground in a mill with water until capable of being passed through a quarter-inch ring. The composition is cast into moulds of the required shape and dried.

14,527. Schnuetgen, J. E. June 28.

Stone, artificial.—Fireproof plates or slabs for partitions or general building purposes are composed

of pumice stone 50 parts, cement 15 parts, volcanic sand 15 parts, and water or hydraulic-lime water 20 parts. The proportions of sand and cement may be decreased and increased, respectively. The slabs may be reinforced with metal, wood, or the like.

15,057. Muller, L. E., [*known as* Muller, L. d'E.]. July 8, A.D. 1903, [*date applied for under Patents Act, A.D. 1901*].

Cements; mortars; plasters; fireproof coverings and compositions; refractory substances.—A fireproof, acidproof, and anti-corrosive material, to be used as a paint, grout, or plastering, for covering and joining stonework &c. in furnaces, ovens, pipes, retorts, or the like, consists chiefly of carborundum, or like materials, such as metal carbides or borides. Thus, the brick walls of furnaces are coated with a mixture consisting of carbon silicide 90–60 parts, refractory clay 10–40 parts, lime 0–4 parts, and sodium or potassium silicate of 47° Bé. 20–50 parts. These are finely ground, dried, and again ground, and mixed with water before use. A mixture of carbon silicide 50–85 parts, calcined magnesia 5–15 parts, and fine sand 10–25 parts, moistened with saturated magnesium-chloride solution is used to resist chemical action. Oxychlorides or other suitable ingredients are sometimes mixed with the carborundum.

15,795. Bodmer, E. H. Rieter-. July 15. *Drawings to Specification.*

Stone, artificial.—Artificial stone for use as a fireproof covering, electric insulating-material, and a non-conductor of heat is composed of disintegrated asbestos or similar material and Portland cement. Pipes, tiles, relief plates, rods, panels for ornamenting walls, ceilings, &c., basins, troughs, and similar articles are moulded from this composition.

15,903. Blacka, F. V. July 18.

Cements.—Joints in brickwork and stonework are pointed with a mixture of Portland cement and iron oxide, or oil mastic, Parian, or Keene's cement, tinted as required with suitable stains.

16,657. Butterfield, J. C. July 28.

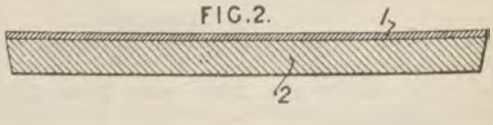
Concretes.—Relates to a method of, and a cement for, making up roads from suitable local material. The available material, such as gravel, ballast, limestone, slaked lime, chalk, sand, granite, slag, or the like, is crushed and sifted. The finer material is mixed with powdered limestone or chalk and with sufficient mixture of sodium silicate and sugar or molasses to form a coherent mass, and is then spread on the foundation of the road. The larger pieces, which form the wearing surface, are distributed evenly and rolled in, so that the plastic layer is forced into the interstices to bind the whole. Ground pitch and asphalt may sometimes be added to the limestone or chalk, or a mixture of limestone or granite and asphalt may be ground together. In another method, the asphalt or pitch may be melted, and the limestone and granite mixture added and the whole ground when cool. The ground material is then added to the silicate-sugar mixture and used as above described.

16,657A. Butterfield, J. C. July 28.

Asphalts; cements.—A surfacing-material for coating roads, walls, pipes, &c. is made from suitable proportions of asphalt, pitch, or like material and finely-divided limestone, together with a solution of sodium silicate, sugar, molasses, or the like. Granite or flint suitably crushed may be added with the limestone. The asphalt or pitch in the proportions of about 20–30 per cent. is ground to a fine state of subdivision and mixed with about 70–80 per cent. of limestone or a mixture of limestone, granite, and flint. The materials may also be mixed by melting the pitch or asphalt and adding limestone and granite to form a thick paste, which, on cooling, may be powdered. The powder is made into a stiff paste with a solution of sodium silicate and sugar, and is applied to the road or other surface to be covered in the moist condition, when it soon sets. The composition may be pressed into blocks to provide a waterproof surface for pavements, tanks, reservoirs, and the like.

16,857. Bösinger, E. Aug. 2.

FIG. 2.

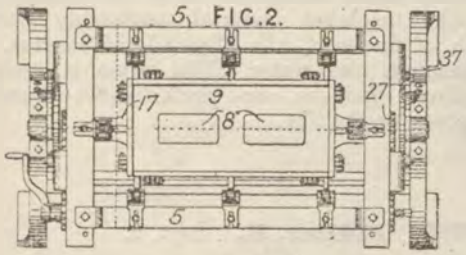


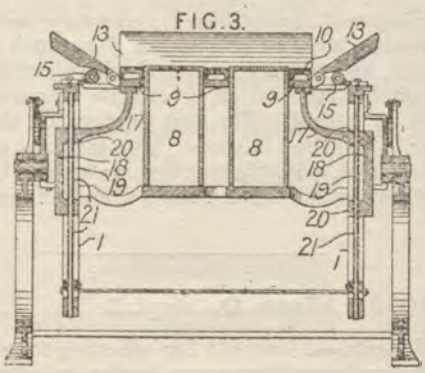
Cements; stone, artificial.—A self-hardening artificial stone or composition used as a non-contracting backing for a glass tile consists of 1 part magnesite, 4 parts finely-powdered marble, and 5 per cent. of magnesium-chloride lye.

16,975. McDowell, J. M. Aug. 3.

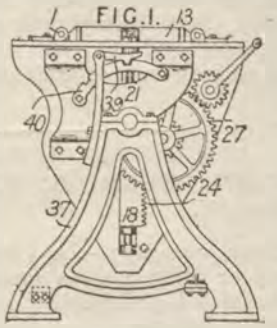
Casting.—A mould for concrete building-blocks slides vertically over fixed cores, has hinged sides, and is pivoted, so that it may be tilted to facilitate coating the interior. Fig. 1 shows an end view,

Fig. 2 a plan, and Fig. 3 a longitudinal section of the apparatus. Side-plates 1, mounted on trunnions





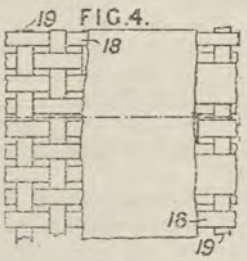
in standards 37, are connected by bars 5 and support the fixed cores 8, over which slides a bed-plate 9, supported by arms 17 on blocks 18 raised and lowered in slots 19 in the plates 1 by rack-and-pinion gearing 24, 27 and guided by rods 21. The bed-plate 9 carries a pallet 10 and hinged sides 13, which, when the mould is raised, fall outwards and ride on rollers 15. The mould is then tilted on the trunnions and held by notched segments 40 and pawls 39 with the front door 13 horizontal. A waterproofing or ornamental coating is then applied, the frame tilted back, and the bed lowered to close the sides ready for the concrete.



17,235. Robin, C. Aug. 7, A.D. 1903, [*date applied for under Patents Act, A.D. 1901*].

Refractory substances.—The quantity of the alumina in a composition for making bricks, tiles, pipes, &c. is five to seven times less than that of the silica, which may form 65–75 per cent. of the whole. The percentage proportions in a specified case are :—Silica 69, alumina 11·5, iron oxide 1·5, lime 4·5, magnesia 1·5, and water, carbonic acid, &c. 12.

17,603. Mayhew, G. S. Aug. 12.



Fireproof coverings and compositions; plasters.—Relates to fireproof ceiling or partition slabs or sheets consisting of a wooden core covered with plaster, and to a machine for perforating the core if in the form of a board and for applying and rolling the plaster. One form of core, shown in Fig. 1, consists of a compo-board of the kind described in Specification No. 28,810, A.D. 1903, [*Abridgment Class* Buildings &c.], faced on both sides with fireproof paper, and formed by means of the machine described in Specification No. 5311, A.D. 1904, [*Abridgment Class* Cutting &c.]. This sheet is perforated to form a key for the plaster, which, according to the Provisional Specification, consists of ground asbestos, infusorial earth, fireproofed sawdust, starch or flour paste, plaster of Paris, and unslaked lime. Another form of core, shown in Fig. 4, consists of woven strips of wood, preferably cottonwood or elm. After being cut, the strips are dried by passing through hot pressure rollers. Those forming the weft 18 consist of two strips cemented together, each of half the thickness of those forming the warp 19.

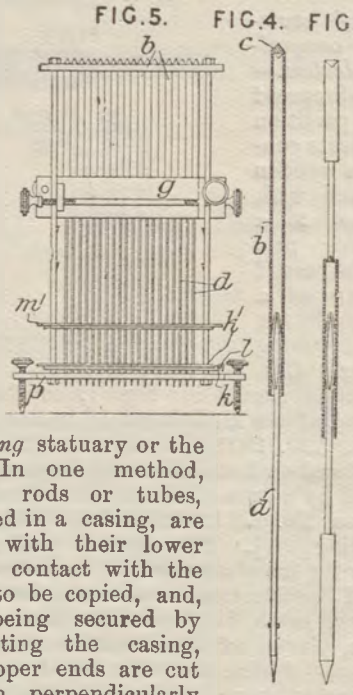
17,870. Elmes, S. Aug. 17.

Stone, artificial; plasters. — A composition to imitate stone, more particularly Bath or Portland stone, consists of equal parts of Keene's or Parian cement and powdered stone, to which is added a small percentage of borax or alum for hardening purposes. The stone may be coloured by adding saffron or other fast dye, and its appearance is improved by adding a small quantity of washed Dorking sand. In some cases, a small quantity of glue is added to retard the setting, and, when used in exposed situations, sodium silicate or similar substances may be added. To increase the durability of the plaster work, a thin coating of glue, with or without addition of hardening-material, such as alum, borax, or formaldehyde, may be applied.

17,968. Prest, S. F. Aug. 18.

Stone, artificial; slags, treatment of.—Artificial stone is formed by crushing the slag from steel furnaces, separating the magnetic or metallic from the non-magnetic portion, adding slaked lime to the latter, shaping by pressure, and finally hardening by treating with steam under pressure in a closed chamber. A red colour may be imparted by adding hæmatite-iron ore.

18,032. Rouxeville, E. A. L. Aug. 19.



Casting statuary or the like. In one method, parallel rods or tubes, arranged in a casing, are placed with their lower ends in contact with the model to be copied, and, after being secured by contracting the casing, their upper ends are cut through perpendicularly to their axes, so that, on allowing the lower ends of the rods to fall upon a plane surface, the upper ends form a mould into which moulding plaster &c. may be poured. Reduced copies are obtained by compressing the rods before casting. In a second method, telescopic tubes, Figs. 4 and 8, replace the rods, and the casing *g*, Fig. 5, is adjusted by screws, the whole being carried on an adjustable frame *p*. When copying, the tubes are allowed to rest on the model, the lower parts *d* are secured by adjusting the relative positions of two perforated plates *k*, *k*¹ by a screw *l*, and the upper parts *b* are forced down on to a vertically-adjustable plate *m*¹, so that, on allowing the tubes *b*, *d* to drop on to a horizontal plane, the upper surfaces form a mould, the spaces between the tubes being filled with fatty material. The thickness of the counterpart may be modified by allowing the tubes to rest on a concave or convex surface. The telescopic tubes may be constructed, as shown in Fig. 4, with upper conical ends *c*, or with recessed upper ends, as shown in Fig. 8, the upper ends of the lower parts forming springs fitting in the upper parts.

18,265. Sullivan, A. W., and **Renshaw, W.** Aug. 23. *Drawings to Specification.*

Sound-deadening coverings and compositions.—Strips of burlap coated with asbestos or felt &c. are placed under the lining of the body of a railway car to deaden the sounds &c. transmitted from the exterior.

18,804. Brunson, C. W. Aug. 31.

Cements; stone, artificial.—A cement for making artificial stone consists of 35 lb of cinders, slag, or like insoluble material, preferably vitrified, 15 lb. of fine sand, ½ lb. of powdered barytes, 2 lb. of cement, and water. The stone is used for buildings, bridges, or piers, and ornamental purposes, or the like.

18,989. Müller, R. Sept. 2.

Fireproof compositions; refractory substances.—Asbestos, with or without a filler such as quartz, kaolin, and the like, is mixed with a small quantity of pitch dissolved in a volatile organic solvent, such as benzol. The last portion of the solvent may be expelled *in vacuo*. The material thus made resists heat, acid, alkalies, fire, water, and electricity, and may be moulded, polished, and enamelled.

19,055. Mess, O. Sept. 3.

Cements.—A cement for securing wooden, cork-dust, or other parquetry blocks is composed of ground chalk, linseed and copal varnish, "silver "litharge," and oil, with a filling, such as brick-dust and sawdust, or sand and grit, and fibre.

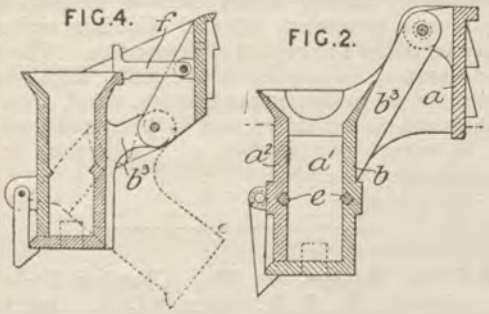
19,737. Boult, A. J., [*Hülsberg & Co.*]. Sept. 13.

Stone, preserving.—In a method of impregnating wood or other porous materials, instead of the material being subjected to air or gas at a high pressure in the initial stage, as is done in the method described in Specification No. 6844, A.D. 1902, it is brought into a chamber under atmospheric pressure and then treated with the impregnating liquid at a pressure of one, two, or three atmospheres. The impregnating-apparatus is then put under vacuum.

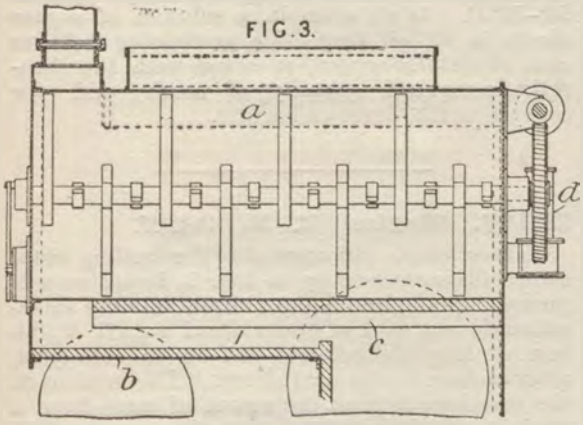
20,018. Ridley, T. W., Tait, J., and **Williamson, J. D.** Sept. 16.

Casting slag. Slag bricks or blocks for paving and other purposes are divided horizontally through the centre; the surfaces thus exposed, being free from blowholes, are placed uppermost when the blocks are laid. To facilitate the division, the blocks are formed with a V-groove produced by fitting the moulds with bars *e*, Fig. 2. The side a^1 and front a^2 of the mould are carried by an arm *a* from the rim of a wheel provided with a series of moulds, and the removable back *b*, side, and base are supported by an arm b^3 pivoted above the mould, so as to clear the block when opened. In a modification, shown in Fig. 4, the arm b^3 is pivoted

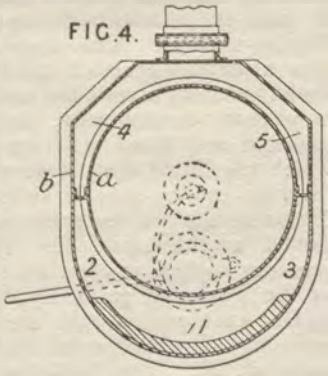
opposite the mould but is slotted so as to move rearwardly. A catch *f* supports the top of the movable part.



20,021. Bradshaw, R. W. Sept. 16.



Asphalts.—In an apparatus for heating and mixing asphalt preparatory to laying, the revolving stirrers are driven by an engine or electric motor *d* mounted on the casing, and a series of furnace flues 1, 2, 3, 4, 5 are formed between the inner and outer shells *a*, *b*, the lower part of the shell *a* being protected by a firebrick arch *c*. The outer shell is coated with asbestos. The draught is regulated by a vertical sliding plate on the ash-pit. The firebars are channel-shaped, the upper flat part being perforated. A removable perforated casing fitted around the boiler and provided with an inlet and outlet serves for drying material to be used with the asphalt. The cover to the boiler is arranged so that it can be opened from either side.



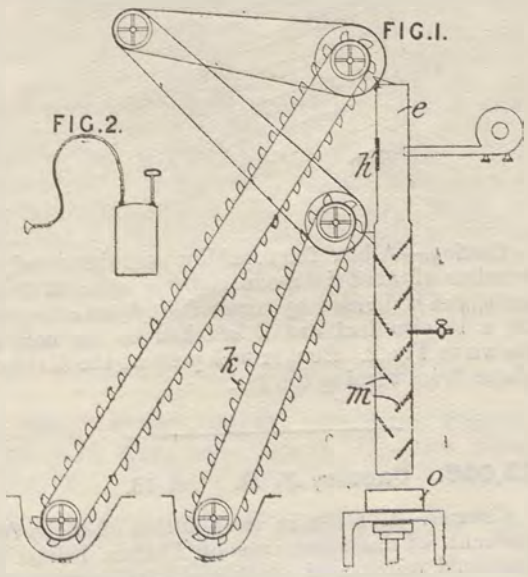
20,138. Galloway, W. Sept. 19.

Mineral wool.—An absorbent material for the burning and storage of hydrocarbons and other liquid fuels is obtained by treating slagwool to remove its impurities. The slagwool is strongly heated in a pan provided with rotating vanes, when the impurities become separated from the useful material. The contents of the pan may be slaked with a small quantity of oil, which condenses on the mass as it cools. The roasted and slaked material is passed over screens of different meshes to remove the various impurities. The finer portion of the slagwool passes through the meshes along with the grit and is recovered by agitating with water in a sieve, when the heavier gritty portions sink through the gauze bottom.

20,285. Martin, F. Sept. 20.

Fireproof coverings.—Electric cables are covered with tapes rubbed with a fire-resisting powder, after being wetted with fireproofing-solution or water. The cable is covered with braidings of cotton, hemp, &c., and is wetted with a solution which may contain sodium tungstate and sodium biborate. While wet, the cable is passed through a box containing a fire-resisting powder, such as a mixture of zinc oxide and calcium carbonate, the powder being well rubbed into the covering. This process is repeated after each braiding. After the last braiding, the wet cable is passed through a box containing French chalk, and is well rubbed and dried at a gentle heat. Tapes of cotton &c. may be treated in this manner and then wound on the cable.

21,233. Reavell, F. N. Oct. 4.



Stone, artificial; stone, preserving; concretes.—In the manufacture of artificial stone from Portland

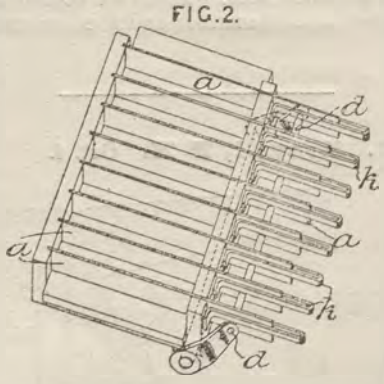
cement and fine gravel, consisting of granite, slag, stone, quartz, or the like, the latter is elevated to the top of a vertical shaft *e*, and, as it falls, dust is separated by blowing it through an aperture *h* in the shaft by a blast entering at the opposite side. At a lower elevation, cement, coloured if desired, is introduced by a second elevator *k*, the proportions of cement and gravel being determined by the rate of feed. At this point, the cross-section of the shaft alters from round to square or rectangular, and a series of sloping vanes *m* are arranged on alternate sides for mixing the materials, which, after being sprayed with water, fall into moulds *o* and are then passed on to a press. The moulded block, before it sets, is stippled, or scratched with file-carding or the like, and is finally hardened by spraying with sodium silicate by means of the apparatus shown in Fig. 2, instead of dipping in a sodium-silicate solution as heretofore.

21,778. Callow, T. Oct. 10.

Refractory substances.—A refractory material for use in making crucibles is composed of blacklead, carbon or coke, Stourbridge clay, pipeclay, and burnt clay, the last four ingredients being in equal proportions by measure and the amount of blacklead being varied according to the capacity of the crucible.

21,999. Gaspary, A. Oct. 12.

FIG. 2.



Casting.—A box for moulding simultaneously a number of artificial-stone slabs is open at both ends, and is divided by removable plates *a* pivoted on a longitudinal rod *d* cranked to the box, as shown in Fig. 2. Bent arms *k* prevent the division-plates from turning too far.

22,056. Castle, J. E. Oct. 13.

Cements.—Consists in the addition of about two per cent. of fine screenings of Thames ballast to the usual mixture of chalk and clay used in the manufacture of cement. By this means, the fuel required for burning the cement is economized.

22,423. Fairweather, W., [*Nettleton, A. B.*]. Oct. 18.

Fireproof coverings.—A fireproofing-composition is made by adding silicon carbide to semi-liquid sodium or potassium silicate. Calcium carbonate may be added to prevent effervescence. The composition may be applied to the walls, flues, &c. of furnaces, to bricks, cement, stone, wood, iron and other metals, or cloth, and to plastered surfaces. It is sprayed or applied with a brush, or the articles may be dipped.

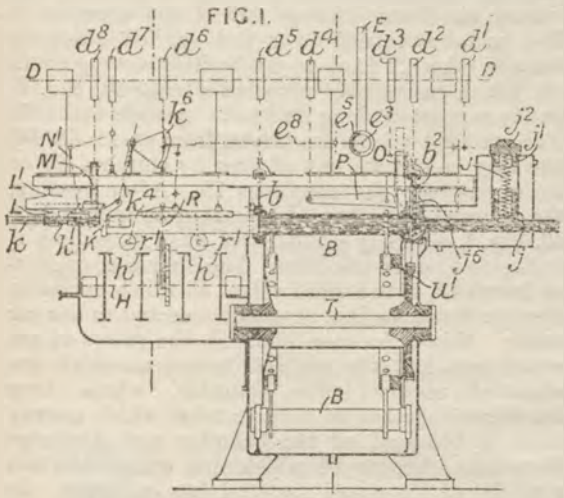
22,547. Lake, H. H., [*Chemisch-Technische Fabrik Dr. A. R. W. Brand & Co.*]. Oct. 19.

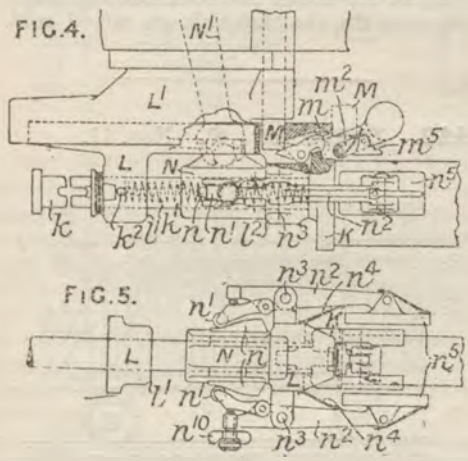
Stone, colouring.—Marble and other natural stones are coloured throughout by drying and impregnating them with iron or other metallic oleates dissolved in a mixture of essential oil and acetic or other organic acid, and heating to a temperature of 50°–70° C. As an example, a solution of copper oleate in oil of turpentine, containing 3–4 per cent. of metallic copper, is mixed with the theoretically-required quantity of acetic acid for converting the oleate on heating.

23,187. Markel, K. E. Oct. 27.

Casting soap. In apparatus for casting soap, shown diagrammatically in Fig. 1, liquid soap is pumped into tubes B on a drum rotating intermittently in a tank of water about a shaft T, the bars of soap being forced out on to conveyers, after cooling, by the next charge. The motions of the machine are taken by means of cams from a shaft D, which is rotated through a worm-wheel E and an automatically-operated clutch on a driving-shaft e^3. The clutch is thrown out of gear after each cycle of operations, and a washer brake instantly arrests the mechanism. The pump is worked continuously, and the feed-pipe is jacketed and fitted with an accumulator J, into which the liquid soap is diverted when its flow into the cooling-tube is arrested. A piston *j* is forced up against the pressure of a spring j^1 and loaded weight bearer j^2. By this means, the pressure applied to eject the cooled bar is greatest at the start and gradually decreases. Near the end of each cooling-tube are cut-offs *b*, b^3, which are actuated when the tube is in filling position by cams d^5, d^2. The feed-pipe is provided with a cut-off j^6, also actuated by the cam d^2. When the machine is first started, plungers are inserted in the tubes to take the place of cooled bars in operating the automatic arrangements. On emerging from the cooling-tube B, the soap bar presses against a plate K, which is attached to a sliding rod *k*, provided with a spring k^1 engaging a stop k^3, as shown in elevation and plan, respectively, in Figs. 4 and 5. The plate K is connected by a rod k^4, Fig. 1, to a slotted quadrant k^6, which, when the soap bar is almost clear of the tube B, actuates the clutch on the shaft e^3 through a rod e^6 and crank fork e^5, and thus starts the mechanism.

The cut-off b is then closed by the cam d^5. The sliding rod k moves through a piece L, which in turn is capable of sliding in a fixed bracket L^1, a vertical sliding stop M, Fig. 4, preventing its





motion for the time being. A sleeve N is also free to slide along the rod k between the points l^1, l^2, and has on two opposite sides cam-paths n, Fig. 5, against which rollers n^1 at the ends of levers n^2, pivoted at n^3 on the slide L, are pressed by means of springs n^4. By the motion of the sleeve N, which is actuated by a lever N^1 from the cam d^7, clip-plates n^5 are caused to grip the soap bar, the pressure being adjustable by thumb-screws n^{10}. The vertical stop M is then lifted by the cam d^8, leaving the slide L free, and the latter is pushed along by the sleeve N, which has come into contact with it at l^1, thus drawing the soap bar over rollers and between vertical guides clear of the rotating drum. A catch m, actuated by the stop M, locks the plate K to the slide L, retaining it against the pressure of the spring k^1. During the gripping of the bar, the cut-offs b^3, j^6 are closed. The stop M then descends again and prevents the return of the slide L, while the sleeve N moves back, thus releasing the soap bar from the grip of the clips n^5. The end of the bar is removed from the plate K, to which it sticks, by the plate m^5 on a lever m^2, which is depressed by the stop M. The bar is then lowered by a forked rod R, Fig. 1, actuated by a cam d^6 on to endless bands h, rollers r^1 on which the bar rests also descending. By a further downward movement of the rod R, the conveyer shaft H is rotated through ratchet mechanism until the soap bar is removed from the rollers r^1. The whole lowering-apparatus then returns to its original position. During the manipulation of the bar, the top cooling-tube, which is secured to the feed supply by a forked clamp-bar O and lever P, actuated by the cam d^4, is released from the clamp-bar by the cam d^3. The drum is rotated to bring another tube into position by a pawl, operated from the cam d^1 and engaging a ratchet-wheel u^1. The tube is then clamped, the cut-offs are opened, and the devices for manipulating the cooled bar returned to their original positions ready for another cycle of operations.

23,242. Cardin, J. H. Oct. 23.

Stonework, ornamental.—Fancy articles, such as plaques, trays, boxes, &c., made of stone, marble, serpentine, &c., are ornamented by letting in a glass disc, to the underside of which is affixed a photograph or picture.

23,292. Lake, H. H., [*Chemisch-Technische Fabrik Dr. A. R. W. Brand & Co.*]. Oct. 28.

Stone, colouring.—Marbling is produced in stone by first soaking the stone in an ammoniacal metallic-salt solution, drying at about 80° C., and then treating with a solution of an alkali salt which will interact with that previously used. As an example, ammoniacal copper chloride and potassium chromate are mentioned, but any metallic salt, other than a sulphate or oxalate, may be used for the preliminary treatment, and the alkali salts of phosphoric, chromic, cyanic, or antimonic acids, or potassium ferrocyanide or ferricyanide for the subsequent treatment. The ammoniacal metallic-salt solution should have a greater concentration than the other as it is intended to penetrate more deeply, and the soaking process may be facilitated by the use of a vacuum and pressure. Stone which does not present a completely-homogeneous structure should be employed.

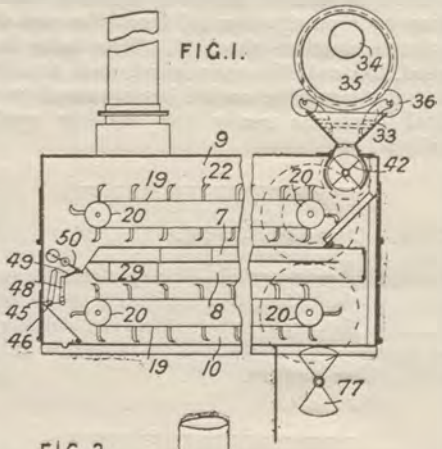
23,364. Vijgh, A. H. van der, Vijgh, H. van der, and **Vijgh, G. van der.** Oct. 29.

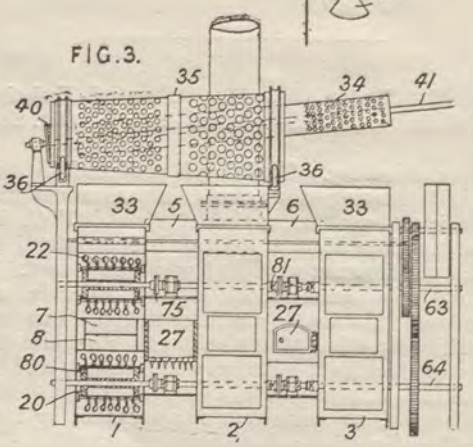
Stone, artificial.—In improvements on the invention described in Specification No. 23,159, A.D. 1898, the slag or sand is dispensed with, the percentage of pumicestone is greatly increased, and the plaster of Paris is replaced by Portland cement.

23,449. Bauer, C. [*Marmorin Grabstein & Ornamenten Fabrik Akt.-Ges.*]. Oct. 31.

Statuary; casting; concretes. — Statuary is produced by casting a mixture of stone chippings and a suitable cement around a wooden core of approximate shape. 100 parts of the concrete contain 57 parts of alumstone, 3 of sodium silicate, and 5 of water, together with 6 of stearin and 1 of bleached resin.

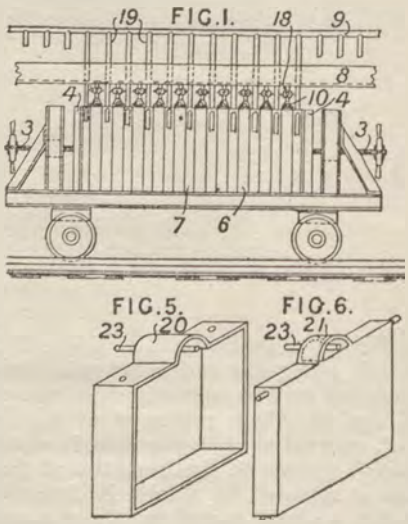
23,887. Ames, R. Nov. 4.





Asphalts; concretes.—In an apparatus for heating, drying, and mixing materials for making tarred macadam, or for mixing concrete or other materials, long chambers are employed, divided by the flues of a furnace into upper and lower compartments. The broken road metal is screened into the upper compartment and is dried while being conveyed by means of rakes or tines along the floor of the compartment; it is then discharged into the lower compartment to be mixed with heated tar. The plant consists, preferably, of three chambers 1, 2, 3, Fig. 3, with tanks 5, 6 containing the tar. The heated gases from the furnaces pass along flues 7, 8, Fig. 1, and enter the chimney by an opening 29. The middle chamber 2, Fig. 3, receives the heat from both furnaces 27, and is used for the largest size of road metal. The metal is screened in a rotating sieve 34 to separate the smallest size, and the remainder passes into a conical screen 35 mounted on antifriction rollers 36 and driven by a bevel-wheel 40 from a shaft 41. The lower portion of the hopper 33 is fitted with a rotating feed-device 42, Fig. 1, to prevent the heated air from passing out of the chamber 9. The metal is turned over and carried along by tines or rakes 22 fixed to an endless moving chain 19, which passes over sprocket-wheels 20, Fig. 3, and is supported along its length by angle-irons 80. The sprocket-wheels are driven from shafts 63, 64, and may be thrown out of gear by clutches 81 or by unscrewing the couplings 75. After heating, the material is discharged against a weighted door 50, Fig. 1, where it accumulates until its weight is sufficient to open the door. The door is connected by levers 49, 48 to conical valves 46 which normally close perforations in a pipe 45 connected to the tar tanks. When the door 50 opens, the valves 46 are withdrawn, and the tar and heated materials are admitted to the lower chamber, where they are mixed together by tines or rakes which convey them to the end of the chamber and discharge them into a hopper 77 which tips when a certain quantity of the tarred material has collected. In mixing concrete, the materials are mixed cold.

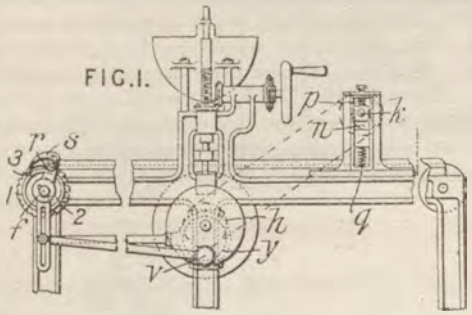
24,440. Holoubek, F. Nov. 11.



Casting soap. The moulds 6, Fig. 1, consist of rectangular frames with open sides, and are clamped between coolers 7 containing water, which form the sides of the moulds. A number of such moulds and coolers are mounted on a carriage and are pressed together by means of screws 3 and pressure plates 4. They may be provided with pegs and corresponding holes to ensure accurate fitting. Soap is passed into the moulds from a trough 8 through pipes 18, provided with cocks, and fastened to inlets 10. Holes fitted with sliding covers are formed in the top of the moulds for the

purpose of observing the process of filling and setting. A continuous stream of water is passed from a pipe 9 through flexible leather tubes 19 into the coolers 7, in which vertical baffle-plates are arranged. Figs. 5 and 6 show modified forms of the mould and cooler, respectively, which enable the feeding-trough 8 to be dispensed with. Dome-shaped caps 20, 21 form, when the moulds and coolers are pressed together, a continuous channel for the passage of the molten soap to the moulds, and through this channel a heating-pipe 23 is passed.

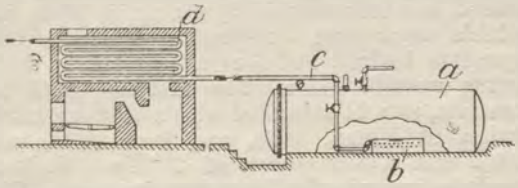
24,487. Robins, J., and **Confectioners' Vegetable Colours and Fruit Essences Co.** Nov. 11.



Casting confectionery. In a machine of the kind described in Specification No. 21,039, A.D. 1896, for making confectionery, in which a number of impressions are formed in starch powder contained in trays which are advanced step by step under a dropping-apparatus, the stamps for making the impressions are given a vertically-vibratory movement as they leave the starch by forming the actuating-cams *n* with corrugated or irregular surfaces. The cross-bar carrying the stamps may be provided with a toothed bar or comb, which enters the starch and protects the previously-formed row of impressions. To ensure an even pressure on the starch, the shaft *k* carrying the cams is mounted between springs *p*, *q*. The starch trays are given an increased length of travel when the ends of two adjacent trays pass under the dropping-apparatus. The carrier chains are driven by toothed or sprocket wheels on a shaft *f*, which is rotated intermittently by pawls *r*, *s*, actuated, respectively, by a crank-pin *v* and an eccentric *y* on the shaft *h*. The pawl *s* engages with a ratchet-wheel 1, and the pawl *r* with a wheel 2 provided with one or more ratchet teeth 3. The pawl *s* advances the trays step by step until the pawl *r* engages with a tooth 3, when the trays are given an increased travel.

24,712. Kwiatkowski, L. F. Nov. 15.

Cements; stone, artificial; stone, preserving.—Sand and lime are mixed in a special manner, and the moulded material is indurated by means of steam. The whole of the lime and about one-third of the sand are ground together, the moisture in the sand partially slacking the lime. The powdered material is mixed with the rest of the sand, and with sufficient water to complete the slaking, in a



mixing-machine. After standing for about a day, the mixture is rendered plastic by the addition of water which is uniformly distributed by agitation of the mass in suitable conveyers. When moulded, the stone is subjected to the action of steam at a pressure of 100–125 lb. or more for from 6 to 10 hours, which results in hardening, calcium silicates being formed. The steaming-chamber *a* may contain a perforated pan *b*, in which are placed salts, and steam at a pressure of 125 lb. or more, heated in a coil *d*, is directed upon the salts from a pipe *c* for the purpose of indurating the blocks.

25,128. Marga, U. A. Nov. 18.

Fireproof coverings and compositions.—Relates to a fireproof, acidproof, non-conducting, preservative composition, to be known as "Refragor." Ten parts of powdered asbestos, heated to bright redness, are mixed with one part by weight of protoxide or binoxide of lead, manganese dioxide, or other oxides; three parts of linseed or other oil are then added, and the whole is mixed. The resulting paste, owing to the oxidation of the oil, which may be quickened by adding virgin cellulose and heating, hardens on standing and is then mixed with alcohol and ether or other solvents to soften, when it may be pressed and rolled into a metallic cloth. Articles manufactured from the composition are improved by dipping in dilute sulphuric acid, or by heating the oil to 250° and adding the oxidizing-agent. The composition can be used for carriage panels, partitions for buildings, ships, barges, pontoons, coverings for floors and buildings, battery boxes, acidproof vessels, or pipes for conducting acids.

25,166. Calico Printers' Association, and **Warr, W.** Nov. 19.

Fireproof coverings and compositions.—Vegetable fibres, chiefly cotton, raw or manufactured, are rendered less inflammable by fixing in them magnesium hydrate. The material, such as flannelette, is saturated with a cold saturated solution of Epsom salts, or other suitable magnesium salt, then dried and treated with a solution of caustic soda of 22° Tw. The operations may be repeated in order to deposit a sufficient percentage of the magnesium hydrate in the fibres.

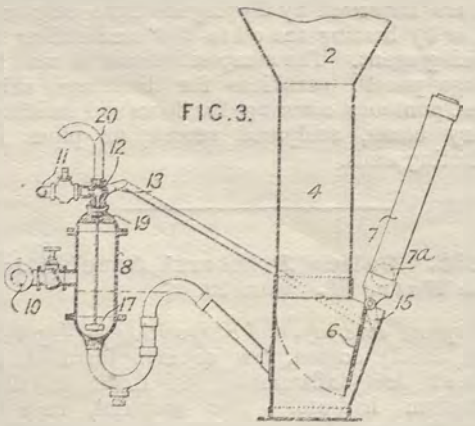
25,167. Calico Printers' Association, and **Warr, W.** Nov. 19.

Fireproof coverings and compositions.—Vegetable fibres, chiefly cotton, raw or manufactured, are rendered less inflammable by fixing in them an insoluble magnesium compound, which is not magnesium hydrate and does not contain an acid-forming metallic oxide. The material, such as flannelette, may be saturated with a cold saturated solution of Epsom salts, and then dried and treated with sodium silicate of 25° Tw. Sodium phosphate instead of silicate may be used. The material is then washed and dried, and, if desired, the whole series of operations may be repeated in order to obtain a sufficient percentage of the insoluble magnesium compound in the fibres.

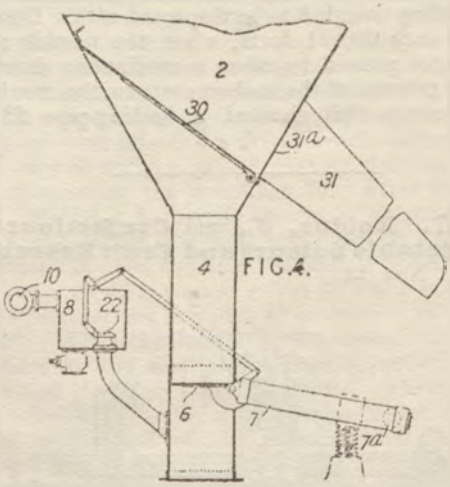
25,289. Podmore, T. April 21, [*date applied for under Patents Act, A.D. 1901*].

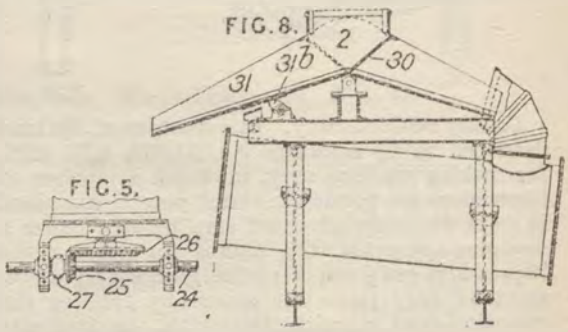
Stone, artificial.—Artificial-stone building-blocks are faced to resemble granite &c. by the application of cement 6, Fig. 4, to the surface of blocks 5, formed of cement and sand or other material, stone fragments 7 being sprinkled over the cement and the whole tamped into position; when it is set, the surface is ground with a stiff brush or stone.

25,309. Tar Macadam (Purnell Hooley's Patent) Syndicate, and **Hooley, E. P.** Nov. 21.



Asphalts; slags, treatment of.—In a modification of the apparatus described in Specification No. 7796, A.D. 1902, for the preparation of tarred macadam, the slag, macadam, &c. and the tar are automatically admitted to the mixing-apparatus in measured quantities. The slag is graded in a revolving screen and discharged into a hopper 2, Fig. 3, but is prevented from entering the mixing-machine, until a certain quantity has collected in





the passage 4, by a door 6, to which is connected a tube 7 containing a ball weight 7^a. The tar is supplied to a vessel 8 from a main 10, and is discharged by compressed air admitted by a three-way cock 12 from a pipe 11. A float 17 fitted to the spindle of a valve 19 closes the valve when the liquid in the vessel 8 has fallen to a certain level. The three-way cock 12, which normally connects the vessel 8 to atmosphere through a pipe 20, is turned by a lever 13 connected to a crank 15 fixed to the counterbalanced door 6. When the door opens, compressed air is admitted to the vessel 8, and the tar and slag enter the machine at the same time. A modification is shown in Fig. 4, in which the tar is admitted by raising a lid 22 connected by links to the door 6, and the slag may be diverted by a flap 30 through an opening 31^a into a side shoot 31. The mixing-machines are driven from a shaft 24, Fig. 5, and the bevel pinion 25 is held in gear with the wheel 26 by a sleeve 27, which is moved to the other side of the pinion when it is desired to put the machine out of use. Fig. 8 shows a modified arrangement of the hopper 2 with the diverting-flap 30 and side shoot 31. The shoot is pivoted at the middle and is vibrated by a cam 31^b.

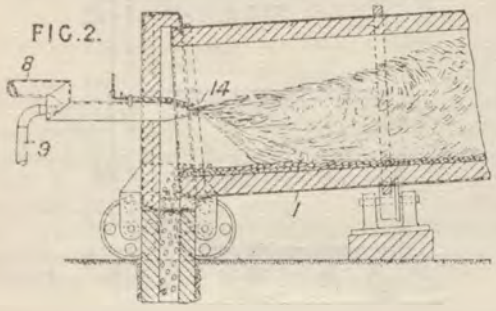
25,385. Wilkinson, J. Nov. 22.

Asphalts.—A mixture of bitumen and powdered and granulated granite is used for paving roads or footways, and for damp-courses. One part of bitumen is heated and made into a paste with two parts of powdered granite. The paste is mixed with three parts of granulated or coarser granite. The mixture, while still hot, may be moulded into blocks for transit.

25,702. Watson, J. B. Nov. 25. *Drawings to Specification.*

Fireproof coverings.—Films of fibro-cement, asbestos, or other fibrous pulp are consolidated by pressure to form a sheet, the layers being made more adherent, if necessary, by coating with glue. Additional strength may be obtained by incorporating wire sheeting with the material. A paper-making machine is used, and the films are spirally wound upon a drum until the required thickness is obtained, when the material is cut and unwound.

25,837. Eldred, B. E. Nov. 28.

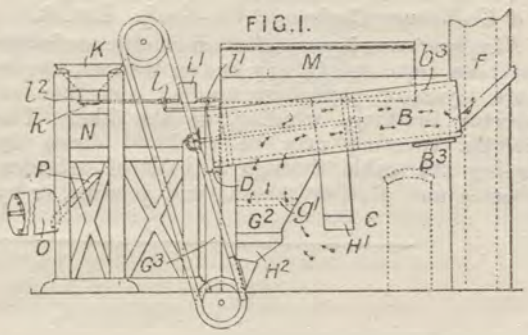


Cements.—According to a process for roasting or calcining cements in rotary and other reverberatory furnaces, the cement is first decarbonized by a cool flame, and is then fused or sintered by a comparatively hot flame. This is effected in a continuous process by enlarging and cooling the flame produced by the combustion of a jet of pulverulent fuel by the admixture with the fuel of an inert gas, such as the combustion products from the chimney, so that a flame of large volume, specially adapted to decarbonize the lime, is produced in the body of the kiln, as shown in Fig. 2, while a jet of air from the nozzle 14, crossing the flame near the outlet of the kiln, produces the localized hotter flame adapted to fuse or sinter the clinker just before it leaves the kiln.

25,884. La Roche, C. de. Nov. 28.

Concretes; stone, artificial; stone, preserving.—Concrete blocks and the like for maritime and other purposes are composed of crushed glass and slaked lime, with or without sand or other material. The blocks are moulded, and dried in the open air, or treated with steam at 100° C or under pressure. On cooling, they may be subjected to pressure. The proportions preferred are 800 parts of glass to 200 of lime, or, according to the Provisional Specification, 300 of glass to 300 of lime and 400 of sand. The Provisional Specification also states that magnesia, baryta, alumina, or the like may be employed in place of sand.

26,286. Constable, S., and **Hart, N.** Dec. 2.



Asphalts.—In a machine for simultaneously making several grades of tar paving or macadam, stones or slag are fed into an inclined rotating screen B, of which the upper end rests on bearing-rollers B^3 and the lower end is enclosed in a chamber D, having an outlet G^3 for the coarsest screenings. The cylinder B has longitudinal angle-iron ribs b^3 for lifting the stones, over which the gases from a furnace C pass to an uptake F, as indicated by the arrows. The various grades of stones are discharged into receivers H^1, H^2 by ducts, such as G^2, which are stepped, as shown at g^1 to prevent clogging, and deliver into conveyers discharging into hoppers K. Each of these has a hand-regulated bottom valve k and is surrounded by a perforated ring l^2, which supplies tar from the tank M, the quantity supplied being measured by the small tank L^1, the cocks l, l^1 of which are coupled so that one closes as the other opens. The stones and tar are fed into a measuring-box N, which, when full, is rotated about a horizontal axis by hand so as to discharge down the shoot P to the inclined, ribbed mixing-cylinder O.

26,516. Staudt, J. Dec. 6.

Concretes; stone, artificial; stone, colouring.—Relates to improvements in the well-known method of making artificial stone from sand, chalk, and other fillers and linseed-oil varnish, which allows of the use of all those fatty and oily cementing-substances which become hard when exposed in thin layers to air and heat, such as the fats and oils as well as their varnishes when

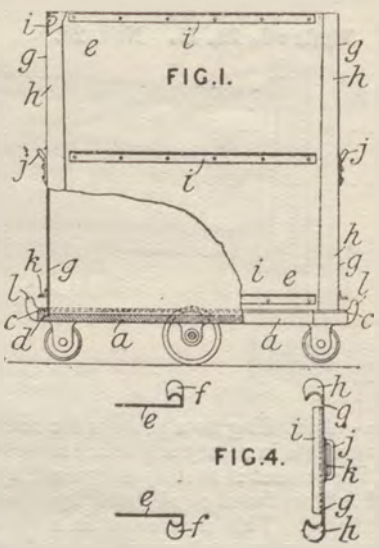
diluted, and which consist of the glycerides of fatty acids, and also compounds of fatty acids of the group of animal and vegetable waxes related to the fats, and finally the heavy resin oils. The process consists in commencing the hardening before moulding by exposing the mixture of binder and filler in thin layers to the action of air at a suitable temperature, so as to reduce the time for the final hardening after moulding. When the proper amount of stiffening has occurred, a pungent smell is noticed and the masses are no longer moist to the touch and can still be easily moulded. The temperatures for completing the hardening after moulding vary, but, generally speaking, a range of 150°-180° C. is suitable. The nature of the filler also varies; for example, for electric insulation it may consist of fine quartz sand, quartz powder, ground felspar or lime-spar, ground glass, and the like; for the manufacture of grinding and polishing stones, emery, carborundum, Vienna chalk, and the like are used. For coloured stones, the fillers used should be of a nature not to affect the colour, for example, quartz meal, felspar, lime-spar, bright clay, and the like. The mixtures of colour can also be put on the ground mass in a thin layer, in patterns or plain.

26,786. Hardingham, G. G. M., [*Felten & Guilleaume Carlswerk Akt.-Ges.*]. Dec. 8.

Fireproof coverings.—After an electric conductor has been insulated in any known manner, one or more layers of paper are applied, and then an asbestos braiding, winding, or the like. The asbestos covering may be rendered dense by passing the cable through a bath of asbestos, asbestos and glue, or asbestos and gelatine, or by coating the cable with a pulp of these preparations. Talc or other fireproof material may be substituted for asbestos. The paper employed is preferably pure manilla or parchmented paper, or paper containing animal glue, resin glue, or tannic glue. The paper may be applied in the form of pulp and then treated with the glue, or it may be impregnated with any fireproofing-substances.

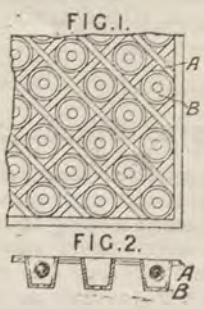
26,836. Boardman, A. E. Dec. 9.

Casting soaps &c. Cooling-frames for soap and other material are made with curled extensions of the sides and ends, so that they can be secured together without bolts and can be taken apart readily. Fig. 1 shows a side elevation, and Fig. 4 details. The base *a* is constructed with a surrounding flange *c*, a channel *d* to receive the bottoms of the sides and ends, and fulcrum pieces *l* for use when lifting the ends by means of a lever. The conical extensions *f* of the sides *e*, when the frame is built together, are enclosed by similar extensions *h* on the ends *g*. Strengthening-bars *i*, handles *j*, and lifting-pieces *k* are provided.



27,124. Fearnhead, J. Dec. 13.

Casting candles &c. A battery of frames containing wire netting A and thimbles B, in the bottom of which are perforations for the passage of wicks, is used for making candles and the like, especially such as are used as firelighters, as described in Specification No. 26,000, A.D. 1903, [*Abridgment Class* Fuel, Manufacture of].



27,308. Ward, J. Dec. 15

Asphalts.—Distilled tar for making tar concrete is rendered more binding by being mixed when hot with powdered lime, chalk, limestone, or other alkaline earth. The proportions vary from three to six parts of tar to one of chalk &c., the higher proportions of earth being used for roads carrying heavy traffic.

27,309. Ward, J. Dec. 15.

Asphalts.—Relates to a machine for making tar

paving, the object of which is to mix together uniform quantities of tar and stone. The steam-jacketed cylinder *a* has a longitudinal opening *e* beneath the shoots *j*, *k*, from which stones and

FIG.4.

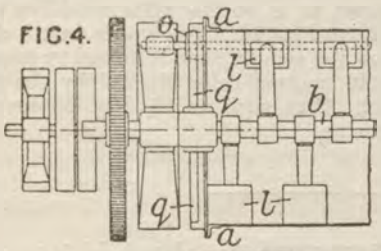
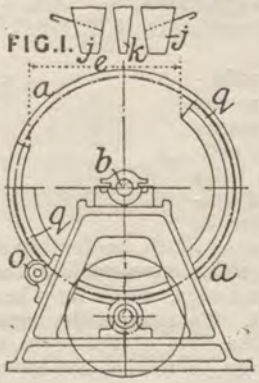


FIG.1.



tar are, respectively, fed uniformly throughout the length of the cylinder. Mixture without longitudinal motion is effected by the rotary stirrers *l*, Fig. 4, which are mounted on the through shaft *b*. Thus, the relative proportions of the ingredients remain the same at all sections along the cylinder. When the mixture is complete, the cylinder is rotated for discharging by means of pinions *o*, which gear with a circular rack *q*.

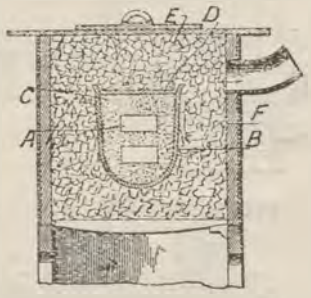
27,326. Richards, W. Dec. 15.

Cements.—A cement for affixing a rough backing of crushed glass, marble, flint, slag, sand, &c. to glass or pottery tiles, is made by mixing with one sack of suitable building-cement 4 oz. borax, 4 oz. potash, 2 oz. aluminium hydrate or sulphate, 2 lb. powdered pumicestone, and 12 lb. gypsum, and passing the mixture through a fine sieve and mixing it with a liquid composed of (1) water ½ pint, sal ammoniac ½ lb., zinc white ½ lb., and zinc oxide ½ lb., (2) Birmingham liquid, (3) Tinman's fluid, or (4) spirits of salts 1 gallon, sulphuric acid 1 gallon, granulated zinc 1 lb., and iron oxide 1 lb.

27,890. Whitcomb, J., and **Hasley, J. C.** Dec. 20.

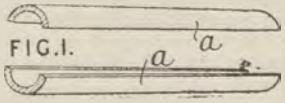
Cements.—Clay 70 parts, burnt or slaked lime 10 parts, and lime rock 20 parts, all well ground and dry, are mixed together; water, preferably hot, is stirred in, and the whole is heated to 1600° F. over a slow fire. After cooling, it is ground and bolted.

27,991. Williams, D. B., and **Stauffer, J. R.** Dec. 21.



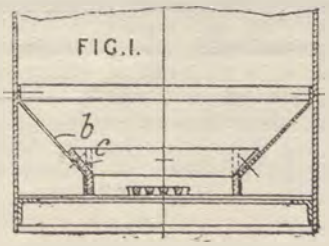
Refractory substances; stone, artificial.—Consists in a material for, and process of, making bricks, refractory linings, crucibles, artificial stone, grindstones, oil-stones, &c. Clay or any clayey material is moulded into forms A, dried, and placed, embedded in ground or amorphous coke C, or carbon, in a converter or crucible B, which is closed by a lid D and heated in the middle of incandescent fuel E in a closed furnace F. The carbon-monoxide and other coke gases in the absence of oxygen convert clay thus treated into a very refractory substance.

28,139. Kumpf, H. Dec. 22.



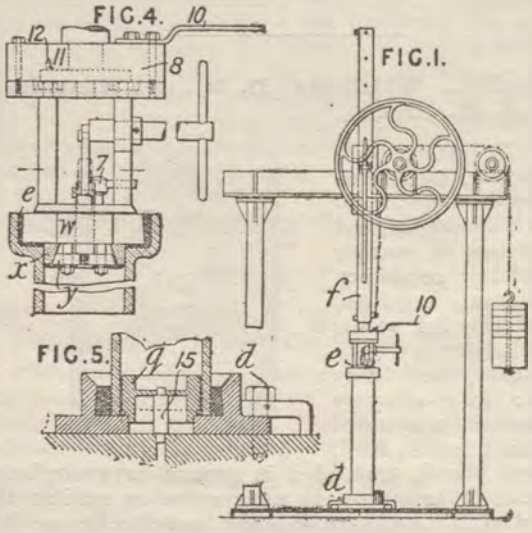
Fireproof coverings. — Comprises non-inflammable felt sleeves which, after pressing and drying, always retain their shape for the insulation of steam pipes and the like. The felt sleeves *a* are saturated in a solution of magnesium chloride or magnesite with aluminium chloride, or cement, or other adhesive substance, and are then pressed into the desired shape.

28,700. Richards, D. D. Dec. 29.



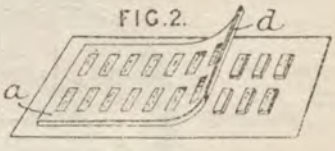
Asphalts.—The furnace casing *b* of an asphalt cauldron is protected from the flames by a belt of metal *c* fitted around the lower part of the casing. The protecting-belt, which may be in sections and perforated, is replaced when burnt away.

29,101. Smith, H. V., and **Freeman Hines, Ltd.** Dec. 30.



Casting.—Relates to means for casting and trueing the spigot and socket ends of pipes. The spigot end of the unfinished pipe is placed in a fixed mould *d*, where it can be held on a cylindrical mandrel *q*, and a movable mould *e* is then lowered into the socket end by rotation of the wheel shown in Fig. 1. An india-rubber ring is forced outwards by the cam-raised plate *y*, and cement, bitumen, or molten metal is then poured into the moulds, the pipe ends being thus made alignable. To make cam-shaped ends, the moulds are formed of the required shape internally with removable pieces, as *w*, so that after moulding the ends can be turned round. The upper part 8 of a mould *e* fits on the spindle *f* and is turned by means of a handle 10, motion being limited by the pin 11 and slot 12. Pins such as 15, Fig. 5, ensure accurate centering.

29,295. Bertrand, L. Jan. 5, [*date applied for under Patents Act, A.D. 1901*].



Casting confectionery. Cores for chocolate creams are made by casting sugar in holes in a sheet of vulcanized rubber *a*, resting on waxed cloth, preferably on a marble or glass table or slab. After cooling, the rubber sheet is lifted by one edge, which may be bound with a metal strip *d*. To remove the cores, the cloth is drawn over the edge of the table, and a shovel is held at the edge to receive the cores. The operations may be performed on an endless waxed cloth traversed over a table.

APPENDIX.

The following 35 abridgments should be added to those appearing in the volume of this Class for the period A.D. 1877–83.

A.D. 1877.

1542. Hislop, G. R. April 20. *Drawings to Specification.*

Cements.—Lime, which has been sulphurized in purifying gas, is calcined and ground, or is mixed with other lime and ground, and is used as a hydraulic mortar or cement.

3192. Gedge, W. E., [*Meckenheim, L. N. de*]. Aug. 22. *Drawings to Specification.*

Refractory substances.—The hearths of puddling-furnaces are lined with bricks made of burnt and pulverized carbonate of magnesia, to which is added boracic acid or a mixture of alum, chloride of lime, and hydrochloric acid.

3703. Brewer, E. G., [*Boule, L. A., Blin, A. P.,* and *Testu, E. L.*]. Oct. 4. [*Provisional protection only.*]

Stone, imitation.—In the production of imitation coral from celluloid, an impression is obtained by a photographic process, and a relief mould in plaster is made from it. From the relief mould, a hollow mould or cast in metal or plaster &c. is made. The hot celluloid is moulded on the metal or plaster cast by means of a press, and is removed and trimmed &c. when cold.

A.D. 1878.

2112. Jones, W., [*Bangert, F.*]. May 27. [*Provisional protection only.*]

Slags, treatment of.—Relates to the manufacture of alum, silica, and calcium sulphate from blast-furnace slag or from other slags rich in alumina. The slag is disintegrated by pouring it in the heated state into water, and is then treated in a stone or other cistern with hot hydrochloric acid in order to obtain a dry crumbly mass composed practically of aluminium and calcium chlorides and silica. The soluble salts are dissolved out of the mass, leaving the silica, which is dried and then freed from sulphur by calcination. The solution is treated to obtain calcium sulphate and alum.

4275. Gjers, J. Oct. 24.

Refractory substances.—According to the Provisional Specification, linings for Bessemer converters consist of crushed ilmenite or titanic iron ore, mixed with lime and water, and applied in the form of bricks, or by pugging and ramming.

4296. Banton, G. W. Oct. 25. [*Provisional protection only.*

Refractory substances.—For making crucibles and linings for steel converters, a mixture of plumbago and silica is employed.

4452. Thomas, S. G. Nov. 4.

Slags, treatment of.—The calcareous basic cinder produced in the basic process for treating iron ores is roasted with free access of air so as to oxidize and render insoluble the protoxides of iron and manganese, and is ground and treated with cold acids to obtain the phosphates, which may be precipitated by lime or chalk and sold for manures. The slag may be roasted in kilns similar to brick kilns, but is preferably powdered, the grinding being facilitated by throwing it while hot into water, and is calcined in a reverberatory or revolving furnace.

4558. Thomas, S. G. Nov. 9.

Slags, treatment of.—In a process for obtaining calcium phosphate, the calcareous slag produced in treating phosphatic pig iron by the basic process is thrown, while hot, into water. The disintegrated slag is then finely crushed and treated in vats or rotating cylinders with cold sulphuric acid. The clear solution is evaporated, part of the iron sulphate crystallizing out. The residue is ignited and the phosphate is taken up with weak acid, or is precipitated by chalk or by ammoniacal gas liquor. Hydrochloric or sulphurous acid may be used instead of sulphuric acid, the phosphate being precipitated by chalk or by heating the solution.

A.D. 1879.

1422. Lake, W. R., [*Jannin, L. E.*]. April 9.

Statuary.—Works of art are reproduced by filling casts of the surfaces with heated celluloid, caoutchouc, &c. under pressure.

2414. Thomas, S. G. June 18. [*Provisional protection only.*]

Slags, treatment of, for obtaining phosphates. The slags resulting from the treatment of iron containing phosphorus in furnaces lined with basic calcium or magnesium, are ground, particles of iron are separated by a magnet or otherwise, and the powder is digested in hydrochloric acid. The solution is filtered to separate gelatinous silica, and the filtrate and washings are evaporated to dryness; the resulting mass, to which lime may be added to neutralize free acid, is heated and then washed with small portions of water to remove iron and manganese chlorides. The basic phosphate thus obtained may be converted into superphosphate.

3196. Thomas, S. G. Aug. 9.

Slags, treatment of.—Relates to methods of obtaining sodium or other phosphates, manganese dioxide, and iron oxide from phosphatic iron slags. The slag is first reduced to powder, from which particles of iron may be extracted by magnets or by sorting. The slag is then treated with hydrochloric acid, and the silica is removed by filtering or otherwise. The solution is treated with an oxidizing-agent to receive any manganese, and iron phosphate is precipitated by adding chalk or dolomite. Manganese dioxide and a little oxide of iron can be obtained from the filtrate by boiling with lime or dolomite. If dolomite is used, magnesia is also precipitated, and can be used to precipitate a fresh quantity of manganese dioxide. The precipitate is mixed with coal and sodium sulphate or carbonate, and is heated in a reverberatory furnace. The molten mass may be stirred up by blowing air and steam into it through a hollow rabble. The bye-products, sulphur dioxide, chlorine, and hydrochloric acid, may be collected and utilized. On treating the residual mass with water, phosphate of soda is dissolved out, and iron oxide is left. Sodium phosphate may alternately be obtained by boiling the iron phosphate with sodium hydrate. When the slag under treatment does not contain much manganese, the phosphorus is precipitated from the hydrochloric-acid extract as phosphate of iron by adding lime.

3927. Gedge, W. E., [*Bonaz, C.*]. Sept. 30.

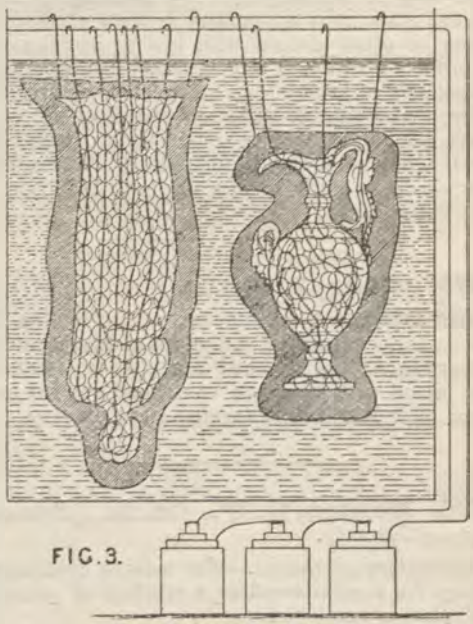


FIG. 3.

Statuary.—Relates to an electrolytic method of reproducing busts, statues, groups, and other articles in "alto relievo" or otherwise, in a single piece in gold, silver, copper, or other metal. A hollow mould of the article is prepared and rendered a conductor of electricity to be used as the cathode; the anode, which may be made of

platinum, copper, lead, or other metal, is placed within the mould. In some cases, the anode consists of a chain, each link being covered with a gutta-percha ball to prevent contact between the anode and the mould or cathode; each ball is perforated for the passage of the solution to the wire. The chain form admits of the anode being easily introduced into or removed from the mould for the inspection of the metal deposit, when the neck of the mould is narrow as shown in Fig. 3. The anode is sometimes formed of a continuous wire covered with gutta-percha balls or perforated india-rubber tubing; a plate anode is sometimes used. The chain anode may be used on open horizontal moulds having great sinuosities.

4363. Hope, W., and **Ripley, R. S.** Oct. 27. *Drawings to Specification.*

Refractory substances.—A metallurgical or converter furnace is lined with bricks made of plumbago mixed with fireclay, steatite, or cryolite,

A.D. 1880.

388. Thomas, S. G. Jan. 28. [*Provisional protection only.*]

[*Addition to Abridgment on page* 23.]

Refractory substances.—A mixture of plumbago or coke dust with fireclay is used for making bricks for lining the upper parts of converter furnaces, and basic or highly manganiferous blast-furnace slags with less than 30 per cent. of silica may be used, particularly if mixed in a liquid state with lime, for the basic "addition" to the converter.

1112. Reynolds, J. E. March 15.

Stone, preserving; stonework, ornamental.—Relates to a process for coating natural and artificial stone, plaster, marble, slate, and other surfaces with brilliant and protective layers of galena. Metallic lead, or a lead salt, oxide, or hydrate is dissolved alone or with other metals or metallic salts &c. in an alkaline solution to which is added thio-carbamide or sulpho-urea or other body capable of affording sulphur by gradual decomposition in the liquid. The article to be coated is then immersed in the solution, and the coating polished if desired. Porous surfaces are first filled up with soluble rubber, gutta-percha, or silicious or other enamels

A.D. 1881.

293. Scheibler, C. Jan. 22.

Refractory substances.—Magnesia, either pure or in the crude state as obtained by treating burnt ores of magnesia and lime with saccharine solutions, is mixed with suitable binding-substances to form fireproof basic bricks and furnace linings which are unaffected by water.

701. Clark, A. M., [*Closson, J. B. M. P.*]. Feb. 17. [*Provisional protection only.*]

Cements; refractory substances. — Magnesia, obtained from calcined dolomite by special methods, is employed for making cement or for making refractory materials as described in Specification No. 5365, A.D. 1880. When making refractory materials in the metallurgy of steel, a little magnesium phosphate or other phosphate is added to the plastic mass.

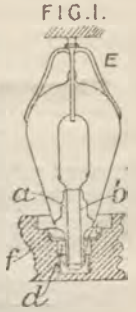
4007. White, G. Sept. 17.

Asphalts, cauldrons for. A wheel-barrow, for carrying and pouring out asphalt &c., is made with a horn-shaped body, the narrow part forming the spout and being placed near the side of the wheel. The body is preferably covered over near the wheel and may be made to pour on both sides of the wheel, or there may be a branch at the side opposite to the spout to receive a portion of the material in the spout when the spout is closed. The spout expands towards its mouth and is provided with movable pieces to regulate the discharge. The section of the rim of the wheel resembles a frustum of an ellipsoid. The side of the rim towards the spout may be serrated so that, when the barrow is tipped over sideways and moved along, it is jerked to loosen the contents. The wheel may be made in several concentric rings of different diameters, and castors may be fixed on the barrow legs, especially when the barrow is to be drawn by animal power. The frame of the barrow may be adapted to carry pots, ladles, &c. containing asphalt, &c, which may be heated on the barrow. Either one or both legs may be curved, so as to take the weight when the centre of gravity of the barrow &c. gets beyond the wheel, and the barrow may be lined with some glassy material.

4174. Brewer, E. G., [*Edison, T. A.*]. Sept. 27.

Casting.—The collars of incandescent electric lamps are attached to the neck of the bulb by moulding with plaster of Paris or other cement. Fig. 1 shows the mould with the rings *d*, *f* of the collar in position. The lamp is held in the upright position by an adjustable spring holder E, and the wires *a*, *b* leading from the carbon filament are bent up on opposite sides and secured by twisting to the short wires on the rings *d*, *f*. The mould is filled with cement, which is allowed to harden before the lamp is removed.

FIG. 1.



A.D. 1882.

902. Haddan, H. J., [*Trivier, T.*]. Feb. 24.

Fireproof coverings.—A yarn or thread is made by surrounding a core of metal wire, linen, hemp, silk, wool cotton, or any similar twisted or untwisted material with asbestos or other similar substance. Or several metallic or textile threads may be twisted together with asbestos threads.

The yarn may be used for weaving, knitting, plaiting, and in the manufacture of ropes and steam packing. Fabrics woven from these threads are suitable for theatre curtains, incombustible wearing-apparel, fire-escapes, or ammunition bags and covers for power chests, &c. The threads may also be used for a similar fabric, by embroidering a metallic or textile woven tissue on one or both sides. Another fabric is made by using a warp of asbestos thread, and a weft made from strips of metal, whalebone, cane, wood, or similar materials, which may be solid or hollow. Flax, hemp, cotton, wool, or other textile threads may be used instead of the asbestos threads. Other fabrics may be made by using asbestos threads, with or without a core, combined with asbestos, textile materials, or metal wires.

1763. Bull, H. C. April 13. *Drawings to Specification.*

Refractory substances.—The crucible part of a blast furnace is formed by ramming a concrete compound between a casing, which forms the outer shell, and an interior metal mould of the shape of the crucible. The compound consists of freshly-burnt lime or other similar substance with silica sand, mixed with tar, oil, or other substance which will evaporate and escape through openings in the outer casing without the lining shrinking or cracking. This lining is so intensely heated as to melt out the inner metal mould, and is thus baked into a very solid substance before the furnace is put into blast.

2277. Haddan, H. J., [*Godard, E.*]. May 15.

Stone, colouring.—Relates to a photographic process for the reproduction of drawings &c. by means of vitrifiable colours on glass for stained glass windows. The process is applicable to the treatment of marble, stone, &c. The drawings are executed on white or blueish paper, which is afterwards rendered transparent with petroleum, and the pieces of glass are cut as usual and placed on the reverse side of the paper. One face of the glass is brushed over with a sensitizing-soluble containing ammonium bichromate and dextrin or glucose, and the coating is then dried by placing the pieces in the heating-chamber at a regulated temperature. The exposure of the sensitive surface under the drawing may be performed in a suitable photographic printing-frame or between two sheets of plate glass. The exposure is continued until the prepared vitrifiable colour when strewed over the sensitive surface by means of a brush adheres only to the shady portions of the picture; this operation developes the picture on the glass. The prepared glass is then dipped into a bath of nitric acid and wood-spirit so that the glucose and bichromate are removed. When dry, the picture may be re-touched by hand, and the application of coloured enamels and the heating are then proceeded with as usual.

3250. Burch, J., and **Allen, R.** July 8. *Drawings to Specification.*

Refractory substances. — The lining of a metallurgical furnace is composed of bauxite rendered coherent by a small addition of silicate of soda, or clay, and about 6 per cent. of graphite.

4281. Heimann, S. Sept. 8.

Stone, artificial.—Peat is mixed with the refuse of aniline works in a boiler fitted with stirring-apparatus and heated to a sufficiently high temperature to fuse the refuse. When the mixing is complete, the mass is moulded under pressure to form paving-blocks. For paving streets, the boiling and mixing is done in transportable boilers, the liquid mass being poured on to the road and smoothed by hot rollers or smoothing-irons.

4671. Evans, C. P. Oct. 2. [*Provisional protection only.*]

Statuary.—An object or person is photographed direct on to a glass, china, earthenware, papier-mâché, or other similar bust or image which has been prepared with a white surface, the bust replacing the negative plate in the camera.

5545. Mactear, J. Nov. 22.

Cements.—Carbonate of lime obtained in the treatment of alkali waste is found mixed with unconsumed coal and other matters, and is used in the manufacture of cement resembling Portland cement.

A.D. 1883.

625. Wise, W. L., [*Bauer, E.*]. Feb. 5.

[*Addition to Abridgment on page* 58.]

Casting.—To form articles, such as cups, goblets, bags, &c., by casting, the compound, in the warm and liquid state, is poured into a mould; or the mould may be dipped into the mass and removed with a layer of compound adhering.

1628. Waterhouse, J. C. March 31.

Refractory substances. — Crucibles and other vessels for chemical and metallurgical purposes are made of a mixture of a luminous fireclay, plumbago free from lime, asbestos and small proportions of magnesia and quartz moistened with a solution of sodium silicate. A mixture of sodium silicate, asbestos powder, magnesia, and silex, may be applied as a coating to the vessels made.

1983. Allison, H. J., [*Shelbourne, S. F.*]. April 19.

Casting. — In the process of insulating the wire skeleton of an underground electric cable, mould boxes consisting of sections A, B, C, Figs. 6 and 7, which fit together and are formed with filling-slots *e* in the covers *g*, are placed round the skeleton, and the ends are stopped with cotton-wool &c. to retain the liquid insulating-material. Small hooks with external washers and nuts are placed through the slots *e* at intervals to grip a wire of the skeleton and to hold the skeleton in the centre of the moulds. The insulating-composition used consists of a mixture of paraffin, resin, or asphalt with the distillate obtained from petroleum tar. The moulds may be rubbed with glycerine or lined with paper to prevent the liquid composition from adhering to them.

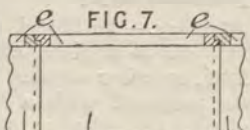
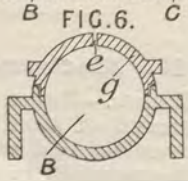


FIG.6.



3839. Thompson, W. P., [*Martin, J. F.*]. Aug. 7.

Asphalts.—A composition for making pipes, tubes, fence-posts, mouldings, tiles for houses, paving-blocks, &c., consists of asphalt and marble dust, to which other materials such as shellac may be added. The marble dust is added to the molten asphalt, and the mass is then run into moulds.

5000. Abel, C. D., [*Brandt, J.*]. Oct. 20.
[*Provisional protection only.*]

Slags, treatment of.—Phosphatic slags, such as those from the Thomas process, are treated with liquid or gaseous hydrochloric acid. The solution obtained is evaporated to dryness, and the dry powder is heated in air or steam. The powder is then lixiviated, leaving a residue containing iron and manganese. The solution, after further treatment to remove iron and manganese, is evaporated to obtain the phosphates, or the phosphates are precipitated by adding lime or magnesia.

5500. Abel, C. D., [*Brandt, T.*]. Nov. 23.
[*Provisional protection only.*]

Slags, treatment of.—Slags from furnaces in which dephosphorizing processes are used, and other products or minerals containing iron, aluminium, or manganese phosphates, are heated to redness in the presence of air with dry calcium chloride, to obtain chlorine and a residue containing iron or manganese oxides with calcium phosphate. If air is excluded during the process, ferric chloride is volatilized, and, if the process is conducted with access of superheated steam, hydrochloric acid is obtained. The furnaced product is lixiviated with dilute hydrochloric acid, and the phosphates in the liquid are precipitated by magnesia or magnesium carbonate. The resulting magnesium-chloride solution is acidulated with hydrochloric acid and used for dissolving out the phosphates from other portions of the furnaced product, and the process is repeated until a strong magnesium-chloride solution is obtained, which is then dried, and heated to redness in the presence of steam to obtain hydrochloric acid, which is collected, and magnesia for re-use. Barium or strontium chloride, or mixtures of sodium or potassium chloride with calcium, barium, strontium, and magnesium sulphate may be used instead of calcium chloride in the process.

5568. Pochin, H. D. Nov. 29. *Drawings to Specification.*

Refractory substances.—Chrome iron ore is used as a lining for Bessemer converters, the interstices being filled with fire-clay or a mixture of magnesium, limestone, and tar.

5849. Justice, P. M., [*Thomas, S. G.*]. Dec. 22. [*Provisional protection only.*]

Slags, treatment of.—An alkaline slag, containing sodium or potassium phosphate, obtained by treating phosphoric pig-iron is lixiviated, and the solution treated with lime to throw down calcium phosphate and leave a solution of sodium or potassium hydrate.

5936. Punshon, R., and **Nicolson, W.** Dec. 29. [*Provisional protection only.*]

Fireproof compositions.—A composition formed of sodium silicate and finely-pulverized micaceous rock is used for fireproofing batteries, cables, &c.

The following abridgment should be added to those appearing in the volume of this Class for the period A.D. 1897–1900.

A.D. 1897.

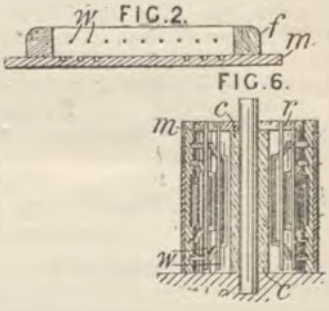
11,168. Garnier, E., and **Prescott, S. J.** May 5.

Fireproof coverings and compositions.—Finely-powdered pumicestone is mixed with india-rubber, gutta-percha, or similar gums or mixtures thereof, in any desired proportions, for various purposes, such as coating fabrics and making sheets, moulded articles, and substitutes for wall-paper, floorcloth, leather, and American cloth. Colouring-matter and sulphur may be added, and the mixture rolled with pattern rolls, and afterwards vulcanized at about 272° F. One part of rubber or gutta-percha may be mixed with as much as six or eight parts of pumice, and such a compound, highly vulcanized, may be used for lithographic stones.

The following abridgments should be inserted on pages 3 and 36 respectively of the present volume.

A.D. 1901.

2224. Thompson, T. C., and **Webb, W. E. J.** Feb. 1.



Casting glue-glycerine printing-surfaces of the kind described in Specification No. 8904, A.D. 1900. (1) The surfaces of the moulds or matrices are wetted with water or other liquids before casting, in order to prevent the formation of air-bells &c. (2) The frame *f*, Fig. 2, for a plane printing-surface, which is placed over the mould *m*, carries transverse wires *w* to be embedded in the casting, or interwoven transverse and longitudinal wires may be used, or coarse wire fabric. The core *c*, Fig. 6, for a cylindrical surface, receives at one end or both ends a ring *r* with wires *w*.

A.D. 1902.

7660. Lake, H. H., [*Electric Furnace Co.*]. April 1. *Drawings to Specification.*

Refractory substances.—An electric resistance furnace for use in making steel is provided with heating-plates made of a mixture of about 75 parts of fireclay and 25 of plumbago; the plates may be protected by refractory material, such as magnesite or dolomite.

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