PATENTS FOR INVENTIONS.

ABRIDGMENTS OF SPECIFICATIONS.

CLASS 22,

CEMENTS AND LIKE COMPOSITIONS.

PERIOD—A.D. 1897–1900.

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*, published at the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C., price 1*s*., postage 6*d*.

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.

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NAME INDEX.

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

ERRATA.

Page 11. *In abridgment No.* **24,978** *for* **Brancroft, G.** *read* **Bancroft, G.**

Page 11. *In abridgment No.* **30,025** delete *; granulating or pulverizing fusible materials by scattering or spraying.*

Page 27. *In abridgment No.* **23,159,** *for* 25,380 *read* 25,880.

In the volume of this Class for the period A.D. 1893–96 :

Page vi. *Under* **Stone, Preserving** *delete '94.* 22,020.

Page ix. *Delete* Tolhurst, A. *'94.* 22,020.

Page 23. *Abridgment No.* **22,020** *should be deleted.*

In the volume of this Class for the period A.D. 1884–88 :—

Page iv. *Under* **Concretes** *delete '86.* 11,078.

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. 1897.

1023. Tiemann, F. Jan. 14.

Cements; stone, artificial.—In the manufacture of cement, the raw material in the state of doughy slip is introduced into an extrusion brick-making or similar machine with a circular orifice, and the issuing material is cut into lengths which are inserted in containers, preferably globular or egg shaped, and made in two parts. The charged containers are placed in an ordinary drying furnace or kiln, or otherwise heated to dry the material, which becomes consolidated and is burnt after being removed from the containers. In the manufacture of artificial stone, the containers are shaped inside to the form required.

1795. Soc. Métallurgique de Champigneulles et Neuves - Maisons. July 11, A.D. 1896, [*date claimed under Sec. 103 of Patents &c. Act, A.D. 1883*].

Slags, treatment of; cements.—Slag from the blast furnace is cooled as rapidly as possible, and the moist slag sand thus obtained is immediately mixed with slaked lime and the mixture passed through a mortar-making apparatus. The mortar so prepared is run into plates on a paved floor, and left until it is hard enough to be crushed into pieces of fair size. The pieces are baked at a red heat in a furnace or oven, and the calcined materials finely crushed or ground in a ball or other mill. The cement so prepared is of a quick-setting character, and may be reground with additional slag and lime to increase the time of setting.

1881. Soc. Métallurgique de Champigneulles et Neuves - Maisons. July 29, A.D. 1896, [*date claimed under Sec. 103 of Patents &c. Act, A.D. 1883*].

Slags, treatment of; cements.—The invention consists in the extension of the process of manufacture of cements described in Specification No. 1795, A.D. 1897, to iron refinery slags of a given constitution, and in general to slags containing more than 1·5 per cent. of oxide of iron.

3571. Vÿgh, A. H. van der, Vÿgh, H. van der, and **Vÿgh, G. van der.** Feb. 10. *Drawings to Specification.*

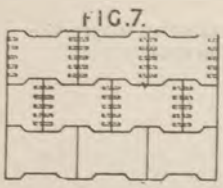
Fireproof coverings and compositions; cements.—Fireproof plates for ceilings are composed of coke dust 15 parts, lime 10 parts, tar 24 parts, plaster 28 parts, and water 23 parts. They are fastened to the joists by nails or screws, and where they break joint are secured together by H clips. A cement for filling in the interstices between wall blocks is formed of lime 15 parts, sand 15 parts, plaster 40 parts, and water 30 parts.

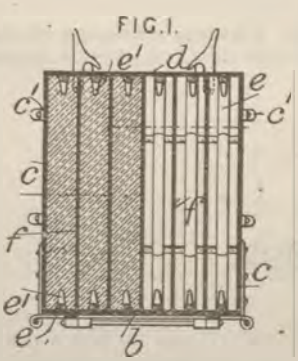
4048. Robinson, W. S., and **Brookfield, S. M.** Feb. 15.

Cements; concretes.—Gravel, sand, earthy matter, or broken stone is bound together into a cement or concrete by the oxidation and hydration of iron, added in the form either of filings or shavings or as crushed hematite or sulphate of iron. When spread, the cement &c. is wet with a solution of

common salt or sal-ammoniac. For road making, the materials are mixed and placed in position, watered with a solution of brine, and allowed to rest till set. For immediate setting, ammonium nitrate may be added and the mass wetted with a solution of silicate of soda. For a cement to set when submerged in water, alum, Epsom salts, and silicate of soda are added.

6467. Lake, H. H., [*Cohn, F.*, and *Brunckhorst, H. G. B.*]. March 11.





Casting. — The sides *c* of a mould for building-blocks are hinged to the bottom *b*, and are connected together in an upright position by catches c^1. Partition plates *f* are slid down grooves in opposite sides, and the spaces between the plates are filled in with gypsum or other substance from which the slabs are made. A lid *d*, hinged to one of the sides, is brought down over the filled mould box and held in place by catches until the material has hardened or set. The top and bottom edges of the slabs are intended to interlock with one another as shown in Fig. 7. Grooves and recesses are formed in the edges of the slabs by ribs *e* and pins e^1, and are filled in with cement during the construction of the wall.

6525. Christie, G. March 12.

Stone, artificial. — In manufacturing artificial stone from Portland or other cement mixed with sand, gravel, &c., the materials are mixed with as little water as possible, insufficient to cause them to set prior to placing in the mould. Water is then applied to the exposed surface of the pressed block, and when this has percolated into the mass the block is immediately removed from the mould. Water is sprayed in very fine particles upon the block to assist in the initial setting, after which it may be treated with water in the usual manner from time to time.

6545. Mersch, P. Feb. 19, [*date claimed under Sec. 103 of Patents &c. Act, A.D. 1883*].

Refractory substances. — A paste containing carbonate of magnesia, asbestos, or the like, and silicate of potash or soda, is used to form bodies to be rendered incandescent in electric arc lamps.

7798. Parker, T., [*Parker, G. W.*]. March 25.

Stone, preserving; stone, artificial.—Relates to a method of hardening articles sawn, carved, &c. of gypsum rock so as to serve as a substitute for marble, chalcedony, onyx, agate, &c. The articles are placed on a truck and run into a chamber where the gypsum is dehydrated by hot air at 330° F. Cooling is then allowed to take place in a closed chamber in the presence of ammonia gas, and the articles are then immersed in a saturated solution of aluminium sulphate at 100° F. After drying, the articles may be polished. To produce colour effects, mineral colours are applied to the surface of the dehydrated material, such, for example, as ammonium nitrate, sulphate of iron, nitric acid, and potassium sulphocyanide, &c.

8626. Moss, F., and **Davis, S. J.** April 5.

Stone, colouring. — Stone or composition is stained or coloured by dipping it in a solution of the salts of one or more metals. The solution described is made by mixing hydrochloric and nitric acids with perchloride of iron and some sulphate of copper, and water. Metallic iron is added, and the solution filtered. Colouring-matters may be also added.

8775. Jenkins, N. S. April 6. *Drawings to Specification.*

Casting. — Easily-fusible substances, such as porcelain enamel used for filling cavities in teeth or for melting upon artificial teeth and platinum or gold plate, are melted in a mould formed of asbestos paste placed in a ladle. The ladle is inserted in a muffle mounted on an adjustable support and heated by a blowpipe burner. For producing stopping-plugs for teeth, an impression is made in the paste by means of a counter-impression formed of gold or platinum foil, and the impression is filled with powdered porcelain enamel or the like, which, becoming melted, takes the exact form corresponding to the tooth cavity. The same process is employed in melting enamel on artificial teeth, or platinum or gold plate or other metals.

8905. Deborde, J. April 7.

Casting, compositions for. A spongy filling for cushions consists of glue, gelatine, or similar matter, optionally containing an equal weight of glycerine to keep it soft, and a small quantity of formaldehyde to preserve it. The substance is liquefied by heating, converted into froth by beating or otherwise, and cast in blocks, which are afterwards covered. Small rubber balls or tubes or other light bodies may be embedded in the heated material.

9030. Hutchinson, T. C. April 9.

Slags, treatment of.—Blast-furnace slag is run into a duct or trough, and a regulated supply of water discharged upon it so as to effect disintegration without leaving an excess of water in the granulated material. A wheel carrying rakes may remove the disintegrated slag. Reference is made to Specification No. 13,534, A.D. 1887.

9072. Wilson, D. April 9.

Cements; concretes. — Portland cement and crushed or powdered slate are mixed to form cement or concrete for general purposes, or for casting into slabs &c.

9073. Wilson, D. April 9.

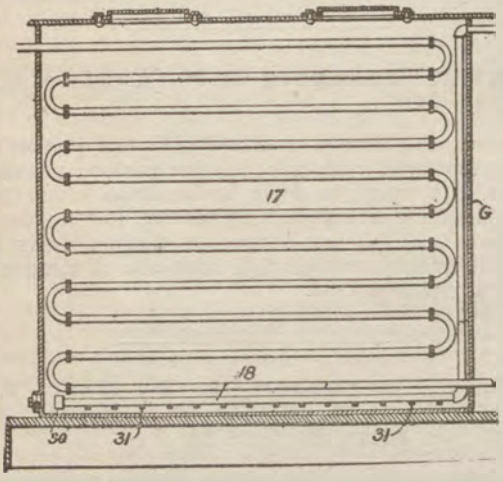
Stone, artificial; cements; concretes.—Artificial stone, cement, or concrete consists of Portland cement and crushed or powdered slate, moistened with water or a solution of silicate of potash or soda.

9315. Richardson, C. April 12.

Asphalts.—Sand or fine mineral matter is sifted by a series of brass cloth sieves into grades of particles of diameters ranging from below ·085 to 2 millimetres, and the graded material is mixed in definite proportions with bituminous cement or bitumen to form a paving-material.

9316. Kasson, L. S. April 12.

FIG. 5.



Asphalts.—Fig. 5 shows a vertical section of an asphalt cauldron forming a part of a portable plant for the preparation of paving-compositions. The asphalt is heated by a steam coil 17, and air is blown through it from a pipe 18 having downwardly-directed nozzles 31.

9405. Haehre, A. G. April 13.

Fireproof compositions.—These consist of mixtures of wood pulp, hydraulic or Portland cement, and a solution of water-glass. In place of wood pulp, cellulose, peat fibre, or like vegetable fibres may be used, and pulverized chalk, lime, marble, dolomite, felspar, quartz, or similar minerals, or a mixture of them, may be substituted for the cement. Such compositions are fireproof and are non-conductors of heat and electricity. They may be employed for building purposes generally, for floor coverings, mouldings, tiles, doors, door linings, and building-slabs, in the manufacture of statuary, or for bullets, or cartridge cases for blasting and other purposes.

10,145. Schirm, C. C., and **Lessing, O.** April 23.

Statuary; casting pottery materials. A mixture of 1 part of plaster of Paris, 5 parts of porcelain powder, and 1 part of a flux is cast in a plaster-of-Paris mould, and the casting with the mould about it is fired for five or six hours in a furnace. The mould falls to pieces when dipped in water, and a porcelain-like model is produced with the fine lines of the original clay model.

10,317. Dyson, W. F. April 26.

Stone, artificial; cements; plasters.—Clean sharp sand is saturated with a strong solution of ferrous sulphate, dried, and heated to a red heat in order to give it the characteristic colour of red sandstone. A small quantity of ferric oxide may be added to modify the tint. Sand so treated may be mixed with Portland or other cement, lime, &c., to form artificial stone, concrete, cement, or plaster precisely as ordinary sand is now employed.

11,368. Issel, A. May 7.

Fireproof compositions. — Relates to a method of fireproofing wood, pasteboard, textile fabrics, and the like. The materials to be treated are first desiccated, and then immersed in a boiling solution of which the following is an example :— Boracic acid 30 parts, oxalic acid 20 parts, potassium carbonate 50 parts, and water 1000 parts. This solution is for resinous woods, and the immersion should last from 10 to 20 hours. After removal from the bath the materials are put into a drying-room.

12,024. Rombach, J. C., and **Restieaux, E. S.** May 15.

Cements.—A cement for effecting a joint between bricks, tiles, &c. used in the construction of acid tanks, pickling-tanks, &c., or for coating the interior of such tanks, is prepared by mixing equal parts of sodium silicate and flour of asbestos with boiling water to the consistency of mortar. Silica, alumina, and sulphate of lime may be added, and alum water may be used. A surface coated with the cement is washed, after a few hours, with weak hydrochloric acid.

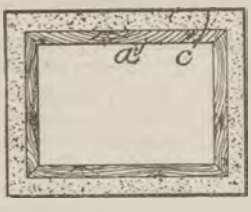
13,000. Crowther, A. W. May 27.

Refractory substances.—A composition for lining, jointing, and repairing gas retorts, furnaces, &c. is prepared by mixing fireclay, gannister, silica, or other refractory earths with soda and grinding to a paste. Barilla may be added, or may be substituted for the soda.

13,024. Antcliff, H. R. May 27.

Fireproof compositions.—A fireproof composition for the chambers of safes consists of Portland cement, steel or iron filings or scrap, and sal-ammoniac. The composition is dried in a muffle when placed in position.

13,065. Jablónski, S. May 27.



Fireproof coverings and compositions.—A composition of water-glass and spirit varnish, with a mixture of pulverized graphite, barium sulphate, clay, peat, ashes, bone-black, chalk, gypsum, infusorial or argillaceous earth, &c. is applied in layers to the surface to be protected. It is applicable to safes, strong-boxes, vaults, walls, &c. For protecting safes, jewel cases, and the like, an inner casing *a* of wood, cardboard, &c. is coated with several layers of the material and surrounded with an iron shell *c*. Surfaces to be coated with the material may be first coated with a mixture of water-glass and potassium carbonate.

14,299. Elbers, A. D. Nov. 25, A.D. 1896, [*date claimed under Sec. 103 of Patents &c. Act, A.D. 1883*].

Slags, treatment of; cements; mortars.—The object is to adapt powdered blast-furnace slag for use in admixture with Portland or other hydraulic cement for mortar &c. The constitution of slags to which the process is applicable is specified by certain limiting-proportions of the ingredients. Crude slag or granulated slag, ground either wet or dry, may be employed. It is preferred to use slag which has been vitrified by casting in a series of superposed layers, which gradually detach themselves and break up into small pieces. The finely-ground slag is mixed with a weak solution of nitric acid, washed with water, and dried, when it is ready for use.

14,325. Bohne, C. C. E. June 12.

Refractory substances; slags, treatment of.—The residue from the treatment of tin slag with sulphuric acid, consisting mainly of silicic acid with a small percentage of tin, is used in making the hearths &c. of the tin smelting-furnaces.

14,970. Danielli, J. M. June 21.

Stone, artificial; stone, preserving. — Oriental or other alabaster, or like calcareous stone, is saturated with alum, calcined, reduced to powder, and converted into a paste with the addition of suitable colouring-matter. The articles are moulded from the paste, allowed to set, and polished in the usual way. They are then dried in an oven and immersed while hot in a warm solution of borate and chloride of sodium and potash alum. After again drying in the oven the articles are exposed to the air for some days, and are then immersed in a hot bath of pine rosin, dammar gum, carnauba wax, and paraffin. The surface is finally cleaned with bisulphide of carbon, benzine, turpentine, sulphuric ether, or other solvent. The hardening and preservative process is applicable to natural stone or marble, and calcareous plaster or chalk may be used in place of alabaster in preparing the artificial product.

15,170. Thompson, W. P., [*Rosenbaum, M.*]. June 24.

Cements.—Cement is mixed with one quarter of its quantity of naphthalene in fine or coarse powder, and with water, to form bodies from which the naphthalene is expelled by heating, leaving them porous. Other proportions or materials may be used similarly, sulphur and carbonate of ammonia being mentioned.

15,238. Bachmann, J. F., Vogt, A., Kirchner, J., König, A., Weiner, C. C., and **Jörg, A.** June 25.

Stone, artificial, for use as electric resistances. Mixtures of powdered conducting and non-conducting or badly-conducting materials are rendered plastic or liquid and moulded or cast to any desired

forms, and dried or baked. The conducting-material may be formed in the baking, by using decomposable ingredients such as tar, sugar, or metallic compounds, or may be powdered metal or carbon. The other materials may be alumina, gypsum, cement, clay, &c., and binding-materials such as water-glass, zinc chloride, sugar, gum, &c. The resistances may be hardened with alum solution, and may be glazed or otherwise protected.

15,330. Mills, B. J. B., [*Granitine Soc. Anon.*]. June 26.

Cements.—Chloride of magnesium is added to a solution of sodium silicate and water until the density rises from 1° or 2° Bé. to 31° or 32°, and aluminium sulphate is added until the density is raised another degree. About 45 per cent. of calcined magnesite is mixed with 55 per cent. of the solution to form a cement for facing mouldings, slabs, bricks, tiles, statuettes, &c. The cement is mixed with kaolin, sand, fine gravel, crushed granite, porphyry, or the like.

16,147. Rosenblum, S. G., and **Rideal, S.** July 7.

Fireproof compositions.—Relates to the preparation of the metallic salts of the fatty acids contained in the oil known as 'Tung' oil, and expressed from the seeds of a tree known as *Elæococca vernicia* or *Elæococca cordata* or *Aleurites cordata*, and the application of the said salts in the manufacture of fireproof compositions &c. The oil may first be saponified with an alkali and the alkaline salt so obtained acted upon by a soluble neutral salt of another base such as manganese to form the manganese salt of the fatty acid. Or the oil may first be decomposed with superheated steam, and the free acid separated in any convenient way and dissolved in ether or other solvent, and then mixed with the dried hydrate of the metal to form the salt required. If desired, colouring-matter may be added to the alkaline solution before precipitating the metallic salt. The aluminium salt, when dissolved in a volatile solvent, may be used as a fireproof composition.

16,490. Stocker, J., and **Zandor, H.** July 12.

Cements; fireproof compositions.—Relates to a fireproof composition which may be employed as a paint, as a filling or pointing material for walls, for insulating purposes, and as a substitute for hard rubber or gutta-percha, and which can be worked in a lathe or used for other purposes. The composition is prepared from the following ingredients :—Caustic alkali, soluble glass, powdered fireclay, burnt magnesite, clay powder, asbestos, and a pigment. For certain purposes earth-nut oil, hydrochloric acid, and isinglass may be added.

16,664. Lake, H. H., [*Seidler, J.*, and *Graf, A. J. C.*]. July 13.

Cements; sound-deadening compositions.—Burnt dolomite is slaked in a diluted solution of hydrochloric acid and mixed with cork, peat moss, or other light insulating porous organic or fibrous material. Trass, pumice, kieselguhr, or the like may be added to increase the porosity and hardness of the material.

17,419. Ashton, N. T., and **Crompton, J.** July 23.

Cements.—Hydraulic cement is prepared by grinding granite, serpentine, china clay, and calciferous sand with or without caustic lime, mixing in the form of slurry, and burning to clinker at a white heat. The clinker is crushed, ground, and sifted to form the cement. The serpentine may in some cases be omitted.

17,538. Sundell, F. R. A. July 26.

Stone, artificial and imitation.—The surface of marble or other grained material is imitated by pouring or laying upon a sheet of glass &c. from an open scoop a semi-fluid mass of plaster of Paris or cement, in which small quantities of coloured material have been scattered and gently stirred. Two or more graining-colours may be employed, and the effect produced may be varied by suitably stirring them in the scoop and by varying the manner in which the contents are poured out. The sheets produced in this way are dried and suitably backed.

18,246. Stevenson, E. C., [Administrator of *Cummer, F. D.*]. Aug. 5.

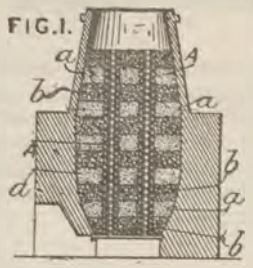
Cements.—In the manufacture of cement from liquid slurry, the process is shortened by the addition of a comparatively small proportion of dried slurry to the liquid mass, which is thus made sufficiently stiff to be heaped upon plates of sheet metal with slightly-upturned edges, and run on trucks through drying-tunnels traversed by currents of hot air or furnace gases. The dried slurry, of which a portion is retained for admixture with the next charge, is discharged to the calcining-furnace.

18,779. Holden, T., and **Major, C.** Aug. 13.

Cements.—The drying of the slurry or mixture of cement-making materials, such as clay, chalk, and limestone, is dispensed with by burning

the ground mixture while still moist in a kiln having vertical perforated passages A for the escape of moisture. The alternating layers *a*, *b* represent the slurry and fuel respectively. The clinker produced is ground into cement in the usual way.

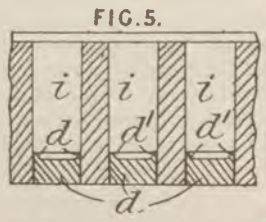
FIG.1.



19,835. Norcombe, E. S. Aug. 28

Casting.—To form menthol sticks to be used in a holder or case, the menthol is poured in a molten state into moulds *i*. Fig. 5, in which are fitted the ejecting-blocks *d* of the holder or case, the edges *d*¹ of which are splayed outwards so as to fit tightly in the moulds.

FIG.5.



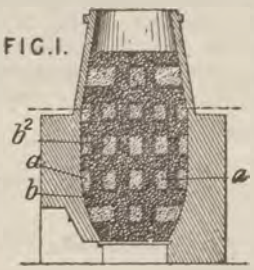
20,664. Fox, E. M. Sept. 8.

Sound-deadening compositions; fireproof coverings and compositions.—Relates to a method of making pulp and sawdust non-inflammable by chemical treatment. Pulp is introduced into a boiler containing a hot solution of sulphate and phosphate of ammonia, and provided with stirring and mixing apparatus and means for regulating the temperature. After treatment, the pulp is removed and pressed free from moisture. This pulp, when dried, can be used for making paper and the like. Sawdust treated in a similar way may be used for the production of ornamental blocks, filling walls to make them soundproof, and for other purposes.

20,670. Holden, T., and **Major, C.** Sept. 8.

Cements.—In the manufacture of cement from clay, chalk, limestone, &c., the materials are ground and mixed dry and burnt in that condition in the kiln, being arranged in alternate layers *a* and *b* of cement material and fuel respectively with columns of fuel b^2 passing through the cement layers. These columns may be formed by putting the fuel into short pipes, which, if perforated, may be allowed to remain in place. The charge after burning is converted into cement in the usual way.

FIG.1.



21,141. Jones, J. A. Sept. 15.

Plasters for walls, ceilings, and the like are made of slag, preferably annealed slag from Cleveland ore, which may be mixed with cements, lime, sand, and hair.

21,179. May, L. Sept. 15.

FIG.1.

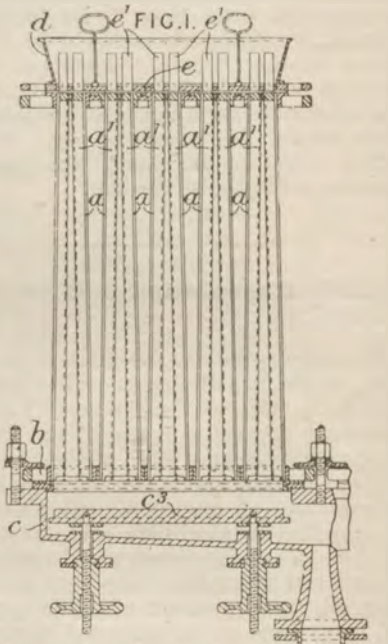
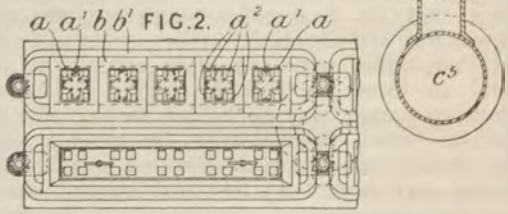
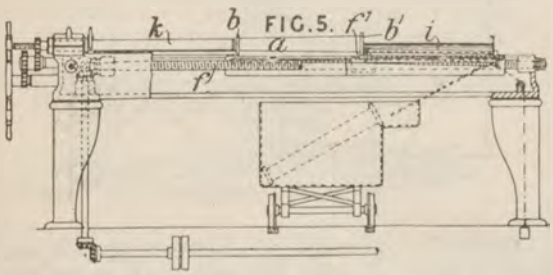


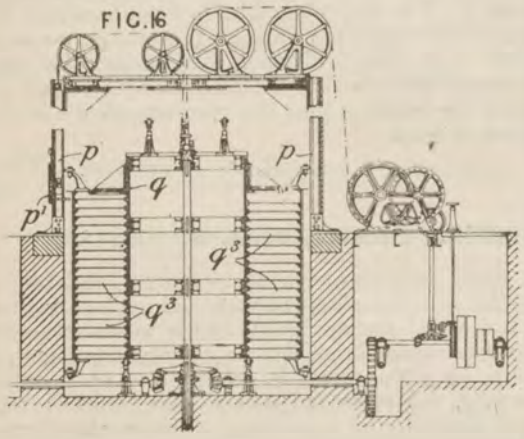
FIG.2.



Casting.—In casting sugar, the liquid is run into moulds consisting of an outer, preferably tapering, tubular part *a* and an inner part a^1, both of which are of the section shown or of any other section, and forming between them spaces a^2. The moulds, which may be grouped in bundles, are mounted in frames *b*, b^1. To fill the moulds, the lower frame b^1 is attached to a trough *c* which is fitted with an air pump c^5. The lower ends of the moulds are closed by screw-actuated doors c^3. At the top is fitted a funnel or mouthpiece *d* into which the liquid is poured to fill the moulds. Within the mouthpiece is a movable bottom *e* having open tubes e^1 corresponding with the spaces a^2. By this arrangement the bars &c. when they solidify

project beyond the moulds, the projecting portion being removed on lifting the bottom *e*. The pump serves to withdraw, in the case of sugar, the green syrup, and then a clarifying-liquid poured in at the





top penetrates through the bars. The clarifying-liquid is afterwards expelled by centrifugal apparatus. The bars &c. are next removed from the moulds, and are inserted into the drying-apparatus by an arrangement shown in Fig. 5. The frame b^1 of the bundle of moulds is placed in a notch in each of two nuts f^1 on screws f; a receiver or holder i for the ejected bars is placed similarly and end to end with the moulds. Ejectors k, sliding within which are screw tubes and rods, are provided to eject the bars &c. from the outer moulds a, and spring bars are then used to eject the inner moulds a^1 from the former, the moulds a^1 then falling into the empty moulds a, which are placed as shown in a trough. The screws f are suitably actuated by bevel &c. gearing. The holders i and bars &c. are next automatically inserted through an aperture p^1 in the drying-chamber p on to helically-arranged supporting-surfaces q^3 on a frame q which is adapted to be rotated and also moved vertically. In the casing is another aperture through which the dried bars &c. are removed, the empty holder when it reaches the aperture P^1 being automatically withdrawn. The frame q may be actuated as shown, or by a hydraulic ram and screw arrangement provided with a spring stop which is automatically controlled by the apparatus shown in Fig. 5. Suitable hot-air tubes are provided.

21,456. Heap, C., and **Oddy, T.** Sept. 18.

Cements; concrete; stone, artificial.—Chloride of magnesium, silicate of soda, water, lime, and silica, with or without other materials, are incorporated with some inert material to form artificial stone, bricks or tiles, concrete, or the like. Solutions of the first two ingredients are mixed, and to them may be added a small quantity of hydrochloric acid. From this mixture a gelatinous precipitate is obtained, to which the silica and lime are added in the desired proportions. If intended for cement, the material is dried in an oven or stove and then ground. In the manufacture of bricks, tiles, artificial stone, or other solid bodies, broken or powdered inert materials are added with sufficient water to render the mass plastic for moulding purposes. The inert materials may consist of quarry marble or stone-cutting refuse, ground or broken glass, clinkers, or bricks, asbestos, plaster of Paris, fine quartz, refuse sand from glass works, shale, retort scale, gravel, ironstone, clay, sand, earth, sawdust, hay, straw, cork, coco-nut fibre, silicious matter, destructor refuse, slagwool, furnace slag, sheet-iron cuttings, wood and paper pulp, paper cuttings, and the like.

21,921. Luther, C. W. Sept. 24.

Cements; fireproof compositions.—These may consist of a mixture of 85 to 60 per cent. of casein or the like, and 15 to 40 per cent. of slaked lime or the like, and a suitable quantity of water with or without matter insoluble in water, and not affecting the properties of the whole. By adding from 5 to 30 per cent. of coal tar to the dry cement, a preservative composition, which is also fireproof and waterproof, is formed.

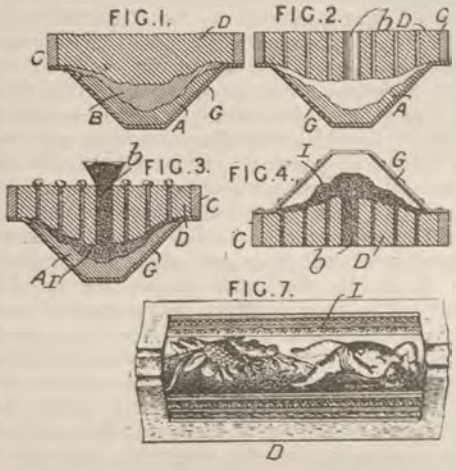
22,741. Dickson, A. A. Oct. 4.

Stone, preserving.—Gypsum or like hydrated rock is mined by channelling or sawing machines to avoid disintegration by blasting; the blocks are turned, shaped, &c. to the required form, and are dried by hot air, being held in suitable clamps. After slow cooling they are immersed in a solution of ammonia alum. After removal from the bath the stone is dried in the open air, and may then be polished. Chrome or iron alum may be added to the solution to produce coloured effects.

22,805. Carlewitz, A. Oct. 5.

Casting.—A pattern A, corresponding in size and configuration to the plaster cornice &c. to be produced, is held in a metal frame G, and soft clay B is pressed into the pattern so as to fill all the cavities &c. to a roughly uniform depth. The back of clay thus follows roughly the configuration of the design. A backing D of plaster is now cast in the frame C, and, having set, the

frame is removed, the backing is carefully detached from the clay, and the clay is detached from the pattern. Holes *b* are now drilled in the backing D, Fig. 2, and into the space from which the clay

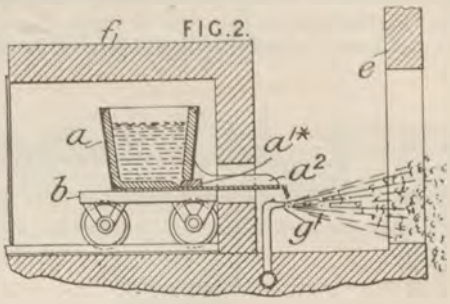


has been removed, as well as in these holes, a flexible composition of gelatine and glycerine together with rosin, chalk, and turpentine is poured hot and allowed to set, the composition being represented at I, Fig. 3. The pattern is now removed and the mould is inverted, as shown in Fig. 4, and upon the elastic base, in inverse relief, is cast the plaster cornice. Fig. 7 shows a view of the mould I with the frame G removed. The backing D is now removed from the elastic part I, which can then be stripped without injury from the plaster and can be used again.

23,080. Hadley, W. S., Sephton, F. W., and **Mills, R.** Oct. 8.

Stonework, ornamental.—Designs are transferred in fatty ink from etched glass plates to marble or similar surfaces, and serve as resists for etching, sand blast, or silvering, or are burnt on. To prepare the etched plate, a plane surface of plate glass is coated with metal foil, wax, asphaltum, or other resistant material, and a design cut in this. The design is bitten in with hydrofluoric acid, and afterwards treated with commercial ammonium fluoride or sand blast, to produce a suitable surface; the resistant material is then cleaned off. To obtain a transfer, the plate is sponged with glycerine, water, or oil, and covered with ink consisting of equal parts of beeswax and commercial pitch, with metallic oxides or other colouring-matter; this is warmed and poured on the plate, and the excess is removed with a warmed scraper. A print is taken off, preferably on waxed paper, and transferred by rubbing or pressure to the surface to be ornamented, which is then etched with acid, sand blasted, silvered, or fired.

23,670. Ingham, W. P. Oct. 14.



Slagwool, preparation of.—Converging rails run from a series of blast furnaces to an annealing-oven *f*. The slag is brought in a pot *a* carried by the truck *b* from any furnace producing a suitable slag. The plug a^{10} being withdrawn, the slag issues at the spout a^2, and is blown by a steam jet from the nozzle g^1 into the receiving-shed *e* in the form of wool.

23,993. Frosell, C. G. J. Oct. 18.

Stone, artificial; cements; concretes.—Relates to a binding-material or cement called by the inventor "Litholith," and applicable in the manufacture of artificial stone, brick, &c., or for binding together broken marble, minerals, stones, or coal, metallic powder, vegetable and animal fibre, sawdust, &c., and generally as a cement. The essential constituents are burnt magnesite or dolomite and magnesium or zinc chloride, together with soluble salts such as phosphates, carbonates, and stannates, stannic acid, and sulphates of magnesia or other bases. The cement so formed is capable of resisting heat. In the manufacture of artificial sandstone, sand is mixed with the powdered magnesite &c. and stirred with a solution of magnesium or zinc chloride. The mass, when partly stiff, is treated with an aqueous solution of phosphate of soda &c., and is then allowed to harden either in air or under water.

24,179. Lee, C. E., and **Lawton, C. F.** Oct. 19.

Cements.—Relates to a cement applicable for cementing sand, gravel, &c. on to the backs of glass or other tiles, or for cementing sand, gravel, or crushed stone on to the faces of bricks, or for putting a smooth and hard finish on brickwork. The cement is prepared as follows:—Sodium tetrasilicate obtained by fusing together sand, quartz, calcined soda-ash, and charcoal is powdered and boiled in water. To the solution is added calcium carbonate, ground quartz, and the ground product of the fusion of quartz, sand, lime, alumina or its silicate, and carbonate of soda, but before the addition of this mixture anhydrous antimonic oxide is added to the tetrasilicate solution. The cement

is improved if the whole pasty mass is ground finely together in a paint mill. Colours may be added if required. Iron oxide may be substituted for lime in the fused compound described above, and natural compound silicate such as prehnite, epidote, ferruginous hornblende, jadeite, augite, and pyroxine, or certain cinders from the blast furnace, may replace the artificial compound silicate. To hasten the final setting of the cement the articles coated or cemented are kept for some hours in an oven at about 230° F.

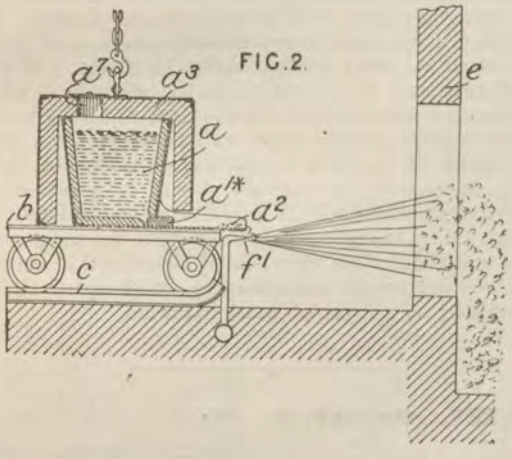
24,609. Brockmann, L. Oct. 23.

Stone, artificial.—An artificial stone or marble having a smooth or polished surface is produced by moulding in smooth-faced moulds a mixture of pulverized gravel, magnesite, barytes, and colouring-medium worked up with a solution of chloride of magnesium, alum, and water glass.

24,978. Bancroft, W. H., and **Brancroft, G.** Oct. 28.

Fireproof coverings and compositions.—Cloth is woven with mule-spun woollen weft and English cross-bred worsted warp. It is treated with a mixture of phosphate and tungstate of soda to render it fireproof, and is finally highly finished by calendering so that dust does not adhere to it. The cloth is specially intended for the clothing of operatives in factories for gunpowder and other explosives, gas works, &c.

25,468. Ingham, W. P. Nov. 3.



Slagwool, preparation of.—Rails *c* converge from a number of blast furnaces to the wool-making house *e*. The ladle *a* resting on the carriage *b* is filled from a furnace producing suitable slag either by removing the non-conducting cover a^3 or preferably by introducing the slag through an opening a^7. The plug a^{10} being removed, the slag flows out by the spout a^2, and is blown into wool by the steam jet f^1. The top only of the cover a^3 need be removable.

25,861. Ferguson, D. H. Nov. 6.

Stone, artificial; fireproof coverings and compositions.—Relates to a fireproof building material imitative of marble. Mineral fibrous material, preferably asbestos, is separated into fibres and while dry divided into portions each of which is separately and distinctively coloured with dry pigments. The fibres are mixed to produce a grained effect, and introduced into a mould where they are pressed, and moistened with a weak solution of silicate of soda. The contents are removed from the mould, dried, and immersed in a solution of calcium chloride. The artificial stone so produced is dried and polished. It may be sawn into veneers and backed with Portland cement, slate, metal, wood, or asbestos boards. In the cement backing a wire fabric may be embedded.

27,530. Dunkin, F. S. Nov. 23.

Stone, imitation.—Vulcanites of various colours are mixed, in a pliable condition, and moulded or otherwise formed into articles such as personal or other ornaments, having the appearance of marble or the like.

27,825. Sellars, J. C. Nov. 26.

Cements.—Bauxite and silicate of soda are combined to form a cement applicable for use in apparatus subjected to heat, for protecting iron and steel surfaces, the plates of ships, &c., for lining the interior of steam generators, or for jointing and repairing or filling cracks &c. in articles subjected to heat. When the cement is required to set rapidly under water, Portland cement is combined with it. The cement may be made up in the form of bricks prepared by soaking the bauxite in water, draining, grinding, and moulding, and then soaking in silicate of soda solution.

27,877. Rodgers, J. Nov. 26.

Petrifying or incrusting porous or other articles.—Porous or other articles to be petrified or incrusted are placed in the annular tray E, and water containing calcareous or mineral matter flows slowly over them from cords B which communicate with a tank A containing iron ore, iron, flint, lead, limestone, &c. and continually supplied with water through the pipe D. Spring water is preferably employed, and lime or lime-water may be added to aid the deposit.

(*For Figure see next column.*)

27,877.

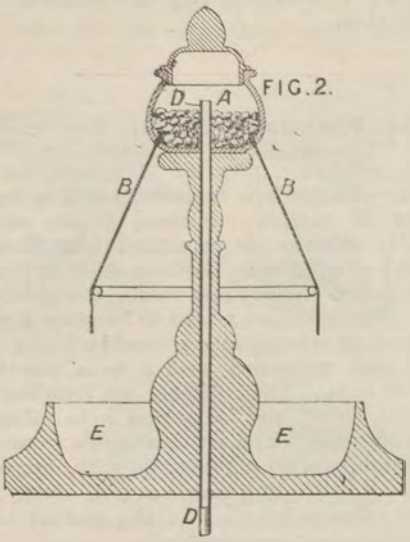


FIG. 2.

27,884. Glendinning, R. Nov. 26.

Fireproof coverings for roofs. A number of layers consisting of overlapping sheets of asphalt are successively applied to the roof by an adhesive composed of a mixture of pitch, resin, tar, and Trinidad asphalt. The surface is then painted with the adhesive, to which gravel, stone chippings, sand, or soil may be attached, or in lieu of these a layer of cement may be applied.

28,276. Spatz, H., and **Quistorp, H.** Nov. 30.

Asphalts.—A substitute for natural asphalt, which consists of carbonate of lime and pure bitumen, is prepared by mixing hot bitumen with a carbonate of lime produced by calcining limestone, dolomite, &c., dissolving the products in water, and depositing, decanting, and drying the precipitate formed when carbonic acid, or air containing carbonic acid, is passed through the solution. The asphalt so produced is used instead of natural asphalt for paving purposes.

28,620. Higgins, H. Dec. 3.

Stone, preserving.—Relates to a method of impregnating stone and other porous materials by first heating them, preferably by superheated steam, and then immersing them in solutions. The solutions are introduced by pipes into the chamber in which the material is treated. Crystalloid salts are employed. Insoluble silicates are precipitated in the pores by introducing separately an alkaline silicate, and a soluble substance such as calcium chloride. In the Provisional Specification bricks are mentioned as materials treated.

28,656. Northcutt, W. H. Dec. 4. *Drawings to Specification.*

Casting.—Paving-blocks of cement and the like, having tongues and grooves, are formed in moulds which have suitable grooves &c. in their hinged sides.

28,789. Mewburn, J. C., [*Soc. Metz et Couturier*]. Dec. 6.

Casting.—Ornamental cement plates or slabs for walls &c. are made of a mixture of 2 parts of finely-powdered magnesite, 2 parts of fine sand, pulverized potteryware, kaolin, or the like, 1 part of water, and 1 part of a solution of magnesium chloride of density 25° Bé. An ornamental design or picture is first produced on the greased bottom of the mould in metal pigments mixed with the composition set forth above, and the mould is then filled in with the plain or coloured composition. The bottom of the mould may be of glass, and a design on a sheet of paper may be placed underneath the mould to serve as a guide in applying the colours. Large polished slabs of two or more metres in length can be produced in this manner.

28,842. Gruner, H. W. Dec. 7. *Drawings to Specification.*

Cements; stone, artificial; sound-deadening compositions; fireproof compositions.—Calcined magnesia is mixed with filling-materials such as sand, sawdust, ashes, burned refuse, powdered granite or marble waste, powdered cork waste, &c., and a solution is added consisting of magnesium chloride, zinc sulphate, acetic acid, and an alcoholic solution of isinglass soap. The material so formed is employed as cement or artificial stone, and may be moulded into bricks, slabs, tiles, &c. Wire skeletons may be embedded in the slabs &c. The material is employed for baths and cisterns, floorings, ceilings, roofing tiles, walls, paving, &c., and is capable of resisting fire and acids. The surface may be ground or rubbed down to produce a mottled appearance. A substitute for linoleum is prepared by using cork powder with the magnesia and solution. The Provisional Specification states that sound-proof walls may be built up of slabs separated by a layer of moss litter &c.

29,122. Grange, J. Dec. 9.

Slags, treatment of; cements; plasters; refractory substances.—Relates to a composition for making refractory bricks, blocks, and slabs, pipe and like coverings, furnace and like linings, retorts, saggers, melting-pots, &c., or for use as cement or mortar for walls, pavements, &c. Blast-furnace slag obtained in the manufacture of North Staffordshire pig-iron is ground to powder, and to each hundredweight is added 1½ gallons of gas tar,

12 lbs. of salt, and 2 or 3 pounds of starch. The last two ingredients may be omitted. The articles formed of the composition may be burnt in a kiln or not. In covering steam pipes, a layer of ordinary non-conducting composition may be applied first and covered with this material. In preparing cement, the ground slag may be used alone or be mixed with sand or ashes.

29,263. Hannay, C. Dec. 10.

Refractory substances.—A mineral diatomaceous earth, such as is found in the island of Barbados, and having a chemical analysis of—silica 80·20 per cent., alumina 6·25 per cent., iron peroxide 1·78 per cent., lime 2·20 per cent., and volatile organic matter 9·57 per cent., is mixed with from 1 to 25 per cent. of fireclay or asbestos. For making light porous bricks, paper or other pulp may be mixed with the earth.

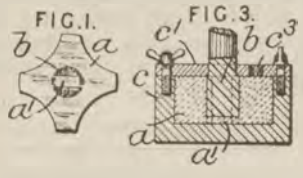
29,595. Kraemer, F. Dec. 14. *Drawings to Specification.*

Refractory substances.—Electric resistances of carbon are supported by being embedded in composition in a metal case or tube. The composition used must have a similar coefficient of expansion and contraction for temperature variations to that of the carbons, and for this purpose there may be used a mixture of ten parts of baryte to one of silicic acid, by weight, in a plastic state. Or six parts of pulverized granite, two of pebbles, and one of lime, silicic acid, and dextrin may be used.

29,837. Matthews, A., and **Matthews, W.** Dec. 16.

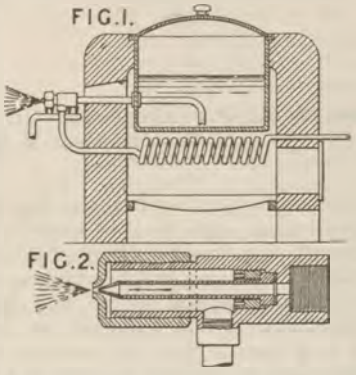
Refractory substances; stone, preserving.—Earthenware for chemical, metallurgical, electrical, sanitary, and other purposes is permeated and coated with carbon by introducing gas tar, oil, pitch, or the like into the muffle or kiln. The earthenware at a bright yellow, or white heat, decomposes the gases, and the carbon is deposited in the pores and on the surface of the ware.

29,879. Hall, I. Dec. 17.



Casting.—The star-wheel *a* of a linotype &c. machine is cast of any suitable fusible material on the end of its spindle *b* in a box *c* having a cover c^1 which holds the spindle *b* in place, and a gate c^3. The end of the spindle *b* has a transverse groove in which a web of material a^1 is formed in the casting operation.

30,025. Elstner, O. Dec. 18.



Asphalts; slags, treatment of; granulating or pulverizing fusible materials by scattering or spraying.—The invention consists in the application of the process of pulverizing materials by scattering them in the molten condition by means of a jet of vapour, air, or gas, to the pulverization of difficultly-pulverizable non-metallic substances such as resins, asphalts, bitumen and pitch, materials for making colouring-matters such as, for instance, anthracene and naphthalene, salts, salicylic and other solid acids, caustic potash, caustic soda, and residual and bye-products of blast or smelting furnaces such as Thomas-slag, &c. The vapour, air, or gas is preferably supplied in a heated condition, and the Figures show apparatus which may be employed.

30,026. Imray, O., [*Grünzweig & Hartmann*]. Dec. 18.

Stone, artificial.—A light and porous building stone similar to cork both as a non-conductor of heat and in respect of its specific gravity is moulded from a mixture of kieselgühr, clay, and finely-divided vegetable matter such as cork, peat, pith, husks, &c. The moulded blocks, when dry, are subjected to a red heat to burn the organic constituents.

30,214. Vögerl, G. Dec. 21.

Stone, artificial.—An artificial stone applicable for general building purposes, baths, sarcophagi, roofing tiles, &c., is prepared by mixing hydraulic cement, sand, and whole pigs' bristles with water and moulding into shape. Wire netting may be employed to strengthen the stone in the case of sarcophagi and baths.

A.D. 1898.

224. Boult, A. J., [*Hartenstein, H. L.*, and *Weber, G. A.*]. Jan. 4. *Drawings to Specification.*

Slags, treatment of.—Blast-furnace slag is mixed with finely-divided coke, and an electric current passed through the fused mixture, heating it intensely, and giving a product containing carbides of calcium, aluminium, and silicon, and applicable for gas manufacture. The slag may be powdered and mixed with one-third of its amount of coke, or liquid slag may be treated directly in a furnace carried on hollow trunnions, so that it may be turned to various positions, and into which reducing-gas carrying powdered coke is supplied through fireclay tuyères. Air may be supplied to increase the temperature by burning some of the coke, before the electrical treatment. The process may be carried out on running slag, by forcing the carbon into this and then treating it electrically.

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679. Lamock, H. F. Jan. 10. *Drawings to Specification.*

Stone, preserving.—Articles cut, carved, &c. from natural alabaster, but still unpolished, are dried at about 80° C. in a steam-heated chamber and are then immersed in a vat containing a cold solution of fluosilicate of magnesium. The articles are removed after a short immersion, the liquid on the surface is allowed to soak in, and they are then again immersed, the process being repeated until no more liquid is absorbed. The articles are now allowed to dry in air, and are then soaked in water and dried in the hot chamber. In some cases, the treatment with water may be dispensed with. The alabaster, after this treatment, is ready for polishing.

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684. Oakley, W. A. Jan. 10.

Stone, artificial.—Natural earths of acid and alkaline character respectively are powdered and mixed in equivalent proportions so that each constitutes a flux for the other when subjected to heat, and they unite and form an artificial stone. Thus disintegrating silicious rocks, marls, shale, earths, kaolins, sands, or clays may be mixed with calcareous earths, alkaline earths, fluor spar, felspathic granite, or clays. Metallic oxides may be added to produce colour effects, and may be mixed in so as to imitate marble &c. The materials, mixed either dry or with water, may be fused and cast, or moulded in fireclay moulds lined with plumbago, or may be moulded dry or wet in the required form, being then covered with plumbago and cased in fireclay, and burnt in a kiln. When burning moulded blocks which are not cased in fireclay, they are prevented from contact in the kiln by similar blocks of fireclay. Powdered charcoal or other reducing-agent may be mixed with the constituents of the stone to assist in the fusion and increase the hardness of the products.

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822. Lake, H. H., [*Micheli, V.*]. Jan. 11.

Stone, artificial.—Relates to a process for the manufacture of paste for replacing stone. The essential constituents of the paste are powders or détritus of natural or fossil carbon such as anthracite, coal, lignite, and peat or artificial carbons and fossil rosins, either with or without the addition to the said powders of terra-cotta, puzzolanas, ashes, fossil farina, or the like. These powders are mixed with any suitable cementing-material. The paste may be moulded by hand or otherwise into any required shape.

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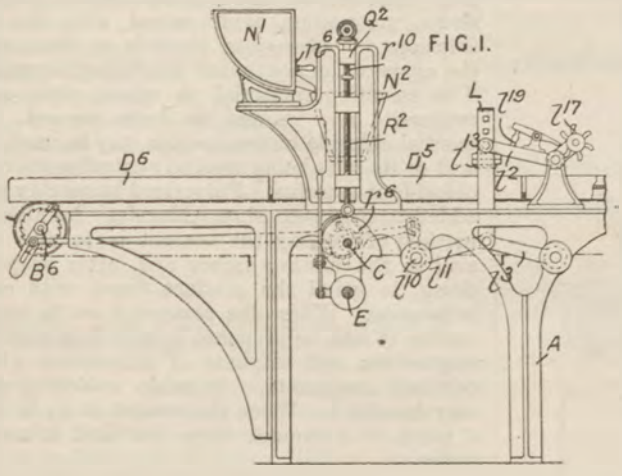
830. Lake, H. H., [*Micheli, V.*]. Jan. 11.

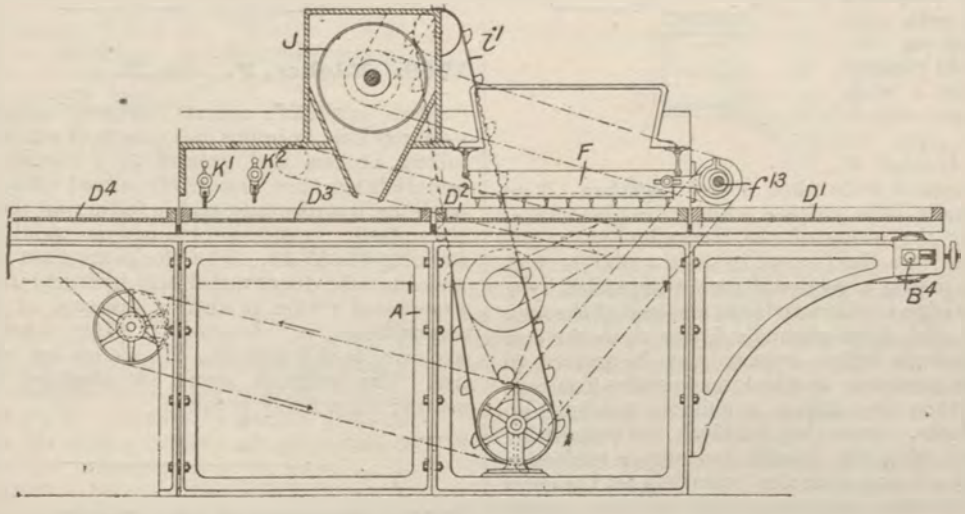
Stone, artificial.—Clays such as argil, potter's earth, marl, sandstone, kaolin, volcanic ashes known as puzzolana, fossil earths, boles, and the like are dried, powdered, and burnt to the required temperature, and kneaded into pastes to which amalgamating-agents such as lime, cement, ashes, silex, potash, or resinous, oily, or adhesive substances are added. Such pastes are moulded by hand or machinery to form porcelain or building blocks which may serve as stone substitutes and are ready for use when dry.

1081. Jones, A. Jan. 14.

Casting.—Relates to machines for making confections by dropping the material in a liquid condition into moulds formed in trays filled with starch, and subsequently separating and cleaning the dried confections from the starch. In the framework A a couple of endless chains are

mounted on sprocket-wheels on shafts B^4 and B^6 and are driven with a step motion by means of ratchet gearing actuated from an eccentric mounted loosely on the shaft C and driven by spur gearing from the main shaft E. The starch trays D^1, D^2, . . . D^6 are filled partly from a suspended sieve F driven by an eccentric from the shaft f^{13}, and partly from a rotary sieve J fed by an elevator i^1 from a starch chamber not shown. The surplus starch is removed from the trays into the starch chamber by levelling-bars K^1 and K^2. The moulds are made in the starch by patterns l^{13} on a vertically-reciprocating frame L connected to the frame A by parallel links l^2, l^3 at each side and actuated by an arm l^{11} on a rock shaft l^{10}. A hammer l^{19} operated by a tappet-wheel l^{17} is mounted on the link l^2 to jar the frame L so that the pattern shall leave the mould clean. The dropping-mechanism comprises two tanks N^1 and N^2 for the liquid material. The tank N^2 is fed





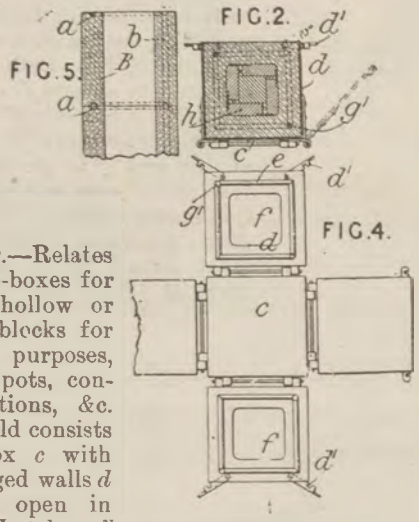
from the tank N^1 through an adjustable slide n^6, so that the head of liquid in the tank N^2 is maintained uniformly to ensure the drops being of regular size. The bottom of the tank N^2 is removable, and is perforated to correspond with the moulds formed by the pattern l^{13}. The perforations are closed by dropping-rods adjustably secured on a cross-bar Q^2 operated by vertical slide bars R^2 at each end actuated by cams r^6 fixed on the shaft C, which is driven from the main shaft E by gearing in which a clutch is interposed so that the dropping-mechanism may be stopped without stopping the eccentrics above referred to, mounted loosely on the shaft C. An adjustment consisting of screws r^{10} is provided for regulating the vertical rise of the bar Q^2 and thus determining the size of the drops. The apparatus for cleaning the dried confections from starch is not shown in Fig. 1. The confections and starch are first fed to the sieve F, which removes the bulk of the starch, and delivers the confections upon an elevator which carries them to a series of brushes, certain of which revolve more quickly than others. The confections then drop upon a stepped sieve having a rotary brush arranged at each step. A blast from a fan is directed along the sieve and removes all starch and small pieces, while the cleaned confections roll down into a receptacle.

1209. Rous, H. Jan. 15.

Fireproof compositions.—A fireproof composition applicable for building purposes, whether cast in the required form or for use as a filling-in composition while plastic, is prepared as follows :—Hay chaff

is added in bulk to a solution of size, ammonia, potash, soda, alum, and tungstate of soda. After standing, lime is mixed with the composition, which is then ready for use.

1314. Lake, H. H., [*Cohn, F.*, and *Brunckhorst, G. H. B.*]. Jan. 17.



Casting.—Relates to mould-boxes for casting hollow or tubular blocks for building purposes, chimney pots, conduit sections, &c. The mould consists of a box *c* with four hinged walls *d* shown open in Fig. 4. Latches d^1 lock the mould walls when closed together. Two of the walls bear strips *e* which form grooves *a*, Fig. 5, for the union of the blocks by cement &c. Apertures *f* are also formed in these walls, through which is passed a sectional core *h* expanded by a central wedge *i*. Core rods are also passed through holes g^1, and form channels *b*, Fig. 5, in the cast block through which cement may be poured to reach the grooves *a*, or which may receive iron rods to strengthen the conduit or chimney top built up of the blocks. In casting the block, the cement &c. is poured into the mould, the upper surface is smoothed off, and after the mass has set the cores are withdrawn and the walls of the mould opened.

1319. Kleber, P. Jan. 17.

Stone, artificial; refractory substances.—An artificial stone applicable for building and paving blocks &c. and for firebricks is prepared as follows:—A mixture of pulverized calcined lime and sand, quartz, or similar material is wetted up with dilute hydrochloric acid and the mass left in small stacks for a few hours. The mass is then worked or moulded into the required form, and the blocks &c. subjected to the pressure of superheated steam in a closed drum. As an alternative, the hydrochloric acid may be omitted from the composition of sand or lime and hydrochloric acid vapour be admitted to the drum together with the steam.

1378. Justice, P. M., [*Lithosite Manufacturing Co.*]. Jan. 18.

Cements.—Relates to cements applicable for paints or for any use to which Portland cement is put. The mother liquor of sea-water is evaporated down, magnesium oxide mixed with the strong solution of magnesium chloride so obtained, and the evaporation continued at a higher temperature. The resulting material is mixed with calcined magnesite and ground to form cement. Commercial chloride of magnesium may be used, oxalic acid or its salts being used to neutralize the calcium chloride it contains. Pulverized burnt clay may be added to the magnesium chloride. An alternative method of making the cement is to add boracic acid to the mother liquor and, after evaporating down, to grind the product direct with calcined magnesite. Where the cement is to be used as a mortar it may be prepared by grinding sulphate of magnesium and sulphate of aluminium with the calcined magnesite. Suitable colouring-matters may be added. When the cement is to be used as a paint it is ground very fine and mixed with water.

1769. Kleber, P. Jan. 22.

Stone, artificial; cements, fireproof compositions.—Burnt lime in lumps and quartz or sandstone are mixed, broken, and ground to a powder. The materials are then thoroughly mixed while a spray of dilute hydrochloric acid is falling on them, and the plastic mass so obtained is moulded into building-blocks &c. The blocks are then placed in a steam-tight drum and dilute hydrochloric acid is evaporated within it until a pressure of about 7 atmospheres is obtained. After some hours exposure to this pressure the stones are ready for use. The artificial stone so obtained forms a cement when finely ground.

2003. Garchey, L. A. Jan. 25.

Stone, artificial.—Relates to 'ceramic stone' formed of devitrified glass as described in Specification No. 5772, A.D. 1896. Waste glass together with slag, scoriæ, potters' and other clay, or other vitrifiable material is pulverized and sifted. When clay or other material not easily fusible is employed, the materials are agglutinated with a silicate or gum to form a paste that can be roughly moulded to the required form, but the powder may be placed in a refractory mould without any such treatment. Fragments of unpulverized glass may be embedded in the pulverized material. The devitrification is effected in a furnace at a temperature below the fusing point of the materials, and the roughly-moulded article is finally shaped under pressure between suitable dies. Molten glass may be run into moulds, devitrified, and finished in the above way. Pieces of coloured glass embedded in the surface may be employed to give decorative effects.

2182. Lehmann, P. Jan. 27.

Fireproof coverings and compositions.—A storm- and fireproof and almost untearable covering for walls and roofs is described. Its foundation consists of jute linen steeped in a boiled mixture of linseed oil and silver litharge (which is a fused crystalline lead oxide obtained as a bye-product in the separation of silver from lead), or of board made of leather parings and steeped in a varnish of caoutchouc dissolved in boiling linseed oil. These fabrics when dried are coated with a mixture of whitening, silver litharge, washed earth-colour, and linseed oil varnish, and while wet are strewed with ground sandstone on one side and sand on the other, the outside finally receiving a coat of oil paint.

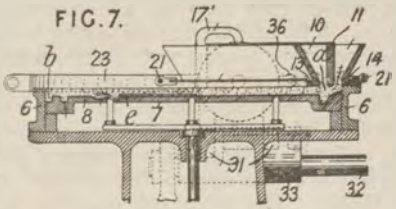
2896. Hurry, E. H., and **Seaman, H. J.** Feb. 4. *Drawings to Specification.*

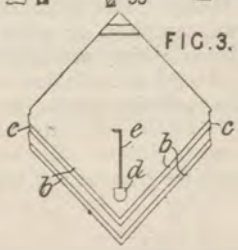
Cements.—Relates to an automatic and continuous process for manufacturing Portland cement. The cement-rock or other material is fed from a platform to a preliminary crusher or mixer which delivers it by a chute into the buckets of an elevator which discharges it to a bin. Thence it is fed by gravity to a pulverizer and conveyed to a bin which supplies a rotary roasting-furnace consisting of a shell lined with firebrick and mounted in an inclined position on roller bearings. The upper end of the shell projects into a chamber having an ashpit below and communicating with a chimney stack. When the cement material is in the form of slurry, it may be pumped into the end of the roasting-furnace. The material is roasted to clinker, while passing through the furnace, by means of a burner which injects powdered fuel together with a small volume of high-pressure air. The clinker is conveyed by an inclined rotary cylinder, through which air passes to the furnace by natural draught, to a breaking or reducing apparatus, where it is wetted by a spray of water. It then passes through a rotary cooling-conduit of the kind described in Specification No. 23,145, A.D. 1895. An elevator conveys the cooled clinker to a bin supplying a pulverizer which completes the manufacture of the cement. The ground cement is fed continuously to the barrels &c. in which it is packed.

3100. Romney, H. R., Thame, J., and **Fibrous Materials Syndicate.** Feb. 7.

Fireproof coverings and compositions.—In order to utilize the dust or short fibrous waste of coco-nut husks, it is mixed with any vegetable fibrous pulp, and moulded into sheets, slabs, mouldings, &c., or worked into long sheets over a paper-making machine. To render the product impervious to moisture, the material is mixed with from 2 to 15 per cent. of resin, turpentine, soap, or size, or the moulded articles may be treated with a solution of glue and passed through a bath of tannic acid. To make the material as non-combustible as possible, it is mixed with asbestos dust or fibre, carbonate of magnesia, fossil meal, whitening, and mineral colouring-matter. For floor coverings, mats, &c., the material may be permeated with oxidizable or drying oils. For packing between the hulls of battleships &c., waste fibres free from dust may be combined with longer vegetable fibres obtained from old rope, sacking, &c. The sheets or material may also be used for covering steam pipes, boilers, roofs, and railway carriages, or as packing for steam and other joints, refrigerators, &c.

3488. Thomann, K. Feb. 11.





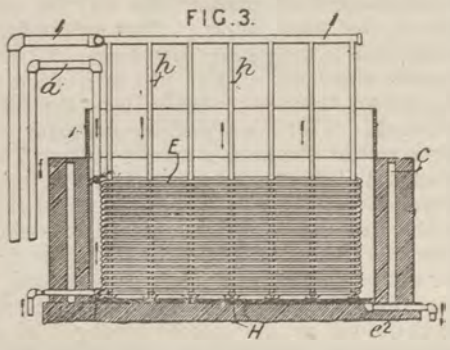
Casting.—Fig. 3 shows a view of the underside of a cement roofing-tile formed with ribs *b* which interlock with similar ribs on the upper surface of the tiles below. The side edges *c* are made with interlocking saw teeth or projections, and a wire hook *e*, fixed in a projection *d* of the tile, is bent down and driven into the batten or woodwork. Fig. 7 is a central sectional view, showing a mould frame 6, a mould bottom 7 with a loose mould plate 8, a hopper 10 with a vertical movable partition 11 for producing the upper ribs *a*, and cutting-knives 13, 14 for separating the cement in the hopper from the ribs. The hopper frame is fitted with a pair of cam discs at each side, and the inner discs are made with feet 31 which enter sockets in saddles or carriages 33 arranged to slide on guide-bars 32. One foot of each inner disc fits in a notch in the guide-bar, and locks the carriage during the moulding of the upper ribs. The knives are moved simultaneously to cut the ribs by the outer cams acting on rollers carried by sliding rods attached to cross-bars 21. A forked operating-lever 23, pivoted on the cam centres, carries rollers 36 which come in contact with the saddles when the lever is raised to operate the cutting-mechanism. On further movement of the lever the hopper frame is raised, and can then be pushed to the right, clear of the mould, along the guide-bars 32. The partition 11 is attached to bent arms 17^1 carrying rollers adapted to work in cam-grooves in the outer discs, and is raised by the upward motion of the lever immediately after the ribs have been cut off. The wire *e* is held down in the recessed mould plate 8, whilst the cement is

rammed down in the mould. The mould plate with the tile is ejected from the mould in the usual manner.

3678. Mac Farlane, A., and **Stanbury, H. W.** Feb. 14.

Fireproof coverings and compositions; casting.—An insoluble gelatine in imitation of glass, celluloid, ivory, or other solid substance is prepared by mixing a warm solution of gelatine with an aqueous solution of formaldehyde; any desired colouring-matter may also be added during the preparation. The prepared gelatine may be applied to fabrics, ordinary paper, wall paper, wood, and the like. Imitation non-inflammable leather, leather cloth, waterproof fabrics, and the like may be obtained by adding tungstate of soda, castor oil, glycerine, and water-glass to the prepared gelatine, and applying the mixture to the surface of any suitable fabric. The prepared gelatine may be cast in wax, camphor, or other suitable moulds to obtain sheets which are afterwards mounted in frames, and used as imitation lead lights or window glass. The gelatine sheets may be treated with a mixture of chloride of sulphur and carbon bisulphide, or with linseed oil, paraffin wax, carnauba wax, pyroxylin, gum, or the like.

3793. Wilkinson, W. S. Feb. 15.

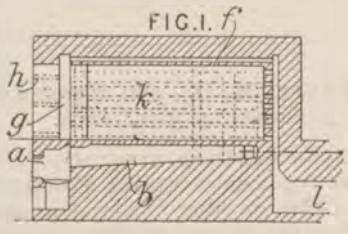


Asphalts.—The invention consists in a process of refining crude asphalt or preparing it for use for paving &c. by agitating it by means of compressed-air jets in the presence of steam pipes supplied with high-pressure steam. In this way the water is driven off and the mass thoroughly mixed without the possibility of injury through excessive heating. Fig. 3 shows a tank which may be employed in this process. It is cased in brick, with an air space *c*. The pipe *a* conveys high-pressure steam, the temperature of which is regulated by the boiler safety-valve, and which circulates through the coils E. The water of condensation is removed at e^2 and pumped back to the boiler. Compressed air for agitating the asphalt is supplied by the pipe I, feeders *h*, and perforated injection pipes H at the bottom of the tank.

4260. Hutcheson, J., and **Service, J. F.** Feb. 21.

Refractory substances.—For cements and mortars, 5 per cent. of asbestos is mixed with 95 per cent. of fireclay. Firebricks for boilers are made of a mixture of 10 per cent. of asbestos and 90 per cent. of fireclay. Firebricks for smelting-furnaces contain 15 per cent. of asbestos. The Provisional Specification states that blacklead may also be used.

4543. Schoenfelder, C. Feb. 23.



Stone, artificial; cements; plasters.—Relates to an artificial stone substance capable of being pressed or cast into shape, and when burnt having the characteristics of marble. It is applicable for sculptures, wall coverings, decorative stonework, floor coverings, plasterings, roofing-tiles, objects of art, &c. Silica, kaolin powder, sulphate of lime, glass, and fluorite are ground together. The mixture may be moulded dry under great pressure, or, after roasting to drive off some of the water of crystallization, is mixed with alum-water and cast in moulds. The articles are then burnt in a furnace of special construction.

4594. Bergmann, F. J. Feb. 24.

Slags, treatment of; cements.—Blast-furnace slag which has been allowed to cool slowly in boxes is ground with lime, with or without the addition of a mixture of coke dust and a slag rich in silicates, such as cupola slag, copper slag, or the like.

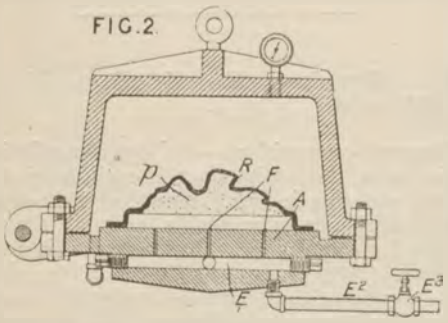
4628. Imschenetzky, A. Feb. 24.

Stone, artificial; refractory substances.—Relates to improvements in the process for the manufacture of artificial stone, described in Specification No. 5254, A.D. 1895. Asbestos fibres are separated and kneaded with water into a paste which is mixed with carbonates or oxides of calcium, magnesium, iron, &c. to cheapen the product or to vary its specific gravity or colour. The paste is made into sheets or into objects of any desired form which are dried, cemented with a solution of silica as in the earlier process, pressed, and again dried. They are then impregnated first with a strong solution of sodium silicate and afterwards with a saturated solution of sodium bicarbonate. Silica is formed in the pores of the material and

the bicarbonate is converted into carbonate of soda. The process may be repeated, and ammonium or potassium salts may be substituted for the sodium salts described. The silicate and bicarbonate may be mixed, and the material saturated with the solution before the silica has gelatinized. A solution of carbon dioxide under pressure may be used in place of the bicarbonate. Objects made of the material may be coated with mineral pigments mixed with silicate, and treated after drying with calcium or magnesium chloride.

4724. Boult, A. J., [*Franco - American Casting Co.*]. Feb. 25.

FIG.2.



Casting.—Relates to means for reproducing in plaster of Paris, metal, &c. patterns in high relief having undercuts, cavities, and bold projections, elastic rubber moulds and patterns being employed for the purpose. Fig. 2 shows the apparatus for preparing a rubber mould. The plaster pattern *p*, to whose surface a thin coating of silicate of soda has been applied, is placed on a base A, having apertures F communicating with the chamber E, pipe E^2, cock E^3, and a vacuum chamber and air pump. The most abrupt cavities in the pattern are partially filled with small pieces of unvulcanized rubber, and an unvulcanized rubber sheet R is then placed over the pattern and the edges cemented on to the base A. The chamber E is then gradually exhausted, and the sheet drawn closely about the pattern. Hot water or steam may be applied to the surface of the sheet during this process. The cover is now secured in place, and steam admitted up to about three atmospheres pressure to accurately mould the rubber sheet to the pattern and to vulcanize it. The mould so formed can be peeled off the plaster, and can be strengthened by a plaster backing when used for casting. Where metals are to be cast, a rubber pattern is required, from which plaster moulds can be obtained. This is effected by taking a glue mould of the original pattern, hardening it with alum, and casting in it a glue relief from which a plaster mould can be obtained suitable for preparing a rubber pattern or relief by a similar process to that described above.

5351. Winkler, P. A. March 4.

Stone, artificial.—Lime slaked with water is pressed by hydraulic power into moulds and dried, and afterwards saturated with liquid carbonic acid to convert the oxide of lime into carbonate.

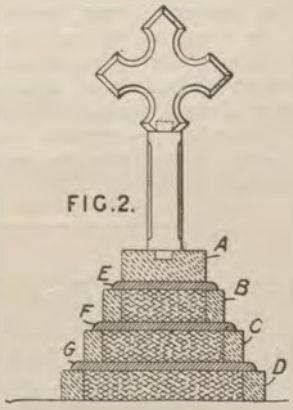
5433. Heys, W. J., [*Ponsolle, N.*]. March 5. *Drawings to Specification.*

Stone, artificial.—Relates to copying-apparatus of the type in which a sheet of damp gelatine or similar substance is used to effect the printing or multiplication of documents &c. To keep the gelatine moist, it is placed upon an artificial stone which is in contact with water in a cistern. The stone is preferably made of a mixture of the following materials, and is cast upon a glass plate or otherwise :—Plaster of Paris 90 parts, sulphate of baryta 3 parts, sodium chloride 5 parts, silicate of alumina 2 parts, and a sufficient quantity of water.

5986. Brindle, T. March 11.

Statuary. — The plinth or base is constructed of stone rings A, B, C, D, cut out of a single block of marble or stone, and arranged one over the other with discs E, F, G, of another kind of stone, between them. The rings may be cut from different blocks, and each ring may have an external diameter larger than the internal diameter of the next ring below it, so that the rings can rest directly one on the other. The spaces between the rings may be filled in with concrete.

FIG.2.



6511. Szek, J. T. March 17.

Cements; stone, artificial; fireproof compositions; sound-deadening compositions. — Sawdust, wood wool, wood pulp, cellulose, or the like is treated with sulphate of magnesia or borax, or a mixture of both dissolved in water, and the pulp is dried, ground, and mixed with magnesia made into a paste with a weak solution of hydrochloric acid. The mixture is moulded into tiles, slabs for lavatories, washstands, table tops, architectural mouldings, cornices, plasters, corbels, &c. Floors and

walls constructed of the composition are fireproof and waterproof, are bad conductors of heat, sound, and electricity, and resist the attacks of vermin and fungoid growths. The composition may be coloured by pigments, or the articles may be painted on the surface.

7418. Miller, H. March 28.

Stone, artificial.—Chimneypieces, ornaments, and other articles are moulded from a hot composition of powdered slate and a varnish composed of boiled oil, asphaltum, and gum arabic together with a little resin. The articles are moulded under great pressure, and are exposed to the air for a few days. They are then moderately heated, and are finally exposed for 10 to 14 days to a temperature of 180° F. They may be grained, varnished, and polished like natural slate.

7634. Brooke, A., Brooke, N., and **Brooke, W.** March 30.

Stone, artificial.—Artificial stone for paving-slabs, copings, blocks, heads, sinks, sills, channels, &c. is prepared by mixing the slurry or refuse from stone sawing, scouring, or polishing plants, or the ground refuse of Lancashire flagrock, ashlar, and sandstone, with Portland cement, and moulding it under pressure in porous or other moulds. The two classes of waste material may also be used together.

7945. Wolfers, R., and **Hannemann, A.** April 2.

Asphalts; stone, artificial.—The residues from the distillation of tar, petroleum, or resin are mixed with sulphur and an oxidizing-agent such as pyrolusite, chloride of lime, or oxide of manganese, and heated. The bituminous material so obtained is incorporated with a filling-material such as slag-sand, sawdust, kieselguhr, or lime and clay containing substances, together with slaked lime, and stones or blocks applicable for paving &c. are moulded from the mixture, which may also be used either as "powder" or "liquid" asphalt. A small proportion of powdered natural bitumen may be employed.

8226. Ford, L. P., and **Barber, T. W.** April 6.

Stone, artificial; concretes.—Lime and sand are rammed while dry into moulds which are placed in a closed chamber. Air is exhausted from this chamber, and hot water is then admitted under pressure. Steam at high pressure is then used to expel the water and complete the hydration of the stone, a steam jacket maintaining the temperature of the chamber at the required value. The vessel is again exhausted to dry the stone, which can then be removed from the moulds. A small proportion of a dry powdered alkaline silicate may be combined with the lime and sand to increase the hardness of the product. Dry powdered pigments may also be employed to colour the stone, and when a multi-coloured effect is required blocks of various colours not completely indurated are broken up into small pieces and re-moulded with fresh lime and sand.

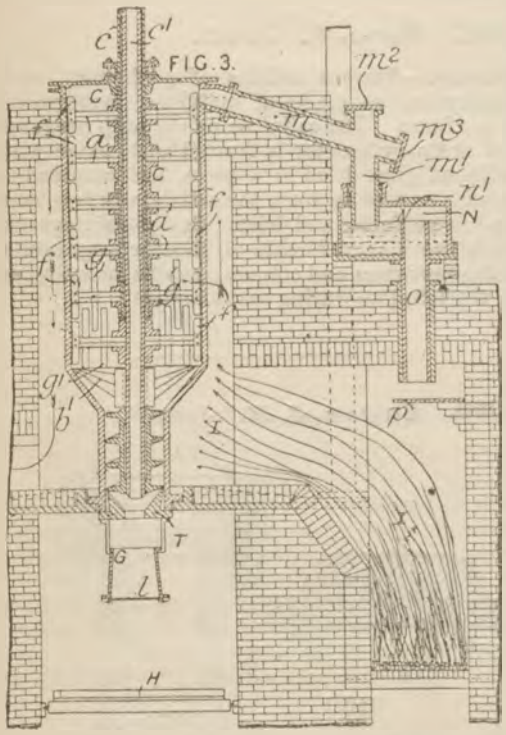
8380. Stocker, J., Zander, H., and **Döblin, W.** April 7.

Fireproof compositions.—Relates to a solution of certain salts, for moistening the clothing &c. of persons entering burning rooms, or for rendering uninflammable dress materials, curtains, draperies, theatrical costumes, &c. The solution is made as follows:—400 grammes of "fasersalz" (a salt with needle crystals found at Stassfurth, Germany) is dissolved in four litres of water; 33⅓ grammes of bicarbonate of soda and 33⅓ grammes of pulverized burnt alum are added; then 500 grammes of a solution containing silicic acid, potash, sulphate of strontium, and talc are added: finally, 30 grammes of rice starch and 5 grammes of sugar are added.

8581. Pieper, A. April 12.

Asphalts.—Powdered asphalt and tar are fed by a hopper to the upper end of a cylinder or chamber C, and mixed by blades *a* which are fixed to a tubular shaft *c*, and carry scrapers *f* in contact with the cylinder. As the material descends within the cylinder, it is melted by heat from a furnace I, kneaded by beaters *g*, g^1 and screw blades b^1, and forced through a mouthpiece T into a box G by a worm. The upper beaters are carried by the tubular shaft, and the lower beaters, screw blades, and worm are carried by an inner shaft c^1. The shafts *c*, c^1 are rotated in opposite directions by spur and bevel gearing. To facilitate the cleaning of the worm, the upper end of the shaft c^1 is screwed through the boss of the driving spur-wheel, and is secured to it by a key. On removing the key and the mouthpiece T, the rotation of the screwed driving-wheel causes the shaft and worm to descend. The bottom of the box G is closed by a slide which can be drawn out to allow the material to fall on a table H or conveyer. The gases given off by the material in the cylinder pass away by pipes *m*, m^1 to a water cistern N, and down through a pipe *o* to the furnace, where they

are consumed. Any oily liquid which may be condensed in the water cistern is led by the pipe *o* to a red-hot plate *p* in the furnace, and is utilized in heating the cylinder. The water within the



cistern forms a seal to prevent the ignition of gas in the cylinder. Removable covers m^2, m^3, n^1 are fitted to the pipes and cistern to facilitate cleaning &c. The treated material is moulded under pressure and heat into articles which are ready for use after they have been removed from the moulds and cooled in water.

9256. Lake, H. H., [*Broussas, L.*]. April 21. *Drawings to Specification.*

Casting.—Various parts of buildings and other structures are formed from either asphalt, cement, concrete, slag, or the like, or a mixture of them, in which connected T-irons are embedded.

9265. Levey, G. C., and **O'Brien, C. L.** April 21.

Stone, artificial.—An artificial stone or tile composition is prepared by mixing magnesia or calcined magnesite, magnesium chloride, and oxide of zinc or like paint or putty with slate or stone refuse &c. or sand together with the necessary quantity of water. The composition is moulded into the required shape. Sawdust is mentioned as a constituent in the Provisional Specification.

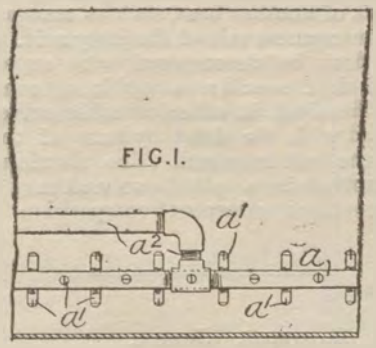
9737. Rott, C. H. April 28.

Casting elastic moulds from clay models in relief. Collodion, or a varnish such as gum dissolved in spirits of wine, is applied to the surface of the clay model. The film thus produced when set is slightly oiled, and a mould of gelatine, glue, or mixtures of these with treacle or glycerine can then be easily taken from the model.

9934. Holden, T., and **Brooke, C.** April 30.

Plasters.—A composition for decorating walls, ceilings, and other surfaces in relief, in the manner described in Specification No. 1082, A.D, 1897, or otherwise, consists of 28 lbs. of whiting, soaked in water, and mixed with 3 pints of boiled linseed oil, and ½ lb. of glue dissolved in water. To these ⅓ to ½ of the whole amount of plaster of Paris is added, mixed with water.

10,210. Day, W. H., and **Murch, W.** May 4.



Casting.—Relates to the "water-box" for use in heating and cooling candle-making and like machines. The pipe *a* is supported above the bottom of the box, and is provided with a series of nozzles a^1 having slotted openings set in different directions. The pipe a^2 for admitting steam or water is connected to the middle of the pipe *a*.

11,750. Willocks, J. May 24.

Plasters.—A disinfectant, deodorant, or like active substance (*e.g.* carbolic acid) is incorporated

with a natural or artificial pigment, clay, earth, or similar material (*e.g.* whiting), forming a more or less retentive vehicle or base. The product is capable of being used as a coating, covering, lining, or material of construction for walls, floors, and like parts of buildings.

12,190. Mersch, P. May 28. *Drawings to Specification.*

Refractory substances.—Incandescence blocks for use in electric arc lamps are made by intimately mixing 4 parts of dry plastic clay, 3 parts of alumina, and ½ part of kaolin. Water is gradually added to form a paste, which is moulded and submitted to prolonged baking.

12,508. Rosenblum, S. G., and **Commercial Ozone Syndicate.** June 3.

Fireproof compositions.—Relates to the preparation of the metallic salts of the fatty acids contained in the oil known as "Tung" oil and expressed from the seeds of a tree known as *Elæococca vernicia* or *Elæococca cordata* or *Aleurites cordata*, and the application of the said salts in the manufacture of drying-oils, varnishes, enamel paints, lacquers, antifouling, fireproof, or waterproof compositions, or cements used in the manufacture of linoleum or the like. The oil may first be saponified with an alkali, and the alkaline salt so obtained acted upon by a soluble neutral salt of another base, such as manganese, to form the manganese salt of the fatty acid. Or the oil may first be decomposed with superheated steam, and the free acid separated in any convenient way and dissolved in ether or other solvent, and then mixed with the dried hydrate of the metal to form the salt required. The aluminium salt when dissolved in a volatile solvent may be used as a fireproof and waterproof composition.

12,592. Hont, J. June 4.

Statuary.—Gelatine is moulded into statuary and theatrical scenery, and electric or other lights are arranged round or behind the statuary or scenery to illuminate the gelatine.

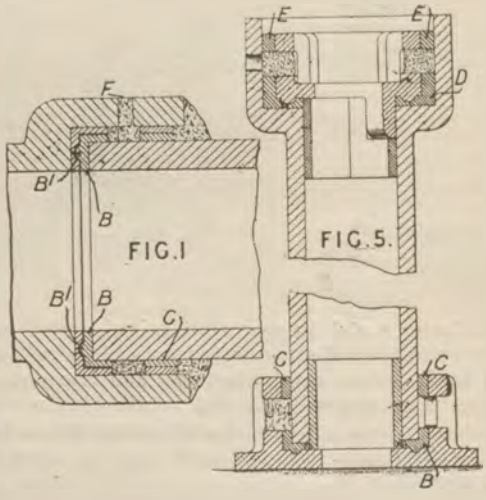
12,902. Goodwin, J. June 9.

Plasters; cements; fireproof coverings and compositions.—Relates to the composition of a plaster or cement specially adapted for covering the walls and roofs of buildings in tropical countries. The ingredients consist of ground clay, china clay, fossil meal, asbestos, blue Lias lime, and flax or other fibre. The cement is said to be fireproof and waterproof.

12,956. Haas, E. June 9.

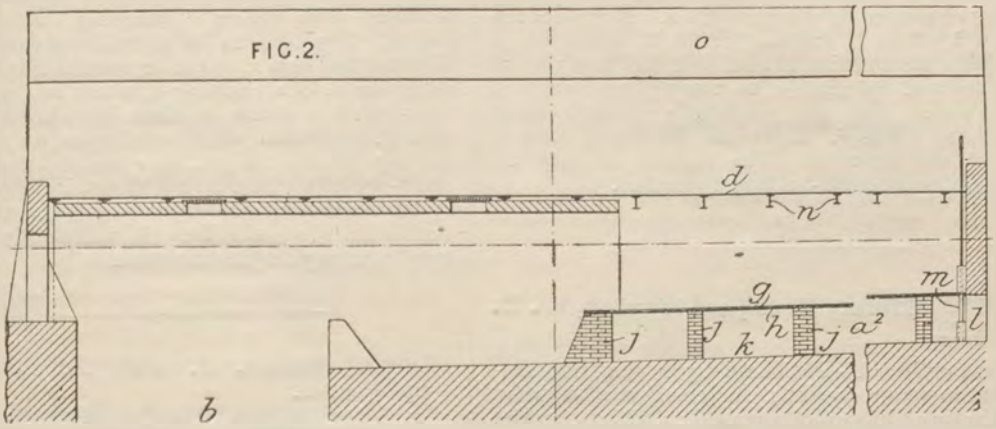
Statuary.—Various articles of perfumery, such as statuettes, are made of cellulose impregnated with perfume. The cellulose or rag pulp prepared in the ordinary manner is treated with water with or without glue, dried in a press, and moulded or otherwise treated to form the article, which is then soaked in perfume, and dried. Easily-disintegrated material, such as carbonate of lime or magnesium, and also perfumes and colours, may be incorporated with the cellulose during manufacture.

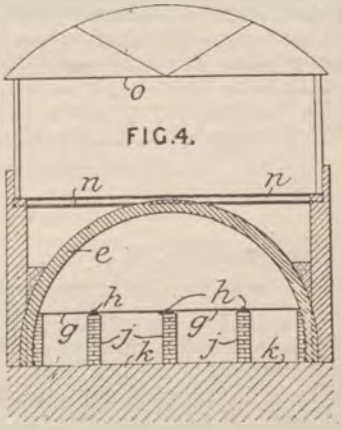
13,099. Sutton, J. H. June 11.



Casting.—Relates to apparatus for casting the jointing-rings on stoneware, earthenware, and other pipes. Fig. 1 shows the spigot-and-socket joint, and Fig. 5 the means for forming the contact rings. Upon the end surface of the spigot is formed a cement or composition ring B, the face being at right-angles to the pipe axis. A similar ring D is formed upon the shoulder of the socket, and is provided with a projecting bead or beads B¹. Extensions C around the circular external periphery of the spigot and around the interior of the socket are also formed, and a band E of composition may also be provided. Liquid cement is run in by the hole F, another hole providing for the escape of air. The cement rings upon the spigot and within the socket are cast by the provision of mould rings, or split flexible rings, as shown in Fig. 5, the ring faces thus being truly perpendicular to the pipe axis.

14,462. Anderson, G. L. June 30.





Cements.—Relates to a chamber for drying slurry, which may be used with a Johnson kiln. The drying is effected by gases from a kiln *b*, and the slurry is placed on horizontal removable metal plates *d* supported on girders *n* and protected by a brick arch *e* as shown. Slurry is also spread on horizontal or slightly-inclined floors *g*, *k*, the former consisting of removable metal plates supported on rails *h* and pillars *j*. The passage of the gases through the chamber a^2 and the opening *l* to the stack is controlled by dampers *m*. A protecting-roof *o* may be provided.

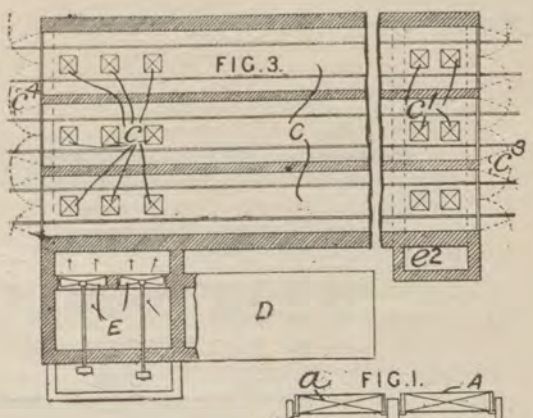
14,532. Litynski, L., Rodakiewicz, A., and **Kurowski, F.** July 1.

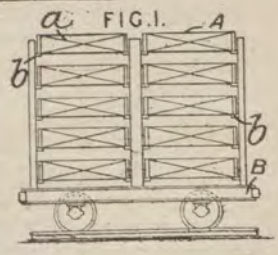
Fireproof compositions. — Combustible substances, such as wood, paper, cardboard, fabrics of all kinds, straw, &c., are rendered fireproof by impregnating them with a preparation consisting of manganese oxide, calcium oxide, potassium hydroxide, potassium carbonate, and sodium oxide, all or singly, together with sodium chloride and a solution of de-fatted quillai, glue, gelatine, horn, or similar animal substances saturated with carbonic acid. The articles are steeped or merely coated, according as they are more or less combustible. Chemical waste or bye-products containing the above materials may replace the pure products.

14,897. Hailes, A. J. de, Redwood, T. H., and **Simpson, H. V.** July 6.

Fireproof compositions.—Relates to the use of substances for fireproofing, preserving, &c. wood, which are free from corrosive action on metals. Double salts of ammonia and the oxides of metals are used. As an example, oxide of zinc is dissolved in boric acid, and sulphate of ammonia added to this solution; or borate of zinc may be used instead of the first two constituents.

15,489. Erith, C. July 4.





Cements. — Fig. 3 shows in sectional plan a drying-apparatus having a number of chambers C in which cement, slurry, &c., passed therethrough on cars B, Fig. 1, are subjected to the action of

an oppositely-directed current of hot air or gases. The tanks A, which are supported on racks *b*, have sliding or hinged discharge doors *a*. Hot gases are drawn by fans E from a furnace D, which has a regulable air opening at one end, and pass thence by a flue and openings *c* to the drying-chambers, from which they pass preferably through openings c^1 and a flue e^2. Inlet and discharge doors c^3 and c^4 are provided. The furnace D may be replaced by other air-heating apparatus.

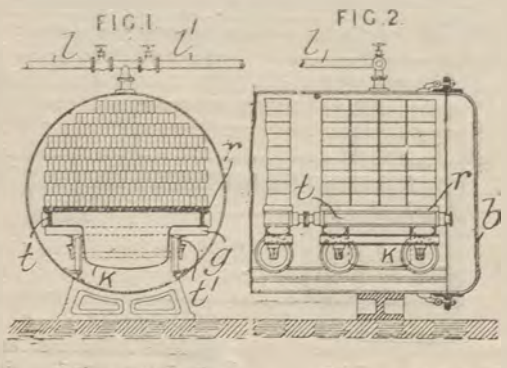
16,022. Kiefer, G. A., and **Herbst, W. T.** July 22.

Stone, artificial.—Powdered hydraulic lime, suspended in water, is partly converted into sulphate of lime by adding sulphuric acid; a filling-material is added, such as sawdust, powdered peat, chaff, ashes, sand, ground slag, or the like; and well-burnt gypsum is mixed and combined with the ingredients to form a plastic mass which sets in moulds without any pressure being applied, and further hardens when dried in the air.

16,173. Imray, O., [*Soc. Anon. des Ciments et Plâtres de Vilvorde*]. July 25.

Cements.—In burning natural or artificial cement materials in the manufacture of Portland cement, sodium chloride is thrown on the charges of fuel or material in the kiln, the effect being to reduce the amount of fuel necessary to completely burn the cement and also to improve its quality.

16,489. Olschewsky, W. July 29.



Stone, artificial.—Artificial stone of the kind known as lime-sandstone is produced by steam heating a mixture of slaked lime and sand. The lime should be thoroughly slaked, but should not contain excess of moisture, as this cracks the moulded articles during the hardening process. Figs. 1 and 2 show suitable apparatus for hardening the stone or slaking the lime. The stone is packed on a grating *r* carried by a truck consisting of longitudinal pieces *t* connected by stays *g* and provided with pieces t^1 carrying the wheels as shown. The lime to be slaked is placed in a box K under the base *r*. One or more trucks is or are then run into a chamber *b*, which is then closed. Low-pressure steam is then introduced from a pipe l^1, the steam which condenses on the stone passing through the grating *r* and slaking the lime. High-pressure steam is then passed in from a pipe *l* to harden the stone. On removing the trucks the temperature of the lime is sufficiently high to evaporate any surplus moisture.

16,663. Rowe, J. July 30. *Drawings to Specification.*

Casting.—Relates to lined tubing consisting of outer and inner tubes with cement under pressure in the annular space between. The tubing is primarily intended for casting printers' rollers.

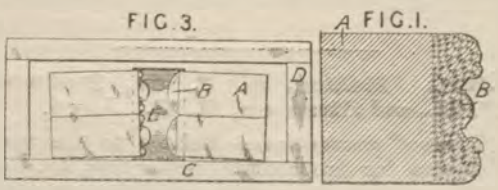
16,785. Strong, H. O. Aug. 3. *Drawings to Specification.*

Refractory substances.—Domes for gas burners are made from a mixture of fireclay, plumbago, peroxide of manganese, and silicate of soda, or silica and fireclay or similar materials may be used. The domes are used in stoves of the type described in Specification No. 22,153, A.D. 1896.

16,996. Litynski, L., Rodakiewicz, A., and **Kurowski, F.** Aug. 6.

Fireproof compositions.—Relates to means for fireproofing wood, textile fabrics, paper pulp, straw, &c. The wood &c. is impregnated with a liquid prepared by mixing a solution of potassium carbonate and boracic acid with an ammoniacal solution of magnesium carbonate and boracic acid. The liquid also acts as a preservative for the wood &c.

17,158. Courtenay, W. Aug. 9.



Stone, artificial.—Relates to improvements in "reconstructed granite" as described in Specification No. 7184, A.D. 1891. The building-blocks &c. are moulded with an inner portion or body A

of calcined and pulverized granite, ground feldspar, and fireclay, rendered plastic with water. This is faced with a similar composition B having, however, a larger proportion of feldspar. When the blocks are burned in the kiln, the latter composition fuses and forms a vitrified surface. The surface may be protected in the kiln by a pottery glazing-mixture sprayed upon it, the glaze being afterwards removed by the sand blast or by hydrofluoric acid. The blocks may be fixed in saggers, but are preferably burnt in kilns, being piled between firebrick tiles C separated by pillars D and having the fusible surfaces protected by asbestos sheeting E. Some other varieties of stone beside granite may be employed.

17,466. Hill, W. S., and **Ingham, W. P.** Aug. 13.

Slagwool, preparation of.—From one to two per cent. of soda-ash is added to the blast-furnace slag from which slagwool or silicate cotton is to be blown.

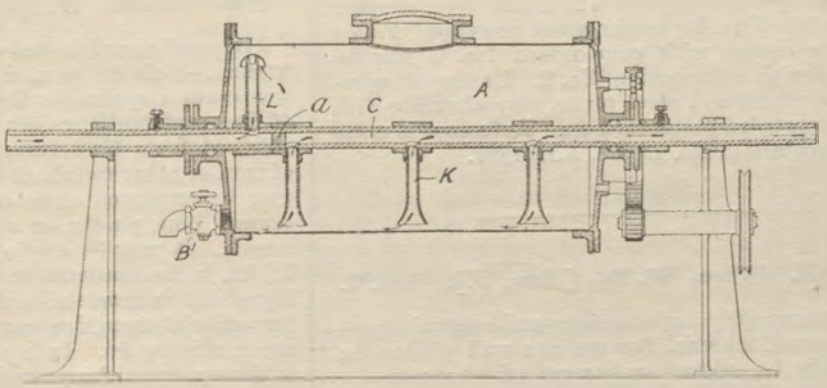
17,497. Dime, G. X. Aug. 13.

Fireproof compositions.—Relates to a composition and the method of applying it to render wood, fabric, lace, celluloid, and other materials fireproof. The ingredients of the composition are 15 parts of chloride of ammonia and 1 part of microcosmic salt. When wood is treated, it is first dried thoroughly, and then immersed in a hot solution of the composition. Fabrics and lace are simply immersed in the solution.

17,921. Stephen, J. Aug. 19.

Casting, moulds for. A design is indented on a thin sheet of copper, brass, or other ductile metal with a stylus, and is filled up by use of the stylus, or by rubbing either surface of the sheet. White plaster casts are made from the sheets and photographed, for the production of printing-blocks.

18,302. Grey, G. H., [*Hayward, J. W.*]. Aug. 25.



Asphalts. — Ground limestone is mixed with petroleum residue, and the mixture subjected to the oxidizing action of air, ozonized air, ozone, or oxygen to form an artificial asphalt. The materials are placed in a retort A, heated by gas or otherwise and turning upon a fixed tubular shaft C blocked at one point by a plug *a*. The air &c. is forced through the branch pipes K into the mixture and passes away by the pipe L. The oxidized material is drawn off at B'. The petroleum residue may be oxidized prior to its admixture with the limestone.

18,483. Steiger, J. Aug. 29.

Cements.—Relates to the production of a cement in dry pulverulent form which can be used in admixture with water and any suitable materials for the manufacture of artificial stone or artificial fuel blocks or briquettes, or for other purposes. Solutions of magnesium chloride and sodium or potassium silicate are mixed and reduced by evaporation to a dry substance, which is mixed with powdered magnesia to form the cement.

18,647. Steiger, J. Aug. 31.

Cements; statuary; stone, artificial.—Powdered calcined magnesite mixed with water is moulded into statuary, columns, ornaments, or other articles, which are exposed to the action of carbonic-acid gas to convert the magnesium oxide into magnesium carbonate again.

18,654. Steiger, J. Aug. 31.

Cements.—Hydraulic cement is prepared by mixing powdered slag, slagwool, scoria, or like

silicates with an approximately equal proportion of calcined and powdered magnesite. Such mixture may be used, either direct or after previous calcination, as cement by the admixture of water.

18,953. Jablónski, S., and **Niewiarowski, S.** Sept. 5.

Fireproof coverings and compositions.—Wood, pasteboard, or other material to be rendered fireproof is in every case coated first with a mixture of bicarbonate of potash and water-glass together with spirit varnish or a varnish composed of a solution of soda-lye heated with powdered colophony and water-glass. The material is then coated with a fireproof composition, of which the following three forms are described :—(1) a solution of water-glass mixed with the above varnish ; (2) a mixture of pulverized graphite, yellow ochre, chalk, sifted ashes, varnish, and water-glass ; (3) a composition consisting of the same constituents together with pulverized peat. Composition No. 2 is used for treating wood, while pasteboard for covering walls is given one or more coats of solution No 1. In manufacturing fireproof plates for chests, cupboards, strong-boxes, &c., pasteboard is thickly coated with No. 2 composition, and a series of freshly-coated boards is laid one upon another and allowed to dry under great pressure. Plates thickly coated with composition No. 3 may be united with composition No. 2. Layers of wire-work or hardened steel plates may alternate with the fireproofed pasteboard &c. Reference is made to Specification No. 13,065, A.D. 1897.

19,102. Wise, W. L., [*Boas, F.*]. Sept. 7.

Plasters ; fireproof coverings and compositions.—A fireproof material for use as a wall plaster &c. is made by adding an excess of chrysotile or serpentine rock to freshly-slaked lime or similar material, the lime uniting with the rock to form a calcium-magnesium silicate which binds the mass together. The material may be made into slabs, which can be nailed to the frame of the building &c. The chrysotile &c. and lime may be mixed together when dry, the mixture being treated with water before use.

19,579. Butler, J. W. Sept. 14.

Cements ; stone, artificial.—Relates to magnesian cement applicable for the manufacture of artificial stone, emery wheels, millstones, grindstones, hones, &c., or for billiard-ball compositions. Eubœan or Grecian magnesite is calcined and powdered and mixed with chloride of magnesium which has been heated together with the ashes of anthracite or bituminous coal. To the mixture are added small proportions of aluminium or potassium sulphate and dry soap. In the Provisional Specification magnesian limestone from Mansfield Woodhouse or Bolsover is mentioned as a substitute for the magnesite.

19,633. Collantier, G. Sept. 15.

Stone, artificial and imitation ; stonework, ornamental.—Relates to a coating-material for use in imitating stone by applying it to surfaces such as ashlar work, brick, metal, wood, &c. A mixture of turpentine, linseed oil, clear oil varnish, water, siccative, and white lead crushed with oil is added to a mixture of powdered grit or gravel, carbonate of lime, phosphate of lime, pumice, and talc. The composition is applied with a brush, and when it commences to set is rolled with an elastic roller to give it a regular grain. When hard, the surface is finished by rubbing with dry gravel or sandstone. When intended for treating mouldings or sculptures, the grit, white lead, and siccative are dispensed with. Stone joints may be imitated by drawing suitable lines with a dye diluted with a volatile oil.

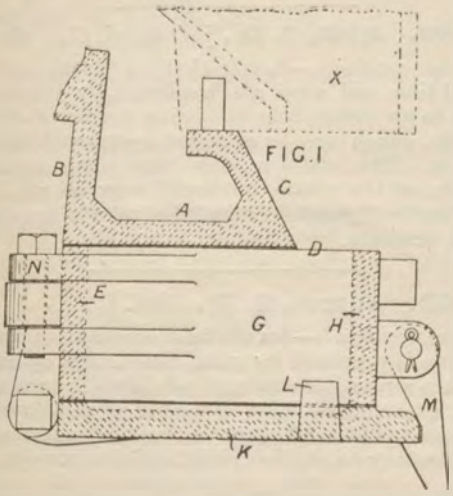
19,684. James, W. H., Wallis, C., and **Mackinnon, W.** Sept. 16.

Fireproof coverings and compositions ; concretes ; mortars.—Relates to a fireproof substance and composition applicable for use in the construction of fireproof buildings &c. The slag or clinker obtained from blast furnaces for the manufacture of iron or other metals, or from glass &c. furnaces, may be employed alone or mixed with Portland cement, lime, plaster, or other fireproof cement or mastic. It may be employed for fireproof fixing bricks, in the construction of partition walls, as an ingredient in concrete, in place of sand for mortar, for artificial stone, for casing ironwork &c., or for use as shingle &c. In laying a floor, the material is thrown upon the centering boards, and allowed to dry and set hard, after which the boards are removed.

19,843. Noltemeier, C. Sept. 19. *Drawings to Specification.*

Sound-deadening compositions. — Relates to the composition of a heat-insulating material, and to various forms of slabs, sleeves, and bricks suitable for heat insulation, or for deadening sound. The slabs, sleeves, or blocks are formed with air chambers or cavities. The material used for the hollow insulators is formed by boiling paper and pieces of asbestos in alum water, crushing the mixture, extracting the water, mixing with soluble glass and chalk into a firm paste, and finally moulding under great pressure into the requisite shape.

20,283. Brand, C. Sept. 24.



Casting.—Relates to moulds for casting paving-blocks &c. of slag, such as are described in Specification No. 15,561, A.D. 1895. The arm B is secured to the turntable which supports the moulds. The inclined face C serves to direct the slag from the hopper X into the opening D, when the surplus is allowed to overflow, a "head" being dispensed with. The end E of the mould and its further side are formed in one with the top A and arm B. The end H and the near side G form one part hinged at N to the end E. These being closed, the bottom K is raised, its side lugs L embracing the sides of the mould so as to keep it closed. The bottom is locked by the catch M pivoted to the end H of the mould.

20,396. Morrison, J. F., Allen, A. J., and **Rawstron, H.** Sept. 27. *Drawings to Specification.*

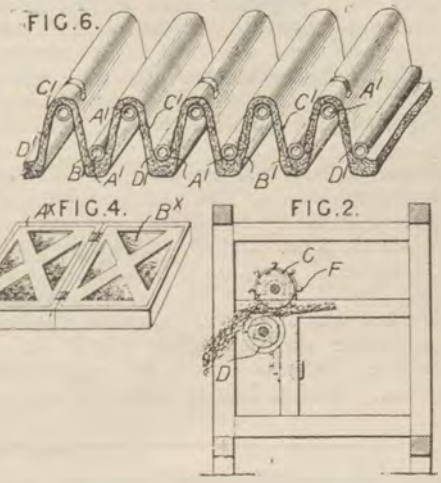
Asphalts.—One part of melted asphaltum is mixed with eighteen parts of comminuted iron and one part of powdered "Wahsatch Rock," which consists of limestone impregnated with asphalt. The mixture is employed as a filling-composition for brake shoes.

20,620. Hutton, W. R. Sept. 30.

Cements.—A mixture of dry sewage sludge, ground limestone, and coal schist is burnt in a reverberatory, cupola, or other furnace so as to obtain a clinker of cement.

20,645. Maussner, E. K. Sept. 30.

Fireproof coverings and compositions.—Relates to a fireproof or waterproof material, or both, applicable for buildings and structures, ships, railway vehicles, walls, partitions, doors, ceilings, floors, &c., or for mattresses and seats. In the production of the material, hair, tow, flax, moss, rattan or willow



fibre, asbestos, or other fibrous material is formed into a layer D^1, Fig. 6, between sheets of paper B^1, C^1, and arranged as shown upon a series of steam-heated pipes A^1, or heated rods or corrugated plates, for the purpose of curling the fibres and giving them strength and elasticity. After this preparation the fibres are interwoven or felted by passing the sheets between an oscillating roll D, Fig. 2, provided with a series of circumferential grooves, and a roll C bearing needles or hooks F. Grooved boards, wire netting, or chain-work may be substituted for the roll D, and to facilitate the felting operation the roll C may be caused to rise and fall as well as to rotate. Two or more layers of the fibrous material may be united by the interlacing of the fibres, the hooks drawing the fibres of the lower layers through the upper ones. The felted material may now be placed in position as a wall or ceiling covering &c., and then be coated with a fireproof or waterproof composition, or it may be saturated with the composition and be pressed or moulded, surface designs in relief being employed if desired. Wire netting may be introduced into the sheet in the course of manufacture to strengthen it, or the fibrous material $B^{\times}$, Fig. 4, may be enclosed in a frame $A^{\times}$ of metal, fireproof wood, &c., to form a slab which may be hinged when it is employed as a cover for pipes or wires &c. The fireproof and waterproof compositions employed may be of any well-known kind. The following materials are mentioned as constituents thereof:—Sawdust, blood albumen, ashes, slag cement, pulverized slag, india-rubber, gutta-percha, cork, woollen or cotton fibre, linseed oil, varnish, sulphur, chalk, zinc white, zinc chloride, white lead, gum-lac, paste, pulped waste paper, asbestos fibre, pulverized fluor-spar or dolomite, clay, pulverized glass, bone, wax, oil, pitch, turpentine, water-glass, and glutinous substances.

20,879. Forward, C. B., and **Davidson, J. M.** Oct. 4.

Asphalts. — Crude petroleum, petroleum tar, or heavy hydrocarbon oil is heated and mixed in agitators with sulphuric acid to precipitate the carbonaceous material. If crude oil is used, the lighter constituents are preferably removed by distillation prior to the treatment with acid. The carbonaceous matter, together with the acid, is in settling separated from the clear material above it, which consists of oils with a proportion of acid which can be removed by washing. The carbonaceous matter is freed from acid by washing, the acid being recoverable by distillation, and is mixed with heavy oil to form asphalt. The heavy oil may be that obtained in refining petroleum, or may be obtained by distillation of the oil obtained as a bye-product above. The heavy oil and carbonaceous matter are thoroughly mixed at a high temperature, at which they are maintained for some time. Marl or lime is added to the asphalt so prepared for paving purposes &c. For cheaper grades of asphalt the heavy oil may be omitted.

21,073. Abel, C. D., [*Westphal, C.*]. Oct. 6.

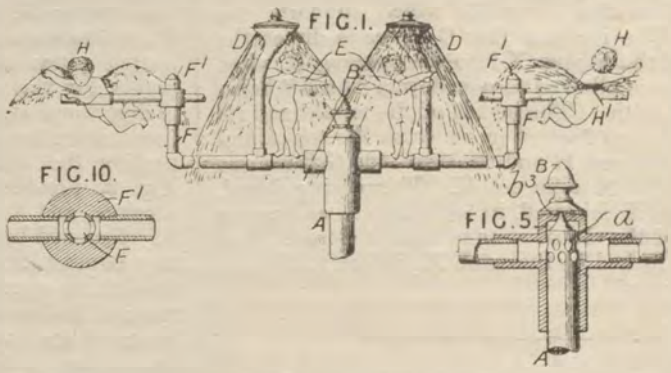
Stone, artificial.—Artificial stone blocks consisting of lime and sand are hardened by subjecting them to an atmosphere consisting mainly of carbon dioxide, which may be obtained by any well-known process. The reaction may take place in open vessels, or the steam produced may be retained. The hardening process may also take place under steam pressure.

21,533. James, T. W. Oct. 13.

Stone, artificial.—An artificial or imitation marble or stone is prepared by moulding under hydraulic pressure a plastic compound of blast-furnace slag, sand, gravel, and mica, together with colouring-material. The sand may be omitted, or silica in solution may be partly substituted for it.

21,855. Hollingsworth, C. M. Oct. 17.

Statuary.—In ornamental fountains spreading jets are combined with ornamental groups or figures so as to represent an integral part thereof, such as the wings of cherubs or birds. The jets may also be arranged to rotate or otherwise move the parts. In the example shown in Fig. 1, two semicircular jets D form niches for figures E, and also serve to rotate the fountain on the central pipe support A. Other figures H are mounted on rotating heads F^1, and are propelled by the reaction of jets H^1, which simulate the form of wings. These jets are also made intermittent or varying in strength by arranging the rotating head F^1, so as partially to close the holes in the top of the pipe F as it rotates as shown in Fig. 10. The rotating head B, as shown in section in Fig. 5, fits snugly over the pipe A, and rests on a centre b^3, the holes *a* allowing a continuous supply of water.



21,954. Wegener, C. Oct. 18. *Drawings to Specification.*

Slags, treatment of.—Relates to the treatment of the slag from refuse-burning furnaces with water, whereby the slag is obtained in small pieces. Beneath the slag outlet, which is a slit across the sole of the furnace, there is a long water trough into which slag bogies are introduced at one end and removed when full from the other end.

22,242. Kiefer, G. A. Oct. 22.

Stone, artificial.—Pulverized hydraulic lime is partially converted into calcium sulphate by the addition of sulphuric acid of 66° Bé., and is incorporated with sawdust, peat débris, dust, ashes, sand, pulverized slag, or other inert material. Calcined plaster mixed with a solution of borax is added, the mass being then run into moulds in which it sets to form an artificial stone. The plaster is obtained by a very complete calcination of gypsum, and must be absolutely anhydrous.

22,882. Boult, A. J., [*Gasse, P. A. J.*]. Oct. 31. [*Patent refused.*]

Stone, artificial.—In the manufacture of artificial stone or marble from a mixture of unslaked lime

with sand, ground marble, &c., the materials are mixed dry and placed within moulds of the desired shape, and are then subjected first to the action of a partial vacuum and then successively to steam and water under pressure. The moulds are finally dried by heat, preferably in a vacuum, which may be obtained by the condensation of steam or otherwise.

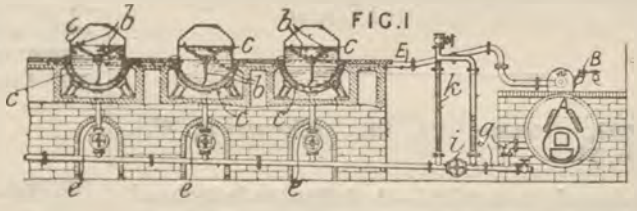
23,159. Vijgh, A. H. van der, Vijgh, H. van der, and **Vijgh, G. van der.** Nov. 3.

Stone, artificial.—Relates to improvements in the artificial stone composition described in Specification No. 25,380, A.D. 1896. According to this invention, the composition preferably consists of pumicestone, slag sand, hydraulic lime, tan (spent or unspent), and plaster of Paris.

23,702. Pattison, J. W. Nov. 10.

Asphalts.—Relates to apparatus for heating natural or artificial asphalt to any desired temperature for paving, or during manufacture &c. The heating-vessels C are provided with rotary agitators *b* and double bottoms *c*, which serve either as steam or water jackets. Steam is supplied to the jackets from a boiler A through the pipe E, its temperature being regulated by a safety-valve B between about 100° and 225° C. The condensed water flows back to the boiler through pipes *e*, *g*, the cock *i* being open, but, when a temperature only slightly exceeding 100° is required, the cock *i* may be closed, the steam then condensing until the jackets are full and the water reaches the top of the pipe *k*. The safety-valve is in this case adjusted to a pressure only slightly exceeding atmospheric. The apparatus may be mounted on wheels when required for paving &c.

FIG. 1



23,981. Stringfellow, J. H. W. Nov. 14.

Cements; asphalts.—Ground glass, flint, pumice, or like silicious material is mixed with a binding-agent such as pitch, shellac, bitumen, india-rubber, gutta-percha, &c. Fibrous organic material such as paper, peat fibre, &c., or inorganic material such as asbestos, may be added. The material, which is waterproof and acidproof, may be moulded or cast or rolled out into sheets, or may be used for coating metal, wood, stone, bricks, &c. It may be used for making boxes, tanks and cisterns, and tubing, and for lining and coating pipes and tubes, rods, &c. It may be superimposed on a framework of wire or other metal, forming slabs for walls, floors, and roofs, tanks, &c. The Provisional Specification states that it is suitable for use in constructing, repairing, and cementing articles of metal, stone, wood, &c.

24,086. Laffan, D., and **Bury, C. J.** Nov. 15.

Stone, imitation.—Glass or the like is painted to imitate marble, for columns &c. The back of the glass is first coated with a mixture of resin, size, alum, and ammonia in water, and dried. Colours such as Chinese blue, vermilion, gamboge, or a brown made by calcining Brunswick green, are mixed with water or methylated spirit, and sprinkled on the coated surface from a brush or sponge, or otherwise, the lightest being applied last, and dried. A thin coating of a mixture of white lead, terebene, and turpentine is then applied, and dried. A thick coating of whiting and size is brushed on, and after drying is covered with Brunswick black or gas tar, on which fine sand may be sprinkled, when the glass is to be set in plaster or cement.

24,378. Engels, E. W. Nov. 18.

Refractory substances.—A mixture of silica and carbon is applied to the surfaces of bricks, blocks, and slabs and to the walls of furnaces &c., and is fused by an electric arc to form a fireproof and acidproof covering of carborundum or carbide of silicon. A binding-substance such as tar is added to the mixture when it is to be applied as a lining to steel, reverberatory, or other furnaces.

24,629. Alexander, A. E., [*Peck, D. W.*]. Nov. 22.

Asphalts.—An artificial asphalt for paving and other purposes is prepared by heating and agitating coal tar or coal-tar pitch and resin together with petroleum residuum or heavy oil, and gradually adding sulphur together with further petroleum residuum. The vapours liberated should be carried off by natural or artificial draught.

24,630. Alexander, A. E., [*Peck, D. W.*]. Nov. 22.

Asphalts.—An artificial asphalt for paving and other purposes is prepared by heating and agitating coal tar or coal-tar pitch and resin together with petroleum residuum or heavy oil, and gradually adding sulphur to the heated mixture.

24,762. Lake, H. H., [*Campanato, G.*]. Nov. 23.

Stonework, ornamental.—A design made by hand or otherwise with fatty inks on wood or zinc is transferred directly or by means of prepared paper, as in ordinary lithography, to marble or other stone to be decorated. Acids are then applied, following the design, to form recesses, in which fusible pastes may be placed, to produce imitations of inlaid enamel work, mosaics, or cloisouné work.

25,155. James, T. W. Nov. 29.

Stone, artificial; casting.—Relates to the manufacture of artificial marble, granite, &c. The compositions are run into moulds, and when half dry are stamped so as to produce recesses imitative of the veins, grain, figuring, &c., which are subsequently filled with suitably-coloured material. The surfaces are finally worked with slips of plate glass to produce a durable glaze. The moulds may be lined with plate glass or tin, and ornamental portions may be formed in the moulds with a mixture of powdered resin and gelatine. The compositions described comprise the following materials:—For statuary or white marble: calcined chalk, mica dust, ground borax, and soluble silicate, and, for colouring-materials, oxide of manganese and slag. For black veined or Bardilla marble: ground slag, sulphuric acid, soluble silicate, calcined chalk, oxide of manganese, and elemi, and, for colouring-materials, calcined chalk and slag. For Kilkenny or green marble: soluble silicate, slate dust, slag, elemi, and chalk, and, for colouring-materials, salt, blue vitriol, sulphuric acid, chalk, elemi, and borax. For Devonshire red marble or spa: slag, calcined chalk, hydraulic lime, and soluble silicate, and, for colouring-materials, red and yellow oxides of iron, oxide of copper, soluble silicate, and elemi. For Aberdeen granite: red and yellow oxides of iron, powdered slag, slate dust, hydraulic lime, and chalk, and, for colouring-materials, oxide of manganese, blue-black ink, elemi, soluble silicate, chalk, and sulphuric acid. For grey or Portland granite: hydraulic lime, slag, chalk, yellow oxide of iron, soluble silicate, and mica dust, and, for colouring-materials, oxide of manganese, dry silicate, blue-black ink, calcined chalk, white vitriol, salt, and sulphuric acid.

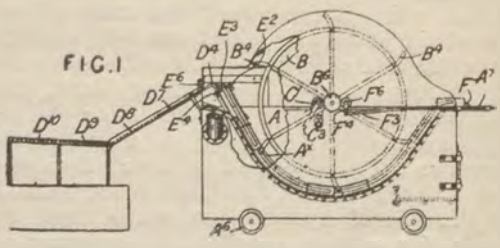
25,275. Boult, A. J., [*Carré, P.*]. Nov. 30.

Fireproof compositions.—Relates to a fireproof composition to be used as a coating for rendering materials non-inflammable. It may be applied to wood, fabrics, curtains, gauze, silk, muslin, &c., theatrical scenery, packing-paper, lamp shades, &c. It is formed of an aqueous mixture of boracic acid, sulphate, hydrochlorate, or carbonate of ammonia, and borax. Glue and colouring-matter may also be added to the composition.

25,304. Haddan, R., [*Koepp & Co., R.*]. Nov. 30.

Stone, artificial; casting.—In the manufacture of artificial stone by casting cement in moulds, a large proportion of the water is removed by suction before the mass has set, so as to enable the cement particles to expand freely in the act of setting. The suction is effected through apertures in the mould, case, &c. by the use of a vacuum of 40 to 50 cm. produced by an air pump or by water or steam jets, or by using a porous base to the mould consisting of gypsum, tufaceous stone, sponge, porous carbon, &c. covered with a fine mesh web.

25,638. McSweeney, J. Dec. 5.



Asphalts.—Relates to a cauldron and mechanism for coating paving-blocks with tar &c. A semi-circular tank A is placed over a furnace running on wheels A^6, and is provided with guides A^x. The blocks &c. to be coated with tar, liquid, or composition in the tank are fed from a table A^7 by a reciprocating finger F, worked by a crank F^4 and connecting-rod F^3, and pass into the guides, along which they are pushed by forks B^4 on a skeleton

wheel B rotated by a crank handle C^3 and gear C^1, B^6. The wheel B^6 is also geared with the wheel F^6 on the crank axle. After passing through the tank, each block is pushed by the next advancing block between spring guides and brushes or rubbers E^2, E^3, E^4, E^6, over the curved grating D^4, and on to the grating D^7, D^8, D^9, D^{10}, these gratings having their bars arranged alternately longitudinally and transversely. The rubbers or brushes are for removing superfluous tar.

26,397. Jung, C., Brecher, A., and **Kittel, A.** Dec. 13.

Fireproof compositions; stone, artificial.—Relates to a composition for use for fire-resisting purposes and as a substitute for coral or marble. The composition is prepared by mixing the casein from skimmed milk with cellulose, aniline or other colouring-matters, a resin solution such as gum sandarac and mastic, a resinous oil such as turpentine, and a small amount of amber solution. The mixture is treated at about 50° C., and is finally pressed into any desired shape.

26,472. Hentschel, J. Dec. 14. *Drawings to Specification.*

Refractory substances.—In a downdraught steam-boiler furnace or firebox the ashpit bottom is lined with a mixture of asbestos, graphite, fireclay, and water-glass.

26,811. McQuade, A., and **Smethurst, R. S.** Dec. 20.

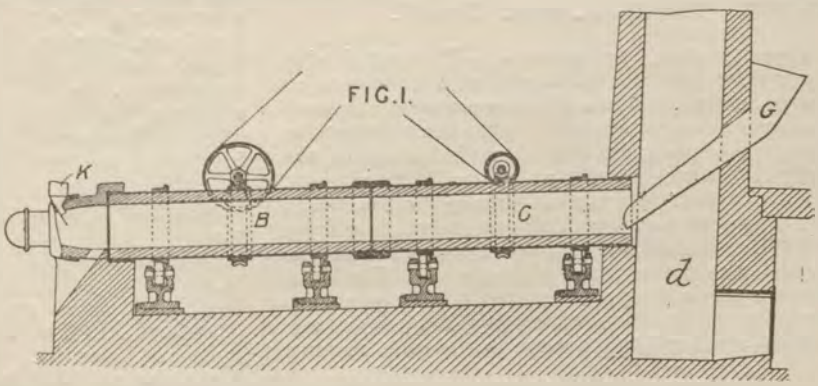
Stone, imitation.—Ground or granulated scrap leather is mixed with glue or gelatine dissolved in hot water, to form a thick paste, to which is added colouring-matter, formic aldehyde, castor oil, and glycerine. Paper or wood pulp, sawdust, or other like material may be substituted for the leather; other oils may be used, and varnish or gums may be added. The aldehyde may be omitted from the composition, and applied afterwards to the finished articles. The composition may be moulded to any form under pressure. A gelatine and aldehyde solution may be used to produce a polished surface on articles made of the composition.

26,957. Howarth, H. W., Howarth, J. E., and **Grant, T. W.** Dec. 21.

Fireproof compositions.—Cotton and other light fabrics are rendered fireproof by means of a solution of sal-ammoniac and borax with or without the addition of stannate of soda.

27,008. Forell, C. F. A. E. H. von. Dec. 21.

Cements.—Relates to the manufacture of Portland cement from limestone, chalk, or marl, together with clay, clay-slate, &c. The raw materials are introduced in a wet state through the charging-shoot G into the rotary furnace C, where they are dried, broken up, mixed, and brought to a red heat. They then pass to the more slowly rotating furnace B, where the fusing process takes place at a higher temperature in the more immediate neighbourhood of the pulverulent or gaseous fuel burner K. Fine dust escaping with the gases from the furnace collects in the space *d*. The furnace C may be situated above the furnace B, when space is limited. The furnaces C, B may be provided with a discharge chute and a charging-hopper respectively, so that the calcining and burning operations may be effected independently, thus enabling the calcined materials to be ground or otherwise treated before burning, when their constitution renders such additional process necessary.



27,118. Ingham, J. J. Dec. 23.

Asphalts.—Relates to a durable waterproof material or composition for bridges, viaducts, flat roofs, footways, cycle tracks, &c., to constitute either the exposed surface or, in the case of bridges

&c., to be covered with paving or macadam. Rock asphalt, bitumen, Stockholm tar, Norwegian tar, and Archangel pitch are boiled together, and some sand or grit is added to the mixture. The composition is spread on one, two, or more layers of canvas, brattice cloth, or other suitable material, and a covering of the same material is applied

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27,327. Bate, F. G., Oakes, A. C., an **Thom, T. M.** Dec. 27.

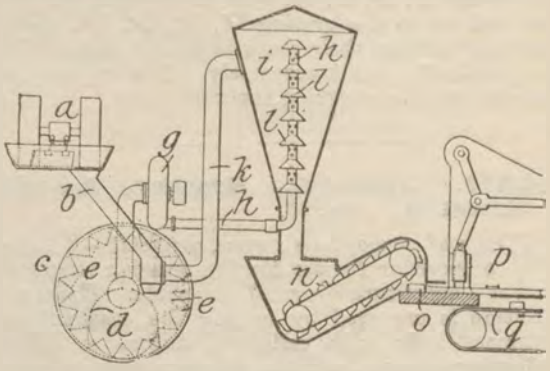
Stone, artificial.—Relates to the production of artificial stone for lithographic and other purposes. Limestone, preferably in the form of marble chips, is calcined in a close kiln with the aid of carbonic oxide and hydrogen, to which is added a supply of oxygen. The carbonic oxide and hydrogen are obtained from a Dowson gas-producer filled with coke &c. and worked with oxygen and steam. The carbonic-acid gas formed in the kiln is drawn off, washed, cooled, and stored for subsequent use. The calcined lime is slaked, sifted, mixed, and moulded into blocks or slabs of the required size. Vacuum pumps may be used to withdraw air from the moulds prior to the introduction of the lime. The dried blocks are impregnated with the carbonic acid obtained from the kiln, a pressure of 10 to 20 atmospheres being employed, or they may be placed in water into which the carbonic acid is forced by a pump.

27,339. Forell, C. von. Dec. 27.

Cement; slags, treatment of.—Triturated slag from blast furnaces is mixed with limestone in pieces and placed in a furnace arranged for continuous working and heated so that the temperature rises from less than 100° C. at the mouth of the furnace to a bright red heat at the hottest point. At the coolest part, the carbonic acid contained in the condensed moisture liberates the sulphur from the slag, which is subsequently dried and dehydrated as the temperature increases. The limestone is partially calcined at the hottest point, the materials being afterwards reduced to powder and burned at a high temperature in the usual manner.

27,431. Hastie, J., and **Gill, J.** Dec. 29.

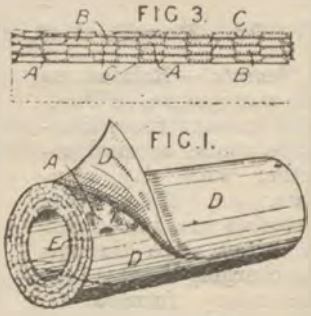
Cements.—Relates to a process for the manufacture of Portland or other cements. The raw materials, after drying, are fed to a mill *a*, passing thence by a shoot *b* to a mill consisting of a revolving drum *c* having within it a heavy edge-runner *d* and provided with elevators *e* for continually lifting and scattering the materials. An exhaust fan *g* produces an air current which conveys the materials which have attained the necessary degree of fineness through the pipe *h* to the depositing-chamber *i*. Conical surfaces *l* scatter the materials on to the inclined walls of the chamber, where they are sufficiently mixed in falling towards the conveyer *n*. The materials



are fed to a mould *o*, and are compressed by a plunger *p*. The blocks or bricks so formed are discharged on to the band *q*, which conveys them to a kiln, where they are burnt in the usual manner. A pipe *k* returns air from the chamber *i* to the drum *c*, a circulatory current of air being thus employed.

27,536. Bell, E. W. Dec. 30.

Fireproof coverings.—An insulating and fireproof covering for boilers, uptakes, pipes, electric conductors, &c. is shown in the Figures. For covering boilers and the like, the covering is in the form of a mattress made of layers of asbestos A, shown in section in Fig. 3, which are indented so as to form air chambers B. The indented layers are separated by plain layers C. As adapted for pipes and so forth, the asbestos layers are rolled into tubes as shown in Fig. 1, which are longitudinally divided at E so that each asbestos tube can be sprung into position on a pipe and covered with a layer of canvas D. The alternate layers of asbestos may be perforated instead of being indented.



27,606. Snowdon, J. Dec. 31.

Fireproof coverings and compositions.—Relates to a fire-resisting floorcloth for war or other ships and other structures. A backing of canvas or of asbestos fabric is employed. When canvas is used,

it may be fireproofed by means of chemicals or coated on the back with fireproof paint. The face of the canvas is coated with a mixture of incombustible materials, agglutinating-substances, and pigments. The incombustible material may be asbestos powder or fibre, kieselgühr, slag, talc, china clay, silicates, gypsum, &c., to which ammonium sulphate, calcium ammonium sulphate, or other fireproofing-salts are added. As agglutinating - substances oxidized linseed oil, linoleum cements, india-rubber, &c. may be used. Elasticity may be imparted by the addition of powdered cork or wood, or of peat. Ochres and other inorganic pigments are employed for colouring the material

A.D. 1899.

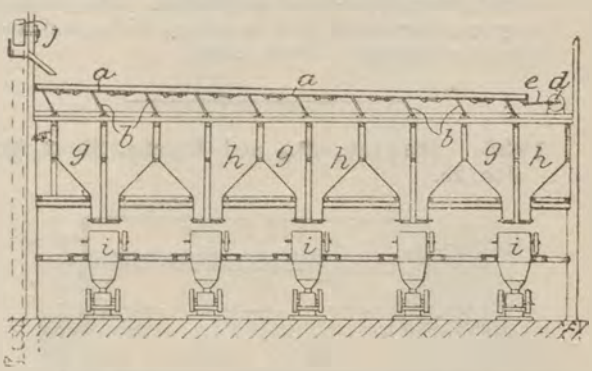
345. Simpson, H. V., and **British Non-Flammable Wood Co.** Jan. 6.

Fireproof coverings and compositions.—Relates to fireproof compositions for painting or covering the surfaces of wood or other materials. A fireproof zinc paint is prepared by mixing silicate powder, borax, ammonium phosphate, and sodium chloride with ordinary zinc paint, which may be white or coloured with pigments. The silicate powder may be obtained by pulverizing commercial slagwool. Aluminium hydrate may be substituted for the borax, or for a portion of it. The ingredients are preferably ground in oil before mixing them with the zinc paint, for which white lead may be substituted. The ammonium phosphate may be omitted or may be replaced by ammonium chloride. For exterior surfaces, whitening or lime solution may be used instead of the lead or zinc paint, with the addition of size or linseed or other oil. Silicate of soda may in this case be substituted for the silicate powder.

1302. Grabau, L. Jan. 19.

Cements.—Welsh or like slate and unburnt limestone are finely pulverized and intimately mixed in the dry state. Sufficient cement, or partly-burnt cement, is added to bind the mixture together after it has been slightly moistened and moulded or pressed. The blocks so produced are burnt in a suitable furnace, and ground to form cement. Any imperfectly-burnt blocks serve, when ground, as cements to be incorporated with the next quantity of raw material.

1573. Werths, H., [*Kleber, P.*]. Jan. 23.



Stone, artificial.—Quicklime is thoroughly mixed with from 8 to 15 times its own weight of moist sand in a mixing-machine, and, after a time, sufficient water is sprinkled or sprayed over the pulverulent mass in a second mixing-machine to just slake the lime. A little water or milk of lime is afterwards added to make the mass plastic. The mixture may be allowed to stand for a time, and is moulded under pressure into bricks or blocks which are hardened by subjecting them to the action of steam under a pressure of from 6 to 8 atmospheres for a period of from 3 to 10 hours. The Figure shows a method of supplying the material to the moulding-presses *i* by a conveyer *j*, a reciprocating perforated trough *a*, and hoppers *g*, *h*. The trough *a* is mounted on links *b*, and is reciprocated by a crank disc *d* and connecting-rod *e*. Each hopper is divided into two compartments *g*, *h*, to provide for alternate working, and to allow the charge in one compartment to stand to complete the hydration of the lime while the other

compartment supplies the matured mixture to the press below.

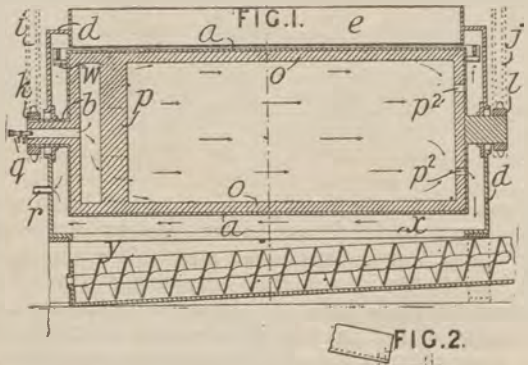
1664. Boisselier, G. A., and **Laurent, V. C.** Jan. 24.

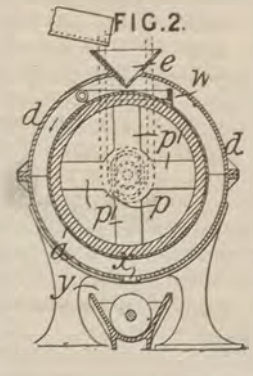
Cements; concretes; stone, artificial.—A cement or powder, containing 2 parts of carbonate of lead, 87 parts of carbonate of magnesium, 1 part of calcined alumina, 9 parts of pulverized feldspar, and 1 part of sodium hydrate, is mixed with a solution obtained by adding 1 part of alum to 16 parts of sulphate of zinc and 16 parts of magnesium chloride dissolved in hydrochloric acid. The paste or liquid cement thus produced is mixed with fragments or particles of stone, wood, coal, earthenware, gravel, sand, earths, &c., and the mixture is moulded into bricks, slabs, or paving-blocks for courts, stables, bridges, &c., or into mouldings, statuary, &c.

1745. Ross, J. Jan. 25.

Asphalts; fireproof coverings and compositions.—A composition adapted for flooring, roofing, and paving purposes, stated to be waterproof and practically fireproof, is prepared as follows :—Blue black clay and slaked lime, preferably kunkur, are mixed, ground, sun-dried, and burnt. The product is ground or sifted, and is mixed with sand and subsequently with molten pitch.

1756. Davies, P., and **Earle, E. J. V.** Jan. 25.





Cements.—Relates to apparatus for drying slurry into slip in the manufacture of Portland cement. Slurry from a hopper *e* is dried on the surface of a rotary cylinder *a*, the slip being detached therefrom by a scraper *w* and discharged through an opening *x* to a conveyer *y*. The cylinder may be suspended by chains *i*, *j* and sprocket-wheels *k*, *l*, and is lined with refractory material *o*. A liquid-fuel feeder *q*, such as that described in Specification No. 6703, A.D. 1898, projects into the hollow gudgeon *b* lined with refractory material so as to form a restricted passage such as is described in Specification No. 14,791, A.D. 1898. The evolved gases pass between the supports p^1 of a plate *p* into the cylinder, whence they pass through openings p^2 into the annular space between the cylinder and its outer casing *d*, having a pipe *r* connected with a fan or other exhausting-apparatus. In a modification, the drum is divided into three concentric chambers; to the outer chamber steam is fed, the condensed water being driven through a pipe having a thermostatic valve at its end; to the inner chamber air is fed, and passes thence through the intermediate chamber to the chamber *d*. The Provisional Specification describes a modification, in which the drum picks up the slurry from a trough arranged beneath it.

2800. Bartleet, F. Feb. 8.

Sound-deadening compositions.—Refuse or other cork in a granulated or powdered form is intimately mixed with a suitable adhesive, such as shellac, resin, &c., which may either be in the form of a powder, or dissolved in or mixed with a suitable solvent, such as methylated spirit, ether, alcohol, benzine, &c., or a solution of oxide of copper in ammonia &c. may be employed as the binding-agent. A suitable composition may be made with cork and an aqueous solution of shellac and borax. After mixing, the composition is spread out to dry, until all or most of the solvent has evaporated. It is then compressed in suitable moulds, baked or heated, while still in the moulds, to a temperature of between 200° and 300° F., allowed to cool, and withdrawn from the moulds, after which it can be turned, cut, sawn, polished, or otherwise treated, as desired. The composition so prepared is stated to be a non-conductor of heat sound, and electricity, and applicable for general building purposes, such as for building and paving blocks, tiles, and slabs, flooring planks, partitions, panels, mouldings, or carved work for walls, ceilings, &c.

2838. Landau, W. Feb. 8.

Stone, artificial and imitation.—Brooches, buttons, mounts for cigarette cases, and other articles are made of india-rubber or other vulcanizable material to imitate agate, marble, coral, or the like. A plaster mould is made in halves, in a metal box, from a wax, gutta-percha, wood, papier-mâché, or metal model of the article required. Variously coloured and shaped strips of vulcanizable material are arranged in one half of the mould, so as to project therefrom, and the other half is afterwards applied with pressure. Small pieces of metal, mica, mother-of-pearl, or the like may be applied at the same time. The mould is then clamped together, and heated to 160°–165° C. in steam for an hour,

to vulcanize the contents. When cold, the moulded article is removed, and finished by filing, cutting, sandpapering, brushing with oil and emery, and polishing with chalk and spirit.

3081. Wigley, H. Feb. 11.

Fireproof compositions.—Muslins, curtains, theatrical scenery, &c. are treated with a composition consisting of a specified proportion of ammonium sulphate and creosote, or, when used with distemper colours, of ammonium sulphate, gum arabic, and acetic acid.

3745. Knoch, P. Feb. 20.

Sound-deadening coverings. — Corrugated non-conducting plates for roofs of railway stations, engine sheds, &c., or for sound-deadening and weather-excluding layers of walls, ceilings, &c., are made from felt or from superposed layers of fabric connected together. The plates are steeped in chrome-gelatine, and when about half dry are pressed between heated metal plates with corrugated surfaces, or passed through heated fluted rollers. The plates are then treated with acetate of alumina, the outside coated with asphalt, and the inside with oil paint.

3826. Platz, R. Feb. 21.

Stone, artificial; fireproof coverings and compositions. — A composition of sawdust, powdered chalk, and water-glass, with or without colouring-matter, is moulded to any required shape, and is, when set, of stone-like hardness, fireproof, waterproof, and a bad conductor of heat. It may be polished and lacquered, and may be used in the manufacture of toy building-blocks, plinths, pillars, isolating-walls, floor and ceiling coverings, picture frames, inkstands, clock cases, trays, and other articles.

3961. Wetter, J., [*Güldenstein & Co.*]. Feb. 22.

Cements.—Portland cement is manufactured by granulating blast-furnace slag in water, drying the slag sand, grinding it with limestone and a small proportion of white lime, and moulding the moistened mixture into bricks which are burnt and ground to form cement.

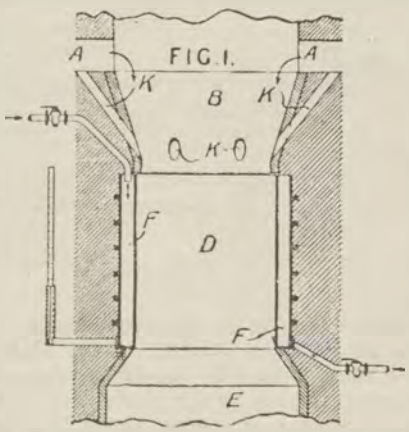
3970. Detsinyi, G. Feb. 22.

Refractory substances. — Potsherds, burnt or unburnt clay, bricks, calcined gypsum, meerschaum, calcined bones, pumice, &c. are saturated with catalytic agents which render the materials incandescent when placed, after preliminary heating, in combustible gases &c. in the presence of oxygen. The catalytic agents comprise salts of metals of the platinum group, manganese or iron peroxide, &c. Salts of metals of the iron group, or of the earthy metals, &c. may be used with the platinum salts or for a preliminary impregnation. Organic compounds may also be added. After saturation the materials are dried and rendered incandescent.

4241. Purvis, J. Feb. 25.

Cements; stone, artificial.—Dry unslaked lime is mixed with sharp clean sand or ground slag; steam is admitted to the mixture to give it the necessary degree of cohesion; the mixture is moulded into bricks, tiles, pipes, chimney pots, &c.; and the moulded articles are hardened by heating them in an atmosphere of steam to a temperature of from 80° to 100° C. for some 70 to 100 hours. Any suitable colouring-matter may be added to the mixture.

4252. Runge, P. Feb. 25.



Cements.—Relates to the burning of cement, lime, &c. in blast furnaces. The material to be burned is fed through apertures A in alternate layers with the fuel to the preparatory heating-zone B. Additional fuel may be fed through the channels K. While the material is slowly falling in the sintering-zone D, adhesion by baking to the walls of the furnace is prevented by the water jacket F. When the burning operation has proceeded far enough, the water is allowed to overflow from the upper edge of the water jacket into the furnace, so as to quench the sintered cement. The furnace is widened at E, to prevent injury to its walls by the overflowing water and to facilitate the dropping of the materials.

4400. Prentice, C. L. Feb. 28.

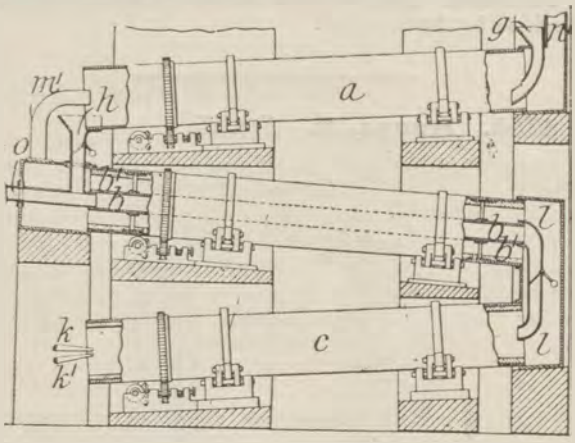
Stone, preserving.—Surfaces of stone, marble granite, &c. are cleaned from dirt, weather stains &c. without the use of acid, and are afterwards

indurated so as to present a polished or dressed appearance. The cleansing-composition, which is applied by a metallic brush or otherwise, consists of ether, chloroform, Cologne spirits, and ammonia. The indurating or dressing composition consists of alcohol and precipitated chalk.

4813. White, L. March 4.

Cements. — In the manufacture of Portland cement, powdered fuel is mixed with the slurry, which is then dried and burnt in a rotary furnace. The powdered fuel may be supplemented by solid, liquid, or gaseous fuel burnt in the furnace.

4814. White, L. March 4.

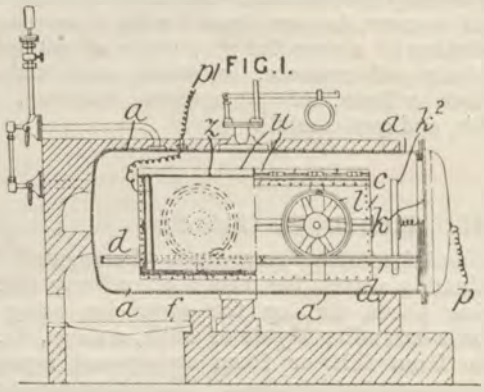


Cements.—Relates to improvements in the manufacture of Portland cement. Wet slurry is fed through the hopper *g* to the drying-furnace *a*, and is conveyed thence by the chute *h* to a calcining-furnace *b*, where it passes through a tube surrounded by a flue b^1. The calcined cement is clinkered in the furnace *c*, in which a high temperature is produced by a blast of flame from the gas and air pipes *k*, k^1. The flues *l*, b^1, m^1 and furnace *a* convey the gradually-cooling products of combustion from the furnace *c* to the chimney n^1. Carbonic acid, practically pure, is drawn off through the pipe *o*, and is passed through heated fuel to convert it into carbonic oxide, which is utilized in the clinkering-furnace.

5571. Christiansen, H., and **Krone, J. H.** March 14.

Concretes.— Relates to the manufacture of a porous material for the construction of walls, conduit pipes, draining-pipes, &c. The volume of the interstices in a mass of clean grained gravel or hard stone having particles of from two to five millimetres in diameter is ascertained by filling them up with water, which is afterwards drawn off. Cement is now added in smaller amount than the volume so measured, the resulting concreted mass being necessarily of a porous nature when dry. Well or pump pipes constructed of the material may be surrounded by pure sand.

5603. Coulon, E. March 15.



Stone, artificial.—Sand and lime are crushed together to an impalpable powder, and the mixture is placed in the dry state in moulds which are introduced into boilers or digesters and are immersed in water at 140° to 155° C. An electric current is passed through the mass to promote chemical action. The mould *c* may be formed with the top plate *z* alone removable, or the walls may be hinged to the base, being tightened up by wire ropes passing round ratchet pulleys. The joints of the moulds are provided with asbestos or wire-cloth linings which will admit water but prevent passage of the materials contained in the mould. To allow of expansion of the block of artificial stone, thin movable walls are provided within the mould separated from the mould walls by a layer of sand. Yoke-shaped iron bars, terminating in eyes to receive the chain of a crane, pass round these movable walls, and enable the finished block to be easily withdrawn from the mould. Wheels *l* running on rails *d* enable the moulds to be transferred to the boiler *a*, which is set in stonework above the fire-box *f*. The boiler is provided with a screwed end-plate *k*. Wires *p*, p^1 in communication with a source of electric current are connected with a copper plate k^2 and with the mould respectively. Ashes, scoriæ, bricks, stones, &c. may be substituted for the sand, and cement for the lime. Reference is made to Specification No. 23,018, A.D. 1895.

5755. Lauermann, A., and **Gaze, H. E.** March 16.

Plasters.—100 lbs. of gypsum, 8 lbs. of infusorial earth, and 10 lbs. of wood or paper pulp (containing 35 per cent. of cellulose), are mixed, and added to 12 lbs. of East India rubber in semi-liquid condition, and 80 lbs. of water. The mixture is spread in layers in a mould, with intervening layers of aloe, jute, or other fibre, of which 10 lbs. are used, the fibre being worked in by

dabbing with a brush. The mixture is allowed to set for an hour, and then dried. The proportions may be varied. Cornices, ceiling ornaments, and other articles, ornaments, or surfaces are thus made.

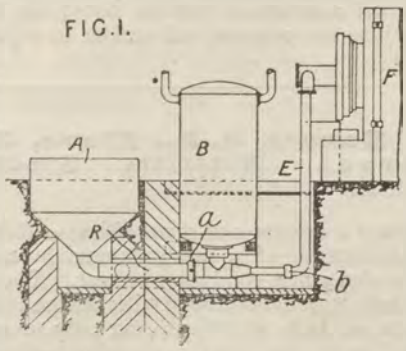
5858. Parietti, A. March 17.

Refractory substances.—A refractory substance composed of silicate of magnesia, mica, graphite, talc, and porphyrized asbestos is employed for the manufacture of firebricks, furnaces, crucibles, &c. It is especially applicable for furnaces or crucibles for the production or fusion of calcium carbide, aluminium, and platinum.

5860. Lake, H. H., [*Fellner & Ziegler*]. March 17.

Cements.—A feeding-appliance for drying-drums, mixing-apparatus, and the like is shown in side elevation in Fig. 1. The collecting-tank A is connected by a pipe R to a vessel B, which is connected to the drying-drum &c. F by the pipe E. The pipes are fitted with valves *a*, *b*. By means of an air pump or otherwise the pressure in the vessel B is reduced so that the sewage sludge, cement constituents, or other material in the collecting-tank is drawn into the vessel. The material is then forced into the drying-drum &c. by means of a force-pump. The operation can be made continuous by using two intermediate vessels.

FIG. 1.

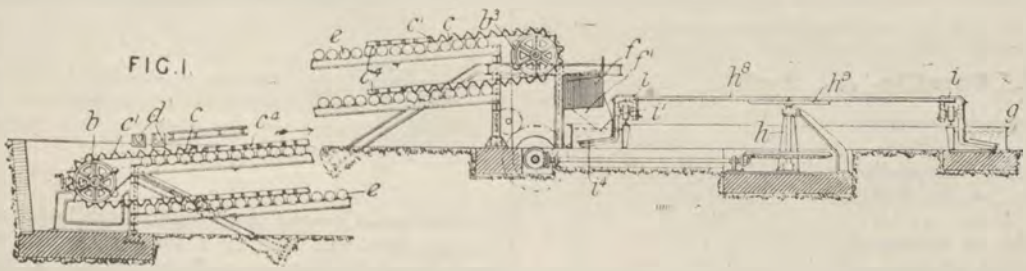


6311. Gehre, F. March 23.

Stone, artificial.—Relates to the production of artificial stone. Boracite, stassfurtite, borate of magnesia, or their respective residues left after the separation of the boron, are mixed, either singly or two or more of them added together, with pulverized carbonate of lime in a crystalline or compact state. The boracite &c. may be mixed with hydraulic magnesia, or the latter may be used alone. The mixture is brought into an aqueous solution of chlorides, such as the chlorides of zinc, aluminium, ammonium, magnesium, &c, used alone or mixed together. Paper fibre is used as the filling-material for this mixture. The paper fibre is prepared by acting upon it in a fine moist state with boracite &c., with one or other of the chlorides, and with carbonate of lime. The paper fibre may be coloured.

6339. Hawdon, W. March 23.

FIG. 1.



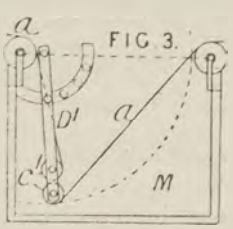
Casting.—Relates to apparatus of the kind described in Specification No. 14,803, A.D. 1887, for use in casting molten iron, slag, or other material run from furnaces or the like. The moulds *c*, having overlapping edges c^1, are provided with lugs formed with apertures for receiving the transverse bars of endless chains c^4, which travel over sprocket-wheels *b*, b^3. The chains are prevented from sagging by rollers *e*, mounted in bearings placed beyond the ends of the moulds. Two endless chains, each with its series of moulds, are preferably placed parallel to each other, and the metal &c. is run into the moulds from a bifurcated runner *d*. The pigs &c. are discharged upon an inclined grid *f*, terminating in a shoot f^1 which directs them on to an annular platform i^4, which is supported by a large number of hangers *i*, mounted upon wheels i^1. The hangers are attached to arms h^8, secured to a wheel or circular frame h^9, which is carried by a shaft *h*, rotated by means of the engine driving the endless chains c^4. The platform i^4 is immersed in water contained within an annular tank *g*, which has a lateral enlargement or well within which is an inclined grid or platform for receiving the pigs &c. from the platform i^4, whence they are swept by a fixed deflecting-plate.

The pigs may be raised from the platform in the well, and discharged into wagons by means of an elevator comprising endless chains provided with projecting arms which pass between the several members of a series of parallel bars; the upper ends of these bars are suitably curved so as to direct the pigs into the wagons, and end in an adjustable inclined plate.

6944. Romney, H. R., Thame, J., and **Fibrous Materials Syndicate.** March 30.

Fireproof coverings and compositions.—Relates to the manufacture of a non-inflammable material which is also a non-conductor of heat. The refuse of coco-nut husk is combined with fibrous materials such as paper pulp, wood pulp, rag pulp, or asbestos fibre and mica &c., and magnesium silicate or carbonate, with or without sodium silicate, are added. The materials are intimately mixed in the presence of water, and the mass is moulded to the desired form in perforated moulds under hydraulic pressure. The moulded articles are dried in a current of hot air. When sodium silicate is employed, silica may be liberated by the addition of an acid or a carbonate. In the manufacture of coverings for boilers &c., the materials are mixed dry, water or a solution of sodium silicate being added when the material is to be applied to the surface of the boiler &c. A plastic fireproof material may be prepared by saturating coco-nut husk refuse with a solution of sodium silicate and treating with acids or acid salts. The excess of sodium silicate, or the soda salt produced, is removed by filter-pressing or centrifugal extraction, and asbestos fibre is added to the mass. The coco-nut and asbestos fibres are treated together in an opening-machine to thoroughly intertwine them. A small proportion of lime may be added when a hard and porous material is required. The material is applicable for panels to protect ships' bunkers.

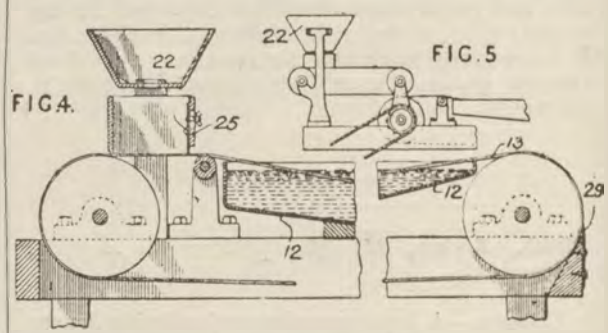
7237. Camille, A. April 6.



Fireproof coverings and compositions.—Canvas, tarpaulins, roofing felt, &c., which have been waterproofed by means of a mixture of tar and other materials, may be fireproofed by passing them through a solution of sodium silicate and sodium tungstate. The fabric *a* is guided through the tank M, containing the solution, by rolls c^1 mounted on adjustable arms D^1.

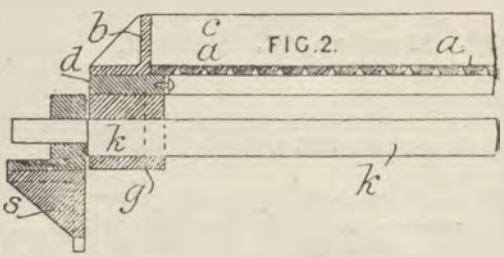
7789. Lake, H. H., [*Sackett Wall Board Co.*]. April 13.

Cements; plasters.—Relates to a process for the addition of water to cement, plaster-of-Paris, &c. applicable in the manufacture of plaster board &c. The material is moved in an even layer and in an unagitated condition through a liquid bath at such a speed that the material is thoroughly saturated



in its passage. Fig. 4 shows apparatus which may be used. A carrier band 13 is led through a long tank 12 and under a depressing-roller. The plaster is fed on to it from a hopper 22 and under an adjustable gate 25, or an auxiliary feed-band may be used as in Fig. 5. The saturated plaster is removed by a scraper 29.

8084. Baker, W. H. April 18.



Casting.—Cement or concrete building-blocks or paving-slabs are cast in a mould formed with a perforated bottom *a* and detachable angle-iron sides *b*, *c* clamped to a rectangular frame *d*. Lugs or projections of the frame *d* enter recesses in a lower frame *g*, and pivoted latches fasten the frames together. The frame *g* is mounted loosely on an eccentric portion *k* of a shaft which is rotated by a handle for the purpose of rocking or agitating the mould. Levers carrying antifriction rollers are pivoted to the frame *s* under the sides of the frame *d*, and normally support the sides of the mould. When the filled mould is rocked, the frame *d* bumps on the rollers, and causes the cement to settle down evenly. A sheet of damp porous paper is placed on the perforated mould bottom before the material is placed in the mould. When the cement in the mould has set sufficiently,

the supporting-lever at one side is turned back out of the way, the mould is reversed, a trolley with an inclined platform is run under the mould, the sides of the mould are unclamped, and the block or slab is gently received by the inclined platform.

8128. Maloney, J. April 18.

Cements.—Chalk is dried, saturated with a solution of alum, pearlash, and borax, drained, burnt in a muffle kiln, and ground to form cement.

8210. Hopps, W. E. April 19.

Cements.—Portland cement is prepared by grinding chalk, sand, sodium carbonate, and gypsum to an impalpable powder, and mixing them in the proportions of 123 parts, 26 parts, 5 parts, and 4 parts respectively. The materials are passed through a brick-making machine, and the bricks are burnt in a kiln, the resulting clinker being crushed and finely ground. For the sand may be substituted roasted flints or a sandy clay or mud.

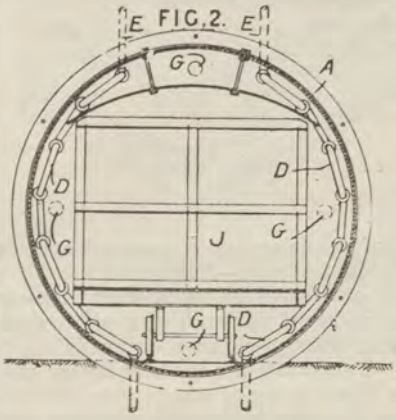
8395. Pletzner, C. April 25.

Casting.—Relates to a light sensitive film capable of producing photographic images in high relief, which can be used as moulds for obtaining casts or the like. The sensitive film consists of a mixture of agar-agar and pure gelatine sensitized with chromate. From an ordinary negative a positive print is taken on the special film. This is developed by the action of water, and a positive cast is taken in plaster-of-Paris. A negative cast is likewise obtained from the positive print. Plastic clay is pressed into the negative cast, and the corrected positive cast, coated with shellac, is pressed down on the clay, to which it adheres and forms a backing. The positive cast is corrected by hand. Variations in the method of obtaining the moulds are described. When the articles are made of ceramic ware, they may be coloured before firing.

9360. Gernaert, J. May 3.

Stone, artificial. — Artificial veined marble is obtained by the fusion and mixture of substances varying in fusibility, or exposed to varying degrees of heat by successive additions in the furnace, or separately fused more or less perfectly before mixing. Thus a mixture of sand, opaline, sodium carbonate, lime, and bichromate of potash heated until the sand is completely fluidified produces a green marble veined with green. A brown marble is obtained by fusing a mixture of sand, sodium carbonate, lime, oxide of copper, and iron filings or iron oxide, scale, or waste. White-veined marble is made by fusing sand, sodium carbonate, and opaline together and adding a fused colouring-material such as oxide of lead or black glass. Decorative covering-plates are made by casting and rolling the composition on tables, and re-heating, smoothing, grinding, and polishing the sheets produced.

9441. Alexander, H. May 4.



Stone, artificial.—A chamber for drying and hardening bricks, artificial stone, &c. is shown in transverse section in Fig. 2. A cylindrical chamber A has closed ends, one or both of which is removable to allow trolleys J containing the bricks &c. to be run into the chamber. Hot air, steam, or hot water entering through pipes E circulates through coils D and dries the bricks. Steam or other fluid at a high temperature and pressure is then admitted through one or more perforated pipes G, for the purpose of hardening the bricks.

9671. Schenkel, J. May 8.

Fireproof compositions.—Relates to a process and material for impregnating wood to reduce its combustibility, without disintegrating the fibres. 50 to 100 parts of burnt lime are dissolved in a solution containing 100 parts of water, or in a 15 to 20 per cent. lye of calcium chloride. The wood, which may have been previously dried or placed in a vacuum, is soaked in this solution without boiling.

9687. Morck, J. D. May 8.

Slags, treatment of.—For preserving hygroscopic and decomposable substances and rendering them suitable for transport, the substances are mixed with non-hygroscopic bodies, and a material which will render the mass loose or porous. Or the two latter may be first mixed together and then added to the body to be preserved. As non-hygroscopic bodies, there may be used fats, oils, petroleum, and the like, and as loosening-materials infusorial earth and the like. Or waste products combining both requirements may be used, such as soot, dried and powdered lignite, coal, &c. Among the articles which may be thus preserved is phosphate slag.

9784. Lantzke, A., and **Juenger, A.** May 9.

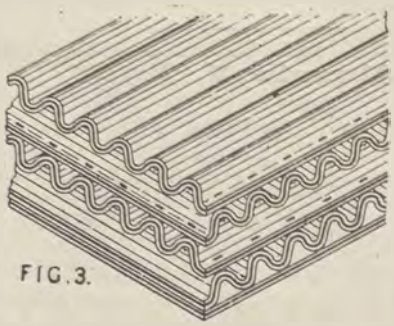


FIG. 3.

Fireproof coverings and compositions; sound-deadening compositions.—Relates to flexible sheets for lining or wrapping pipes, flues, boilers, and bulkheads in ships, for wall and other coverings, and for fireproofing buildings or insulating heated surfaces. The sheets are in three layers, the inner and outer layers being of nearly pure asbestos, and the filling or core of fibrous material saturated with incombustible hardening-solution, such as sodium silicate. The composite sheets are run between heated corrugating-rollers, thereby forming corrugated sheets as shown in Fig. 3. Coverings or building-blocks may be composed of several layers of sheets which are laid crossing each other. The material is formed in sheets, or in tiles and building-blocks, and is sound-proof.

9816. Stevens, C. W. May 9. *Drawings to Specification.*

Stone, artificial. — The Specification describes methods of moulding building-blocks or tiles from an artificial stone consisting of ground natural stone mixed with cement.

10,338. Dunlop, H. May 16.

Asphalts for wood-block paving. The blocks are covered with a composition or asphalt consisting of ½ cwt. of caustic soda and 3 cwt. of resin boiled in water and cooled, to which is then added 2 cwt. of basalt or other igneous rock screenings, 1 cwt. of Portland cement, and 2 cwt. of calcined clay. The composition, when set, is covered with a coat of a second mixture consisting of 2 cwt. of bitumen, 1 cwt. of resin, 2½ gallons of boiled linseed oil, and 12 gallons of Stockholm tar, boiled to a liquid state and then mixed with 2 cwt. of basalt screenings, 2 cwt. of calcined clay, and any required quantity of sand. The second mixture is applied hot, and when cold is sanded and rolled several times.

10,618. Willner, S. May 19.

Fireproof compositions.—Relates to a process and compositions for hardening wood and rendering it fireproof and waterproof. The wood is placed in a closed receptacle, and subjected to a boiling temperature till all the moisture is driven out. The receptacle is then exhausted, and a spray of a solution containing tungstate of soda and gelatine or ammonia and soluble glass or mica admitted. Pressure is now applied to force the solution into the pores of the wood. This solution is then run off, and the wood is treated in the same way with a solution of formic aldehyde.

10,671. Pilkington, W. W., and **Ormandy, W. R.** May 20.

Refractory substances.—Crucibles are made from the waste sand of glass-grinding works. The waste sand, graded in water or otherwise, with or without the addition of other material, is pressed, while damp or dry, into the required shape. The moulded article is then heated until the glass particles in the sand slightly frit so as to bind the mass together; it is then slowly cooled.

10,777. Patterson, W. J., and **Acklin, A. M.** May 23.

Casting.—Relates to the casting of slag in a series of moulds which are secured to an endless carrier and pass through a tank containing water for the purpose of cooling the slag. Fig. 3 is a plan, and Fig. 4 a cross section, showing the moulds and carrier. The moulds *h* are formed with perforated lugs h^1 fitted upon pins *g* which pass through apertures f^4 formed in filling-pieces *f*, Fig. 6, fitted within the links *d* of the carrier. The ends of these filling-pieces are semicircular, and fit snugly against the bent axles *e*, Fig. 4, which connect the links and carry wheels *k* running on rails *r*. The inner sides of the links bear against clamps *i* which are tightened upon the axles by means of bolts. Bifurcated lugs h^2 on the moulds engage with the vertical portions of the axles *e*. The

FIG. 3.

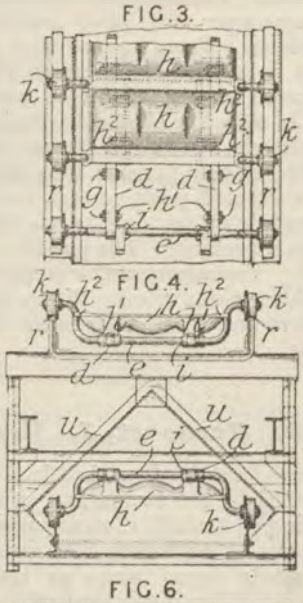
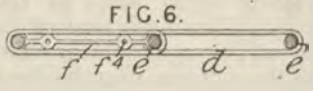


FIG. 4.

FIG. 6.



wheels *k* are mounted upon the axles between collars and split rings fitted within annular grooves. In the lower part of the water tank are pockets which are provided with cleaning-holes. Inclined shields *u* are placed beneath the upper moulds at the casting end of the apparatus. In a modification, the axles are prevented from turning by lugs on collars mounted on the axles ; these lugs enter the open spaces in the links. The bearings of the wheels are protected by hoods. In another modification, the tank extends the whole length of the apparatus ; the sprocket-wheels supporting the carrier are polygonal, with removable corner pieces acting as drivers for the carrier, and the wheels of the carrier are formed with pockets to receive absorbent material, which becomes saturated as the wheels pass through the water tank and serves to lubricate the bearings. The water tank has a horizontal part and an inclined part into which the water is introduced by spray pipes ; the water level in the horizontal part of the tank can be adjusted by means of boxes, attached to and communicating with the tank, and made of two sections, one of which is vertically adjustable and is hinged or otherwise attached to the other.

10,798. Wheeler, J. A., and **Eells, S. W.** May 23.

Stone, artificial ; fireproof compositions.—Relates to plastic compositions applicable as substitutes for wood and stone and for the manufacture of bath tubs, burial caskets, hollow-ware, and like articles, or for flooring, wainscotting, doors, &c. The chief material in the compound is fibrous pulp, preferably wood pulp, but, when the composition is to be fireproof, the wood pulp is replaced by asbestos fibre mixed with ashes, talc, &c. The pulp or fibre is moistened with water and mixed with potassium or sodium silicate, the doughy body so obtained being kneaded with pulverized lime, moulded into the required form, and baked in a suitable kiln. White lead, zinc white, or slaked quicklime may be added when the finished article is to be white. Pulverized resins or gums may be added to the wood pulp, the compound so prepared being well adapted to resist hot water and alkali soaps. Calcined pulverized magnesite, soaked in chloride of magnesia or other chloride, may also form a constituent of the compound. The moulded article may be hardened by applying a solution of magnesium or other chloride to its surface.

10,904. Schulthess, W. May 24.

Stone, artificial.—Compressed artificial sandstones are formed from blocks of a mixture of sand and slaked lime, by submitting them to the action of superheated pressureless steam. The steaming-chamber has a containing-vessel 1, divided into three horizontal compartments,—an upper open one 11 into which the blocks are placed through a door 36 so as to rest upon a perforated floor formed of beams 2 ; a middle one, which is divided up into smaller compartments 16, and is heated by steam entering the central compartment through the tube 18 and passing to the outer compartments by curved tubes at the opposite end,

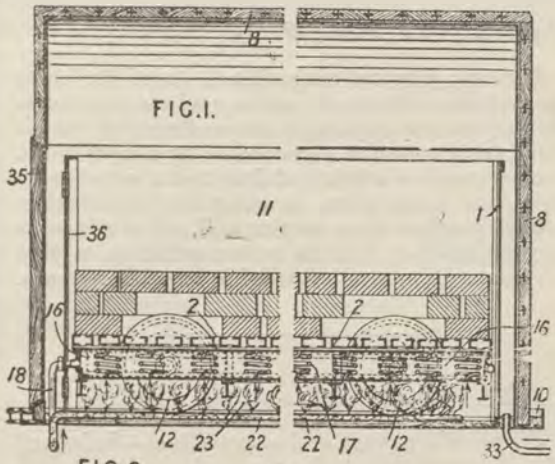


FIG.1.

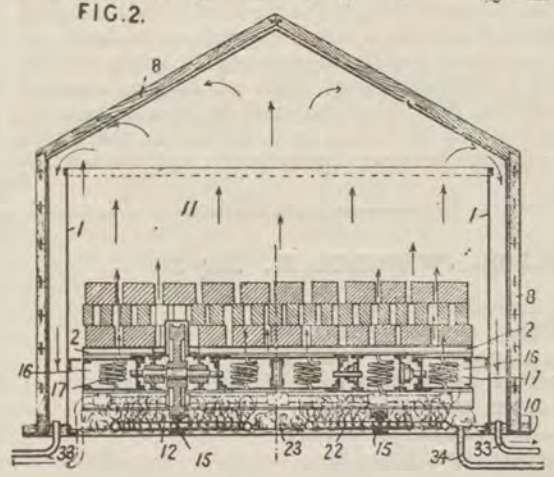


FIG.2.

and also by another steam supply pipe not shown ; and a lower one 23 into which steam at a temperature of 97° C. is injected through a perforated coil 22. The two lower compartments form a carriage running by means of wheels 12 upon rails 15. The steam entering the middle compartments is at a temperature above 100° C., and the steam from the lower compartment passes through coils 17 arranged in the middle compartments to be superheated, and thence to the vessel 1 to produce the chemical change. The vessel is covered by a casing 8 formed of wood, and provided on the inside at some slight distance away with an inner covering of thin sheet zinc. A door 35 is provided. The casing dips into a liquid lute 10, from which the condensed water overflows through a tube 33, while that accumulating within the chamber 1 escapes by a siphon 34. In a simplified form, there is only one compartment below the steaming-chamber. The whole apparatus is heated up by a steam coil, while steam for acting upon the blocks enters through a perforated coil in the lower compartment, and, becoming superheated therein, passes upwards to the steaming-vessel.

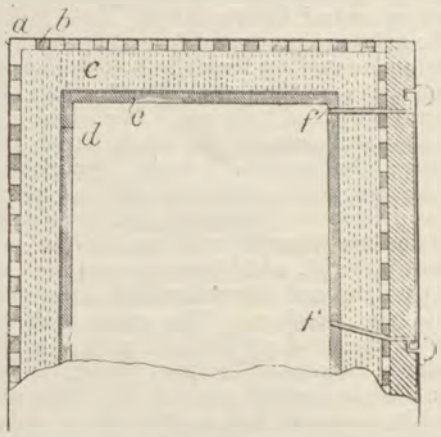
The formation of the blocks of calcium silicate is effected in from 8 to 48 hours.

11,078. Chrystal, W. J. May 27.

Mortars; fireproof compositions; sound-deadening compositions.—Relates to mortars suitable for building purposes and applicable also as fireproof, soundproof, verminproof, or non-conducting compositions. The composition consists of lime waste, vat or soap waste, and sand, ashes, or other silicious matter, ground together in a mortar mill. The materials may be dried or roasted before grinding, so that the composition may be stored in bags like cement.

11,167. Niewiarowski, S. May 29.

Fireproof coverings and compositions.—Safes and other fireproof receptacles are filled in with a known fireproof material *c*, which expands under heat, and is composed mainly of water-glass, spirit varnish, and a binding-cement made of baryta, alumina, graphite, &c. This material is in the form of slabs joined by fusion, or is applied in the plastic condition between pasteboard and united by pressure. Wood gratings or frames *b* are placed round the mass *c* between it and the outer walls *a*. The fireproof material surrounds the inner walls or wooden lining *e*, which may have an outer

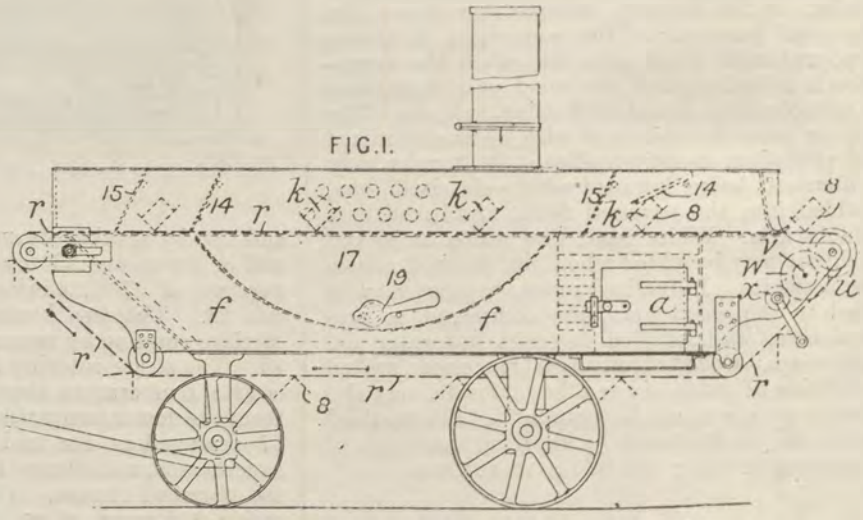


metal covering *d*, and at the door fronts &c. the fireproof mass is covered with a thin wooden sheathing *f*. When heated by fire, the mass *c* expands, and fills the interstices between the woodwork, or the spaces left when this burns away, and hermetically closes and protects the inner walls or lining *e*.

11,302. Whitfield, R. May 31.

Asphalts. — Paving-blocks, stones, pitch concrete, &c. are treated by heating to recover the pitch, a receptacle in the furnace receiving the melted pitch, which can be drawn off as required. Various forms of apparatus may be employed. In the form shown, the products of combustion from the firebox *a* are passed through flues at the top and through the space *f* about the receptacle 17, from which the pitch can be drawn off by the valve 19. Through the central upper flue passes a conveyer consisting of an endless chain *r* with brackets 8 for the paving-blocks &c. *k*. The conveyer is worked from a handle by gear *x*, *w*, *v*, *u*. Suitable doors &c. are provided, and flaps 14, 15, 14, 15, lifted successively by the brackets 8, prevent escape of hot gases. The apparatus may be used as an ordinary pitch cauldron.

FIG. 1.



11,333. Simpson, H. V. May 31.

Fireproof compositions.—Relates to a method of treating wood to render it non-inflammable, waterproof, and non-corrosive. The wood is placed in a receiver into which solutions of salts are forced

at a pressure of from 250 to 300 lbs. per square inch. The solution is then removed, and the receiver exhausted. Live steam is then admitted, to cause ebullition of the solutions in the wood. This process is repeated as often as necessary. The salts in the solution are such as become insoluble when the solution is concentrated. Phosphate of ammonia, sulphates of ammonia, and sulphates of zinc or magnesia are preferably used in the solution.

11,435. Bremer, H. June 1. *Drawings to Specification.*

Sound-deadening compositions. — Cork chips, waste cork, &c. are finely divided by suitable machinery, and mixed with a binding-agent, such as lactein, casein, or a resinous india-rubber or other preparation, the mixture being employed to form a backing or underlayer for linoleum, oilcloth, felt or other carpets, mattings, paperhangings, and wall coverings, &c., to which it is affixed by pressure. The backing so prepared is stated to be moisture-proof, draught-proof, soundproof, and a bad conductor of heat. The material may also be made into boards for use in the manufacture of boxes &c

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11,536. McLean, J. H. June 2. *Drawings to Specification.*

Stone, artificial.—An artificial stone especially suitable for paving purposes is made of burnt clay or burnt ballast, which is pulverized and mixed with Portland cement and water so as to produce a thick slurry, which is moulded into slabs or bricks.

11,544. Elbers, A. D. Nov. 19, A.D. 1898, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

Slagwool, preparation of.—Blast-furnace slag to be blown into slagwool is desulphurized by melting it in a cupola furnace together with a small proportion of gypsum or other sulphates of the alkaline earths. The cupola is charged with layers of coke, slag, gypsum, and slag in the order named, or materials such as quartz, limestone, oyster shells, &c. may be used instead of the slag. The molten charge is blown by steam jets in the usual manner. Natural anhydrous gypsum is preferable to the hydrate, or the rock may be calcined. If any appreciable proportion of the gypsum becomes reduced to sulphide, it will be found preferable to attach a hopper to one of the tuyères, and blow the gypsum into the melting charge.

11,637. Wise, W. L., [*Culmer, G. F.*, and *Culmer, G. C. K.*]. June 5.

Asphalts.—Relates to fluxes derived from petroleum residues for incorporation with natural asphalts to form asphaltic cements for paving and roofing purposes, lining water reservoirs, coating iron or other metal pipes, &c. Petroleum residuum of about 18° to 22° Bé sp. gr. is heated in an open kettle to from 300° to 450° F., watery vapours being given off during the process. Air is then forced through the liquid in considerable quantities, the temperature being maintained constant. The resulting oxidation causes the proportion of asphaltine, as determined by extraction with carbon bisulphide, to increase from a small percentage to one-fourth of the whole amount, the specific gravity remaining, however, almost unchanged. The flux so prepared is combined in the proportion of 50 to 80 per cent. with Trinidad asphalt, uintahite, gilsonite, wurtzilite, elaterite, or other bituminous materials for the purposes named above. Heavy crude oils, such as are found in California, may be substituted for the petroleum residuum.

11,712. Zellenka, R., Kolbinger, J., and **Hagyi-Ristic, S.** June 6.

Casting.—Relates to moulds for casting magnesium compositions and similar cements, and has for its object to provide an acid-resisting mould material which will enable castings such as plates, type-boxes, type for posters, ornaments, &c. to be accurately and cheaply produced. The material consists of a mixture of equal parts of sulphur and Portland cement together with about 10 per cent. of iron filings. Sand, brick-dust, ashes, &c. may be used instead of the cement. The mould prepared from this composition is saturated or coated with molten sulphur, and portions which are to produce flat surfaces in the casting are preferably formed of ground sheet glass or metal.

11,805. Rouse, T. June 7.

Concretes; stone, artificial.—Portland or similar cement is mixed with ordinary proportions of sand and gravel, or with broken granite, clinkers, coke breeze, or other material usually employed in preparing concrete. After moistening and mixing, the composition is put into moulds and consolidated by rocking. The moulds are placed in a closed chamber and treated with steam, the temperature being allowed to rise slowly to 212° F., pressure being applied in any suitable manner. After heating for some days, the stone is removed and passed through a solution of sodium silicate. When dry, it is immersed in a bath of calcium chloride.

11,891. Schlegelmilch, R. June 7.

Casting.—Frames for pictures, looking-glasses, &c. of porcelain or other ceramic material are made

hollow and in one piece by pouring the paste or slip into a pair of double moulds forming a closed tube. The face *b* of the frame, Fig. 2, is made of any desired ornamental configuration, and the rear

FIG.2.

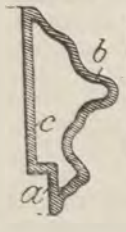
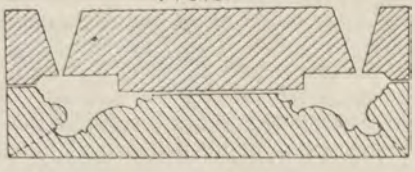


FIG.3.



face or back is stepped as at *a*, *c*. The receding portion *a* serves to receive the mirror or picture. The moulds are of the form shown in Fig. 3, and are made of plaster-of-Paris, which is allowed to dry upon flat plates of the same substance so as to prevent warping. The hygroscopic nature of the mould causes it to absorb moisture rapidly, so that the porcelain slip poured into it and adjacent to the surface of the mould quickly sets. Slip is first deposited on the plain or back mould, and then the mould is filled with slip, and after the deposition of a sufficient thickness of porcelain the superfluous slip is poured off by tilting the mould or the table upon which it is placed. Before the frame is thoroughly dry, openings for fixing the picture &c., and suspending-ears, are provided. The frame is allowed to dry on a flat surface, and afterwards it is baked in a kiln and glazed upon the face.

12,556. Logan, C., [*Hubbell, C. H.*]. June 16.

Mineral wool.—Mineral wool is blown by jets of steam or air from a molten mixture of granite with limestone, burnt lime, or other alkaline substance.

12,871. Borgolte, W. June 20.

Cements.—Relates to cements for general building purposes specially adapted for taking oil colours or like coatings. Ground limestone and ground clay are mixed with a small proportion of tar, naphtha, paraffin, coal, sawdust, fat, &c., and are separately burnt in the absence of air. The products obtained are pulverized, ground, mixed with the addition of oil, coal, &c., and again burnt without access of air. This second product is broken, pulverized, and ground like Portland cement. Clay-marl and alumina may be used in addition to clay to give a good glazed cement, which may subsequently be mixed with unburnt minerals or with minerals burnt with hydrocarbons. A composition of glazed cement, raw ground clay, ground burnt clay-marl, ground sandstone, ground burnt slaty marl, ground burnt red sandstone, and ground cinder may, for example, be employed.

13,146. Dörr, C. June 24.

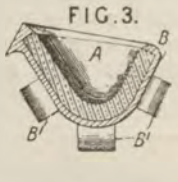
Asphalts; stone, artificial.—Granular or otherwise finely-divided inorganic materials such as sand, gravel, &c., or organic materials such as sawdust, are intimately mixed with from 10 to 30 per cent. of tar and heated to from 150° to 200° C. to remove from the tar the more volatile of its constituents. The composition is pressed or stamped into the required form before it is completely cold. The hardness of the product varies, in accordance with its composition, from that of hard wood to that of granite, and it is applicable as a substitute for wood, vulcanite, stone, &c. The watery constituents of the tar may be removed by distillation before mixing with the filling-materials.

13,238. Dime, G. X. June 26.

Fireproof compositions.—A solution of ammonium chloride, ammonium carbonate, and microcosmic salt, to which may be added ammonium alum, is employed for fireproofing wood, fabrics, laces, &c. by immersion and drying. The wood is first thoroughly dried, or it may be treated with steam. In the manufacture of celluloid, the materials may be used in the form of powder, which is mixed with the substances from which the celluloid is made.

13,323. Uehling, E. A. June 27.

FIG.3.



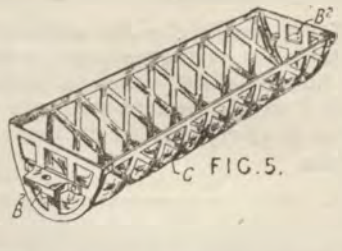


FIG.5.

Casting.—Relates to moulds for use in casting metals and other materials. Fig. 3 shows one form of mould in cross-section. The mould comprises an inner portion A of refractory material, such as fireclay, and an outer casing B, which may be made of cast iron, and cast in two parts connected together by means of steel bows or bent plates B^1, lugs and bolts, or other devices. The casing B may be formed with trunnions, for use in mounting the moulds upon travelling chains. In another form of mould, the inner refractory portion may be fitted within an openwork casing C, Fig. 5, formed with lugs B^2, trunnions, or the like. In some cases, the moulds may be made of hydraulic cement or other equivalent material, within which strips, openwork, or other forms of metal or other suitable material may be embedded.

13,573. Woodhouse, S. J. June 30.

Refractory substances; cements.—Relates to a refractory composition for caulking the joints in

gas retorts and furnaces, or steam and hydraulic pipes &c., or for moulding bricks, blocks, or slabs for building forge furnaces, or for making crucibles for melting brass or steel &c. The composition consists of fireclay, cast iron, or steel borings, glass or pottery refuse, and lime or forge slag. The cement is mixed with water when required for use.

13,665. Heyden, F. July 1.

Stone, artificial.—Relates to the production of artificial marble for slabs, ornaments, wall coverings, columns, statues, &c. A mixture of ground non-calcareous magnesite, sand, marble dust, and gypsum or other mineral is coloured with mineral colour, and a solution of chloride of magnesium is added to it. On a polished base covered with a very thin layer of celluloid marble-like veined patterns are drawn with the material so prepared, and, when the pattern has set, a filling of similar composition is poured upon it to the desired thickness. When set, the slab &c. is exposed to a temperature of about 300° C. to fix the colours, and it is saturated while still hot with mineral wax. The surface is then polished with celluloid solution, and is finally rubbed with a felt cloth saturated in wax.

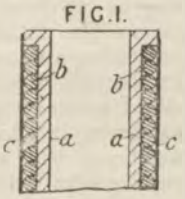
14,014. Jackson, A. J. July 7.

Castings.—Knobs or other articles of circular transverse section are cast to show profiles of a human face or other object, when viewed at right-angles to their axes.

14,067. Day, W. H., and **Murch, W.** July 7.

Casting.—The moulds *a* are strengthened by coils *b* of copper wire or other good conductor of heat, or by wire gauze, strengthening-ribs, or the like, surrounding the mould, or embedded in the material of the mould. The wire may be embedded in, or carried by, any suitable material or casing *c*.

FIG. 1.



14,201. Dudman, W. July 10.

Asphalts for paving. Crushed flintstone, pitch, and dried gas lime are boiled for two hours and then spread.

14,612. Owen, W. July 15. *Grant of Patent refused.*

Stone, artificial.—Relates to the manufacture of artificial-stone building-blocks, slabs, bricks, tiles, &c. from a mixture of slaked lime and sand or marble dust, or of other suitable granular materials. The composition, after a preliminary mixing and moistening or slaking with hot water, is subjected to pressure by a hydraulic or screw press in moulds of the required form. The moulded mass is simultaneously hardened and dried by subjecting it to the action of superheated steam in a chamber provided with a relief valve opening at a pressure of about 85 to 90 lbs. per square inch.

14,644. Golby, F. W., [*Matray frères & Co.*]. July 15. *Drawings to Specification.*

Casting.—Common salt is formed into compact blocks by heating in a blowpipe or electric furnace, and allowing the fused product to flow out into a mould placed beneath the outlet. The salt may be rapidly cooled in the mould by inserting a tube through which cold air is passed at the same time as the liquid fills the mould.

15,026. Cochrane, W. R. July 21.

Cements.—A white cement, similar in properties to Portland cement, and capable of being coloured, and, when set, of taking a high polish, is obtained by intimately mixing and grinding together from 58 to 66 per cent. of white lime or a chalk or other limestone or a combination thereof which will be white when calcined, with from 42 to 34 per cent. of a white clay, and from 1 to 20 per cent. of calcium chloride, or such an addition of hydrochloric acid as will form with the lime such an amount of calcium chloride. The mixture is afterwards dried and calcined to the point, or almost to the point, of incipient vitrification. The resulting clinker is afterwards finely ground. When mixed with water, the cement may be used for any desired purpose, such as for concrete.

15,080. Salamon, A. G. July 21.

Stone, artificial; refractory substances.—Relates to a process of producing refractory material for building and other purposes of the kind described in Specification No. 4628, A.D. 1898, and consists in avoiding, wholly or in part, the use of sodium bicarbonate. This improvement is effected by using bicarbonate of calcium, or of strontium or magnesium, which is prepared by suspending the carbonate of the alkaline earth, for example chalk, in water, and passing a current of carbonic-acid gas through the mixture until the solution has become substantially clear. This liquid is used for saturating the asbestos which has previously been mixed with chalk, or kindred substances, and impregnated with sodium silicate solution. The sodium monocarbonate produced is washed out, and the material is then dried. Bicarbonate of soda may first be used after the impregnation with sodium silicate, and the material is then rolled and pressed or dried, again soaked in sodium silicate, and finally treated with the calcium-bicarbonate solution. The

product is stated to be applicable, not only for building purposes, but also for shields for field guns and in shipbuilding.

15,102. Sellars, J. C. July 22.

Cements; mortars; fireproof compositions; stone, artificial; refractory substances.—Slate waste or refuse is ground to powder and worked into a plastic condition with silicate of soda, silicate of potash, or a solution in which the silica has been precipitated by an acid. The plastic material is moulded into slabs, tiles, building-blocks, slates, or other articles which are dried while under pressure in porous or other moulds. The dried articles may be dipped in or treated several times with sulphuric acid, hydrochloric acid, alumina or an aluminous solution, or silicate of soda, or with a solution of silicate of soda and a salt of iron. The plastic material may be used as a fireproof cement or mortar, either with or without the addition of small quantities of Portland or other cement. Hearthstones may be moulded *in situ*, or the composition may be used for partitions, walls, roofs, &c. The articles may be coated with colour as described in Specifications Nos. 3527, [*Abridgment Class* Paints &c.], and 12,985, [*Abridgment Class* Casks &c.], A.D. 1899. Filtering-slabs for acids, liquids, and gases are made of ground slate and silicate of soda.

15,132. Potter, C. J. July 22.

Cements.—Burnt clay, preferably clay such as is used for the manufacture of red bricks, is mixed and ground with ordinary cement clinker.

15,640. Gernaert, F., and **Libert, C.** July 31.

Stone, artificial.—In the manufacture of artificial stone by subjecting a mixture of sand and lime &c. to the action of steam under pressure, the natural sand is wholly or partly replaced by crushed sand, or sand which has been "burst" in ice water after heating it to a high temperature. Sand treated in this manner enters into more intimate combination with the lime than natural sand, and the stone produced is frost-proof.

15,734. Rueff, E. Aug. 1.

Fireproof compositions; sound-deadening composition.—Relates to compositions applicable as fireproof materials for building-blocks, wall and ceiling coverings and linings, safes, &c., or as a sound-deadening composition. Calcined magnesite is mixed with water and aërated with carbonic-acid gas under pressure. The mass is dried at about 160° F., and shaped under pressure. Fibrous material such as asbestos, paper pulp, sawdust, vegetable fibre, &c. is preferably incorporated with the magnesite during the process of manufacture.

16,050. Forell, C. von. Aug. 5.

Cements.—Granulated blast-furnace slag and calcareous materials, such as limestone, chalk, marl, &c., are rendered friable by heating to a clear red heat, and are then ground to powder and burnt together. The clinker produce is ground to form Portland cement.

16,128. Hartenstein, H. L. Aug. 8.

Slags, treatment of.—Relates to improvements in the process described in Specification No. 224, A.D. 1898, for preparing a product containing carbides of calcium, aluminium, and silicon from blast-furnace slag, and consists in adding to the slag, while in a molten condition, powdered limestone and a carbonaceous material, and then subjecting the mixture to the action of an electric current. The apparatus described in the case referred to is preferably used.

16,501. Zientarski, S. Aug. 14.

Stone, artificial; cements; mortars; plasters.—A mixture of sand, powdered unslaked lime, pulverized unburnt clay, and alum, gypsum, or other ordinary material for retarding slaking, is rendered plastic with water, and may be moulded and pressed. It afterwards hardens slowly without alteration of volume. Up to 15 parts of clay may be used to 100 of lime. The alum or other retarding-material may be previously dissolved in the water. Specification No. 22,227, A.D. 1893, is referred to as describing a mixture for the same purpose. The Provisional Specification describes the addition of sifted ashes or ground slag to the mixture, and hardening in alkaline lye containing lime. It also mentions the use of the material for making roofing-tiles, which may be rapidly hardened by the action of high-pressure steam; the material may also be used to make concrete for walls, roofs, and foundations for wood or other paving.

16,647. Brothers, W. Aug. 16.

Fireproof compositions.—Fabrics or yarns are loaded and rendered less inflammable by treatment with solutions of calcium chloride and a soluble sulphate, which results in precipitating calcium sulphate on the fibres.

16,653. Cross, C. F., and **Bevan, E. J.** Aug. 16.

Stone, artificial; refractory substances.—In the process described in Specification No. 4628, A.D. 1898, a mixture of asbestos fibre and chalk &c. is hardened by impregnating it first with a solution of sodium silicate and afterwards with a solution of a bicarbonate or of carbonic acid. The invention consists in the substitution of sulphurous acid, preferably in the form of bisulphites, for the bicarbonates. Salts of ammonia such as the sulphate or chloride will also effect the same purpose, viz., the liberation of silica, which is dehydrated by heating the material after it has been slowly dried. When employing ammonium salts, the operation is carried out in closed vessels, and the ammonia is drawn off and passed into dilute sulphuric acid or otherwise fixed for re-use.

16,827. Blake, H. D. Aug. 18.

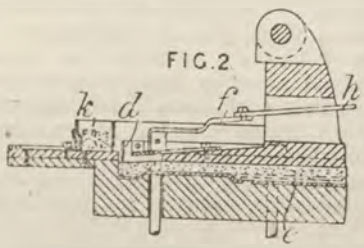
Asphalts.—Relates to asphalt compositions for paving, roofing, or flooring, or for damp courses &c. The materials employed are natural mineral bitumen, fine sand or limestone powder, and mineral rock asphalt. For paving purposes, the composition may be heated to a semi-plastic state, laid on a concrete foundation, and raked and rolled, or a larger proportion of natural bitumen may be employed and the composition be used in a liquid state. The composition may also be cast into paving-blocks, which may be grooved so as to form a joint when filled in with bituminous cement.

16,981. Henderson, J. T., and **Brown, G. A.** Aug. 22.

Cements.—Relates to a composition for coating wood and metal. The composition may be applied in the form of a cement, glue, or paint. The composition consists of tar, resin, slaked lime, kieselgühr, pitch, ground coal ashes, creosote oil, and Portland cement. The ingredients are all heated together, and, when required for use, the composition is melted and thinned to the proper consistency with creosote or other oil.

17,470. Bröcker, H. Aug. 29.

Casting.—In order to ensure that the cement which is applied to form the ribs of cement tiles shall unite with the cement forming the body *e* of the tile, the layer of coloured powder or facing material is removed from the surface by a scraper *d* operated by a hand-lever, connecting-rod *h*, and a forked guide-piece *f* which moves on downwardly-inclined guides. The cement for the ribs is supplied to the body of the tile by a hopper *k*, and is



pressed into shape by a hand lever and pressing-stamp in the usual manner.

17,608. Seidel, W. Aug. 31.

Cements.—Argillaceous and calcareous marls are mixed in spherical mills with sufficient water to bring the proportion of moisture to 32 per cent. The paste is ground fine between millstones, and is mixed in a kneading-machine with sufficient cement materials ground dry to reduce the moisture to 22 per cent. Bricks formed from this mixture are dried and burnt to form the cement.

17,853. Thompson, W. P., [*Terranova Industrie C. A. Kapferer & Schleuning*]. Sept. 4.

Cements.—Cement suitable for decorative work, or for artificial stone &c., is prepared by mixing lime with a clay as free as possible from iron, such as kaolin or pipeclay, and with feldspar, also as free as possible from iron. The mixture is burnt to fusing point, *i.e.* beyond the clinkering temperature, or to produce a cement similar to Roman cement it may be burnt only to the clinkering limit. A similar result may be obtained with kaolin, silicic anhydride such as infusorial earth or waste silica, and carbonate of soda or other alkali. Or kaolin, quartz sand or powder, and lime may be employed, with or without alkali, fluor-spar, or feldspar &c., and in this case the burnt and fused material may be granulated, ground, and used as puzzolana.

17,966. Haddan, R., [*Soc. Berthe & Cie.*]. Sept. 5.

Stone, artificial.—An artificial granite is prepared by mixing in varied proportions, according to the use and colour required, some or all of the following materials :—flints, quartz, glass, cork, sand, waste glass and flint produced in the process and reduced to dust, and grey or white cements. To give a surface which will take a good polish, the

glass and flint used must be of the same hardness. Articles are built up of the mixture by hand, while temporarily supported at different points by suitable frames. Domestic baths, for example, may be constructed by applying the composition to an iron frame. When glass is used in the composition, the articles are submitted to an acid bath. The artificial stone is manufactured throughout completely in a cold state, and is allowed to dry and set for a few days, and is afterwards polished. The artificial stone may be used, among other purposes, for wall linings, paving, baths, bricks, tiles, columns, balusters, statuary, and fountains.

18,010. Brown, P. S. Sept. 6. *Drawings to Specification.*

Fireproof compositions. — Built-up veneers for roofing-plates, packing-boxes, &c., may be impregnated with substances adapted to make them fireproof, insectproof, and waterproof, such as metallic soaps containing copper or alumina, or copper and alumina, borax, sulphate of ammonia, and tungstate of soda.

18,058. Meurer, H. C., and **Bormann-Zix, F. T.** Sept. 6.

Stone, artificial.—Artificial calcareous sandstone is prepared by obtaining an intimate mixture of dry hot sand, as described in Specification No. 12,368, A.D. 1896, with powdered lime (Staubkalk) and slaking the same in a mixer with the exact amount of warm water required. The temperature of the water must vary inversely with the temperature of the sand. The slaked mixture may be immediately passed to a second mixer, or, if allowed to cool, must be reheated before being passed to the second mixer. In the second mixer from 6–8 per cent. of hot water in a finely-divided state is added during the mixing process. The final product is pressed into blocks, and is afterwards hardened by high-pressure steam, sufficient water being carried over by the steam for the formation of calcium hydrosilicate.

18,257. Thompson, W. P., [*Simmons & Bocks*]. Sept. 9.

Refractory substances; fireproof coverings and compositions.—About 20 parts of asbestos, 7 parts of cement, and 3 to 10 parts of zinc oxide are mixed with weak glue water to form a paste which is applied to a skeleton or backing of wire netting, jute, canvas, muslin, or the like. The plates, slabs, or blocks thus produced are pressed, impregnated with a waterproofing solution of sulphate of alumina, and afterwards pressed and polished or coloured. Instead of the above composition, 4 parts of asbestos may be mixed with 2 parts of cement, 1 part of sulphate of alumina, and 1 part of zinc oxide. Sheets, plates, or slabs for covering floors and walls are formed of a mixture of 4 parts of asbestos, 2 parts of cement, 1 part of water-glass, and 1 part of sulphate of alumina, applied to wire network or other fabric. For roofs, the sheets &c. are made waterproof by a mixture of 6 parts of alum, 2 parts of sugar of lead, and 1 part of soda.

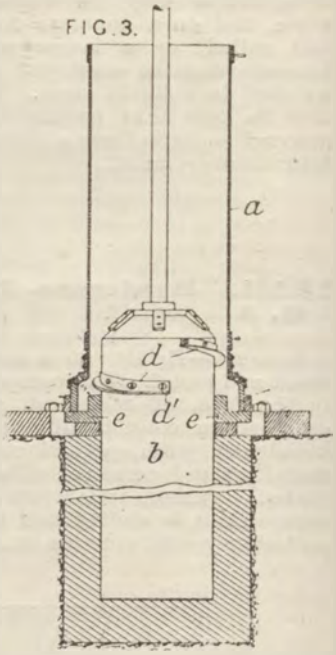
18,264. Schmidt, F. Sept. 9.

Refractory substances. — Mixtures containing carbon together with refractory substances, such as magnesite, are raised to a glowing heat in retorts and exposed to the action of carburetted gases or vapours, carbon being deposited within the materials. The mixture may be in a loose or moulded form, and the carbon may be in the form of coke, charcoal, turf-charcoal, &c. The carburetted gases may be replaced by hydrocarbons of the fatty and aromatic series &c., which, when heated, develop carburetted gases. The resulting product is applicable as a refractory material.

18,353. Kielberg, C. J. Sept. 11.

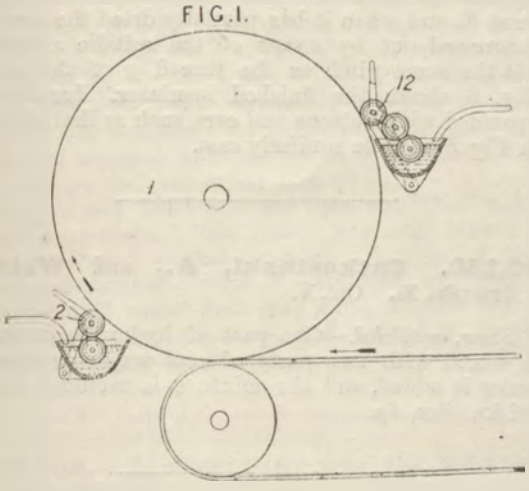
Casting.—Cement pipes for drains &c. are cast in a mould consisting of a two-part external portion *a* and an internal core *b*. The cylinder *a* is placed on a wooden pallet *e*, and is locked in position. The cement is then filled into the mould, and the core *b* turned so as to be worked upwards through the cement by the action of the spiral flange *d*. A horizontal portion *d*¹ of the flange smooths off the upper end of the pipe when the core has worked its way to the top. The cast pipe in the casing *a* is transferred on the pallet *e* to the drying-yard, and the casing *a* is then removed, leaving the pipe to dry on the pallet.

FIG. 3.



18,747. British Uralite Co., [*Imschenetzky, A.*]. Sept. 16.

FIG.1.



Fireproof coverings and compositions.—In the manufacture of asbestos cardboard and like fire-resisting materials, used for building and other purposes, the layers of material which go to make up the sheet are impregnated with silica in the following manner:—The material, as it is wound on to the drum 1, comes into contact first with a roller 2, which applies a solution of sodium silicate, and afterwards with a roller 12, which applies a liquid, such as a solution of sodium bicarbonate, capable of decomposing the sodium silicate with deposition of colloidal silica. Specifications No. 5254, A.D. 1895, and No. 4628, A.D. 1898, are referred to.

18,787. Owen, W. Sept. 18. *Grant of Patent refused.*

Stone, artificial.—In the manufacture of artificial stone from lime and sand or other materials, the moulded blocks are immersed in hot water under pressure as the last stage of the process. When lime and sand are employed, they are mixed dry, slaked, allowed to rest exposed to the atmosphere, mixed in an edge-runner mill, and compressed into blocks of the required shape. After partially hardening in the air, the blocks are immersed for from six to ten hours in hot water at a pressure of not less than 85 lbs. (absolute) and a temperature of not less than 316° F. The blocks may be run on trolleys into a chamber provided with a steam-tight door and heated by steam or by adjacent flues.

18,809. Schwarz, W. Sept. 18.

Stone, artificial.—In the manufacture of artificial sandstone from sand and lime, the unknown quantity of moisture contained in the materials is removed before they are mixed together, the mass being subsequently rendered plastic by water or steam employed in known amounts. The materials are preferably dried in vacuum pans provided with revoluble wings for mixing the dried materials while still *in vacuo*.

18,870. Boult, A. J., [*Jungbluth, J.*]. Sept. 19.

Stone, artificial.—An electric insulating-composition for conduits for electric conductors &c. is formed of a mixture of powdered calcium carbonate, Trinidad asphalt, neutralite, or other similar bituminous material, and a small proportion of selenite. The materials are melted together until homogeneous.

18,945. Gruendler, G. J. Sept. 20.

Cements.—Fresh Dutch cheese is mixed with lime, and the mixture is used for cementing facing-tiles to wooden boards or building-blocks. The lactic acid of the cheese combines with the lime to form calcic lactate.

18,964. Herdman, G. A. Sept. 20.

Stone, artificial.—A pumice like material or slag possessing non-conducting qualities, and free from sulphur in a volatile form, is made by a process consisting essentially in melting sandstone, or other form of silica, and lime or blast-furnace slag together with fuel and a substance capable of fixing the sulphur, such as manganese spiegel-slag, ferro-manganese slag, or soda, the molten mass being rendered porous by water in the usual way. The slag material is especially suited for packing the walls of refrigerators, cold storage chambers, and the like.

19,192. Allison, W., and **English, J.,** [*trading as* Allison, English, & Co.]. Sept. 23.

Cements.—Relates to apparatus for drying cement, slurry, &c. before burning. The cement &c. is run on trolleys into tunnels A, where it is subjected to the action of a current of hot air driven by a fan G through a flue F into a longitudinal chamber E^1, whence it passes by openings E into the tunnels A. The moist air passes through gratings B, at the charging-end of the tunnels, into a flue D leading to a chimney C. The air is heated by its passage through the burnt cement &c. in the kilns K, or by means of a steam heater, which may be situated in the tube N. During the burning of the cement &c. the holes L are built up, doors R being provided to allow the

openings L to be broken through by means of a bar to allow the passage of air.

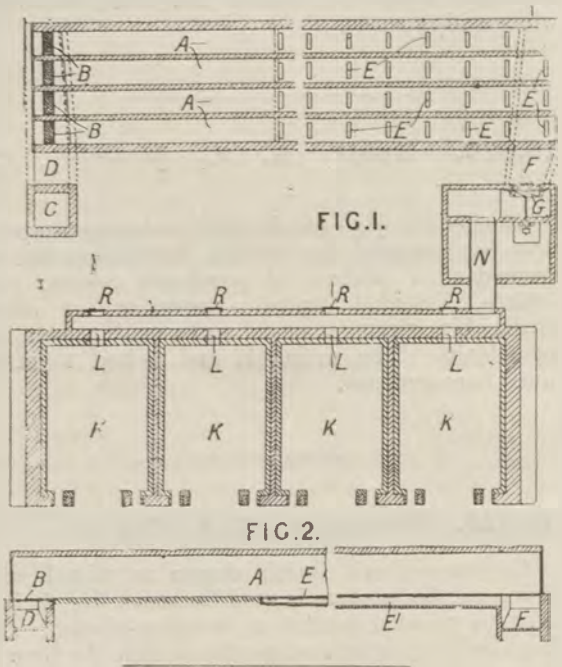


FIG.1.

FIG.2.

19,358. Le Mesurier, C. J. R. Sept. 26.

Sound-deadening compositions.—Sheets or blocks for paving, flooring, &c. are made of moss litter compounded under pressure with tar or other bituminous substance, such as asphalt or creosote residues, or with india-rubber or other resinous substances, with or without the addition of mineral substances such as brickdust, sand, &c. The paving or flooring produced is elastic and noiseless.

20,121. Kapfenberger, F. Oct. 6.

FIG.6.

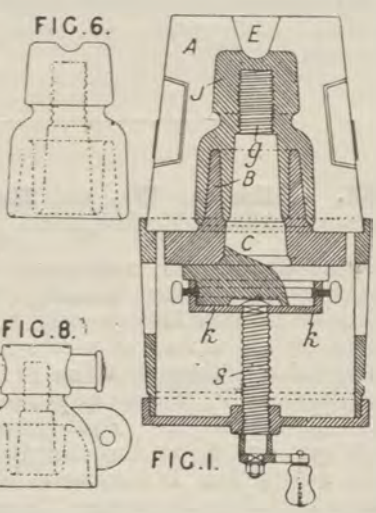


FIG.8.

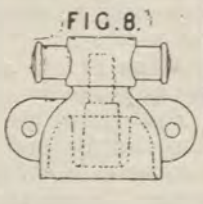


FIG.1.

Casting.—Relates to the casting of insulators for electric wires at a single operation. A two-part mould A is furnished with a recess corresponding to the external form of the insulator J to be made. A core B is inserted at the base of the mould, and a core C detachably secured to the cap *k* is passed through the core B. The composition is poured in at E, and when it has partially dried the core C is screwed out by means of the spindle *s*, which has the same pitch as the thread *g* of the core. Fig. 6 shows the finished insulator. Insulators provided with buttons and ears, such as that shown in Fig. 8, may be similarly cast.

20,139. Catkosinski, A., and **Weintraub, L.** Oct. 7.

Stone, artificial.—One part of hydraulic cement is mixed with two parts of coal waste or slack, water is added, and the mixture is moulded into bricks, tiles, &c.

20,347. Pryor, H. A. Oct. 10.

Stone, artificial.—Silicate of soda is added to milk of lime, and Parian or similar cement is gradually mixed with the liquid. Pigments, preferably mineral colours, mixed with a proportion of dry cement, are dropped into the box containing the liquid mixture, which is then agitated by means of a suitable tool so as to produce a veined or variegated appearance in the mass. The material so prepared is cast in moulds of glass or other hard and highly-polished material. The articles, when dry and hard, are removed from the moulds and rubbed with linseed oil applied by a soft cloth. As an alternative, the liquid composition may consist of milk of lime, glycerine, sodium silicate, soap, salt, and ground marsh mallow root, boiled and stirred together and strained through a sieve. The cement employed in this case may be hydraulic cement, gypsum, or other material commonly used in the manufacture of artificial stone. The material may be moulded as a plastic substance, or cast in the liquid condition.

20,387. Sehr, F. Oct. 11.

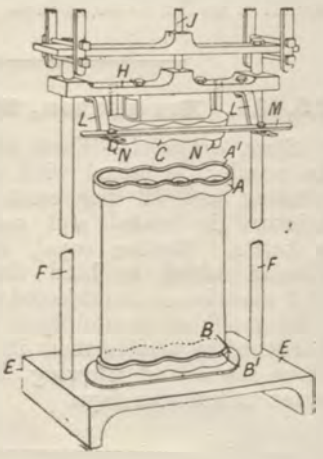
Cements.—A finely-ground powder, prepared from waste fragments of fully-burnt hard porcelain and of half-burnt porcelain, together with feldspar, is made into a paste with water-glass. The resulting cement is applicable for cementing porcelain, glass, &c., and in some cases for cementing these substances to metal. It is also specially applicable as a substitute for plaster-of-Paris in the manufacture of electric glow lamps, or it may be employed as a dental filling or cement.

20,518. Weill, S. Oct. 13.

Stone, artificial.—Relates to the production of artificial marble. White English marble cement, water, and glycerine are stirred together, forming a paste, and an earthy colouring-matter, with which water and glycerine have been mixed, is added. After again stirring, the paste is moulded and dried by air or other means. The blocks thus produced are smoothed with pumicestone, the cracks &c. are stopped, and the blocks again dried. The blocks are then smoothed with whetstone and again stopped and dried, and are then smoothed with a polishing-stone. The blocks are next soaked in olive oil and treated by wax polishing. A hard monochromatic marble is produced by using a mixture of cinder-dust &c., white English marble cement, water, glycerine, and colouring-matter, and treating as above.

20,655. Albion Clay Co. and **Lawton, R.** Oct. 14.

Casting.—Relates to apparatus for moulding the spigot and socket ends of drain pipes, and multiple conduits of the kind described in Specification No. 6024, A.D. 1898, [*Abridgment Class* Electricity, Conducting &c.]. The spigot end of the conduit is inserted in a mould B mounted on a base-plate E, and a core C is lowered down on guide-rods F into the centre of the socket A. Bituminous composition or cement is then introduced between the mould and core and the ends of the pipe to form a spigot B^1 and socket A^1 accurately in line with one another. The core may be balanced by a weight connected to the spindle J by a cord passing over a pulley, or it may be raised and lowered by a screw or lever. The socket end of the conduit is maintained in position by spring arms N fixed to the crosshead H, and by an adjustable bar M clamped to brackets L fixed to the crosshead.



20,936. Metz, A. Oct. 19.

Statuary; stone, artificial.—A ceramic setting paste is made of 4 parts of pulverized calcined Mandoudi stone (consisting mainly of baryta), 4 parts of powdered baryta, 2 parts of pulverized baked clay, 1 part of crushed sandstone, and a solution of sodium silicate, and is moulded into slabs, statuettes, and other articles which are hardened by burning them at a temperature of from 300° to 500° C., so as to fuse their outer surfaces. The panel or article may be ornamented by first applying coloured cements to the bottom of the mould, or the upper surfaces of the paste may be ornamented in relief, or the article from the mould may be moistened with silicate of sodium, and ornamented with coloured setting pastes. Landscapes, flowers, fruits, portraits, and paintings in relief may be represented or produced. Filings, grains, or powder of metals, glass, &c. may be applied to the articles, or they may be gilded or coated with metal &c.

21,779. Straub, C. Oct. 31.

Cements; mortars; plasters.—Calcined limestone is partially hydrated, and is then heated in an oven or upon a heated plate &c. until all moisture is expelled. The lumps of limestone break up into smaller particles, which are ground to powder. The hydration may be effected by water or steam, and the water used for hydration may contain calcium sulphate, alkaline salts of boracic or other acid, or glue or gum solution. The hydration may be checked at the required point by a sudden change of temperature. The lime cement so prepared may be combined with sand to form mortar, or it may be employed as plaster or cement. When sifted finely and mixed with colouring-matter, it is applicable as a wall paint. Potassium chloride, aluminium sulphate, or like substances which will combine with lime may be added to the lime cement.

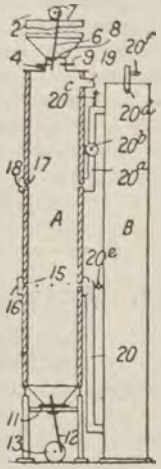
22,085. Boult, A. J., [*Nieske, A.*]. Nov. 4.

Fireproof compositions.—Organic materials such as textile fabrics, cloth, feathers, documents, manuscripts, drawings, &c. are treated with a solution of a salt of molybdenum, preferably sodium molybdate, to preserve them from decay and render them fireproof.

22,714. Straub, C. Nov. 14.

Cements; mortars; plasters; fireproof compositions.—Slaked lime, hydrated aluminium oxide or bauxite, and water are combined to form a cement, mortar, or plaster. Mica may be added to form a fireproof composition. Granite, gneiss, syenite, or schistose rocks in a crumbled or deteriorated state, or argillaceous shales, may be employed instead of bauxite, free soda or potash being washed out by the percolation of water. Where the deterioration of the granite &c. has gone so far as to form clay, it is necessary to heat it to bring it into a condition to act on the lime. Acids, sub-acids, and salts tending to form insoluble and stable combinations with lime and alumina may be added.

23,415. Naef, P. April 26, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].



Cements. — Relates to treating solid materials with gases which are continuously circulated through the apparatus and through heating or cooling vessels, whereby the temperature within the apparatus may be raised, lowered, or regulated as required, the solid material under treatment preferably passing continuously through the apparatus. The apparatus consists of a shaft or column A, having a charging-hopper 2 connected thereto by a ring 4. The material is continuously charged by means of a stirring-rod 6, working in a guide 8, and an eccentric 7. The rate of charging is regulated by inserting plates 9 having openings of various sizes. The lower or discharge end is also provided with a rod 12 and eccentric 13, and with closing-doors 11. The column has two annular channels 16, 18, connected by two series of ducts 15, 17 with the column, and by tubes 20, 20^a with a gas heater B, or cooler, of any form. In use, the solid material passes down the column continuously, and gas is circulated by the fan 20^b through the heater (or cooler), the tube 20, the column A, and the tube 20^a back to the heater. Two heaters may be employed, which are alternately heated and used in the process. Tubes 20^c, 20^d, and 20^e are supplementary steam or water inlets, and 20^f an inlet for oil. The excess gas passes upwards through the freshly-charged layer of solid material, whereby it is cooled and purified, and escapes by the outlet 19. When the column is worked so that the coal charged therein is not entirely consumed, the residue is mixed with lime, clay, or the like, and burned in the presence of air, so as to produce a clinker suitable for building purposes, and producer gas. This operation may be carried out in a revolving furnace.

24,612. Sellars, J. C. Dec. 11.

Stone, artificial; cements.—Clinker, slag, or residue from a refuse destructor is ground, and mixed with a binding-substance such as glue water, lime, cement, sulphate or other solution of alumina, protosulphate of iron, or other salt which will act on the residue. The mixture is moulded into articles, which are dried, and immersed in a solution of sodium silicate, potassium silicate, or other alkali, under ordinary or artificial pressure. Precipitated or hydrated silica may be added to the mixture before it is moulded, or may be applied to the surfaces of the articles. Pipes and conduits made of the mixture may be glazed and fired. The articles may be made waterproof by dipping them in an acid, or a solution of alumina, or a salt of iron. In order to make the residue combine readily with the silicate solution, spent lime, common salt, sand, or other silicious substance may be added to the refuse. The articles may be coloured or coated as described in Specification No. 3527, A.D. 1899, [*Abridgment Class* Paints &c.].

24,812. Reese, E. Dec. 13. *Drawings to Specification.*

Stone, artificial.—Bricks, blocks, setts, slabs, &c., for use as paving-stones or for other purposes, are composed of the refuse of granite, slate, or stone quarries mixed with a binding-composition consisting of tar, pitch, bitumen, &c., with sulphur and alum. The stone &c. refuse is preferably immersed in a solution of alum, with or without borax, as a preliminary step. The outer surface of the brick may be coated with a dusting or surface composition of any desired colour or material. It may consist of sawdust, cork, &c. in addition to the stone refuse.

25,431. Broughton, W. C. Dec. 22.

Stone, artificial.—Waste or scrap slate, reduced to powder, is mixed with about 10 per cent. of whiting and 10 per cent. of sand, and the mixture is heated and moistened by steam in a kettle. Shellac, copal, black varnish, or the like is added to bind the particles together, and the mixture is subjected to pressure in moulds. The moulded mantelpieces or other articles are hardened by placing them in a heated chamber or store room, and allowing them to remain from seven to fourteen days.

25,512. Willcox, B., [*Soc. J. et A. Pavin de Lafarge*]. Dec. 23.

FIG. 1.

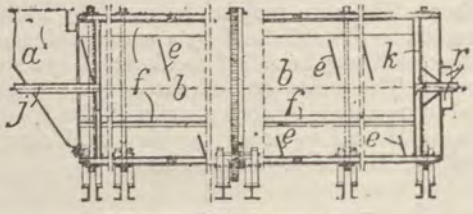
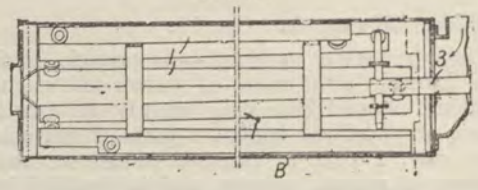


FIG. 4.



Cements.—Relates to apparatus for slaking lime, and for the similar treatment of hydraulic cements

&c. The lime or cement is fed in lumps into a hopper *a*, Fig. 1, and is moistened with just sufficient water to slake it. The material passes into a rotary chamber *b* surrounded by a jacket into which steam enters by pipes *j*, leaving by pipes *k*. Mutilated helices *e* effect a slow movement of the materials along the chamber, and longitudinal ribs *f* serve to lift and agitate them as the cylinder revolves. The materials are discharged at *r*, and may be subjected to further agitation in cylinders between which a re-heating chamber is interposed. The re-heating chamber may consist of a rotary cylinder B, Fig. 4, containing steam pipes 1 constituting a continuous coil. The pipe 3 may be divided by a longitudinal partition so as to serve both for the introduction and return of the steam. The slaked materials may in some cases be maintained for from 24 to 48 hours at a temperature of 100° C. in a pit surrounded by non-conducting material.

25,734. Timofeeff, P. Dec. 30.

Stone, artificial; cements.—Relates to the manufacture of artificial stone for building and paving blocks and slabs, railway sleepers, &c., and to the manufacture of cements for uniting the blocks. Materials such as clay, limestone, brick, stone, and rubbish, together with fluxes, alkalies or alkaline earths, lime, oxides, mineral colouring-matters, &c., are ground to a fine powder and melted at a high temperature in furnaces such as those employed in melting steel or glass. The fused material is cast or pressed in moulds to form blocks which are afterwards annealed in the same manner as glass. The cement employed for uniting the blocks consists of lime together with calcium silicate, or of ordinary cement together with the pulverized artificial stone. Ordinary cement may, however, be employed without modification. When great hardness is required, quartz sand is mixed with the molten materials just before casting. The blocks may consist of a core of one kind of the fused material, covered by fusion with a layer of a different composition. The outer layer may, however, consist of a mortar composed of soluble glass and quicklime applied like a paint. Proportions are given for a composition consisting of quartz sand, red clay, lime, river silt or mud, and brown iron ore.

A.D. 1900.

622. Bonhivers, E. Jan. 10. *Drawings to Specification.*

Refractory substances.— Blocks, to be rendered incandescent in arc, gas, petroleum, or spirit lamps, are made from a mixture of 25 parts of crude clay, 20 of baked clay, 25 of pounded quartz, and 5 of boric acid. The mixture is heated to a high temperature for 48 hours in a mould made of a refractory material, and is afterwards immersed in a saturated solution of boric acid in water, and dried.

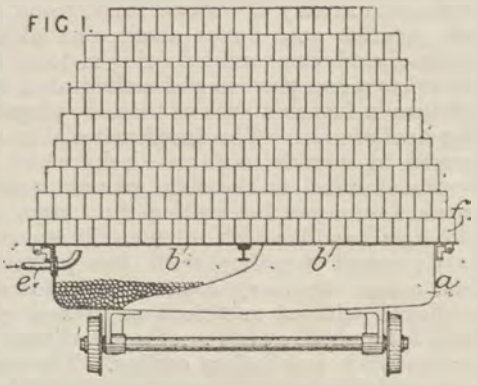
791. Schürholz, H. Jan. 13.

Stone, artificial.—In the manufacture of artificial stone, the lime in lumps is placed in baskets and dipped into water. The moistened lime is placed on a layer of damp sand from the pit in a mixing-cylinder, and is covered with another layer of sand. The heat produced by the slaking of the lime removes both the superfluous moisture in the lime and that contained in the sand, a dry powder being thus produced. The necessary quantity of water is added to this powder, and the blocks of stone are moulded or hardened in the usual way.

1458. Schroeter, C. Jan. 23.

Fireproof compositions.—Borax and sulphate of magnesia are applied together or successively to fabrics or other articles, to form an insoluble borate of magnesia therein. The mixture may contain also gypsum and ammonium chloride. Curtains and the like may be boiled in starch solution containing the chemicals. Other sulphates may be substituted for the magnesia salt.

1705. Olschewsky, W. Jan. 26.



Stone, artificial.—Relates to apparatus for drying blocks of artificial stone and for simultaneously slaking lime. The moulded blocks *f* of artificial stone are stacked on the cover *b* of a truck *a*, and, to enable the lower layers of blocks to withstand the pressure of those above, the lower layers are preliminarily dried by admitting steam through the pipe *e* to the chamber *a*. The condensed water serves to slake lime contained in the chamber, and the heat developed in the process assists in drying the blocks *f*. The quantity of lime is so chosen that the preliminary drying is sufficiently advanced when the lime is entirely slaked. The truck is then transferred to the drying-chamber or furnace where the blocks are hardened The chamber *a* may be made deeper than that shown in Fig. 1, and an agitating-device may be employed to stir the lime.

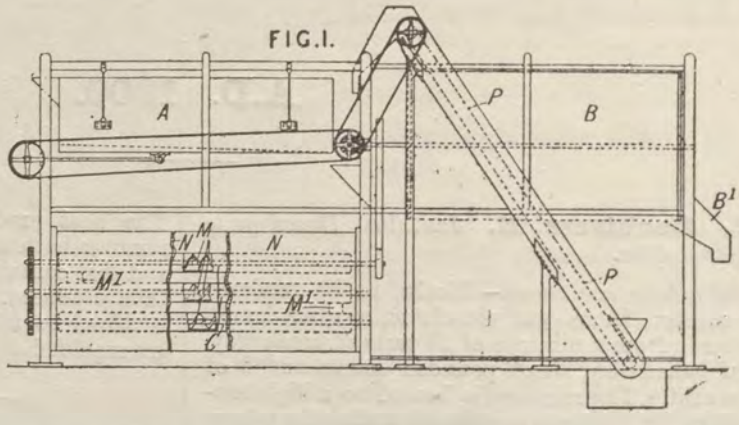
1894. Haddan, H. J., [*Clark, A. G.*]. Jan. 30.

Refractory substances.—Consists of a refractory and corrosion and abrasion resisting lining or covering especially adapted for retorts, furnace linings, bricks, &c. used in the distillation of certain ores containing both zinc and iron oxide. The surface of the retort &c. to be protected is first covered with a thin layer of a sintering material such as a solution of sodium silicate, to which is then applied a thicker layer of refractory basic material, such as calcined magnesite. On firing, the sodium silicate binds the basic lining to the retort &c. by its power of chemical combination with the fireclay of the retort on one side and with the basic material on the other.

1915. Caudemberg, C. A. C. Aug. 12, A.D. 1899, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

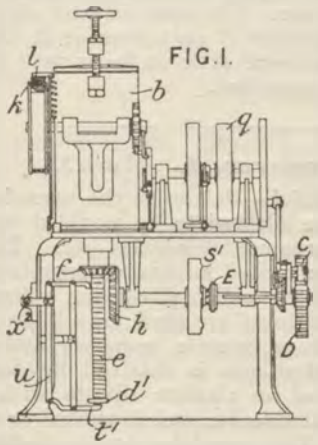
Asphalts for paving are mixed with a solution of india-rubber in spirits of turpentine or petroleum spirit, benzine, or the like. The preferred proportions are 100 kilos of asphalt, in a fine powder, to 75 to 100 grammes of india-rubber in 5 litres of petroleum spirit.

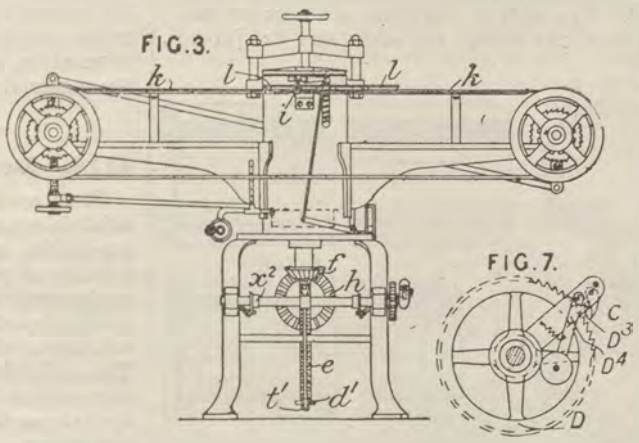
1956. White, W. L. Jan. 31.



Casting.—Relates to means for sifting and heating the starch employed for the moulds in which confectionery is cast, and for freeing the confectionery from adhering starch. The starch and cast sweets are fed together to a reciprocating sifting-box A, which removes the bulk of the starch. The sweets pass on to a rotary sifter B, fitted inside with brushes which assist in removing the starch. Granulated sugar, peas, or other clean hard materials are fed by an elevator P to the screen B, and are mixed with the sweets to facilitate the removal of the starch. The starch passes through the first portion of the screen, which is of fine mesh, and the sugar, peas, &c. pass through the remainder of the screen. The cleaned sweets tail over at the chute B¹. The starch removed by the sifting-box A falls into troughs C fitted with screw conveyers M and provided with a steam or air-heated jacket or casing N. The heating-troughs C are connected by passages M¹ so that the starch circulates through them before being fed once more to the tray-filling machine. The Provisional Specification states that the starch may be heated in a steam-jacketed cylinder provided with stirring or agitating arms &c.

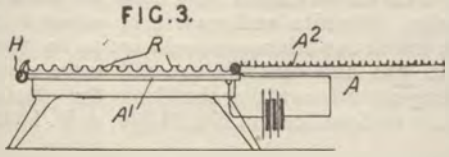
2123. Gaebel, R. Feb. 2.





Casting.—An automatic machine or extrusion press, for filling moulds with chocolate, marchpane, and other similar pastes used in the manufacture of sweetmeats and confectionery, is shown in Fig. 1. The moulds *l* are carried on an endless band *k*, and are filled with the paste extruded from the mouthpiece *i*, Fig. 3, of the cylinder *b* through the upward motion of the piston. The piston is worked intermittently from the pulley *q* through the pawl C, ratchet-wheel D, and bevel gearing *h*, *f*, and the cylinder is water-jacketed and heated by steam. The forward movement of the moulds *l* coincides with the piston movement, being adjusted by the ratchet mechanism. When the screw rod *e* of the piston is at the top of its stroke, the lever *u* is struck, the shaft x^2 rocked, the clutch E connected to the pulley S^1 so as to reverse the machine quickly, and the ratchet mechanism thrown out of effective operation by the pawl D^3, Fig. 7, of the arm D^4. When the knob d^1 hits the lever t^1, the machine is again reversed, so that it again extrudes the requisite quantity of paste and advances the moulds in order.

2703. Schlomann, H. W., and **Castro, A. de.** Feb. 10.



Fireproof coverings and compositions. — Any porous material, such as waterproof mantles, sail-cloth, stuffs, linen, balloon material, textile fabrics of all kinds, ropes, hose, cork, or asbestos, is passed through a trough containing a solution of any desired metallic salt, such as of copper or zinc. The material is then passed by means of feeding-rolls to a table having a metallic surface A^1 forming a cathode, which is afterwards covered by a hinged metal plate, the lower portion A^2 of which forms an anode, while the upper portion A acts as a heavy lid or cover. The particular shape of anode and cathode here shown is intended for use in treating ropes, which are held in the grooves R. On passing the current, the material becomes impregnated by the deposition therein or thereon of copper, nickel, iron, titanium, or other metal, and is rendered both waterproof and non-combustible. Textile material thus treated may be suitable as roofing-material or for wearing-apparel. The hydrogen produced during the process is blown away by compressed air fed through the tube H. The lid is afterwards raised, and the material withdrawn by other rolls, and fed to winding-rolls. To treat hose, it is drawn over a tube laid upon the table, the anode and cathode forming lengths of half tubing.

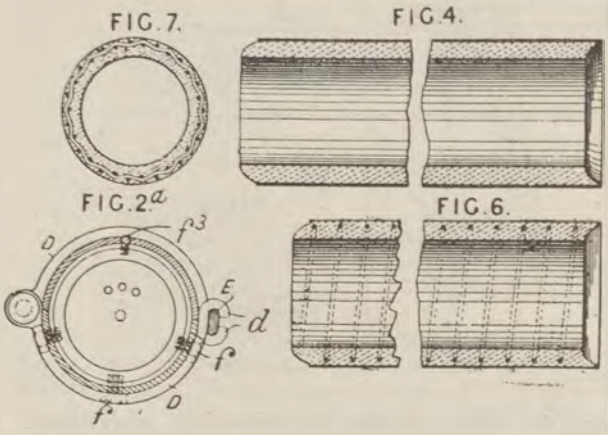
2886. Wurth, W. A. O. Feb. 13.

Cements; slags, treatment of.—Relates to the production of Portland cement from blast-furnace slag. Such slag contains the constituent materials of Portland cement, but is deficient in lime and in soda, and contains too high a proportion of sulphur in the form of sulphide of calcium. The invention consists in adding to the ground slag burnt lime hydrated with water containing sodium nitrate in solution. The mixed slag and lime are burnt either in the form of powder or in bricks, the sodium nitrate serving to convert the calcium sulphide into calcium sulphate by oxidation. Nitrates or chlorates of potash, lime, baryta, strontia, &c. may be used instead of sodium nitrate, but the latter salt is preferable.

2964. Howard, A. H. Feb. 14.

Casting.—Hot plastic or liquid asphalt or bituminous material is moulded into pipes &c. within a metal casing as shown in Fig. 4, or about a skeleton of coiled wire or wire network as shown in Fig. 6, or Fig. 7, by inserting the casing or skeleton and the hot material in a closed mould, and rotating the mould rapidly so as to cause the asphalt to fly

outwards under the action of centrifugal force, and spread itself evenly over the interior of the casing or mould. The ends of the tubes are rounded and recessed to fit one within the other, and are joined



by inserting a hot iron dished block between the ends of adjacent pipes, then applying melted bitumen to the joint, and afterwards pressing the pipes together. The mould is constructed of two halves connected together by wedges E driven between claws *d* of semicircular straps D, which are hinged together. One end is secured to one half of the mould by screws *f*, and to the other half by a pin f^3. The other end is formed in two parts, which are secured to the halves of the mould by screws. The mould is lined with paper, chalk, &c., and may be cooled by a spray of water, or air currents may be forced through the perforated end of the mould.

3749. Thaarup, A. C. F. P., and **Dohlmann, S. F. A.** Feb. 26.

Stone, artificial; stonework, ornamental; casting.—Relates to the production of plain or ornamented artificial stone in the form of tiles, plaques, &c., without the use of heat or pressure. Suitable proportions of magnesium-chloride solution, magnesite, and sand or gravel are mixed together with water and any required colouring-matter, and allowed to set in moulds, after which the tiles &c. are air-dried. Tiles &c. with smooth surfaces are obtained by using glass or glass-lined moulds. Pictures, sketches, &c., may be made on the surface of the glass with a mixture of magnesite, magnesium chloride, colouring-matter, and water, and allowed to dry. It is stated that the picture &c. will be transferred to the surface of the next lot of composition cast.

3975. Bloxam, A. G., [*Panzl, R.,* and *Troetscher, A.*]. March 1.

Cements.—An acidproof lining for tanks and like vessels and conduits used for storing, boiling, and conveying corrosive liquids is made by mixing finely-powdered hydraulic or burnt cement, chamotte, and quartz or silicious material such as glass or slate with a warm aqueous solution of sodium silicate. The warm plastic material is applied in layers to the vessel &c., which must be kept cool. Tiles may be applied, if desired, before the material sets. The material may also be used in the construction of partitions or of the vessels themselves, a metal skeleton being used to which the material is applied.

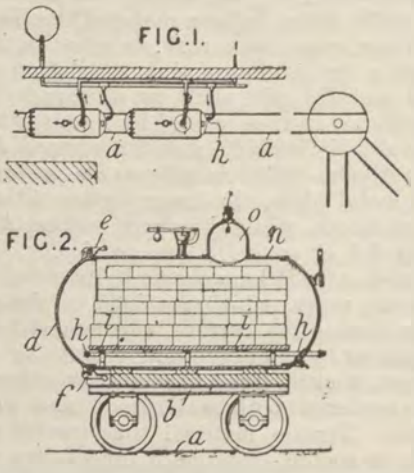
4114. Denaeyer, A. March 3.

Stone, artificial.—Relates to the manufacture of artificial stone adapted to be moulded into building-blocks, ornamental articles, &c. The stone consists of pulverized mineral or organic materials agglomerated by colloidal calcium silicate. The materials mentioned are sand, gravel, lava, asphalt, calcareous stones, granite, porphyry, and sawdust. The colloidal silicate is obtained by double decomposition of an alkaline silicate with calcium hydrate or chloride &c., and is washed or squeezed before use. The materials may be moulded under pressure, and the blocks may be coated with asphaltic or bituminous solution.

4166. Engels, E. W. March 5.

Fireproof coverings and compositions; refractory substances; cements.—Relates to the production of a fireproof and acidproof material or coating, which is composed essentially of carborundum obtained by means of the electric furnace. The combination of the carborundum with the Dinas stone, firebrick, or other substance to be rendered fireproof is effected either by applying it together with water-glass, boric acid, &c. to the already finished baked or dried material, or by rubbing the carborundum into the moulded but unbaked blocks &c. The carborundum may also be mixed with the clay, dolomite, and quartz or other materials from which the bricks or blocks are to be moulded, and in this case the mixture will serve also as a binding-agent for uniting the blocks &c. Reference is made to Specification No. 24,378, A.D. 1898.

4241. Fimmen, R. March 6.

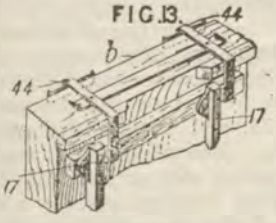


Stone, artificial.—Relates to apparatus for hardening moulded blocks of artificial stone by

steam pressure. Trolleys *b* running on rails *a* support hardening-chambers *n* having removable ends *d* secured by clamps *e*, *f*. The blocks are piled on a table *i* beneath which is a perforated steam pipe *h*, which is put into connection with a source of steam supply as shown in diagrammatic plan view in Fig. 1. The exhaust steam may be conveyed from the dome *o* to another hardening-chamber. After the hardening process is complete, the chambers are run on rails directly to the place for shipment.

4271. Carlson, G. March 6.

FIG. 13.



Casting.—Relates to machines for preparing starch moulds for casting sweetmeats or confectionery and for subsequently emptying the trays and separating the confections from the starch. Fig. 5 shows a longitudinal section through the forward end of the machine, Fig. 9 a transverse section at the point where the moulds are filled with starch, and Fig. 6 a longitudinal section through the rear end of the machine. A pile of trays *b*, Fig. 5, is placed on rails 3, between which moves intermittently a chain conveyer 4 bearing lugs 5. The trays contain confections which have already been cast and are ready for separation from the starch. To enable the bottom tray to move freely, the trays above it are temporarily lifted by means of lugs 21^a, 22^a adjustably secured to lifting-arms 21, 22. The lifting-arms are shown in Fig. 5 in their lowest or rest position. They are provided with slots 25 through which pass pivot-studs 24, and also with slots 26 with which engage crank-pins 27. As the cranks 28 revolve, the lifting-lugs move in curved paths so as to clear the lowest tray and enter beneath the one above it. The plates 41 secured to the lifting-arms 21, 22 then abut against the shaft 31 and stud 42 respectively, so as to prevent further inward movement of the lifting-arms, and the inclined slots 26 then serve as cam surfaces to produce a vertical movement of the lifting-arms and raise the trays. At the second movement of the chain conveyer 4 the tray *b* is brought on

FIG. 5.

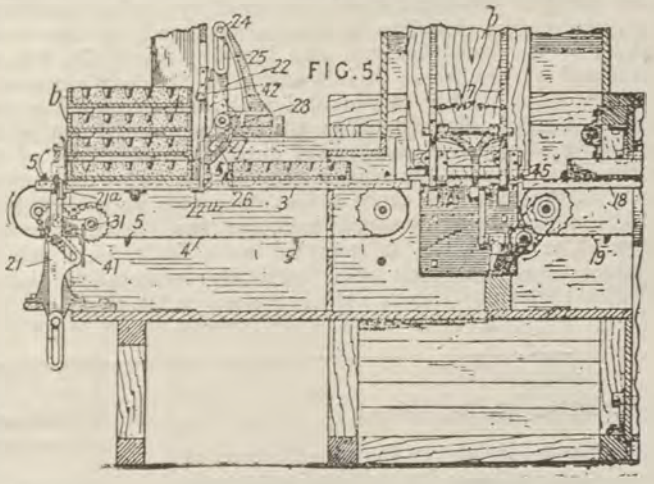


FIG. 9.

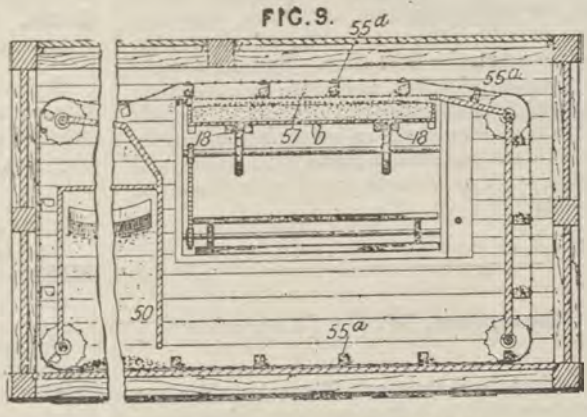
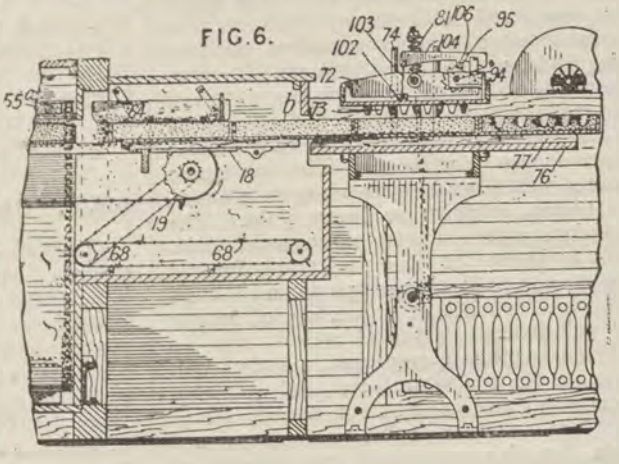


FIG. 6.



to a reversing-frame 17, capable of turning on hinges 45 from the horizontal position in which it receives the tray into the vertical position. Fig. 13 shows the outer end of the reversing-frame, with the clips 44 for holding the tray *b*, and in Fig. 5 the frame is shown in the vertical position, the bottom of the tray *b* being turned towards the observer. The starch and confections fall on to a sieve hung on spring arms and reciprocated by an eccentric and rod. The confections are twisted and cleansed in the manner described in Specification No. 20,789, A.D. 1894, and the starch is conveyed to a chamber 50, Fig. 9, for re-filling the trays *b*. The tray, having been emptied, is swung back to the horizontal position, and the one advancing behind it pushes it on to the rails 18, Figs. 5 and 6, between which runs another chain conveyer 19. It is then brought beneath a sieve 57, Fig. 9, on which is deposited starch conveyed by buckets or troughs 55[a] from the chamber 50. The starch is swept across the sieve by the buckets, and the tray beneath is filled with the sifted starch, after which it is passed beneath the levelling-frame 64, Fig. 6, which smooths the surface. The starch removed by the frame 64 is transferred by chain scrapers 68 to the chamber 50. The tray finally passes on to a table 76 provided with rails 77, and the moulds are formed by the descent of a platen 72 bearing dies 73. The platen reciprocates on guide-pins 74, and is provided with a yielding spring 81 which is compressed during the moulding of the starch. The platen 72 is rapped, to free the dies 73 from adhering starch, by the following means:—A spring slot or bar 102, fixed at its ends to the platen, is connected at its centre by a cord 103 to a lever 104 operated by a star-wheel 95, the slat being snapped back on the platen as each tooth of the star-wheel passes the tooth 106. The star-wheel is mounted on a shaft 94, which is turned step-by-step by means of ratchet mechanism consisting of a vertically-reciprocating slotted rod having two sets of ratchet teeth which act alternately upon a ratchet wheel on the shaft.

4355. Challis, C. E. March 7.

Stone, artificial.—Relates to the manufacture of an artificial stone suitable for grinding and sharpening tools, or as a filtering-medium. The stone is composed of pulverized flint, feldspar, sand, corundum, or other silicious substance, together with china clay or stone, alumina, or other clay, and sometimes bone or flint glass. Sodium silicate borax, lead salts, nitre, &c. are added to constitute a flux when the moulded blocks are fired. Cobalt salts &c. may be employed as colouring-materials. The materials are made into a paste with water, and are moulded, with or without pressure, in plaster or metal moulds.

4556. Thompson, W. P., [*Karavodine, V.*]. March 9.

Stone, artificial; refractory substances.—Mineral substances insoluble in water and containing water chemically combined with them, such as the hydrates of aluminium, silicon, magnesium, calcium, iron, copper, and tungsten or wolfram, are subjected simultaneously to a high temperature, (varying from 100° to 1000° C. or over), and to a high pressure, (varying from 100 to 1000 kilogrammes or over per square centimetre). The substances may be mixed with fibrous or powdery substances, such as asbestos, graphite, or paper pulp. The resulting body is a very slightly porous solid mass. By treating as above the blue precipitate formed by mixing solutions of copper sulphate and sodium carbonate, which consists of a mixture of copper carbonate and hydrate, artificial malachite is obtained. When graphite is employed, a body is obtained suitable for the manufacture of crucibles, pencils, crayons, and carbons for electric lamps and the like. Other substances mentioned as suitable for this treatment are silicate of aluminium, calcium, or magnesium, and aluminates of calcium or magnesium.

4605. Thompson, W. P., [*Tigerstedt, A. F.*]. March 10.

Refractory substances.—Soapstone or other like mineral composed mainly of silicate of magnesia is crushed and mixed with a binding-material such as clay, coal tar, or lime.

5242. Johnson, W. B., [*Fitzgerald, F. A. J.*]. March 20.

Refractory substances.—Cellular carborundum from an electric furnace is crushed to grains or powder; a dilute solution of glue or other adhesive substance is mixed with the grains or powder; the mixture is moulded into bricks, blocks, crucibles, grinding-stones, &c., and the moulded articles are fused in an electric furnace. For electrical purposes, a conductor such as graphite is mixed with the material.

5507. Chary, J. March 23.

Casting.—Relates to means for forcing out the solidified contents of cinder or slag tubs. The tub *a*, mounted on a railway truck, has a loose plate *f* jointed to the rod *c* coupled to the threaded plunger *b*, which receives longitudinal motion from the electric motor *h* and the gearing shown. The platform *p* is adjusted vertically by turning the wheel *t*. The bearing r^1 is mounted on trunnions, in which it can be turned by the wheel *x* and the worm gearing shown. In some cases the plunger *b*

may be connected directly to the piston of a cylinder subjected to air, steam, or water pressure.

FIG. 2.

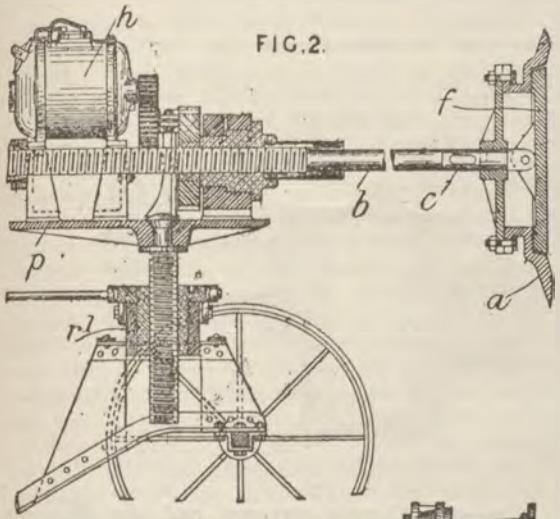
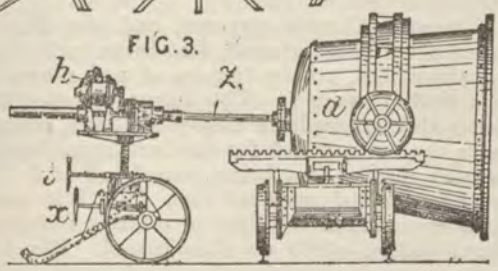


FIG. 3.



5659. Wright, W. March 26.

Cements; concretes; stone, artificial.—Relates to the improvement of the setting and working qualities of Roman, Portland, and other cements, and concretes or artificial stone compositions &c. prepared therefrom, especially those containing chalk, such compositions being applicable for building or paving bricks and slabs, window sills, &c. For the above purpose, carbonate of potash or other alkali is mixed with the water used in the preparation of the cement. Sulphur may be combined with a strong alkali, and the material may be hardened after setting by the application of sulphuric acid.

5740. Morrison, J. F., Allen, A. J., Hill, J. F., and **Rawstron, H.** March 27. *Drawings to Specification.*

Casting, compositions for. Sixteen parts of comminuted iron or steel and one part of sulphur are mixed with eight parts of melted asphaltum to form a composition for brake blocks.

5829. Naeyer, J. F. de. March 28.

Stone, artificial.—In the manufacture of artificial stone, the sand and lime or cement are mixed dry, small proportions of tarry matter in the form of powder and sulphate and aluminate of soda being added. The powdered material is placed in moulds, which are first treated with boiling water and then with superheated steam at a pressure of 6 or 7 atmospheres. The tarry matter is preferably concentrated gas tar mixed with finely-powdered coal cinders, but asphalt or tar in the form of powder may also be employed. A mixture of quicklime and powdered coal cinders forms a suitable cement for admixture with the sand.

5885. Garchey, L. A. March 29.

Stone, artificial.—Relates to improvements in the manufacture of the ceramic stone described in Specifications No. 5772, A.D. 1896, and No. 2003, A.D. 1898. A sheet-iron mould *a* is placed as shown in Fig. 4, and the space *e* is filled with sand. The sliding bottom *c* is then slipped into the grooves *b*, and the mould inverted as shown in Fig. 5. A sheet of paper *d* is placed on the mould bottom, and pulverized glass which has been separated into three grades is arranged in the mould in layers *f*, *g*, *h* of increasing fineness, the layer *h* serving to form the facing of the tile or brick. The mould is now transferred to a support or tray E of refractory material, which is only withdrawn from the furnace for a sufficient time to enable this to be done, and the sliding bottom *c* is removed and the mould lifted off, leaving the glass surrounded by sand as shown in Fig. 8. The mass of glass is devitrified in the furnace, and is then carried to the press, a fresh mould being placed on the support E. Instead of using the paper sheet *d* to prevent disturbance of the layer *f* when the bottom *c* is withdrawn, the mould may be formed with transverse partitions *i*, Fig. 9, which effects the same purpose. The process is applicable for the manufacture of other articles than ceramic stone.

FIG. 4.

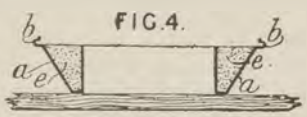


FIG. 5.

FIG. 8.

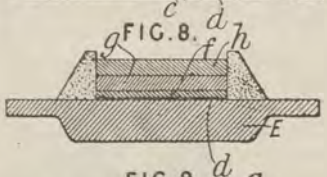
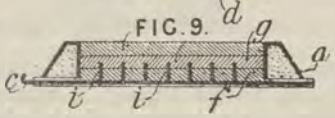


FIG. 9.

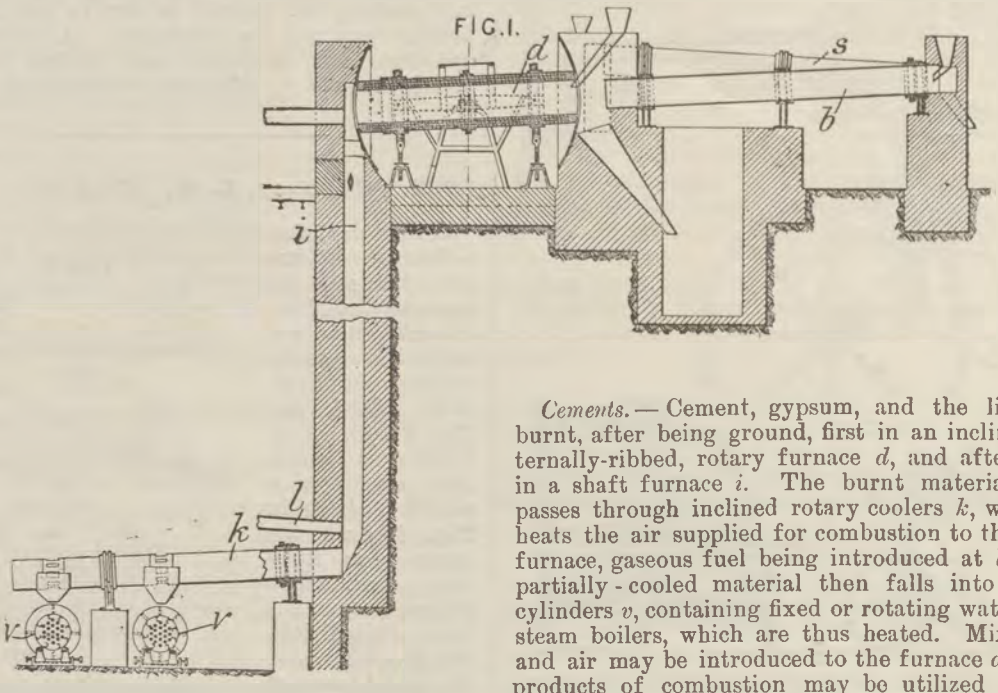


5893. Lake, H. H., [*American Wood Fireproofing Co.*]. March 29.

Fireproof coverings and compositions.—The solution preferably used consists of magnesium, zinc, ammonium, and sodium sulphates and oil emulsion in certain specified proportions. When the wood or other substance to be treated is dry or nearly

so, it is treated, in a vacuum, with ammonia, and after a certain time it is similarly treated with carbonic-acid gas. One or more of the components of the solution may be omitted, or others may be substituted for them.

5922. Lessing, W., and **Rheinfeld, D.** March 29.



Cements.— Cement, gypsum, and the like are burnt, after being ground, first in an inclined, internally-ribbed, rotary furnace *d*, and afterwards in a shaft furnace *i*. The burnt material then passes through inclined rotary coolers *k*, where it heats the air supplied for combustion to the shaft furnace, gaseous fuel being introduced at *l*. The partially-cooled material then falls into rotary cylinders *v*, containing fixed or rotating water-tube steam boilers, which are thus heated. Mixed gas and air may be introduced to the furnace *d*. The products of combustion may be utilized to dry the material, before it is ground, in inclined internally-ribbed drying-cylinders *b*, and they may be finally passed through a rotary cylinder *s*, in which material such as marl, clay, or the like may be dried. Or, instead of the drums *b* and *s*, steam generators may be arranged to be heated by the waste gases.

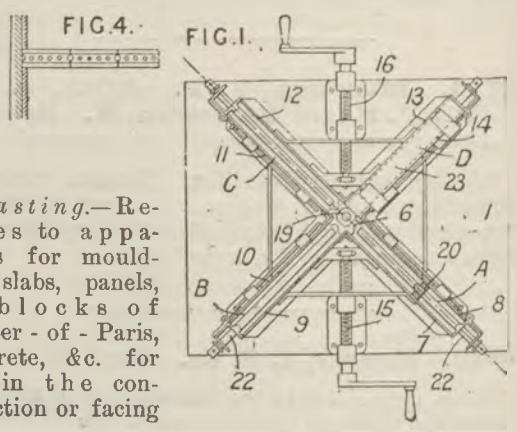
5995. Lake, H. H., [*Wachtel & Co., D.*]. March 30.

Stone, artificial.—Relates to the manufacture of artificial stone from arenaceous quartz or materials rich in silica, such as flint, slack from smelting-furnaces, ores rich in silica, &c., and slaked lime. Instead of admitting high-pressure steam directly to the chamber in which the moulded blocks are treated, the chamber is steam-jacketed, and trays of water, the evaporation of which is facilitated by steam-heated coils, are contained within it, the result being that a gradual increase of pressure and temperature takes place, and cracks and strains in the stone are avoided. After the slabs or blocks have been allowed to cool, a solution of sesquicarbonate of ammonium is introduced into the vessel for the purpose of hardening the stone.

6238. Thompson, W. P., [*Terranova Industrie, C. A. Kapferer,* and *W. Schleuning*]. April 3.

Cements.—Relates to a modification of the process for making white cement described in Specification No. 17,853, A.D. 1899. The modification consists in replacing the natural feldspar by equivalent non-ferruginous artificial ingredients, consisting of acid silicate frittings and glass, the frittings or glass being composed of alkalies, or alkaline earths, or both, together with silica, and in some cases clay.

6338. Hedemann, E. E. von, and **Hedemann, R. von.** April 4.



Casting.—Relates to apparatus for moulding slabs, panels, or blocks of plaster-of-Paris, concrete, &c. for use in the construction or facing

of walls or ceilings &c. On a base-plate 1 is supported a cruciform mould consisting of four sections A, B, C, D, which may be employed to cast either four separate slabs, or a corner, or T-shaped, or cruciform slab. By the insertion of loose end pieces 20, of which one is shown in section in Fig. 1, the size of the slabs cast can be varied. The mould is formed of vertical iron plates 7–14, of which the opposite pairs 7, 9 and 12, 13 are movable by means of screwed shafts 15, 16. A tubular core 19 rises from the base-plate in the centre of the mould, and a four-sided core 6 surrounds it when separate slabs are to be cast. The vertical end-plates of the moulds are perforated for the passage of cores 22, which may end in points resting in depressions in the core 6. The moulds are provided with lids or covers 23, of which one only is shown in Fig. 1. By the use of two concentric tubes in the central part of the mould, an annular mould may be formed for casting chimney tops &c. A tool-box may be arranged beneath the base-plate, and the appliance may be mounted on wheels. The cores 22 may be arranged vertically instead of horizontally. Fig. 4 is a plan view, showing three of the slabs placed together for the construction of a wall. When corner blocks &c. are moulded, the passage made by the core 19 enables an iron strengthening-bar to be carried through the corner &c.

6455. Hatschek, L. April 6.

Stone, artificial.—Relates to the manufacture of imitation stone slabs, plates, and tiles applicable for roofing and other purposes. Fibrous material, preferably asbestos, is mixed with cement, hydraulic lime, or the like in a rag-engine, and the mixture is then operated upon by the machines used in cardboard manufacture, so as to produce thin plates, which, by the subsequent application of high pressure, can be given any desired shape or appearance, including smooth or figured surfaces.

7096. Grünberg, A. April 17.

Stone, artificial.—Relates to a process for the production of artificial stone free from air, and in consequence of a harder and more compact structure. The dry materials employed for producing the stone are fed into the mixing-chamber A through an inlet opening *x*. Air is exhausted from the chamber through a pipe l^1, and water is then admitted to it through a pipe f^1. The air pump may be again put in operation, and water, as free as possible from air, is then circulated from the reservoir C through the pump D, chamber A, and stirring-apparatus B. The vertical shaft *e* of the stirring-apparatus is tubular, and communicates with stirring-arms *a* having hollow blades faced with perforated metal *b*, Fig. 3, over which straining-cloths *c* are stretched by clamping-rings *d*. Air still contained in the materials is removed by this washing process, and the mixed material is then removed at the outlet opening *k*.

FIG. 1.

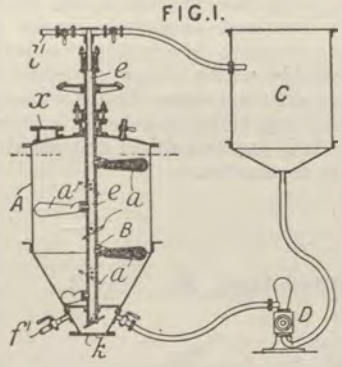
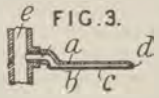
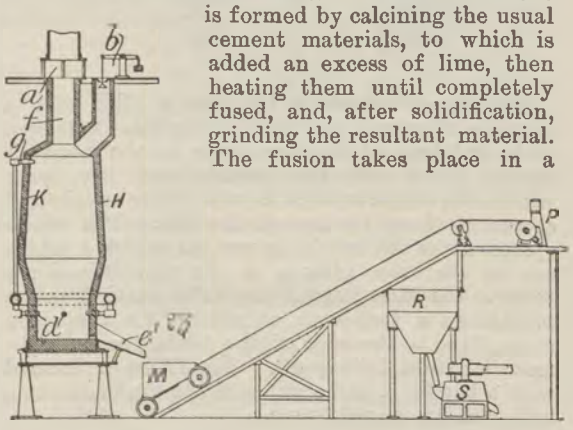


FIG. 3.



7139. Hurry, E. H., and **Seaman, H. J.** April 17.

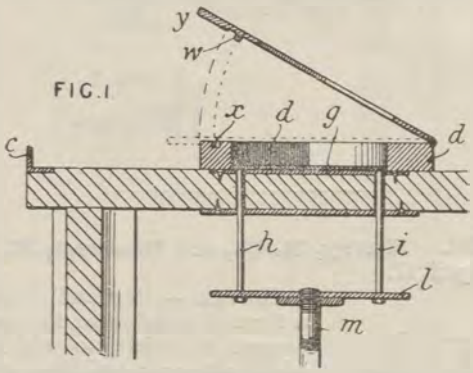
Cements. — Portland cement is formed by calcining the usual cement materials, to which is added an excess of lime, then heating them until completely fused, and, after solidification, grinding the resultant material. The fusion takes place in a vertical blast furnace, a suitable form being shown. This furnace consists of a sheet-iron shell H, with a refractory lining K. The cement materials, which need not be ground and mixed together, are charged in at *a*, and are partially calcined in the chamber *f* before entering the furnace proper. Fuel is charged in at *b*, and air is introduced at *g*. A very hot blast is introduced through tuyères *d*. The calcination may take place in another furnace, before introducing the materials into the blast furnace. The fluid mass is tapped off through a conduit e^1, and flows into a car M, in which it is granulated by a water spray Q. The car is raised by a hoisting-engine P, and the contents discharged into a hopper R, from which the material passes to a grinding-mill S. Reference is made to Specifications No. 23,145, A.D. 1895, and Nos. 2896 and 2896A, [*Abridgment Class* Furnaces &c.], A.D. 1898.



7733. Blackburn, W. F. M. April 26.

Stone, artificial.—Crushed marble chips, of a colour resembling the granite to be imitated, are mixed with Portland cement, coloured or otherwise, and the mixture is moulded under pressure in metal moulds while damp or slightly moist. The block of artificial stone thus formed is placed in water for about three days, and is then allowed to harden. It is finally rubbed and polished in the same manner as marble.

8143. Oldendorf, H. May 2.

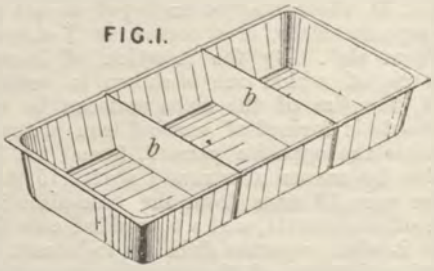


Casting.—A mould *d* for tiles is filled with a mixture of cement and sand, or the like. A hinged plate or frame, of the same shape as the mould, is turned down over the moulds, and the space within the frame is filled in with colour or coloured cement, to form the face of the tile. The tile is ejected from the mould by vertical rods *h*, *i*, which act on the loose plate *g* in the moulds, and are fixed to the plate *l* at the top of a vertical rod *m* pivoted to a foot-lever or pedal. An angle-iron rim *c*, fixed to the edge of the table, prevents the material from falling off. The frame is formed with a handle *y*, and a pin *w* of the frame enters a hole *x* in the mould frame.

8267. Baswitz, C. May 4.

Fireproof coverings and compositions.—Fabrics such as those used for deck awnings &c. are rendered fireproof and waterproof by treating them with a composition comprising 34 parts of "amphibolin," 9 of size or other gelatinous material, 2 of chrome alum, and 2 of sulphate of ammonia, mixed together in 53 parts of water. The material is applied in one or more coats, and after each application is exposed to light. Extra coats of chromated size may be applied after each of the other coats, to increase the waterproofing and prevent the earthy matter from falling out.

8409. Warren, G. May 7.

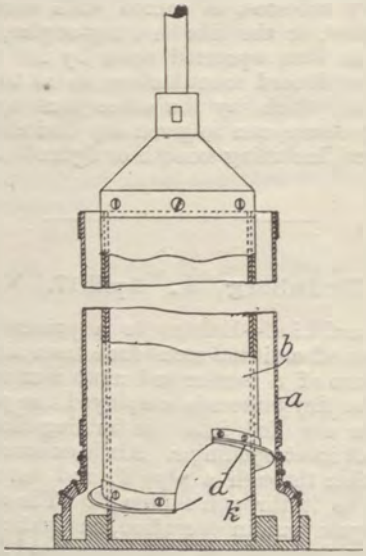


Cements; casting.—In the manufacture of cement, plaster-of-Paris, and similar materials, the slurry is cast into moulds which are placed on a drying-floor or on the roof of the kiln to dry the contents into bricks. These are then removed from the moulds and fired in a kiln. Fig. 1 shows the form of mould preferably employed. It is provided with removable partitions *b*. A modified form of the kiln described in Specification No. 24,946, A.D. 1894, [*Abridgment Class* Furnaces &c.], is preferably employed.

8987. Thompson, W. P., [*Johannsen, A.*]. May 15.

Cements.—A cement for lining ships' bottoms consists of Portland cement, coke, slaked lime, and sawdust.

9131. Kielberg, C. J. May 17.



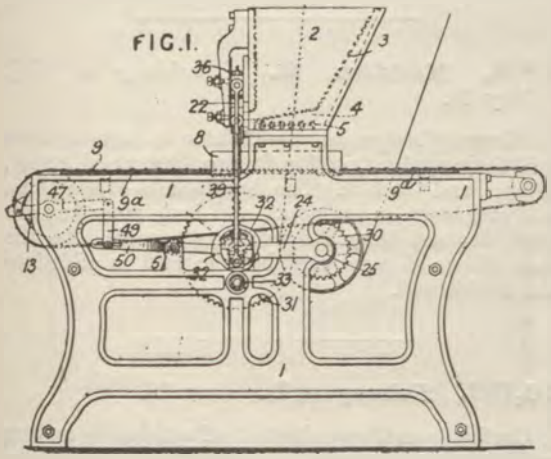
Casting.—For cement pipes, instead of using a longitudinally-movable core with a compressing-screw attached to it, as described in Specification No. 18,353, A.D. 1899, a tube *b*, carrying the screw *d*, is arranged to slide on a fixed or rotary core *k*. Cement or the like is inserted in the

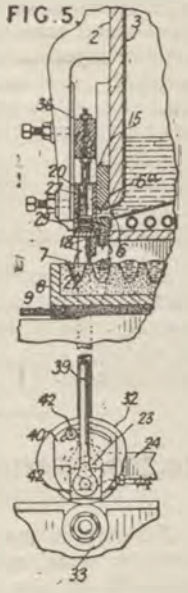
mould cylinder *a* when the screw is in its lowest position, and is compressed by screwing the tube upwards through the plastic material.

9133. Lombardi, L. Oct. 31, A.D. 1899, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1383*].

Casting.—Thin plates or laminæ, such as are used in electric condensers, are obtained by pouring the fused material upon a liquid mass of lower melting point and allowing it to cool. The film can then be lifted off. For making paraffin wax plates mercury is a suitable base.

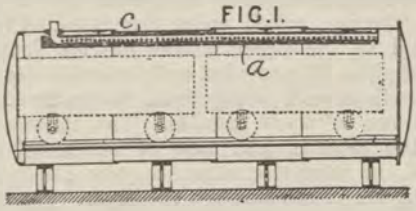
9219. Holmes, D. M. May 18.





Casting. — Relates to machines for casting confectionery in starch or like moulds. The frame 1 supports a tank 2 for the confectionery mixture. The tank is provided with a copper lining 3, and a chamber 4 in which are located steam pipes 5. Longitudinal bars 9^a support a pair of conveyer chains 9, on which rest trays 8 containing the starch moulds 7. All the moulds in each transverse row are filled simultaneously from the tank 2, and the chains 9 then advance the tray 8 sufficiently to bring the next row of moulds beneath the discharge nozzles 19, Fig. 5. A brass plate 15, bored with a series of holes 6^a, is fixed in front of the discharge slot 6 of the tank. In front of the plate 15 moves a slide 20 operated by vertically-moving rods 22. The slide 20 is bored to form cylinders 27 provided with parts 29 adapted to communicate in turn with the openings 6^a and discharge passages 18. Each cylinder is provided with a piston, and the piston-rods are carried by a bar 36 reciprocated vertically by rods 39. The rods 22 are loosely pivoted to a shaft 23 supported in bearings at the ends of two arms 24, which are themselves pivoted loosely on the main driving-shaft 25 of the machine. The shaft 23 is driven through gearing 31, 30 from the shaft 25, and, as the cams 32 rotate in contact with the cam-rolls 33, the shaft 31 rises and falls, and the rods 22 and slide 20 are reciprocated. A plate 40 is adjustably secured to each cam 32 by a bolt 42, and a block 42 is adjustably held by a screw 44 between ears projecting from the plate 40. The rods 39 are connected to the blocks 42, and reciprocate in a manner or to an extent determined partly by the shape of the cams 32 and partly by the adjustment of the parts 40, 42. In the position shown in Fig. 5, a charge of mixture has just been deposited in the mould. As the cams 32 rotate, the piston will first be lifted slightly, so as to draw any adhering mixture into nozzles 19. As soon as the eccentric portions of the cams 32 begin to bear on the rolls 33, the slide 20 will rise with the pistons, the latter, however, rising faster. The slide 20 ceases to rise when the parts 29 register with the openings 6^a, and the pistons then draw the mixture from the tank by suction. During the remainder of the revolution of the cams 32 the pistons descend faster than the slide 20, and the mixture is discharged to the moulds. The movement of the tray 8 is effected by the slotted rocking-lever 50 (pivoted at 51), link 49, pawl lever 47, and ratchet-wheel 13.

9275. Prior, P. May 19.



Stone, artificial. — Relates to a process for hardening lime or artificial calcareous sandstone which is used for building purposes as a substitute for bricks and facing-stones &c. For this purpose, the raw material of the stone may be mixed with alkalis or their salts, such as sodium carbonate or potassium carbonate, the stone being subsequently subjected to the action of superheated steam under pressure. Instead of mixing the alkali with the raw materials, it may be volatilized and introduced in that condition into the superheated steam, or the proper proportionate weight of the alkali may be placed in pans in the hardening-vessel and the superheated steam passed over it. Fig. 1 shows apparatus for carrying out the latter process. The alkali is placed in flat pans *a* formed with perforated sides, and the steam is introduced through a perforated tube *c*.

9356. Duniczewski, M. May 21.

FIG.1.

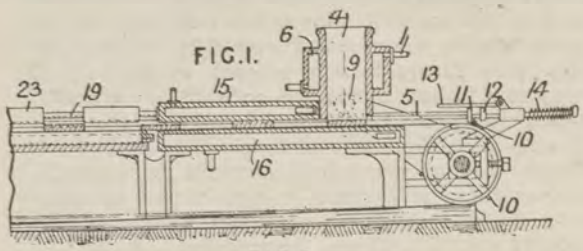
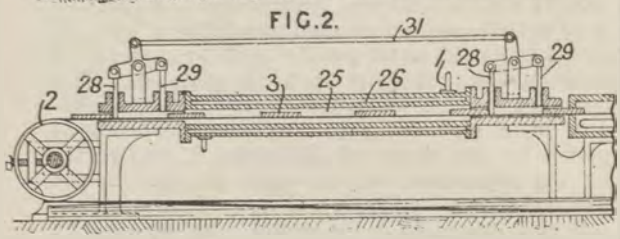


FIG.2.



Casting.—An apparatus for manufacturing lump sugar is provided with an endless carrier which conveys the moulds successively past a sugar-feeding funnel, a cooling-arrangement, a cleare-supplying apparatus, and a drying-chamber. The endless carrier, which may be made of wire gauze, passes over two drums 2, and carries a series of moulds 3, which receive charges of sugar from a funnel 4, provided with an agitator 9, and a steam jacket 6. A reciprocating slide 5 controls the feed of the sugar, and is closed by means of pins 10 on the right-hand drum, which strike a projection 11, on the slide; the slide is locked in its closed position by a pivoted arm 13, which drops behind a stop 12 on the slide. When a mould passes beneath the funnel, the arm 13 is released by one of the pins 10 striking a projection on the arm 13, and the slide is opened rapidly by means of a spring 14. The cooling-arrangement comprises two chambers 15, 16 through which water circulates. Cleare is supplied to the sugar in the moulds from perforated pipes 19, provided with movable sleeves 23, the length of each being equal to the distance between two adjacent moulds. The sleeves travel with the moulds, and may be connected to the slide 5. A vacuum chamber may be employed for drawing the cleare through the sugar. The drying-chamber is provided with a steam jacket 26, and is connected to an air pump. Each end of the chamber is provided with double doors 28, 29, supported by bell-crank levers connected by a rod 31. By this means cold damp air is prevented from entering the drying-chamber. Instead of the wire-gauze carrier, a chain of moulds, having wire-gauze bases and partition walls, may be employed.

9559. Martin, A. May 24. *Drawings to Specification.*

Casting. — Advertisement tablets, decorative facias, and the like are formed with raised representations of letters &c., by casting, in a gelatine mould, plaster mixed to a paste with a solution of boric acid, ammonia, and salt, in which a cloth is impregnated or embedded.

9684. Taylor, A. G. May 26.

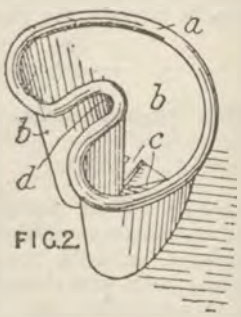


FIG.2.

Casting. — For artificial teeth, plaster casts which do not require shaping are taken from the impressions of the mouths by stretching over the impressions flexible moulds having enlarged rims *a* and tapered sides *b* and then filling them with plaster. In Fig. 2, which shows a mould for the lower model, an indentation *d* is formed, and retained by means of a cross-web *c*. The mould for the upper model is not indented.

9989. Haddan, R., [*Huelsberg & Co.*]. May 30.

Fireproof compositions.—Relates to compositions and their application for fireproofing wood, paper, fabrics, and the like. The double salts of ammonia and magnesia, or ammonia and iron, zinc, &c., are used because they are not hygroscopic. In the case of wood especially, boracic acid is added to the double salt.

10,778. Schreyer, L. June 13.

Casting.—In the production of articles by casting artificial stone or marble compositions in moulds, sheet-metal moulds coated internally with a thin smooth layer of enamel are used instead of the polished glass moulds hitherto employed. The enamel consists preferably of lead silicate, or may be of a vitreous character.

10,800. Serkowski, S. June 13.

Fireproof coverings and compositions.—Relates to waterproof coated fabrics. Talc is added to the coating-material to render the fabric incombustible, or at any rate less inflammable than it would otherwise be.

10,960. Berlyn, F. H. P. June 16. *Drawings to Specification.*

Statuary is made of china, porcelain, or other ceramic ware, with translucent walls, and illuminated by gas burners, candles, or electric or other lamps, placed on ledges provided inside; air-holes, and openings through which the lamps can be introduced and products of combustion discharged, are also provided. Such statuary may be used for lighting or dercoating. The lamp bases

may have projections to pass through slots and rest in recesses in the ledges, to allow them to be placed in position from below.

10,977. Sinclair, D. June 16.

Stonework, ornamental.—Coloured surfaces are produced electrolytically on metal by making this the anode in an alkaline lead or lead and copper solution; the process is applicable to stone articles, previously faced with metal by electrodepositing copper, fritting on foil, or heating in vapour of nickel carbonyl. The lead solution is made by boiling litharge with caustic soda or other alkali in water for an hour, and diluting the mixture; it is preferred to add some cyanide coppering bath to the solution. The articles are afterwards washed, and may be lacquered. Additional effects may be got by applying varnish or other resists to parts of the articles during part of the time of electrolysis, and by afterwards heating the articles to from 150° to 500° F.

11,189. Long, J. de, and **Homergue, J. B. d'.** June 20.

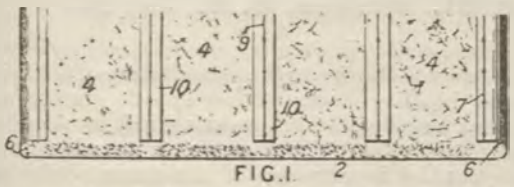


FIG. 1.

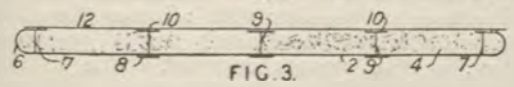


FIG. 3.

Sound-deadening coverings and compositions.—Linings for carpets, refrigerator cars, cold storage houses, dwellings, buildings, &c. are formed for insulating against heat and cold, and for deadening sound. A filling-material 4, composed of raw cattle hair, used separately or mixed with cellulose formed from ground corn-stalk pith, is enclosed between sheets 2, 12 of paper or other suitable material. The edges of the bottom sheet are turned up at 6, and secured by chain-stitching 7. Tapes or strips 8, 10 are arranged at intervals in the manner shown, and are connected together by chain-stitching 9. The top sheet is fixed to the turned-up edges 6 and to the upper tapes 10 by cement, glue, or paste.

11,514. Nobis, L., and **Wenzel, A.** June 25. *Drawings to Specification.*

Cements.—Relates to tanks, boiling-pans, &c. constructed of a skeleton framework of iron coated with concrete. In order to ensure a light joint between the framework and the iron caps, manhole frame, or nozzles, the iron parts are covered with red lead and sand, and thereupon coated with soluble glass.

11,561. Wurts, A. J., Potter, H. N., Bennett, E., and **Beebe, M. C.** June 26. *Drawings to Specification.*

Refractory substances.—Thin supports for fine wire used for electrical heating in a lamp are made of powdered talc, soapstone, glass, or quartz, mixed with tragacanth or other binding-material, moulded to form, baked, and burnt at a high temperature.

11,987. Cordes, M. July 3.

Stone, artificial.—To one part of gypsum are added four parts of water, one part of peat rubble, and one part of tan. The resulting mixture is moulded into blocks, which are dried either artificially or in the air, and are adapted especially for the construction of light partitions or dividing-walls.

12,317. Tachard, P. July 7.

Cements for floors. A foundation consisting of a mixture of 30 parts by weight of sawdust, 35 parts of oxide of magnesium, and 4½ parts of a solution of chloride of magnesium at 22° to 23° Bé. is first laid down, and an upper layer is applied composed of 40 parts of oxide of magnesium, 10 parts of asbestos, 5 parts of wood meal, 5 parts of calc spar, 5 parts of colouring-matter, and 4½ parts of chloride of magnesium solution. When the floor is composed of one homogeneous jointless layer, the proportions of the ingredients of the composition are altered.

12,513. Lake, H. H., [*Wachtel & Co.*]. July 11.

Stone, artificial.—In the manufacture of artificial stone from sand and lime, the sand is dried at a temperature of 100° C. and upwards, and the hot sand is mixed with the requisite quantity of slaked lime in the form of paste. The sand employed preferably consists of two parts of large grain sand together with one part of fine grain.

13,129. Jager, O. July 20.

Casting.—A movable side *d* of a mould box for bricks carries a series of partition plates *i* for dividing the mould box into compartments, and a series of core rods *k* for producing perforations in the bricks. The opposite fixed side *f* of the mould box is recessed to receive the ends of the plates and core rods. A loose bottom plate *e* rests on a plate *r* fixed to vertical sliding rods *p* operated by a treadle *s*. The side *d* is mounted on rollers adapted to run in channel-iron guide-rails, and is operated by

a lever *p* and links *o*. In a modification, the movable side and bottom are operated by hand-wheels, pinions, and racks, and are secured in

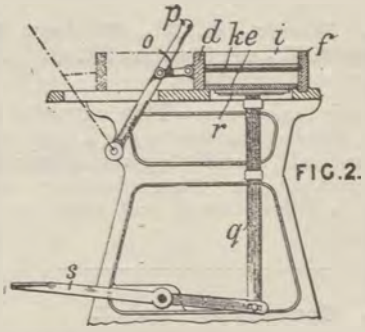


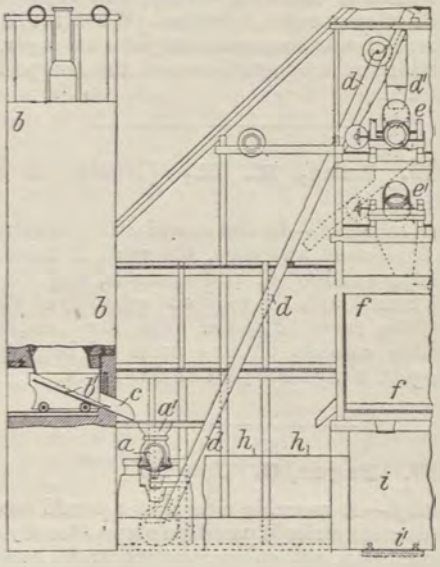
FIG.2.

position by pawls which are kept in engagement with the racks by springs, and can be turned out of action by handles on shafts carrying the pawls.

13,168. Ward, J. July 21.

Concretes for paving. The body is composed of relatively large-gauge stone, screened, broken, and tarred. With this is mixed similar, but much smaller gauge, stone which constitutes a filling for the interstices. The whole becomes solid on rolling.

13,169. Ward, J. July 21.



Asphalts.—Relates to broken stone paving. The stone to be broken is heated and dried in a kiln *b* and passed down a shoot b^1, *c* to a hopper a^1 and stone-crusher *a*. The broken stone is lifted by an elevator *d* to a hopper d^1, whence it passes into screens *e*, e^1 on different floors, and is sorted into a series of bins *f*. From these it may be drawn off into trucks on the railroad i^1, but it is more usually discharged while still hot and dry upon a table *h*, where it is mixed and tarred. The table *h* is situated in a hut which is kept at a uniform temperature.

13,467. Thom, T. M., and **Oakes, A. C.** July 26.

Stone, artificial.—Pure lime, or a mixture of pure lime and unburnt limestone, is slaked with just sufficient water to bring the mixture to a suitable consistency for moulding. The moulded blocks or slabs are dried, and are then introduced into a closed vessel capable of resisting an internal pressure of 300 to 400 lbs. per square inch. Carbonic-acid gas is introduced into this vessel, the initial pressure being about 30 to 40 lbs. per square inch, and this is gradually increased so as to maintain the stone at a constant temperature of about 90° F. The final pressure employed is about 300 to 350 lbs. The stones produced are suitable for use as lithographic stones when polished, and are also adapted for other purposes.

13,491. Güssow, G. E. July 26.

Stone, artificial; fireproof compositions; refractory substances.—Relates to the manufacture of artificial-stone building-blocks of low specific gravity and having considerable fire-resisting and non-conducting properties. The material from which they are moulded is composed of a mixture of clay and silicious sinter together with asbestos fibre, magnesite or bauxite, and finely-divided peat-wood, straw, or like organic material. The moulded blocks are burnt like ordinary bricks.

13,640. Denny, F. July 30.

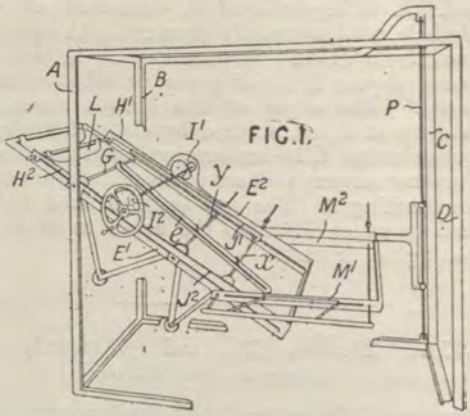


FIG.1.

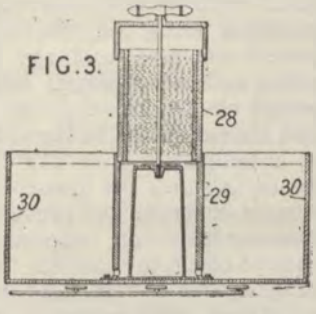
Stonework, ornamental.—Relates to pantographic apparatus for producing to scale copies of sculptures, carvings, and solid ornamental work generally.

Within a frame A, B, C, D, a rectangular frame E^1, E^2 is mounted to turn about an axis G. On the frame are mounted two pairs of racks H^1, H^2 and J^1, J^2. These racks are moved simultaneously in opposite directions by a hand-wheel and spur gearing I^1, I^2. One rack carries a balance weight L, while the other carries a shaft *x* upon the end of which the cutting or shaping tool is fixed. A tracing bar or shaft *y* is connected to the shaft *x*, and also to the shaft G by a pantograph linkage, so that, as the shaft *x* is moved to and from the shaft G, the shaft *y* has a corresponding motion on a reduced scale. The motion of the shafts *x* and *y* in the direction of their lengths is effected by means of a slotted arm *e* pivoted to the shaft G and engaging with the arms *x* and *y*. When this arm is rotated by a treadle, acting through a rope, the tracer and cutting arms are forced against the work, and the motion takes place in the same ratio as that due to the pantograph. When a bust, say, has to be copied, it is placed on a stand opposite to the end of the tracing-shaft *y*. A block of stone is similarly placed opposite the end of the cutting-shaft *x*, which is fitted with a drill driven by a flexible shaft. Then the bar *e* is rotated until the end of the shaft *y* comes in contact with a point on the bust being copied. During this time the drill on the shaft *x* enters the block of stone to a corresponding depth. By the operation of the gear I^2, or the rotation of the frame E^1, E^2, the shaft *y* is brought opposite to a second point, and the operation repeated. When the work has to be reproduced on practically the same scale, the shafts *x* and *y* are too close to allow of the necessary space for the bust &c. In that case, therefore, the motion of the shaft *x* is transmitted to a second shaft fitted in a horizontal frame M^1, M^2, which slides on an upright P. For undercutting work, the drill &c. is mounted on the end of the shaft *x* at the necessary angle, and a corresponding tracer is fitted to the shaft *y*. In this arrangement, the simultaneous adjustment of the cutting-drill and the tracing-point about the respective axes of the shafts *x* and *y* is effected by chain gearing.

13,693. Edison, T. A. July 31.

Casting.—Relates to methods of obtaining duplicates of phonographic records. Fig. 3 shows a method of casting with the ordinary composition. The record cylinder mould 28 is mounted over a bath 30 of the heated composition, and is supported by a cylinder 29 carrying a plunger by which the material is raised into the mould. The mould may be cooled to produce a sharp casting.

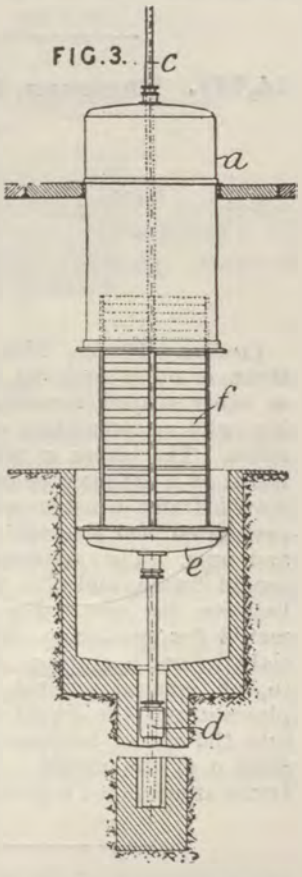
FIG. 3.



13,896. Soc. H. Croizier et Cie. May 28, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

Stone, artificial.—Relates to the manufacture of artificial-stone blocks, bricks, &c., in which the moulded blocks are hardened by subjecting them to steam pressure. The blocks are placed on shelves or platforms *f* carried by a shaft or piston-rod *c* adapted to be raised and lowered by means of a hydraulic cylinder *d*. The shelves having been filled, the blocks are lifted into the bell *a*, and the platform *e* is bolted to the flange of the bell. Steam is admitted to the bell, and, when the hardening operation is complete, the blocks are gradually lowered, each shelf being emptied and refilled with freshly-moulded blocks as it descends. The blocks may be arranged on plates which are adapted to fit the shelves, and the shelves are preferably mounted rotatably on the shaft *c*.

FIG. 3.



14,278. Passow, H. Aug. 9.

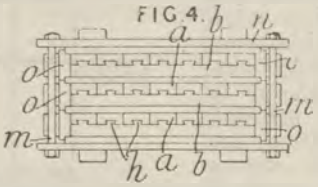
Cements; slags, treatment of.—The raw materials employed in the production of Portland cement are melted down completely and granulated by passing oxygen, air, or oxygen-containing gases through them. Blast-furnace slag may be similarly treated to form cement clinker. The cement produced by grinding the clinker may be added to ordinary Portland cement or used alone. The treatment of the slag &c. with air may take place in apparatus like a Bessemer converter, or the air may be brought in contact with the slag in rotating drums or upon rotating discs.

14,503. Talbot, B. Aug. 14.

Refractory substances.—In order to prevent the cracking or disintegration of acid or basic bricks and blocks in metallurgical furnaces, crucibles, gas

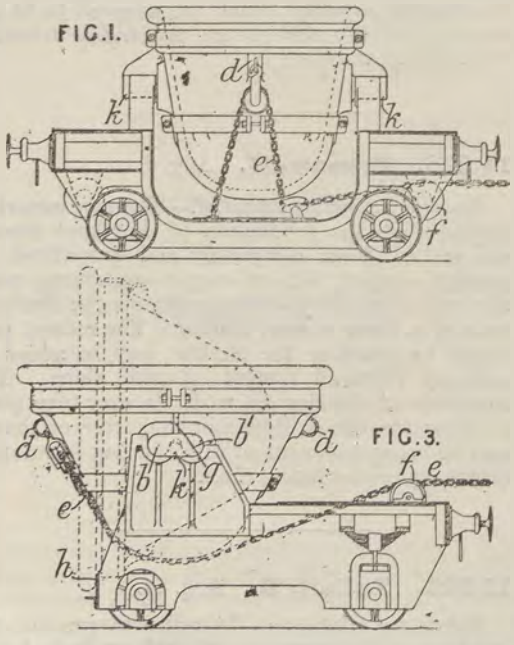
retorts, &c. by the intense heat, they are impregnated with carbonaceous material by soaking them in hydrocarbons such as coal tar, heavy oils, resin, or the like, heated to a temperature of 100° F. or more. Resin, or a hydrocarbon which is solid at ordinary temperatures, is preferably added to the tar or liquid hydrocarbon, or it may be melted and used by itself.

14,697. Thomson, G. F. Aug. 16.



Casting.—Blocks, tiles, or pieces *a*, of wood, stone, or other material, are formed with dovetail or other shaped recesses, ribs, or projections to key with a foundation or backing *b* of artificial stone. The pieces *a* may be placed face downwards on a flat plate or table and be clamped in a mould frame constructed of four bars which are perforated near the ends and provided with screws and nuts. The artificial stone is run into the mould frame, and fills the recesses *h*, or spaces between the ribs. Fig. 4 shows in a plan a mould for producing three compound blocks or slabs in one operation. The pieces *a* are attached to, or secured against, slate slabs or partition plates *n*, and the liquid artificial stone is poured into the spaces between the pieces *a*. slabs *n*, and sides *o* of the mould. The parts of the mould frame are clamped together by bolts *m*.

14,749. Dewhurst, J. H. Aug. 17.



Casting.—Consists of an improved slag ladle and carriage. The mouth of the ladle in plan is rectangular with rounded corners; its sides make an angle of about 80° with the rim, and its back and front an angle of about 60°. The walls converge into a hemispherical bottom. The ladle is supported by double trunnions *b*, b^1, and can be reversed. Webs *g* and an angle-iron *h* prevent overtipping, and flanges *k* prevent lateral movement. When supported as shown in Fig. 3, the ladle tips endways from the carriage, the tipping being effected by blocking the wheels and pulling on the chain *e*, which is connected to a projection *d* of the ladle and passes over a pulley *f* on the carriage. Fig. 1 shows a carriage in which the same ladle may be used to tip sideways.

14,778. Croizier, A. H., and **Thomine, A. E.** Feb. 5, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

Stone, artificial.—Blocks, bricks, tiles, cornices, mouldings, ornaments, &c. of artificial sandstone are moulded under pressure from a mixture of slaked lime, clay or loam, and sand, or in some cases of lime and clay only. Colouring-matters may be added, and blast-furnace or like slag may be substituted for the sand. If the lime is slaked in the mixing-apparatus, the mixture should stand for from 24 to 36 hours before moulding. The moulded blocks &c. are subjected to the action of high-pressure steam in a closed chamber.

15,352. Rouse, T. Aug. 29.

Concretes; stone, artificial.—Slabs, building and paving blocks, bricks, and other articles are made of a central body, core, or part of lime-concrete, faced with cement-concrete, or, in the case of partition slabs &c., the inner parts may be of cement-concrete, and the faces may be of the softer and more porous lime-concrete. The compound blocks are subjected to pressure in moulds, and are submitted to the action of vapour or steam at a temperature of 212° F. for from 80 to 120 hours, to cause the lime-concrete to unite with the cement-concrete, and prevent disintegration of the lime-concrete on exposure to weather. The cement-concrete consists of Portland or other cement, mixed with sand, broken granite, &c. and moistened with water or steam. The lime-concrete is produced by mixing unslaked lime with gravel, sand, broken or powdered stone, bricks, clinkers, slag, coke breeze, &c. and steam in a closed mixer. Moulds for slabs may have projections on the sides to form channels in the edges of the slabs for the reception of grout. The

cement and lime may be coloured to present the same appearance, or so that one may be in contrast to the other.

15,432. Gibb, A. Aug. 30.

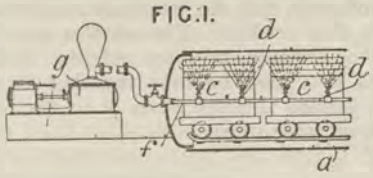
Cements. — Portland cement is prepared by fusing the constituent materials in a furnace of the kind described in Specification No. 11,301, A.D. 1900, [*Abridgment Class* Furnaces &c.]. In order to render the materials fusible without using a smaller proportion of lime than the requisite 60 per cent., peroxide of iron is substituted wholly or in part for the clay or shale usually employed. The furnace flame should be an oxidizing rather than a reducing one. Fusibility may also be ensured by substituting baryta, as carbonate or silicate &c., for part of the lime. Suitable materials for the production of cement by this process are sandstone or sand, limestone or chalk, and the residue remaining after extracting copper from burnt pyrites, known as purple ore; or the peroxide of iron may be added as burnt ironstone or as hæmatite. Clay may also be added. The materials should not be powdered, but should be moistened and formed into lumps of about three inches diameter. The melted product is granulated in water, drained, and dried, the waste heat from the furnace serving for that purpose. The granulated material is then ground to form cement.

15,830. Tuckwell, J. Sept. 6.

Stone, artificial; fireproof compositions; stonework, ornamental.—Relates to the manufacture of slabs, tiles, mouldings &c. of artificial marble, granite, or other stone. The artificial stone is of a fireproof, waterproof, and ornamental character. Keene's marble cement, white silver sand, ground alum, and in some cases litharge, are mixed dry, and formed into a thin paste with water. Parian cement is sometimes added. Slabs or tiles are cast from the paste in shallow moulds, of which the bottom surface is of glass or polished metal. When plain colours are required, the slabs &c. after removal from the moulds are coated with enamel paint, stoved at 155° F., polished with rottenstone or Tripoli powder, coated with spar or other varnish, stoved again, and finally polished while warm with a composition of beeswax, turpentine, and precipitated chalk. The backs of tiles &c. may be coated with boiled linseed or litharge oil to prevent damp. Before polishing the slabs may be decorated in suitable colours, varnished, stoved, and rubbed down with rottenstone. To imitate marble, granite, &c., the requisite graining may be applied in oil or water colours to the surface of the bottom of the mould. Preferably, however, the slabs &c. are coated with paint, stoved at 155° F., marbled or grained in colours, stoved at 250°, varnished, stoved at 155°, rubbed with rottenstone, and polished with the aforesaid beeswax composition.

15,940. Schwarz, W. Sept. 7.

FIG. 1.



Stone, artificial.—In the manufacture of artificial limestone, the moulded blocks *c*, while undergoing the steam hardening process in the chamber *a*, are sprayed at intervals with water by means of sprayers *d*, pipes *f*, and a pump *g*.

15,960. Gabrielli, A. Sept. 7.

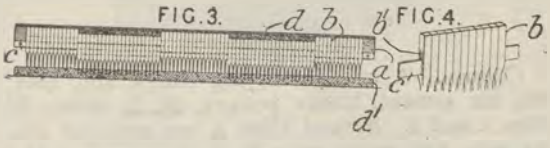
Fireproof coverings and compositions.—Relates to fireproof coverings, adapted more especially for the walls and floors of the cabins &c. of war-ships. The covering is formed of two layers. The first layer is applied directly to the wall, and consists of asbestos sheets or cloth, wood, cork, cloth, felt, papier mâché, &c. perforated with small holes, and, if necessary, fireproofed by ammonium salts, phosphates, borates, or aluminium salts &c. The other layer is applied in a liquid form, and consists of linseed oil, copal varnish, &c., together with such substances as calcium, iron, zinc, or lead carbonate, red or yellow ochre, or other materials which, when heated, evolve gases tending to check combustion.

16,004. Rawson, W. S., and **Littlefield, R. D.** Sept. 8.

Refractory substances.—Calcined magnesite, or magnesium oxide, is mixed with a small proportion of a fusible boron compound, a little water is added, and the mixture is moulded into bricks, crucibles, retorts, or other articles, which are baked at a high temperature. For furnace linings and bottoms, the mixture is rammed in place, and baked by the heat of the furnace.

16,155. Baeck, E. C. Sept. 11.

FIG. 3. FIG. 4.



Casting.—Rollers for printing wallpaper designs &c. are made by first producing the design on a strip of rubber, soft metal, or other pliable material, and then mounting it on a roller. The design is first drawn on a chalked surface formed by the tops of needles *b* packed in a frame *a*, and frictionally held in the vertical positions in which they may be placed. The needles within the

design are then uniformly depressed, and the strip &c. *d* cast or moulded in the spaces produced. A strip *d* of cork, felt, &c. prevents accidental movement of the needles. The needles may be made square to produce tapestry effects, and, if of sufficient size, may be held together in rows by strips *c* passing through slots b^1 in the needles or by other suitable means.

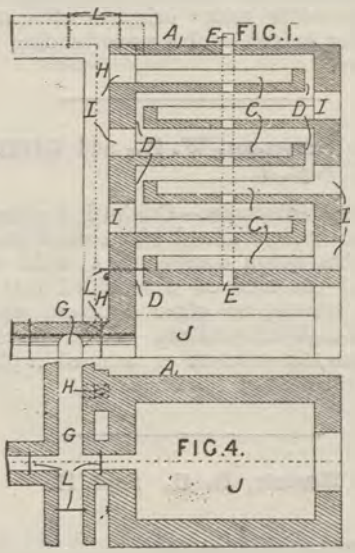
16,167. Metz, A. Sept. 11. *Drawings to Specification.*

Asphalts for paving. The upper layer is of asphalt, bitumen, rough porous gravel, and pulverized stone, well mixed and heated to a high temperature.

16,307. Seifarth, H. Sept. 13.

Stone, artificial.—In the manufacture of artificial stone, alkali waste in the crude damp state is combined with lime and sand, slag, or ashes, and the stones or blocks, moulded under pressure, are hardened by superheated steam.

16,817. Hewitt, W. W. Sept. 21.



Cements.—A kiln for drying slurry, slip, clay, &c. for cement, bricks, pottery, &c. is shown in Figs. 1 and 4. Several kilns A are arranged side by side, and waste gases from furnaces or coke ovens J pass up through the kiln in a zig-zag manner over and under the drying-floors C, which have flues D at alternate ends. By means of a vertical flue H leading from the top of each kiln and a connecting-passage G, controlled by suitable dampers L, the hot gases can be diverted from one kiln while it is emptied and recharged through apertures I, and passed into an adjoining kiln or directly into the chimney. The drying-floors are perforated by a passage E through which the coke oven is charged, and the apertures in the floors are covered with suitable plates when in use.

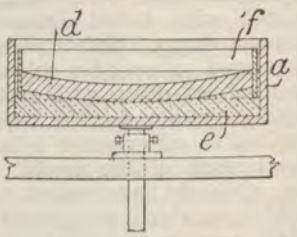
17,120. Pilkington, W. W., and **Ormandy, W. R.** Sept. 26.

Mortars; cements; refractory substances.—Ordinary coarse field sand, silica, or coarsely-crushed refractory rock is mixed with fine waste sand from glass works, or finely-ground sand or refractory material, a small quantity of lime, clay, or other binding-material may be added, and the mixture is moistened with a dilute solution of an alkaline silicate which may be obtained by acting on waste sand of glass works with caustic soda solution under a steam pressure of 90 lbs. to the square inch. By using the very finely-ground refractory material and alkaline silicate solution, articles can be produced containing a smaller quantity of flux or binding-material, and can be stacked and handled until they are fired. Refractory cements for use with the firebricks and blocks are made of the same composition, to ensure equality of expansion and contraction, and equal resistance to the action of fluxes &c. The fine sand or material may be passed through a sieve with 100 to 150 wires or silk threads to the linear inch. The Provisional Specification refers to Specification No. 376, A.D. 1883, [*Abridgment Class* Moulding &c.].

17,475. Steenstrup, C. A. R. Oct. 2.

Asphalts.—Old or cut rubber is boiled for four to twelve hours with four to eight parts of linseed or other oil or oil refuse, with constant stirring, air being also passed over the surface of the mixture until it becomes very adhesive. During the process the mixture is strained, and it may be separated from mineral admixtures by allowing these to subside. A little red lead may be added. The product is stated to be elastic, and proof against concentrated hydrochloric acid and 50 per cent. sulphuric or nitric acid. It may be mixed with sand or other minerals to serve as asphalt.

17,698. Krank, A. Oct. 5.



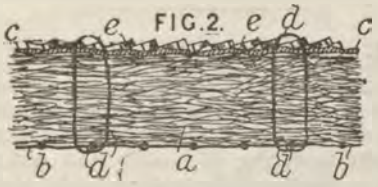
Casting paraboloids of revolution. A vessel *a* containing mercury or the like *e* is rotated, and then a substance *d* which will set, such as melted wax or plaster of Paris, is poured on it. A ring *f* floating on the mercury prevents contact of the substance with the wall of the vessel, and facilitates

removal. The solid produced may be coated with reflecting-substance, or used as a mould for producing concave parabolic surfaces.

18,279. Naef, P. Oct. 13. *Drawings to Specification.*

Asphalts.—A material, which may be used as a substitute for asphalt, may be prepared by exposing sand, cement, &c. to the action of gases obtained during the destructive distillation of coal. The process may be carried out in a rotary apparatus, fitted with revolving blades.

18,339. Christie, J. Oct. 15.



Fireproof coverings; sound-deadening coverings.—Fireproof sound-deadening slabs or coverings for walls, ceilings, bulkheads, &c. are made of silicate cotton *a*, secured between wire netting *b* and expanded-metal sheets *e* by staples or wire fastenings *d*. The ribs of the expanded metal are inclined to retain plaster, and a sheet of strong paper *c* may be interposed between the metal and silicate cotton.

18,457. Kielberg, C. J. Oct. 8, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

Casting.—In the apparatus described in Specifications No. 18,353, A.D. 1899, and No. 9131, A.D. 1900, the inner cylinder provided with the helical projections is adapted to rise and fall without rotation, and the mould itself, together with its foundation, is rotated. The cement &c. is carried round with the mould, and lifts the inner cylinder by its pressure against the helical projections. The method is applicable for the production of pipes of cement or similar material.

18,698. Friswell, R. J. Oct. 19.

Stone, artificial; refractory substances; fireproof compositions.—Relates to an improved manufacture of refractory or fire-resisting materials for building or other purposes as a substitute for slate, plaster, wood, corrugated iron, &c., and consists more particularly of improvements on the invention described in Specification No. 4628, A.D. 1898. Asbestos, which has been converted into a pasty or plastic condition by kneading with water, is mixed with china clay or kaolin, or other clays or like bodies. The mass is formed into sheets, blocks, &c., a silicate solution and a bicarbonate solution being introduced during the process, and the sheets &c. are then saturated with silicate solution, and afterwards with bicarbonate solution, to precipitate gelatinous silica throughout the mass. The product is pressed, dried, and stored. A relatively small proportion of a carbonate or oxide of calcium, magnesium, iron, &c. may be added to the asbestos fibre and clay.

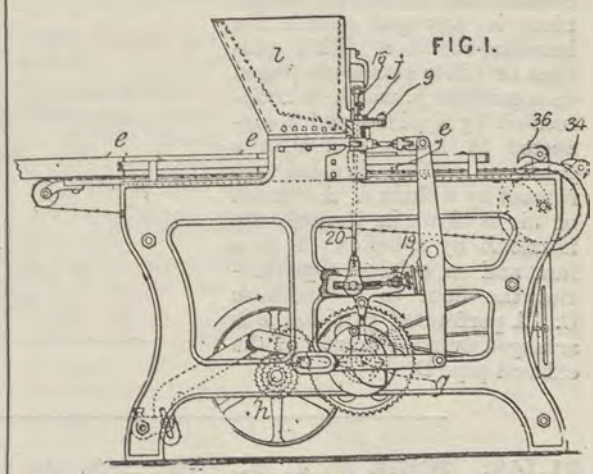
18,860. Rensing, C. Oct. 22.

Stone, preserving.—Relates to heating by steam under pressure for hardening calcareous sandstones and for other purposes. Air or other suitable gas is forced into the heating or treating vessel until the requisite pressure is approximately obtained, after which steam at the desired pressure is introduced. The pressure steam is thus mixed with a quantity of air or gas, and the rigid, pasty, or liquid masses are subjected both to pressure and to the action of the steam.

19,392. Müller, K. Oct. 30.

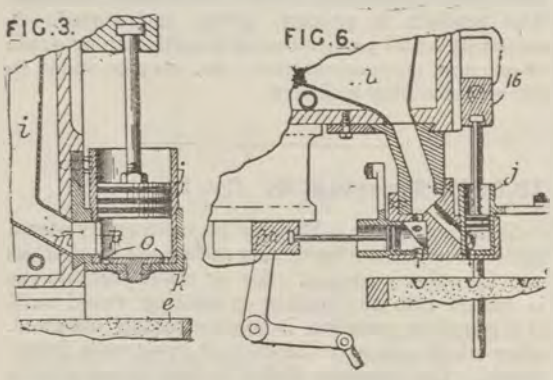
Cements.—A cement suitable for fine castings consists of a mixture of calcium sulphate and a saturated solution of magnesium sulphate together with burnt magnesia. The Provisional Specification states that limestone may be used instead of calcium sulphate.

19,412. Carlson, G. Oct. 30.



Casting.—Relates to confectionery-making machinery. Fig. 1 shows a side view of a machine which deposits the mixture contained in the reservoir *i* into several rows of moulds at one time. These moulds are made of powdered starch or the like contained in trays *e* carried by chains which are moved forward, intermittently, by ratchet gear.

The ordinary movement to shift the moulds is given by the pawl 34, but an additional movement is given when substituting one trough for another by a pawl 36 which is normally held out of contact with the wheel by a cam. This cam is rotated



by ratchet gear, the number of steps depending on the number of rows of moulds in a tray. The machine is driven by a pulley on the shaft *h*, which rotates the shaft *g* by the variable-speed gear shown. From the reservoir *i* the mixture passes to a series of cylinders *j*, Fig. 3, which can be rotated through a small angle to cause the port *p* to register with the port *m* or the ports *o* in the cylinder bottom to register with similar ports in the bar *k*. The cylinders are rotated by the bar 9, Fig. 1, actuated by a cam through the gear shown. The pistons which fill and empty the cylinders are connected to a vertically-reciprocating bar 16. This bar is coupled at each end to a rod 20, which is adjustable in a link swung about a centre 19 by an eccentric on the shaft *g*. In a modified machine, two sets of cylinders are used, one being horizontal as shown in Fig. 6.

19,515. Lebloda, G. F. Oct. 31.

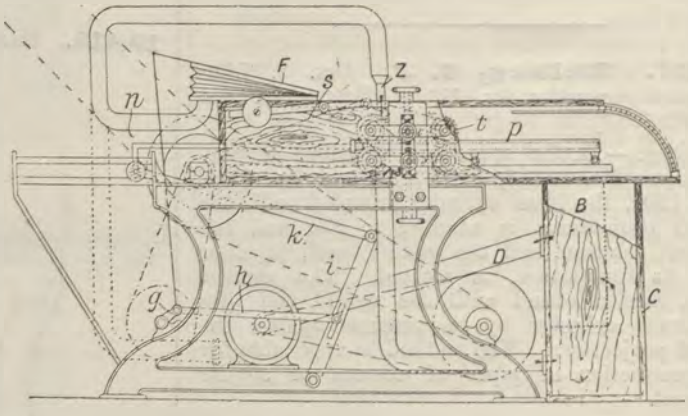
Fireproof compositions.—Relates to a method of preserving wood and making it fireproof. The solution used for treating the wood contains about six parts of boric acid, ten parts of borax, and forty parts of sulphate of ammonia. The impregnation may be effected by sprinkling, immersion, or painting. The wood may be compressed after impregnation.

19,597. Bushman, E. Nov. 1.

Stone, artificial; plasters; fireproof compositions.—Consists of an improved composition which may be used for various purposes, such as for a fireproof and waterproof covering for walls and ceilings, for flooring or paving, or for making baths, sinks, wash tubs, or sanitary bowls. It is made of oxide of zinc, pulverized flint and silica, solution of borax, caustic soda, caustic potash, aluminium, asbestos, and water, in specified proportions, and enough silicate of potash and silicate of soda to bring the composition to a thick paste.

19,861. Paehlke, J. Nov. 5.

Casting.—In a machine for brushing flour &c. from cast confections, the driving-mechanism is arranged outside the brushing-chamber. The pralines or other sweets are placed on a carriage *p*, which is reciprocated by a sliding rod *n* connected by levers *k*, *i*, *h* to a crank *g*. The brushes are rotated by a chain *s*. A current of air is blown in through the nozzle Z by a bellows F or a fan, and an exhaust pipe carries the flour to a receptacle C. A perforated partition B is arranged over the mouth of the exhaust pipe D.



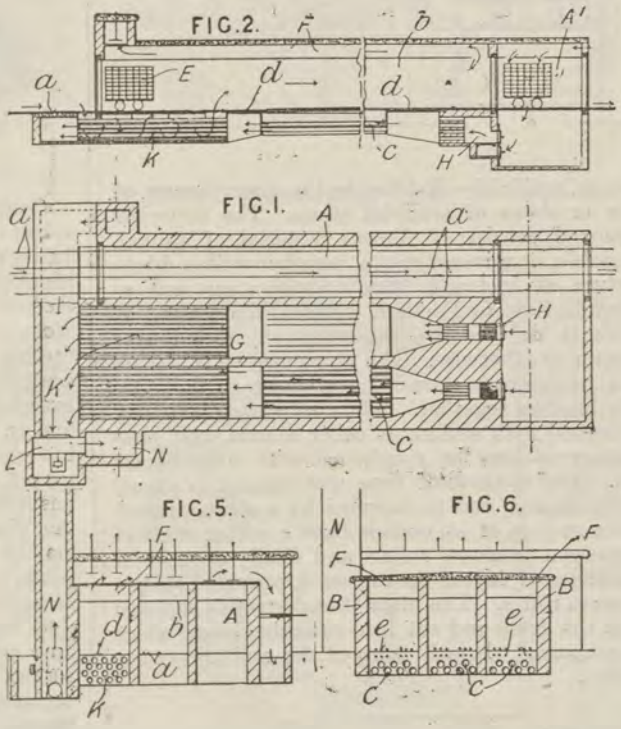
21,148. Mills, B. J. B., [*Soc. Anon. des Enduits Archambault*]. Nov. 22.

Fireproof coverings and compositions.—Relates to an acidproof, fireproof, and damp-proof coating for bottles, carboys, casks, tuns, and other receptacles or articles of glass, pottery, wood, &c., the coating serving also as a protection against breakage. A first coating, consisting of pulverized cork, liquid silicate of potash, and powdered asbestos, kneaded or mixed to a paste, is applied by hand or mechanically to the vessel or article. For large articles, such as carboys, a mould made in two or more parts may be employed, in which the article is placed, while the composition is introduced into the intervening space, and applied by a spatula &c. to the article. When the article is removed from the mould, the coating is allowed to dry. A

second light coating of a similar paste without the cork is then applied. The invention is stated to be of importance in the maritime transport of petroleum, mineral oils, wines, &c.

21,226. Brown, A. E. Nov. 23.

Cements.—A tunnel dryer suitable for drying bricks, clay, slurry, timber, fuel blocks, and other articles in which rapid drying without cracking is required is shown in the Figures. Several tunnels A are constructed side by side, and have ceiling flues F formed by means of a metal partition *b*. The materials are placed on trucks E, which traverse the tunnels on rails *a*, and radiating pipes *c* are placed under the metal floors *d*. The radiators are divided into sections by chambers G, to reduce the effect of expansion and contraction. The combustion gases from the furnaces H are drawn through a tubular air-heater K by a fan L. Cold air enters the heater, and, when heated, passes into and through the tunnels, returning by the ceiling flue and being drawn by the fan into the chimney N. The dried materials are run into a cooling-chamber A^1, and are cooled by passing the air for the furnaces through the chamber. The combustion gases may be mixed with cold air or kiln gases. In a modification, hot kiln gases are circulated through the ceiling flue. Steam may be employed as an auxiliary heating-agent by means of pipes *e*, Fig. 6, or may be used exclusively, and gilled heating-pipes may replace the ceiling flue or be used elsewhere.



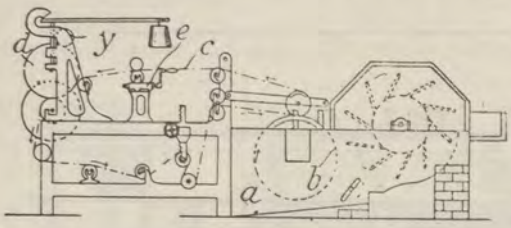
21,483. Rawson, W. S., and **Littlefield, R. D.** Nov. 27.

Refractory substances.—Refractory impervious vitrified articles are produced by mixing finely-pulverized magnesium oxide and a highly-basic borate, (or dolomite, magnesia, and a fusible compound of boron), moulding the mixture to the desired form, and baking the moulded articles at a high temperature. The highly-basic borates may be prepared by adding boracic acid, or boron trioxide, to calcined lime at a high temperature, or lead borate, iron borate, or a mixture of borates may be used. The invention is especially applicable to furnace linings and articles which have to resist the chemical action of molten lead oxide and the like.

21,493. Friswell, R. J., and **British Uralite Co.** Nov. 27.

Refractory substances; stone, artificial.—Relates to improvements in the process described in Specification No. 4628, A.D. 1898, in which sheets or moulded objects of refractory material composed of asbestos, silica, chalk, &c. are saturated with a strong solution of sodium silicate, and subsequently with a saturated solution of sodium bicarbonate. The improvement consists in the continuous regeneration of the bicarbonate solution in the tanks by passing a stream of carbonic-acid gas into it, thus converting into bicarbonate the carbonate liberated by the reaction which takes place in the articles under treatment. The liquid in the tanks may be continuously circulated through a device in which the gas is supplied to it, instead of supplying the gas direct to the tanks. The sodium bicarbonate which is precipitated in the tanks is removed, and the gas recovered by heating it. The resulting carbonate is fused with sand, the remaining CO_2 being thus obtained; the sodium silicate produced can be used for the first impregnation. In a modification, the articles saturated with sodium silicate are subjected to the action of carbonic-acid gas in an airtight chamber. The sodium carbonate produced is subsequently washed out of them. Cooled or washed furnace gases may be used instead of pure carbonic acid.

22,139. Hatschek, L. Dec. 5.

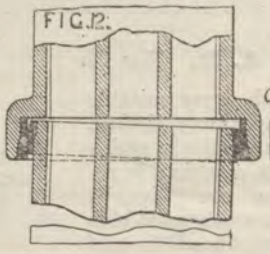


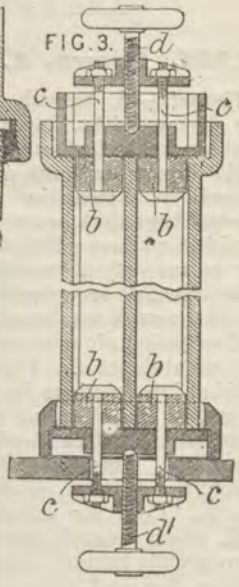
Stone, artificial.—Relates to the manufacture of slabs or plates of artificial stone. The materials employed consist of fibrous material of animal, vegetable, or mineral origin, together with a dilute mixture of hydraulic binding-substances such as hydraulic lime or Portland cement, the setting of which is delayed by the addition of unburnt gypsum, or otherwise. The fibres may be subjected to a preliminary chemical treatment to facilitate their binding together. Thus, cellulose fibres may be treated with sodium or other silicate, and glass or slagwool may be roughened with hydrofluoric acid. The mixture of fibre and cement is placed in the tank *a*, and is supplied by a sieve drum *b* to the surface of an endless band *c*, which conveys it between pressure rolls *e* and finally deposits it in a series of layers on a drum *d*, provided with a pressure roll *y*. The plate thus formed is stripped from the drum and cut into suitable pieces, which are embossed, shaped, stamped, &c. and allowed to harden.

22,302. Bell, E. H. Dec. 7.

Sound-deadening coverings and compositions.—Sawdust, wood wool, ground cork, infusorial earth, asbestos waste, or a mixture of two or more of these materials, is boiled in a jacketed receiver with a solution of 55 parts of crystallized chloride of magnesium, 45 parts of distilled water, and 1½ parts of chloride of ammonia. The boiled material is drained and left to mature for a week or more. The foundation on which the composition is to be applied is roughened or grooved, or tacks may be driven half-way into a wooden floor. The surface is brushed with a mixture of 55 parts of chloride of magnesium, 45 parts of water, 5 parts of glue, and 5 parts of magnesite. The first layer is composed of coarse sawdust or cork boiled and treated as described above and mixed with calcined magnesite. The mixture is rammed down, levelled, and allowed to dry, and is brushed over with the mixture of magnesium salts and glue. The upper or wearing surface is composed of finer prepared sawdust or materials mixed with the magnesium compounds or mixtures, and mineral colours ground in boiled linseed oil. The floor thus laid is smoothed and polished, and forms a continuous surface. The lodgment of dirt, germs, vermin, &c. is prevented, and the material is non-inflammable, and deadens sound. The compositions may be formed into plates or tiles for floor coverings, walls, partitions, ceilings, &c.

22,788. Doulton, H. L., and **Morris C. E.** Dec. 14.





Casting.—Relates to spigot-and-socket joints for earthenware pipes or conduits for electric cables, and to means employed in casting rings of composition around the exterior of the spigot and in the interior of the socket so that a good fit may be ensured, or so that the pipes or conduits may be laid in other than straight lines and the joints made flexible. The mould shown in Fig. 3 is applicable for casting the joint-rings on a two-duct conduit. The internal pieces *b* are of rubber, and are expanded by compressing through the screws *d*, *d*¹ and rods *c*, or by compressing or expanding the rubber pieces by other suitable means. Fig. 12 shows the position taken by the joint-rings and pipes in an oblique joint for a three-duct rectangular conduit. The spigot-joint surfaces are formed on two opposite sides from a cylinder having its axis at right-angles to the axis of the conduit and on the other two sides from a sphere having its centre at the intersection of the two axes. In the socket the joint-surfaces are throughout parallel with the conduit axis.

22,941. Doyle, J. Dec. 15.

Stone, artificial.—Relates to the production of artificial stone suitable for facing buildings, or for window sills, arch-stones, quoins, &c. The inner surface of the mould in which the artificial stone is to be formed is coated with a layer of glue and whiting, sodium silicate, or other adhesive substance, and on this layer is sprinkled a layer of pulverized granite, quartz, glass, limestone, sandstone, &c., according to the appearance of the natural stone to be imitated. The mould is then filled with cement and sand, plaster-of-Paris, or other material. After removing the block from the mould, the surface is washed with a solution of chloride of lime and oxalic acid, which removes the adhesive substance, and the surface of the stone may then be treated with a waterproofing-composition.

22,952. Cuel, G. Dec. 15.

Cements; stone, artificial and imitation.—Mother-of-pearl waste is sorted, sifted, washed in weak acid and water, and mixed with white or coloured cements, which may contain salts of soda, magnesia, or the like. The mixture is moulded into panels or slabs for walls, staircases, vestibules, bathrooms, water-closets, vases, columns, statues, mosaic floors, pavements, and the like, or it may be applied to the ground or foundation to form pavements or floors. Enamels, ivory, bone, or the like may be incorporated with the pearl waste. After the material has set and hardened, the surface is polished to produce ornamental effects.

23,388. Dickmann, M. Dec. 21.

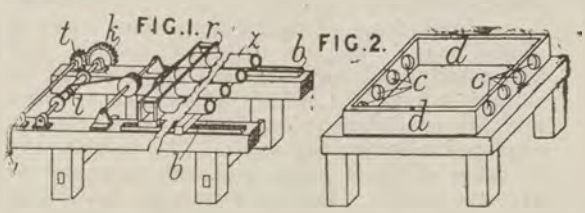
Fireproof coverings; sound-deadening coverings.—Relates to the manufacture of elastic, fireproof, waterproof, airproof, sound-deadening, heat non-conducting materials for floor coverings, wall coverings, &c. Paper, peat, or other animal or vegetable fibre or pulp, or asbestos, or other material, is rolled, moulded, or pressed into sheets, and treated in the pulp or sheet form with oxidized linseed oil, metallic oxides, alum, sulphate of iron, soap, water-glass, resins, paraffins, wax, size or glue, gelatine, potassium chromate, casein dissolved in ammonia water, caoutchouc, flour, salt, formaldehyde, or cuprammonia, or mixtures of two or more of these substances. Grooves or recesses are formed in the back of the sheet, and perforations or hollow corrugated spaces or cells may be formed in the interior of the material. The spaces may be filled in with peat, sawdust, india-rubber, cork, linoleum, gutta-percha, leather, or other sound-deadening elastic non-conducting material, or with compressed air by sizing or glueing the sheet in a chamber filled with compressed air. Inlaid patterns may extend into the material, and granite or marble may be imitated by mixing coloured pieces with the raw material or pulp. Parquetry or mosaic patterns are produced by rolling strips or sections of the material together. For imitation tapestry, the grooves or open spaces are in communication with one another to permit free circulation of air.

23,399. Bacon & Bros., P., and **Bacon, A. A.** Dec. 21.

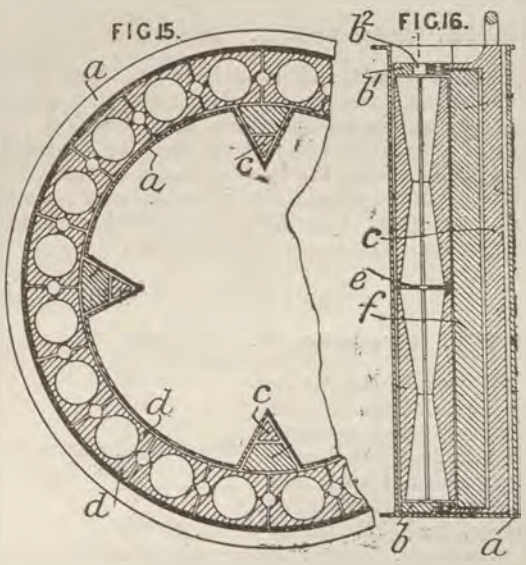
Stonework, ornamental.—Mosaic or ornamental sheets for wall, ceiling, and furniture coverings or decorations are formed of strips or pieces of plain or coloured marble or the like, secured between lead cames or grooved strips after the manner of ornamental lead glazing.

23,462. Wayss, G. A., and **Freytag, C.,** [*trading as* Wayss & Freytag]. Dec. 22.

Casting conduits for electric conductors. Tubular steel or other cores *z* are attached to a frame *r* adapted to slide on rails *b*, and are inserted in holes *c* in the mould box *d*. Cement, concrete, artificial stone, or the like is rammed into the mould about the cores, which are afterwards withdrawn by a windlass *i* operated by a handle H and toothed wheels *t*, *k*.



23,508. Lafeuille, J. C. F. Dec. 22.



Casting. — Crystallized sugar is obtained in loaves or blocks of any desired forms or sizes, by employing annular moulds formed of separable parts, and adapted to be placed in a centrifugal drum, in which the sugar is machined and liquored. Figs. 15 and 16 respectively represent, in sectional plan and elevation, moulds for producing one hundred and sixty loaves in the form of frusta of cones. The moulds, each consisting of two removable sections *d*, d^1, are arranged within a filling-box *a*, comprising upper and lower annuli *b*, b^1, connected by ties *c*. Removable bars *f* are placed between the ties and the moulds, and keep the sections in position. Perforated diaphragms *e* are removably fitted between the upper and lower columns of moulds. The massecuite is run into the moulds through forty apertures b^2, one for each column of moulds, in the upper annulus b^1. After casting, the mass is allowed to cool, and, if the mould sections are imperforate, the outer sections *d* are removed and replaced by perforated sections, and the inner sections d^1 are removed. The whole is then placed in the centrifugal drum. The moulds are formed so that the widest portions of a mould column are at the same level as the narrowest parts of the immediately adjacent columns, in order to

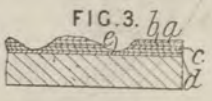
economize space. In another form of mould, for producing small balls or other blocks of sugar, the various mould cavities, formed in a series of superposed annuli, are connected by horizontal channels. A modified form of mould may have series of conical mould sections arranged radially and horizontally, and held together by means of an annular cover-plate, which is secured to fixed uprights or distance pieces and carries funnels employed in casting the sugar. The moulds may be made of sheet metal, and may communicate with one another. For the purpose of facilitating the emptying of moulds, such as those shown in Figs. 15 and 16, a removable sector or wedge may be introduced within each ring of mould sections.

23,512. Hansted, J. Dec. 22.

Casting.—Boot and shoe lasts are made of a composition consisting of glue, resin, linseed oil, and soap cast in moulds taken from the feet. A core of wood or other material may be provided. The glue is soaked for two days in cold water, the water is poured off, the glue is melted over a water bath, the other ingredients are added, and the composition is poured into the moulds.

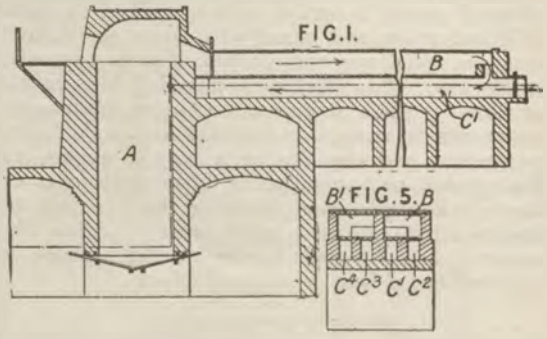
23,709. Gremme, T. Dec. 28.

Statuary. — Relates to the manufacture of pictorial or other coloured reliefs and embossed work in any material, applicable in the manufacture of statues and all kinds of ornaments. Several differently-coloured layers *a*, *b*, *c*, *d*, *e*, of wood for instance, are combined by glueing &c., and the relief is cut as usual, the layers being cut away until the desired colour is reached. Plates of different kinds of wood or other material may be used instead of coloured plates, and form a kind of mosaic with a painted effect. The overlying layers show on the cut, and give a shaded effect. The plates may be made so thin that one shows through the other, giving shades and combinations of colours. A similar effect is obtained by colouring only the upper surface of each layer. A shaded effect is also obtained by using layers of increasing depth of shade.

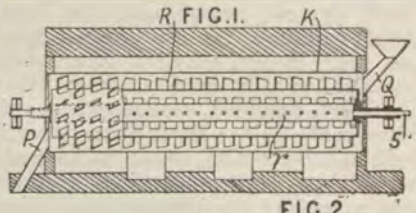


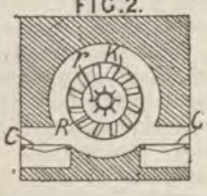
23,718. Hewitt, W. W. Dec. 28.

Cements.—The gases from ordinary cement kilns are led through and under drying-chambers for the slurry. The drying-chambers are worked in pairs, one being in action while the other is discharged and recharged. Fig. 1 shows a longitudinal section of such an arrangement, and Fig. 5 a transverse section of the drying-chambers and flues. A is the kiln, B, B^1 the drying-chambers, and C^1, C^2, C^3, and C^4 the flues beneath them. The covers of the drying-chambers, and their floors, are removable. The covers may also serve as drying-floors.



23,851. Diesler, C. Dec. 31.





Cements. — Relates to a process and apparatus for the manufacture of cement. A finely-divided mixture of the materials which contain silicic acid together with the calcined calcareous materials is introduced into the furnace, roasting-drum, or retort K, which is heated exteriorly by furnaces C. Within the drum are mounted oppositely-rotating spirally-bladed mixers R, *r*, which serve to convey the materials towards the discharge openings P. The inner mixer *r* consists of a perforated tube provided at one end with a hollow trunnion 5. The tube serves to convey to the materials hot air at about 900° C., or superheated steam at 600° to 700° C. The outer mixer R is unperforated, the material being divided between the two mixers on its way to the discharge outlet. The exhaust preferably takes place through the charging-opening Q.

23,890. Peust, A. W., and **Apel, A.** Dec. 31.

Fireproof compositions. — Electric conductors, cardboard, wood, and other objects are coated with a mixture of magnesium oxide and magnesium chloride with or without Portland cement. The Portland cement may be mixed with the magnesium oxide, or may be mixed with dilute molasses. The composition may be applied to the covering-fabric of electric conductors, and acts as an insulating, acidproof, fireproof, or waterproof composition in its various uses. When cracks occur in use, they may be filled with the materials used as a cement.

APPENDIX.

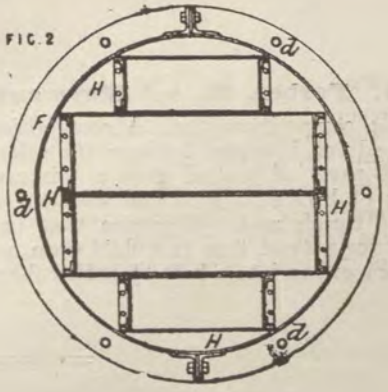
The first of the following abridgments should be added to the volume of this Class for the period A.D. 1889–92, the next three to the volume for A.D. 1893–96.

A.D. 1891.

8017. Imray, O., [*Zernikow, F.*]. May 9.

Stone, artificial.—In the manufacture of artificial stone from a mixture of burnt lime, sand, slag, &c., the moulds into which the materials are rammed and in which the lime is slaked by steam are packed together and embraced by rings F and end plates held by bolts *d* and enclosed in a casing into which high-pressure steam is introduced. The moulds afford each other mutual support, and the expanding action of the slaking lime is effectually resisted.

FIG. 2



A.D. 1893.

13,386. Salmon, H., and **Whiting, J. E.** July 10.

Stone, artificial.—Relates to a substitute for pumicestone. A mixture of ground sandstone and common salt with sawdust is pressed into cakes and fired. Other materials and methods may be used, in which is employed:—a sharp silicious sand, a soluble silicate binding-material, and a removable material to form the interstices, and means for removing this material, and for rendering the soluble silicate insoluble.

A.D. 1895.

4799. Campbell, J. E. March 6.

Stone, artificial.—Relates to the preparation of an iron oxide compound, some of the residual products being adapted for rubbing, cleaning, and polishing purposes. Iron oxide precipitated from the waste hydrochloric or other acid obtained from galvanizers, wire-works, copper smelters, &c. is mixed with hydrated iron oxide from aniline or other manufactories, and kieselguhr, infusorial earth, sawdust, &c. added. The hydrated oxide may be replaced by oxide precipitated from the aniline waste, and either of the oxides may be mixed separately with the kieselguhr &c. The residual liquor from the galvanizer's pickle, after the separation of the iron oxide, may be boiled down to a suitable strength and, after the addition of sulphuric acid, calcined in a retort furnace &c. to recover the hydrochloric acid. The residual calcium sulphate may be treated with cyanide blue or other colouring-material or disinfecting agent, and used for cleaning &c purposes.

A.D. 1896.

18,864. Forbes, D., and **Weymouth, J. S.** Aug. 26.

Casting, compositions for. A composition, applicable for wheel tyres, cushions for seats and chair backs, and for insertion between the soles of cricket and tennis shoes &c., is obtained by adding to about 76 parts of melted glue a mixture of about 3 parts of each of the following:—Sulphur, sulphate of barium, a saturated solution of alum, collodion, sulphuric acid, glacial acetic acid, nitric acid, and formic acid. Glycerine may be added to produce a softening effect. The composition remains for a brief time in a fluid state, and is run into moulds. For making tyres, it may either be used alone or run into a tube of india-rubber or canvas.

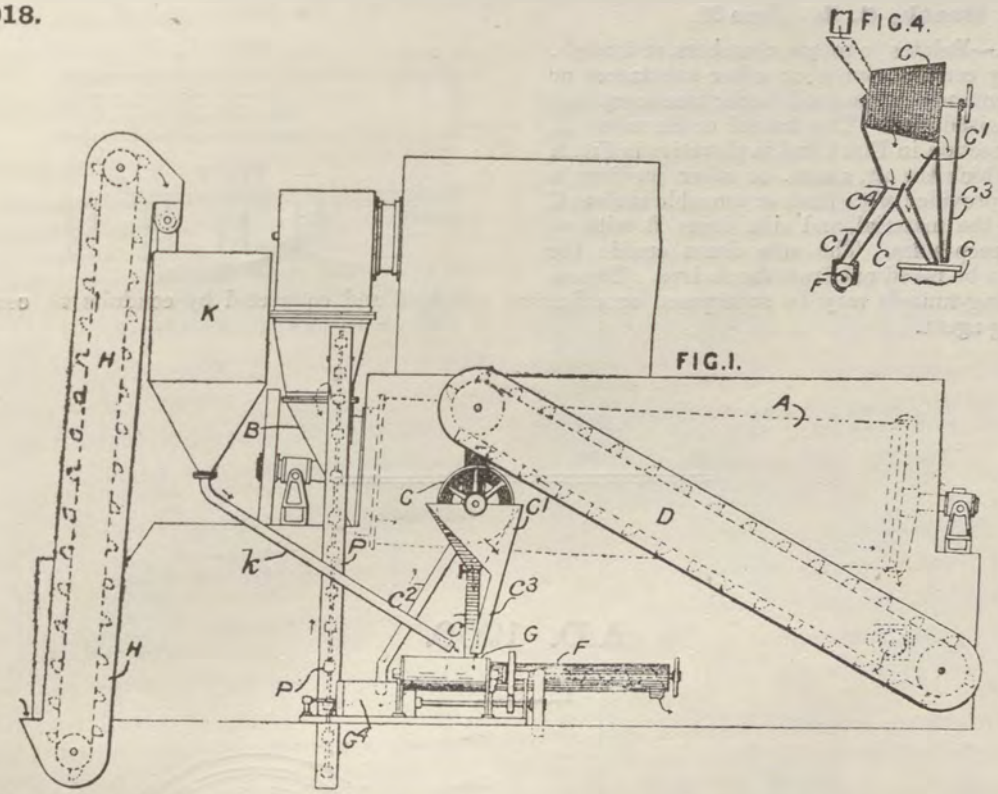
A.D. 1897.

20,018. Cummer, F. D. Aug. 31.

Cements.— Cements and other materials are more or less completely dried in a cylinder A, which may be of the kind described in Specification No. 16,052, A.D. 1895, [*Abridgment Class* Drying]. The partially-dried material is separated from that wholly dried by a screen C. The coarse and insufficiently-dried matter passes by a shoot c^3 to a granulator G, and is then passed along with raw material back to the cylinder. The material discharged from the cylinder is carried to the screen C by a conveyer D. Fine dried material passes to a hopper C^1 having two spouts c, c^1, the former feeding a supply of dry material, regulated by a valve, to the granulator and the latter c^1 leading to a conveyer F. A screen which will separate the material into three or more grades may be used. Two cylinders may be used side by side, each being provided with a tank K to which raw material is fed by an elevator H. From each tank material passes by a spout k to the granulator, the mixed material from which is conveyed to the feeding-spout B by a conveyer P. The granulator consists of an upper section G, containing two rotating shafts with inclined mixing-blades, and a lower section G^4 containing a rotating shaft with a series of inclined cutting-blades to break up the lumps of material and a spiral blade which mixes the material with dust coming from the spout c^3. The two shafts in the part G are driven in opposite directions from the main shaft passing through the part G^4.

(*For Figures see next page.*)

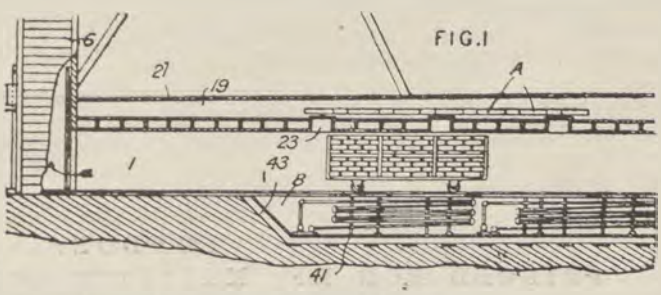
20,018.



A.D. 1899.

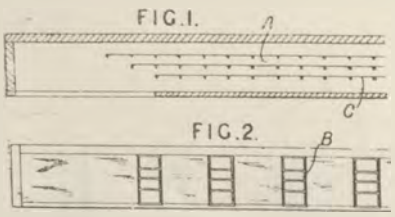
49. Wolff, M. Jan. 2.

Cements.—Relates to improvements on the apparatus described in Specification No. 22,598, A.D. 1895, [*Abridgment Class* Drying], for drying cement and the like, whereby the temperature of the material is gradually raised as it passes through the drying-chamber. Cold air is admitted, at the feed-end of the drying-chamber 1, through longitudinal openings A in the sides of the conduit 19, which does not communicate directly with the chimney 6, and the openings 23. This air passes down to the drying and heating chambers 1 and 8, and finally passes to the chimney along with the air entering by the conduit 43 and perforations 41. The openings A are protected by the eaves of the roof 21. The end of the chamber 8 is some distance from the chimney, as shown.



13,595. Booth, C. L. June 30.

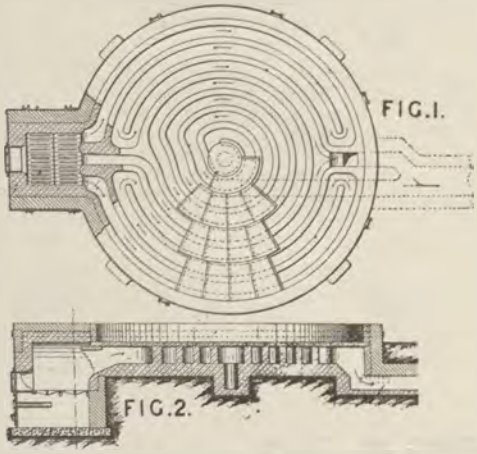
Cements.—Relates to rooms, chambers, or tunnels, for drying cement slurry or other substances or articles, from which the goods under treatment may be easily withdrawn. The tunnel or chamber A, shown in section in Fig. 1 and in elevation in Fig. 2, through which hot air, steam, or other medium is drawn, is provided with fixed or movable shelves C to receive the material, and side doors B with or without peep-holes. The side doors enable the material to be raked out from the shelves. Two or more drying-tunnels may be superposed or otherwise arranged and connected by conduits to convey the drying-agent.



A.D. 1900.

11,852. Meldrum Bros. and **Orton, J. S.** June 30.

Cements.—Floors for heating and drying mineral substances, such as cements of the Parian type or plaster of Paris, are constructed with external furnaces communicating with tortuous or other flues underneath the floor, which preferably consists of removable tiles or slabs. Figs. 1 and 2 show one arrangement of such a floor with tortuous flues in three divisions. Two or more such floors may be arranged in series at different levels, or otherwise, in groups heated by the same or separate furnaces, and one floor may have more than one furnace.



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