

PATENTS FOR INVENTIONS.

ABRIDGMENTS OF SPECIFICATIONS.

CLASS 22,
CEMENTS AND LIKE COMPOSITIONS.

PERIOD—A.D. 1884–88.



LONDON:
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PUBLISHED AT THE PATENT OFFICE, 25, SOUTHAMPTON BUILDINGS,
CHANCERY LANE, LONDON, W.C.

1896.

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THE END OF THE WORLD.

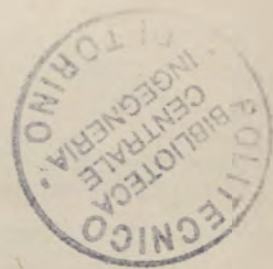
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EXPLANATORY NOTE.

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 One Shilling, postage (parcel post) Sixpence.

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 Eightpence, may be purchased at the Patent Office, or ordered by post on the Patents Form C¹ (to be obtained from any Post Office), no additional charge being made for postage.

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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. 1884.

11. Graham, W. J. B. Jan. 1.

Refractory substances for lining furnaces, ladles, backs of stoves, &c., which may be used alone or mixed with other fire-resisting materials. The ingredients are four parts of silica, one of silicated carbonized clay, and one and two-thirds of clay. The proportions may be varied according to requirements.

32. Lake, H. H., [*Scales, H. E.*]. Jan. 1.

Plasters or stuccos.—Air-slaked lime, fine sand, rice flour, fine salt, and colouring-matter are mixed dry and the mass rendered plastic by the addition of weak glue. If a waterproof coating is required, a little bichromate of potash is dissolved in the weak glue. For stucco or other fine work plaster of Paris may be substituted for lime.

153. Stone, R. Jan. 1. *Drawings to Specification.*

Cements.—The materials are mixed and run through a mill, and then ground by a pestle-and-mortar mill. They are then run into a tank and mixed with breeze, and afterwards moulded into indented blocks, dried, and placed in the furnace. The blocks are then crushed and ground while red hot.

386. Shaw, I. B., Shaw, E. S., and Shaw, W. S. Jan. 2.

Stone, artificial.—Artificial marble is made by forming a piece of clay, cement, plaster, &c. into a "bot," allowing this to crack by exposure either to air or artificial heat, filling up the cracks with a "slip" formed of coloured clay &c., and then baking when necessary. In some cases moulded figures of shells, bones, or fossils are made use of. Artificial granite is made from the scraps obtained in the above process, by passing them through riddles, moulding, and firing.

1294. Cowie, C. R. Jan. 12.

Stone, artificial.—Oxide or sulphide of magnesium, or a mixture of them, is mixed with suitable earthy materials such as sand, ground quartz, ground glass, emery, &c., and a saturated solution of aluminium chloride with or without a little chloride of magnesium or iron is added. The whole is mixed, shaped, and allowed to harden.

1412. Roth, L. Jan. 14.

Cements.—A finely-pulverized mixture of furnace slag and lime, dolomite, or chalk, raw or burnt, is made into a paste with an alkaline salt solution, formed into balls or bricks, dried, and burnt, and afterwards powdered. When the slag is poor in alumina, bauxite is added to the raw materials.

1504. Gerhard, F. W. Jan. 16.

Cements.—Certain rocks found in Staffordshire, and known as Rotch Bat or Bovin, black lime, &c., and which are deficient in the proper proportion of lime, are utilized for the manufacture of cements by mixing with them a certain quantity of either the monocarbonate, or by preference the bicarbonate, of lime, and burning.

1707. Harding, E. W. Jan. 18.

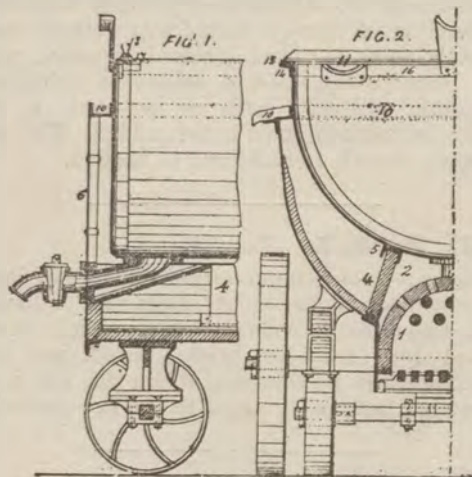
Cement, Portland. The materials are freed from moisture by heating with gas, and mixed in a mill together with a small quantity of resin or similar substance. The mixture is then put in a pug-mill together with water, moulded into bricks, and stacked in a kiln with alternate layers of coke. Or the materials are mixed in a wash-mill, resin added, and the liquid removed to floors and dried by gas and waste gases from kilns and the furnaces of gas retorts. The result is put into kilns with alternate layers of coke. Gas is injected into the kilns at various points, and both the coke and gas necessary are supplied by gas retorts, the tar from which may be used instead of resin.

1736. Brooke, E. Jan. 19.

Refractory substances suitable for Bessemer and other furnace linings, firebricks, blocks, tuyères, pipes, &c. Gannister, quartz, or other silicious stone is mixed with fireclay, boiled tar and oil, and water, in suitable proportions, and ground in a mortar mill.

1884. Johnson, J. H., [Lesley, R. W., and Willcox, J. M.]. Jan. 22.

Cements.—The materials are reduced to powder, moistened with water or with water and a liquid combustible (but not reduced to a paste), then moulded into balls or other suitable shapes by heavy pressure between rollers, calcined, and reduced to powder.

2096. Healey, B. D. Jan. 25.

Asphalt cauldrons.—Fig. 1 is a longitudinal section of the back end of the cauldron, and Fig. 2 a half transverse section across the firegrate. The arched flue 1 over the firegrate has holes for the gases to pass to the central flue 2. The slabs 4 are readily withdrawn from the trough-irons 5, the back end of the casing 6 being movable, and attached to the trough 10 used as an overflow channel for the lips 11. Side angles 14 are below the top edge of the pan, the outer edges of the cover having a bar 15 underneath. The ends of the cover have bars 17 on the top sides, fastened by thumb-screws 18 to the angles 16. The front flue has a double damper, arranged so that both flues cannot be open at once. The trailing wheels have springs to tilt the pan as its contents are withdrawn, the bogie having a swivel plate without springs.

2154. Nagel, J. Jan. 25.

Fireproof coverings and compositions.—Consists of an improvement upon the plates described in Specification No. 1468, A.D. 1882, which plates were made by pressing a mixture of asbestos and

zinc oxide on to nets of metallic wire, and treating with zinc chloride and other substances. As an addition to or substitute for the zinc oxide, magnesia, gypsum, or lime is used, or a mixture of two or more of these bodies, and in place of the zinc chloride some other metallic chloride or chlorides or sulphate of alumina may be employed. The wire net or like material is coated with the asbestos mixture and passed between rollers carrying an endless band saturated with the chloride or other solution used. The plates may be coated with varnish or otherwise treated to render them fireproof and waterproof. They may be applied directly to form stage decorations, curtains, and the like, as well as to roof coverings and protective coverings for woodwork in ships, railway carriages, &c., and for other inflammable materials.

2247. Lortzing, C. J. Jan. 28.

Asphalts, obtaining. Waste waters from wool-washing &c. are run into a tank and treated with water containing lime and green vitriol (or other sulphate, or sulphuric acid), in proportions determined by the nature of the liquids. The sediment is dried by filtering or otherwise. For asphalt mastic, the sediment is ground upon a warm metal surface under pressure, or by a mortar mill with heated rollers. The mass is melted, limestone or slag &c. added, and the result is run into moulds. For compressed asphalt, the sediment is powdered and thoroughly mixed with powdered limestone, and then employed as usual. The addition of lime to the sediment may be avoided by increasing the amount of lime added to the waste waters.

2640. Guattari, A., [Soderini, M.]. Feb. 2.

Stone, artificial.—Imitation marble is made from any variety of gypsum. In the first method, without decomposition, the gypsum is dehydrated (by heating to a specified temperature for each variety), immersed in a bath (containing a specified silicate solution for each variety), dried, re-heated to a specified higher temperature, replaced in the bath, and dried in the air. The various colouring-matters to produce various tints are described. In the second method, the gypsum is first reduced to small pieces, then dehydrated, soaked, dried, twice burnt and cooled, and finely powdered. The powder is made into paste with a silicate solution, pressed in moulds, and dried. The paste may be coloured, and the result is washed and polished. Or, the powder may be mixed with the waste chippings from marble made by the first method, a proportion of sulphate of aluminium or aluminate of potash added, and the whole calcined and pulverized. The powder is then made into a paste with a saturated solution of sodium chloride or aluminium silicate and treated as before. Or, the powder may be made into a paste with a proportion of marsh mallow and water, to facilitate working.

2787. Guattari, A., [Soderini, M.]. Feb. 5.

Stone, artificial.—Artificial marble is made from alabaster. Objects formed of gypsum or alabaster are heated, soaked in a hot solution of borax and potassium diphosphate in certain proportions, re-heated, cooled, and re-soaked in the bath after adding to it nitric acid. Or, after heating, objects are soaked in a bath of borax, dried, re-heated, re-soaked after adding to the bath nitric or oxalic acid, exposed to the air for two days, warmed, and rubbed with a mixture of Canada balsam and naphtha.

2847. Guattari, A., [Soderini, M.]. Feb. 6.

Stone, artificial; statuary.—Relates to the invention for artificial marble described in Specification No. 2640, A.D. 1884. Carved and sculptured gypsum objects are not dehydrated in a stove, as described in the above-mentioned Specification, but are soaked in a hot preparation of bitumen. Gypsum blocks or powder may be similarly treated.

3780. Dulfus, Baron L. M., [Ponty, J.]. Feb. 22.

Fireproof coverings and compositions.—A pulp for making fireproof paper or for other purposes is made of varying proportions of the following constituents:—(1) Asbestos fibre which is crushed, pulverized, and bleached. (2) Bleached "fossil powder" (a substance containing silica, fossil-wood, lime, and iron), which is crushed and pulverized with an equal quantity of neutral silicate of soda; in some cases the latter may be replaced by sulphate of alumina or other unflammable material. (3) A pulp obtained from animal fibre, such as waste silk or other material of similar quality. Sizing may take place before or after the paper is formed, the size consisting of water, kaolin, and neutral silicate of soda in varying proportions, with or without a small proportion of resinous soap.

3786. Dulfus, Baron L. M., [Ponty, J.]. Feb. 22.

Fireproof coverings and compositions.—Relates to covering objects with an incombustible paper, described in Specification No. 3780, A.D. 1884, by means of an incombustible adhesive material. The material is obtained by grinding 10 to 15 per cent. of fossil powder with 80 to 85 per cent. of neutral silicate of soda, having a density of 40° Bé., and decanting the mixture after two or three days when the bases have been precipitated.

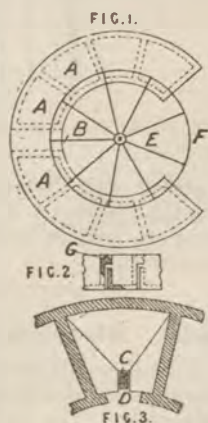
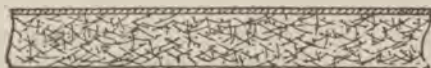
3808. Wirth, F., [Rosenthal, L.]. Feb. 23.

Stone, artificial.—Unshrinkable cement, with a surface that can be polished, is obtained by mixing unset cement with cement already hardened, or

with finely-ground carbonate of lime. Half of the cement to be used is made with water into thin plates and hardened quickly, repeatedly moistened and re-heated, ground, mixed with the remaining unset cement, and put in a mould divided by a horizontal perforated plate covered with linen. The mass is then subjected to a pressure of 20 atmospheres, the water necessary for setting is sucked through by the action, below the plate, of an air pump, and the whole is again pressed. Finally, a solution, obtained by the lixiviation of cement, is forced through the mass, to fill up all the pores.

3839. Patchett, G., and Dixon, J. Feb. 23.

Casting slags. A horizontal wheel B carries moulds at its rim. The moulds are filled from the blast furnace while opposite the space F, and the slag is sufficiently set while traversing this space. The bricks are deposited on annealing-kilns A, A arranged concentrically with the wheel B. One side of each mould is provided with a lip G, Fig. 2, overhanging the joint between it and the next mould, in order to prevent slag from running in between the joints. The top edge is made sharp to prevent splashing. In other respects the arrangement of the moulds is the same as of those now in use.

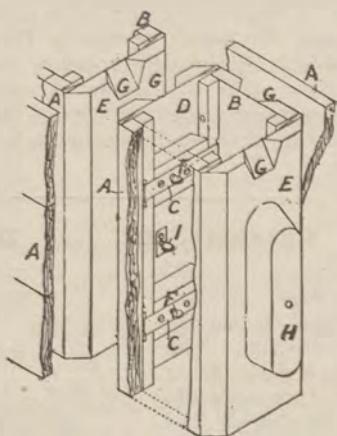
**3921. Batho, W. F. Feb. 26.**

Refractory substances.—The material for forming a basic lining for open-hearth furnaces is mixed with iron or steel wires which bind the whole firmly together. The wires may be arranged in several ways; cut in short pieces (as shown), or in long, twisted, or helical threads, parallel to, or crossing, one another. In addition to holding the material together, the wires on working to the surface flux and form a hard coating.

4051. Thompson, W. Feb. 28.

Casting concrete blocks. The moulds are either for building hollow concrete walls or for making hollow blocks, and are made to be readily fixed and taken apart when the concrete has set. The Figure shows the arrangement for the former, with parts of the outer frame removed to show the cores. These consist of sides A, B connected by the

wrought-iron straps C, C, and the sides D, E fastened to the straps by the thumb-screws F. Spaces G are cut at the upper part of the cores to form corbels on which the moulds rest in building the next course. The cores are fastened



together with distance-pieces H between them by the thumb-screws I. The outer frames A and cores are held in position by wrought-iron straps not shown.

4448. Dietrich, E. March 6.

Asphalts.—Relates to a process by which pure or bituminous limestone is caused to absorb bitumen uniformly. The limestone is powdered and mixed with pure powdered bitumen, and the mixture is heated in a rotary or other vessel.

5064. Tickelpenny, W. J. March 18.

Drawings to Specification.

Fireproof compositions for ceilings and for the bedding of wood floors. The girders and joists are entirely embedded in concrete. The under surface of the concrete is covered by a fireproof material composed of fireclay, asbestos or slag cotton, Portland cement, and alum. The flooring boards are of unusual thickness, and are bedded on a fireproof composition similar to that above described.

5237. Walley, H., and Gare, T. March 21.

Stone, preserving.—Resin and gum thus are melted, and then petroleum, benzoline, or bisulphide of carbon is added, and afterwards boiled linseed oil with or without a little india-rubber or caoutchouc. The proportions vary according to the use to be made of the compound. It may be applied to stone, brick, walls, &c.

5515. Pochin, H. D. March 26. *Drawings to Specification.*

Refractory substances.—The sides and flues, and in some cases the beds of furnaces and the interior

of casting-ladles, are formed of blocks of chrome iron ore. The blocks may be dressed, and the interstices filled with fireclay, tar, or pitch; or a backing of fireclay, tar, or such material may be formed, and the blocks set more roughly in it.

5568. Clark, A. M., [Dolman, W. H.] March 27.



Fireproof coverings and compositions for the woodwork of buildings. Consists in surrounding all beams, joists, and other woodwork with sheet iron, the interstices being filled with ashes or dry earth. In the Figure, A represents the flowing joists in section, to the lower side of which sheet iron E is nailed. On this a layer of ashes or earth F is laid, heaped up at the sides. Near the top of the joists strips of wood c are nailed to carry sheet iron B, leaving a space underneath the flooring, which is also filled with ashes. At openings in the floor where the sides of the joists would be exposed, they are covered by sheet iron and the space is filled with ashes, the trap doors H being also composed of sheet iron filled with ashes or earth. All other woodwork may be protected in a similar manner.

5768. Mills, W. April 1.

Cements and limes.—Relates to improving the hydraulic or setting qualities of limes and cements by mixing soluble sulphates, carbon, and certain other salts with the calcined material. It is preferred to heat silica, iron and aluminium sulphates, iron oxide, carbon, and chalk to redness in closed vessels, and add the product when cold to fresh calcined limestone, grinding the whole intimately with some of the following salts, viz., potassium carbonate, ammonium sulphate, sodium carbonate, potassium sulphate, and iron sulphate.

6427. Dechend, F. von. April 16. *Drawings to Specification.*

Castings.—Relates to a process and apparatus for finishing and preserving plaster casts. The casts are hardened, finished, and conserved by applying suitable fluids by a special spray-producer.

6517. Ransome, F. April 18.

Cements.—Relates to the invention described in Specification No. 4664, A.D. 1878, by which slag sand is ground and calcined in certain proportions with spent gas-lime, a small quantity of fuel being added to the mixture to get rid of the

sulphur present, and a jet of steam being introduced into the furnace during the process of ignition. The mixture is calcined, by preference, in a cylindrical retort, revolving slowly in an inclined position and serving as a flue connecting the fire-chamber to the chimney. A jet of steam enters near its lower end. The mixture is fed in near the upper end by a self-acting feeder, and, after cooling, is ready for use. Or, the cement may be burnt in an ordinary kiln.

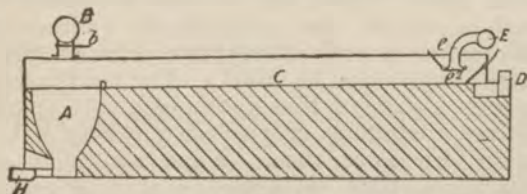
6995. Mills, B. J. B., [Zwillinger, A.]. April 29. *Drawings to Specification.*

Fireproof coverings and compositions.—For protecting the retorts and pipes of furnaces for distilling coal, carbonizing bones, &c. from being oxidized by the air supply, they are coated with a fireproof composition consisting of refractory clay, common clay, boneblack dust, and cow-hair or barley chaff.

7059. Frank, A. April 30.

Slags, treatment of.—Molten slags, phosphatic or not, are treated with a solution of magnesium chloride, or of its combinations as double salts with other chlorides, and stirred till it forms a powdery mass, whereby the sulphides present are decomposed with evolution of sulphuretted hydrogen, and the free lime forms calcium chloride. If any of the lower oxides of iron &c. are present, they are oxidized by heating in an oxidizing-flame. The slags thus acted on may be used for manure at once.

7111. Watson, J., and Spoor, J. L. May 1.



Cements.—Relates to processes for drying slurry in cement kilns. The Figure shows a longitudinal section of a kiln constructed according to the invention. The calcining-chamber A can be lighted immediately after completing its loading, the gases being passed by the flue B direct to the chimney until the slurry has been placed in the chamber C. The damper *b* is then closed and the gases from A pass along C to the flue D. When a kiln is burned off, the dampers *e*² on the light sheet-iron flue E or on its branches *e* are opened, and cold air is drawn through A and C to the chimney by a draught-creating apparatus. In the arrangement shown, the gases from B and D are led into a regenerator and thence by a flue H for use as fuel in the kiln or elsewhere. The regenerator may be used to heat the air supply or to raise steam to work the draught-creating apparatus.

7237. Beasley, J. May 5.

Refractory substances for lining puddling-furnaces. A mixture of two parts by weight of purple ore or other suitable oxide and one part of tap cinder is saturated with dilute hydrochloric acid, and used with a quantity of lime and salt as a fettling-material. The hammer slag and roll scale used on the furnace bottom are also saturated with dilute hydrochloric acid.

7258. Solvay, E. May 6.

Cements.—The residuum obtained in a process for the manufacture of chlorine from chloride of calcium in the presence of silica or alumina, is stated to be applicable for the manufacture of cements.

7260. Solvay, E. May 6.

Cements.—The residuum obtained in a process for the manufacture of hydrochloric acid by the decomposition of chloride of calcium by the vapour of water in the presence of silicious and aluminous substances, is stated to be applicable for the manufacture of cements.

7304. Brandon, D. H., [Brown, D. A., and Brigham, C. F.]. May 6. *Drawings to Specification.*

Fireproof coverings and compositions.—A mixture of magnesium oxide and asbestos, the latter preferably in fibrous form and with or without other fibre or paper pulp, is made plastic by magnesium chloride or an equivalent, and moulded to the shape required. The compound is applicable for roofing and other purposes for which wood is employed.

7305. Brandon, D. H., [Brown, D. A., and Brigham, C. F.]. May 6. *Drawings to Specification.*

Fireproof coverings and compositions.—Relates to the manufacture of a fireproof and waterproof material for roofing, sheathing, and like purposes. Boards or paper composed of asbestos are treated successively with solutions of silicate of soda and chloride of calcium. The solutions may be applied by means of a brush. Boards of the material are applied to roofs or to the sides of buildings in the usual manner.

7342. Toope, C. May 6. *Drawings to Specification.*

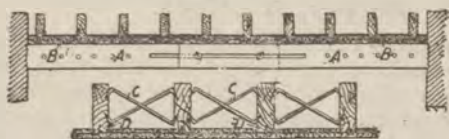
Fireproof coverings and compositions.—Fireproof slabs for ceiling and floor joists are covered with asbestos sheeting attached by a cement formed of pipeclay and sodium silicate.

7395. Jones, J. A. May 8.

Concretes; stone, artificial.—Blast-furnace or annealed slag and whinstone are ground, incorporated with Portland or other cement, preferably in a mortar or pug mill, and moulded for use in paving or the like.

7397. Jones, J. A. May 8. *Amended.*

Concretes; stone, artificial.—Blast-furnace slag is annealed in an oven, heated from without or not. It is then ground and mixed with Portland or other cement, preferably in a mortar or pug mill, has water added to it, and is moulded for use in paving or the like.

7490. Clark, W. May 9.

Cements; fireproof coverings and compositions.—In buildings, bearers A, the length of which may be adjusted to fit any sized room, are fixed between the walls or suspended from the joists. They are adapted to support boarding B of sufficient strength to carry, without sagging, the weight of the material used to form the ceiling. Selenitic lime is used in combination with other materials, and the mixture is plastered in from the top before the flooring is laid. Netting or separate wires may be nailed to the joists instead of common lathing. In fireproof floors the joists are struttied by cramps C driven into the sides of the joists, and an additional layer of selenitic lime and sawdust is applied; the lower edges of the joists are grooved to form a key to support the fireproof material, as shown at D. A second layer of fireproof material may be laid on top of the joists. Walls and partitions may be plastered in a similar manner, and, by employing suitable moulds, the method may be made applicable to ornamental ceilings.

7562. Harbord, F. W. May 10.

Slags, treatment of.—Relates to a method of obtaining phosphates, free from iron, from phosphatic materials containing iron, such as Thomas-Gilchrist slags. The slags &c. are ground, calcined, if necessary, freed from shots of metallic iron, treated with very dilute acid, and the dissolved phosphoric acid separated from the residue. Into the solution thus obtained steam and air are blown to peroxidize the iron, and a solution of an alkaline or alkaline-earth ferrocyanide added, in just sufficient quantity to precipitate the whole of the iron as Prussian blue. The solution containing the phosphate should preferably be neutral and hot. The precipitate formed is separated, and the solution evaporated to dryness. If sulphuric acid had

been used in the earlier process, the phosphoric acid will now be in a soluble form, but may be precipitated by chalk or lime. The Prussian blue precipitate may be reconverted into ferrocyanide of soda &c. by treating with solutions of a hydrate or carbonate of an alkali or alkaline earth, and the precipitated hydrate or carbonate of iron thereby formed may be mixed with the residue left after treating with acid, and made into bricks for smelting.

7707. Haddan, H. J., [Perin, L.]. May 14.
Drawings to Specification.

Slags, treatment of; stone, artificial.—Molten slag is cooled slowly in moulds smeared with sandy clay to prevent adhesion and sunk in hot slag covered with cinders. The castings may be used for paving and the like, and are suitable for embedding iron for fencing posts &c.

8036. Clark, A. M., [Wirth & Co. acting for Kissel, A. K., and Zimmer, C.]. May 21.
Amended.

Asphalts.—Natural or artificial bituminous products are hardened by treatment with an alkaline earth or alkaline-earth carbonate, which neutralize the acids present.

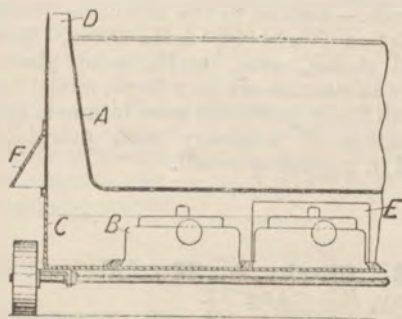
8124. Liebhaber, G. J. C. M., Baron de. May 23.

Statuary.—The method of cleansing building fronts described below is stated to be applicable for cleaning statuary and the like. The stonework is heated superficially by gas or coke, or, for small work, by a spirit or other flame with a steam blast. While hot, an acid is applied by a brush or as a jet; the acid is usually hydrochloric, but other acids, such as sulphuric or nitric acid, or water only, may be used. For carbonaceous deposits, a paste of lime and caustic soda, or other mixture containing or producing caustic soda, is applied for some time. When treatment with sulphuric acid has left a white coating of sulphate of lime, soda solution is applied to remove it. To cleanse bricks, potassium chlorate is applied and heated to fusion, afterwards washing with hot water. To remove metallic deposits the chlorate is mixed with hydrochloric acid and heated as before. For sandstone and other silicious materials, fluoric acid is applied as gas or in solution or paste. In every case, after the acids &c. have loosened the deposits, the cleansing is completed by washing with water.

8235. Walker, G. May 26.

Asphalt cauldrons.—Pitch and tar or creosote oil, in which the blocks are dipped, is kept boiling in the tank A by means of the lamps B enclosed in the outer casing C. Outlets D are provided at

the ends, and chimneys if desired. At the sides are sliding doors E to regulate the draught. The



apparatus runs on wheels, the bearings being protected by the shields F.

8236. Walker, G. May 26.

Asphalts, elastic, intended chiefly as a foundation for wood pavement. Mungo, shivy-dan, hay, chopped straw, and animal or vegetable fibres are mixed with boiling coal tar or creosote oil and mineral pitch.

8317. Fottrell, J. May 28.

Cements for paving and other purposes are mixed with a powerful disinfecting-agent, either in a solid or liquid form, in order to neutralize exhalations from the litter &c. in the roadway. Fresh disinfectant is exposed as the surface is worn away. In the case of wood pavements, the mixture may form a layer below the wood, and be pierced here and there for the escape of rain-water.

8890. Capitaine, E., [Nahnsen, M.]. June 12.

Slags, treatment of.—Phosphoric slags are boiled with ammoniacal salts to liberate free ammonia, instead of lime. It is preferable to have a series of apparatus, so that in one the almost used-up slag may be boiled with fresh ammoniacal lye, while in another the nearly-spent lye may be boiled with fresh slag. The slag should, before the operation, be broken into pieces. After the reaction has taken place, chlorides of the free bases present in the slags are found in solution, and the residuum contains the whole of the phosphoric acid, available for use directly as manure, or for the manufacture of superphosphates.

9018. Toope, C. June 16.

Fireproof coverings and compositions.—Relates to the manufacture of hard coherent fireproof blocks or slabs, specially adapted for protecting the joists of buildings as described in Specification No. 7342, A.D. 1884. Pipeclay, silicate of soda, and silicate-cotton or asbestos fibre or a mixture of the two

are worked up together in a pug-mill to a plastic mass, moulded, and baked. A coating of asbestos sheeting or asbestos paper is used to render the surface smooth; this may be applied to the plastic mass in the mould, or to the moulded block, in which case a cement consisting of pipeclay and silicate of soda is used.

9699. Frankenberg, S. July 2.

Asphalts.—Pulped wool and cotton, pitch, asphalt, granite mastic, bitumen, resin, and coal tar are mixed together and boiled for about six hours. The composition is suitable for use as a damp course for foundation walls, or for covering fireproof floors or roofs.

9803. Blane, Sir S. J. July 5.

Slags, treatment of.—Furnace slag is pulverized and placed in a vat with hydrochloric or other acid; steam is then injected until the mass is of a jelly-like consistency. The slag-jelly is strained and washed.

Fireproof compositions.—Relates to the process described in Specification No. 1432, A.D. 1883. Kieselguhr is subjected to intense heat and mixed with slag-jelly obtained by the above-described method. Lime water, gum, glue, or the like may be added to form an adhesive composition, which will render fireproof any materials not containing oil.

9888. Liebhaber, L. E. A. E. D. de. July 8.

Stone, colouring; stone, artificial; stucco; hearth-stone.—Certain stones, such as Bath stone and yellow sandstone, are changed in colour, especially to red or pink, by the action of heat. The blocks of stone are immersed in or floated upon melted lead or a fused alloy, contained in a tank of convenient size, for a sufficient time, and are turned from time to time. The temperature of the bath is determined by the nature of the stone. A furnace or oven may be used instead of the heating-tank of lead &c. above. Stone thus treated may be ground to a red or pink powder and used for stuccoes and artificial stone, and in place of hearth-stone for colouring stairs, window sills, &c. in front of a house.

9917. Johnson, J. H., [Mallion & Son, J. B.]. July 8.

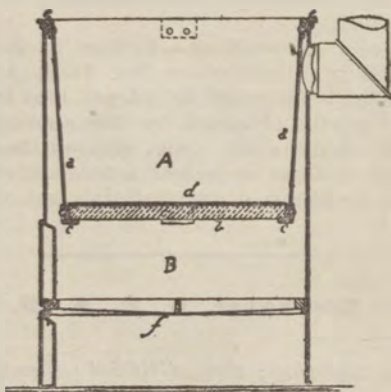
Refractory substances.—Consists in the use of magnesia as a refractory lining in the construction of furnaces, retorts, crucibles, and other apparatus in which a high temperature is employed.

10,490. Stone, R. July 23.

Cements.—Chalk, lime, gypsum, and analogous materials are saturated with sulphuric acid, either in suitable tanks or at the kilns, as the material is being loaded therein. The material is then burnt, and after grinding to powder is ready for use. Plaster thus prepared is stated to be suitable for use in any climate, and specially adapted for ceilings, cornices, columns, statuary, stucco, and the like.

10,823. Stollmeyer, C. F. July 31.

Asphalts.—Asphalt, preferably Trinidad or a similar asphalt, is melted and mixed with as much sawdust as it will take up, generally about 50 per cent. The substance thus produced can be employed for paving, either in the usual way or in blocks, or moulded for flooring or railway sleepers, or filled between thin sheet-iron plates for the protection of vessels against shot.

10,949. Reed, A. H., [Schilling, J. J.].
Aug. 5.

Asphalt cauldrons.—Relates to apparatus for heating asphaltum, resin, and the like, and its object is to prevent the formation of a hard cake upon the bottom of the heating-vessel A, and the bottom from being burnt out. The heating-vessel A is constructed of a metal jacket *a*, open at both ends, at the lower end of which angle-irons *c* support a bottom of fireclay *b* covered by a sheet-metal plate *d*. This vessel is fixed by angle-irons *e* in the furnace B, which is of ordinary construction and of which *f* is the firegrate.

11,000. Lake, H. H., [Hazard, R. R.].
Aug. 6. *Drawings to Specification.*

Sound-deadening compositions.—In order to lessen the noise in railway tunnels, the walls &c. are constructed of a special non-resonant material, consisting of a woven fabric or metallic grating &c. covered or inlaid with fibrous material and solidified vegetable oil, india-rubber, &c., and formed into slabs &c. Or, a double wall of corrugated iron or steel, with a filling of asphalt, cement, &c., may be used.

11,108. Bosshardt, F., [Dietrich, E.].
Aug. 9.

Asphalts.—Relates to the invention described in Specification No. 4448, A.D. 1884. Natural or artificial stones, ores, earth, sand, glass, wood, or paper substances are powdered, mixed mechanically with finely-powdered pure bitumen, sprinkling the mixture if necessary with petroleum, and warmed in a rotating vessel.

11,292. Clark, A. M., [Koch, G. von, and
Adamy, R.]. Aug. 14.

Casting cements. Moulded pieces suitable for stereo-chromatic painting are prepared by coating the mould with a mixture of pure cement and ground pumice stone, and then filling up with a mixture of cement and coarse sand. The pieces are kept damp for some time after leaving the mould, and the surfaces and joints are polished with the first mixture.

11,655. Mitscherlich, A. Aug. 26. *Drawings to Specification.*

Mortars.—In roasting-kilns employed in the manufacture of sulphurous acid the bricks are cemented with a mortar consisting of tar and sand, sieved coal-ashes, or the like.

11,660. Lake, H. H., [Brown, L.]. Aug. 26.

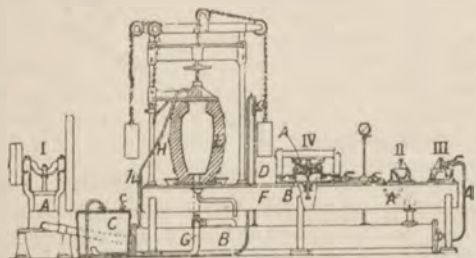
Stonework, ornamental.—Sublimated zinc powder formed in the process of reducing zinc ore, or the dust which is one of the products of the distillation of zinc ore, is utilized for metallizing the surface of stone, brick, &c., or as a protecting or fire-proofing composition. The zinc is mixed with oil or any other suitable vehicle, with or without an admixture of colouring-matter. After the material has been coated with this composition it may be burnished and subsequently varnished.

11,805. Justice, P. M., [Thomas, S. G.].
Aug. 30.

Slags, treatment of.—Relates to the production of phosphates, free from iron, from phosphoric slags containing iron. The material is ground, dissolved in acid, preferably hydrochloric, the silicious insoluble matter allowed to settle, and the solution run off or filtered. If there is much iron in the solution in the ferric state it should be reduced to the ferrous condition, preferably by digesting with scrap iron. The iron is then precipitated by means of a constant current from a dynamo, and when entirely precipitated the solution is run off, and the phosphoric acid precipitated by means of lime, magnesia, or chalk. If the amount of iron present in the dissolved slag is small, it is precipitated by chalk &c. as phosphate of lime, and the latter dissolved in acid, and electrolysed as before.

11,948. Williams, M. Sept. 3.

Mortars.—Furnace ashes or cinders, breeze, sand, slag, stone, flue dust, or like substances, or mixtures thereof, are pulverized to a suitable degree of fineness and intimately mixed, either before or after grinding, with a proportion of "dry lime" prepared according to Specification No. 7255, A.D. 1884, or of quicklime, or of air-slaked lime. The substance thus prepared, mixed or not with other mortars or cements, can be used either as an air-drying or hydraulic mortar.

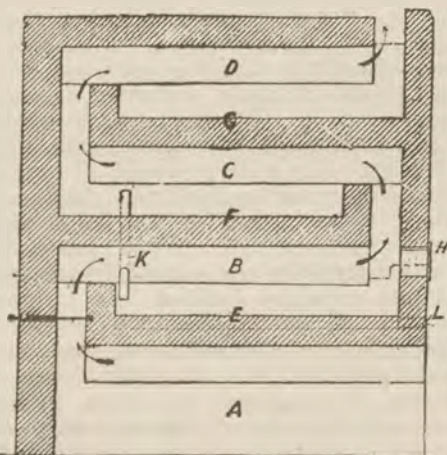
12,081. Robinson, H. M., Minton's (Limited), and Arnoux, L. Sept. 6.

Casting pottery. Compressed air is employed in the processes of moulding and casting pottery to increase the density of the clay so as to reduce the shrinkage and liability to contortion &c. during drying and burning. The left-hand portion of the Figure, marked I, shows the apparatus employed for casting. The air is compressed by a pump A and forced into the reservoir B. The slip clay is placed in an airtight tank C communicating with the reservoir B by a pipe D with a stop-cock *d*. The mould E, which is fitted with an adjustable metal cover as shown, stands upon a platform F and is connected to the slip tank by a pipe G leading from the bottom thereof into the bottom of the mould. A pipe H passes from the cover to the reservoir, and is fitted with a stop-cock *h*. The process of casting is as follows:—The stop-cock *d* is opened so as to force the slip into the mould by the pressure of the compressed air. After a sufficient time the stop-cock is closed and the compressed air allowed to escape from the tank through the outlet *c*, when the superfluous slip falls back into the tank. Compressed air is then admitted to the mould through the pipe H to increase the density of the clay. The cover is then raised, the process being complete.

12,379. Kingsford, C. Sept. 13.

Cements.—The waste gases from coke ovens and furnaces are utilized for drying slurry &c. The flues, heated air, &c. from the furnace A pass along flues B, C, D over trays E, F, G in which the substances can be placed. The trays are thus heated both from above and below. A manhole H is provided for removing solid substances from E, and

overflow pipes such as K are fitted, so that, when any tray is nearly full of liquid, the one below begins to



fill. The lowest tray has exit pipes L for removing its liquid contents.

12,425. Kettmann, H. Sept. 15.

Asphalts.—The limestone, asphalt stone, or other suitable substance to be impregnated with bitumen is pulverized, mixed with about 40 per cent. of water, and heated to about 50° C. The impurities of the crude Trinidad, Mexican, or other bitumen employed are precipitated by adding hydrocarbons, such as schist oil or naphtha residues, during the application of heat, in such quantity that the bitumen can be drawn in threads at from 17° to 33° C. The hydrocarbons are then expelled by continued heating, and the pure bitumen, heated to about 70° C., is added, in amount up to about 15 per cent. of the dry stone, to the stone paste in an agitating-apparatus, the consistency being maintained by adding water at 60° to 70° C. The resulting mass is formed into blocks, air-dried, and finally exposed for a considerable time in a retort furnace to a temperature of about 100° C. The blocks are then pulverized, and the material is ready for use.

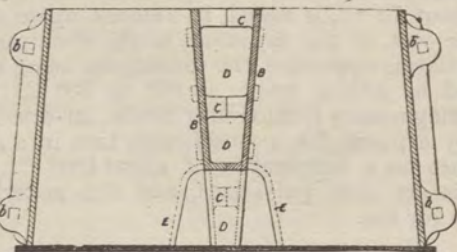
12,803. Robbins, E. Sept. 25.

Stone, artificial; concretes; cements.—Relates to a material for building and other purposes. Un-ground sulphate of lime is dehydrated by heat or pressure in a suitable way, pressed in a mould into which any suitable material may be first placed to form the face of, or to be embodied in, the product, and the mass is indurated by the addition of water or an aqueous solution of any chemical, or by heat, or by pressure. The gypsum employed may be combined with any other ingredient, solid, liquid, or gaseous, such ingredients being either of a binding, neutral, or colouring nature. Various methods of carrying the invention into effect are described.

12,906. Imray, J., [*Schaal, E.*]. Sept. 25.
Drawings to Specification.

Asphalts.—Petroleum and the hydrocarbons resulting from the dry distillation of coal, shale, peat, &c. are oxidized to form organic acids, which by subsequent treatment yield materials suitable for making asphalts &c. The oxidation may take place in several ways, which are described in detail in the Specification. The acids produced all form soaps, and can be separated by distillation, fractional precipitation, or extraction of the liquid acids by benzene, petroleum, &c. When superoxidation occurs the oxy-acids are reduced by zinc powder. The liquid acids are distilled in a vacuum at a temperature of 360°C ., whereby resinous portions, similar in property to the solid acids, remain behind. The solid acids yield soap on addition of an alkali; with lime or magnesia they form asphalt-like masses; and their esters, obtained and purified as below, are more or less hard resins, suitable for use in the manufacture of varnishes or as substitutes for wax, pitch, or asphalt. The liquid or solid acids are dissolved in strong alcohol, and sulphuric acid salts &c. gradually added, the mixture being finally boiled; or hydrochloric acid is led into the alcoholic solution till it is saturated. By these means the ester separates, and the excess of alcohol is distilled off. Non-volatile alcohols may be heated with the acids under pressure, to 120° to 300°C ., to form ester combinations which are also formed by the action of such gases as carbonic acid. The esters may be purified by washing with water and soda and by distillation in a vacuum.

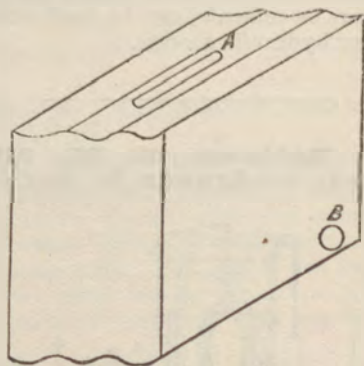
12,862. Johnson, E. P. Sept. 27.



Slag-boxes of any shape are divided internally by hollow partitions, and have walls made of a number of separate sections held together by cottar-bolts or otherwise. The partition plates B^1 fit between the side sections, and are secured by bolting to lugs similar to lugs b , to which are secured the two parts of a partition at right-angles to B^1 , the slag-box shown in sectional elevation being divided into four compartments. If more divisions are required, a central support may be inserted and the partitions flanged and bolted thereto. The sides slightly converge towards the top, and the dividing-plates are wedge-shaped, in order to permit easy removal from the slag. Each partition B^1 has two faces connected by ribs C , air passing up through each space D from openings in the bogie, and the partitions are cut away over the centre of the bottom, as shown at E , so that all the compartments are filled by pouring slag

into one. The partitions may only extend for a part of the depth of the box, which, after being filled and standing for an hour, is withdrawn from the slag, which cools rapidly and breaks easily when tipped.

13,181. Rogers, I. Oct. 4.



Fireproof coverings.—Hollow fireclay blocks, square or oblong, provided with sunk hand-holes A , and plain or corrugated as shown, are employed for the temporary closing of openings in fireproof partitions, stacked between double iron doors &c. They may also be used for the protection against fire of single doors, windows, skylights, &c. The blocks may have holes B at the side to permit the escape of the enclosed air on subjection to heat.

13,355. Smith, W. Oct. 9.

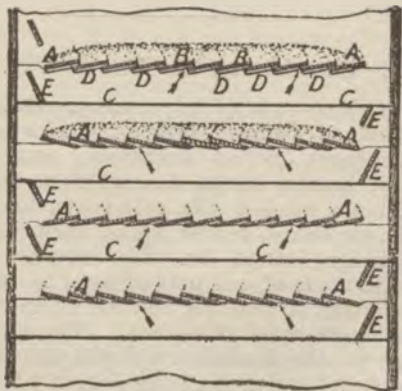
Cements; asphalts; concretes.—Melting pitch is intimately mixed with about an equal weight of finely-ground limestone or calcareous shale. The mixture may be used alone for making gas and water pipes, tiles, &c., or as a cement for combining other materials to form blocks, bricks, paving and building materials, or for making waterproof concrete and damp-courses.

13,425. Abel, C. D., [*Gehring, G.*]. Oct. 10.

Stone, artificial; stonework, ornamental.—Relates to ornamenting and protecting surfaces of natural or artificial stones. Sebacitate or resinate of alumina, *i.e.* alumina soap (prepared by precipitating a solution of common or resin soap with alum), is mixed with oil of lavender or other volatile oil, and incorporated with aluminium or aluminium bronze by rubbing upon glass, porcelain, or marble to the consistency of a thin syrup. The mixture is applied to the surface by a brush or feather or by printing. The surfaces are then exposed to air or to heat. The compound may be varied by the addition of a flux, such as oxides of bismuth with or without borax, lead quartz, and fluorspar. The aluminium coating may be further ornamented by precious metals and metallic oxide colours.

13,761. Dennstedt, M. Oct. 17.

Stone, colouring and preserving; cements.—Indurating and increasing the density of articles of gypsum, terra-cotta, stucco, soft stone, and other like substances, by employing hot saturated solutions of barium or strontium hydrate alternately with such free acids (carbonic, sulphuric, anhydrous silicic, chromic, or phosphoric acid), or metallic salts thereof, as will prevent the formation of soluble bye-products. For example, the object is dried and heated to 80°–100° C., and a hot saturated solution of barium hydrate is applied with a compound glass brush until it will absorb no more, any baryta crystals forming on the surface being removed with a soft brush. The object is then exposed to an atmosphere containing carbonic acid and dried, and the operation may be repeated if desired. For any other acid the process is reversed, the object being first treated with acid and then with the hydrate, a portion of the latter remaining uncombined for future neutralization by the carbonic acid of the atmosphere, or the acid solution may be mixed with the material before making the object, which is afterwards treated with the hydrate. For anhydrous silicic acid the hydrate, which may be that of calcium, is added in the solid form, or to the material in solution, and the silicic acid is added as a solid, preferably as pulverized glass. The gypsum &c. may also be mixed with substances which either by chemical action on the hydrate or inherent properties will give the required qualities, *e.g.*, glass, cement, kaolin, or like substance, separately or mixed, or combined with marble-dust, witherite, heavy spar, or analogous substances. When sulphuric acid is employed a black colour is given by mixing an organic substance, such as sugar, with the hydrate, or employing barium tartrate, oxalate, or citrate.

13,800. Hope, W., and Deacon, G. F. Oct. 18.

Cements.—Relates to apparatus for drying, cooling, or "oxidizing" cements &c. by exposure to air or other gases at a high or low temperature. The material is spread upon floors A one above another, formed of boards B resting and turning upon notched bearings C and overlapping each other as

shown, the overlappings being in alternate directions in each successive floor, and notched stiffening-pieces D ensuring a passage for the air in the direction of the arrows. These boards are lifted or rotated in succession, the material falling on to the floor below; fixed boards E prevent the material from accumulating near the sides. They may be arranged horizontally, if desired, with narrow passages between, and be pivoted at the ends. Those of each floor may also be operated simultaneously by means of links worked by a hand-lever.

13,824. Grach, E. Oct. 18.

Casting mosaics. Honeycombed moulds or beds to receive the tesserae or reticulated frames are made of plaster of Paris, paper pulp, or metal. To form the moulds, the design is drawn full size on a suitable material, such as soap, wood, clay, or gypsum, and is then engraved to a depth depending on the thickness of the tesserae, the walls of the cells of the finished mould appearing as recesses. When the moulds are not intended permanently to form a portion of the completed article, a sheet of paper or linen is caused to adhere to the coloured tesserae for the purpose of removing them and placing them in the position they are destined to occupy; a cement is then employed to fix them. When it is desired to reproduce ancient Roman mosaics, the original is tinted, and sheets of wet blotting-paper are laid over it, by which a tinted impression is obtained. Plaster of Paris is then poured over the surface of the impression, and when set is engraved so that a mould may be cast from it as in the first case. Instead of the tesserae being coloured before being set, they may be put into the mould uncoloured. In this case the kaolin or clay is mixed with a carbonaceous substance and is burnt after being set. Colour is applied to the non-porous material, and it is then re-burnt. Cheap mosaic patterns are produced by impressing and cutting plates of clay while plastic; a pattern thus produced may be used as a matrix for casting moulds or beds similar to those before referred to.

14,010. Cooper, H. J. Oct. 22.

Cements.—For Portland cement, lime, chalk, limestone, or other suitable calcareous material is added to molten iron slag not containing large proportions of iron oxides or sulphur. As the slag flows from the furnace 100 parts of the powdered calcareous material are added to about 35 to 50 parts of slag. The materials are thoroughly mixed by rollers or other apparatus, and then, if necessary, furnace to complete the formation of the clinker, which is cooled, granulated, and ground.

14,087. Farthing, I., and Lorrimor, J. H. Oct. 24.

Asphalts.—Creosote oil 1 gallon, pitch 8½ lbs., and resin 8½ lbs. are boiled together; ground

barrow lime 22 lbs. is stirred in and boiled for about an hour. Pulverized limestone 42 lbs., and limestone sand 35 lbs., are then separately stirred in. Limestone grit 30 lbs. is added either at the first boiling, subsequently, or at the place where the asphalt is to be used.

14,241. Clark, A. M., [*Derrom, A.*]. Oct. 28.

Asphalts.—Hard Venezuelan bitumen or other crude asphaltum is melted in refined and boiled soft bitumen from a lake near Maturin (Venezuela), in the proportions 5 to 10, 2 to 10, or 10 to 2. The composition is applicable as a ductile covering for telegraph wires, roofs, &c.

14,393. Stansfield, J. Oct. 31. *Amended.*

Asphalts.—In paving, the last layer of asphalt is made of comparatively-fine stone chippings, sand, &c., mixed with tar or pitch and creosote or other oil, and is well rolled. The surface is then painted with a mixture of mineral or rock pitch, or both, creosote oil, and finely-powdered chalk or spent gas-lime or the like, the consistency of this varnish being varied according to the size of stone to be employed for the final dressing.

14,430. Joy, A. B., and Lewen, J. J. Oct. 31.

Stone, artificial; castings.—A cast of the object to be reproduced in artificial marble is taken in plaster of Paris mixed with zinc white, and also with finely-flaked mica when it is desired that the cast shall have a crystalline appearance throughout its substance. A small quantity of ochre or other colouring-matter may be added to the other ingredients. The cast, when dry, is immersed in a bath of refined linseed oil for six or seven days, and afterwards allowed to stand in a warm place for four or five days. It is then coated over with a mixture of old refined linseed oil and flake white or other suitable white, and finely-flaked mica may be applied to give a crystalline appearance. The glossy surface may finally be rubbed over with dry whiting.

14,607. Turner, S., and Bell, J. Nov. 5.

Fireproof coverings.—A cloth is woven from fine hard-spun asbestos thread as warp, and fine brass, copper, or other suitable wire as weft, or from a wire warp and asbestos weft. The fabric thus obtained is stated to resist heat better than ordinary asbestos cloth.

14,621. Hatfield, J. Nov. 5.

Stone, artificial.—One part of hydraulic cement is intimately mixed with one of crushed granite

and three of blast-furnace slag. Water is added, and the whole well stirred. Immediately on the total absorption of the water, one part of slagwool is kneaded in.

14,712. Moerath, J. N. Nov. 7. *Drawings to Specification.*

Mortars.—An elastic and unflammable mortar is made of cork shavings, sawdust, &c., and sodium silicate.

14,989. Lowe, R. L. Nov. 14.

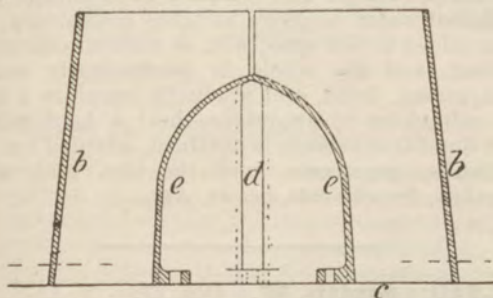
Cements for wood pavements, floors, &c. Consists of resinous matters (such as resin, resinous gum, or shellac), grease or fatty matters, heavy anthracene or other coal-tar oil with a higher boiling point than the rest of the composition, coal tar, pitch, and Stockholm tar, with or without cresylic or carbolic acid or derivatives thereof. As an example, the proportions of the materials employed may be:—Resinous matters, 4 parts; grease, 12 parts; Stockholm tar, 2 parts; pitch, 2 parts; cresylic acid, $1\frac{1}{2}$ parts. These materials are melted together, 4 parts of heavy oil are added, and the whole is boiled for some time until amalgamated. Wooden blocks for paving, flooring, or the like are dipped in the melted cement and laid close together.

15,014. Thompson, J., and Bryant, J. H. Nov. 14.

Stone, artificial.—Portland cement, crushed granite, and iron slag are mixed together in certain proportions, and water containing sodium silicate is added, with or without a suitable pigment. The mass is then laid *in situ*, or made into slabs, and allowed to set.

15,036. Goodison, B. W. Nov. 15.

Concretes; stone, artificial; casting.—Relates to a composition of Portland cement, plaster of Paris, Parian cement, boiled brimstone, and shingle, sandstone, broken bricks, &c., which is applicable for buildings, window sills, gate posts, door jambs, sinks, flower boxes, fender kerbs, cornices, blocks of any design, letters, &c. The exteriors of these articles are made of one part of sand to two parts of the mixture of cements, and the interiors of one part of shingle to six of cements. The sides, ends, and base of the moulds employed are made of wood or metal and are fastened together by clamps. The pattern is obtained by pouring a liquid mixture of plaster of Paris and Portland cement over the subject, and is then fixed by clips to the bottom of the mould.

15,118. Cochrane, W. Nov. 17.

Slag-boxes.—The slag mould, a section of which is shown, is fixed to the bogie floor *c*, and extending across it is a hollow ridge *e*, bolted to the bogie, through which air passes, the ridge being open to the atmosphere at both ends as shown at *d*. The object is to obtain an irregular cooling of the slag and facilitate breaking up afterwards. Other forms of mould are described in which the ridge extends from the top, being attached to the casing *b*.

15,121. Best, T. F. Nov. 18.

Malachite and coral, imitation.—Cellulose, after treatment with nitric and sulphuric acids, is saturated with a solution of sulphurous acid and heated at 100° F., preferably in a closed vessel, until the excess of nitric acid has been decomposed. The excess of acids is then removed by pressure, and 10 to 50 gallons of water are added for every 50 lbs. of the mass, which is then washed to remove all traces of free acids, and afterwards submitted to any bleaching process, if necessary, washed with warm water, and dried. Crude camphor is dissolved in its own weight of methyl alcohol, or a mixture of methyl alcohol and liquid hydrocarbon, and filtered into a closed vessel through a mixture of fused calcium chloride or other drying-agent with charcoal or other decolourizer or deodorizer. From 55 to 65 lbs. of this camphorated solution are added to every 50 lbs. of the treated cellulose, the result being ready for rolling or pressing. For a transparent or semi-transparent product suitable colouring-matter is added to the solvent, or for an opaque product suitable pigments are added to the material before moulding. The material may be made less inflammable by adding 12½ to 25 per cent. of magnesium borate.

15,140. Schelbler, C. Nov. 18.

Slags, treatment of.—The phosphatic slags from the Thomas process are run in the liquid state into vessels, coated with a bad conductor, which are then placed in a room protected from access of cold air so as to cool slowly. They remain here till the outer surface of slag begins to solidify. The inner fluid-slag is then removed, and contains the greater part of the phosphate of lime, which is utilized for manures; while the outer crust, which is rich in iron and manganese, is returned to the blast furnace.

15,628. Liebhaber, G. J. C. M., Baron de. May 23.

Stone, colouring.—Relates to the invention described in Specification No. 4101, A.D. 1881, according to which stone is dyed green by a solution of copper nitrate or chloride, the colour being afterwards transformed into blue, bronze, or black by the use of caustic soda and hydro-sulphates. For a dark red colour, white marble or other stone, dyed green as before, or after first heating the stone or the copper solutions, or by the use of copper sulphate mixed with a small quantity of common salt or saltpetre or other chloride or nitrate, is heated, brought into contact with a solution of yellow prussiate of potash, and afterwards submitted to a jet of hydrochloric acid vapour or liquid. For a pink or light red colour, the stone is boiled in water, heated, and treated with prussiate and acid as before, the operations being repeated if necessary. A red colour is produced on ferruginous stones by applying a layer of potassium chlorate, either in powder or hot solution, heating until fluid, and washing. Porous stones are dyed pink or red by applying the prussiate in the cold and leaving in contact for some days, without using acid. They may afterwards be dyed blue by bringing in contact with fluoric acid.

15,739. Margetts, W. G. Nov. 29. Drawings to Specification.

Cements.—Relates to the process for obtaining Portland cement described in Specification No. 1963, A.D. 1870, and to apparatus to be used therewith. The mixture of clay and chalk, with or without fuel, is passed, after leaving the wash-mill, between rolls one of which rotates at double the speed of the other, instead of between mill-stones, and is then fed into an angular rotating screen with inclined sides, which throws out any uncrushed masses to be returned to the rollers. In treating clay and chalk alone the rolls may be dispensed with.

16,000. Allison, H. J., [Rowland, J. L.]. Dec. 5.

Stone, artificial.—Ground or pulverized slate is mixed with a calcined calcareous base, such as hydraulic cement, hydraulic lime, hydrate of lime, or quicklime, and set by water. If it is desired to imitate any natural stone, one or more of the following materials is added, viz.:—Finely-divided marble, limestone, talc, sand, or equivalent material. Several applications are described, of which the following is an example:—Portland cement and hydrate of lime are screened and intimately mixed; ground slate is added, and the whole is mixed until the colour is uniform; the mixture is then made into a paste with water, and moulded into the articles required. The articles, such as mantel-pieces, table-tops, slabs, &c., may be hardened by treating with water containing carbonic acid in solution or otherwise. Suitable mineral pigments may be used to colour the result, and the proportions

of the ingredients varied according to the qualities required. To improve the surfaces of articles thus made, a smooth sizing of chloride or hydrate of lime is coated over them, and they may then be hardened and rubbed down. To facilitate the hardening, finely-divided hydraulic cement may be added to the sizing.

16,006. Musgrove-Musgrove, J., and Musgrove - Musgrove, H., [*trading as Norman & Son*]. Dec. 5.

Fireproof compositions for cornices and mouldings are formed of a mixture of asbestos and plaster or stucco or glue &c.

16,251. Brady, E. Dec. 10.

Stone, artificial; refractory substances.—To clay reduced to a thin mash with water is added any vegetable pulp (such as jute, cotton, straw, grasses,

&c.) and finely-sifted coal ashes, or either of them. Pulverized felspar and caustic soda or potash, with sufficient water to give a suitable consistency, are then added to the mass, with or without colouring-matter, and the whole is mechanically mixed, compressed, dried, and gradually burnt in a kiln. By subjection to an intense heat a hard, tough, and durable substance is obtained, adapted for use in walls, pavements, and the like, and, when vitrified, for culverts, bricks, &c.

16,950. Smith, W. Dec. 27.

Cements.—For Portland cement, the calcareous sands which occur along parts of the Irish coast are mixed with suitable clay or shale or other combination of silica, alumina, and iron oxides, in such quantities that the mixture shall consist, when calcined, of from 60 to 64 per cent. of calcium oxide, 20 to 23 per cent. of silica, and 6 to 12 per cent. of alumina and iron oxides. The mixture is powdered, made into any suitable shape if desired, dried, calcined, and finally ground.

A.D. 1885.

217. Court, W. Jan. 6. *Drawings to Specification.*

Cements or composition for laying wood flooring. The blocks are laid, on a foundation of concrete, in a composition consisting preferably of Stockholm tar, pitch, and resin. Before being laid the blocks are dipped into the melted composition.

642. Budd, J. Jan. 16.

Stone, imitation.—Relates to a method of producing pillars, boxes, or other tubular or hollow objects with the appearance of marble, malachite, onyx, or other stone. A glass tube or hollow piece of the shape and size required is so treated on its inner surface as to imitate the stone and lined with wood or other suitable material, and a brass or other beading may be fixed round its edges. In

the case of pillars, a wooden or other core may be provided, and the space between the core and the glass may be filled with sand or other suitable substance. When a glass tube has been treated in this way for use as a pedestal for a statue, lamp, &c., it may have a wooden base, painted or otherwise treated, and may have on its top a disc of wood on the upper side of which is secured a glass sheet suitably treated.

669. Walker, P. Jan. 17.

Casting cement as tiles, table tops, mouldings, &c. The bottom of the mould is of plate glass, which gives the tiles &c. when set a polished surface. The cement may be mixed with various colouring-matters, and by applying portions of different coloured cements to the glass surface, and then

filling up the mould with plain cement, various ornamental tiles may be produced. The pattern may be cut out in leather, which is then used as a templet for filling in the coloured devices.

884. Mills, B. J. B., [Laboré, C.]. Jan. 21.

Concretes.—Relates to economizing cements &c. in the formation of agglomerates not of a marly or earthy nature, permitting the employment therein of vegetable matters such as hay, algæ, sawdust, &c., and hardening without baking or compression, by the addition of rock alum and a suitable sulphate. The materials are mixed and shaped, dried, and immersed for twenty-four hours or less in a solution of any suitable sulphate, preferably zinc sulphate, with the addition of rock alum. The compound may be dried and again immersed in a bath of greater density than the first, or the immersions may be replaced by three or four waterings at intervals with the same liquid.

Plasters; statuary; stone, preserving; fireproof compositions.—The mixture of rock alum and a sulphate may be applied for the preservation of public monuments &c., for hardening soft stones, plasters, &c., for incombustible coatings for woodwork, &c.

1038. Bramall, C. Jan. 24.

Refractory substances for furnace linings. The lining is composed of gannister or highly-silicious rock and lime in the proportion of about 90 parts of gannister to 10 parts of lime. The limestone is burnt, slaked, allowed to stand twelve hours, and the gannister added; water is added to give the required consistency, and the whole is thoroughly mixed. The material is moulded in the furnace and dried by slow firing.

1102. Warwick, R. Jan. 26.

Plasters, ornamenting. To permanently colour and decorate surfaces of plaster work, the pigment is mixed with the plaster of Paris, cement, or composition employed. The surface formed with this mixture, which may be cast or plain, has a pattern marked thereon by any ordinary method, using for the purpose a caustic, which acts on the colour incorporated in the plaster, and permanently alters its tint.

1232. Wise, W. L., [Notz, J. F., and Kourad, F.]. Jan. 28.

Fireproof compositions.—Relates to a fireproofing-emulsion for fabrics &c. A solution is obtained by adding to 90 kilogs. of water 10 kilogs. of ammonium sulphate, 1 kilog. of ammonium carbonate, $\frac{1}{2}$ kilog. of borax, $\frac{1}{4}$ kilog. of mercury bichloride, the decoction obtained by extracting 2 kilogs. of peppermint in 6 kilogs. of water at

85° C., and 150 grammes of carbolic acid with a S.G. of 1.062 at 20° C. To this solution are added 6 kilogs. of sodium bitungstate dissolved in 94 kilogs. of water, and as much of a saturated solution of calcium chloride as will prevent solidification or precipitation. The liquid is then put in a vessel provided with an agitator and kept at about 70° C., and is converted into an emulsion by passing into it the products of distillation by heat of 1 kilog. of Peru balsam and $\frac{1}{4}$ kilog. of camphor dissolved in 2 kilogs. of acetic or other ether. Fabrics and other materials to be rendered unflammable, obnoxious to vermin and the growth of fungi, &c. are immersed in the final product.

1778. Thomlinson, J. Feb. 9.

Cements or plasters.—A cement of similar character to Keen's, Parian, and Martin's cements is obtained from calcined and powdered gypsum mixed with powdered tincal, with or without other ingredients. With each ton of calcined and finely powdered gypsum is intimately mixed 40 to 50 lbs. of powdered tincal, the proportions of tincal being varied to suit the quality of the gypsum, and being increased to give greater hardness or decreased to give less hardness. In some cases about 10 lbs. of powdered alum, or other materials, may be added to the gypsum and tincal.

2775. Donald, W. J. A. March 2.

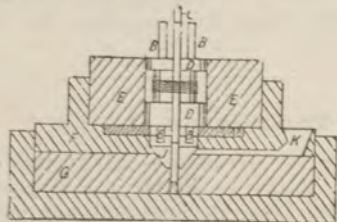
Refractory substances.—Calcined bauxite, preferably as free as possible from silica, iron, and alkalies, is ground with a quantity of milk of lime sufficient to produce a pasty mass; in some cases a small proportion of uncalcined clay may be added to the bauxite. The resulting material is intended for lining furnaces, making firebricks, or other uses where the presence of silica is disadvantageous. Another material is composed of chrome ore ground to about the fineness of sand, worked up to a pasty mass with a milk, which may be of lime or of ground bauxite, and calcined or uncalcined. A small quantity of asbestos fibre or jute may be added to render the material more cohesive while drying. The use of this material is similar to the former, but it is especially suitable for chrome ore furnaces and those in which are produced potash and soda salts intended for the preparation of chromates of those salts.

2806. Cawley, J. March 3.

Cements; stone, artificial, for slabs, monuments, statuary, &c. An argillo-calcareous clay found in the neighbourhood of Boulogne and with little sand therein, is crushed, washed, burnt, re-crushed, and sifted ready for use. This cement may be used only for the surfaces of products, other cements being used for the interiors, or *vice versa*, or its composition may be varied so as to give a finer grain at the surface, the surfacing-cement

being placed first in the mould. The invention is especially applicable to the production of tombstones, the inscription and ornamentation being formed by incised panels inserted in the mould or by cutting the sides of the matrix, but it is also applicable to the production of architectural ornaments and to the encasing of corpses, as a substitute for coffins.

2857. Ley, H. W. March 4.



Casting cements. The wire leaves of lantern pinions are fixed in their positions by a medium which solidifies from a fluid condition. The Figure shows moulds &c. for casting one end of such pinions with a wheel A attached. The leaves B and central spindle C are held in their correct relative positions in a block D, supported above the wheel A in another circular block E. This rests upon the moulds F and G, in which are formed the space J and gap K. The cement is poured into the said space and sets around the ends of the leaves. The other end is formed in a similar manner.

2886. Millar, W., and Nichols, C. F. March 4.

Cements and concretes for floors, walls, buildings, casts, statuary, slabs, mouldings, &c. Certain chemical ingredients which have the effect of accelerating setting and of indurating are added to the water mixed with the cements or concretes when used. The ingredients employed are—for accelerating the setting, carbonate of soda, alum, and carbonate of ammonia; for indurating, chloride of calcium and oxide of magnesium, chloride of magnesium, or bitters water; and for obtaining intense hardness, oxychloride of magnesium. As an after process for further hardening, there may be used silicon, boron, or some combination of these with bichromate of potash. The proportions employed are varied according to the material operated upon.

2927. Millar, W., and Nichols, C. F. March 5.

Fireproof coverings and compositions.—An aggregate is formed of brickdust or ground pumice stone combined with slagwool and an equal bulk of Portland or other cement, and is set with an aqueous solution of certain proportions of sodium

and ammonium carbonates, caustic soda, and bitters water. While still plastic the mass is incorporated with tow or other fibre, or is laid upon perforated zinc or woven netting or prepared canvas, and is rendered fireproof by steeping in a solution of borax or ammonia. Intense hardness is given to articles made from this material by treating with calcium chloride, sodium silicate, and potassium bichromate. The composition is applicable for constructing mouldings or decorations, or for rendering ceilings, walls, beams, girders, stairs, and columns fireproof, and generally for constructive, decorative, and other purposes.

2979. Louvet, E. P. March 6.

Fireproof coverings and compositions are made by filling with tar the pores of dry absorbent bodies such as cardboard, paper, rope, canvas, &c. On placing tar products in contact with the bodies and creating a vacuum the tar settles in the pores of the bodies. The material is then subjected to pressure, and the volatile and liquid portions of the tar are afterwards expelled by graduated heat. The product is stated to be impermeable, unflammable, and acid-proof, and capable of many applications such as to hollow-ware, barrels and pipes for acids, panels, and the manufacture of paving-blocks, railroad sleepers, spinning bobbins, boats, buttons, jewellery, packing-materials, &c.

3133. Imray, J., [Remaury, H., and Valton, F.]. March 10.

Refractory substances.—For lining converters, cupola furnaces, open-hearth furnaces, rotary furnaces, &c., pulverized chrome iron ore is mixed with 15 to 20 per cent. of magnesia carbonate, or with 5 to 10 per cent. of slaked magnesia or lime or magnesian or other limestone or of magnesium hydrate, with or without a small quantity of water. Or the lumps of chrome iron ore may be built up to form the lining and cemented together with a mortar of pulverized chrome iron ore and magnesian or other limestone or magnesium hydrate and water. A little tar may be added to increase the binding power where required.

3445. Atkins, G. J. March 17.

Stone, imitation.—Relates to ornamenting surfaces of glass, porcelain, metal, &c. for obtaining imitation tile and marble surfaces, and various articles, by coating with a sensitive film, producing the design by exposure under a tracing &c., and then covering with an insoluble tacky varnish, such as boiled oil. The surface is then washed, whereby parts of the design (those unacted upon by light or *vice versa*) are washed away. The surface is dried, dusted over with any desired powder (bronze, glass stains, &c.) which will adhere to the tacky surface, and the intermediate space filled in, or not, with colours, &c.; if ceramic powders are used, the whole may be heated or fired. Several

modifications of the process are described, the principal being in the application of a coating of varnish before the sensitive film is put on, and dusting the tacky surface with cork powder &c., as a resist when a sand blast or acid etching is also applied. The glass surfaces, ornamented as described above, may be treated with a cement or plaster backing, of any thickness or colour. The backing may be of vitrifiable clay, flux, or earth in combination, and then the whole may be fired.

3897. Johnson, J. H., [*Brandstätter, I.*].
March 26.

Stone, artificial.—Pure quartz or similar material, such as flint, granite scraps, &c., is ground to a degree of fineness suitable for the grain to be produced, and 6 to 10 parts by weight of magnesia are added to every 100 parts of quartz &c. If greater hardness is desired, the magnesia may be replaced by 4 to 6 parts of minium or litharge and 12 to 16 parts of a concentrated solution of sodium or potassium silicate. The mixture is moulded under great pressure and dried, and may afterwards be burned at a white heat and gradually cooled. For architectural and ornamental purposes the proportions may be, quartz &c. 100 parts, and magnesia 3 to 6 parts, or, in place of the magnesia, minium or litharge 2 to 4 parts, powdered limestone or chalk &c. 2 to 4 parts, and sodium or potassium silicate solution 16 to 20 parts. Colours may be added to the mixture before or after the addition of the solution.

3916. Ormerod, E., and Horne, W. C.
March 27.

Cements; concretes; castings.—Cements, plaster of Paris, concretes, &c. are rendered luminous by adding thereto a phosphorescent substance such as powdered calcium sulphide, and afterwards waterproofing. 1 lb. of the luminous powder may be added to from 2 to 5 lbs. of cement &c. mixed with water, and shaped or applied as required. Moulded articles are dried and soaked in a bath of paraffin wax and benzoline or of other suitable waterproofing solution. If the cement is applied to a wall or ceiling, the waterproofing solution may be sponged over it. The application of the cements &c. is mentioned in regard to the following structures &c.:—Bridges, pavement kerbs, dock wharfs, posts, railway platform edges, the parts of fortifications, door knobs, walls, ceilings, and bricks and tiles.

4151. Heys, W. E., [*Ladewig, E.*]. April 2.

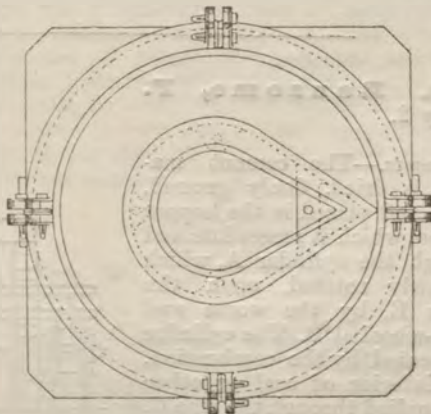
Fireproof coverings and compositions.—A mixture of soft asbestos fibres, pulverized ammonium sulphate, solutions of zinc chloride ammonia and resin soap, crushed asbestos stone, and baryta white, is worked up with water in a rag-engine to a pulp, which can be made into paper or pasteboard in the usual manner. Ordinary roofing pasteboard

or felt may be coated on one or both sides with this material, or ordinary paper or pasteboard stuff may be felted with it on a paper or pasteboard machine.

4889. Lyte, F. M. April 20.

Refractory substances for crucibles, muffles, gas furnaces, tuyères, and tubes. Magnesite, magnesia, or magnesium carbonate is calcined at a strong white heat; it is then ground and sifted, and again calcined and sifted several times until it has sufficiently contracted. It is then agglomerated with water alone, or with water and an admixture of from 6 per cent. to 10 per cent. of magnesium hydroxide or about 15 per cent. of less strongly burnt magnesia, or with a solution of a magnesium salt or the corresponding acid, and brought to a consistency suitable for moulding. Any finely-divided form of carbon may be mixed with the above. In some cases sawdust, flour, or other organic matter may also be mixed with the calcined magnesia.

5003. Cochrane, W. April 22. *Amended.*



Casting slags. Moulds for receiving liquid slag from blast furnaces are made with cores of a wedge shape, as shown in plan in the Figure, the angle strengthening the core and facilitating the breaking up of the slag on discharge from the bogie.

5216. Thompson, W. P., [*Imperatori, L.*].
April 28.

Slags, treatment of.—Relates to the manufacture of phosphates of sodium and potassium from basic slags, such as are obtained in the Thomas-Gilchrist process, by smelting the slags with potassium or sodium sulphate, and carbon, and treating the product with carbonic acid. The slags are crushed and pulverized, and mixed with 176 parts of the sulphate, and 74 of coal, the theoretical quantity of slags employed being 100 parts, but practically a considerable excess should be used. The mixture is put into a black-ash furnace and smelted. The resulting semi-fluid mass is moulded into blocks, which are subsequently broken up and treated with carbonic acid either as a gas, or by

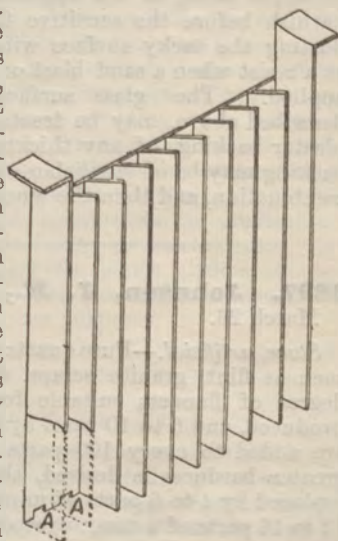
being mixed with a substance which can be made to evolve carbonic acid. The mass is then lixiviated, whereby neutral phosphate of soda or potash and carbonate of soda or potash are obtained in solution, from which both salts may be obtained by crystallization.

5346. Lovett, P. C. April 30.

Cements; stone, artificial.—A hydraulic cement is obtained by grinding and mixing together in certain proportions, and with sufficient water to render the mixture plastic, two minerals which occur on the applicant's estate of Liscombe Park, near Leighton Buzzard. The resulting compound is calcined and gradually cooled, and is applicable to all purposes for which cement or plaster can be employed; or it may be made up into blocks for statuary &c. The composition of the minerals is stated in the Specification, each of them containing in different proportions the following substances:—oxide of iron, alumina, lime, carbonic acid, magnesia, alkalies, sulphuric acid, silica, and insoluble silicates.

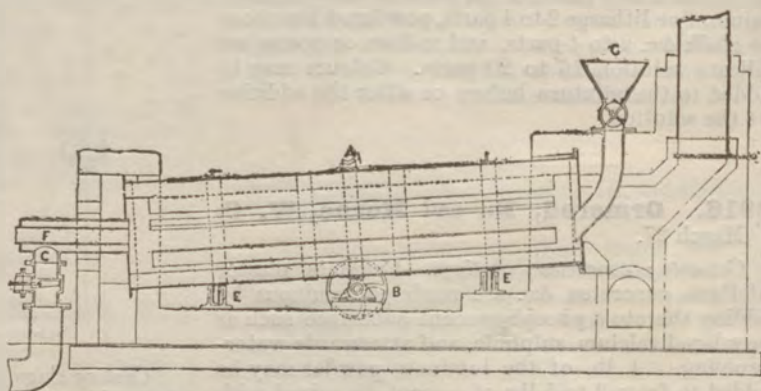
5399. Lake, W. R., [*Napavil F.*]. May 1.

Casting sugar. Sticks of sugar are formed in moulds of the shape shown, made of sheet metal with projecting ribs. A number of these are fixed in a cast-iron case with perforated or open bottom; each compartment has an aperture A near the lower end, so that when the case is placed vertically the syrup may run away. After treatment in the centrifugal machines the moulds are taken out and bent in special apparatus so that the sticks fall out.



5442. Ransome, F. May 2.

Cements.—The cement material is dried, finely ground, sifted, and placed in the hopper G, from which it passes into and through the cylinder A, which is slowly rotated, upon the rollers E, by the worm and worm-wheel at B. The cylinder A is heated by the combustion, in its interior, of coal or other gas supplied through the pipe C. Air or steam is supplied through the pipe F.



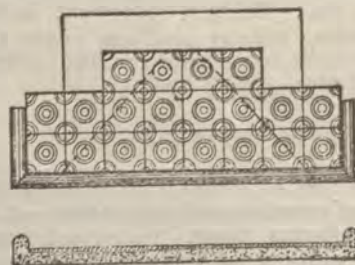
5538. Walker, P. May 5.

Casting cements. The moulds are composed of, or covered with, glass plates in parts, in order to give a fine even surface to the cement forming the inner portions of baths, washing-tubs, sinks, &c.

5579. Diss, A., and Goodey, H. May 6.

Casting concretes &c. Fireproof hearths, window-heads, door-jambs, and the like are moulded from any well-known aggregate or concrete. The several articles mentioned are ornamented by tiles of various design or material attached to the surface. The inside of the mould having been brushed over with linseed oil, the tiles or other ornaments are placed in position in the mould. The concrete is then filled in, and while it is yet

in a wet state, metal bars are thrust through the mass and so disposed as to impart adequate strength to the finished article. The Figure shows



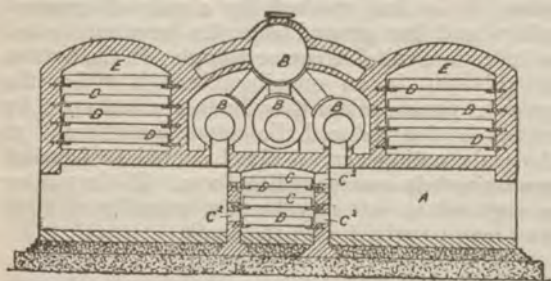
a plan and section of a hearth illustrating the application of the invention.

6025. Montgomery, W. May 16.

Fireproof compositions; cements.—A fireproof cement is prepared in two parts, a powder or aggregate, and a paste. The aggregate is composed of about 50 parts of finely-ground porcelain or pottery waste, 40 parts of Portland cement, and 10 parts of red lead. The paste is composed of very finely-ground porcelain or pottery waste with about 5 per cent. of plumbago, mixed with water containing a flux, such as borax and sodium silicate. The paste and powder are mixed together in proportions suitable for the purpose to which it is to be applied. The proportions of the ingredients may be varied considerably, and for certain purposes the red lead and plumbago are not included in the mixture. The cement is used for making slabs for mantelpieces &c., for the foundations of chemical pans or furnaces, and for other purposes.

6027. Tulloch, J., and Tulloch, T. May 16.

Refractory substances; fireproof compositions.—Hollow blocks for the construction of fireproof buildings are formed of a mixture of fireclay or common clay, sharp sand, and common salt, preferably in the proportion of 65 parts of clay, 25 parts of sand, and 10 parts of salt.

6313. Kingsford, C. June 4.

Cements.—Relates to means for drying slurry or slip, and consists of an improvement on the invention described in Specifications No. 1078, A.D. 1882, and No. 12,379, A.D. 1884. The former invention, consisting of a steam generator B heated by the waste heat of coke ovens or other furnaces A, is combined with one or more drying-chambers for drying cement and other materials. These chambers C, fitted with suitable trays D, are arranged between successive rows of ovens and communicate with them by means of apertures C'. Other chambers E may be arranged on each side of the steam generator, if desired.

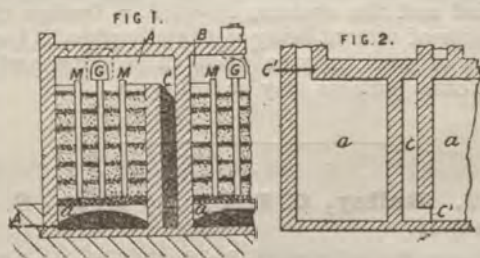
6866. Twynam, T. June 5.

Slags, treatment of.—The phosphoric acid in the alkaline slags produced in the manufacture of iron and steel, exists principally in an insoluble form.

To obtain it in a soluble form the slag is fused with, preferably, an alkaline carbonate, but may be fused with an alkaline hydrate, sulphate (in which case an oxidizing atmosphere is required, and the sulphurous fumes given off must be condensed), or chloride (when a steam jet is preferably introduced, and hydrochloric-acid fumes are evolved). The amount of alkaline salt necessary to be added to get the largest yield of soluble phosphate is best determined for each sample by experiment. Sometimes the slag is finely ground and boiled in a strong solution of an alkaline carbonate or hydrate, with or without pressure. Sodium or potassium salts may be employed.

7148. Wilkes, C. A., and Millar, W. June 11.

Concretes for floors, paving, &c. Blast-furnace slag is broken into fine pieces and mixed with a definite proportion of hydraulic cement, water being added until the requisite consistency is obtained. With the water added is mixed bittern water (dregs from the manufacture of sea salt) or brine, and a small proportion of carbonates of soda and ammonia. Sometimes a small quantity of carbonate of potash and copperas are used; the latter promotes speedy hardening. Red or yellow oxide of iron may be mixed with it if other colour is required. The compound sets quickly, is not slippery when wet, and does not soften in hot weather.

7189. Joy, W. June 12.

Cements.—Relates to the manufacture of cement by drying wet slurry in the kiln and afterwards burning it therein. Any number of kilns are arranged in two rows, back to back, with a central flue communicating with a chimney. Fig. 1 is a part sectional elevation of the arrangement, and Fig. 2 a part plan along the line A. The kilns have reticulated arched bottoms *a*, which communicate with the flues C by the dampers C', and also suitable air openings regulated by dampers. The slurry is mixed with small fuel and charged into the kilns in alternate layers with suitable fuel in large lumps. In the charge are placed a number of pipes M, M made of wood, paper, or any combustible material, or slurry, &c., that will not impair the quality of the cement; or the material is arranged so as to form suitable air passages. When the kiln A has been charged, the damper in the flue G, which communicates with the

chimney flue, and the air-flue damper are opened, and the charge ignited. After the whole of the charge has been dried by the hot gases from below, the damper in the flue G (kiln A) is closed and that for the kiln B opened, and also the damper C¹ is opened; this draws the heated gases down the flue C into the bottom of the kiln B, and thence through the pipes M, M placed in the charge, thus drying the slurry &c. When the gases passing from the kiln A to the kiln B will support combustion, the charge in the kiln B is ignited, and the gases from the kiln B passed on to the next kiln, and so on round the series. Above the tops of the kilns is placed a slurry mixing and feeding apparatus.

7364. Tucker, E. S., and Tucker, D. F. March 17.

Stone, artificial.—Relates to the manufacture of such articles as chimneypieces, flower-pots, fountains, gravestones, grottoes and rockeries, summer-houses, tables, verandahs, &c., from cement and fragments of spar, marble, &c. A wire, metal, or wooden skeleton, with meshes or openings in it, is made in the form of the desired article. A mould smaller in size than the skeleton is then placed inside, and a cement is spread over the outside. Broken pieces of spar, marble, glass, and the like are now pressed into the surface before it sets, with the result that the finished article has a variegated and rough surface. When it is desired to produce articles with a smooth surface, an external mould of glass is employed, and the pieces of spar, marble, glass, &c. are carefully placed on its inner surface. A layer of cement is then applied and the skeleton inserted. a further thin covering of cement being afterwards added. Large pieces of work may be made in sections, and in some cases portions may be left open.

7457. Bailey, C. I. C., and Dean, S. C. June 18.

Cements for jointing the bricks of furnaces, kilns, &c. are made of a solution of sodium silicate and alumina, preferably china clay.

7740. Munro, J. M. H. June 25.

Slags, treatment of.—Basic cinder, such as is produced in the manufacture of steel by the Gilchrist-Thomas or "basic" process, is pulverized and mixed with enough sulphuric acid to render soluble some or all of the phosphoric acid and to convert into ferrous sulphate some or all of the ferrous oxide contained in the cinder. The mixing of the acid and cinder may be effected in the ordinary apparatus used by manufacturers of artificial manures. The cinder before being treated with the sulphuric acid may be mixed with substances containing phosphoric acid, *e.g.*, coprolites.

The compound manure thus formed may be used either alone, or be mixed with raw basic cinder, lime, magnesia, &c.

7809. Stewart, R. June 26. *Drawings to Specification.*

Fireproof coverings.—Relates to a compound covering for boilers, roofs, and walls of buildings, &c. Silicate cotton or slagwool is placed between an outer casing of corrugated or plain sheet metal, or other suitable material, and an inner casing of wire netting; these are held together by bolts and suitable washers and nuts. When the covering is to be applied to the roofs and walls of buildings, both casings may be of wire netting, and strips of wood or other material may be embedded in the slagwool, sheets of paper or other light material being placed between the slagwool and the strips. After fixing in position, an external coating of plaster or cement may be applied.

8096. Stone, R. July 3.

Cements or plasters.—In making plaster the raw materials, such as chalk, limestone, &c., are first saturated with sulphuric acid and then loaded into kilns mixed with any solid or liquid fuel which will produce a very high temperature. A hot or cold air blast is also used to assist in producing the high temperature. After burning, the material is conveyed directly to the pulverizing-machinery, where it is first crushed by a pair of grooved rollers, and then ground beneath a large corrugated cylinder in a suitable pan or trough. In the bottom of this pan is an opening through which the material passes, when it is further acted upon by rollers having reduced diameters towards and at the ends, acting against fixed curved surfaces of approximately-corresponding form. If the plaster is required to set very hard, a quantity of river mud may be mixed with the chalk.

8139. Redfern, G. F., [Tanczos, R.] July 4.

Fireproof coverings and compositions for wood. The wood is well dried, and then impregnated with a solution of about 4 parts of borax and 3 parts of Epsom salts dissolved in about 20 parts of hot water. When dry it is coated with a mixture of washed clay and a sufficient quantity of liquid water-glass to make a paint. When this coating is dry a covering of paper or woven fabric, impregnated with the above solution of borax &c., is applied, and the whole is then painted over with a mixture of from 30 to 40 parts of ammonium sulphate and 35 to 45 parts of gypsum, diluted with a sufficient quantity of water to be conveniently spread.

8153. Thompson, W. P., [*Bosse, R., and Wolters, F.*]. July 6.

Cements.—Cements composed of two or more of the following substances, viz., calcined cement, natural or artificial puzzuolane, lime, and other usual ingredients, and also those of the above substances which have cementing-properties although not setting of themselves with water, are rendered hydraulic and increased in homogeneity and strength by a supplementary grinding in ball mills and similar machines.

8364. Matthew, J. July 10.

Stone, preserving; stonework, ornamental.—The object is to glaze stone and to render it impervious to moisture. The surface of the stone is first smoothed by rubbing, or finished in any other manner. The stone is then placed in a drying-room to expel any moisture if necessary, and afterwards coated with any suitable glaze, transparent or coloured, and fusible at a low temperature. It is then placed in a kiln or oven and heated sufficiently to run the glaze.

8392. Thompson, W. P., [*Osann, B.*]. July 11.

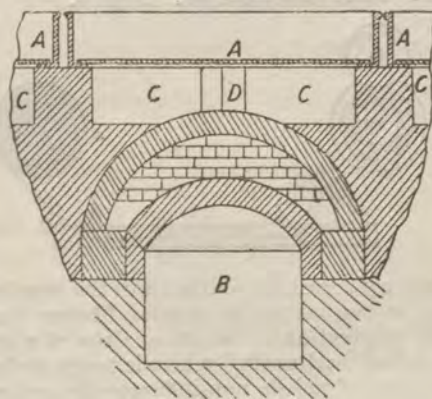
Slags, treatment of.—In the Thomas-Gilchrist process for the purification of iron, carbonated or caustic alkali with sesquioxide of iron or of manganese is fused in the converter; and when it is desirable to convert the whole of the carbonated alkali into caustic alkali, finely-powdered sesquioxide of iron or manganese is mixed with the slag produced. The usual lime flux may be replaced by the above mixture, or by carbonated alkali in lumps or fused, or by a mixture of these. The lumps of alkali with sesquioxide of iron or manganese may be made by first moistening the material and afterwards moulding and heating; the lumps of carbonated alkali may be obtained by fusing and running into moulds to cool, or by moistening and moulding. The slag obtained is treated with water, and contains, after precipitation of acids, either caustic alkali or a mixture of carbonated and caustic alkalies.

8736. Merritt, H. W. July 20.

Cements or plasters.—Relates to a plastic composition especially applicable as a plaster for coating walls or surfaces of wood, masonry, or glass, and consisting of the combination of a pulverized solid silicate with comminuted silica by means of a caustic alkali dissolved in water, and with or without a soluble alkaline silicate. For example, $1\frac{1}{2}$ lb. of caustic soda or potash is dissolved in about 22 lbs. of water and 20 lbs. of powdered "asbestine," a mineral consisting chiefly of magnesium silicate, and 40 lbs. of quartz sand are added, the resulting plastic mass being then worked and applied like mortar. The proportions may be varied and, when

the composition is to be applied to a smooth surface, about $3\frac{1}{2}$ lbs. of soluble sodium silicate may be added. Preferably magnesium silicates are employed, but other silicates may be mixed therewith, and the sand used need not be pure silica but must be silicious, and infusorial earth or coal-ashes may be substituted for sand or intermixed therewith. The ingredients of the composition, except the sand, may be mixed together and kept for future use, the sand being added when it is desired to make the composition.

9017. Wood, J. H. July 27.



Cements.—Relates to ovens for drying slurry. The floor is formed of a series of rectangular or other shaped troughs A of steel or other material. Each trough is heated independently by a separate furnace B, the flues C opening into a common chimney stack and controlled by independent dampers. D are additional supports for the troughs, which are also provided with suitable lugs to facilitate their removal.

9087. Reddie, A. W. L., [*Egleston, T.*]. July 28.

Stone, preserving.—Suitable petroleum products, such as paraffin or vaseline, and preferably also sulphur, are dissolved in mineral or vegetable oil, preferably linseed, which has been converted into "fat oil," and the combination is applied warm to the stone with a brush. The linseed oil may have its lighter elements removed by blowing cold or warm air through it, and the proportions employed may be "fat oil" 100 lbs., paraffin 20 lbs., and sulphur 13 lbs.

9154. Joy, W. July 30.

Cements.—In burning cements the kiln is partly charged in any way and, when the charge is well alight, wet slurry from the wash-mills or settling-tanks, mixed with small coke or other suitable fuel, is deposited where the flames are issuing most freely. The feeding is continued in this manner until the kiln is fully charged, care being taken

that the draught is not at any time entirely stopped. The full charge is burnt out and drawn as usual, or the kiln may be worked continuously, burnt clinker being withdrawn from the bottom and fresh slurry and fuel charged at the top. The kiln should preferably be as wide at the bottom as at the top and have a large firebar surface, and, if the draught is too much checked at any point, passages may be made through the wet mixture by iron rods thrust from the loading-eye. The slurry and fuel may be fed in separately so as to form alternate layers.

9319. Morrow, H. W. Aug. 4.



Fireproof coverings.—Relates to the treatment of paper, woven fabrics, or similar fibrous material, for the production of sheets or slabs of a material to be called "celluvert," which is tough and strong, susceptible of polish, non-inflammable, and capable of resisting most acids and alkalies; also to the treatment of the material so produced to make it permanently soft and flexible. The application of the material to the manufacture of a number of articles is mentioned in the Specification. It may be sawn, cut, or punched into the required shape while dry, or heated and pressed in moulds or dies. Sheets of the paper &c. are immersed in a bath of nitric acid or a suitable nitrate, with or without other solvents of cellulose, until the surfaces become pasty, and two or more sheets are then united by heat and pressure to form sheets or slabs. Any suitable apparatus may be employed, such *e.g.* as that shown, in which material is unwound continuously from the roll A, passed below the rollers *b* through the solution in the trough B, and between the squeezing-rollers D to the drum E; E is provided with flanges and is preferably heated, and the roller F resting upon it gives by its weight solidity to the mass formed by the cementing together of the sheets. When a roll of the desired thickness has been formed, it may be removed by splitting it longitudinally, and the resulting sheet or slab is then soaked in alkaline or clear water, slowly dried and pressed, and may be coated with gum, oil, albumen, glycerine, or saccharine matter, or any mixture thereof. Sheets of woven material may be interposed between sheets of the soaked material before cementing, and starch, gum, mucilage, dextrin, albumen, or any form of cellulose may be added to the material, either during manufacture or before soaking, or by dissolving in the bath. Any mineral or earthy substance, starch, &c., or any form of cellulose, may also be sifted between the layers during winding. The sheets or slabs may be made pliable by immersion in a bath

of glycerine or saccharine matter, or both, or preferably in a bath containing a deliquescent salt or salts, which may be added to the bath containing glycerine or saccharine matter.

9780. Thompson, W. P., [*Lilienthal, G.*]. Aug. 18.

Stone, artificial.—About equal weights of powdered slaked lime and ground limestone or marble are worked into a paste with curdled milk. The plastic mass is then moulded into bricks or blocks of any required shape, which are dried in the open air, or at a temperature not exceeding 100° C. Colouring-matter may be added if coloured bricks &c. are required.

9881. Shorten, F., [*Rachner, A.*]. Aug. 20.
Drawings to Specification.

Stonework, ornamental; statuary; casting cements. Relates to the manufacture of stucco ornaments. The articles or surfaces are moulded from a composition of gypsum, chalk, dextrin, and sawdust. The proportion of the latter constituent is varied according as the finished article is required to be light or heavy, and in small castings it may be altogether omitted. The moulds are of glue, and the material is thrown in with a brush until the surface is covered, or it is squirted in. Russian hemp is then placed round the interior of the mould, and laths, which have been soaked in glue and allowed to dry, are then inserted. A further coating of the material is then added, and finally a lining of buckram is laid on and pressed down by hand.

9900. Boulton, A. J., [*Gehring, G.*]. Aug. 20.

Stonework, ornamental.—Relates to a process for ornamenting natural and artificial stones. In carrying out this invention metallic oxides or colours are mixed with an aluminous solution consisting of aluminium oxide dissolved in a volatile oil, or with an aluminium preparation consisting of a mixture of aluminium soap, a volatile oil, and aluminium powder, which is then applied to the surface to be ornamented, and fired in any ordinary manner. As the colours are rendered less fusible by the addition of the aluminous solution or aluminium preparation, it is advisable to add some flux. By adding a tin preparation to the above, a white colour is obtained on heating.

9919. Ratcliff, D. B. Aug. 21.

Fireproof coverings and compositions for safes. Alum and sawdust or other fireproof mixture is subjected to hydraulic or other pressure to get more material in the same space. This compression is preferably effected before the mixture is put in place, and so as to form cakes or slabs which

can be conveniently applied to the interior of a safe and held in place by a lining of wood or other material.

10,185. Maxwell - Lyte, F. Aug. 27.
Amended.

Refractory substances.—Magnesia or magnesium carbonate (magnesite) is calcined at a white heat, ground, and sifted, then recalcined, and again ground and sifted. If sufficient lime is present in the magnesia to be deleterious, it is removed by treating with dilute hydrochloric acid, or a solution of magnesium chloride; or phosphoric acid or an acid phosphate of lime is mixed with the water with which the magnesia is made up. Cupels and tests are made by moistening the magnesia with water and moulding under pressure. Bone-ash may be added to the magnesia, or a mixture of 80 per cent. of highly-calcined magnesia and 20 per cent. of lightly-calcined magnesia may be used. The setting of the material is accelerated by the addition of some heavy magnesium hydroxide, or a little hydrochloric acid or magnesium salt, to the water used in the moulding. Articles, when made from the hard-burnt magnesia, are kept from cracking by being maintained in a moist state, by special means, until sufficiently set. To increase the porosity, finely-powdered tan, wood-pulp, starch, &c. are added; and to make the articles sufficiently strong after firing, about 10 per cent. of clay, or the compounds of some metallic oxides, is added. The bowl of the cupel or test is lined with bone-ash or magnesia of a finer grade, or with a mixture of the two. Cupels or tests made as above may be fired or merely dried before use. The cohesive properties of cupels or tests made of magnesia or bone-ash, or a mixture of the two, are increased by adding silica or silicates (preferably in the form of an alkaline silicate) previous to moulding.

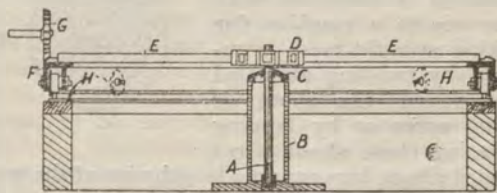
10,544. Parrington, M. B. Sept. 5.
Drawings to Specification.

Cements.—Relates to a special arrangement of apparatus for making cement in which the cement kilns are combined with coke ovens. Over the coke ovens, and also over the kilns, there are arranged in series drying-floors for drying slurry.

10,934. Stone, R. Sept. 15.

Cements.—Relates to a method and apparatus for making cement from chalk or lime and river mud, or any similar mixture of raw materials. The material is first treated in a wash-mill shown in vertical section in the Figure, in which A is an axle passing through a cylinder B, containing oil and closed at the top with a fluid-tight metal cover C. The axle carries a casting D with

radial arms and sockets, into which wooden arms E are secured. The arms E are attached to a ring F driven by the wheel G and supported by rollers H. Toothed harrows are attached by



chains to the arms E, and projections are formed on the side walls to disintegrate the materials. After the materials have been worked up they are passed into a blending mill, with a vertical oscillating or rotating armed shaft, and are afterwards dried and ground in mills, several forms of which are described.

11,001. Hassall, W. Sept. 16.

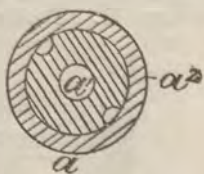
Cements specially applicable for casting linings for stoneware and other pipes, for moulding collars round the same, or for making mouldings, &c. For lining pipes a mixture of one ton of oxide of iron from gas purifiers (which contains a large amount of free sulphur), seven cwts. of pitch or gas tar, or both, one ton of sulphur, and half a cwt. of quicklime, limestone, sand, or slag, is used. For moulding the collars &c., a larger proportion of quicklime, limestone, sand, or slag is mixed with the other ingredients. The proportion of oxide of iron may be varied according to the nature of the work for which the cement is to be used.

11,098. Stone, R. Sept. 18. *Drawings to Specification.*

Cements.—Reference is made to Specification No. 10,934, A.D. 1885. In the manufacture of cement, sulphuric acid and petroleum or any other oil or substance of a highly-inflammable nature are mixed with the wet slurry in place of coal or coke, and the mixture is loaded directly into the kilns. To obtain the necessary supply of air for combustion, temporary draught shafts or air channels are constructed in the interior of the kiln; these shafts are constructed of boards or other suitable material. Peat, brushwood, tow, sawdust, jute, rope, or other material may be substituted for the shafts. The kilns may also be loaded by placing, first a layer of coke or coal upon the bottom, then a layer of slurry, mixed or not with the vitriol and inflammable substance, and above this a layer of dried slurry. The chalk or limestone and river mud may be burned as raw material, and slag, flint, or other silicious substances may be mixed with the chalk &c.

11,254. Collier, J. R., and Musgrave, D. S. Sept. 22.

Fireproof coverings.—The invention is described with reference to a machine for making straight-mesh wire-work, by twisting annealed wire round the shoot or laying wires or by lapping or lacing these shoot wires to hard ribs or bars running lengthwise of the work, but it is applicable also to the manufacture of fireproof lathwork. Upon a suitable frame are a series of spindles *a*, each consisting of two tubes, the inner one *a'* being grooved longitudinally on the outside and lying within the outer one *a''*, and projecting so far as to allow of fixing one or two bobbins along each spindle. The longitudinal rods pass from a drum through the hollow spindle *a'*, and the shoot wires &c. are passed across these from another drum, being previously straightened by passing between rollers. The annealed wires for binding these together are carried through the grooves in the inner tube *a'*, from the bobbins mounted on the projecting ends of the spindles. The work, as it is finished, passes to a cylindrical or conical drum by which it is wound. By using crimped or corrugated transverse bars or laths a wire-work is formed suitable for fireproof lath-work.

**11,270. Killick, E. W.** Sept. 22.

Cements.—The lime, chalk, and clay are mixed with the coke or coal or other fuel by kneading or grinding to form a stiff pug, which is fed directly into the kiln to be burned. The proportions of the ingredients are about $\frac{1}{4}$ fuel and $\frac{3}{4}$ lime, chalk, and clay.

11,806. Timewell, W. T. Oct. 3.

Cements.—Relates to the manufacture of cement from a mixture of hard limestone and silicated aluminous stone, fireclay, pipeclay, potter's clay, porcelain clay, and silicated mud. The stone, mud, &c. are analysed to ascertain the proportions of silica and alumina, and, if necessary, these are added to make the proportions about 58 per cent. to 68 per cent. of silica and 18 per cent. to 24 per cent. of alumina and iron. When mud is used it is specially prepared by treating in a wash-mill, and then passing through several depositing-pits until fine enough to run through a sixty-gauge sieve into a reservoir, where it is allowed to settle. To obtain a uniform mixture of silica and alumina the silicated stone and the aluminous stone are reduced to an impalpable powder, and then mixed in a wash-mill and the mud run into settling-tanks. The limestone is dried and reduced to a powder, fine enough to pass through a sieve having 4000 holes to the square inch, then mixed with a certain proportion of the prepared mud in a machine, and kept agitated for some time. The mixture is then passed through millstones to form a slurry, which

is dried upon a drying-floor, burned in a kiln, and ground to a fine powder. For separating the impalpable powder from the ground limestone &c., a blower or fan is used in connection with a "stive" or collecting-chamber and a dressing-machine or diagonal sieve.

12,383. Ponton, A. C. Oct. 17.

Stone, artificial; concretes.—Calcareous and silicious materials, either in solution or in a finely-divided state, are used for binding together the aggregates of shingle, gravel, stones, slag, clinker, &c., for the production of artificial stone and concrete. For artificial stone, one part of quicklime is dissolved in water and 5000 parts of inert material, such as burnt and ground loam, is added with 80 to 160 parts of combined silica and a certain quantity of soluble silica. Several modifications are described for producing different qualities of the artificial stone, in which sand and sulphate of lime are used, and part of the lime is converted into the gelatinous or the insoluble silicate before adding it to the aggregate, the total quantity of lime being in some cases largely increased. For concretes, the following mixture is used:—1 part of quicklime, 160 parts of combined silica, 1 part of soluble silica, 2000 parts of fine inert powder, 6000 parts of sand, and 16,000 parts of fine shingle for fine concrete, and to this is added 48,000 parts of stones, broken pottery, &c. for coarse concrete. The sulphate, chromate, or bichromate of lime may be substituted for the hydrate. Ovens, drying-rooms, and other methods of heating are used when convenient. The artificial stone and concrete may be stored in tanks containing lime water, until required.

12,484. Brin, A. Oct. 19.

Refractory substances.—Consists of a mixture of silica, magnesia, and alumina, in approximately the proportions of 10 of silica, 83 of magnesia, and 7 of alumina. The powdered mixture is placed in moulds and subjected to great pressure. The heat may be applied simultaneously with the pressure or afterwards, as desired.

12,568. Lake, W. R., [Brown, L.] Oct. 2

Cements; fireproof compositions.—Magnetic iron ore, preferably "sand-iron-ore," is reduced to a fine powder, and employed in the manufacture of fireproof cements and fireproof roofing.

12,908. Pitt, S., [Speyser, A., and Pillivuy, L.] Oct. 27.

Cements applicable for forming mortars, cements concrete, and artificial stone. Fat lime, slaked and pulverized, is mixed with raw clay, dried and pulverized, in the proportions of 2 to 4 parts of

lime to 7 to 9 of clay. The mixture is reduced to a paste by water, and is moulded into bricks which are dried and crushed to a small size. At this stage it is roasted in rotating cylinders, gently at first and afterwards more strongly, the mixture being allowed to cool slowly in the still rotating cylinders. When cold the mixture is reduced to an impalpable powder, and is mixed with from 1 to 3 parts of fat lime.

13,132. Bennett, R., and Peet, H. Oct. 31.

Cements or plasters.—Relates to a composition to be used for coating and decorating walls &c. The surfaces to be decorated, for example walls, ceilings, or the interior of carriages or of ships' cabins, are covered with a composition which, while in a soft condition, is subjected to various impressions by the aid of combs, stamps, rollers, or blocks. It is composed of forty parts of common whiting, six parts of plaster of Paris, three of glue, and three of molasses; the glue is previously dissolved in water, and water is used to thin the mixture if required. The composition may be brought to any desired tint by the addition of any colouring-materials fitted for the purpose. After the plaster has dried and hardened it may be further ornamented by the use of gilding or painting, though in some cases it may be preferred to omit these latter operations.

13,328. Smith, T. Nov. 4.

Cements.—Relates to the manufacture of cement or plastic material from a mixture of about 40 parts of sulphur and 60 parts of ground porcelain refuse, earthenware, or the like. Fragments of earthenware &c. are thoroughly washed, fired in a retort or oven to expel moisture, and ground to a fine powder. The sulphur is then melted, and the powder mixed with it by means of any convenient stirring-apparatus, heat being applied until the mixture becomes a thick plastic mass. The stirring is continued until the substance has slightly cooled, when it becomes liquid and is poured out upon a flat surface to cool. When set, the slab is broken into pieces and remelted. It is then ready for use. The composition is adapted for admixture with tar and other bituminous materials for use in place of asphalt. It may be cast or moulded into any form for the manufacture of electric insulating-supports and the like, acid-proof vessels and boiling-pans, statuary, stereotype, &c.; and it may be used as a mould for casting and for filling up defective and other castings; it may also be employed as a damp-proof covering for walls &c., for fixing standards, railings, lewis bolts, &c., for foundations of buildings, engines, and machinery, for making, lining, or covering baths and cisterns, as a material for slabs and the like in place of stone, and for a variety of other purposes.

13,595. Brookes, A. G., [*Meyn, R. A., and Armack, J. F. O.*]. Nov. 9.

Stone, artificial.—The object is to produce stone resembling marble or granite. Fine hydraulic cement is added to barytes in the proportion of one of cement to one or two of barytes. Mineral colouring-matters may be added to various portions. Pieces of the coloured portions are taken and covered by dry cement, the whole mass being then kneaded. Imitation granite is produced by pressing small pieces of coloured cement together without dry cement. When set the blocks are smoothed and ground with a grinding-liquid of calcareous lye and potash water-glass, the final polishing being done with "tin putty," sublimed sulphur, and alum.

13,662. Barber, A. L. Nov. 10.

Asphalts.—Asphalt mastic is made by intimately mixing finely-divided unburned limestone or fine sand, or both, with a composition consisting of about 80 parts of refined Trinidad asphaltum to about 20 parts of heavy petroleum oil or petroleum residuum, 20 to 30 parts of the composition being added to 80 to 70 parts of the limestone &c., heated and freed from moisture. The product may be moulded into blocks of any convenient size or form and, after breaking, making plastic in a cauldron into which a small quantity of the asphaltum composition has previously been placed, and adding 25 to 60 per cent of small gravel or grit, may be used for any purpose to which asphalt mastic is applicable.

13,699. Keller, W. Nov. 10.

Cements or mortars.—Gypsum, cement, or other binding-agent is intimately mixed with metal fibres or wire and set. The product thus obtained is employed for the construction of arches, reservoirs, walls, ceilings, &c. for which hardness and capacity for withstanding strain are requisite.

13,840. Hunter, T., and Brown, J. G. Nov. 13. *Drawings to Specification.*

Casting concretes. In making special concrete blocks for foundations for bridges, quays, docks, piers, lighthouses, &c., a mould is employed in which the bottom, ends, sides, and cover (in two parts) are secured together by iron bars, bolts, and binders. In order to form cells or chambers in the blocks wooden boxes are set in the mould, with concrete and suction pipes fitted thereto. Grooves are made in the floor of the mould to make a bead on the blocks.

14,064. Mathey, H. Nov. 17.

Cements.—Instead of moulding Portland and hydraulic cements into bricks for burning in a

kiln, the several ingredients are finely pulverized and fed into a heated receptacle kept in constant motion. Plaster of Paris may be similarly prepared, the finely-ground gypsum being similarly calcined to dehydrate it, thus dispensing with the later grinding. For preparing lime, the rock is crushed, screened, and conveyed direct to the heating-receptacle.

14,294. Blaxter, D. W., and Page, S. G. Nov. 21. *Drawings to Specification.*

Casting pottery materials. Relates to making bottle stoppers of porcelain or other suitable material. Segments of screw threads are formed upon the stoppers by fitting core-prints in the moulds used in forming the main stoppers. These core-prints bore a hole through the stoppers. The latter are then inserted in a screwed mould and the material is poured in, making the segment threads required.

14,468. Bolas, T. Nov. 25.

Fireproof coverings.—Relates to a method of ornamenting asbestos fabrics and other fire-resisting articles. A tissue is prepared by dissolving gelatine in water with the addition of gum, sugar, and of a metallic vitrifiable pigment, and spreading a thin layer thereof over paper. The coating is then sensitized with a solution of soluble bichromate, and a picture produced by exposure in the usual way. The exposed tissue is then immersed in water till soft and pliable, when it is placed face downwards on the asbestos slabs or sheets &c. to be ornamented, and gently pressed down closely thereupon by means of a squeegee, if the surface is flat, or a counter-mould if irregular. The paper backing and soluble gelatine are then washed off with warm water, and the surface treated further, if necessary, with a vitrifiable metallic powder by dusting or otherwise, and finally fired so that the gelatine is burned off, and the design left in the vitrified pigment. To prevent blistering, the muffle &c. furnace is charged with the vapour of potassium cyanide, or a spray of a solution of an alkaline salt is injected; while to assist in obtaining a bright metallic lustre, a reducing-gas such as hydrogen, carburetted hydrogen, or carbonic oxide is advantageously introduced.

14,507. Tucker, A. E. Nov. 26.

Refractory substances for furnace and converter linings and bottoms. Basic slag, as obtained in the basic process for the manufacture of steel, alone or mixed with lime or oxide of iron, is cast, rammed, or pressed into bricks or blocks, or formed into slurry and used for lining the belly, nose, and other parts of steel converters, and also for lining iron cupolas, and copper, lead, and glass furnaces.

14,518. Ward, J. R. Nov. 26.

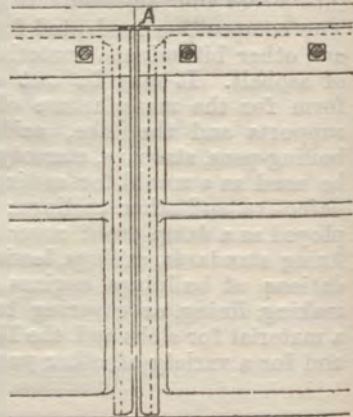
Rockwork, artificial.—Coco-nut fibre in a finely-divided state is attached by paste to a paper or textile backing, preferably canvas. The material is intended for use in the formation of rockwork in artificial grottoes, or in the mounting of stuffed animals. In order to secure variety, sand may be used for some parts of the work instead of coco-nut fibre.

14,703. Colflier, C. H., and Jordan, T. R. Nov. 30.

Stone, artificial; coral, artificial.—Relates to a product to be employed for articles usually made by ivory turning and other similar trades. The composition consists of waste horn, vulcanite, cork, glass, alabaster, earths, coral, ivory, malachite, marble, or other material, and is prepared as follows:—The horn is reduced to powder and then further pulverized in a suitable machine such as "Jordan's Patent Pulverizer." The powder is next compressed in a steel mould heated by any suitable arrangement by means of a screw or hydraulic press. The blocks thus produced are purified, if necessary, and again pulverized; the powder is dyed of any desired colour and is then remoulded in steel moulds of the requisite form, the blocks being finally finished in the same way as bronze castings. To produce veined or marbled composition ivory waste is used; the waste is first treated with oxygenated water which bleaches it and extracts the gelatinous matter therefrom, and is then dyed, dried, and made to absorb clear gelatine which fixes the colouring-matter. The dyed ivory is mixed with the powdered horn or other material so as to form the veins &c. The surface of the composition can be ornamented by inlaying or otherwise. Cork dust may be employed in place of the horn or ivory waste, in which case egg albumen is used as an agglomerant to give body to the composition. The composition prepared by the above processes may be made in imitation of marble, coral, malachite, &c.

14,817. Cochrane, W. Dec. 2.

Casting slags. The invention relates especially to bogies or moulds described in Specification No. 15,118, A.D. 1884, and consists in means for making the joints in the moulds or partitions liquid-tight. The edges of the plates are grooved, and a strip A of iron or other suitable material is inserted to cover the joint. Where



three or more joints meet, one strip is made continuous, and the others may be continuous or may abut closely against the sides of the continuous strip.

14,846. Armstrong, J. Dec. 3.

Asphalts; slags, treatment of.—Asphalts, slags, and other materials are strengthened by wires embedded in them. These may be placed singly or in groups, or in the form of chains, rings, or ropes. They are placed in loose, or in frames, or bound together, and the material is applied in a soft state and allowed to set.

14,949. Ransome, T. Dec. 5.

Fireproof coverings.—A fireproof fabric is formed by coating wire gauze, wire cloth, or wire netting on one or both sides with suitable fibrous or other material, such as woven or felted fabrics, paper, paper pulp, asbestos, &c. The material is first rendered fireproof by treating with tungstate or phosphate of soda or other suitable substance, and is then coated on one side with silicate of soda, and while moist applied, with the coated side upwards, to the wire gauze &c., to which it is attached by weaving, twisting, knitting, or felting. The fabric thus formed is used for coverings of walls, floors, doors, shutters, and ceilings, for curtains, screens, floorcloths, and scenery, and for covers for papers, goods, and other substances, &c.

15,236. Heller, E. I. Dec. 11. *Drawings to Specification.*

Casting artificial stone, in making millstones. To form the stone with ventilation holes through it, cores are placed in the mould. The cores are of wood, iron, stoneware, &c., or they may be tubular, and may be arranged in various forms.

15,371. Allison, H. J., [Gilman, C. C.]. Dec. 15. *Drawings to Specification.*

Fireproof coverings and compositions.—Blocks of porous terra-cotta made by mixing one part of clay with two parts of sawdust, moulding, and firing, are saturated with alum or other liquescent substance and used either as a lining or as a filling between the walls of the structure. In the former case they are held in place by clamps or by other suitable means, and in the latter case the inner wall of the structure is preferably perforated.

15,751. Joy, W. Dec. 22.

Cements.—Relates to the method of working cement kilns. The lower part of the kiln is charged in any suitable manner, and when the fuel is properly ignited, slurry and coke-breeze or other fuel, either mixed or separate, are thrown upon the parts where the combustion is most active, so as to retard the draught. This process is repeated until the kiln is completely charged. The slurry employed is partially or completely dried, and may be in the form of powder or lumps.

A.D. 1886.

31. Joy, W. Jan. 1. *Drawings to Specification.*

Cements.—The waste heat from cement kilns or lime kilns is used to heat air for drying the slurry. The air is drawn through pipes &c. in the upper part of the kiln, and forced through the slurry to be dried.

820. Jensen, C. Jan. 19.

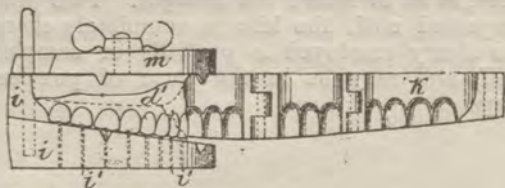
Plasters, ornamenting. In order to ornament porous materials, such as plaster of Paris, in imitation of pinked work, use is made of fat, transfer ink, or colour on a flexible foundation, such as paper. After the pattern is made on the paper

and is coated over with gum-lac, or other body soluble in water, and moistened with water, it is transferred on to the material to be ornamented, and pressed firmly thereon. The paper is then removed, and the surface stained as required, the stain sinking into those parts of the surface unprotected by the transfer ink, but not touching the remaining parts. The design is finally dried, the transfer ink rubbed off with a fat-dissolving fluid, and then the surface is cleaned, polished, or lacquered as desired. Objects in plaster treated by this process may be used for decorating buildings.

948. Bobrownicki, A. Jan. 21.

Slags, treatment of, for producing fertilizers. Phosphatic slags, such as those obtained in the Gilchrist-Thomas process, are treated with sulphuric acid or an acid sulphate of sodium, potassium, or ammonium. Heavy slags are mixed with common salt and then treated with sulphuric, nitric, or other equivalent acid. Any monosulphates formed by the above treatment are removed by lixiviation.

1022. Hooton, J. Jan. 23.



Casting cements in making artificial teeth. A wax model d' of the patient's mouth is placed into the mould shown, which consists of a base i with a cover m , and parts k hinged together, forming the front and sides when closed; plaster of Paris or other material is then run in through holes in the cover so as to obtain an impression of the gums; the wax having been removed the surface of the mould thus formed is oiled and the composition of which the teeth are to be formed is run in and moulded. i' , i' are holes through which pass metal pins carrying tubes of platinum &c., which become embedded in the substance of the teeth. The teeth when formed may be fired and treated in the ordinary manner.

1102. Tooth, W. Jan. 25. *Drawings to Specification.*

Cements.—Relates to the smelting of zinc ores and utilizing the waste products. Carbonate of lime is added to the ordinary charge to form, with the residue, a cement as a bye-product, while the gases generated are led away to a gas holder; the retorts are preferably flanged and provided with special nozzles.

1126. Allison, C. D. Jan. 26.

Cements or plasters; fireproof compositions; refractory substances.—Relates to a cement or plaster for external or internal use, and also as a fireproof cement for lining or covering furnaces, kilns, retorts, &c. It is composed principally of a natural non-diatomaceous silicious earth, in a finely-divided state and containing about 95 per cent. of silica, such as is found in the locality of Bristol. This earth may be mixed with gypsum, magnesia, or magnesian limestone, lime, sand, or plaster of Paris, and certain proportions of silicates of sodium, potassium, and aluminium, and chlorides or carbonates of zinc, sodium, ammonium, magnesium, barium, and lime. To produce a fireproof and waterproof covering the following are the proportions:—83 per cent. of the silicious earth, 15 per cent. of silicate of soda, and 2 per cent. of burnt or unburnt gypsum.

1161. Thompson, W. P., [*Cowles, E. H., and Cowles, A. H.*]. Jan. 26. *Drawings to Specification.*

Refractory substances for linings of electric furnaces. Powdered charcoal is soaked in a solution, or a suspended mixture, of lime, aluminium hydrate, or other refractory material, or the charcoal is mixed with pulverized lime, alumina, or any refractory substance.

1243. Fould, A., and Genreau, P. Jan. 27.

Refractory substances for making crucibles, tiles, tubes, or furnace linings. Two classes of substances are employed, basic and agglomerating. The basic materials consist of quicklime and magnesia, together or separate, added to anhydrous alumina. The agglomerating-materials, which are mixed in the proportion of their chemical equivalence, consist of either calcic, sodic, or magnesian chloride, together with one of four substances, quicklime, or calcic, sodic, or potassic carbonate. In place of the chlorides, fluorides may be substituted, as, for example, cryolite or any body of the same class. The basic and agglomerating substances are separately fused, cast into plates, and broken up. The ingredients would usually be melted in iron crucibles, but when the fusion is difficult, as in cases wherein sodic chloride and quicklime are used, they are melted in a reverberatory furnace on a strong sheet-iron plate with turned-up edges. To the crushed basic material about ten per cent. of the agglomerating-material is added, and the mixture is pulverized, moulded under pressure, and baked, care having been taken at every step to keep all the materials free from moisture. When separate articles are being made, the furnace in which they are burnt must be free from substances of silicious or acid composition. For this reason the bed of the furnace is constructed of bricks of magnesia, slabs of retort carbon, or coke. A similar refractory material may be produced by directly combining with the

same basic substances as before the chloride of sodium, calcium, or magnesium, instead of the agglomerating-material described above. These chlorides should preferably be anhydrous, but they may be used as hydrates, or in the form of solutions, in which case the mixture is calcined before being moulded. In order to diminish the probable amount of shrinkage in burning, the material may, as a preliminary to its being used as described above, be rough moulded with a small admixture of petroleum, oil, or tar, and then calcined and re-pulverized.

1538. Butler, J. W. Feb. 2. *Drawings to Specification.*

Asphalts.—The composition is intended for use as a mastic in paving or in the form of paving-blocks, and for making such objects as sleepers, pipes, conduits for electric conductors, secondary battery plate frames, &c. It is composed of bitumen, 15 lbs.; paraffin, 12 oz.; sand or pulverized limestone, 8 lbs.; roughly-pulped wood, 8 lbs.; Portland cement, 6 oz.; and Taranaki sand, 8 oz. The bitumen and paraffin are boiled together for about an hour before the other ingredients are added, and the latter, previously heated, are gradually introduced while the liquid is at or near the boiling point. The order may be varied, but in all cases the Portland cement and Taranaki sand should be added last. In some cases the latter may be dispensed with, and in place of pulped wood, tanyard waste or finely-sifted sawdust may be used.

1792. Candy, F. Feb. 6.

Mortars.—A material for use as a mortar is prepared by incorporating a quantity of tar with ground caustic lime and heating the mixture without excess of air until vapours cease to be given off. In the Provisional Specification it is stated that the tar may be replaced by the green or black oil obtained by distilling tar, or by any fluid or semi fluid carbonaceous substances, or by any resinous or bituminous substances, or by any mixture of such substances.

1796. Twynam, T. Feb. 6.

Slags, treatment of.—Relates to the purification of pig-iron and basic slags by treating them together in a basic or neutral lined furnace. When a phosphoric pig low in silicon is used, it is mixed with basic slag on the hearth of a Siemens or other suitably-lined vessel; the silicon, carbon, and phosphorus are to some extent oxidized at the expense of the metallic oxides in the slag. The slag thus obtained is richer in phosphates, and has less metallic oxides than the slag when added, and the pig-iron, having less silicon, is more suitable for use in the basic process. If the pig contain much silicon, it is treated with basic slag in

quantity sufficient for the silicon of the iron to reduce the phosphates and metallic oxide. The resulting slag is run to waste, and the desiliconized pig either treated with fresh slag, or used directly in the basic process. If the pig-iron be silicious, but not phosphoric, it is treated with basic slag in a basic or neutral lined furnace, a practically pure carbide of iron being obtained, sufficient basic slag being added to prevent the formation of a too silicious slag, which would cause reduction of phosphates.

1816. Joy, W. Feb. 8.

Cements.—Relates to the method of working cement kilns. The lower part of the kiln is charged with fuel, or with dried slurry and fuel in the usual manner, and ignited. Fuel and slurry are then fed into the kiln, as described in Specifications Nos. 9154 and 15,751, A.D. 1885, using in either case about 7 parts by bulk of breeze to 8 parts of slurry, or 7 parts by bulk of coal dust to 10 parts of slurry. The feeding is continued until clinker is formed in the bottom part of the charge. The burning is then allowed to continue until the surface of the charge has become red, when a mixture of fuel and slurry, in which the proportion of fuel is less than that used for starting the kiln, is scattered uniformly over the surface. This is repeated until the kiln has been fully charged, when it is allowed to burn out and the charge is withdrawn; or a portion only of the charge may be withdrawn, and the feeding continued as before. If, during the burning, the combustion becomes very active at any part of the charge, some of the mixture is scattered over that part alone, until the burning has become uniform over the whole surface. The mixture of fuel and slurry may be fed into the kiln in the form of dry, moist, or wet lumps, or as a powder.

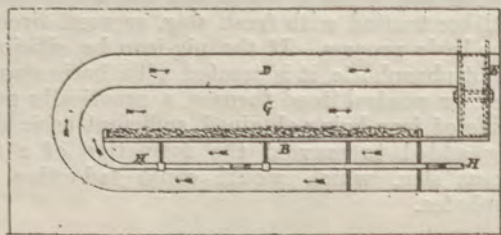
2243. Budd, J. Feb. 16.

Stonework, ornamental.—Relates to a method of ornamenting roughened surfaces of stone, slate, &c. by first drawing the design thereupon, and placing on the colour, as desired, in the dry powdered state, and then heating to a high temperature. A layer of gelatinous or adhesive material is then placed on by a sprayer, brush, syringe, &c., and a final waterproof coating is applied by dipping or otherwise.

2471. Collier, E. W. Feb. 19.

Cements.—Relates to means for drying slurry. The drying-chamber, heated by flues in the usual manner, has discharged into it the products of combustion, or, where these will injure the materials treated, air heated by any suitable means. The evolved vapour &c. is drawn off by means of an exhaust fan. In the Figure, G is the drying-chamber, into which hot air is discharged by the

pipes H traversing the flue B, which may be extended around and above the drying-chamber as



shown at D; E is the exhaust fan, which may be connected with several drying-chambers.

2659. Spackman, C. Feb. 24. *Drawings to Specification.*

Cements, Portland. Relates to the manufacture of Portland cement, and to a system of drying the prepared mixture of raw materials. The material, made into bricks or cubes, is fed into the kiln in which it is to be burnt, and dried by a current of air heated by passing through the cement in another kiln in which the calcination is nearly or quite complete.

2812. Abel, C. D., [Mürkle, L.]. Feb. 26.

Casting sugar. After cleaning with pumice stone and glass paper, the moulds are coated with three coats of soluble glass, with or without body colours; after each coating they are dried at about 122° F.

3217. Hannay, J. B. March 8.

Cements, making from sewage. The sewage is treated with a mixture of lime or carbonate of lime and clay, and the precipitated sludge is dried, and then heated in retorts to distil off the ammoniacal and other volatile matters, and the residue is calcined in a reverberatory furnace. This calcined product, which constitutes the cement, is ground and exposed to the air for some time before use.

3391. Payne, S. J. March 10.

Refractory substances specially intended for the manufacture of firebricks, retorts, crucibles, and other fire-ware goods. The substances are composed of clay, gannister, graphite, millstone grit, flint, sandstone, sands, loam, and spent lime, either together or separate, with an addition of Portland cement, cement slurry, or a mixture of chalk and clay.

3420. Jarvis, G. A. March 11.

Refractory substances for basic bricks. Hard burnt magnesian lime or hard burnt lime is ground

and mixed with a small percentage of fluor-spar, sodium carbonate, sodium silicate, calcium nitrate, calcium chloride, or magnesium chloride, either singly or several together.

3424. Macleod, M. March 11. *Drawings to Specification.*

Asphalts for paving. A mixture of natural rock asphalt with sufficient bitumen to cause fusion at about 220° F. is employed.

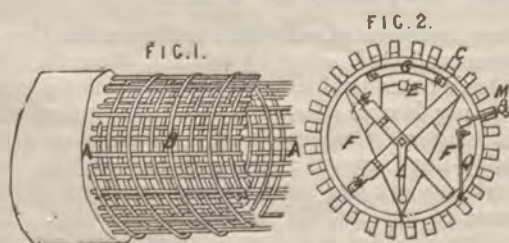
3663. Pitt, S., [Haret, C.]. March 15.

Fireproof compositions for fabrics, furniture, paper, theatre scenery, wearing-apparel, wood, &c. The object is to combine salts which disengage incombustible gases under the action of fire. The compositions consist of glycerine, soluble cream of tartar, tartaric acid, oxalate of potash, or lactic acid combined with phosphates, borates, tungstates, silicates, and other similar salts, to which are added ammoniacal salts, sulphates, hydrochlorates, carbonates, &c. The proportions in the mixture are, say, glycerine, 2 parts; cream of tartar, 8; sulphate of ammonia, 8; carbonate of ammonia, 40; and river water in sufficient quantity to effect solution. For practical application, gelatinous, glutinous, albuminous, oleaginous, bituminous, resinous, &c. substances are added to form incombustible glazes, paints, varnishes, &c., according to the nature of the substance to which it is to be applied.

3832. Constable, W. E. March 18.

Asphalts.—Hard limestone, preferably Derbyshire, is crushed, heated to about 120° F. to 130° F. to eliminate moisture, and then mixed with refined distilled tar. This mixture is stored for about three months and forms the base of the composition. To make the asphalt this base material is mixed with about 8 per cent. of bitumen, 10 per cent. of lime, 2½ per cent. of sulphuric acid, and 12 gallons of refined distilled tar to each ton of limestone. It is laid cold and coated with ground spar.

3835. Monier, J. March 18. *Amended.*



Casting cements. Relates to the manufacture of tanks, pipes, &c. with an iron skeleton covered with a coating of cement. For pipes, the skeleton

is made from a combination of iron coils and longitudinal bars by winding iron rods or wire B, Fig. 1, round a wooden core and overlaying it with longitudinal bars A. A second coil is then wound on, and the process repeated till the required thickness has been attained. The core, shown in Fig. 2, is collapsible and consists of wooden bars C mounted on hinged segments F, F. The segments are held apart by the distance-piece E, attached to them by iron rods G secured to the segments by lugs and pins. On withdrawing the distance-piece the core can be collapsed and the segments held together by the hook Q. To wind the rod or wire on the core, it is attached by the screw M, and the core is then rotated by the handle L. Skeletons for tanks &c. are built in a similar manner, the rods being secured together by wire tying if necessary. The skeleton is placed in a mould and covered with cement, which hardens round it. The cores for the moulds are of various designs, and can be either collapsible or capable of a slight rotation to loosen them preparatory to their removal. The moulds themselves come to pieces when it is desired to remove the article inside. In a vertical mould for pipes, a core is drawn through, after running in the cement and while the core employed during that process is being removed, in order to reduce the wall of the pipe to its desired thickness.

3867. Clark, A. M., [*Harmet, H.*]. March 18.

Refractory substances.—Relates to basic linings for converters and other metallurgical apparatus. Blocks of lime are cut, preferably by means of a hand-saw, into bricks of the required dimensions, the dust being removed by means of a fan, and care being taken to exclude moisture during the operation. The bricks are at once placed in position to form the lining, or in a stove or flame gallery, or dipped into tar, pitch, or other similar substance, to preserve them from moisture. The bricks are rubbed one against the other in laying to cause them to adhere, or they may be grouted with pitch or tar. The space between the bricks and the metallic sheathing of the converters &c. should be filled with a mixture of coke and tar. The bricks may be calcined at a high temperature to prevent shrinkage.

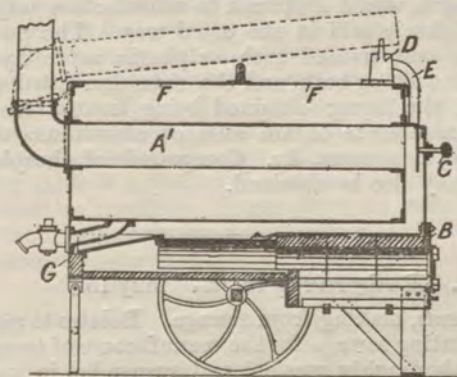
4872. Cottier, D. April 7.

Stone, artificial; statuary; stonework, ornamental.—For the decoration of buildings, statuary, and other articles, the surface is made to appear like that of stone, marble, terra-cotta, or the like by coating it first with a layer of paint, varnish, or other adhesive substance insoluble in water, and then by dusting thereupon by hand, or by any suitable arrangement of apparatus, a layer of powdered sandstone, freestone, brick, terra-cotta, granite, onyx, or marble.

5843. Howe, C. J. April 29.

Cements or plasters.—In making plaster or cement, lumps of raw or calcined gypsum are placed in a suitable receiver, from which the air is then exhausted, and a solution such as that generally used in making Keene's, Parian, or such like cements, is admitted and put under pressure by a force pump. If the gypsum has been previously calcined it is not necessary both to exhaust the air and apply pressure to the liquid, and one of these operations may be dispensed with. For raw or uncalcined gypsum a hot saturated solution is used, in which case the receiver is steam-jacketed to prevent cooling; or the solution may be boiled under pressure by the direct application of heat. The saturated material is removed from the receiver and exposed in a thin layer on a drying-floor to a current of air; or it may be placed in a series of troughs or shallow boxes fitted with removable coverings. It is then calcined in the usual manner and ground.

5959. Healey, B. D. May 3.



Asphalt cauldrons.—The arch over the firegrate is formed of saddle-shaped firebricks, and the flue extending from the firegrate is of cast iron. The door frame B is removable and covers an opening in the front casing through which the arch firebricks may be replaced when necessary. The products of combustion pass along the main flue, then back by the sides of the cauldron, and along the upper flue A', which passes through the centre of the cauldron to the chimney. The back plate is fastened to the angle-iron G by T-bolts, and over a portion of its surface are fastened firebricks. C is a disc-damper for regulating the draught, and D a gas box which communicates with the flue by the pipe E. The covers F, F' are hinged together, and their edges are flanged to prevent rain from dripping into the pan. More than one upper flue may be used. A modification is described in which the products of combustion pass from the main flue directly along the upper flue to the chimney placed over the firegrate. The chimney is hinged and rests upon the gas box as shown, when not in use, but for small sizes it may be telescoped into the upper flue. The cauldron may be constructed upon wheels.

5978. Winterhoff, F. May 3.

Stonework, ornamental.—The surface of marble, granite, &c. is coated with a mixture of asphalt and turpentine or similar material, which can be rendered insoluble by exposure to light. The design or lettering is printed on lithographic transfer paper and transferred to the asphalt. Bronze or other similar powder is then dusted on the sheet and washed off; it adheres only to the inked portions. The whole is then exposed to light, when the uncovered parts become insoluble. The covered parts are washed away, and the plate etched in the ordinary manner.

6128. Craig, G. May 6.

Slags, treatment of.—The slag is first converted into a granulated porous condition by running it, while in the molten state, into a horizontal iron pipe, partly submerged in a trough of water and fitted with an archimedean screw which moves the porous slag as it is formed towards the end of the trough. During the operation a portion of the sulphur in the slag is converted into sulphuretted hydrogen, which is utilized to manufacture sulphur or sulphuric acid in the usual way. The porous slag is now treated with sulphuric acid, hydrochloric acid, or both, and the mass lixiviated with water, the liquor obtained being treated in the usual manner to obtain salts of aluminium, magnesium, manganese, &c. Compounds of phosphoric acid may also be obtained.

6520. Redgrave, G. R. May 15.

Cements, making from sewage. Relates to means for treating sewage for the manufacture of cement. Clay, thoroughly washed and suspended in water, is mixed with the sewage water in the proportion of 16 to 20 grains per gallon, by allowing them to flow along the sewer together for some distance before entering the first depositing-tank placed at the outfall in which a portion of the solid matter is deposited. The sewage water as it flows from the first tank is divided into two portions, one of which is about five or six times the quantity of the other. The larger portion flows along a channel to a second tank, and during its passage is mixed with from 20 to 24 grains of slaked lime per gallon. In the second tank a further deposition of solid matter takes place, and the liquid flows forward to a third tank in which it mixes with the smaller portion from the first tank, to which has been previously added from 6 to 9 grains of lime per gallon. Any excess of lime in the second tank is expended in completing the precipitation of the under-limed portion from the first tank. The sludge obtained from the second and third tanks is manufactured into cement in the usual way. The sludge from the first tank is disposed of in any convenient manner.

6804. Hitchins, R. W. May 20.

Cements or plasters; fireproof coverings and compositions.—Relates to a compound applicable for ordinary plastering, covering boilers, lining safes, &c. The plaster is formed by mixing together about equal quantities of slagwool and plaster of Paris or any cement, by means of a machine which consists of a pair of discs studded with pins and revolving in opposite directions. Beneath the machine is placed a sieve which allows the material which has been sufficiently reduced to pass through. The slagwool may be previously treated in a carding-engine.

7285. Fredureau, J. B. F. May 31.

Refractory substances; fireproof compositions.—Pulverized slate or schistous rock is mixed with potassium or sodium silicates, either taken separately, or combined in convenient but variable proportions according to the nature of the schists, forming a paste in which the silica enters in a greater proportion than in the natural substance. For obtaining the composition in a very pure condition, the pulverized schists are previously washed with acids, whereby they are freed from oxides of iron. The material after a moderate amount of drying acquires sufficient solidity to render it useful without burning, as well as capable of being worked like wood. If, however, after a previous drying the material is submitted to a still higher temperature for a few hours, as from a cherry red to a white heat, it reaches a condition intermediate between the amorphous and crystalline states. It further admits of being tempered in water, oil, or any fatty substance, and in order to improve its insulating and water-resisting properties, it may be impregnated with paraffin, tar, petroleum, benzene, or sulphur. Among other uses it may be applied to the manufacture of bricks and building materials, laboratory furnaces, crucibles, cocks, pipes, vessels for acids, and other chemical apparatus for laboratory use, earthenware, crockery, buttons, artificial pearls, tables, and miscellaneous pieces of fireproof furniture, electric insulators, and moulded articles generally.

7355. Lake, H. H., [Cummings, U.] June 1.

Cements.—The residue left by calcining blocks formed of a mixture of pulverized gypsum and pulverized clay for producing sulphuric acid, is used as a cement.

7361. Lake, H. H., [Cummings, U.] June 1.

Cements.—Consists in the manufacture of hydraulic cement from gypsum and clay, sulphuric acid being obtained as a bye-product. 1266 lbs. of pulverized gypsum and 400 lbs. of dried ground clay are intimately mixed together, and the mixture moulded into blocks by the addition of a little water. These blocks are then

calcined in a kiln, to the top of which is connected a flue communicating with condensing and other chambers. During the calcination sulphuric acid or sulphurous acid and oxygen, or a mixture of these, are expelled and passed through cooling chambers or passages lined with lead, in which the sulphuric acid is condensed and collected. The sulphurous acid is converted into sulphuric acid in the ordinary manner by means of steam and nitric acid.

7492. Brierley, W., [*Wallbrecht, F., and Russe, H.*]. June 4.

Asphalts.—Relates to the production of artificial "elaterite" for road-making, roof surfacing, &c. Naphtha or liquid bitumens are heated to about 250° C. and then again heated under pressure with 10–30 per cent. of vegetable oils, or of the corresponding fatty or sebatic acids, with 10–25 per cent. of sulphur and 8–15 per cent. of saltpetre or other suitable chemical. A powdered asphalt can be obtained by mixing 4–8 per cent. of the above product with 84–92 per cent. of powdered limestone and 4–8 per cent. of pure asphalt.

7674. Mathey, H. June 8.

Cements.—Hydraulic cement is made from a mixture of argillaceous limestone or natural cement rock and clay. The rock is crushed to the required degree of fineness, then analysed to ascertain its exact composition, and the amount of thoroughly dried and crushed alluvial clay necessary for the formation of double silicates is added,

and the mixture fed into a revolving cylinder to be burned. By this process dolomite or magnesian limestone may be made available for the manufacture of cement.

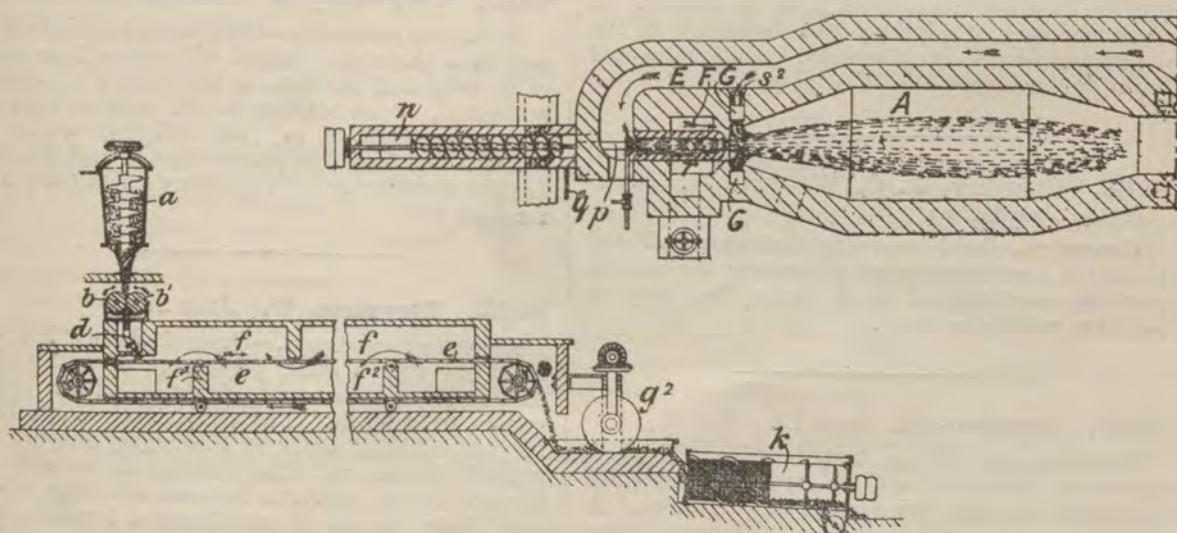
7675. Mathey, H. June 8.

Cements.—Cement is made from a mixture of argillaceous limestone or natural cement rock, crushed clay, and a roasted ore. The rock is crushed to a suitable degree of fineness, then mixed with a certain proportion of crushed clay, and the mixture burned in a revolving furnace, with a diminished amount of oxygen or only just enough to promote combustion. An ore, of iron or other metal, is then roasted in a suitable furnace, to convert the metal into an oxide, and allowed to cool slowly out of contact with the air. This metallic oxide and the product first obtained are then thoroughly mixed by grinding.

7676. Mathey, H. June 8.

Cements, colouring, by the addition of a metallic oxide or burnt clay containing iron oxide. Iron ore is first crushed fine and then roasted in a suitable furnace, in which the admission of air can be easily controlled, to convert the iron into the protoxide. The material is then discharged from the furnace and allowed to cool gradually, out of contact with the air. A suitable proportion of the iron oxide is added to the cement, and the two are mixed by grinding. Some clays are rich enough in iron to give the desired colour when burned and added to the cement.

7888. Stokes, F. W. S. June 12.



Cements.—Relates to drying the slurry or other cement material in strips or layers, grinding the dried material and reducing it to powder, and burning it in suspension in air and depositing the cement in the regenerative furnace. The slurry is well mixed and introduced into the pug-mill *a*, where it is further mixed. It then falls and is forced by the rollers *b, b'* into an iron vessel *d* from which it emerges in several thin strips or a thin sheet and falls on the travelling chain *e* which passes over two chain-wheels.

The slurry is thus carried along the chamber *f, f*, through which the products of combustion are carried up and down through the chain *e, e* to dry the slurry. When it reaches the end of the chamber *f* the dried slurry is deposited in the pan of the mill *g*² to break it up. It is then passed to the sieve *k*, and the material which passes through is moved forward by a helical blade to a trough from which it is lifted by an elevator to a storing-bin. The material in the bin is passed to a hopper which supplies the chamber *n*. This chamber is heated by a small furnace the products of combustion of which pass first under and then along the chamber *n*. The material is thus heated as it is carried along by the screw. At the end the material falls into another hopper, which is supplied with a blast nozzle for compressed air. The material is thus carried forward against a disc, or is divided into two streams which are directed together again so that the material is reduced to a fine powder. The air with the powder in suspension passes along the pipe *p* to the nozzle *r*. The mouth of the pipe *p* is surrounded by a circular jet of hot air which draws hot air from the regenerating-furnace through the flue *E*. Round the nozzle *r* is a space *F* supplied with gas from any suitable gas-producer. Hot air from the flue *E* enters at *s*³ to a ring opening to supply air to the outside of the flame. These jets combine to produce a flame in the combustion chamber *A*, and the powder entering with the air is burnt and issues at the other end with the products of combustion. The products of combustion pass to the regenerative furnace, where the cement is deposited and the air for the flue *E* is heated. Two forms of regenerative furnace are described. In one there are alternate ways for the products of combustion and the air that is to be heated, and an arrangement of tiles for catching the cement powder and separating it. In the other the products of combustion pass along a helical flue round the air-supply tube and the cement is deposited centrifugally through openings in the sides. In another form of apparatus for burning the material there is a blast furnace to the flame of which the powder, suspended in air, is supplied.

8064. Feldmann, A. June 17.

Fireproof compositions.—One or more of the fluorides of sodium, calcium, magnesium, strontium, barium, or aluminium, and one or more of the oxides of calcium, magnesium, barium, strontium, aluminium, or zinc, are reduced to a fine powder, which may be washed if insoluble, then mixed together and water added to produce a dough or paste, which is dried and burnt at such a temperature that its constituents sinter together and form a fireproof material. Articles may be moulded from the dough in any suitable manner and then dried and burnt. To serve as an enamel it is spread on the metal surface to be coated and heated. The quantities of the constituents are varied to suit the purpose to which the product is to be applied. A small quantity of pipeclay may be added to the dough to increase its plasticity. Aluminates and burnt dolomite may also be employed.

8088. Stanley, J. C. W. June 17. Drawings to Specification.

Concretes.—Road sweepings are crushed and treated in a wet separating-apparatus; the heavier portions, consisting of sand, stones, &c., may be used for making concrete.

8120. Lowden, S. June 18.

Cements.—Consists in first forming a highly-aluminous cement termed the "nucleus," to which is afterwards added dried chalk or limestone. A mixture of one part by weight of "Medway" blue clay or equivalent aluminous compound, and five parts of chalk or limestone, is first formed, the

clay and chalk having been previously crushed and washed in the usual way. The compound is then run into settling-tanks, the supernatant water run off, and the deposit removed and dried. It is then transferred into kilns and subjected to a white heat, more fuel being used than usual. The material is then reduced to pieces about the size of a walnut in a stone-crushing machine, when it is fit for transport. The chalk or limestone is subjected to a temperature of about 210° F., and then mixed with the "nucleus" in the proportions by weight of one part to three parts.

8358. Twynam, T. June 24.

Refractory substances.—Chrome iron ore is ground and then thoroughly mixed with about 5 per cent. of its weight of chromate or bichromate of sodium, potassium, or an alkaline earth, such as lime or magnesia, dissolved in just sufficient water to moisten the ore. The plastic mass is used directly for the manufacture of refractory bricks for lining furnaces &c.

8359. Twynam, T. June 24.

Refractory substances.—Ground chrome iron ore is mixed with a small percentage of an alkaline salt, such as the carbonate, hydrate, silicate, manganate, or chloride. The alkaline salt is dissolved in just sufficient water to thoroughly moisten the ground chrome ore. The material may be used for furnace linings, converter bottoms and plugs, bricks and blocks for use in metallurgical furnaces, and for lining moulds for steel and other castings. The mixture may also be used for making tuyères.

8405. Robinson, E. June 25.



Cements.—Slurry is dried in a revolving cylinder A containing a fixed axial tube D provided with nozzles *d* through which hot air is forced, the saturated air escaping through suitable apertures in the ends of the cylinder. The material is agitated during the process by tines or blades *e* carried by arms E fixed to the cylinder and revolving with it, the tines *e* revolving between similar fixed tines carried by arms attached at *e*³ to the tube D. Instead of using the fixed and revolving arms, the material may be enclosed in openwork frames or boxes of a quadrant shape, carried by longitudinal T-irons and forming in sets of four a series of drums, the air being discharged by the nozzles *d* into the spaces between them. In another modification, the cylinder is stationary and the drums are made to revolve by gearing.

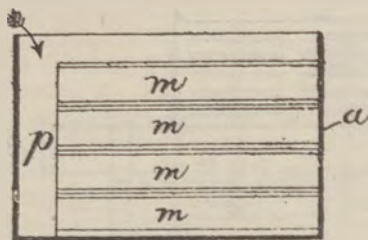
8615. Gill, P. July 1.

Casting soaps. The Figure shows an end elevation of a pair of frames A, each divided into two portions and fixed between an angle-iron C and a wooden bar B carrying rollers D. The outer side A⁴ is fixed, and the inner A² movable; the bottom A¹ is also movable, and the outer end A³ hinged to A⁴ at E and fastened to the side A² at E¹. A horizontal shaft F with a hand-wheel runs along the top of the frames and works two vertical shafts G by bevel gearing. Each shaft carries two screws G², G working links *h*, *h* to close or open the sides A²; the upper screw is of quicker pitch than the lower. The lower ends of the sides A² are made with a bevel edge to lift the bottoms A¹. After closing the frames the soap is run in; when it has cooled slightly the frames are slightly loosened; they open more widely at the top owing to the difference in the pitch of the screws. The whole is then hammered down to render it homogeneous, the frames opened, and the blocks with the bottoms A¹ fall on the rollers D and are easily removed.

9246. Lyle, C., and Lyle, J. July 16.

Casting sugar. During the filling process the moulds are placed in a trough &c. into which the "masse-cuite" is poured. In the form shown in the Figure the moulds *m* are arranged horizontally

in the vessel *a*, a passage *p* being left for the filling mass.



9436. Parker, J. A. July 20.

Asphalts for paving or paving-blocks. Cork is granulated till in a condition resembling sawdust, and with one part of it by weight about six parts of asphalt or other bituminous substance are incorporated while hot.

9536. Clark, E. T. L. July 23. *Amended.*

Castings, statuary, or moulds, hardening and preserving. Plaster of Paris casts and moulds are first immersed in a solution of borax, containing about one pound of borax to each gallon of water. The temperature of the bath is regulated according to the hardness required, and the time of immersion varies from fifteen minutes to two hours according to the thickness of the cast. They are then dried at a temperature ranging from 90° F. to 100° F. The casts &c. may be further treated by immersing them in a bath of pure white wax which is kept in the liquid state by being surrounded by boiling water, the time of immersion varying from fifteen minutes to two hours, according to the porosity and thickness. When cool, they are fit for use, or they may be polished, when quite cold, with soft soap and water applied by means of a sponge or soft brush. Casts &c. treated as above described can be readily washed.

9551. Reid, W. F. July 23.

Cements, hydraulic. "Toadstone," locally known in Derbyshire as "Dunstone," is mixed with lime or limestone in such a proportion that the mixture shall contain when burnt from 55 per cent. to 65 per cent. of lime. The materials may be mixed in fragments and then ground, or pulverized separately and mixed. The pulverized mixture is moistened with sufficient water to render it coherent, and then reduced to pieces of a convenient size for burning. These pieces are then dried and burnt at such a temperature that they clinker, but do not completely fuse. This clinker is then pulverized to form the cement.

10,167. Jeserich, P. Aug. 9.

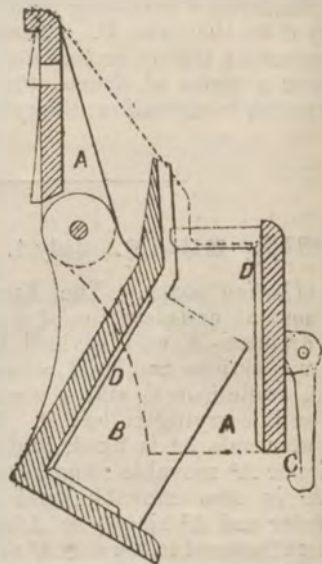
Asphalts.—Tar, or other semi-liquid viscid hydrocarbon having a high boiling point, is heated in an

iron boiler to a temperature from 130° C. to 200° C.; from 5 to 20 per cent. of sulphur is then added in small quantities, which causes the evolution of sulphide of hydrogen and other sulphides. While in a fluid state this composition is mixed in a machine with from 75 to 94 per cent. of pulverized limestone or silicates. The mixture is then transferred to a kiln and dried at a temperature ranging from 120° C. to 150° C., being occasionally turned over by suitable means during the operation. The mixing-apparatus may be heated to act also as a drying-apparatus. The finished material may, if required, be mixed with natural asphalt.

10,829. Dobbs, C. J. Aug. 24.

Casting slags.

Slag paving-blocks are cast double and with a V-groove round them, along which they are broken so that a fractured surface is obtained for exposing to wear. The moulds for casting them, arranged on the periphery of a turntable, are formed in two parts *A*, *B*, hinged together so that they may be separated for the blocks to fall out when set. One of the pieces *A* is fastened to the turntable, and they are held together in a closed position by a catch *C*. The groove is made by the V-fillets *D*, *D* formed on the face of the mould.



10,891. Finlayson, W., [Martin, R. H.] Aug. 26. *Drawings to Specification.*

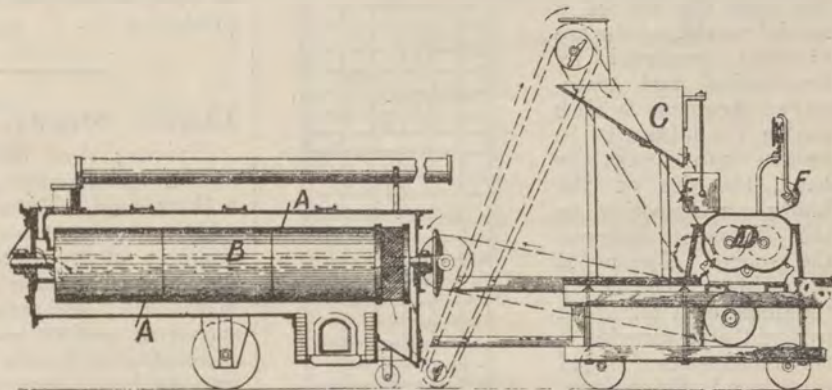
Fireproof coverings.—Preparing asbestos to obtain incombustible sheets for preventing the radiation of heat and for other purposes. The asbestos is passed through a carding-machine and the fleece formed deposited in even layers upon an apron or table, or cooled upon a rotating cylinder, until a sufficient thickness is obtained. A small quantity of water or solution of silicate of soda is added at any convenient stage. The piled sheets are pressed, according to the density required, by means of a roller or other suitable apparatus. Hair, wool, mineral wool, or other fibre and clay, chalk, or infusorial earth may be added to the asbestos fibre. The layers, coiled upon a cylinder, may be cut longitudinally and used for applying to pipes &c. The outer fleece may be saturated with size, to

form a hard exterior, and the sheets coated on either side with paper or other material, which may be arranged to form a flap or cover over the joints.

11,078. Barber, A. L. Aug. 31.

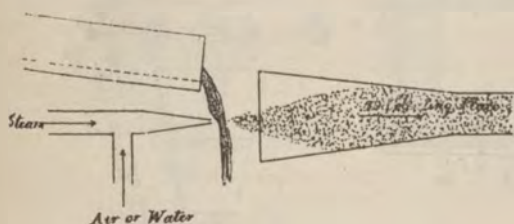
Asphalts; concretes.—

Relates to plant for preparing asphalt concrete for laying pavement, and comprises portable apparatus for heating the sand or pulverized stone, melting the asphalt, and mixing the two together at the point where they are required for use. The sand heater A consists of a rectangular chamber which is provided with a furnace, and within which are a pair of rotary sheet-iron drums B. At one end of the



drums is a feed-hopper, from the lower part of which the material is carried forward by an endless screw upon the drum-shaft. The opposite and larger end of the drum, by which the material passes out, is made in the form of a screen. The heated material is next transferred by an elevator to a hopper C over a mixing-machine D, which may be of any usual construction. Below the hopper is a measuring-vessel E mounted on trunnions so that it may be tilted for discharging its contents into the mixer. Towards one side of the latter is situated the melter (not shown), between which and the mixer is an elevated track, upon which travels a carrier F, also mounted on trunnions, for transferring the asphalt from the one machine to the other. The melter consists of a rectangular chamber with a firebrick-lined furnace having a baffle-plate to prevent the flames from coming into direct contact with the bottom of the melting-tank. The several portions of the plant are all mounted on wheels for portability, and the necessary driving power is furnished by an engine which, being preferably a road engine, may be used to draw them from place to place. A similar arrangement of plant is shown mounted on a boat for transport by water.

11,303. Larsen, E. Sept. 6.



Slags, treatment of; slagwool; cements.—Molten slag is finely divided by treatment with one or more jets of water, steam, or air, separately or combined, or by the action of centrifugal force. When using the first method, the nature of the product (between "slag sand" and "slagwool") can be varied by varying the speed or force, the angles of inclination, and the combination of the jets. Care must be taken that too much water or steam is not used, so that the product may be obtained in a comparatively dry state. The currents of air, water, and steam are produced by means of an injector. When using the second method, the molten slag may be dropped upon a horizontal revolving disc or pan. To form cement, the pulverized slag is dried, reduced to a fine

powder, and then sifted and intimately mixed in a dry state with a suitable quantity of burnt lime.

11,600. Tucker, A. E. Sept. 13.

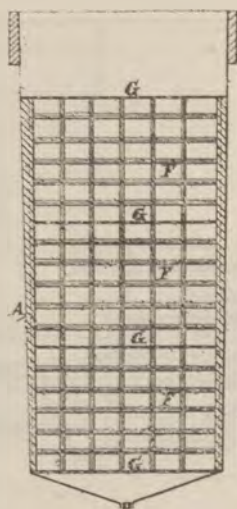
Slags, treatment of.—The slag produced in the Thomas-Gilchrist basic steel process is formed into bricks by casting or compressing, and is employed for lining various parts of copper, lead, iron, steel, and other similar smelting and re-heating metallurgical furnaces, Siemens furnaces, steel converters, &c. Reference is made to Specifications Nos. 7571 and 14,507, A.D. 1885.

11,629. Heaton, C. J. Sept. 13. *Drawings to Specification.*

Cements for cloisonné work employed for decorating buildings, and applicable to vases, jewellery, and furniture. The cement consists of white resin melted with about one-fifth part of beeswax and one-sixth of sulphur. Into this is stirred ground marble dust and the requisite colouring-substances.

11,861. Carre, T. C. A. Sept. 17.

Casting sugar. By the ordinary processes employed in the manufacture of sugar loaves but with the aid of a special mould, tablets are obtained traversed by longitudinal and transverse grooves which enable the tablets to be broken into lumps by hand, the size of the lumps corresponding to the distances between the grooves. The mould A consists of a box having the shape of a truncated pyramid and carrying a horizontal series of ribbed partitions F, the distance between which is equal to the thickness of the tablets to be obtained and is regulated by means of grooved plates arranged upon the sides of the box, and having grooves into which the edges of the partitions slide, pieces of wire gauze G or perforated plates being placed between the various series of partitions, and above and below the same.



12,159. Weygang, C. Sept. 24.

Cements; stone, artificial.—The peat of moorlands is boiled in an alkaline solution and then drained. The solid matter is transferred to a beating-engine, and the pulp obtained is treated to yield substitutes for wood, stone, cement for plastering, &c.

13,278. Straub, C. Oct. 18.

Cements; stone, artificial.—Glue and water are mixed together under a moderate heat to produce a thick fluid. To seven parts of this fluid are added one part of boiled linseed oil and the same quantity of hydrochloric acid or one-third the quantity of sulphuric acid. To form artificial marble &c., one part of this composition is dissolved in twenty parts of water and plaster of Paris added to form a paste, which may be moulded into any desired shape and coloured by any pigment. Variegated marble is formed by means of pieces of paste of different colour. To form a plaster, calcined calcium sulphate and carbonate, together with any colouring-matter, are added to a solution of the composition containing both hydrochloric and sulphuric acid, and the mixture dried. An inferior quality is formed by adding to this plaster a mixture of calcium sulphate and dry washed sand

13,938. Butler, J., and Evans, J. Oct. 30.

FIG. 1.

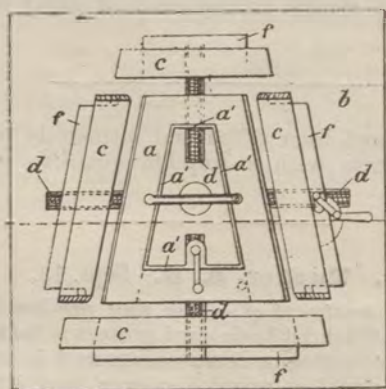


FIG. 2.

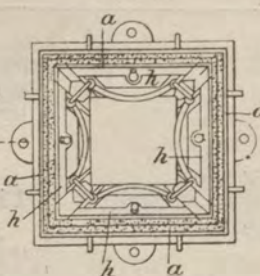
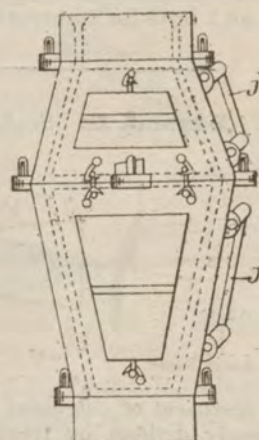


FIG. 3.



Casting, moulds for. Relates to moulds for casting cubical or polyhedral frames. In Fig. 1, a trapezoidal plate *a* with inner flanges *a'* is secured on the table *b*, and the pattern-plates *c* are screwed up to it by the screws *d* and hand-wheel *e*; sand is rammed between the plates *c* and flanges *a'*, the mould being formed by patterns *f*, which are capable of being withdrawn through the plates *c*. A guard-plate *h* is fixed over the top of the sand after it is rammed up. Several of these moulds are fixed into a box, as in Fig. 2, in which four are shown, the last one added being pressed up by cams *j*, Fig. 3. This last Figure shows a mould complete, the dotted lines indicating the shape of the frame. Apparatus for moulding a rectangular frame is described, the plates being hinged together and tied from the centre instead of being packed in a box. Two frames, one larger than the other, may be moulded at the same time by having two patterns in the pattern-plates *c*.

14,294. Oldfield, B., and Oldfield, W.
Nov. 5.

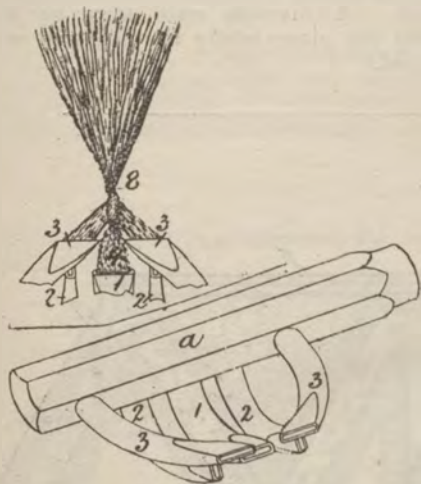
Casting, moulds for. The invention relates chiefly to patterns or moulds for stereotype plates for printing posters, paperhangings, &c. The letters or design are traced upon a sheet of paper, pasteboard, or similar material which is then cut out after the manner of a stencil plate, and pasted upon a backing of paper &c. A plaster &c. cast may be taken from it, and from the plaster cast a sand mould may be made.

14,674. Scott, W., Swan, J. C., Smith, H., Whamond, W., and Gibb, T. Nov. 12.

Cements.—Portland, Roman, or other hydraulic cement is mixed with flints, or flint gravel, or flint sand, and slaked lime, in any suitable apparatus whereby the mixture is reduced to a powder sufficiently fine for 90 per cent. of it to pass through a sieve having 180 meshes per lineal inch.

15,012. Macevoy, H., Holt, H., White, L., and Wilders, W. Nov. 18.

Cements.—The slurry is mixed with coke breeze, or coal dust in a proportion not exceeding 25 lbs. of breeze, or 15 lbs. of coal dust to each 100 lbs. of the finished cement. The mixture is dried on floors or in chambers and loaded into kilns together with hard coke in the ordinary manner. The clinker obtained is then ground in the usual way.

15,154. King, J. T., [Kennedy, H.]. Nov. 22.

Slag wool.—Relates to apparatus for preparing slag wool. Fastened to the pipe *a* are the jet pipes or nozzles 1, 2, 3, which have flattened discharge orifices. The molten slag is allowed to fall vertically between the nozzles 3, 3 and in front of the

nozzle 1, when it is acted upon by the jets of steam or air in such a manner, that a twisting or swirling motion is imparted to it. The jets converge towards the point 8. Two modifications are described, one of which consists of a hollow rectangular frame with openings on one of its faces, and the other of a double conical shell, somewhat like a tuyère, with openings at the end.

15,211. Johnson, J. Y., [Coignet, E.].
Nov. 22. *Drawings to Specification.*

Concretes.—Sand or gravel is mixed, in a special apparatus, with measured quantities of cement and lime. The mixed materials are then transferred to a triturating-mill in which they are sprinkled with water, which may contain calcium chloride.

15,222. Burns, W. Nov. 23. *Drawings to Specification.*

Cements.—The residue obtained in the destructive distillation of sewage sludge mixed with chalk, clay, lime, and coal dust, in retorts under high pressure and low temperature, is calcined to form cement.

15,534. Tucker, A. E., and Harbord, F. W. Nov. 29.

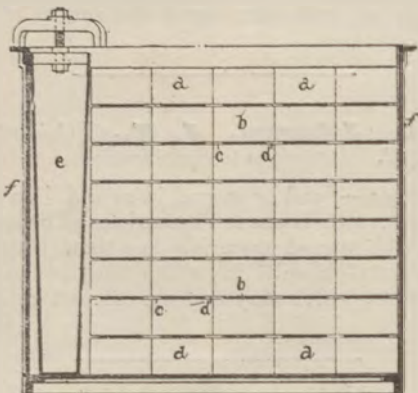
Refractory substances; slags, treatment of.—Relates to the inventions described in Specifications No. 14,507, A.D. 1885, and No. 11,600, A.D. 1886. Basic slag (as obtained in the Thomas-Gilchrist steel process) is ground and pressed into bricks, either alone, or mixed with from 5 to 20 per cent. of wood, paper, vegetable, or other pulp. In certain cases from 10 to 30 per cent. of gas-retort carbon, plumbago, limestone, magnesia, bauxite, chrome iron ore, blast furnace slag, &c. may be added. These mixtures may be compressed in the dry state, or they may be moistened with a little water, or a solution of one of the alkalies or alkaline earths, such as silicate of soda, chloride of calcium, &c., or tar may be used as the binding-material. The bricks may be burned or not. Natural mineral phosphates or mixtures of blast-furnace slag and lime &c. may be substituted for the basic slag. The hearths of the furnaces may be formed by spreading coarsely-broken slag over the bottom and covering this with a layer of finely-ground slag, and then glazing by hard firing.

15,904. Davison, R., and Creed, W. T.
Dec. 4. *Drawings to Specification.*

Cements or mastics for wood-block flooring The composition consists of pitch, resin, tar, fatty matter, resin oil, lime, and red or white lead, or

other cements, boiled with a sufficient quantity of asbestos, cow-hair, or other short fibrous material.

16,016. Scheibler, F. Dec. 7.



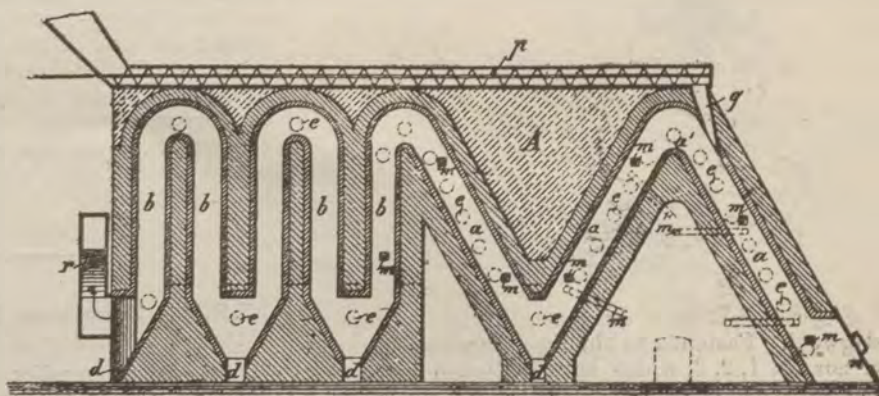
Casting sugar. A number of moulds *a*, in the shape of frames open at top and bottom, are placed in a casing *f* and separated by strips *b* running transversely and leaving small spaces *c* and *d*. The masse-cuite is run into all moulds simultaneously. For removing the blocks one side of the casing may be hinged, or a wedge-piece *e* may be forced in to keep the moulds in place and removed after the operation.

16,039. Hartland, W. H. Dec. 8. *Drawings to Specification.*

Cements, making from sewage &c. In a process for treating sewage, foul waters from manufactories &c., or the like, the liquid passes through settling-tanks and is aerated. It may then be filtered through chalk, which is then ground to a slurry, or it may first be reduced to a clinker by heating in a furnace.

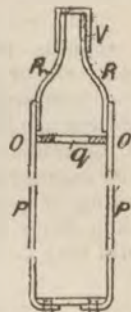
17,098. Sonnet, W. Dec. 30.

Cements. — Consists in apparatus for the continuous manufacture of Portland cement. The raw materials, properly mixed and ground sufficiently fine to pass through a sieve having 900 meshes to the square centimetre, are moved across the top of the kiln *A* by the worm conveyor *p* to the opening *g*. As the mixture descends into the inclined passage *a* it is met by a mixed current of air and other gases



16,827. Vivien, H. Dec. 22.

Casting sugar, starch, glucose, and the like. The mould is U-shaped, having two flat sides *P* with the edges *R* fastened together by a clamp *V*. A frame *q* rests on an inner flange *o* near the top.



16,926. Bronson, E. A. Dec. 24.

Cements.—Relates to plasters for coating and finishing walls &c. Consists of a mixture of 10 parts of plaster of Paris, 4 parts of fine white sand, 2 parts of "Keene's cement," and 5 parts of marble dust, with a varying amount of glue. For covering a wall or ceiling a groundwork of plaster of Paris, sand, whiting, and glue is first applied and allowed to set; it is then faced with a mixture of "dental plaster," sand, glue, marble dust, and "Keene's cement."

17,049. Maruhn, K. W. E. Dec. 29.

Slags, treatment of.—Consists in a process for granulating slag and separating the metal therefrom, to render the further reduction of the slag more easily accomplished. The molten slag is preferably transferred to a trolley or box and allowed to run out in a thin stream, which is divided into grains or granules by the action of a current of air or steam. The granules of slag are carried further forward by the current than the metallic granules, the separation of which is thus effected. A division wall may be arranged between the places where the slag and metal are deposited.

and carried along the passages *a, b* into the zig-zag channel *r*, at the end of which is arranged a fan to produce the blast. The heavier particles are deposited in the channels *d* and withdrawn through suitable openings in the side of the kiln. The lighter particles carried away by the blast are deposited in dust chambers. The channel or passage *a, b* is provided throughout its length with openings *e, e* for watching the burning, removing cement, &c.

17,130. Mack, A. Dec. 31. *Drawings to Specification.*

Fireproof coverings and compositions.—Relates to the manufacture and application of artificial boards, slabs, mouldings, and the like, especially suitable for rendering floors and ceilings sound-proof and fireproof. A layer of reeds is placed in a mould upon a strip of tarred felt or cardboard, and a semi-fluid or plastic material is then poured in upon them. This is composed of ordinary burnt and ground gypsum mixed with water, cork-cuttings, breeze or hair, or any combinations of these. The strip of tarred felt or cardboard may, if desired, be dispensed with. According to the Provisional Specification, the material consists of calcined plaster and pulverized cinders made into a pap-like substance with a solution of alum, copperas, and soluble glass in glue-water; hair and sawdust may be added. This substance is cast in forms and stiffened by canes pressed into it. For fireproofing purposes, thick slabs, formed as above described, are inserted between the floor-joints in place of the usual herring-bone strutting.

A.D. 1887.

156. Wade, F. B. Jan. 5.

Cements.—Relates to the production of paving and like blocks from crushed wood and cement, the cement employed consisting of river sand $6\frac{1}{2}$ parts, boiled tar $2\frac{1}{2}$ parts, and sulphur one part.

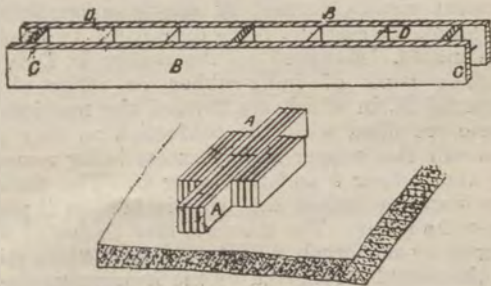
678. Jones, E. W., and Brand, C. Jan. 15.
Drawings to Specification.

Casting slags for paving-blocks. The blocks are cast in moulds carried by a turntable in the usual manner, an inverted V-shaped guide placed over the space between adjacent moulds distributing the molten slag and preventing waste.

857. Ranyard, A. C. Jan. 19.

Casting cements and concretes. Relates to the manufacture of paving &c. blocks with alternate vertical layers of hard and soft materials, so that the edges are exposed and form the wearing

surface. In consequence of the unequal abrasion of the several layers, a rough surface presenting a series of ridges is always ensured. For road-paving blocks, the hard material may consist of

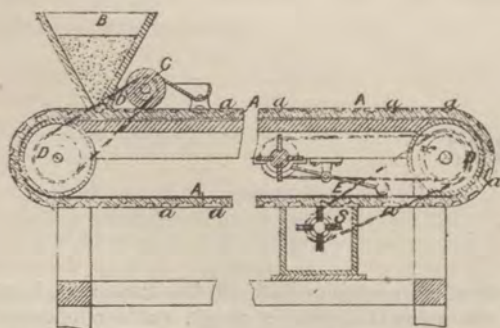


pure Portland cement, and the softer one of Portland cement mixed with three times its weight of sand or clean gravel. The Figure illustrates a mould for casting the blocks, with removable sides B held together by tie-bolts C for casting these in horizontal layers, several blocks being cast end to end, separated by sliding zinc plates D.

979. **Gedge, W. E.**, [Thorrand, J., Nicolet, V., and Bonnet, A.]. Jan. 21.

Cements.—The constituents are dried magnesium chloride with or without inert matters, and magnesia mixed with calcareous or other powder, which remain separate until required for use. The magnesium chloride is dissolved in the smallest possible quantity of water and a certain weight of pulverized calcium carbonate or any other inert absorbent powder is added. The mixture is then kept at a temperature of 110° C. until the appearance of chlorohydric vapours. It is afterwards incorporated with a larger quantity of inert matter. Or the magnesium chloride may be pounded, mixed with inert substances, and passed in small quantities to any grinding-apparatus, and then rapidly sifted to ensure the complete mingling of the substances. The magnesia is mixed with calcareous powder or inert matter in variable quantities according to the purpose for which the cement is to be used. These two powders are mixed together in equal volumes with water, when sand &c. may be added. The cement is applicable for plastering, moulding objects in imitation of stucco, marbles, or mosaics, and for making tiles, or flagging, &c.

1159. **Mewburn, J. C.**, [Coleman, W. E.]. Jan. 25.



Casting confectionery &c. Relates to casting candies, toy confections, and like goods in permanent moulds formed of elastic or semi-elastic material, the castings being discharged by bending the mould. Mounted on the rollers D, D' is the endless band of india-rubber or other elastic material A, in which are formed the matrices *a*; these are filled with the confection as they pass beneath the hopper B, any excess being removed by the scraper *b* and the roller C. The castings are discharged when the band is bent as it passes over the roller. The matrices may be dusted with starch by the brush S. Any casting which sticks to the mould is removed by the hammering-device E. Mats may be used in place of the endless belt A.

1330. **Kammann, F.**, and **Jurschina, F.** Jan. 27.

Stone, artificial, for type &c. Consists in forming type, stereotype moulds and plates, borders, reglets,

and the like by casting or moulding from an artificial stone obtained by moistening finely-ground quartz with an aqueous solution of water-glass. Hydraulic cement may be incorporated with the quartz.

1569. **Snyder, F. H.** Feb. 1. *Drawings to Specification.*

Fireproof compositions; refractory substances.—The carbon from gas retorts is finely powdered and specially treated for purification and separation. Made coherent with tar, asphalt, resin, or india-rubber, it serves generally as a non-conductor of heat. With subsequent moulding and firing it is made into shaft bearings, firebricks, linings for crucibles and safes, coatings of steam boilers, pipes, or cylinders, hot-air furnaces, hot-blast pipes, &c., and filaments for incandescent and pencils for arc electric lights. A more porous material is produced by adding sawdust. Sometimes other non-conductors of heat, such as slagwool and asbestos, are mixed with the powdered carbon.

3027. **Tuteur, E.**, and **Goulborne, W. J.** Feb. 26.

Fireproof compositions.—Waste leather is disintegrated and passed through sieves of various degrees of fineness, and mixed with other materials for producing a variety of useful articles. A hard fireproof substance may be produced by mixing four pounds of the leather flock with a quarter of a pound of Tuteur's belting glue, one pound of asbestos cement, half a pound of asbestos powder, and a quarter of a pound of plaster of Paris.

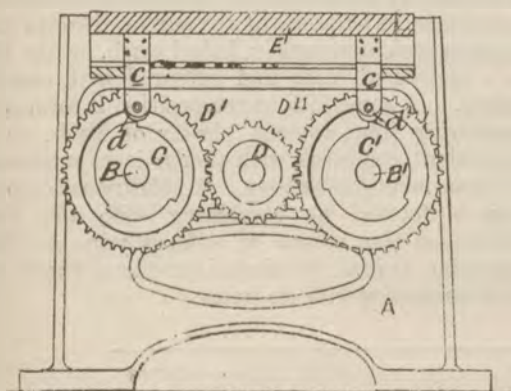
3292. **McMurray, T.** March 4.

Slags, treatment of.—Furnace slag is granulated by running it, while hot, into a mixture of acid and water, and is then intimately mixed with vegetable carbon or charcoal. This mixture, with or without other substances, is used as a disinfectant, filtering-medium, manure, and for deodorizing and filtering the waste liquors from chemical and other public works.

3568. **Girling, G. G.** March 9.

Casting artificial stone. Relates to a machine for imparting a jumping motion to the moulds containing the artificial stone mixture. Mounted between the two end frames A are the shafts B, B', upon which are keyed the spur-wheels D', D'' driven in opposite directions from the driving-shaft through the pinion D. Mounted on the shafts B, B' are also the cams C, C', upon which rest the friction rollers *d*, *d'* carried by the arms *c*, *c'* secured to the underside of the table E. The moulds are placed upon the table E and filled

with a mixture of Portland cement and pulverized Kentish rag, or other suitable materials to form an



artificial stone. When the machine is put into operation a jumping motion is imparted to the moulds.

3880. Bouche, M. March 15.

Statuary.—Consists in applying a composition consisting of fish scales and gelatine, or analogous substances, to the surfaces of various articles and materials to produce an iridescent effect in imitation of mother of pearl. The Specification mentions the application to statuettes. The articles are either dipped into the composition, or the latter is applied by a brush. The coating is dried and covered with a transparent coating of varnish or the like.

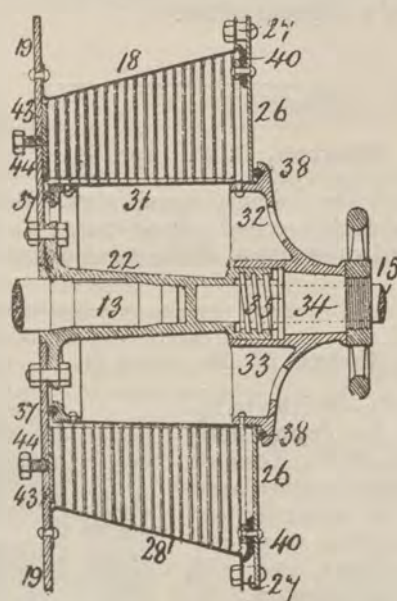
4389. Snelus, G. J. March 23.

Slags, treatment of.—Relates to the treatment of furnace slag, more especially that obtained from the "Siemens-Martin" steel-melting furnaces, to facilitate its utilization. The slag is run in a thin layer upon a cast-iron plate or into a shallow mould mounted upon small brick pillars. When cool, the slab can be readily broken up into small pieces, which may be used for road-metal, or treated in a blast furnace for the recovery of the iron &c. The steel mixed with the slag can also be separated.

4397. Walker, H. W., and Patterson, T. L. March 24.

Casting sugar. The mould employed is of a truncated conical form, and consists of a shell 18 fixed to a plate 19, from the centre of which projects a hollow boss 22 shaped to receive the horizontal rotating shaft 13. The other side of the boss receives the non-rotating shaft 15, by which the mould is kept in place. The wider end

of the shell is attached by shouldered studs 27 to an annular cover 28, in such manner that a space is left round the edge, closed by the rubber ring 40 until the mould is rotating at a high speed. In the



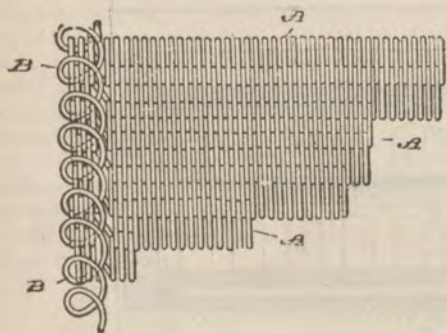
annular portion of the mould a number of steel &c. plates 28 are inserted; they are kept apart by studs or ribs, and leave space for drainage at their edges. An inner shell 31 keeps the plates in place; it is fixed to a cover 32 with a boss 33 which slides on the shaft 15 and carries a bush 34 with a screw 35 engaging with the boss 22. Suitable fluid-tight joints are made by rubber rings 37, 38. When in use the mould is filled with "masse-cuite" while it is rotating slowly, and the opening at the end therefore closed by the ring 40; after crystallizing it is driven at high speed to remove the green syrup and for the liquoring process. Afterwards the cover 32 is removed, and the plates 28 forced out by the plate 43 and screws 44.

4583. Biggs, R. H. W. March 28.

Stone, artificial.—The zinc chloride obtained as a bye-product in the extraction of tin from tin-scrap is mixed with sand or broken glass to form artificial stone.

4689. Preussner, L. March 29.

Stone, artificial; casting.—Relates to a process for producing smooth and bright marble-like or enamel-like objects by mixing in a suitable vessel from 1000 grammes to 1500 grammes of concentrated muriatic acid with 1500 grammes of burnt magnesia. The fluid paste is poured into suitable hard india-rubber moulds in which it is allowed to set.

6882. Emerson, J. E., and Midgley, T.
May 10.

Fireproof coverings.—Helical coils of wire A, A are woven together by screwing one into the other, the edging being formed by longitudinal coils B. The material is then flattened by passing through special rolls, after which it may be coated with or embedded in rubber, canvas, &c. The coils may be kept from spreading laterally by cross rods. The material may be used for fireproof theatre curtains &c.

7243. Knemeyer, L. G. May 18.

Cements; stone, artificial.—Relates to a cement for coating walls, or for moulding columns, cornices, vases, slabs, &c. It consists of a mixture of 4 parts (by measure) of fine ground tufa-stone, 2 parts of Portland cement, and from 1 to 2 parts of ground lime. Moulded work is formed by placing a layer of the cement or artificial stone in the mould, and filling up with mortar or concrete. The cement may be coloured by adding colours dissolved in water. When coating walls for painting upon, the plaster surface, after it is dry, is washed with hydrochloric acid, and after this is dry it is brushed over with a solution of water-glass and sal-ammoniac. The painting, after it is finished, may be brushed over with the same solution.

7292. Barker, W., and Beall, J. May 19.

Casting, compositions for. Relates to the manufacture of sticky rollers for use in feeding sheets to printing and like machines. A suitable roller may be made by boiling together 2 lbs. of glue, 6 lbs. of treacle, and 2 oz. of glycerine. This is poured into a mould containing the roller spindle.

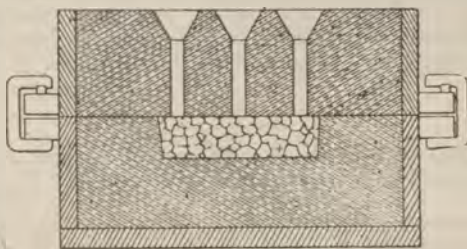
7411. Busch, A. May 21.

Cements.—Cement is prepared from a mixture of blast-furnace slag and calcined magnesia, sometimes with chalk. The slag used should preferably be granulated. Dolomite is preferably used as the source of magnesia; it is calcined at a low temperature (300°–450° C.) so that the carbonate of lime may not be decomposed. The following is a

suitable mixture:—Slag, 2 parts; magnesia, 1 part; and chalk (or limestone), 1 part. The ingredients may be ground separately and then mixed, or mixed and then ground. Other substances, such as are used for improving clay cements, may be added to the mixture.

7539. Smith, A., Robertson, J., and Andrew, J. R. May 25.

Cements.—Consists in using the whole or part of the lime in its burnt unslaked condition. The moist clay is mixed with the unslaked lime, or a mixture of limestone and unslaked lime, and the mixture afterwards finely ground by any suitable apparatus, and formed into lumps or bricks, which are burnt in a kiln in the usual manner. The proportion of unslaked lime is adjusted according to the quantity of water contained by the clay.

7644. Wicks, F. May 26.

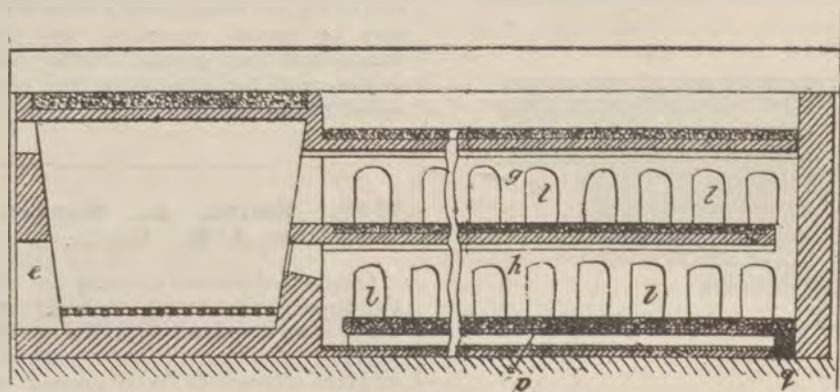
Casting asphalt or slag building or paving blocks composed of fragments of natural or artificial stone, slag, or like materials embedded in a foundation of a material such as asphalt or slag capable of being liquefied or rendered sufficiently plastic by heat. When a material that can be liquefied is used, the pieces of stone or slag are placed in an ordinary foundry-mould of loam or sand, and the molten substance is run in in the usual manner. The Figure shows a section of a mould with the pieces of hard material filling it as described.

7708. Foster, N. R. May 27.

Cements.—Relates to apparatus for drying slurry Kilns and drying-floors are built together, the latter being heated by waste gases. The drying-chambers *g, h* are preferably in pairs, and are divided by a wall with openings *l*. The floors are preferably flat and the roofs formed by flat arches. The top of the kiln and of the drying-chamber may be used as a drying-floor. The waste gases pass through the upper chambers *g*, back through *h*, and thence through flues *p* to the main flue *q*. The chambers may also be used for burning "flare" lime.

(For Drawing see next page.)

7708.



7809. Harrison, G., and Trimming, O.
May 28.

Fireproof compositions for textile fabrics and other inflammable materials. 1 lb. of sulphate of ammonium, 1 lb. of powdered borax, and 1 lb. of potash alum are dissolved in one gallon of water, and to this solution is added one ounce of boracic acid. A paint is prepared by forming a thin paste with common whiting and the above solution, to which is added boiling size and any colour.

8666. Chance, A. M., and Chance, J. F.
June 16. *Drawings to Specification.*

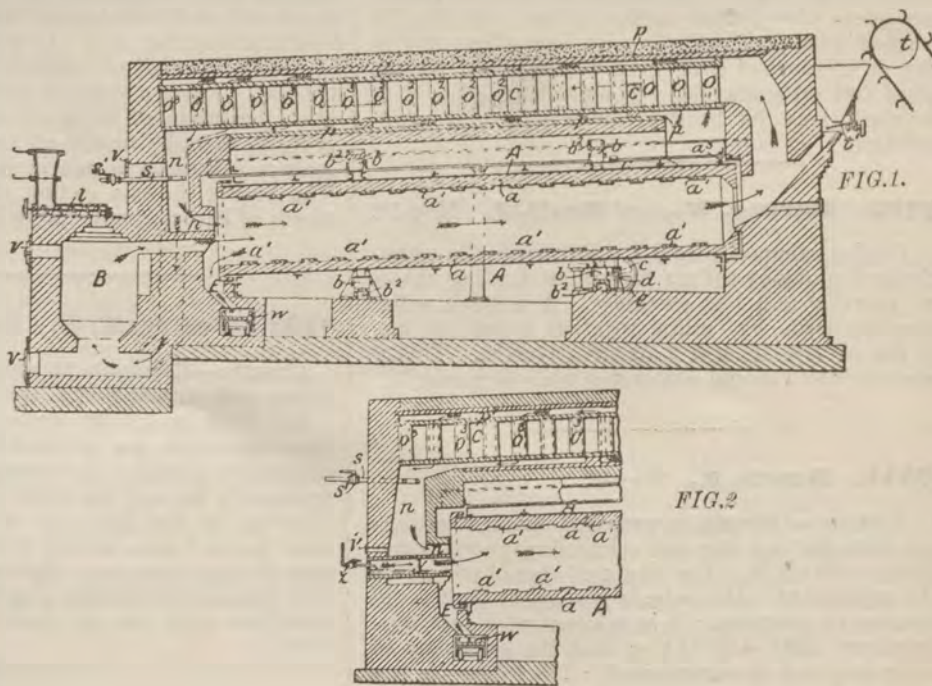
Cements, materials for. The residue, after treating alkali waste with carbonic acid by a special process, is applicable for cements &c.

8939. Crombie, J., and Crombie, J.
June 23.

Casting concrete or cement slabs for paving and flooring. Relates to casting slabs or flags *in situ* so as to be reversible. The bed or foundation having been prepared, a series of moulding-boards are arranged upon the area to be flagged, dividing it according to the number of flags required. Sheets of fabric, such as canvas or cardboard, are then spread upon the bedding, and the concrete is poured into alternate cells. The boards are then removed and the edges of the slabs already cast are coated with plumbago or other non-adhesive material. The remaining slabs are then cast. In places where the slabs have to contend with heat, the joints, before casting in the filling-in slabs, may be packed with slips of cardboard, iron, &c., which are afterwards taken out, thus leaving room for expansion.

9694. Stokes, F. W. S. July 11.

Cements.—Slurry is pressed into slabs or strips of about equal sectional area as described in Specification No. 7888, A.D. 1886, dried, and burnt in a rotary furnace provided with regenerative appliances. Fig. 1 shows one form of apparatus. The rotary cylinder A, lined with refractory material *a*, with ribs or projections *a'*, is mounted on rollers *b* running on rails *b'*, and is driven by worm or other gearing *c, d, e*. Gaseous fuel is



supplied from the producer B and the fragments of dried slurry charged in through a hopper provided with a vibrating plate ¹, the clinker being delivered at E into conveyers W or wagons arranged to receive it. The producer B is provided with a double hopper and a conveyer *l* that the supply of fuel may be constant. The regenerator consists in a flue C, for the products of combustion, with flues *p, p* above and below connected by the pipes *o, o*², *o*³ for the air, which is collected in a hood above the cylinder, enters the regenerator at the hotter end, and is discharged at *n*. The regenerator may be divided, part of the heated air being supplied to the producer at *v*. If the supply is insufficient a steam jet *s, s*¹ or other apparatus may be employed. The conveyer W for the cement passes along a flue, may heat air or the partially-cooled gases from the regenerator, which air or gases can then be employed for drying slurry, or the hot cement clinker may pass along a flue through which the wet slurry also passes. Instead of the conveyer a second rotary cylinder may be employed. The regenerative arrangements may be entirely separate from, or may be at the side of, or underneath, the cylinder. The furnace may be arranged to burn liquid fuel, as shown in Fig. 2. Hydrocarbon or like oil is fed through the pipe *z* into a vessel *y* and there vapourized.

9887. Rust, J. July 14.

Cements, colouring. Sand containing iron, sandstone, or the refuse black sand from iron foundries, is calcined and steam is passed over it while red hot. The brown or red colouring-matter thus obtained may be mixed with cements &c.

10,063. Lake, H. H., [Macario, A.] July 18.

Stonework, ornamental.—Any required design is produced on marble, stone, &c. in relief or intaglio, either pierced through or simply engraved, by means of a sand or other similar blast (such as is employed for cutting glass). The material is first coated over at the parts which are to be acted upon with a layer of a material composed of glue and glycerine in water, to which nitric acid or honey and alcohol are added. To obtain the design of different depths the protecting layer may be put on more thickly at one place than at another, or the material taken away from the action of the blast, and other parts coated or uncoated as required, before again subjecting it to the action of the blast.

10,168. Imray, J., [Moszczensky, A.] July 20.

Refractory substances.—A composition for forming crucibles, pots, bricks, and lumps for furnaces is formed from about 30 parts by weight of fragments of highly-refractory fireclay, 20 parts of pulverized blast-furnace slag, 20 parts of pulverized glass, and 5 parts of crude sulphur, which are mixed together and heated until they assume a pasty condition. About 25 parts of shredded asbestos is added, and the thick paste is run into moulds and baked. The composition may be made more refractory by increasing the proportion of asbestos and reducing the proportion of the other ingredients.

10,206. Bull & Co., H. C., and Bull, H. C. July 21. *Drawings to Specification.*

Slags, treatment of.—Slag in an open-hearth furnace is made thoroughly basic by introducing hot lime from kilns arranged in the vicinity.

10,244. Rigby, J. S. July 22.

Cements.—Waste carbonate of lime obtained in the Leblanc process is treated with carbonic-acid gas to remove sulphur, in the form of sulphuretted hydrogen, and then mixed with aluminous material and treated to form a cement. The gas given off from the kilns &c. may be used as the source of carbonic-acid gas, or a solution of the gas may be employed. The purified carbonate may be washed and filtered previous to mixing with the clay. In the Provisional Specification it is stated that dilute hydrochloric acid may be used alone or together with carbonic-acid gas.

10,385. Larsen, E. July 26.

Cements; slags, treatment of.—Relates to the treatment of slag, lime, and other ingredients for use in making cement. Slag is collected in ladles or vessels mounted on rails and thus transported while in a molten state to a suitable place for the treatment. It is, if necessary, oxidized by blowing air through in a vessel, such as a "Bessemer converter" or crucible, in which the slag is kept fluid. It is then granulated or pulverized. The lime, which may be hydraulic, or a mixture of pure and hydraulic lime, is preferably slaked with water containing gypsum or sulphuric acid, or it may be burnt in presence of sulphur vapours. The same result may be obtained by mixing a little sulphuric acid or a sulphate, such as iron sulphate, with the cement. The lime may be slaked by steam in closed and heated vessels, or, by mixing it with the wet granulated slag, it becomes hydrated while drying the slag. The slag, if porous, should be ground while wet; a portion of the water can then easily run off.

10,443. Tabary, C. P. July 27.

Cements, materials for. A "metallic" cement is formed by burning the following ingredients in about the proportions stated:—Stone of trachytic origin or stone of Lorraine, 75 per cent.; oxide of zinc, 10 per cent.; and magnesia, 15 per cent. The stone should first be immersed in a neutral or acid

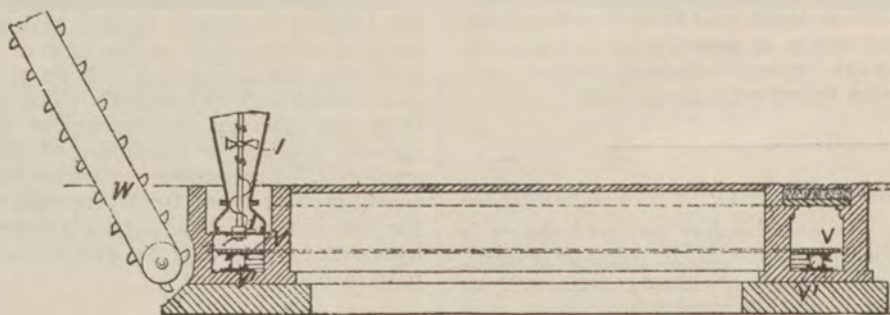
solution of zinc chloride containing also about 8 per cent. each of borax and sal-ammoniac, and then mixed with the other ingredients. The material is applicable for preserving stone.

10,516. Abrahams, M. July 28.

Stone, artificial.—The material is composed of silica, calcium carbonate, sodium sulphate, magnesium carbonate, and alum. The silica is used in the form of specially-pure sand as free as

possible from iron oxide. Sodium carbonate also may be substituted for sodium sulphate. Colouring-matters such as oxides of iridium, iron, manganese, cobalt, platinum, arsenic, antimony, cadmium, or thallium, or cryolite or calcium phosphate may be added. These substances are separately pulverized and sieved, and are consolidated by fusion or by simple pressure. The material is peculiarly adapted for staircase treads and risers, slabs, mosaic and ornamental pavements, friezes, panels, string-courses, facias, &c., as well as for mural and furniture decoration generally.

10,764. Stokes, F. W. S. Aug. 5.



Cements.—Relates to apparatus for drying slurry and subsequently cooling the burnt cement, being improvements upon the invention described in Specifications No. 7888, A.D. 1886, and No. 9694, A.D. 1887. Slurry is discharged through a pug-mill *I* in the form of strips or thin sheets on to a ring platform *V* rotating in an annular chamber or flue, through which are passed hot waste gases from a furnace, or hot air, or other heating or cooling agent. The platform is carried on balls *V*¹ and driven by a chain. A scraper is provided for removing the dried slurry, and also an elevator *W*. The platform may be provided with two or more shelves, in which case burnt cement may be cooled and slurry dried simultaneously, or cement may be cooled by charging it on to the table and passing cold air through the chamber. Slurry may be delivered to the platform from a trough in which a rake is provided for dividing it into strips. Settling chambers in which cement dust is deposited are also made annular and provided with a revolving table, from which the dust is removed by a scraper.

10,898. Keirby, E. Aug. 9.

Cements, materials for. Relates to a composition or cement, and its application for coating and renovating asphalt walks, protecting masonry, &c. A thin paste is formed by adding water to a mixture of 2 parts of sand, 1 part of quicklime, and 1 part of Portland cement. To this paste is added $\frac{1}{2}$ part of copperas, dissolved in water, which thickens it and forms a kind of pulp. In this state the composition is poured on to the asphalt walks and serves to consolidate and render them more durable. The composition may be made very thin by the addition of water, and applied with a brush to masonry &c. The ingredients may be mixed together in the dry state, and water afterwards added.

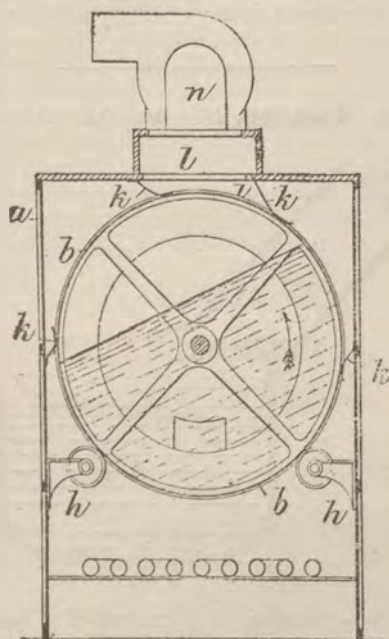
11,154. Howarth, R. Aug. 16.

Cements, drying. Consists of apparatus for drying granular, fibrous, and like materials, such as cement &c. The material is fed into a perforated cylinder *b*, which is rotated slowly by worm gearing

in a chamber *a*, divided into compartments by felt-covered strips of metal *k*. The compartment *i* is connected to an air-trunk *l*, and the heated air or the gases are drawn through the cylinder *b* from the compartment *h* by the fan *n*. Cold air may be admitted by a slide at the bottom.

(For Drawing see next column.)

11,154.

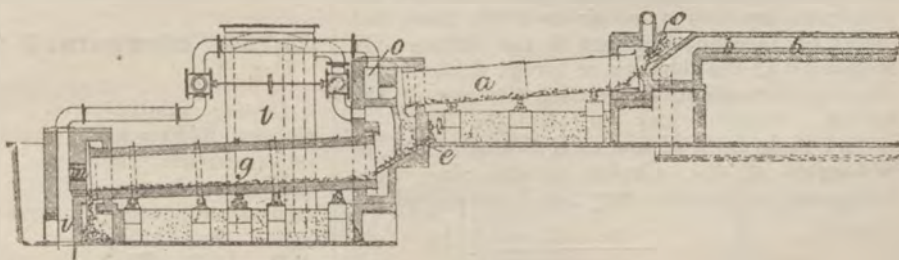


11,274. **Rigby, J. S.** Aug. 18.

Cements.—Lime mud obtained in the Leblanc process is treated to remove sulphur and render it useful as whiting and in the manufacture of cement. For making whiting, the lime is treated with carbonic-acid gas, such as lime kiln gases or a solution thereof, or with a carbonate, such as sodium carbonate in a solution, in a causticizer or similar vessel, then washed, filtered, and dried at a temperature not exceeding 220° F. and ground. The drying-apparatus may be a tower or drying-chamber heated in a suitable manner. For making cement, the lime, after treatment with carbonic-acid gas or carbonate, is washed and filtered, as above, mixed by agitators with clay or other aluminous material, and calcined, preferably in a furnace such as a black-ash furnace.

11,412. **Thwaite, B. H.** Aug. 22.

Cements. — Relates to calcining, heating, and drying slurry &c. The substances receive a preliminary treatment in a rotary furnace heated by the products of combustion from a second rotary furnace in which the substances are completely calcined.



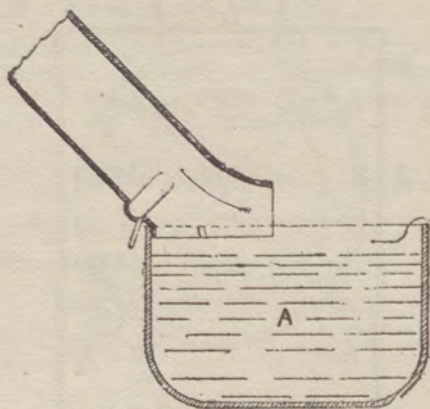
The Figure shows one arrangement. The furnace *a* is heated by products of combustion which have first passed through a regenerator *l*, being supplied through a pipe *o*. The materials under treatment are charged in through the opening *c*, and are discharged into a chamber *e*, whence they are fed by a screw into the second furnace *g*, there to be completely treated. This furnace is supplied with gaseous fuel and heated air, which meet in the chamber *i* and pass into the cylinder through the opening *m*. The regenerators may be of open brickwork, or of the continuous type. The furnace *a* may have an independent supply of gas if the products of combustion are not sufficiently hot. The flues to the chimney may be led beneath a slurry drying-floor *b, b*. In a modified form of apparatus one preliminary heating-furnace is arranged to feed two completing furnaces, and regenerators of a continuous type are arranged beneath these furnaces. The charging-arrangements are also modified, consisting of hoppers with rotary feeds. In further modifications, the furnaces are arranged side by side. The cylinders are driven by worm gearing, are mounted on rollers, and are provided with gas-tight joints. The second treating furnace is lined with refractory material.

11,494. **Lake, H. H.**, [Kayser, A., Williams, H., and Young, A. B.]. Aug. 23. *Drawings to Specification.*

Cements; stone, artificial.—Relates to a method of manufacturing hydrochloric acid, the residual materials being applicable for use in the manufacture of hydraulic lime and artificial stone. Calcium chloride, which is a waste product in several chemical operations, such as the ammonia-soda process, is mixed with silicious material, such as clay or sand, moulded into cakes,

balls, or bricks, and heated to redness in presence of steam. Hydrochloric-acid gas is evolved, and may be condensed in any ordinary manner.

11,805. Banner, S. Aug. 31. *Amended.*



Bitumen.—Consists of a process for hardening gums, resins, balsams, or oleo-resins. In the Provisional Specification the method is stated to be applied to the treatment of bitumen. The material is heated to the required temperature in the vessel A, and hydrate of lime is added in small quantities with constant stirring. The gases evolved are withdrawn by suction, or air or steam blast, but preferably by connecting part of the surface only as shown with the chimney or forced draught and allowing air to be drawn in over the rest of the surface. Sulphur may be employed with, or instead of, hydrate of lime. Hydrates, oxides, or carbonates of the alkaline earths, zinc, iron, manganese, and alumina may also be employed.

12,353. Foster, H. Le M. Sept. 12.
Drawings to Specification.

Refractory substances.—From 15 to 25 per cent. of plumbago is mixed with fireclay or gannister, or both, and the mixture is moulded into stoppers, nozzles, &c. employed in steel-melting plant, and burnt in the usual way.

12,524. Snelus, G. J., Whamond, W., and Gibb, T. Sept. 15.

Cements, materials for. Oxide or silicate of iron, or a mixture of both, is added to hydraulic or like cement or cement-making materials. The oxide used should be one low in oxygen, such as "blue billy" partly reduced, or the scale obtained in working iron, such as "forge scale" &c. The silicate employed is preferably such as tap cinder, or the slags produced in copper smelting.

13,180. Hargreaves, J. Sept. 29.

Cements, materials for. Alkali waste is utilized in the manufacture of cements &c. The lime waste is first treated with carbonic-acid gas to remove sulphur, and the residual lime is mixed with aluminous material, preferably the clay obtained from coal mines, and burnt in the usual manner, the carbon in the waste assisting in the burning.

13,336. Johnson - Johnson, J. E.
Oct. 1.

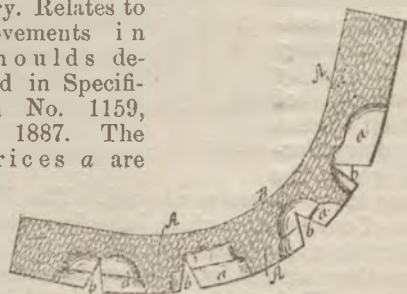
Cements, materials for making. For lining with firebrick the vessels used for distilling acetic acid, a special cement is employed consisting of pure powdered silica mixed with a solution of sodium silicate.

13,534. Hutchinson, T. C. Oct. 6.

Slags, treatment of; cements.—Slag as it issues from a blast furnace is passed into a shallow vessel containing water, and as it rises to the surface again is removed in a spongy condition while still hot by a suitable shovel or other means. It is dried immediately, either by ordinary means, or by exposing to highly-heated air in a drying-kiln.

13,754. Mewburn, J. C., [Coleman, W. E.].
Oct. 11.

Casting confectionery. Relates to improvements in the moulds described in Specification No. 1159, A.D. 1887. The matrices *a* are



formed in the elastic sheet A, their sides being split transversely as at *b* to facilitate the discharge of the castings when the sheet A is bent, as shown in the Figure. The back of the mould B may be elastic, and the matrices *a* may be either elastic or hard and rigid.

13,902. Punshon, R. Oct. 13.

Asphalts.—An aggregating material consisting of a mixture of asphalt, bitumen, resin, and oil, is mixed with finely-granulated refractory material in a cauldron and ladled into moulds to form building or paving blocks, and roofing sheets or tiles, or it may be poured on to the roadway and levelled with scrapers. Any of the following substances

may be used, viz.: granite, granulite, syenite, elvans, greenstone, tinstone, sandstone, freestone, trap, marble, limestone, iron slag, coke, burnt clay, slate, spar, quartz, bitumen, asphalt, ozokerit, resin, and oil.

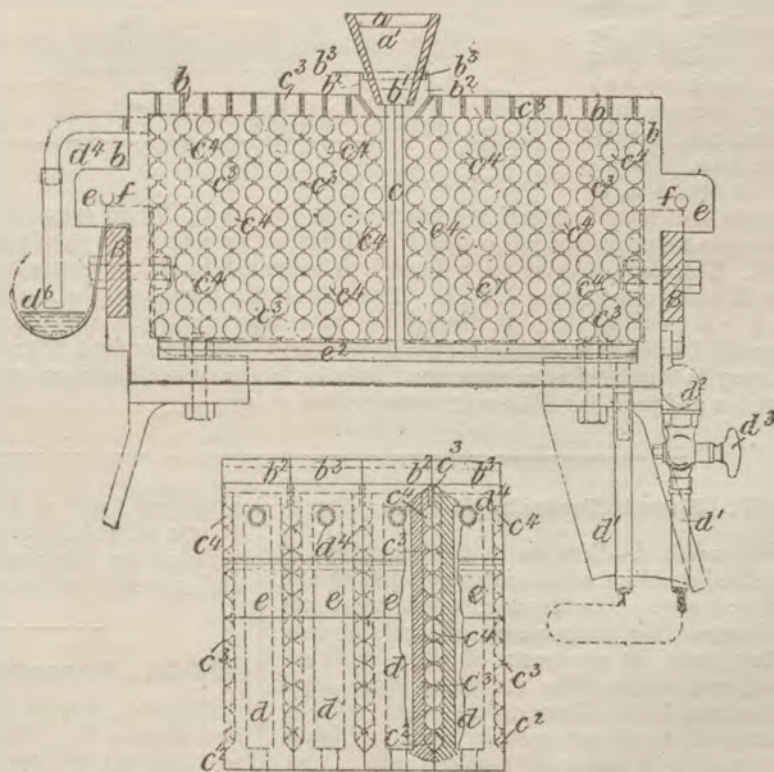
13,971. Davenport, J. Oct. 14.

Refractory substances.—Consists in mixing sulphate of baryta with silica and alumina, for the

manufacture of firebricks, furnace and cupola linings, retorts, crucibles, muffles, tiles, fireproof safes, &c. For the production of the compound, a sand found in the limestone districts of Derbyshire and Staffordshire, and called gannister sand, and which contains about 80 per cent. of silica and about 9 per cent. of alumina, is employed. To this sand is added about 10 per cent. of powdered sulphate of baryta, and the whole is thoroughly mixed by means of any suitable machinery, and then moulded into the shape required.

14,085. Fenner, H. J., and Fenner, G. H. Oct. 17.

Casting naphthalene into forms suitable for use in illumination. The naphthalene is moulded into balls, more or less spherical in form. The apparatus employed is made up of a series of moulds *b*, each having the matrices of a number of half balls *c*⁴ on one or both faces. The latter are connected, preferably in vertical rows, by angular channels *c*³ which communicate with the main horizontal and vertical distributing-channels *c*², *c*. The main channels are also of angular section and are supplied with the molten naphthalene from a channel *b*¹, running the length of the moulds, into which fits a funnel *a*. The sides *b*² of the channel *b*¹ are provided with a lip *b*³ to catch



any overflow, and the funnel *a* is strengthened by cross ribs *a*¹. Each mould section is kept cool by circulating water or other refrigerating-agent through an internal space *d*. The cooling-liquid is supplied from a main *d*² through tubes *d*¹, the supply being regulated by taps *d*³, and the overflow is carried off into a channel *d*⁴ by tubes *d*¹. The moulds are fitted into a frame with side bars *B* which serve as rails upon which the lugs *e* slide, and are tightly clamped together by a screw. Each of the lugs *e* has a pin *f* which fits into a corresponding recess in the adjacent mould.

14,394. Snelus, G. J., Whamond, W., and Gibb, T. Oct. 22.

Cements; slags, treatment of.—A mixture of blast-furnace slag and quicklime is employed for making hydraulic cements. The slag is granulated by being brought while molten in contact with water, a portion of the water being afterwards removed by mechanical means. Lime, not exceeding 52 per cent., is added and the mixture is ground in any suitable apparatus.

14,543. Tepper, E. Oct. 25.

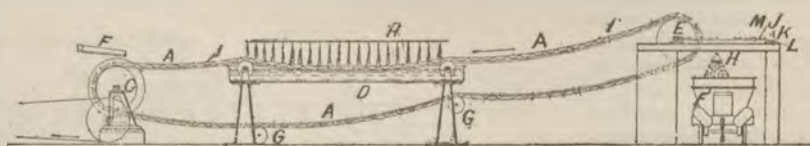
Fireproof compositions for theatre scenery. The composition consists of 78 parts of white cheese (curds), 8 of slaked lime, $5\frac{1}{2}$ of phenol, and $8\frac{1}{2}$ of alum.

14,750. Lloyd, W. Oct. 29.

Refractory substances.—Puddling, heating, mill, ball, reheating, annealing, and other furnaces used in the manufacture of iron and steel are fettled, or lined, with limestone, or quicklime, or calcareous compounds which, on being heated to redness, produce quicklime. These materials may be used alone or mixed with ordinary fettling.

14,803. Hawdon, W. Oct. 31.

Casting slag. Relates to apparatus for removing molten slag, scoria, and other similar materials from furnaces, and for cooling the same. Endless bands or chains A, to



which are fixed mould plates I, are mounted on pulleys C, E and supported by rollers G. The chains dip into the water reservoir D, which is provided with a continuous supply of water from the perforated pipe H. The shaft carrying the pulleys E is mounted in sliding bearings, adjustable by means of the screws M and worm gearing J, K, L. The molten slag is run into the moulds I from the spout F, and is carried by the endless chains A through the water reservoir D and over the pulleys E, when it falls from the moulds I into the receptacle F', which is supplied with water from the rose H. The endless chains or bands may be formed of wire ropes, or of links, or in any suitable manner, and the moulds may be formed in sections and provided with overhanging edges or lips.

14,897. Krystoffovitch, P. von. Nov. 1.

Stone, artificial.—Consists in the formation of an artificial granite from a mixture of fireclay and baked red clay. The fireclay, which must not contain more than 1.5 per cent. of oxide of iron and less than 50 per cent. of silica, is dried, ground, and sifted. The red clay, which must contain from 13 to 17 per cent. of oxide of iron, and from 45 to 55 per cent. of silica, is formed into a paste with water and moulded into blocks, which are well dried and baked, being afterwards reduced to powder by grinding and sifting. The two pulverized materials are now mixed together in the dry state, in the proportion of about 2 parts of fireclay to one part of baked red clay, and the mixture is formed into a paste with water. This paste after being partially dried is moulded into blocks &c. under considerable pressure, and these are burnt in a kiln at a temperature of from 1000° to 1200° C.

15,008. Brandt, W. Nov. 3.

Fireproof compositions.—The principal component of the compositions for rendering articles or things fireproof is soluble glass or common salt. A composition may be formed of 12 parts of common salt, 2 parts of bicarbonate of soda, 2 parts of burned alum, 1 part of borax, 30 parts of soluble

glass, and 1 part of tungstate of soda. The bicarbonate of soda, burned alum, and borax may be replaced by other substances having fire resisting and extinguishing properties.

15,065. Ransome, F. Nov. 4.

Cements.—Relates to the invention described in Specification No. 5442, A.D. 1885, in which cement material, in a fine dry powder, is passed through a rotary furnace. According to the present invention the temperature is raised to such a degree that the powder will cohere and pass out in lumps, which are afterwards ground.

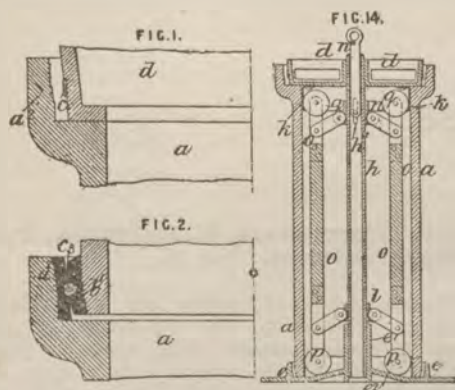
15,382. McLea, K., and Punshon, R. Nov. 10.

Fireproof compositions.—Relates to compositions for preserving timber, linen, cotton, flax, and other similar fabrics, and for rendering them non-inflammable. The timber or fabric to be protected is steeped in a solution of calcium chloride and ammonium phosphate.

15,520. Stanford, W. H. C. Nov. 12.

Casting cements. Relates to the invention described in Specification No. 4039, A.D. 1873, and

consists in casting cement round the spigots and sockets of pipes and embedding elastic rings therein. Referring to Fig. 1, a is the pipe with socket a^2 , into which is introduced a core d , round which is



an elastic ring c . Cementing-material is introduced into the space between the socket and the core. After setting the core is withdrawn, leaving the ring embedded in the cement. The spigot end is covered with cement in a similar way, the elastic ring being placed either on the spigot or in the socket. A split or elastic ring may be used to keep the packing-ring in place while embedding it in the cement. One form of the joint is shown in Fig. 2. The spigot end has a cement covering b^1 , the outer surface of which is a spherical zone, the largest diameter of which is situated opposite the packing-ring c . The mould for casting is of corresponding shape and is made in one piece, the shrinkage due to the setting of the cement allowing the pipe to be removed from the mould. Fig. 14 shows a device for centering the pipes in the moulds. The socket mould e has inclines e^2 and a central socket e^1 . A hollow mandrel h having a fixed collar l and a loose collar n fits in the socket. The rods o, o are linked to the collars and carry rollers p, q which bear against expansible rings k , which enter the pipe. The upper ring carries the upper mould. The collar n is moved by a handle n^o which engages with pins projecting through a slot h^o in the mandrel. Other equivalent centering-devices may be employed.

15,666. Layton, G. M. R. Nov. 15.



Cements.—The heat of hot clinker is utilized for

drying slurry. The clinker is charged into trolleys or conveyers, and pushed into chambers A, B covered with iron or brick tiles, upon which the slurry is poured or laid. The chambers are of any desired length, and are provided with dampers and turntables at each end.

16,349. Spiess, A. Nov. 28.

Casting building blocks and mouldings. Blocks and mouldings for building purposes are cast from furnace slag in iron moulds, internally coated with a layer of loam or clay to prevent adhesion.

16,355. Johnson, J. Y., [Aubriot, M.]. Nov. 28.

Stonework, ornamental.—In ornamenting stone by enamelling cloisonné designs, the designs, instead of being traced by hand, are impressed on the surface by a rubber stamp or roller moulded to the required form, and pressed on a pad charged with oily flux. The spaces are then filled up with colours or powders mixed with water; or the stamp may be in water and the colours in oil.

16,510. Oldfield, B., and Oldfield, W. Dec. 1.

Stone, imitation; stonework, ornamental.—Relates to a process of imitating marble or grained inlaid woods on wood, marble, or other suitable material, consisting in graining the whole surface with distemper colour in imitation of the wood &c. (having previously varnished the surface to render it non-absorbent) and then producing the required design thereon, either by means of a transfer process or by printing. The ink employed for this purpose must be one which is soluble in spirit. The colour is then washed off from the parts not covered with the ink, and the process repeated as often as desired to obtain as many different kinds of wood or marble as required. Finally the ink is removed by alcohol, leaving the different colours, which are then varnished over and the surface polished.

17,814. Quarante, P. L., and Escalonne, C. E. d' (Veuve) née Le Revert. Dec. 27.

Fireproof compositions.—Wood or other vegetable material is preserved and rendered unflammable by injecting the preservative product in a closed chamber or by immersing in the preservative solution, the latter method being employed for preserving canvas, tilts, awnings, cables, cordage, &c. The composition employed preferably contains acetate of alumina or soda, sub-acetate of lead, pyrolignite of lead, and glycerine. The acetates and pyrolignites of lime and baryta and the borate of soda may also be used.

A.D. 1888.

487. Orr, A. Jan. 12.

Stone, artificial.—Nitro-cellulose is dissolved in chloracetate of chloramyl diluted with a little fusel oil. By mixing with suitable colouring-matters, and sometimes castor oil or camphor, a hard artificial malachite is produced.

607. Rave, C. Jan. 14.

Asphalts.—Relates to the treatment of the acid residuums or tars resulting from the refining of mineral oils by concentrated acids. The bitumen obtained is mixed with burnt pyrites and used in the manufacture of asphalt.

667. Mackay, M. Jan. 16.

Cements, fusible. A mixture of the following substances is heated :—Sulphur (about 3 parts), manganese or aluminic silicate such as steatite (1 part), and asbestos (2 parts). Suitable colouring-matter may be added. When a softer material is required a part of the sulphur is omitted and tar, pitch, resin, or other suitable material added. The material may be used as a paint by adding hot turpentine, resin, and sulphur. The cement is stated to be applicable as an electric insulator, for coating pipes or joints, and as a substitute for metals for casting.

1294. Cliffe, J. Jan. 28.

Asphalts.—A fibrous asphalt composition for rendering concrete roofs, railway arches, walls, &c. waterproof consists of Limmer rock asphalt, bitumen, sand, limestone, creosote oil, varnish, tar, and cowhair, cotton, and fibre waste in about equal proportions. Sacking cloth is embedded in the composition. In applying this composition to walls the surface is first thoroughly dried, and the composition is softened by heating and then applied to the surface; sacking cloth is laid on and pressed, another layer of composition is applied; then a layer of sacking cloth, and so on, completing with a layer of the composition.

1371. Hargreaves, J., Robinson, T., and Hargreaves, J. Jan. 30.

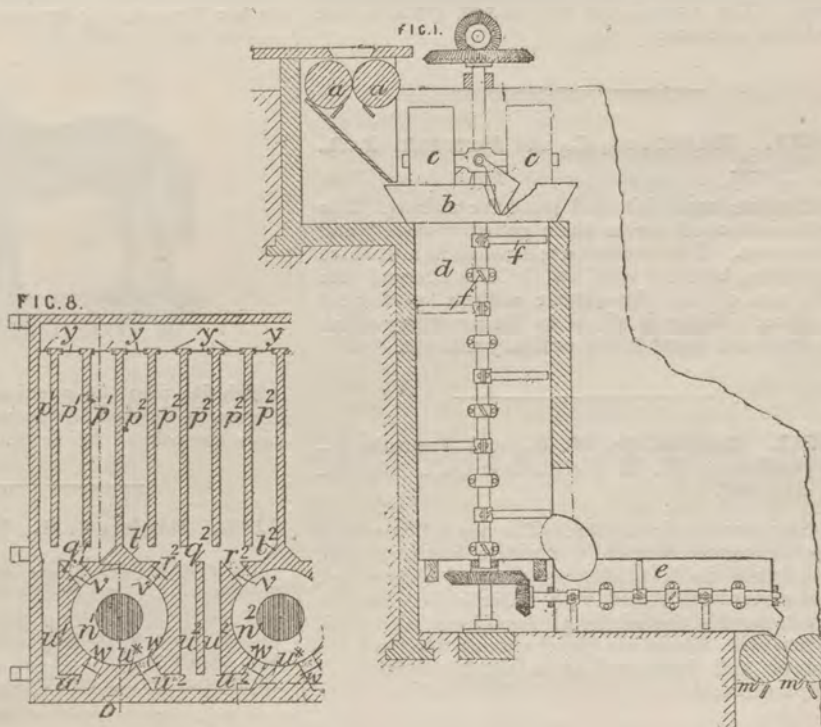
Cements, special processes and materials for making. Relates to the utilization of alkali waste to form cements. The waste is treated with calcium chloride, whereby the sodium salts are rendered soluble and may be washed away. The residual waste is mixed with clay, moulded into bricks, and then decomposed with superheated steam in a series of chambers. Sulphuretted hydrogen passes off, and may be employed for any purpose, while the remaining mass is further heated to form cement. The treatment is modified for waste which has been oxidized by exposure, as follows :—The soluble sodium salts are removed by washing, and the residue mixed with clay and reduced by heating with carbonaceous material or by passing reducing-gases previous to or at the same time as passing the superheated steam. Or fresh alkali waste may be treated with carbonic acid in a chamber or series of chambers having shelves upon which the waste may be continually stirred by mechanical means, and so arranged that the gases pass in the reverse direction to the waste. By this means sulphuretted hydrogen is evolved. The carbonated waste is washed, and the residue mixed with clay and heated with superheated steam to above 1500° F., whereby carbonic acid suitable for use in carbonating in a fresh operation is evolved. The residue is then roasted to form cement in a revolving furnace.

1549. Guy, J. P. Feb. 2.

Refractory substances.—Consists of a mixture of alumina and asbestos with or without lime, silica, gannister, burnt clay, and other substances, and is specially applicable for making gas retorts, and saggars for use in burning pottery, and also for lining furnaces, kilns, ovens, &c. A highly-aluminous asbestos found in Natal is preferably employed. A mixture of this aluminous asbestos and fireclay is used for making saggars. A composition for forming more refractory saggars is made by pulverizing the old saggars made as above described and mixing the powder with fireclay.

1978. Joy, W. Feb. 9.

Cements.—Relates to the preparation of materials for making slurry, and to methods of burning and drying slurry. In forming slurry, chalk is supplied to a mill through crushing-rolls *a, a*, Fig. 1, and is mixed with clay in the pan *b* by the action of the edge-runners *c*. The pan is perforated to form a grid through which the ground material falls into a chamber *d* in which it is further mixed by the revolving arms *f*. The material passes into a second chamber *e* in which it is further mixed, and is discharged between rolls *m, m* into a receptacle. Water may be added as required. Slurry is dried on



floors beneath which the gases from the kilns pass. Fig. 8 shows a horizontal section of part of the structure, taken below the floors. The gases from the kilns *n¹, n²* are led through flues *p¹, p²* beneath the floors to a flue *o* leading to the chimney. Each kiln is in communication with two drying-floors, and each drying-floor (excepting the end ones) with two kilns. The heating of the floors is regulated by adjusting the dampers *v, w, y*. In starting the kiln, a layer of faggots is placed on the grate, above this a layer of coke, and then a layer of mixed slurry and fuel, or other suitable arrangements may be adopted. The faggots are now lighted and slurry alone, and slurry mixed with fuel, are charged in alternately upon those spots which become red hot until the kiln is fully charged. The slurry may be wet or partly dried.

1980. Heys, M. H. Feb. 9.

Cements.—The raw material, consisting principally of chalk, calcareous, argillaceous, or magnesian limestone, or dried cement slurry, is calcined in a kiln of usual construction provided with a damper at the eye of the kiln to regulate the admission of air. The kiln is fired from above after being charged as follows:—The raw material is placed between alternate layers of fuel which are connected together by columns of small coal to carry the fire downwards from one layer to the next. When the fire has burnt to the bottom all further admission of air through the eye of the kiln is stopped, and after the charge has cooled sufficiently it is withdrawn in the usual manner. The calcined product may be pulverized and used as ordinary plaster or cement, or it may be coarsely ground, partially slaked, and then sifted to remove the slaked portion. The unslaked portion

is ground and employed as a cement, and the slaked portion is mixed with silicious materials and again calcined.

2366. Snelus, G. J., Swan, J. C., and Smith, H. Feb. 16.

Cements.—Blast-furnace slag is pulverized, mixed with lime, and the mixture burnt. The lime should be slaked except when the slag contains sufficient water. Suitable proportions are two parts of lime to five of slag.

2619. Hughes, O. Feb. 22.

Cements.—Broken slate and slate waste is used as a substitute for clays used in the manufacture

of cement. The following are suitable proportions :—Lime 69-58 per cent. and slate 45-33 per cent. The ingredients are mixed, ground, and calcined as usual.

2632. Robertson, J., and Patrick, J. A.
Feb. 22.

Cements, materials and plant for making. The materials used are a shale called "blaes" and limestone. The limestone is crushed in a machine and then, together with the shale, is charged into the pan of an edge-runner with a perforated bottom. Water is added to form a slurry which is dried and burnt in the ordinary manner.

2641. Constable, W. E., and Joseph, J.,
[trading as W. E. Constable & Co.]. Feb. 22.
Amended.

Stone, artificial; casting.—The ingredients used are limestone, cement, and dilute sulphuric acid. Limestone rock, preferably that of Derbyshire, and cement are mixed with water and allowed to set in moulds, preferably of wood lined with steel. When the blocks are hard enough they are removed and immersed in a dilute solution of sulphuric acid.

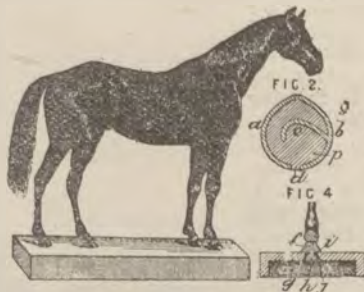
2803. Brunton, J., and Griffiths, L.
Feb. 24.

Stone, artificial.—The stone is made from a mixture of crushed granite, slag, limestone or similar material which will furnish lime, or lime and alumina, an alkaline silicate and carbonate, an acid (nitric or sulphuric), cement or cement-making materials, and colouring-matters. Sulphate of lime may be added to render it fireproof. The alkaline carbonates should be added separately as solutions. The materials are placed in moulds, and, when hard, can be further hardened by immersion in a solution of an alkaline silicate. The stone may be coloured by impregnating it with metallic salts and adding a precipitant, or by exposing it to sulphuretted hydrogen, or by similar means, and it may be strengthened by embedding in it metal bars.

3077. Lake, H. H., [Simonds, W. E.].
Feb. 29.

Statuary.—Relates to the production of metallic representations of horses and other objects. Two longitudinal halves *a*, *b*, Fig. 2, formed of metal and provided with curved projections or prongs *c*, are placed together in their proper position, and the interior is filled, through the opening *d*, with plaster of Paris or similar medium *p* which, after

setting, holds the two parts together by means of the projections *c*. The feet *f*, Fig. 4, are secured to the base-plate *g* by surrounding the button *h*



which fits into the opening *i* with solder *j*. The Figure is finished by lacquering, gilding, plating, or in any other suitable manner.

3148. Rigby, J. S. March 1.

Cements, materials for. Lime-mud from the ammonia-soda process is exposed to carbonic-acid gas and thoroughly washed to remove chloride, then mixed with a silicate, such as sodium silicate, and again washed. The product is mixed with aluminous matter and treated in the usual way.

3752. Imray, O., [Lee, G. S.]. March 10.

Fireproof compositions.—Consists in using what is termed "iron slag," which is obtained from gold and silver reduction works, in the manufacture of fireproof compositions. The slag is chiefly composed of oxide of iron, silica, lime, and alumina. It is reduced to a fine powder and mixed with 5 per cent. of talc, 5 per cent. of fireclay (from the Coal Measures), and 2 to 3 per cent. of lime.

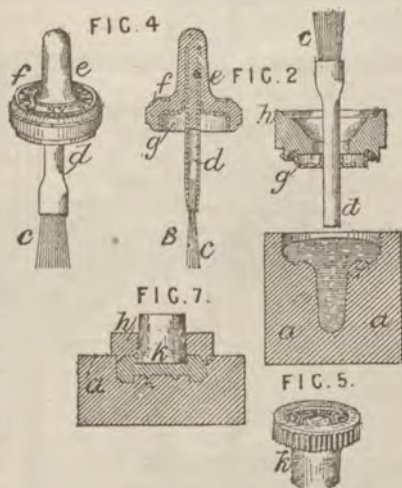
4281. Beasley, J., and Wood, A. J.
March 20.

Refractory substances.—Relates to the lining or fettling of puddling or other furnaces used in the manufacture of iron and steel. The furnaces are fettled or lined with blast-furnace slag mixed with purple ore or other substances now employed. The slag is used in small lumps, or is ground or pulverized. The slag may also be added to the charge.

4401. Higgins, C. M. March 22.

Casting cements. Relates to apparatus for casting resinous or fusible cement specially applicable for making bottle caps and stoppers, bottle brushes,

and other small articles, and to the particular composition employed. The moulds employed are formed of large blocks of metal, preferably brass, or of any good heat conducting or absorbing



material so that they will not become heated, and the molten composition will soon solidify. In some cases metallic shells filled with water or other heat-absorbing liquid may be employed. A series of moulds are arranged so as to be used successively and in rotation, a sufficient number being employed to allow each one to cool before being refilled. In some cases the moulds may be plated with gold, platinum, or other similar metal. A suitable composition for casting may be formed from equal weights of common resin and powdered silica, with or without any pigment or colouring-matter, or sulphur combined with powdered silica may be employed. With the latter composition the moulds are liable to corrode, in which case they may be plated with gold, platinum, or other similar metal. Fig. 2 shows a suitable form of mould for casting the caps or handles for bottle brushes, and Fig. 4 shows two views of the finished brush. The mould is formed of the bottom block *a* and the cap *h*. The tin stem *d* carrying the bristles *c* and flange *g* is fixed to the cap *h*, the molten composition is then poured into the bottom part of the mould *a* and the two parts are brought together, which forms the cap and causes the molten composition to adhere to the stem *d*. Fig. 7 shows a suitable form of mould for casting bottle stoppers as illustrated in Fig. 5. In this case the cap of the mould *h* may be dispensed with or the cork *k* may be made tubular to serve as the pouring-opening for the molten composition. Any ornamental or proprietary mark or advertisement may be formed around the top of the bottle stopper.

4403. Higgins, C. M. March 22. *Drawings to Specification.*

Casting cements. Moulds for casting resinous or fusible cements are formed of thick metal so as

to cool the composition rapidly and thus prevent its adherence to the walls of the mould.

4405. Higgins, C. M. March 22. *Drawings to Specification.*

Casting cements. Moulds for casting resinous or fusible cements are formed of thick metal so as to cool the composition rapidly and thus prevent its adherence to the walls of the mould.

4617. Spence, F. M., and Spence, D. D. March 26. *Drawings to Specification.*

Fireproof coverings and compositions.—A mixture of alum and an anti-tumefaction material such as sawdust is formed and compressed into cakes for lining fire-resisting safes, boxes, chests, chambers, doors, and floors. A solution of alum is evaporated until its boiling point has been raised to about 106° C., when it is mixed in a steam-jacketed pan with the sawdust &c. This mixture is then placed in divided moulds and compressed into cakes in a hydraulic or other press. The cakes may be moulded or cut to any required form for fitting into the jackets of different shaped safes &c. Ammonia-alum or potash-alum, or a mixture of the two, is employed.

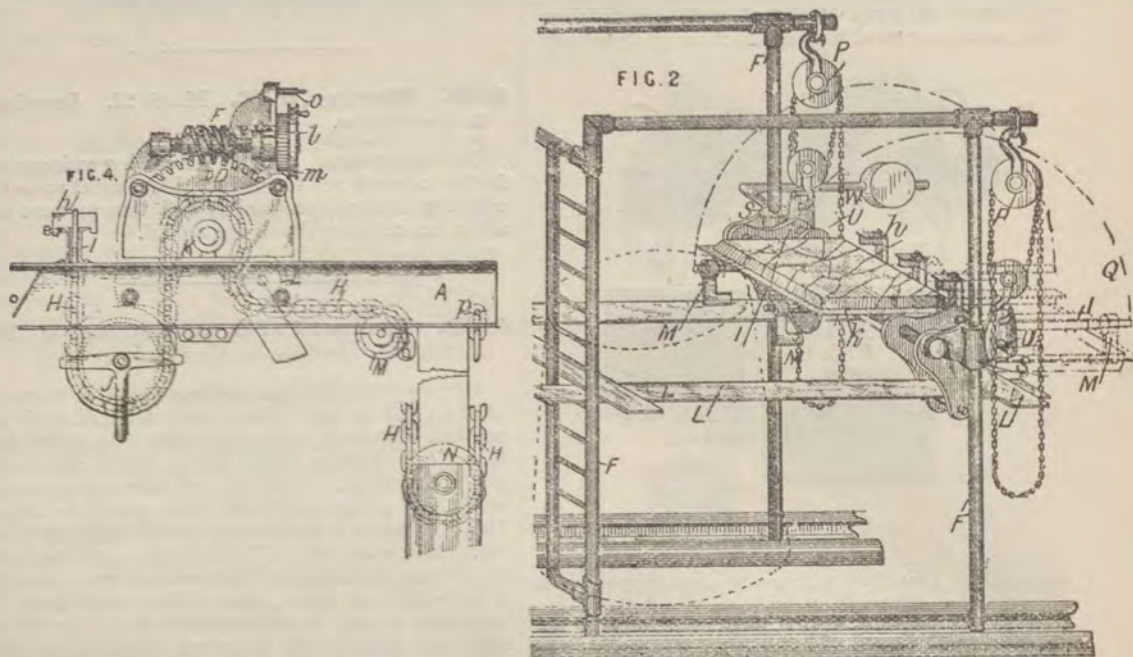
5214. Gooch, W. D., Varley, F. H., and Liddstone, F. B. April 7.

Stone, artificial.—Relates to the manufacture of porous stone for use as wicks for lamps, or for filters &c. The ingredients, preferably sand, asbestos, borax, and lead oxide, are finely ground, dried, and heated until the mass partly fuses; the mass is again ground and heated in suitably-shaped moulds. Instead of sand and asbestos, or in addition thereto, powdered clay or rottenstone may be employed, or finely-powdered emery or corundum; or, instead of borax and lead oxides, glass or other suitable flux may be employed.

5253. Beer, F. April 9.

Stone, artificial; casting.—Relates to a plastic composition applicable for making artificial stone or marble, or for moulding &c. The composition contains a mixture of pulverized marble, glass, and quicklime, to which a solution of silicate of soda or potash is added. The glass may be replaced by flint, terra-cotta, brick, or sand, and the quicklime by slaked lime; mica and pigments may also be added. A mixture of petroleum and vaseline is employed for lubricating gelatine moulds.

5333. Lodge, T. H. April 10.



Cements, making. Relates to the apparatus described in Specifications Nos. 5814 and 5815, A.D. 1887, in which dried slurry is stacked above a kiln and lowered in for burning. In stacking the slurry the apparatus shown in Fig. 2 is employed for inverting the trays. A framework F of tubular iron is mounted on slides above the mouth of the kiln. On two of the bars F¹ slides S work and support a bar and pivot U; secured to the pivot is a framework I, counterweighted at W. A slurry tray is brought under the framework when in the position shown in dotted lines, and secured by the catches M. The whole is then turned over and the tray removed. The slab of slurry is then pushed over bars suitably arranged on to the stack. Suitable means, such as the blocks P, are provided for raising or lowering the slide S. The framework is arranged so that planks L may be adjusted for the use of the workmen. The slurry trays are so suspended that they "right" themselves when lifted in the inverted position. A travelling crane is arranged for moving them from the car to the inverting-apparatus. The stack of slurry when completed is lowered into the kiln by the apparatus shown in Fig. 4, in which a chain H is secured at h to the frame A, and in it is suspended the sheave J from which the levelling-bars of the stack are suspended. The chain then passes over a pulley K, which is provided with recesses or pockets for the chain and is rigidly attached to the worm-wheel D, then round the guide-pulleys L, M, and through the sheave N of a counterweight, being finally secured at p. A worm F gears with the wheel D; to it is rigidly secured a ratchet-wheel l and a brake-wheel m; a pawl may be suspended from the stud o. This arrangement serves to regulate or assist the lowering of the stack, and suitable arrangements may be supplied for applying power through the wheel m. Beneath the kiln a receiving-chamber is arranged, provided with doors for readily removing the clinker; it is also partly closed by a shutter sliding vertically and actuated by an arrangement of levers. For filling trays with wet slurry a valve of the gridiron type is provided. A perforated plate slides in a valve box with a face-plate perforated at intervals. At each orifice double pivoted shoots are placed so that two trays on the same level may be simultaneously filled.

5384. Birchall, C. F. B., Wood, A., and Budd, J. April 11.

Stonework, ornamental.—Designs are transferred from a lithographic stone, engraved plate, or wood block by means of a roller covered with printers' composition to stone or other surfaces. The designs may then be fixed by hydrofluoric acid; in this case the ink for transferring is mixed with palm oil. The whole may then be coloured by hand or machinery, and the design is covered by means of a sprayer with a transparent coating of white shellac, naphtha, white varnish, and methylated spirit.

5386. Twynam, T. April 11.

Slags, treatment of.—Alkalies and alkaline salts are obtained from basic slag obtained in the manufacture of ingot iron and steel. The slag is produced by treating phosphoric pig iron, by the basic process, with alumina, together with lime, soda, or other bases, in a furnace lined with bauxite, dolomite, chrome iron ore, or other substance. The alumina used in the charge may be in the form of bauxite, or preferably the alumina recovered from the slag in prior operations may be used. The resulting slag is ground fine, mixed thoroughly with coke dust and salt, and made into briquettes. These are heated to a red heat in a cupola or other suitable furnace, coke being used as fuel. Steam, preferably superheated, is then passed through together with the blast. The resulting mass is withdrawn from the furnace, digested with water, and the dissolved phosphate and aluminate of soda are separated by crystallization. The phosphate may be converted in the ordinary way into phosphate of lime and soda, and the aluminate may be decomposed, preferably by carbonic anhydride, into alumina and carbonate of soda. Instead of mixing chloride of sodium with the slag, chloride of potassium may be used, and salts of potassium obtained.

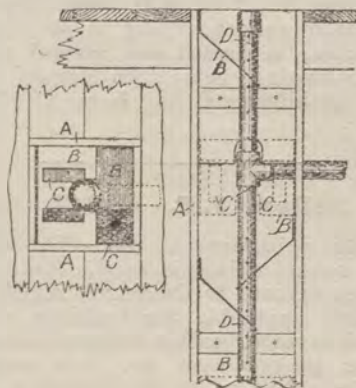
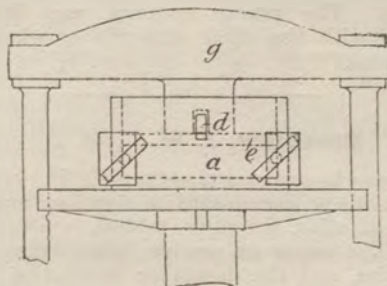
5808. Ponton, A. C., Mosely, B. L., and Chambers, C. April 18.

Stone, artificial.—The materials consist essentially of silicious materials, colouring-matters, fluxes for glazing, and a cement. The mixture is exposed to a red heat in a kiln until crystallization in the tridymite state has been attained. The cement used is a solution of silicate of soda or potash. Marble is prepared by mixing ground flint or sand and the cement, compressing in moulds, and burning in a kiln. The moulded material may be immersed in a solution of silicate before or after firing. Stone of different character may be produced by varying the fineness of the materials employed, the proportion of colouring-matter, fluxes, &c. The stone is suitable for balustrades, paving, cornices, statuary, architectural work, &c.

5881. McCara, A. April 20.

Cements.—Cement, after manufacture, is "matured" or "cooled" by exposure to the influence of air. It is charged into a cylinder A with a central perforated air pipe and with alternating shelves B, down which the cement falls from the one to the next, being continually exposed to the air forced in through the pipe D. The shelves are preferably perforated as shown at C. After this treatment, carbonate of lime is mixed with the cement.

(For Drawing see next column.)

5881.**5917. Spence, F. M., and Spence, D. D.** April 20.

Fireproof coverings and compositions.—Compressed cakes or blocks are formed from a mixture of aluminium sulphate or aluminio-ferric sulphate (aluminium sulphate with ferric sulphate), or both, in a state of aqueous fusion, with an anti-tumefaction material such as sawdust, for filling the jackets of safes, boxes, chests, and chambers, and the cavities of doors and floors. A solution of the aluminium sulphate or aluminio-ferric sulphate, or both, is evaporated until its boiling point rises to 112° C., when it is mixed in a steam-jacketed pan with the sawdust or other anti-tumefaction material. This mixture is then placed in divided moulds a and compressed in a hydraulic or other suitable press g as shown in the Figure, a loose platen e being employed so that it may be retained in position by a cottar to allow the mixture to congeal or crystallize under pressure. The sawdust may be mixed with the solution before the latter is evaporated. In the Provisional Specification it is stated that aluminium sulphate, aluminio-ferric sulphate, soda-alum, or iron-alum, or any mixture of these, may be employed.

6070. Schott, G. A. J., [Lortzing, C.] April 24. *Drawings to Specification.*

Asphalts; cements.—Sewage sludge, obtained in a special process of purifying sewage water, is

converted into asphalt in the manner described in Specification No. 2247, A.D. 1884. The precipitated matter may, according to the Provisional Specification, be heated and pressed through a filter, the product being then cleansed by bituminous disinfectants to form a plaster or mortar.

6261. Sellars, J. C. April 27.

Cements; refractory substances.—The object is to obtain a cement which will remain elastic for some time when exposed to the air, and which shall be particularly applicable for buildings subject to heat, such as retort benches, furnaces, ovens, stoves, fireplaces, gas-producers, &c. It is prepared by adding, according to the use intended, a plastic substance composed of a mixture of an alkali or alkaline substance with flour and water, or sodium silicate, resin, oil, tallow, or like material, to ordinary cement, mortar, cement-making materials, or, in the case of a fire cement, to Sellars' or like cement. The plastic material may be mixed directly with the other materials or when about to be used.

6422. Freebury, J. W. May 1.

Stonework, ornamental.—Consists in producing decorations or inscriptions in stone or marble by means of acids, for signs, tablets, tombs, and the like. The stone or marble, after being coated with size, and the design or inscription formed upon it in grease, beeswax, &c. is immersed in or covered with the acid. The decoration or inscription may be formed in relief or intaglio, and the etched parts may be filled with lead or a composition.

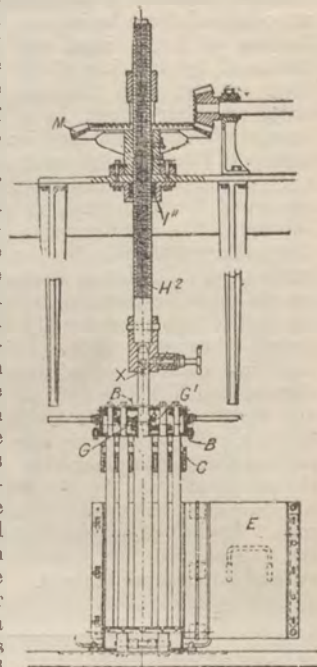
6455. Pönninger, F., and Koller, G. May 1.

Casting, moulds for. Glue or gelatine moulds for casting works of art in wax, plaster of Paris, artificial stone, &c. are treated with an energetic oxidizing-agent such as an aqueous solution of anhydrous chromic acid, alkaline chromates or permanganates, or nitrate of silver, to harden the surface of the same for the production of the casts. The glue or gelatine mould is coated with the oxidizing-agent and exposed to the action of light, being afterwards coated with a thin layer of varnish. The glue or gelatine may be dissolved in an aqueous solution of an oxidizing-agent and the mould exposed to the action of light after being formed in the usual way.

7152. Borsche, G., and Brünjes, F. May 14.

Casting.—Relates to the manufacture of hollow bodies of cement or like substances. The Figure shows the apparatus, which consists of a divided

mould E formed of two parts hinged together and provided with a perforated bottom, and a series of rotary cores raised from, and lowered into, the mould by a screwed spindle H². The cores are mounted in a casing B, B, and pass through a guide box C, their lower ends being pointed to fit into the perforations in the bottom of the mould. The central core is provided with two spur-wheels G, G¹, which communicate motion through spur gearing to the other cores; this core is also continued through the casing B, B, and connected at X with the screwed spindle H², which latter passes through a nut I¹ and engages by a groove and feather key with a bevel-wheel M to which motion is imparted through a pinion and crank handle. The cores having been lowered into the mould, cement or other material, in a liquid form, is poured into the latter and allowed to stand until it is partially set, when the apparatus is set in motion and the cores withdrawn.



7206. Straub, C. May 15.

Cements or compositions for wall coverings. Vegetable fibre, preferably sawdust, is saturated with sulphuric or hydrochloric acids or a soluble silicate. To this is added a solution of glue and oil or fat, preferably linseed oil. The mixture is dried and any suitable cement added. For some purposes the treatment with acid may be omitted.

7350. Brasier, E. May 17.

Fireproof coverings and compositions.—Relates to the treatment and utilization of *Bauhinia Vahlia* and similar fibrous materials. The materials are first treated by suitable breaking and decorticating machinery, such as is described in Specification No. 6679, A.D. 1888, and then reduced to pulp as in the process of paper-making. The pulp is made into continuous sheets by ordinary paper-making machines, and wound upon rollers, which are then mounted in a frame. Sheets drawn from the rollers are laid together to make a compound sheet of the required thickness, which may be passed through a fireproof and waterproof solution

and dried. Sheets of wire gauze may be placed between the layers to make the fibrous slabs suitable for partitions of railway carriages &c., for doors, floors, ceilings, colonial houses, and other structural purposes, and for organ and other pipes &c. The pulp may be formed into slabs or blocks by means of a frame with a wire gauze or perforated bottom, which is dipped into the tank, raised, and drained. The pulp is then placed in suitable moulds and subjected to pressure to form plain or ornamental panels, blocks, or slabs.

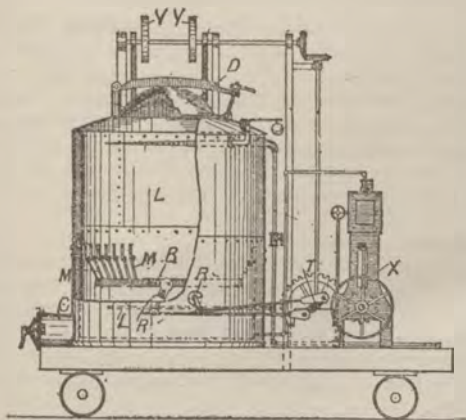
7456. Rigby, J. S. May 19.

Cements, materials for. The object is to utilize, chiefly in the manufacture of cement, the lime-mud refuse obtained in sugar manufacture and processes other than those of the alkali manufacture. The mud is carbonated with carbonic acid or sodium carbonate, with separation of sulphuretted hydrogen or formation of soluble salts; alkaline silicates may also be added, and the soluble salts washed out. The purified lime is mixed with clay or other suitable cement-making materials, dried, and burnt.

7747. Snelus, G. J., Swan, J. C., and Smith, H. May 26.

Cements.—Aluminous iron ore, or material of similar composition, is added to cement made from slag and lime, or to the materials used in the manufacture of the cement. The object is to obtain a quick-setting cement. The following are suitable proportions:—Aluminous iron ore 5 to 10 parts, and slag cement or cement-making materials 100 parts.

7798. Belmor, G. E. May 28.

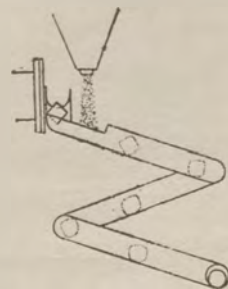


Asphalts, melting. Consists of a portable steam-tight tank divided by a series of rocking grate bars into an upper melting-chamber and a lower heating-

space. The tank is provided with an inlet opening D at the top and an outlet C in the side at the bottom, which are closed by steam-tight covers. The tank is enclosed in a steam jacket, and perforated pipes L supply steam to the interior. The grate bars B are suspended by links M at the ends, and are pivoted alternately to the transverse bars R, which receive a rocking motion from a cranked shaft T worked by the steam engine X. One series of bars are moved in one direction, while the other series are moved in the opposite direction, thus facilitating the disintegration and melting of the bituminous mass. The material is raised to the top of the tank by an endless chain of buckets passing over pulleys Y worked by the engine X.

7915. Fleiner, A., Hauenschild, H., and Bauermeister, A. May 30.

Cements. — The object is to give such a form to the raw material used in manufacturing Portland cement that it may be readily burnt and transported. The form preferred is that of a sphere. The plastic material is expressed from a suitable machine with a circular orifice and cut into short cylinders, which are rounded by causing them to roll down a curved or zig-zag channel or tube. The pipes or tubes may be heated to dry the material, and may be arranged to feed the material to the kiln. To prevent the plastic balls from adhering they are coated with powdered lime or similar material on leaving the machine. The charging of the kiln should take place more frequently than the discharging.

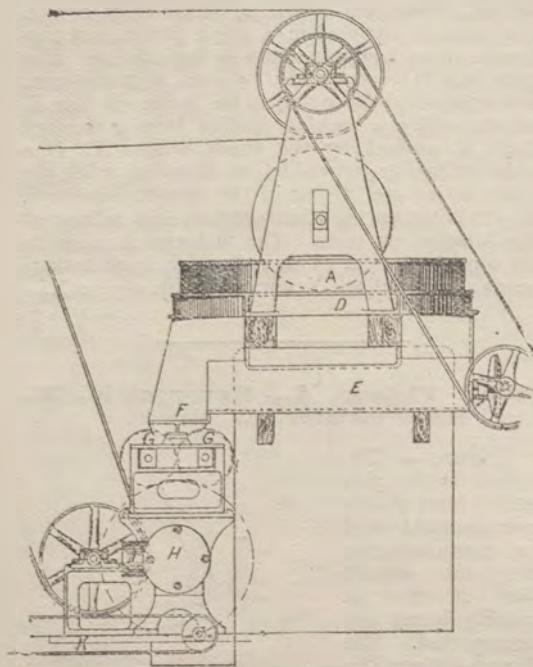


8879. Fawcett, T. C., and Castle, T. June 18.

Cements.—Relates to combination apparatus for producing slurry, consisting of grinding-machines, a mixing-machine, a pug-mill, and an endless band or other conveyer. The Figure shows one form of the combination; the cement-making materials are charged into a grinding-pan A provided with a perforated bottom through which the material drops first into a pan D and then into a mixer E provided with revolving screws. The material then passes into a hopper F, and is fed between rollers G into a pug-mill H, whence it is expressed through a die I on to a travelling band K or other conveyer.

(For Drawing see next page.)

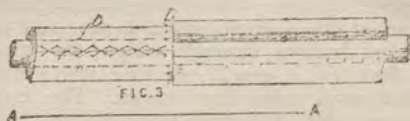
8879.



9000. Langen, E. June 19.

Fireproof compositions.—Relates to the manufacture of a fire-resisting material applicable as a cork substitute. The material is made from the granulated pith of maize stalks or similar plants mixed with suitable agglutinating-material, a little oil or tar to give flexibility, and a fireproofing substance such as sodium tungstate, infusorial earth, light clay, &c. The mixture is preferably made by using three kilogs. of the hot granulated material with hot paste prepared from three kilogs. of potato flour and twenty-seven kilogs. of water. The other substances are then mixed in and the material dried at 100° to 110° C. in blocks or otherwise.

9303. Johns, H. W. June 26.



Fireproof and sound-deadening coverings and compositions.—Relates to a non-conducting composition and covering for steam pipes, boilers, &c.;

which may also be used for lining or filling safes, refrigerators, carpets, partitions, &c., and as a fire-proof or sound-deadening covering. A composition is formed of fibrous asbestos and small pieces or shreds of sponge, preferably in about equal proportions, with or without a small percentage of other material. This composition can be used for filling or lining purposes, or it may be formed into sheets, rolls, blocks, &c. Sheets may also be formed from alternate layers of asbestos and sponge, or the materials may be made into pulp and the sheets formed by paper-making appliances. The surfaces of the sheets may be treated with a sizing or binding material, and they may be indented, corrugated, or otherwise formed with an uneven surface. The sheets may be strengthened by embedded wire netting or other sheeting as shown in Fig. 3, and the covering may be made in cylindrical sections for pipes, boilers, &c., these being secured in position by hooks D through which a cord is laced, or by wrapping or sewing. The sponge may be treated with a fireproofing-material such as silicate of soda or with a disinfecting or antiseptic substance, or it may be waterproofed by treating with oil.

9665. Justice, P. M., [Gravelin, A.].
July 3.

Fireproof compositions.—The foundation of the composition consists of a mixture of paper or fibrous pulp and an albuminous substance such as blood, and to this mixture may be added resinous, oily, or fatty matters, wax, gums, paraffin, casein, gelatine, glue, starch, dextrin, sodium or potassium silicate, lime, and metallic salts or oxides, according to the nature of the composition desired.

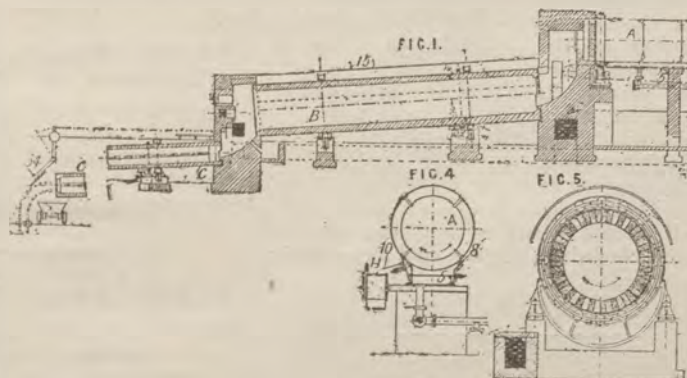
9763. Rigby, J. S., and Macdonald, A.
July 5. Amended.

Cements.—Leblanc waste is utilized for the manufacture of cement. The waste is mixed with water and carbonic acid passed through. The crude carbonate of lime which remains is mixed with aluminous material, roasted in a furnace, and then heated to dull redness, the fumes being permitted to escape or passed through lime or caustic alkali solution. The materials are now moistened with water and burnt in the usual manner. The waste may be dried and burnt previous to mixing with the aluminous material. In a modification, the crude carbonate is agitated in water by means of steam, again carbonated, and the soluble salts washed out, sulphate of lime being removed by treatment with vat liquor. The carbonate is mixed with aluminous materials and burnt.

9986. Stokes, F. W. S. July 10.

Cements.—Relates to a process and apparatus for drying and burning slurry. The slurry is cut into strips or plates of about equal size. Fig. 1 shows the general arrangement. The slurry is dried on a drum A, then fed into a rotary furnace B, and the clinker cooled in a drum C by the incoming air. The drums are mounted on rollers, Fig. 5, and driven by worm or other suitable gearing, and are supported on rocking frames to allow for expansion.

They are preferably of iron lined with firebrick; the bricks may be partly hollow or filled with asbestos, and may be of any suitable shape to facilitate or retard the movements of the slurry. The roller A, through which the products of combustion pass, dips into a trough 5, into which slurry is pumped, and receives a coating of slurry, which, on passing round, is cut into strips by cutters or markers 8¹, Fig. 4, and the dried slurry is removed by a scraper 10, falls on to a conveyer H, and is carried to the furnace B. The drying may be facilitated by covering the drums with hoods 15 and supplying the hot air from the furnace to the drying-drum. Several modified arrangements may be used for drying. In one the slurry is dried on fixed tables, beneath which the products of combustion from the furnace pass; the tables are provided with travelling markers and scrapers, by which the slurry is thrown on to conveyers. In another the slurry is distributed from a revolving pipe on to a circular floor above a flue, and the dried slurry is removed by a scraper, carried by the pipe, to a conveyer. The cooling-drum may be a continuation of the furnace, or may be placed underneath it. It may be inclined the opposite way to the burning-drum and arranged to elevate the clinker. The mouth of the drum is provided with a valve 4 to regulate the admission of air. Instead of using the cooling-drum the clinker may be cooled by being passed on a conveyer or trucks through a chamber or flue, through which the air for supporting combustion enters. The burning-drum may be polygonal, or a truncated cone, and may be supplied with liquid, gaseous, or pulverulent fuel, the form shown having a gas-producer built at the side.



10,107. Snell, C. S. July 11. Drawings to Specification.

Fireproof compositions for paper. The pulp may be mixed with asbestos, alum, and borax, or tallow, soap, and alum, or the paper may be coated with sodium silicate, or alum and sulphate of copper, or a mixture of soda, silicious earth, and charcoal, or asbestos paint.

10,292. Langford, W. July 16.

Stone, colouring and preserving; fireproof compositions.—Relates to a fireproof composition suitable for ornamenting and preserving stone. The composition consists of a mixture of oil, manganese, nitric acid, gas tar, turpentine, gold size, prussian blue, and other colouring-matters; the whole is brought to a proper consistency by boiling.

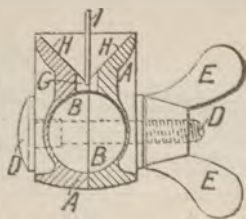
10,312. Snelus, G. J., Gibb, T., Swan, J. C., Smith, H., and Whamond, W. July 16.

Cements, materials for. The materials used are blast-furnace slag, lime, and clay, with or without other cement-making materials. The slag is granulated, dried by passing on an endless band between rollers, and then calcined to oxidize any calcium sulphide present. A frit of lime and alumina is prepared by burning suitable materials, such as clay and lime. This frit is ground and mixed with the prepared slag. A cement may be formed by mixing the slag with cement-making materials, alone or mixed with the frit.

11,026. Tickle, R. P. July 30.

Casting, moulds for. A casting-box A containing any number of spherical or other shaped

moulds or matrices B is formed in two halves provided with registering dowel pins and secured together by bolts D and wing nuts E. The upper part H of the box is hopper-shaped and the necks G of the moulds are divided by a partition I, the liquid substance entering the moulds at one side of this partition, and the air escaping at the other. The moulds are formed of thin metal, so that they may be quickly cooled, for which purpose cold air or water may be employed.



11,158. Smith, A. L. Aug. 1.

Fireproof coverings.—Relates to a fabric especially applicable for making scenes and side wings for theatres, concert halls, &c. Coarse flannel or woollen woven fabrics, felts, or union materials, which may be made in specially-wide widths, are coated on both sides with whiting, white lead, or other white pigment, coloured or not, and mixed with size and water.

11,590. Mitchell, W. Aug. 11.

Fireproof compositions.—Fireproof carpets and underfelts are made of asbestos or amianthus and animal or other fibre such as wool, flax, or hemp, felted together.

11,909. Stephens, J. W. T., and Clark, R. Aug. 17.

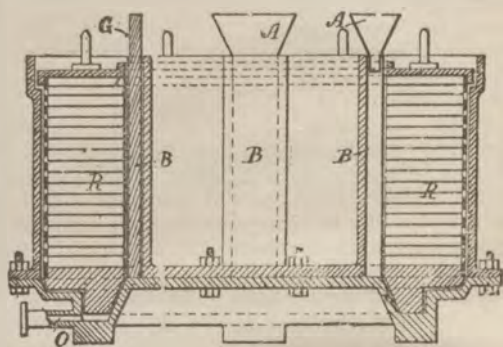
Cements.—In making Portland cement, the materials used are "blue lias pebble limestones," and the "clayey mud of the Bristol Channel." The limestone is burnt and powdered, and then mixed

with the mud, in proportions of about 5 parts of lime and 1 part of mud. The mixture is burnt in the ordinary way.

12,596. Temple, W. J., Rogers, F. W., Trotman, C. W., and Hobbs, T. F., [trading as Temple, Rogers, & Co.]. Sept. 1.

Stone, colouring.—Slate, marble, and such like materials are coated with metallic colours in the process of enamelling, the surface afterwards being ornamented in any manner.

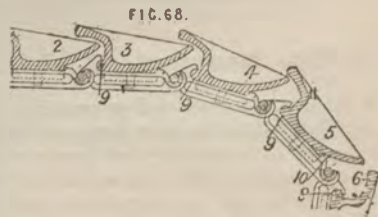
13,084. Adant, G. Sept. 10.



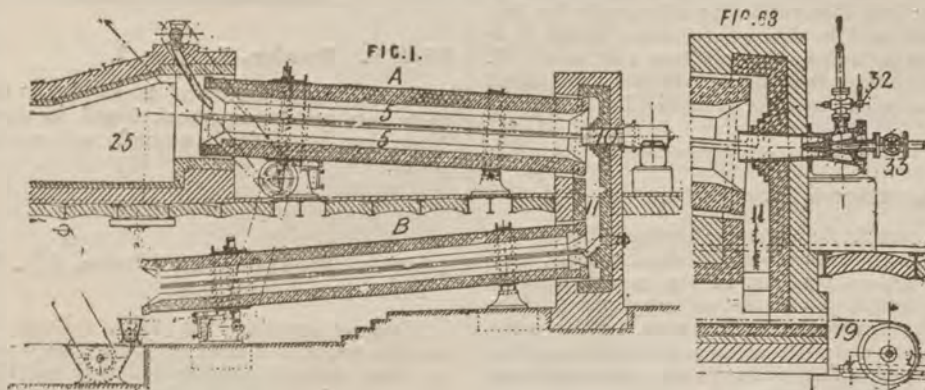
Casting sugar. In obtaining refined sugar the mass is filled into the basket shown in the Figure, consisting of a number of compartments, each divided into parts by partitions R forming the moulds. The basket is placed in a filling-vessel and the mass enters the chambers B through the funnels A. When full the chambers B are closed by plugs G, the superfluous material running out through the opening o, and the whole is allowed to cool for some hours. The basket is then removed to a centrifugal machine, where it is freed from green syrup. The cleare is then introduced from a reservoir at a high level, and forces its way through the blocks R. It passes through a measuring-vessel which regulates the amount employed. Air is then admitted, the basket removed and taken to pieces, and the blocks dried in a suitable stove.

13,556. James, J. W. H. Sept. 20. *Amended.*

Cements, making. Relates to arrangements of rotary furnaces, cooling-drums, or other cooling-apparatus, air-heaters, conveyers, &c. Fig. 1 shows an arrangement of a rotary furnace A, burning gas, and a rotary cooling-drum B. Both drums are provided with "fins" or projections 5 to assist the movement of the materials, which are charged in through a hopper. Gas is supplied through a burner 10, and the products of combustion pass into a chamber 25 and thence to a chimney. The air for supporting combustion passes through the drum B and abstracts heat from the burnt material in its course. The burnt and cooled material is discharged into a receptacle whence it is removed by a conveyer. The amount of air passing through is regulated by a



valve. The drums are driven by worm gearing and supported on suitable rollers. The refractory lining 5 is preferably formed of blocks moulded with grooves communicating with the air by perforations in the iron or steel shell, to prevent overheating. In modified arrangements, the axes of the drums are horizontal, the material being fed through by spiral grooves formed in the linings. In other cases the



cooling-drum is dispensed with, the air being heated by regenerators, and the furnaces worked in pairs. In other forms the material is cooled by being carried on trays through a chamber through which the air for supporting combustion is passed. Fig. 68 shows an arrangement of interlocking trays. They pass below the flue 11, Fig. 1, receive the material, and carry it through a flue or chamber. The trays 2, 3, 4, &c. are carried on endless bands or chains and are held by projections 9 and the interlocking of the trays. They may be removed by bending the chains, as shown at 6. The furnaces may also be arranged in groups or series.

13,768. Stone, R. Sept. 24. *Amended.*

Refractory substances for lining retorts, converters, &c. are made by mixing sulphuric acid with pulverized slate, lava, &c. The Provisional Specification describes apparatus for grinding and moulding the materials.

14,026. Steedman, R. H. Sept. 29. *Amended.*

Cements.—Consists of a process for utilizing impure carbonate of lime for cement-making &c. The impure carbonate of lime obtained in Chance's process for recovering sulphur from alkali waste is mixed with the impure carbonate produced in alkali manufacture, and the mixture is heated to a boiling temperature, and agitated by injecting air or otherwise, to cause the sulphur to be converted into soluble sulphides, which are removed by settling or washing; milk of lime may be added if there is not sufficient free lime or alkali for the sulphur to combine with. The washings may be used in preparing the alkali-waste cream for Chance's process. The mud from Chance's process may be mixed with milk of lime, and the alkali mud may be treated separately. The treated material may be mixed with clay for cement-making, the mixture being filtered and formed into cakes for drying and calcining.

P 10822

14,750. Waxin, C., and Clery, A. Oct. 13.

Cements; stone, artificial.—The cement or stone is formed by dissolving a mixture of pulverized stone, zinc oxide, and magnesium oxide in a mixture of hydrochloric acid, zinc, borax, and sal ammoniac. The stone to be used in the mixture is preferably of the nature of the stone to be imitated, such as marble &c. Suitable colouring-matters may also be added. The mixture is used in the liquid condition, or may be allowed to set in moulds.

14,854. McIntyre, B. F. Oct 16.

Fireproof compositions for fireproofing and preserving fabrics &c. A fireproofing-composition for fabrics, wood, &c. is formed of sulphuricinoleate of ammonia, carbonate of ammonia, cream of tartar, acetate of soda, and hydrochloride of ammonia, to which mixture boracic acid may be added for preserving purposes. When required for use the mixture is dissolved in distilled water in the proportion of one lb. to a gallon.

15,041. Randall, G. J. Oct. 19.

Stone, preserving.—Consists of a process for hardening, preserving, and preparing oolitic and other limestones, to render them impervious to

atmospheric influences and capable of taking and retaining enamels. The limestone, after being heated to destroy germs and drive off quarry damp, is immersed in or coated with a mixture of milk of lime, acetic acid, and cane sugar or molasses; it is then rubbed to a face with fine grit and dried in the atmosphere, after which it is heated to a temperature of from 130° to 160° F. For enamelling, the face of the stone is coated, while hot, with linseed or mineral oil.

15,182. Stone, R. Oct. 22.

Stone, artificial; statuary; casting.—Consists in utilizing waste refuse such as slate, marble, spar, granite, glass, lava, &c. in the manufacture of enamel, statuary, sleepers, chimney pieces, slabs, blocks, crockeryware, earthenware, bottles, casks, tanks, pipes, and other articles, and for enamelling or surfacing. The materials are pulverized and mixed together or separately with sulphuric acid, nitric acid, petroleum, or other liquid operating as a solvent, and with fluxing-material such as carbonate of soda, potash, soda silicate, lime, marble chips, fish oil, ammonia, or linseed oil. The mixture is then rendered fluid in a furnace, and run into moulds of the required shape, or upon the surfaces of material for enamelling. As an example a mixture of slate, petroleum, and fish oil is given.

15,256. Ponton, A. G., Mosely, B. L., and Chambers, C. Oct. 23.

Stone, artificial.—The object is to obtain all kinds of natural or artificial silicas or soluble alkaline silicates to be used for making artificial stone or marble in the form of tridymite, having a specific gravity of 2.2 to 2.3. Silicas having a less specific gravity are ground to powder, made up into compact masses by mixing with water, silica in solution, &c., compressing into moulds, and finally heating in a porcelain kiln till the required specific gravity is obtained. Heavy silicas are simply heated in a kiln till of the required specific gravity; the silica thus formed may be mixed up with lighter silicas in a powdered state, and the mixture treated as the lighter ones alone.

15,367. Wallis, H. W. Oct. 25.

Slags, treatment of.—The slag obtained in extracting lead, and consisting of sodium sulphide, is dissolved, and then either (1) treated with carbonic acid, whereby sodium carbonate forms, and sulphuretted hydrogen is evolved, which is employed to precipitate metals as sulphides, or (2) added to the solution of a metal required to be precipitated as sulphide, and a current of carbonic acid led in. Instead of passing carbonic acid, sodium bicarbonate may be added. It is also stated (1) that sodium sulphide obtained by any

method may be substituted for the slag solution, and (2) that sodium sulphate may be obtained when the metal contains alkali.

15,971. Danby, J. Nov. 5.

Cements for lining ships' tanks &c. 'Doggerstone,' an iron-bearing rock found in north-east Yorkshire, is calcined, ground, and applied by water.

16,053. Huelser, C., [Fenton, A.] Nov. 6.
Drawings to Specification.

Fireproof coverings for walls, ceilings, vaults, machine parts, and other objects. Cords of hemp or other material impregnated with soluble glass or other suitable fireproof material are stretched over walls, ceilings, &c., in the form of a network, and are plastered or cemented over. The pins round which the cords pass are secured to T-irons fixed to iron or other supports.

16,400. Stone, R. Nov. 12.

Fireproof coverings.—Relates to a fireproof material for bags for containing cement, plaster, grain, and the like, and for other purposes. A backing of tow, cotton, hemp, &c. or woven wire is employed, and is covered with a hot composition, put on with a brush, containing two or more of the following ingredients:—China clay, Staffordshire clay, Devonshire clay, marble, spar, shale, cement or plaster, or any other analogous material, together with tar oil, and to which driers may sometimes be added.

16,677. Zerr, E. Nov. 16.

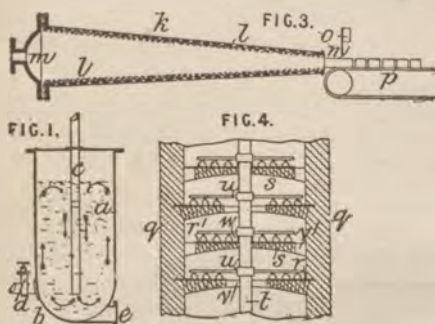
Castings plaster of Paris &c. Relates to the manufacture of designs, pictures, medallions, and the like in relief, cameo, or intaglio. A photographic negative is obtained in the usual manner, the sensitive plate employed being prepared by coating a glass plate with an emulsion of gelatine and gum tragacanth, and sensitizing the same by a second coat of an emulsion of bichromate of potash, dextrin, and gelatine; the exposure may vary from one-half to two hours. The plate is developed by placing it in water until the gelatine softens, and then repeatedly adding quantities of glacial acetic acid. The acid dissolves portions of the upper dextrin-gelatine layer, and produces a negative in relief from which a plaster of Paris mould can be obtained, this being employed for producing any number of metal, porcelain, plaster of Paris, or like casts.

16,860. Doebling, W. Nov. 20.

Fireproof coverings and compositions; cements.—In the preparation of laths for plastering, they are impregnated with soluble glass and calcium chloride, or lime, and are also coated with soluble glass to which baryta and zinc powder may be added, the object being to make the laths fireproof and increase the adhesion of the plaster. A preliminary coating or plaster is made of a mixture of the following materials:—Chalk, hydraulic lime, infusorial earth, oxide of zinc, magnesia, powdered flint, and firebrick, sand, and soluble glass. This mixture sets firmly on the surface of the laths, and forms a rough surface to which the usual plastering firmly and permanently adheres.

17,257. Cussans, W. Nov. 27.

Cements; stone, artificial.—Cement is mixed with colouring-matter and used in the manufacture of imitation marble, mosaics, ornamental flooring, slabs, tiles, &c. The ingredients used are cement, preferably Portland cement, iron and copper oxides, and colouring-matters, such as ultramarine, chromium oxide, manganese oxide, barium sulphate, Bath stone, chalk, whiting, plumbago, boneblack, &c. These ingredients are mixed with water and cast in suitable moulds to give the forms desired. In the moulds may be placed copper, tin, brass, or other metallic borings, &c., arranged in suitable patterns by stencil plates or otherwise. The designs may be varied by suitably arranging the colours of the metals.

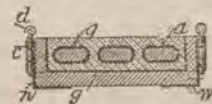
17,363. Hargreaves, J., Robinson, T., and Hargreaves, J. Nov. 29.

Cements.—The materials, such as lime, clay, &c., to form slurry are mixed by means of air &c. The materials are contained in a vessel *a*, having a conical or hemispherical bottom *b*, and the air &c. is forced into the vessel through a central pipe *c*. The slurry is run off through a cock *d*, and the coarse particles removed through the opening *e*. The slurry is forced into a vessel fitted with a

central compartment or tube, perforated and covered with filter cloth, through which the water passes. Another form of apparatus, shown in Fig. 3, consists of a tapered perforated casing *k*, covered with gauze and filter cloth *l*. The slurry is forced into the opening *m*, and is exuded at *n* on to a travelling band *p*. The stream of plastic slurry may be cut into pieces or bricks by a reciprocating knife *o*, and dried by passing through an oven on endless travelling bands, or the filtered slurry is fed into a chamber *q*, Fig. 4, fitted with a central shaft *t*, carrying a series of revolving arms *u*, to which are fixed scrapers, ploughs, or rakes; these rakes move the slurry over shelves *s* lined with firebrick, alternate ones of which have central and side discharge openings *v*, *v'* respectively. As the slurry descends it is met by ascending hot products of combustion, the waste products from the manufacture of cement being preferably employed. The cement is weathered by subjecting it in a finely-divided condition to the action of carbonic acid and aqueous vapour. Apparatus of the same form as the drying-apparatus above described may be employed for this operation. Cool products of combustion, freed from soot &c., and mixed with aqueous vapour by passing through a scrubber, may be employed.

17,415. Katz, A. Nov. 29.

Casting hollow building blocks. Woody or similar refuse such as chaff, chopped straw, stalks, &c., with hair, cinders, or sandy material, is mixed with plaster of Paris, lime, or suitable cement. The sides of the mould are secured together and to the bottom of the box by means of pins *d* passing through eyes *c*, and by metal strips *w*. To prevent adhesion of the material, the cores *a*, and sides and bottom of the box, are covered with wet fabric *g*. The material is poured into the box, smoothed off level, and allowed to set.

**17,521. Digby, E. J. T.** Dec. 1.

Refractory substances.—The composition is for making crucibles and like vessels or utensils, and consists of a mixture of finely-ground granite, plumbago, Welsh slate, and German clay.

17,693. Furstenburg, R. W. Dec. 4.

Fireproof coverings.—Relates to the manufacture of waterproof fibre and weather-resisting material for roof coverings. A mixture in specified proportions of asbestos fibre, asbestos card waste, zinc oxide, curd soap, alum, carbonate of soda, sugar of lead, and zinc chloride is made into sheets or slabs by the ordinary process for making carton.

17,786. Billault, E. A. Dec. 5.

Casting.—Sulphide of silver is used for coating metals for jewellery and other purposes. The sulphide is fused, preferably in a reducing-atmosphere, and cast on to the articles, which are placed in suitable moulds. The moulds should be heated in a muffle, preferably in a reducing or inert atmosphere. The articles may be finished by polishing &c. with a hot iron.

18,031. Johns, H. W. Dec. 11.

Fireproof compositions; cements.—A non-conducting and fireproof composition for covering steam pipes, boilers, &c., and for lining or filling walls, safes, refrigerators, refrigerating-cars, wagons, &c. is formed of finely-divided sponge, with or without asbestos or hair, a body material such as infusorial earth, kaolin, or magnesia, and a cementing or binding material such as plaster of Paris or lime. It may be used in a dry state for filling purposes, but is made into a plastic mass with water for applying to boilers &c.

18,369. Kuhn, E. J. Dec. 15.

Casting.—Relates to means for producing casts of busts, statuary, coins, medals, and other articles larger or smaller than the original. A model of the article is first produced in gelatine, or a composition formed of gelatine, chalk or flake white, and Irish moss or peat. To enlarge or reduce this model it is soaked in water, or alcohol, respectively. From this enlarged or reduced model, a mould, preferably of plaster of Paris mixed with alum, is obtained in which the enlarged or reduced reproductions are cast. When the enlargement or reduction is very great, the reproduction is obtained in two stages, a second enlarged or reduced model being obtained from the first. A mould of the

article may be formed in the gelatine composition, by first casting a plaster mould on the article, then separating this mould a short distance from the article, and running the gelatine composition into the space between the plaster mould and the article; these moulds may be expanded or contracted by water or alcohol, to obtain enlarged or reduced reproductions.

18,491. Joy, W. Dec. 18. *Drawings to Specification.*

Cements, making. The slurry from a special washmill is passed, when required, to a disc mill, in which the feed is regulated. Or the slurry may be fed to the mill by a bucket wheel, bucket elevator, or worm. The fuel and slurry are fed by worms from separate receptacles into a horizontal container provided with a worm, or a shaft carrying radial beaters. The proportions of the slurry and fuel may be varied by altering the speed of the feeding-worms. The Provisional Specification describes a roller arranged in connection with a flat or curved bed for grinding the slurry: also a cylindrical sieve mounted to rotate within a casing and fitted with an internal drum, provided with an archimedean screw nearly touching the surface of the sieve.

19,010. Sharpe, G. H., and Turner, F. W. Dec. 29.

Cements.—The cement is formed from a mixture of slate dust quicklime, and limestone, or a ferruginous clay. The materials are dried and burnt separately, then mixed and ground, or they may be ground separately and not mixed until they are to be used. The cement is specially adapted for setting bricks, lining or covering walls, ceiling mouldings, modelling, &c.

APPENDIX.

The first eight of the abridgments below should be added to those appearing in the volume for A.D. 1877-83.

A.D. 1877.

4494. Pieper, C., Schott, F., Nagel, A., and Kaemp, R. Nov. 29.

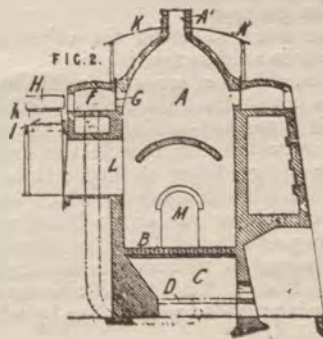
Cements.—Relates to a method of utilizing the waste heat of cement kilns for drying and heating the raw material used in cement making, the essential feature being that the materials to be dried are heated or introduced into the upper part of the kiln above the charge when it has sufficiently settled. According to one arrangement the kiln is provided with a side opening *b* near the top, which can be closed by the door *c*. Two lines of rails, one above the other, enter by this opening and pass across the kiln. The furnace is charged in the usual way, and when the charge has sufficiently settled two trucks *a* and *a'* containing the materials to be dried are run into the kiln on the rails.



A.D. 1878.

4328. Castle, T. Oct. 28.

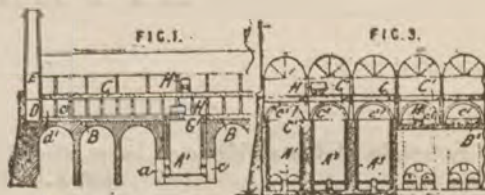
Cements.—Relates to the utilization of waste gases from cement kilns for drying slurry &c. The furnace roof *B* is of openwork, and on this is placed the chalk or other material to be calcined. The waste gases pass off through *A*, or by raising the dampers *G* are employed to heat the drying-chambers *F*, extending the length of the kiln. The chambers are charged with the cement to be dried through an opening from the trucks *I*, carrying the cement *H* on the rollers *h*. Cement may also be dried under the roof *K* supported on columns over the kiln roof. To increase the air supply, perforated pipes may be led into the body of the fire.



A.D. 1879.

384. Killick, E. W. Jan. 30.

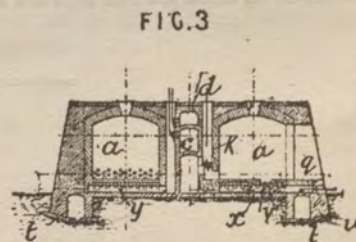
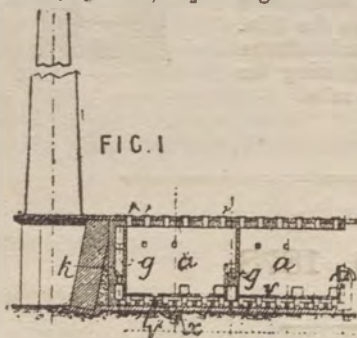
Cements.—Relates to the utilization of the waste heat from cement kilns for drying slurry &c. Fig. 1 shows a longitudinal section, and Fig. 3 a transverse section of a duplicate set of kilns. They have vertical sides, and each have twin pairs of drawing-eyes *a, c*. The lower drying-floor B communicates with the flue D and the chimney E, and is carried by a series of arches. Above this is an upper drying-floor C carried on the arches *c* &c. The flues are provided with dampers by which the products of combustion from any kiln can, if necessary, be made to travel over any other. An auxiliary furnace is provided in the flue to consume any smoke that may have escaped unburnt. The kilns are charged from wagons with movable bottoms through an opening formed in the upper floor by the removal of a plate or otherwise. The said trucks are filled at the base of the kiln and then hoisted up. The upper drying-floor is preferably of iron plates, and is such a distance above the lower floor that men can work upon the latter without removing the plates.

**704. Atkinson, E. J.** Feb. 21. *Drawings to Specification.*

Cements.—Relates to the utilization of waste gases from calcining-kilns such as are described in Specification No. 4982, A.D. 1878, for drying slurry. Hot air is supplied to a chamber for calcining, and the hot air which escapes is utilized by means of flues or otherwise to dry the slurry.

3232. Gedge, W. E., [*Marle, P.*] Aug. 12.

Cements. — Relates to the utilization of the waste gases from cement kilns for drying slurry &c. The kiln consists of a series of chambers *a, a* arranged in a circle or in two rows with the flues between them; each chamber is separated from the next by two partitions, the gas passing over one and under the other, and a damper being provided by which the passage can be closed.

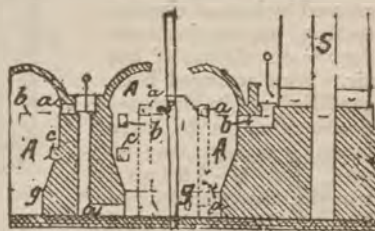


When gas is used as fuel it passes from the producer by the flue *t* to the flue *x* under the bottom of the chambers, a damper *u* regulating the supply. The gas passes through holes in *x* to the grating *v*, where it meets hot air from the flues *y*. When solid fuel is used, grates for its combustion are arranged as at *v*. The kiln is worked continuously, the articles in the different chambers being in different stages. Suppose there are twelve chambers in use, one will be in process of being filled and the next of being emptied, both air and gas being shut off; three will be in process of cooling, the cold air being passed through them; the next chamber, in which burning is just finished, is cut off from communication with other chambers, neither gas or air being admitted to it. In the next combustion is taking place, and the products pass through the other chambers so as to heat the charges they contain gradually. The last two chambers contain materials in the drying stage, the drying being effected by hot air from the flue *c* or from the flue *d*. The flue *d* also serves to carry hot air to the drying-room above the kilns. Each chamber is provided with valves by which the course of the gas, air, and the products of combustion can be regulated.

A.D. 1880.

320. Bauer, M., [*Quistorp, J.*]. Jan. 24.

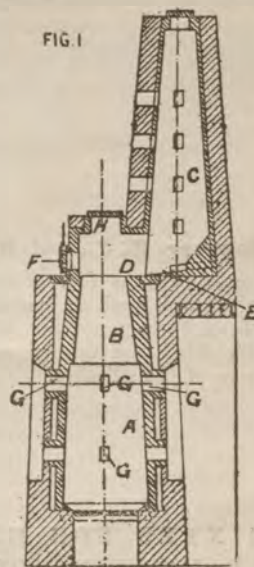
Cements.—Relates to the utilization of the waste gases from cement kilns for drying slurry &c. The kilns are built in series, round or in connection with a chimney S. Each kiln A has a charge opening at the top, which is closed immediately the charge is introduced; also an opening at the bottom for withdrawing the burned charge and firebars *g*. Each kiln communicates with those on each side of it by passages provided with valves, so that the gases of combustion pass from the top of one kiln to the bottom of the next, in order to dry and heat the material in the latter. Each kiln communicates with the chimney by two passages *b* and *c* at different heights, these passages being also provided with valves. The kilns are worked continuously, the gases passing from the first to the second, from the second to the third, and so on till they are discharged into the chimney, the valves being opened and closed as required.



A.D. 1883.

1578. Justice, P. M., [*Dietzsch, C.*]. March 28.

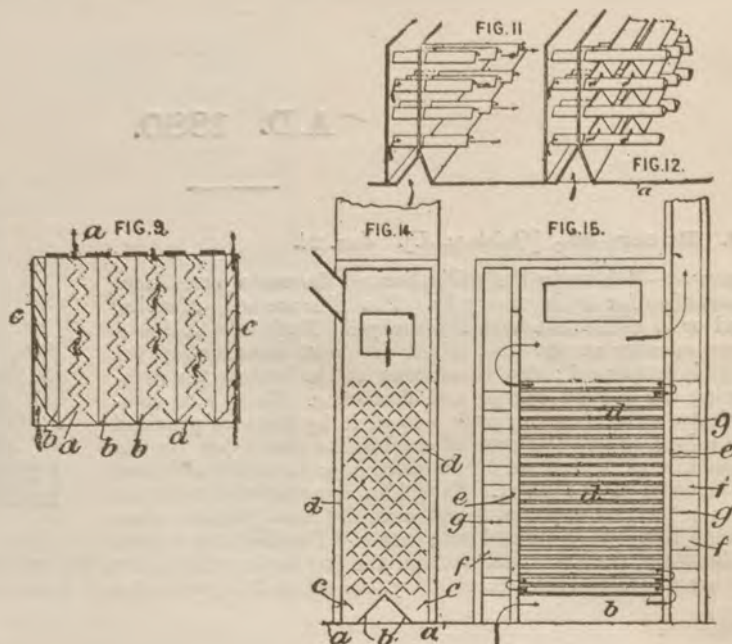
Cements.—Relates to the utilization of the waste heat from cement kilns for drying slurry &c. The kilns consist of three parts, a cooling-chamber A, a combustion chamber B, and a heating-chamber C. The burnt material in A is cooled by air supplied under pressure or otherwise, passing up to B. In B the fuel is burned, and the products of combustion pass through C to heat its contents and escape into the air or into a chimney. When combustion in B is complete the charge is drawn from A, and that in B sinks into A. The contents of C are drawn through the neck into B. Fuel is added through F, and a charge of fresh material is put into C. Access is provided to the various parts of the kiln by doors E, F, G, H, by which tools can be introduced to loosen the charge when necessary. The chamber B is widened at the bottom to facilitate the descent of the charge. A series of burning-chambers may be placed round one heating-chamber, or a series of heating-chambers round one burning-chamber. The waste heat from the heating-chamber may be made to circulate under a floor on which the charge may be dried before being put into the kiln.



4285. Lawrence, W. Sept. 6

Cements. — Relates to means for drying slurry by distributing currents of heated air, either direct from a furnace or through an air-heater, through troughs for drying slip and slurry used in cement manufacture. The floors may be undulated and perforated, or formed of V-shaped bars crossed by bars of circular section, leaving intervals for the circulation of hot air. Bars arranged horizontally or in inclined positions so as to leave lateral openings may be used, but V-shaped troughs, as shown in Figs. 9, 11, 12, 14, and 15, are preferably used. As shown in Fig. 9, the frames are removable and are formed of troughs of lath with end boards and sides *c, c*. The frames are held together by cramps. Hot

air passes through the passages *a* and malt is put in the spaces *b*. When the malt is dried the frames are taken apart and it falls on the kiln floor ready to be fired. Figs. 11 and 12 show arrangements of A-pieces communicating at the ends with boxes from which air flows through them. The material to be dried falls in a layer having diamond-shaped passages in it through which the air circulates. The arrows show the direction of the air current. In Figs. 14 and 15 the troughs *d* are shown arranged for drying substances that may be kept in continuous motion, such as slip or slurry. The passage of the heated gases is shown by arrows. There are perforations *e* in the side walls to allow air from shafts *f* to pass into the troughs. The air currents are directed by baffles *g*. On the horizontal floor *a* is an inclined floor *b* and inclined flaps *c, c* are let down for unloading if necessary. The material enters at the top and the hot air circulates along the troughs *d* and partly rises through the material treated.



A.D. 1884.

8083. Coxeter, S. J., and Nehmer, H. May 22.

Casting, compositions for. Finely-divided carbon, either alone or mixed with a substance that gives off oxygen readily, such as peroxide of manganese, is made into a paste with a solution of alkaline silicates. It is then poured or placed in a mould or otherwise moulded to the required form, being subsequently dried and treated with a salt of ammonium or other chemical agent to bring about the decomposition of the silicates.

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D.—1889—1892. (In preparation.)

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E.—1893—1897. (In preparation.)

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