

PATENTS FOR INVENTIONS.

ABRIDGMENTS OF SPECIFICATIONS.

CLASS 22,
CEMENTS AND LIKE COMPOSITIONS.

PERIOD—A.D. 1867-76.



LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE
BY DARLING & SON, LTD., 34-40, BACON STREET, E.
PUBLISHED AT THE PATENT OFFICE, 25, SOUTHAMPTON BUILDINGS,
CHANCERY LANE, LONDON, W.C.

1904.

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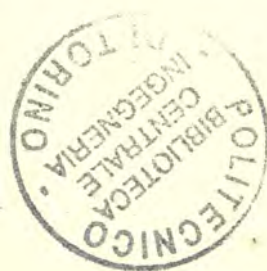
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EXPLANATORY NOTE.

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 1s., postage 6d.

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 8d., may be purchased at the Patent Office, or ordered by post, no additional charge being made for postage.

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

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" W. V.'67. 979
Wirth, F.'75. 959. '76. 4514
Wise, W. L.'74. 1763
Witt, G. de.'73. 1004
Wood, C.'72. 302. 2618
'73. 3255. '74. 201. '76.
795. 4372.

" G. B.'71. 2478
Wood, J. F.'72. 3389
Woodhouse, J.'76. 2807
Woodward, J.'69. 3716
Wray, T.'76. 2078
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ERRATUM.

Page 60. Abridgment No. 3714 should be deleted.

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. 1867.

77. Henry, M., [*Coignet, F.*]. Jan. 11.
Drawings to Specification.

Cements. — Relates to the manufacture of a cement or beton such as is described in Specifications No. 2659, A.D. 1855, No. 2757, A.D. 1859, and No. 1086, A.D. 1863. The ingredients are brought to the condition of a pasty powder by adding a small quantity of water, so that the cement may be agglomerated in moulds by ramming. According to the present invention, damp sand or damp gravel is mixed directly, in a special mixing and triturating machine, with powdered lime slaked by sprinkling, and with a very small amount of water. Instead of lime powdered cement may be used.

305. Betjemann, G. W. Feb. 4. [*Provisional protection only.*]

Stonework, ornamental. — Relates to means for applying ornamental mounts to various articles made of, or fitted with, stone or marble slabs. The mounts may have screws which are screwed into the stone and fastened by nuts, elastic washers being used to prevent fracturing; or stems on the mounts may be cemented into undercut holes in the stone.

407. Newton, W. E., [*Larauza, A. G.*]. Feb. 13. [*Provisional protection only.*]

Statuary. — Consists in the production of a photographic statuette, or portrait showing the back and the front of a person photographed. The person to be photographed is placed on a turntable capable of turning exactly through half a circle, so that the person is first seen and photographed from the

front and afterwards from behind. The corresponding photographic pictures form two exact halves, which may be placed back to back. The edges of the two portraits are then stuck together, except at the bottom, and the whole is then expanded by introducing a piece of wood or other material into the interior. The photographic statuette is placed in a kiosk, which is composed of four, five or more looking glasses placed in connection with each other and ornamented with gilding, sculpture, or otherwise.

471. Wadkin, H., and Shepherd, C. Feb. 21. *Drawings to Specification.*

Cements. — Consists in burning or calcining limestone and cement in closed chambers in such a manner that, while the flames and gases from the fuel employed pass among and act on the material, the fuel itself is kept separate from it. Specially-arranged kilns or ovens are described and illustrated in the Specification.

568. Clark, W., [*Archereau, H. A.*]. Feb. 28.
Drawings to Specification. [*Provisional protection only.*]

Refractory substances. — A lining for cupola furnaces to which compressed oxygen is supplied is composed of anthracite or coal, or lime and magnesia, or all of them, mixed with resin, pitch, or tar.

- 979. Storey, J., Bickerdike, W. E., and Wilson, W. V.** April 2. [*Provisional protection only.*]

Stonework, ornamental.—Slate and other surfaces are coated with a solution of aniline or other dye-stuff in alcohol or other volatile solvent. A film of the solid dye-stuff remains on the surface, presenting the appearance of bronze. The solutions may contain shellac or other gum for rendering the surfaces more durable. The solution may be applied by a brush, or designs may be printed on the surfaces by means of blocks, rollers, or other contrivances.

- 1118. Oakden, J., and Pickin, J.** April 15. [*Provisional protection only.*]

Stone, preserving.—An enamel for coating metals and stones to prevent rust, corrosion, and incrustation. Red marl is fused in a reducing-flame, and is then ground with oxide of lead and made soluble. Stone is dipped into the solution and heated until it adheres.

- 1458. Parsons, P. M.,** [*Pozzi, P. R.*]. May 17. [*Provisional protection only.*]

Stone, artificial.—Relates to the manufacture of artificial granite applicable for the construction of houses, docks, seaports, fortifications, roads and pavements, &c. Fragments of granite or other remains of quarries are submitted for several hours to a strong heat, about 700° to 800° C., which causes them to dissolve and form a granite sand. This sand is mixed with clay and pounded glass, in varying proportions according to whether the cement is to be refractory or not. Iron slag, pounded lava, or potash may be mixed with the clays in place of one or both of the other ingredients. The materials are diluted to an extent which leaves them slightly adherent, and are submitted to the action of a powerful mixing-machine, so as to form a perfectly-homogeneous paste, which is afterwards moulded into bricks and blocks of various forms and subjected to a great heat for at least 36 hours, so as to produce a complete cohesion of parts.

- 1700. Macintosh, J.** June 10. [*Provisional protection only.*]

Casting, moulds for. Felt &c. is saturated or covered with paraffin, stearic acid, or the pitchy residuum obtained by distilling paraffin or vegetable substances. The fabric may be used for taking "casts" of the human figure.

- 2114. Hargreaves, J.** July 19.

Slags, treatment of.—Steel slag produced by the process described in Specification No. 2046, A.D. 1867, (*Abridgment Class Iron &c.*) is lixiviated

with water and the solution is evaporated; the residue is roasted with sodium nitrate &c. to obtain an alkaline detergent. Or the solution may be treated to obtain pure alkalis. Or it is fused with silica, lime, and lead or zinc oxides &c. to make glass.

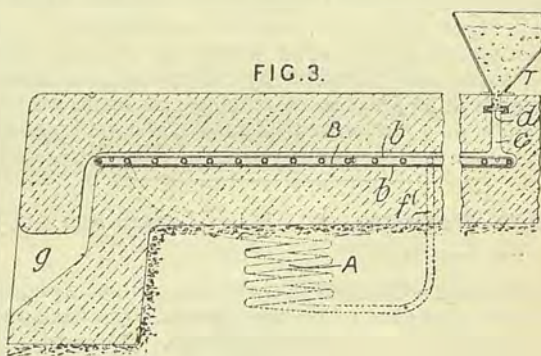
- 2131. Franzoni, B. P.** July 22. [*Provisional protection only.*]

Plasters; castings.—Plasters or plaster casts are hardened by placing them in a warm solution of glue, until they have absorbed a certain amount.

- 2632. Rust, J.** Sept. 19.

Stone, artificial.—Old, broken, or waste glass is melted in a crucible or furnace with a suitable proportion of sand, barytes, strontia, magnesia, or other earthy matter, various oxides and pigments being added for colouring purposes. By allowing the materials to remain for about six hours in the crucible or furnace, a mottled appearance resembling stone is produced by the sand. A small quantity of oxide of cobalt mixed with the other materials will give the pattern and colour of lapis lazuli; oxide of copper will give brown, dull red, green, or iron colour, according to the quantity used; oxide of iron will produce yellow or amber, and oxide of manganese a purple and grey or brown. The light and dark green materials mixed in the crucible will produce the shades for malachite. Veined marbles may be imitated by mixing the colours in the crucible at one time and moulding them as required. The material is applicable for the construction of reredoses and also for forming pavements.

- 2780. Spence, W.,** [*Marval, A. C. J. de.*]. Oct. 3.



Cements, drying. Plaster of Paris &c. to be dried is fed down a hopper T fitted with a regulating-valve d to a vertical shaft c, down which it

falls on to a travelling band *b* driven by fast and loose pulleys and spur gearing outside the apparatus. The band passes over a hot-water coil *B*, which is in communication by a pipe *f* with a coil *A* in a furnace; the dried material falls out by a chute *g*. By this arrangement the cement may be dried by a continuous process.

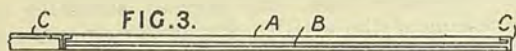
2782. Pochin, H. D., and Hunt, E.
Oct. 3. [*Provisional protection only.*]

Refractory substances.—Chrome ore is used in constructing furnaces, flues, or parts of furnaces &c. which are subjected to intense heat.

2816. Abel, C. D., [*Perret, C. E.*]. Oct. 7.
[*Provisional protection only.*]

Casting.—Melted camphor is run through a heated spout into moulds, which are made in halves, and coated with potters' earth and glue to close the joints, and then with lime-water and glue, so that the camphor may be readily detached.

2878. Nicoll, B. Oct. 12.

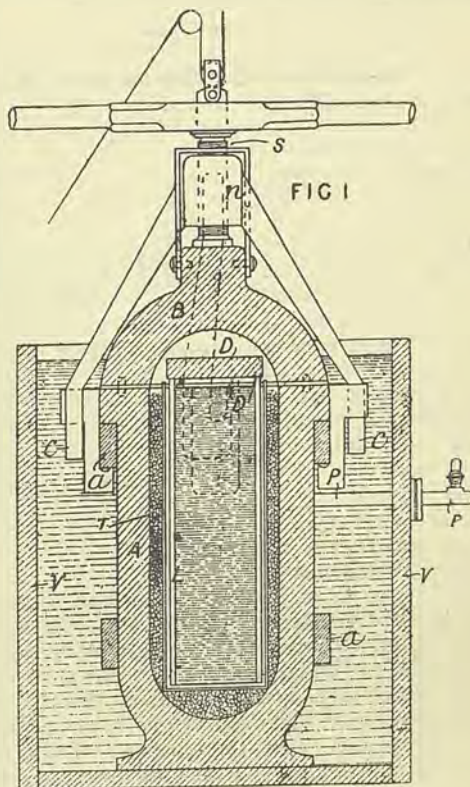


Fireproof coverings and compositions.—Slabs or sheets for walls, partitions, and roofs are formed of straw or like fibrous materials *A*, Fig. 3, stitched in the form of a web or sheet, having its edges cemented in angle-iron frames *C*, iron bars *B* being inserted in the straw, for stability, and riveted to the frame. The slabs are rendered less inflammable by soaking them in milk of lime, mixed with silicate of soda; they are then consolidated in a press, and, when dry, covered with asphalt or other material on one or both sides; after which they are again pressed and given a second coating of the same material. When fixed in position, the slabs are coated with cement or plaster.

2912. Rives, J. Oct. 17.

Casting.—Pressure is applied to castings while they are solidifying, to render them dense and homogeneous. The mould *L* is placed in a strong vessel *A*, which can be closed airtight by a cover *B* forced down by a screw *S* working in a nut *n* carried by hooked arms *c* engaging under a ring *a* on the vessel *A*. After the material has been poured into the mould, the vessel *A* is closed and compressed air is admitted through a pipe *P*. When it is desirable to apply heat to the substance

during solidification, the mould is surrounded by a thin case *T*, between which and the internal surface of the vessel *A* pieces of charcoal are packed. When the material is poured in, it ignites the



charcoal. A thin plate *D*¹ is placed on the top of the material, and a thick plate *D* of fireclay is placed over the top of the mould. The vessel *A* is kept cool by immersion in water in a vessel *V*.

2919. Cubitt, J. Oct. 17. [*Provisional protection only.*]

Stone, preserving.—Surfaces of brick, stone, &c. to be preserved or hardened are coated with a liquid composition which hardens on the application of heat, and the coating is then hardened by a blast or jet of hot air, vapour, gas, flame, or superheated steam.

2952. Crossley, W., and Hutchinson, T. C. Oct. 21.

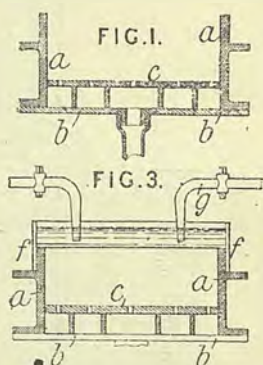
Slags, treatment of.—Blast-furnace slag is decomposed by hydrochloric acid, with the aid of heat if necessary, and the residue evaporated to dryness; soluble chlorides are washed out, and the insoluble portion, which consists principally of silica and alumina, is treated with acids to obtain salts of aluminium.

- 3135. Botterill, J.** Nov. 6. [*Provisional protection only.*]

Fireproof compositions.—Fabrics composed wholly or partly of China grass are fireproofed by treatment with a solution of ammonium sulphate.

- 3193. Ransome, E., Bessemer, H., and Ransome, E. L.** Nov. 11.

Stone, artificial; stone, preserving; casting.—Relates to the manufacture of grids, stones &c. from artificial stone. The mould used consists of a hoop or ring of iron *a*, Fig. 1, resting on a plate *b* and having within it a false bottom *c* perforated with numerous small holes, over which a cloth may be laid, if necessary. A pipe leads to an exhaust chamber connected with an air pump. Sand and silicate of soda or other material of which the stone is to be made are mixed intimately and gradually put into the mould, the exhaust apparatus being in operation. When the mould is full, a disc of india-rubber or other soft impervious material is laid over the top, so that the pressure of the atmosphere firmly presses the material into the mould. If greater pressure is required, a lid or cover is fitted over the mould, the impervious disc being held between flanges on the mould and cover, and air or other fluid is forced on the top of the disc till the required pressure is obtained. The cover and disc may then be removed, the top of the material being smoothed, if necessary. A hoop of india-rubber *f*, Fig. 3, is now placed at the top of the mould, and a pipe *g* brought over it. On opening a stop cock a solution of calcium chloride is run on to the stone, and is drawn through by the vacuum. The stone may be afterwards immersed in hot calcium-chloride solution, and water may be drawn through to remove soluble salts. The impregnation may be aided by pressure. Slabs and tiles may be made with a pattern of a different colour to the body of the stone. A wood or metal pattern is laid on the false bottom, and coloured powder such as titaniferous iron sand, or the coloured sands of Alum Bay, or crushed ores or slags, or burned clay mixed with fluid silicate, is put into the perforations of the pattern and drawn down by exhausting the air beneath. The pattern is then lifted, and the material to form the body of the stone is added and solidified as described. Grindstones formed of artificial stone may be provided with hollow metal bushes or hollow or solid axes, these being embedded in the stone while it is being made, or a cast-iron wheel may be used, round the circumference of which is



moulded a rim of artificial stone, or concentric perforated rings of iron or other material may be embedded in the stone. Broken flint may be used in place of sand, and titaniferous iron sand may be used alone or with other materials when great hardness is required.

- 3234. Parsons, P. M., [Pozzi, P. R.]** Nov. 15.

Stone, artificial.—Natural granite is disintegrated, by submitting it to the heat of a Hoffmann or other furnace or oven, and is mixed with pounded glass, or the constituents of glass, or lava, or iron slag, or a mixture of all or any of them. Refractory or other clay is then added, and the mixture is kneaded with water, moulded, and subsequently vitrified by heat. Quartz, mica, gneiss, felspar, or the like may replace the natural granite. The artificial granite may be moulded into blocks suitable for buildings, fortifications, docks, and other engineering structures and for pavements.

- 3501. Bessemer, H.** Dec. 9.

Refractory substances; statuary.—Relates to materials for the manufacture of firebricks, tiles, solid or hollow fire-lumps, retorts, pipes, crucibles, and other vessels required to resist a high temperature, and of ornamental busts, figures, &c. To save time, and prevent shrinking and distortion of the articles during drying and burning, they are made of fireclay (sometimes mixed with other materials) which has previously been subjected to a red heat, whereby it loses its plasticity and power of shrinking. Old firebricks or bats may be used, or raw clay may be burnt for the purpose. The burnt clay is sometimes mixed with a little plastic clay in a dried and powdered state. The requisite crushing and pulverization are preferably effected by the machine described in Specification No. 1346, A.D. 1858, with the subsequent use of rolls or edge-runners, the clay being afterwards sifted or otherwise separated into various degrees of fineness. To withstand changes of temperature, when porosity is permissible, coarsely-powdered clay is preferably used. In a pug-mill or mixing-cylinder, the prepared clay (sometimes after being moistened) is well mixed with sufficient silicate of soda or potash, having the consistency of thick treacle, to produce a sticky or moist mass, which is well rammed into the mould employed. The moulded article, when removed from (or sometimes while in) the mould, is well saturated with a solution of chloride of calcium or other soluble salt containing a base which will form an insoluble compound with the silica, and the article may be subsequently kept in a dry place, to allow the gelatinous silicate of lime formed in the interstices between the grains of clay to harden and cement the whole together. Afterwards the chloride of sodium, which is also formed, is dissolved by a shower of water acting

for several hours. The article is then dried. In making ornamental articles, coloured clays or metallic oxides &c. may be added to the clay before burning, in order to vary the colour. A partial vacuum is preferably employed to assist in the moulding, saturating, washing, and drying of the articles, in accordance with the invention described in Specification No. 3193, A.D. 1867.

3561. Kidd, J. H. Dec. 14. [*Provisional protection only.*]

Fireproof coverings and compositions.—Relates to the manufacture of air-proof and non-inflammable brattice cloth, without the use of tar, and consists in treating the fibre or yarn or thread before it is manufactured or woven, or the cloth after it is woven, with a solution of sulphate of ammonia, tungstate or silicate of soda or potash, or borax, or any one or more of them. After being thus treated, the cloth is passed through solutions or pastes made of the above-mentioned solutions, or

of soda and water combined with steatite or china clay. Separate vats or vessels are employed, the first containing one or more of the solutions first-named, and the second one or more of the solutions or pastes of steatite or china clay. The cloth enters the first vat, where it is immersed and thoroughly saturated; it then passes through the second vat, then to rollers which press it, and then to drying-cylinders. A small portion of dye, gummy matter, or dissolved buffalo hide may be added to the solution in the second vat, if necessary.

3708. Mennons, M. A. F., [*Picker, J. G. W.*] Dec. 31.

Stone, artificial; concretes.—In order to accelerate the induration of concrete or artificial stone containing lime and sand or other silicious matter, the mass is dried sufficiently to allow manipulation, and is treated with carbonic-acid gas in a closed chamber.

A.D. 1868.

20. Izod, E. Jan. 2. *Drawings to Specification.*

Casting.—To form a block from which to prepare the moulds on which stays or corsets are bent into shape, a pair of stays are fastened together and covered top and bottom to form a bag, which is filled with sawdust, bran, &c., to keep it distended, and then coated with plaster of Paris. When the coating has set, the sawdust is removed and replaced by plaster of Paris.

131. Nimmo, G. Jan. 15.

Refractory substances.—A composition for making furnace linings, crucibles, firebricks, &c. consists of the ash or residuum from the combustion of coal mixed with clay or clay and fire sand. The mixture is moulded into the shape required.

615. Bodmer, R., Bodmer, J. J., and Bodmer, L. R. Feb. 24. *Drawings to Specification.*

Stone, artificial.—Lime, either anhydrous or hydrated, is mixed with Portland or other cement, especially the cement described in Specification No. 1970, A.D. 1866, and with silicious materials or any kind of stone, such as sandstone, limestone, granite, quartz, felspar, puzzuolana, tufa, blast-furnace or other slag, well-burnt clay, or similar materials. These materials, or any of them, are ground and mixed dry, and are then damped and may be moulded into bricks, building-blocks, tiles, slabs, &c. The cementing-material may be mixed with sand, broken stone, slag, hard burnt clay, broken earthenware, or similar materials, the mixture being made either dry or wet.

741. Lewthwaite, J. March 4. *Drawings to Specification.*

Statuary.—Relates to the treatment of parkesine for use in making busts &c. The parkesine is applied in a plastic state to a backing of paper, calico, &c., and submitted to pressure, and, if desired, it may be polished and ornamented by transferring designs on to it or by embossing, colouring, &c. In some cases two or more fabrics may be united by layers of parkesine, or they may be first coated and then united. The fabrics &c. may be stripped from the parkesine, leaving the latter only.

818. Lake, W. R., [Lowrey, R. O.]. March 9.

Fireproof coverings and compositions.—Relates to a composition consisting principally of vegetable fibre treated or united with chemicals, for producing soft waterproof and fireproof paper, cloth, leather, and other articles. The fibre, pulp, paper, or article made therefrom is saturated or otherwise treated with a solution of gelatine or animal glue, soap or like matter, and glycerine or saccharine matter; the material is then treated with an astringent solution, which will render the gelatinous solution insoluble in water, a solution of an aluminium salt and common salt being preferably employed. If desired, the two solutions may be used mixed. In place of the gelatine solution, gum arabic or senegal, dextrin or casein, or albumen, gluten, starch, or a mixture of any of these, with or without gelatine or glue, may be used; and in place of the astringent solution tannin or tannic acid, catechu, gallic acid, boracic acid, alum, borax, any of the salts of the sesquioxide of chromium, sodium chloride, &c., or a mixture of any of these, may be used. For giving body to the material, clay or aluminous earths, plaster, ground slates or stone, or metallic oxides may be added to the fibre or pulp; pigments or colouring-matters may be added to the gelatinous compound, especially when a coating is required on the paper &c. The surface may be enamelled or polished, and painted upon. For fireproofing the material more completely, ammonium sulphate or phosphate, sodium tungstate, borax, magnesium sulphate, carbonate, or chloride, &c. may be mixed with the gelatinous solution. The treated material is applicable as a substitute for oilcloth, leather, &c., or for the manufacture of bags, belting, cordage, twine, harness, roofing, household utensils such as buckets, tubs, and basins, boats, barrels, wearing-apparel, and ornamental articles such as are usually made of papier mâché.

896. Gee, J. S. March 16.

Stone, colouring; stonework, ornamental.—Consists of a process for ornamenting and enamelling slate, marble, and similar materials. A design, prepared upon a sheet of transfer paper, paper, cloth, or the like, is coated with adhesive material, laid on the slate or other surface, and dried, and,

the paper is moistened and peeled off. The surface is stoved, varnished and heated alternately, as often as is necessary, and polished. The transfers are preferably produced by wood-block printing. In ornamenting slate &c., made into the form of a panel or the like, it is coated with colour for the ground, and placed in the stove. Colour is then projected on to the surface, and the article is dried, varnished and dried again, and rubbed down with pumice. The design is transferred as described, and the slate is stoved, varnished and dried alternately, rubbed smooth, varnished, stoved, polished with rottenstone, and rubbed with the hand.

1045. Warner, A. March 27.

Cements.—Consists in making cement by combining silicate or oxide of iron with sulphate of lime, soluble phosphates, acids, &c. The iron silicate, preferably in the form of iron slags, iron oxides, or iron ores, is ground to a fine powder, and intimately mixed with sulphate of lime which has previously been mixed with soluble phosphate of lime, water being added to give the mixture the desired consistency. In place of the soluble phosphate of lime, superphosphate may be used, or phosphoric or boracic acid may be substituted.

1074. Claus, C. F. March 30. [*Provisional protection only.*]

Refractory substances.—Silicious materials are as far as practicable excluded from iron during puddling, the furnaces being constructed only of substances such as alumina, magnesia, or lime, which are not acted on by oxide of iron, pig iron, or the fluxes used, and which do not contain silicic acid; but, as an exception, steatite or serpentine may be used.

1124. Abel, C. D., [Perret, C. E.]. April 3. [*Provisional protection only.*]

Casting.—Moulds for camphor are made in halves, and are coated first with a mixture of potters' earth and glue to close the joints, and then with a mixture of lime-water and glue to assist the separation of the camphor from the mould.

1202. Verstraet, L. April 9. *Drawings to Specification.*

Fireproof coverings and compositions.—Oil tanks on board ship are protected by an outer casing enclosing an incombustible packing, which may consist of sawdust saturated with calcium-chloride solution and carbonized.

1267. Hargreaves, J. April 18. [*Provisional protection only.*]

Slags, treatment of.—Steel slag obtained in the process described in Specification No. 2046, A.D. 1867, (*Abridgment Class Iron &c.*), is lixiviated with water to obtain alkaline phosphates. Or the slag is ground and used as manure.

1283. Malam, W. April 20. [*Provisional protection only.*]

Refractory substances.—Gas and other retorts, retort casings, crucibles, and melting-pots are made of a composition consisting of asbestos or talc (or compounds thereof) combined with fire-clay, firebrick, "rough stuff," or other refractory material. After the refractory material has been kneaded with water into a pasty consistency, the asbestos or talc is worked into it, laying it on in films, flakes, or layers, or in a pulverulent state, so that it becomes incorporated with the material.

1361. Spence, P. April 25. [*Letters Patent void for want of Final Specification.*]

Slags, treatment of.—Slag from the regulus formed during the smelting of copper ores, or the tap cinder obtained as slag in puddling, is ground and used, together with ferrous carbonate, as a purifying-material for coal gas.

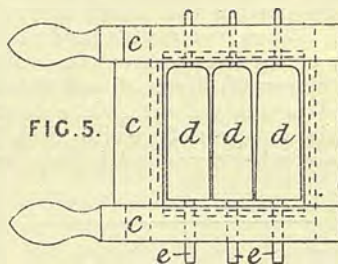
1382. McDonnell, E. April 28.

Concretes for making tiles, pavements, &c. The concrete consists of chalk, stone, lime, grit, shingle, broken stones, ground burnt clay, vegetable or mineral pitch, and tar, with sometimes resin and colouring-matters. One half of the pitch and tar is melted, and the other materials, previously mixed and heated, are stirred in, more pitch being added till the required proportions are obtained. Or the material may be made without the addition of the broken stone &c.; it is then remelted, and the hard materials stirred in. The material is either run into moulds, or spread at once over the surface to be covered. The concrete may be used for paving streets or for the manufacture of tiles, mouldings, architectural decorations, floors, roofs, &c., and in all cases where it is necessary to exclude or retain water.

1591. Johnson, J. H., [*Sabrou, F. L.*]. May 15.

Casting.—Relates to moulds for casting hollow bricks or blocks for floors, ceilings, &c. in plaster or the like. The mould is made of india-rubber, caoutchouc, or the like, and has internal projections which form air recesses in the brick or block to facilitate its drying and form a keying for

plaster &c. Fig. 5 shows a mould for forming hollow bricks, in which hollow cores of light material are embedded in the brick. A series of hollow cores *d* are supported by rods *e* in a wood



or metal mould *c*, which is provided with handles and formed of removable sections. The cores are made by covering a greased or soaped mandrel with cloth or canvas and coating the latter with plaster or any cheap material. The end, through which the mandrel has been withdrawn, is then closed with a cover of wood or plaster, with or without cloth. The cores are left in the moulded blocks.

1907. Clark, A. M., [*Fabre, F.*]. June 11. [*Provisional protection only.*]

Slags, treatment of.—Blast-furnace slag, while in an incandescent fused state, is plunged into water troughs, whereby it is converted into a coarse sand, which is then mixed, in a mortar-mixing or similar machine, with hydraulic or other limes, cements, or plaster, and moulded under heavy pressure to form bricks or slabs.

1920. Fleury, A. L. June 12. [*Provisional protection only.*]

Cements; concretes; stone, artificial; fireproof compositions.—A soluble hydrate of silica is made by heating silica or silicious materials in presence of sulphur, and decomposing the resulting sulphide of silicon by water. It is used for making cements or concretes, artificial stone, fireproof compositions, &c. For making concretes or the like, it is mixed in a mould with heated marble dust, sand, chalk, plaster, clay, or lime. The cement made from the solution is applicable for making statuary, monuments, mantelpieces, columns, &c. The solution can be used alone for fireproofing walls, roofs, wood, &c.

1921. Henry, A. L. June 12. [*Provisional protection only.*]

Cements; fireproof compositions; stone, artificial.—Relates to the treatment of gold and silver ores and to the utilization of products remaining after the extraction of the metals, for making cement &c. Powdered gold or silver ore is mixed with calcium fluoride, or other fluorine salt or acid.

This mixture is exposed to the combined action of steam and carbonic acid. A decomposition of the mineral results, and a milky solution is obtained from which the mechanically-suspended gold is abstracted by passing the liquid through a bath of mercury. When mixed with sand and clay, the residue may be used as a cement for making roofs and other waterproof, fireproof, and weather-proof materials. When mixed with white quartz, sand, and "slightly compressed white flint," marble for statuary or other ornamental purposes may be made.

1972. Clark, A. M., [Clémandot, L., and Rousseau, E.]. June 17.

Refractory substances.—Kaolin, felspar, and other materials for crucibles, furnace hearths, and other vessels or apparatus used in making glass or pottery, are freed from iron oxides or other iron compounds by heating them to a red heat with ammonium chloride, or ammonia, or a material containing ammonia.

2048. Highton, H. June 25.

Stone, artificial; concretes.—Relates to the manufacture of artificial stone or slate for paving &c. Blocks of the required form are moulded or cast in hydraulic mortar, cement, or lime mixed with water, to which a little hydrochloric or other acid may be added, and, if necessary, with sand, gravel, burnt clay, broken flint, or other substances, pressure or percussion being applied if plastic materials are used. The blocks are then steeped in a solution of soluble silicate, supersaturated with soluble silica. As the silica is withdrawn from solution, fresh quantities, as a precipitate or as soluble silica, are added, or the alkaline liquid may be withdrawn and replaced by fresh. In place of a solution of soluble silicate, a solution of soda or potash, either caustic or with the addition of lime, may be used. The blocks may be formed with elevations or depressions, to allow the access of the solution, or the interior may be saturated by atmospheric exhaustion. When the block has been sufficiently steeped, it may be washed, or a solution which will decompose the silicate and throw down an insoluble precipitate, such as a salt of the earths or metals, or an acid such as oxalic, fluoric, fluosilicic, tartaric, boracic, or phosphoric acid, may be applied to the surface. In constructing pavements, the mixture of cement and stones or other material may be laid down and covered with soluble silica and a solution of soluble silicate.

Stone, colouring.—To produce a white colour, a solution of a metallic sulphate, such as sulphate of zinc, magnesium, or aluminium, which when decomposed by the lime in the stone will throw down a white oxide, is applied, and then a solution of chloride of barium or caustic baryta. To produce other colours, a soluble salt of barium or other metal is applied, and then chromic acid, or, in some cases,

metallic salts may be used alone. The sulphates and other salts of copper and iron are used for green and red shades.

Cements.—The cement for making artificial stone may be made of lime in conjunction with clay or silica and alumina burnt together and ground, or by mixing lime with substances containing silica and alumina, such as puzzuolana and "natural soluble silica."

2108. Francis, L. July 2.

Casting, compositions for. An elastic composition of glue and glycerine, with or without saccharine matter, and metals or metallic salts is used for making printing-plates, hones, belts, polishing-wheels, &c. Gelatine may be substituted for the glue, and gums, resins, or bitumen in suitable solvents may be added. The composition is cast in oiled moulds.

2340. Abel, C. D., [Roux, H.]. July 25.
Drawings to Specification.

Cements.—For cementing together firebricks forming the bed of a reverberatory furnace for separating zinc from argentiferous alloys, a paste is employed composed of fireclay and powdered calcined bones.

2379. Newton, A. V., [Tardieu, A.]. July 29.

Refractory substances.—Bauxite and other analogous substances are employed in the production of a refractory powder which can be used instead of emery powder. The bauxite may be calcined in a powdered state or in pieces, when it may be advantageously cooled in water to break it up and render it friable. If the bauxite contains too much oxide of iron, this is removed by heating the bauxite with hydrochloric acid and washing away chloride of iron. The bauxite may be pressed into moulds, either alone or mixed with boracic acid, chlorides of calcium, potassium, sodium, or barium, lime, chalk, marl, dolomite, magnesia, gypsum, phosphate of lime, sulphate and carbonate of barium, common and refractory clays, and alkaline, earthy, or metallic silicates. The material may be bound together by a quick or slow setting mortar of powdered bauxite and plaster of lime, or Portland cement, or other analogous products, which may be mixed with gelatine, glue, &c. The powder or the composition may be used for making hones and stones for sharpening and working in metal, whetting-scythes, for grinding and sharpening knives, carpenters' and joiners' tools, polishing marble, glass, and crystal, cutting stones, grinding and crushing, making millstones, making bricks, firebricks, tiles, potteryware, kerbstones, paving &c. stones, retorts, crucibles, reverberatory, puddling, &c. furnace bricks, beds, walls, bridges, domes,

arches, roofs, hearths, &c., which may be moulded in place, muffles, tuyères for melting &c. furnaces, Bessemer converters, laboratory instruments, domestic &c. vessels, and pipes for heating air or conducting gas.

2492. Le Roy, F. Aug. 10.

Cements.—A cement or mortar for use in building boilers &c. is made by mixing brick-clay, charcoal, sawdust, fuel sweepings, cow hair, coco-nut fibre, starch residues, and flour, yeast, or the like with water and oil. After stirring, the mixture is allowed to ferment before use.

2494. Hunt, B., [*Osgood, J. M.*]. Aug. 10.
[*Provisional protection only.*]

Casting.—Relates to apparatus for casting eyelets from metal or composition. The molten metal or composition passes from a suitable vessel through a tube into a chamber covering part of a cylinder formed with an annular recess fitted with sliding tubes surrounding fixed cylindrical pins, thus forming circular spaces to receive the metal. As the cylinder rotates, the tubes are withdrawn by means of cross-bars working in cam-grooves formed on the inner sides of the cylinder heads, and the metal flows into the spaces formed. The continued rotation of the cylinder carries the recesses past the edges of a plate which smooths off the outer ends of the eyelets. The tubes then gradually force the eyelets out of the recesses and against projections, buttons, or headers on a second rotating cylinder which forms the heads of the eyelets. The tubes are afterwards thrown out to their fullest extent, to eject the completed eyelet.

2629. Setchell, O. C. Aug. 24.

Stone, artificial; concretes.—Hard substances such as gravel, broken stone, burnt clay, broken bricks, tiles, or pottery, debris of slate or stone quarries, slag, scoria, cinders, or other substances are mixed with Portland cement, or hydraulic lime, and iron filings, or crushed slag from iron works. When the materials are all well mixed they are moistened with dilute hydrochloric acid and moulded to the required forms in metal or other moulds, under a pressure of one or two tons on the square inch.

2674. Richardson, E. Aug. 29.

Casting, compositions for. Relates to materials for wholly or partially casing or covering bottles or other glass or earthenware vessels, applicable also as a substitute for papier mâché in forming sheets, slabs, mouldings, ornaments, or vessels. Spent hops are reduced to a soft mass or pulp to which is added glue or size with treacle or

chemicals, such as alum and potassium bichromate. Paper, fibre, or paper pulp may in some cases be added. The mixture is rolled into sheets or slabs or cast, moulded, or pressed into the desired shape.

2759. Holland, C., [*Frear, G. A.*]. Sept. 7.

Stone, artificial; cements.—Relates to compositions which may be used for making artificial stone or marble, or as stucco, mastic, cement, &c., and which may be moulded into statuary, drain pipes, roofing-tiles, or other articles. In making one composition for artificial stone &c., an aqueous solution is first obtained by boiling gum shellac in water containing alkali enough to dissolve the shellac. This solution is then used to damp a mixture of quicklime, fresh hydrate of lime, or hydraulic cement with sand or silicious material, with or without the addition of gravel, colouring-matter, &c. The mixture is then compressed into moulds, and afterwards allowed to harden. Sand, clay, lime, chalk, and other substances may be used in place of the lime and cement. For mastic or stucco the aqueous solution is added to lime, sand, clay, &c. to make a pasty mass which can readily be applied to the surface with a trowel. Another composition is obtained by adding to the mixture of lime or other material and solution of shellac, sand, red or black oxide of iron, or asphaltum, mixing thoroughly and compressing in moulds. This composition also may be used as stucco or cement by reducing to the proper consistency with water or shellac solution. Gypsum may be added, and the compositions may be coloured with black oxide of manganese, carbonate of iron, &c.

2948. Ritchie, G. Sept. 25. *Drawings to Specification.*

Sound-deadening coverings and compositions.—Waterproof and sun-proof &c. fabrics for covering walls, ceilings, or floors of rooms, for preventing sound from travelling from one room to another, or for similar uses, are made by coating two cotton or other woven fabrics with a mixture of cork dust and waterproof and elastic gum or india-rubber cement, and placing the fabrics with their coated surfaces together and passing them between rollers. The mixture of cork dust &c. is squeezed into and through the fabrics, so as to form an external coating to them. In some cases the cork cement is inserted between two thin pieces of boarding, which may afterwards be covered with paint. For some applications, sheets of cork are cemented between sheets of canvas.

3006. Highton, H. Oct. 1.

Stone, artificial; stone, colouring; stone, preserving.—In order to produce blocks, slabs, and slates of artificial stone, such as are described in Specification No. 2048, A.D. 1868, but coloured to

any desired tint, they are moulded or cast in hydraulic mortar or cement, mixed, in some cases, with sand, gravel, &c. Hair, fibre, or pieces of metal &c. may also be added to increase the toughness. When the material has set, the surfaces of the blocks &c. are washed with any durable pigment, such as lampblack, ochre, ultramarine, or red oxide of iron, mixed with lime or alkaline earth and water. According to the Provisional Specification, a solution of a salt of iron or copper, or other colouring-solution, may be applied. When the wash is dry, the coloured blocks &c. are steeped in a solution of soluble silicate, to which soluble silica may be added, to harden and close the pores and set the colour. In order to preserve walls or other surfaces of stone, plaster, &c. the pores are first filled by dressing the surfaces with one or more solutions capable of producing a precipitate of insoluble matter, and the surfaces are then dressed with a solution of paraffin or bituminous substance, such as asphalt, saturated solutions in carbon bisulphide and turpentine being preferably employed.

3035. Howden, J. Oct. 5. [*Provisional protection only.*]

Plasters.—A mixture of plaster of Paris and lime, with or without gelatinous or glutinous matter, is employed as a non-conducting plaster for boilers, pipes, &c.

3059. Monteith, R. T. Oct. 7. [*Provisional protection only.*]

Cements; refractory substances; fireproof compositions.—Consists in the use of a mixture of fireclay and pulverized "oil still coke" for cements or for luting or coating articles to be subjected to heat.

3111. Barnett, F. Oct. 10.

Asphalts for paving. Ten hundredweights of powdered limestone and five hundredweights of pitch are placed in alternate layers in a cauldron, which is then hermetically sealed. Half a hundredweight of mineral tar is injected, and the whole is boiled, being mechanically agitated meanwhile; the mass is then drawn off and cast in moulds into convenient blocks.

3155. Bonneville, H. A., [*Taylor, T., Rogers, E. P., and Coryell, M.*]. Oct. 15.

Casting.—Elastic moulds for casting sugar, pottery materials, wax, soaps, confectionery, plaster of Paris, &c. are made of vulcanized rubber. The rubber prepared for vulcanization is shaped in metal moulds, and vulcanized in the usual manner. When the reis much undercutting, as in the case of works of art, incisions are made in the rubber

compound or mould at the undercut points. A back mould of plaster &c. is generally used to hold the rubber mould in position and keep the parts together while the plastic substance is poured into the mould. To prevent the material from adhering, a little moisture or alcohol is applied to the mould instead of oil.

3249. Ferguson, R., and Lord, G., [*Executors of Anderson, J.*]. Oct. 24. [*Drawings to Specification.*]

Asphalts.—Native mineral pitch or asphalt for use in making felt &c. is purified, softened, and tempered by boiling it and adding tars or oils, such as shale tar, paraffin still bottoms, "called also "paraffin sludge or boghead tar," paraffin tar, Archangel tar, asphalt oil, &c., the mixture being stirred until it becomes a thin fluid.

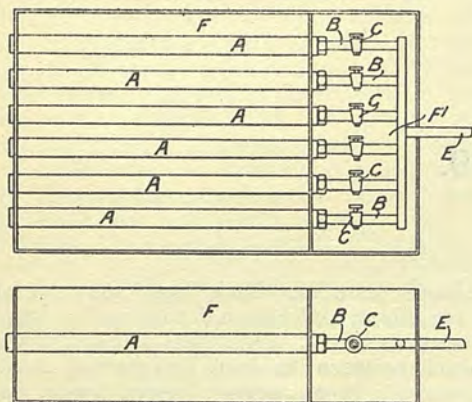
3269. Nicoll, B. Oct. 26.

Plasters; stone, artificial; concretes.—Relates mainly to a composition for ornamenting walls, floors, pavements, roofs, and ceilings and for manufacturing mantelpieces, pillars, pilasters, and other parts of buildings. Chalk is mixed with cement, and colouring-matter if required; the mixture is spread out into a layer, and is allowed to dry and harden, after which it is broken up and the fragments are mixed with a plastic mixture of cement and chalk tinted as required. The mixture is applied to the surface to be decorated with a trowel or otherwise, and when dry the surface may be scraped, rubbed, or otherwise treated so as to produce a smooth surface, and it may be hardened by the application of a solution of silicate of soda.

3279. Ransome, F. Oct. 26.

Stone, preserving; cements.—Relates to means for preserving and hardening stone, brick, cement, &c. The stone is treated with a solution of baryta, with a brush or by immersion, the operation being repeated, if necessary. The surface is afterwards coated with a solution of a soluble silicate, preferably made as neutral as possible by adding gelatinous silica, freshly precipitated from a weak solution or separated by dialysis. Lime may be used instead of baryta, sugar being added to increase its solubility. The order of applying the solutions may be reversed. Or the stone may be treated in succession with solutions of superphosphate of lime, baryta, strontia, or lime, preferably baryta and silica, or an alkaline silicate. The phosphate of lime may be wholly or partially replaced by alumina, zinc, lead, or other metallic salts. Colouring-matters may be added.

- 3393. Bousfield, G. T.,** [*Divine, S.*].
Nov. 7.



Casting.—Relates to apparatus for casting soap into bars. The soap in the hot liquid condition is supplied by the pipe E to the pipes B provided with stop cocks C and immersed in a vessel F¹ of hot water; thence it flows to the pipes A, of the form of the intended bar, immersed in a vessel F of cold water by which the soap is cooled and hardened. The liquid soap is supplied to the pipe E by a pump. After a tube has been filled with liquid soap, it is allowed to cool, and its stop cock C is opened; the pressure then forces out the bar of soap, its place being again taken by liquid soap. A small quantity of the solidified soap is left in the tube, to act as a plug and prevent the escape of the liquid soap. The stop cock is then closed, and the contents of the tube are left to cool. The pipes may be filled with hot soap by exhausting the air, and the cooled soap may be expelled by a piston, by pneumatic or hydraulic pressure, or otherwise. The pipes are preferably of copper, and may be of rectangular or other section; they are preferably horizontal as shown.

- 3651. Johnson, J. H.,** [*Blake, D.*].
Nov. 30. [*Provisional protection only.*]

Stone, artificial and imitation.—In order to produce imitations of and substitutes for stone and other hard substances, dry fibrous material is ground to a fine flock and is mixed with powdered gum, shellac, or other adhesive and, if required, with white lead or pigments. The mixture is then moulded by pressure and heat.

- 3673. Clark, A. M.,** [*Trenauay, A.*].
Dec. 2. *Drawings to Specification.*

Concretes; asphalts.—A concrete for road foundations is composed of coarse river sand, lime from

gas works, hydraulic lime, pulverized brick, and dried and pulverized clay. A "mineralizing" composition for treating wood paving-blocks consists of "hydrocarburet of resin," boiled linseed oil containing litharge, pure wood tar, naphthalene, and pulverized plumbago. A waterproof coating for the underside of the blocks is composed of coal tar, resinous pitch, baked clay, pulverized lime, and plumbago. An adhesive mastic for filling the interstices is composed of pitch from peat, yellow galipot, whiting, pumicestone, and manganese oxide.

- 3786. Prince, A.,** [*Fleury, A. L.*]. Dec. 12.
[*Provisional protection only.*]

Cements; stone, preserving; stone, artificial; fireproof compositions.—Relates to the treatment of gold or silver ores or quartz to obtain various useful products. Gold or silver ores are powdered, mixed with calcium fluoride, cryolite, or other fluorine compound, and treated with water, steam, and carbonic acid in a closed vessel. The mechanically-suspended gold in the liquid is removed by amalgamation &c. Silver is also separated when required. The residual liquid is applicable as a cement or paint. It may be used alone as a preservative coating for old buildings, or mixed with sand and clay as a cement for roofs &c. Quartz or flint is powdered and mixed with gas tar, petroleum, or other carbonaceous substance or hydrocarbon. The mixture is moulded into small balls and heated in a crucible in a current of sulphur vapour, carbon bisulphide, or sulphuretted hydrogen. Silicon sulphide is thus obtained as a grayish-white powder, which is decomposed by water, forming a solution of soluble silica and sulphuretted hydrogen. The sulphuretted hydrogen may be collected and used again, and the solution of silica may be applied as a cement or coating. Thus it may be mixed with marble dust, sand, chalk, plaster, clay, or lime, to form artificial-stone building-blocks or concretes, columns, mantelpieces, statuary, monuments, &c. It may be used alone as a fireproof coating for roofs, vaults, fabrics, &c.

- 3893. Gedge, W. E.,** [*Labat, F., and Meric, J.*]. Dec. 21.

Asphalts.—A bituminous composition is made by melting sulphur and adding to it galipot or colophony, then lampblack, and, lastly, sand, the whole being well mixed. The material may be used in the shape of bricks, and it may be applied to wood or laid as a coating upon any desired foundation. It is suitable for bottoms of reservoirs, and for pavements, and for roofing and other purposes.

A.D. 1869.

41. Robbins, E. Jan. 6.

Casting; statuary.—Relates to the manufacture of ornamented building slabs and blocks, tiles, columns, casts, statues, statuettes, vases, &c. Powdered substances are suitably distributed over a table, or a ground or roughened glass surface, by stencil plates. The plates or the table may receive motion to give shaded or other effects. The substances may be rendered adhesive by steam, moisture, heat, or coating the table with an adhesive substance. The table is preferably washed over with a mucilaginous solution to facilitate the separation of the finished slab &c. The design is backed with cement, plaster, clay, or other material, which can be hardened by liquids, chemicals, or heat, and is applied in a dry or wet state. The powdered substances may be of a mineral, vegetable, animal, metallic, or fibrous nature, and are sometimes mixed with soluble silicates, cement and plaster, or substances indurated by water, chemicals, or heat. A polished glass table or slab is used in making polished blocks or slabs. A translucent cement is sometimes coated over the table, and adheres to the finished slab. Portions are sometimes removed from the powdered design, by means of an adhesive pattern, and are suitably replaced. The stencil plate may be treated with colours, or they may be left in position, and finally drawn through the plastic backing to produce marbled or other effects. A plastic slab of cement or plaster, made to imitate marble, may be rolled up in cloth and then unrolled upon the design in powders. The stencil plates are supported upon the table by wire gauze or perforated sheets so attached as to bind together metal strips set edgewise, which are themselves skeleton stencils. The metal strips may be replaced by a gelatine, wax, sulphur, metal, plaster, cement, or other framework, which may be left embedded in the design. The stencil plates may be of lace, network, woven fabric, paper, or fibrous material, and may be left embedded. The powders may be distributed over the table by hoppers fitted with tubes and valves operated by hand or automatically. Or the powders are blown into a cloud, or fall through a vacuum chamber and settle upon the table. The moulds, cores, and stencil plates may be formed of combustible material, so as to be burnt out when the casts, slabs, or tiles are fired. Recesses are thus formed, and are filled in with coloured substances; or the recesses are coloured by applying colours to the moulds &c. The article may be formed of layers, by successively dipping the moulds and cores in

the plastic material. Each layer may be of a different colour, and have a decoration to be seen by transmitted light. Ornamental spaces may also be formed between the layers by inserting combustible pieces. Lace, netting, fabric, paper, paper pulp, fibrous, or other combustible patterns may also be used, and be treated with colours or powdered substances. The moulds may be strengthened by wire. Statues, statuettes, and the like are made in combustible moulds formed from a gelatine or india-rubber model or original; or they are modelled upon a combustible bed or support.

198. Walton, F. Jan. 21.

Stone, artificial; stonework, ornamental; stone, colouring; casting.—Consists in part in performing by machinery, instead of by hand, the operations described in Specification No. 1505, A.D. 1862, for making artificial marble &c. A carriage or framework is mounted on wheels covered with india-rubber or other soft material, which run on the edge of the sheet of glass or other material on which the marble is to be moulded. The frame carries a hopper, an adjustable roller with a "ductor" to keep it clean, and an adjustable metal gauge. The artistic work is produced by placing threads of silk saturated with colouring-matter on the glass, covering them with liquid cement, and afterwards withdrawing them. The frame is then run along the slab so as to distribute equally over the surface a layer of dry cement, preferably Keene's, from the hopper. The slide of the hopper is then closed, and the roller is lowered so as to pass lightly over the surface. If the moisture is not equally distributed, the roller is further lowered, and again passed over. A piece of canvas is fixed at one end of the slab and spread over the surface, and the roller is passed over it to embed it in the cement. The roller is now raised, and a quantity of coarse cement, mixed with water in a pug-mill, is placed on the surface to form the backing. The gauge is then lowered, and passed over so as to spread the cement in a uniform layer. This operation is repeated until a sufficiently thick backing is obtained. The canvas backing is sometimes saturated in a waterproof composition, preferably linoleum varnish, or wire gauze or perforated sheet metal may be substituted for the canvas. Instead of the backing of cement, a layer of pasteboard, previously roughened, may be used, and the slab, while still pliable, may be used as veneering for pillars or other irregular surfaces, the pasteboard being removed when the cement is

dry. In a modified method of preparing the artificial marble, the frame, running on wheels as before, carries a roller, under which is fixed a thin adjustable steel "ductor" almost filling the space between the roller and the glass surface. Above the roller is placed a trough divided into compartments, to receive differently-coloured fluid cements. A lateral motion is given to the trough by crank or other motion derived from the carriage wheels. The trough filled with coloured material is adjusted to the roller, and the machine is passed over the slab. The colours pass on to the roller in more or less waved lines, and, as the colour is taken off by the ductor, it runs on to the slab. The colour may be allowed to pass to the slab without the intervention of the roller and ductor, the colours being mixed or marbled by points of metal or wood, made to rotate by the motion of the carriage. To produce well-defined patterns, a plate of glass or other material with a raised pattern is taken, and the slab is moulded on it. When set, the slab is removed, and the pattern is printed with blocks as in floorcloth printing. An elastic or soft pad of gutta-percha or linoleum is used, and, to make the blocks retain their colour, felt, plush, or other absorbing-medium is used to fill the parts where it is necessary to feed large bodies of colour. The colours are made by mixing cements with water and colouring-matters, thickened so as to work freely from the blocks. Where body of colour is necessary, as in the manufacture of encaustic pavements, the blocks are laid more than once. The design on the blocks should be a little larger than that on the slabs, and excess of colour over the edges of the recesses should be wiped off. The slab with recessed pattern may also be treated as follows:—The design is drawn on a piece of finely-perforated metal, and metal walls are fixed round the pattern so as to separate the different colours. Each space is then filled with finely-powdered cement of the required colour. The slab is floated with water, and the metal pattern is placed over it, and tapped so as to sieve the coloured compounds into the recesses. A plain or marble surface is then applied and when dry is removed, the recesses are filled up, and the surface is polished off. In place of making a recessed pattern, a stencil plate may be fixed on the glass plate. A figured design in colour may be made by spreading a thin layer of fine liquid cement, and printing on the groundwork with blocks or stencil plates, with a waterproof varnish. When this is dry, the pattern is printed in thickened dye colours, which saturate the cement where it is not protected. In some cases, an engraved plate, or an electrotyped or stereotyped reverse, is covered with liquid cement, white or tinted; this is removed from the plate when dry, and a thin liquid cement is floated into the lines. These methods of ornamentation can be applied in some cases to irregular surfaces, such as the interiors of moulds for pillars, chimney-pieces, &c.

327. Macintosh, J. Feb. 3.

Stonework, ornamental.—A composition for ornamenting the surface of stone &c. consists of

paraffin or stearic acid, india-rubber, and collodion mixed with metallic powders or gold or silver leaf. In some cases the compound of india-rubber and paraffin or stearic acid is used as a ground, and the metallic powder or leaf is spread thereon.

330. Abel, C. D., [Dubus, J. A.]. Feb. 3.

Cements; stone, artificial; stone, colouring.—A hydraulic cement or artificial stone, white or tinted, suitable for moulding into ornamental or other objects for architectural, sculptural, and other purposes, consists essentially of fat lime, refractory clay, and sulphate of lime, to which boracic and sulphuric acids are added in small quantities. The clay in a dry state and the quicklime are broken up and mixed, the other constituents are then added, and the whole is ground to powder. This powder is then mixed with water in a mill, from which it passes in the form of cakes. These are dried, baked at a white heat, and powdered for use. Or the quicklime may be slaked with water saturated with clay, the sulphate of lime and boracic acid added, and the whole mixed. After drying, the blocks are fired as before. The sulphate of lime and the boracic acid may be introduced after baking, and either before or after the final powdering. The cement, mixed with powdered marble or with fine granitic sands of the desired colour and with water, forms a paste which may be moulded into any form. The moulding may be effected by pressure or otherwise, and the object may be removed from the mould at once or may be allowed to set for a few days. The surface may be polished with sand &c.

357. Page, J. Feb. 5. *Drawings to Specification.*

Cements.—A cement, primarily described for making pipe joints but stated to be applicable for cementing other articles, such as building-materials, is composed of Portland cement, iron filings or turnings, or ground-up iron oxide, sal ammoniac, and sulphur. The cement is made up with water.

386. Lake, W. R., [Danks, S.]. Feb. 8.

Refractory substances.—A lining for puddling, "boiling," and other furnaces is obtained by mixing alkalies such as lime, soda, potash, or common salt, separately or combined, with the cinders of these furnaces while in a fluid state, or when pulverized after tapping from the furnace. Pulverized or melted iron ore, mixed with alkalies, lime, or salt, may be used for "fixing" puddling-furnaces. Quicklime is preferably made into a cream with water or brine, and then iron ore or scale mixture is added. This mixture is proportioned according to the amount of silica to be removed from the iron or ore, and is applied to the furnace when needed.

- 548. Mills, B. J. B.,** [*Munroe, W.*]. Feb. 22. [*Provisional protection only.*]

Stone, artificial.—The stone is composed of fragments, chips, or powder of stone or other mineral matter cemented together with calcined magnesia, and bittern water, (a residuum of salt works). The stone and magnesia are thoroughly mixed and moistened with the bittern water to a thick mortar. The mortar may be shaped by a tool, or by moulding, after which it is dried with or without artificial heat. The stone may be made of various colours.

- 621. Rust, J.** March 1.

Stone, artificial; stone, colouring; stone, preserving; cements.—Powdered glass of various colours, opaque, or rendered opaque by fusing with bone dust or tin oxide and sand, is mixed with lime or cements. Or lead, lime, baryta, or alumina, all or any of them, are mixed with sand, alkali, tin oxides or bone dust, and colouring-oxides such as those of cobalt, copper, iron, chromium, antimony, and silver. The mixture is fused, ladled into water, and ground, and mixed with lime, or with Keene's, Portland, or other cement, and then made into a paste with water. This paste may be spread on walls to give them the appearance of granite, marble, &c. Table tops, chimney-pieces, &c. may consist of slabs of the composition, backed by a cheaper material. When the cement sets hard, it may be saturated with a weak solution of hot glue. A solution of water-glass renders the surface hard and capable of taking a polish.

- 627. Cliff, J.** March 1.

Refractory substances.—Furnaces, kilns, ovens, retorts, linings for blast furnaces, &c. are made of powdered or reduced gannister, quartz, sand, mica, sandstone or other silicious material, plumbago, lime, baryta, steatite, or magnesia, alone or mixed with fireclay, or with each other, or with silicious or other solutions, which may be mixed with hair, fibre, sawdust, shavings, or pulverized coke &c. The materials in a plastic state, or mixed with water or solution, are sustained by wire, or a skeleton framework, in the shape of the required structure, until they have been dried, fixed, or burnt.

- 654. Cochrane, A. A. L. P.** March 4. [*Drawings to Specification.*]

Concretes; asphalts.—Blocks for various marine structures &c. are formed of a concrete consisting of gravel or stone chippings, lime or chalk, sand, and bitumen. For uniting the blocks, bitumen mixed with gas tar is used.

- 908. Johnson, J. H.,** [*Muller, E.*]. March 25. [*Provisional protection only.*]

Refractory substances.—Pure magnesia, or a refractory magnesian product containing magnesia as pure as possible, is used for lining iron and steel furnaces and apparatus employed in the Bessemer, Martin, or other similar processes.

- 945. Hope, W. P.** March 29. [*Provisional protection only.*]

Cements.—A level surface is formed above the arches or roofs of specially-constructed cement kilns and chambers, for the purpose of drying slurry.

- 1044. Rickard, W. T.** April 7. [*Provisional protection only.*]

Cements.—Potassium or sodium silicate is mixed with calcium carbonate, clay, plaster of Paris, hydraulic cement, lime, bole, red lead, litharge, &c., to form a cement for resisting the action of water, steam, and fire.

- 1122. Azambuja, A. d'.** April 12.

Sound-deadening coverings.—Relates to the manufacture of a non-conducting felted fabric. Hair cloth or "thibaude" composed of animal hair and fibrous material is spread on a piece of canvas, and layers of animal hair are placed thereon and covered with another piece of haircloth over which a second piece of canvas is spread, and the edges of the two pieces of haircloth are sewn together or are otherwise attached. The whole is then felted together to form a compact fabric, the outside cloths being then removed. In place of or in addition to the haircloth, fabrics of cotton, hemp, flax, &c. may sometimes be employed, and the fabrics are, in some cases, applied on one side only of the layer of animal hair. The upper and under pieces of canvas may sometimes be dispensed with in making the material. The material is applicable as a non-conductor of sound and heat &c.

- 1147. McLauchlan, J.** April 14. [*Provisional protection only.*]

Refractory substances.—Retorts for re-burning sugar-refiners' animal charcoal, for making gas, and for other like uses are made of fireclay, flint, Cornish granite, felspar, Lynn sand, blue Devonshire clay, Cornish china clay, barium sulphate, and fired earthenware, or other ingredients having similar qualities. Different compounds may be formed with selections of these ingredients; for example, fireclay may be used with flint and

granite, blue clay and sand, and so on. The materials are pulverized, mixed with water, drained, &c., and are then moulded and fired in the ordinary way.

1383. Highton, H. May 5. [*Provisional protection only.*]

Stone, artificial; stone, preserving.—Relates to the making, hardening, and preserving of artificial stone, and to the preserving of the surfaces of walls and other surfaces. In the process described in Specification No. 2048, A.D. 1868, instead of natural sand and gravel, artificial sand and gravel formed by crushing granite or other hard stone, in a Blake or other stone crusher, are used. In steeping the stone, a layer of soluble silica is placed above each layer of blocks of stone so as to keep the silicate solution charged with silica.

1399. Hart, J. M. May 6. [*Drawings to Specification.*]

Fireproof coverings.—In fireproofing safes or depositories, instead of combining the non-conducting and the solvent matters before placing them in the chambers, they are applied in separate layers using, preferably, first a layer of an earthy matter such as chalk, lime, or clay, secondly a layer of aqueous crystals such as ammonia alum, and, thirdly, a layer composed of a combination of such earthy matter and aqueous crystals.

1603. Johnson, J. H., [*Blake, D.*]. May 25. [*Provisional protection only.*]

Stone, artificial.—Stone &c. substitutes or imitations are prepared from any kind of fibrous material, such as flock paper, leather chips, or asbestos, finely comminuted and dry, and mixed with some dry pulverized solid fusible adhesive material such as gum lac, and are moulded in hot moulds under pressure until set by cooling. The specific gravity of the material is regulated by adding white lead or other suitable pigment. The appearance of the surface may be improved by dipping the article into a solution of pyroxylin, with or without colouring-matter. In some cases, the compound is made of ivory dust, bone dust, &c., agglutinated with pyroxylin.

1689. Barrett, O., and Wheeler, G. P. June 1.

Mortars; cements; plasters.—A mortar or cement consists of lime (slaked for ordinary slow-setting mortar, or unslaked for quick-setting hydraulic mortar), slag, and "calcined coal shale clay." Brick dust, clinkers, ashes, sandstone, marl, or sand may be added. The mixture is preserved

as a dry powder, to be mixed with water when required for use. The material may be used as an ordinary mortar and as a cement for the manufacture of concrete, or for plastering, the addition of hair being unnecessary.

1719. Morgan, W. V., [*Hall, J. L., and Morgan, J. V.*]. June 3.

Refractory substances.—In making crucibles, melting-pots, evaporating-dishes, chemical porcelain ware, bricks, tiles, or linings for furnaces, and other articles which are to be subjected to great heat, pure alumina is substituted for the blacklead, silicate, or burned clay ordinarily used. In some cases a portion of the blacklead may be retained, and the pure alumina may be used alone for lining blacklead &c. crucibles and other receptacles.

1731. Duke, J. June 4. [*Provisional protection only.*]

Cements; plasters.—A plaster or cement, which may be used for internal and external mouldings, is made by mixing limestone, chalk, or other calcareous substances with sand, ground flint, or other silicious substances. The calcareous substances are ground in an unburnt state, or burnt and then ground or air-slaked, or the burnt materials are used in an unground state. The mixture is worked up with water in a pug-mill, mixing-machine, &c. The materials may also be ground together, mixed with water, dried, burnt, and ground again.

1903. Martin, J. June 22. [*Provisional protection only.*]

Stone, preserving.—Stone is rendered waterproof by immersion first in a solution of fatty acids and afterwards in a solution of aluminium sulphate. The stone may be carried on an endless band through vats containing the solutions.

2001. Frazer, W. July 2.

Refractory substances.—Materials for lining puddling-furnaces and for other similar purposes may be made by melting in a furnace, oxide of iron obtained as refuse from the roasting of pyrites in the manufacture of sulphur or sulphuric acid, with or without an admixture of lime or other calcareous material, slag, or cinder. The melted material is tapped, and then broken up and crushed.

2047. Mallet, R. Jly 7. *Drawings to Specification.*

Refractory substances.—Plates for the temporary separation of molten cast iron from nitre or other purifying-agent are made of a compressed dioxide of manganese, preferably pyrolusite or wad. The plates are preferably perforated, and may be of various shapes and sizes. The manganese dioxide may be mixed with hæmatite, ochre, clay, spathic iron ore, or oxide of chromium, cobalt, nickel, or tungsten. The chromium, cobalt, nickel, or tungsten may be introduced into the manganese oxide by moistening the oxide with a solution of a salt of the metal. Chlorate, permanganate, or nitrate of sodium or potassium may also be added to the mixture. The plates may be formed of hæmatite, with or without any of the above materials. Alumina, magnesia, or lime may also be used. Hollow cylinders or other hollow vessels for enclosing materials for purifying iron in a furnace may be made of similar materials, also bricks or blocks for lining puddling and other furnaces, or linings for crucibles &c.

2238. Lincolne, W., and Chafer, E. July 23.

Stone, artificial; stone, colouring.—An artificial marble or stone with a polished finish is obtained by applying to smooth moulds or plates of glass, metal, &c., Keene's cement or plaster of Paris, to which may be added colouring-matters, mordants, sand, and other cements. The ingredients are made into a thick paste with water, and are then applied to the moulds or plates in layers according to the number and order of the colours, using pressure. The polished finish of the surface when taken from the mould or plate may be improved by using polishing-paste, oil, &c. Bars, frames, or plates of wood or metal may be embedded in the cement. Cement thus treated is applicable for the beds of billiard and bagatelle tables.

2431. Matt, W. Aug. 14. *Provisional protection only.*

Stone, imitation; stone, colouring.—A composition for making imitation marble is made by adding glycerine to a solution of glue in water and mixing therewith a solution of resin in linseed oil. The mixture is stirred in a heated condition until it becomes white. Colours are placed in hollows in a slab or other surface and kneaded with different portions of the composition. The kneaded masses of composition are rolled together on a warm slab, and moulded to any desired form.

2448. Ransome, F. Aug. 16. *[Provisional protection only.]*

Stone, artificial.—In the manufacture of blocks of artificial stone, formed of sand &c. and a soluble

silicate, and saturated with calcium chloride &c., the process of saturation is carried out in closed chambers under steam pressure. When the process is complete, the remaining solution is drawn off, and the block is allowed to cool in a partial vacuum. Soluble salts are removed from the block by treatment with steam, or with steam and water applied alternately, the partial vacuum produced by the condensation of the steam assisting the penetration of the water.

2510. Johnson, J. H., [Blake, D.]. Aug. 23. *[Provisional protection only.]*

Stone, artificial.—A substitute for stone &c. consists of finely-divided fibrous material such as flock, paper, leather chips, or asbestos and agglutinating-material, or of ivory, bone, or other suitable powder, and pyroxylin solution, or of xyloidine, pigments, ivory dust, asbestos, &c. The compositions are, in all cases, subjected to heat and moulding under pressure, and in the case of the last-mentioned composition solvents are forced into the moulds to dissolve the xyloidine and to induce the desired solidification. To improve the surface, the objects are dipped into solutions of pyroxylin containing any required colouring-matter, and in some cases the coatings are moulded on.

2610. Hargreaves, J. Sept. 4.

Slags, treatment of.—To obtain phosphoric acid and phosphorus from the tap cinder of puddling-furnaces and iron refineries, iron cinders, and other materials containing iron and phosphorus, the materials are treated with hydrochloric acid and the soluble and insoluble portions separated. The ferrous chloride in the soluble portion is converted into ferric chloride by passing it downwards through a tower filled with coke &c. Combustion products from a furnace, together with oxygen, chlorine, and hydrochloric-acid gas &c. from a subsequent operation, are passed up the tower to heat and concentrate the solution, which is then heated in a reverberatory furnace to expel chlorine and hydrochloric acid and produce oxide of iron. The hydrochloric-acid after passing through the coke towers is condensed and used in the first process. Chloride of sodium or magnesium is added to the solution of iron chloride, corresponding in amount to the quantity of phosphoric acid present. The oxide of iron is treated with a solution of soda or potash, which dissolves the phosphoric acid. The phosphoric acid is obtained from the solution, and the phosphorus may be obtained from the acid. Iron cinders are roasted before the treatment with hydrochloric acid. Other acids than hydrochloric, and other chlorides than those of sodium or magnesium, may be used.

2724. Willans, J. G. Sept. 18.

Refractory substances.—A bottoming, lining, or fettling for puddling, cupola, steel-melting, and other furnaces is made by mixing granulated iron with iron oxide or cinder, or, instead of using iron oxide, the granulated iron may be rusted.

2921. Duckworth, J., Hindle, T., and Jerram, G. B. Oct. 8. [*Provisional protection only.*]

Casting.—Moulds for forming articles in concrete or cement are composed of sections fitted together and bound by bolts and nuts, cramps, or the like.

2940. Reid, H. Oct. 9.

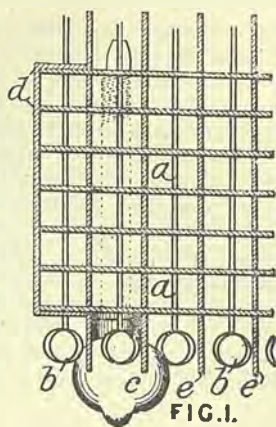
Cements.—The object is to bring the clay or shale used in making cement into a condition suitable for mixing with the carbonate of lime, and to remove injurious impurities, such as iron pyrites &c. The disintegrated clay is triturated with water, and the mixture is allowed to deposit in settling-tanks. Or the carbonate of lime may be mixed with the water holding the fine particles of clay in suspension, so that both are thrown down together.

2974. Kennedy, J. Oct. 13. [*Provisional protection only.*]

Cements.—A "sanitary" cement is made without acids, and consists of gypsum, mustard, and camphor.

3109. Simpson, C. Oct. 27.

Casting.—Moulds *a* for toy and other bricks are formed with longitudinal metal bands *d* attached to a strip of metal or wood, above which they project a distance equal to the thickness of the bricks to be cast. Intersecting the bands *d* are movable cross-bands *e*, the position of which determines the length or breadth of the bricks. The bands *d* and *e* may both be formed with teeth for fitting them together, or the cross-bands *e* may be plain and may fit into slots in the longitudinal bands. Adjusting-screws *c* passing through screw plates hold the parts together. Wires or rods *b* pass through the moulds, to form perforations in the bricks. Plaster of Paris &c. is poured into



the moulds and, when dry, the wires *b* are withdrawn, and the frame unscrewed to liberate the bricks.

3143. Burge, G. Oct. 29. [*Provisional protection only.*]

Cements.—The substance known as "soap" or "chalk soap," "found between grey stone chalk and gault," a "combination mainly of chalk or carbonate of lime and aluminous clay," is employed for the manufacture of cement. The material is treated in tanks with a hot or cold saturated solution of alum. When the effervescence produced has ceased, the supernatant liquor is drawn off, and the residuum is dried, burnt and ground, when it is ready for use as cement.

3174. Spice, R., [*Pye-Smith, A.*]. Nov. 2. [*Drawings to Specification.*]

Stone, artificial.—Relates to apparatus for forcing solutions such as calcium chloride into blocks of artificial stone. The block is placed in a chamber the bottom of which is perforated or within which perforated pipes leading to the porous material are fitted. Any holes not covered by the block are plugged. The block may be supported on a suitable bedding. The chamber is filled with the solution, and, hydraulic pressure being applied, the solution is forced into the block, the air escaping through the tubes or through the perforations in the bottom of the chamber. Water may be forced through in a similar way to wash away any soluble materials left in the stone. The chamber may have movable sides or top, fitted with airtight joints.

3190. Snell, E. Nov. 3.

Stonework, ornamental; stone, imitation.—Relates to compositions for use in imitating marble, veneer, &c. on wood or other substances. In one composition, an aqueous solution of glue is mixed with a boiled mixture of resin and potash or soda, and with glycerine. In a modification, the glycerine and water are replaced by oil and lime water. Another composition consists of gum arabic, water, and carbonate of lime. A mixture of oil and carbonate or sulphate of lime, or a mixture of gold size, driers, glue, and water may be used. Any desired colour may be added to these compositions. The compositions may be rolled on to the wood &c., or may be first rolled into a slab and then glued to the surface.

3373. Thomlinson, J. Nov. 22.

Cements.—Gypsum burnt at a red heat is ground and mixed dry with alum, tartaric acid, cream of

tartar, borax, pearlash, or potash. The cement is then ready for use. Sand, ashes, broken bricks, or burnt clay may be added to it before use.

3522. Prideaux, T. Dec. 6.

Cements; plasters; concretes; stone, artificial.—Refuse lime from the purifiers of gas works or "soap lime" is ground in a mortar to oxidize the sulphides, the product being used, either alone or mixed with sand, quick lime, iron scale, colouring-matters &c., for making plaster, concrete, or cement, or for making blocks for constructive purposes. The lime may be calcined, when it is applicable as a hydraulic cement for sea walls &c.

3541. Johnson, J. H., [*Ponsard, A.*]. Dec. 7.

Refractory substances for use in the manufacture of crucibles, retorts, melting-pots, pots of glass works, hearths &c. of furnaces, and in the entire construction of puddling, reverberatory, and other furnaces. The crucibles &c. are formed in the ordinary manner with a paste composed of aluminous and silicious earth, alumina, magnesia, and other materials and carbon, such as coke, graphite, anthracite, and charcoal reduced into grains, and when dried are covered with a concentrated solution of chloride of calcium. This coating is then dried in a stove and a second coating is applied, consisting of materials which will melt at a temperature approaching that to which the crucible &c. will be afterwards subjected. This second coating, consisting of silica and clay diluted with a solution of chloride of calcium, is then melted in a furnace and forms a glaze which protects the carbon of the crucible &c. from the destructive action of oxidizing-gas. Two furnaces

may be used, one for drying the first coating and the second for fusing the glaze. In the case of small articles, the glazing may be effected in closed receptacles.

3564. Ballou, R. A., [*Greely, J. P.*]. Dec. 9.
Drawings to Specification.

Fireproof compositions.—Lampblack, with or without plaster of Paris &c., is used as a stuffing for safes.

3656. March, T. C. Dec. 17.

Stonework, ornamental.—Flat pieces of glass are cemented to slabs of slate or to vases or other vessels, for the purpose of ornamentation, the cement employed being coloured by adding paint, or the pieces of glass being themselves first painted on the back. Small pieces of porcelain of various shapes and colours may sometimes be used in place of the glass pieces.

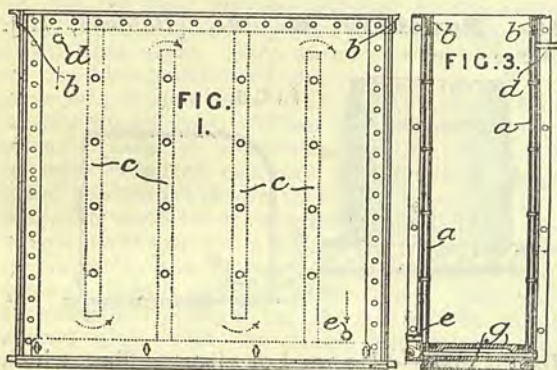
3716. Woodward, J. Dec. 23.

Casting.—Consists in the utilization of the slag from blast furnaces for the manufacture of bricks, building slabs or blocks, and tiles. The slag is run from the furnace into moulds supported upon trucks and having fireclay or annealed slag bottoms. The sides and tops of the moulds are then removed, and the trucks, with the cast blocks thereon, are run along a tramway into an annealing-kiln having sliding or folding doors at each end. The moulds may be of metal, fireclay, sand, or other material, fixed in suitable frames, beds, or boxes.

A.D. 1870.

99. Goreham, W., and White, L. Jan. 12.

Cements—In making Portland cement, the fuel (breeze &c.) is finely powdered and mixed with the slurry or slip before it is burnt, instead of charging it into the kiln. The slurry may be mixed separately and then run into a pug-mill &c. together with the breeze, or the fuel may be added in carts &c. fitted with mixing-appliances. Loose fuel in small quantity is also charged into the kiln.

496. Thomas, C. Feb. 19.

Casting soaps. Soap frames for casting soaps are made with hollow sides and bottom so as to allow of the circulation of water, steam or air to regulate the cooling. The sides of the frame are preferably made of sheet iron *a*, *a* stiffened by angle-irons *b* and the space between the plates is divided vertically or horizontally by thin iron bars *c*. Water supplied by the pipes *d* at the top is made to travel in a serpentine direction by the bars *c*, and escapes by the pipe *e*. The soap having sufficiently cooled, the sides of the frame are taken away, the end plates are also removed, and the soap is left standing on the hollow bottom *g*. The frames may be made of double width, a hollow partition being inserted to divide the block into two parts.

784. Johnson, J. H., [Wiert, L.] March 16.

Asphalts.—Wood, disintegrated into coarse filaments or splinters, is mixed with pitch or bitumen, for use in paving or the like.

986. Thomas-Anquetil, A. April 4.

Fireproof compositions; cements.—A composition to be employed for coating wood, stone, plaster, cement, bricks, tiles, pottery, metals, india-rubber, wire ropes, &c., for preserving them from decay and for rendering them incombustible, is made by heating oleic or stearic acid over an open fire in an uncovered vessel, evaporating it, and filtering the fatty or oily liquid. The liquid is also suitable for use as the base of paints, stuccoes, &c.

998. Busk, C. J., [Busk, R. P.]. April 5.

Cements; casting; stone, artificial.—Cement from limestone shale, such as Tournai or other hydraulic cement, is mixed with a soluble silicate into a pasty mess which can be rammed or run into moulds for the production of artificial stone. Sand, chalk, clay, pounded stone, marble, &c. may be added, the proportions varying according to the product required, and according as it is to be rammed into ordinary moulds or run into elastic moulds. The stone is left to dry. The hardening process may be shortened by occasional damping and dipping in water or by soaking in solution of alum.

1082. Joseph, C., [Krause, F. C.]. April 13.

Stone, artificial.—A composition for filtering water, acids, &c., and for other purposes, consists of sand or silicic acid, marble dust or carbonate of lime and glass, and silicates of soda or potash. The composition is wetted and thus rendered plastic, so that it can be moulded. For small articles, gum water is added. The moulded articles are heated in a kiln to a white heat. By adding to the composition black oxide of manganese, iron oxide, or other metallic oxide, any desired colour may be imparted to the articles.

1204. Scott, H. Y. D. April 26.

Cements.—A small proportion of plaster of Paris is made into a thin slip with water, quicklime and clay are then added, and the whole incorporated in a mill into a pasty mass, which may be formed into bricks or lumps by machinery or by hand. The blocks are air-dried and burnt in a kiln, after which they may be ground to powder or not as

preferred. When chalk or limestone is used instead of lime, the slip is allowed to settle in tanks in the ordinary way. A small proportion of quicklime may be added. Instead of using sulphate of lime as described, the lime employed may be slaked, and then mixed with clay and sulphate of soda, sulphuric acid, or alum, to form the necessary sulphate of lime.

1205. Scott, H. Y. D. April 26.

Mortars; plasters; cements; concretes.—Relates to a method of making mortar and plaster, which may also be used for making concrete. Quicklime is treated with a large proportion of water, to which a sulphate, preferably gypsum, or sulphuric acid has been added. The lime is stated to remain unslaked in the mixture. The incorporation may be effected under edge runners. When necessary, sand and air may be added during the process of mixing. In making concrete, gravel, ballast, sand, &c. are added. The concrete may be used for concrete walls, or it may be made into bricks or blocks for building purposes. For the latter purpose the slip is to be of a more pasty condition. The slip or mortar prepared as above may be combined with any cement, such as Keen's or Parian, to impart hydraulic or quickly setting properties.

1233. Ransome, F. April 29.

Cements; refractory substances; stone, artificial.—Relates to improvements on the process for preparing artificial stone described in Specification No. 877, A.D. 1861. Finely-divided silica is mixed with lime, clay, sand, chalk, and with a solution of a soluble silicate. Vessels for containing or conveying heated air or gases are made from a mixture of silicious or vitreous matters such as gannister stone or burnt clay with a soluble silicate.

1289. Johnson, J. H., [Hyatt, T.]. May 5.
Drawings to Specification.

Fireproof compositions.—Relates to fireproof and non-conducting compositions for safes, bank vaults, and other like structures. The parts of the structures may be packed with water to which one third of its weight of plaster of Paris has been added. Asbestos mixed with earths or any chemical salt containing water of crystallization or both may be used. Asbestos alone or the asbestos mixtures described above may be combined with liquid or semi-liquid vapour or steam generating materials such as water, solutions of glycerine, gelatine, or mucilage may be employed.

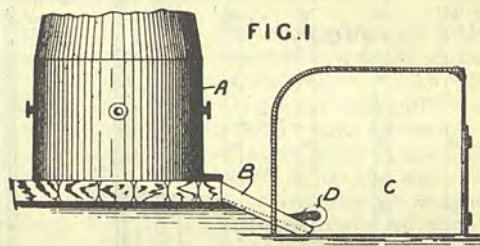
1379. Pimont, P. May 14.

Sound-deadening compositions.—To prevent the transmission of sound from one apartment to another, a composition, consisting of a mixture of potters' earth, water, common oil, fish oil, arachis, lime, or other plant, vegetable or animal black or charcoal, sawdust and hair, is applied to walls in conjunction with an intervening air space between two or more partitions of lathwork.

1494. Ximenes, H. C. M., and Betin-court, E. May 24. [Letters Patent void for want of Final Specification.]

Stone, preserving.—In order to harden, preserve, and face stone, chalk, brick, and other building-materials, a solution of iron, aluminium, copper, or zinc sulphate or other metallic salt is applied to them. Mixtures of two or more of these salts may be used. The material is allowed to absorb as much as possible of the solution.

1644. Bousfield, G. T., [Baldwin, H.]. June 7.



Mineral wool.—Slag wool or vitreous fibre, which is highly non-conducting and incombustible and is used for covering steam pipes, steam boilers, hot blast pipes, &c., for lining refrigerators, the filling of fireproof safes, &c., is produced from slag, scoria, &c. melted or produced in a furnace A. The slag &c. flows down an inclined hearth B into a chamber C where it is exposed to a blast or jet of air, preferably heated, air and steam, or ordinary or superheated steam alone from a pipe, nozzle, or tuyère D. The fibrous material produced by the blast is deflected into the chamber behind the blast pipe. The blast may be applied to slag as it runs from a blast furnace. The material may be used in bulk or formed into sheets or pads.

1733. Joseph, C., [Krause, F. C.]. June 17.
Drawings to Specification.

Refractory substances.—The parts of gas burners for heating purposes from which the gas issues are made of a porous refractory composition consisting of powdered fireclay mixed with glass, carbonate

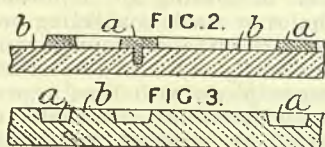
of soda, or other flux. The moulded burners are baked until the flux becomes fused and binds together the particles of fireclay so as to leave pores for the issue of the gas.

1744. Campbell, C. M. June 17.

Cements.—A flux or cement for binding together or backing the tesserae of mosaic work is formed of sand, calcined or powdered felspar, pounded glass, oxide of tin, and red lead mixed with gum water.

1822. Adamson, W. B. June 27.

Stone, artificial; stonework, ornamental.—Artificial stone or articles composed thereof are made of Portland &c. cement. The articles are formed in moulds, and a high polish may be imparted to them by a rubbing with putty powder, oil, &c., or they may be polished by the methods used for marble or by the process employed for enamelling slate. This stonework is ornamented by producing coloured patterns on it. For this purpose a stencil plate *a*, Fig. 2, is laid on the face of the mould *b*, *b*. When the cement is set, the stencil plate is removed and the space filled in with coloured cement. To make a design in relief the mould shown in Fig. 3 is used. In this case the pattern is recessed in the face of the mould, as shown at *a*, *a*, and the coloured cement is placed in the recesses of the mould, the other cement being applied afterwards. Instead of forming the pattern in the face of the mould, a second plate with the design cut therein may be placed on the mould.



1963. Goreham, W. July 12.

Cements.—In the manufacture of Portland cement the chalk and clay are mixed in a wash mill, having harrow tines &c., with a small proportion of water. The resulting mixture is ground by a pair of millstones and then dried, in stoves or chambers, and burnt in kilns. A portion of the fuel used may be mixed with the chalk and clay, as described in Specification No. 99, A.D. 1870.

1992. Curtis, C. J., and Fiddes, A. July 14.

Fireproof compositions for lining safes and other depositories. Plaster of Paris, or Portland, Roman, or other plastering cement is reduced to

the consistence of putty or thick paste by mixing it with "bone spirit" or a solution of saltpetre, ammonia, or common salt. For lining the small chambers of fireproof safes &c. a mixture of saltpetre and common salt is employed.

2327. Day, A. G. Aug. 24.

Asphalts and concretes for paving, subaqueous walls, foundations, &c. Asphalt or bitumen and coal tar, in the proportions of 2 to 1, are fused together and the water expelled. The mass is thinned by adding coal oil or petroleum oil, and finely pulverized iron ores, or sulphides, or oxides with sulphur added, are mixed with it, a little acid being added to aid the chemical combination, and cotton-seed oil to give elasticity. The compound is then kept at 300° to 350° F. till the hydrocarbons are vulcanized, when the heat is withdrawn and finely pulverized earth, sand, gravel, or broken stone is mixed with the mass in a heated condition.

2337. Parsons, P. M. Aug. 25. [*Provisional protection only.*]

Cements.—The residue, after burning a special artificial fuel containing coal, pitch, chalk, and clay, consists "chiefly of lime or cement," which may be utilized.

2490. Timmis, I. A. Sept. 15.

Fireproof compositions.—The object is to render woven brattice cloths, used in coal and other mines, unflammable, and to fill the interstices with a sizing or filling composition so as to render them impermeable to air or gas. The fabrics are immersed in solutions of glue, bone size, Iceland moss, gelatine, isinglass, flour, or other glutinous or gelatinous substances in combination with aluminium, magnesium, zinc, or other soluble sulphate. These sulphates are used in conjunction with ammonia, or the glutinous or gelatinous solutions may be used in combination with ammonium sulphate; a small proportion of carbolic acid is preferably added, to resist damp. In order to render the fabric still more opaque, insoluble sulphate of lime, baryta, China clay, and substances of a similar nature may be added. The fabrics to be treated may be of cotton, flax, jute, hemp, &c. or of wool, mohair, silk, &c., or of a mixture of vegetable and animal fibres, and may be twilled or plain woven. The mixture may sometimes be applied to the fabrics by means of rollers or brushes and it may be spread by means of scrapers &c.

2661. Stapelton, J. G. Oct. 7. [*Provisional protection only.*]

Casting.—In the manufacture of tobacco pipes, bleached cotton or other vegetable fibre is mixed to a milky consistency with water and an equal bulk of freshly baked gypsum added. Just before the mixture begins to thicken, it is poured into a mould and cores for the bowl and stem are pressed into the mould. The prints are cut off with a sharp knife and the parts smoothed with fine sand paper.

2668. Newton, W. E., [*Spencer, R.*]. Drawings to Specification.

Refractory substances.—Firebricks for metallurgical kilns and furnaces are made from fireclay, which is washed, dried, ground, and mixed with gannister and broken calcined pot. These materials are rendered plastic by the addition of lime water, to which may be added silicate of potash or soda. When the bricks have been moulded and dried they may be dipped in a solution of the silicate and then burnt in a kiln. The composition may be used for lining or protecting the bricks of kilns or furnaces. Reference is made to Specification No. 907, A.D. 1871.

2810. Lundy, J. J. Oct. 25.

Fireproof compositions.—A solution of sodium or other tungstate or phosphate, or of magnesium chloride or other deliquescent or fire-arresting salt, or a mixture of them, is sprinkled over, or otherwise applied to fibres, or it may be mixed with a lubricating compound consisting of gallipoli or olive oil, or recovered wool oil, or other oil or oils mixed with a solution of caustic soda, soda ash, or potash.

3125. Bethell, H. S. Nov. 29. [*Provisional protection only.*]

Asphalts.—An artificial asphalt for paving and waterproofing consists of earthy, stony or mineral

matters, such as marl, clay, and metallic powder, mixed with coal tar, coal tar pitch, or cannel coal oil, or with products of the distillation of coal tar or cannel oil, or with any bituminous compound in which such tar, oil, or products, whether in combination or separately, are the principal ingredients. The ingredients are preferably ground together between millstones. The powder is consolidated by heat and pressure.

3346. Scott, H. Y. D. Dec. 21.

Cements; mortars.—In making mortar by the process described in Specification No. 1204, A.D. 1870, the slaking action of the water on the lime is controlled by adding a thin slip of calcium sulphate &c. According to the present invention calcareous shales or marls containing only a small proportion of carbonate are burnt and pulverized. This powder is added to a mixture of the slip containing sulphate with lime in proportion according to the richness of the shale in carbonate. Sand is added as required, and alkaline silicate is sometimes added to increase the hydraulic action of the mortar. In making cement by a similar process as described in Specification No. 1205, A.D. 1870, the shale is mixed with the chalk or lime used.

3348. Brooke, O., and Read, A. W. Dec. 22.

Fireproof compositions for use in the manufacture of non-inflammable brattice cloths. The cloth, or the yarn of which the cloth is to be made, is first saturated with a solution of sodium carbonate, phosphate, arseniate, sulphate, or stannate, or with a solution of alum. The cloth or yarn is then dried and afterwards steeped in a solution, infusion, or decoction of oak bark, catechu, sumach, or other substance containing tannin. The cloth or yarn is next passed through a mixture of a saturated solution of one of the before-mentioned salts, of iron or other metallic oxide, of farinaceous flour or China clay, and of catechu or other tannin material. The cloth &c. is then dried and finished.

A.D. 1871.

58. **Wrigley, T.**, [Greiff, P.]. Jan. 10.
[Provisional protection only.]

Stone, artificial.—Relates to the manufacture of substitutes for the wooden, stone, or metal sleepers of railways &c. Coal tar is distilled sufficiently long to render the residue into a firm hard mass that will melt only at a high temperature; or pitch and asphalt of any description are distilled, if too soft, until a hard substance is produced. This coal tar or pitch and asphalt when thus prepared and in a melted state are mixed with sifted lime, sand, ashes, silicate, clay, refuse of wood, iron oxide, and residue of soda, the whole being kept well stirred until a thorough amalgamation has taken place, after which the composition is pressed into moulds for forming it into sleepers. To improve the quality and durability of the compound it may be subjected to the pressure of a hydraulic press before it is quite cold.

118. **Carteron, J. A.**, and **Rimmel, E.**
Jan. 17.

Fireproof compositions; cements.—A compound for rendering threads, fabrics, wood, and other materials unflammable, and for extinguishing fire, is made by dissolving equal quantities by weight of calcium chloride and calcium acetate in hot water and then adding powdered chalk and sal-ammoniac to form a thin paste which, after being strained, is heated to evaporate the water. The substance may be allowed to crystallize, or the evaporation may be continued until all the water is driven off, the residue being crushed into powder. Either the crystals or the powder may be mixed with size or starch for rendering warp yarns, fabrics, and paper unflammable; or a solution of the substance may be employed for sprinkling or saturating fabrics, paper, washed wearing-apparel, &c.; or the substance may be employed in a dry state or in solution for extinguishing fires; or it may be mixed with paints, colours, or varnishes, or used as a ground before painting or varnishing, in order to render buildings and structures, ships, furniture, &c. unflammable; or it may be spread or sprinkled on the plaster of walls and ceilings or mixed with the plaster; or it may be associated with dye colours.

385. **Goreham, W.** Feb. 15. *Drawings to Specification.*

Cements, drying. The gases from continuous lime and cement kilns are passed through drying and heating chambers to dry and prepare the materials for the kiln.

520. **Cochrane, A. A.** Feb. 27. *Drawings to Specification.*

Asphalts; concretes; cements.—Relates to the application of bituminous compositions for making concretes for marine work, paving, &c., and for making cements for similar work, or for preventing exhalations through the soil into buildings &c. Bitumen or gas pitch is mixed in varying proportions with gas tar, and shingle, coarse sand, or chalk. In some cases small quantities of creosote oil are used, and Stockholm tar. A hydraulic cement is made by mixing bitumen and tar with Portland or Roman cement. Plaster of Paris may be added to a mixture of bitumen and creosote oil. Portland stone, and shales, or "oleaginous" stone may be used in forming concrete. The stone, shingle, sand, or the like are previously heated on hot plates before being added to the bitumen.

657. **Bramwell, F. J.** March 13.



Cements.—Slip for use in the manufacture of Portland &c. cement is dried on an endless band *d*, Fig. 4, carrying a set of trays *e*, and made to traverse a chamber *a* which is heated by oppositely directed waste gases, from a kiln or furnace entering at *b* and leaving at *c*. The trays are made with partitions and into the divisions thus formed the slip is introduced, the tray is put on the band at the entrance, and, passing through the chamber, the slip is dried. The dry cement should, while hot, be transferred to the kiln, but if this cannot

be done the chamber may be continued and the air to support combustion may be made to pass over the hot cement so as to become heated and cool the cement. The drying-oven may be made circular or of other form. The recesses in the trays are made bevelled so as to facilitate the removal of the dried cement.

703. Hennis, S. J. March 16. [*Provisional protection only.*]

Cements.—A mixture of native aluminium silicate, glue, barytes, and resin, or boiled oil and colouring-matters, and vegetable &c. stainers, is used as a cement for preserving damp walls, calcareous stone, brick, stucco-work, and other building materials. The cement is coated over with a special paint.

717. Wilson, W. P. March 17. *Drawings to Specification.*

Refractory substances.—Bricks, blocks, linings, &c. of furnaces are composed of fireclay, "garner" and gannister, plumbago and other graphites, asbestos, and pumice. Two or more of these materials are mixed together, preferably with some easily combustible substance, so that when the bricks are burnt they may become porous.

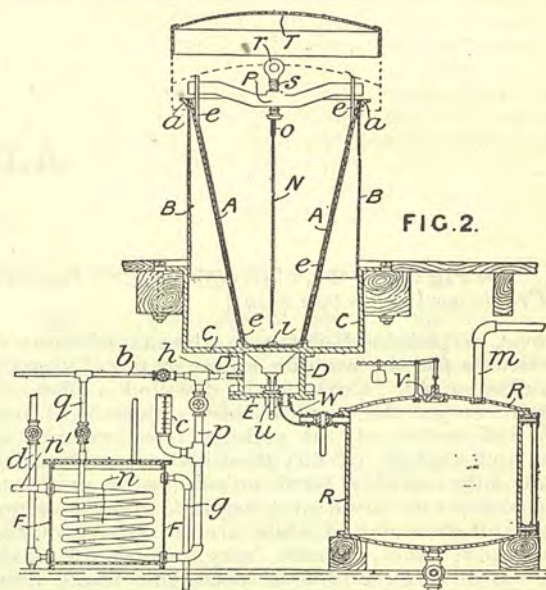
723. Wright, J. March 17. [*Provisional protection only.*]

Asphalts; cements.—In the manufacture of asphalt, asphaltine and bituminous cements, tar or tarry matters, raw petroleum, or naphtha or naphtha and petroleum residues, are mixed with clay and lime, or ferruginous or non-ferruginous argillaceous lime, and the mixture is heated in a still. The volatile products are driven off, and treated as usual. The residue is cooled and, if for cement, is ground to powder, and consists of asphalt or asphaltine or bituminous cement. The tarry matter may be distilled in a separate vessel, the distillate being passed into the argillaceous lime. If pitch is used no distillation is necessary, but the pitch is mixed with heavy oil from which the carbolic acid has been removed.

745. Pout, H., [*Rolls, J. G.*] March 20.

Cements.—Cements for flooring or building purposes are composed of juices of euphorbia mixed with chalk or clay. The juices are extracted by incising the branches of the plant, and are hardened for use by heat or exposure to the air.

849. Gedge, W. E., [*Partz, A. F. W.*] March 30.



Casting sugar. After sugar has been concentrated in a vacuum pan it is cast into large blocks, drained, and dried in an apparatus consisting of two vessels A and B, one inside the other, their bottoms being formed by a casting C and their upper ends riveted to a flange a. A bottom plate E is secured to the apparatus by means of a casting D. Holes are formed in the casting C into which are screwed plugs, and holes are left in the plate E directly beneath so that these plugs can be withdrawn, the holes in the plate E being then closed by a screw plug. Bands of wrought iron e are made to fit into the vessel A and are secured to the bottom by bolts i. Cross-pieces P fit into holes near the ends of the bands e and through the middle of these cross-pieces pass strong screws s provided at the top with rings r. A thin sheet of metal N is suspended in the mould by hooks o so as to divide the cast block of sugar into two within a few inches of the surface. The space between the vessels A, B is filled with water which is heated by passing steam into it. A chamber is arranged on the side of the vessel B for the purpose of examining the temperature and height of the water in the space between the vessels A, B. A cover T is provided for the vessel or mould A. The boiled sugar is run from the vacuum pans into the mould A, the space between the vessels A, B being filled with hot water which is gradually allowed to cool. By this method the sugar is gradually allowed to crystallize out. When the crystallization of the sugar is complete, the plugs are taken out of the bottom of the casting C, the crust of sugar is broken through, the holes in the plate are closed by screw plugs, and the syrup is drained away by a pipe w to a vessel r. After a time the cover T is removed, the "smear" which has collected on the surface is removed, and the cover is replaced. Air is exhausted from the vessel R by a pipe m connected with a pump. A relief valve v is arranged

in connection with the vessel R to admit air as soon as the required degree of exhaustion is exceeded. White sugar liquor is poured into the mould in order to carry away the brown syrup, the water in the space between the vessels A and B being at the same time warmed. After the syrup has all drained out hot air is forced through the cast sugar in order to remove all moisture. When the drying operation is completed, the nuts are removed from the bolts *i*, and ropes or chains from a hoisting gear are attached to the hooks *r*, so that the block of sugar may be lifted out, and transferred to a platform. The bands *e* are taken off, and the block is broken in two, by means of wedges, at the section formed by the plate N. To facilitate cleaning the chamber C, D, E and the mould A, steam may be blown in from a pipe *b*. Two or more moulds may be enclosed in a single casing connected to a common apparatus for draining and drying the sugar. In place of a single plate N, two or more dividing-plates may be employed.

907. Newton, W. E., [*Spencer, R.*]. April 5.

Refractory substances.—Lumps, bricks, blocks, or linings for furnaces and kilns or fireplaces, and crucibles, saggars, melting-pots, and other articles are formed from a composition consisting of three parts of washed and ground fireclay, one of washed and pounded gannister, and one of pulverized calcined pot mixed with lime water, to which may be added alkaline silicate to impart adhesiveness.

925. Newton, W. E., [*Graham, J. L.*]. April 8.

Asphalts; cements; concretes.—A mixture of hard asphalts such as Trinidad, Cuban, &c. with soft or liquid asphalt, such as the Mexican, is heated, and powdered grahamite or albertite added. Powdered limestone, sand, &c. is then mixed with the asphalt. To obtain an asphalt which will not soften at summer temperatures, grahamite or albertite is distilled, and the distillate of oil and "petrolene" re-distilled until fifty per cent. of oil has been obtained. The residue is then mixed with hard asphalts and powdered stone &c. For making an asphalt cement, heavy petroleum or petroleum residue is heated, hydrate of lime and roasted brick clay are added, and the mixture heated more strongly until the water in the hydrate is driven off. Grahamite and other asphalts and broken stone and sand may be mixed with the cement thus formed.

1035. Newton, W. E., [*Graham, J. L.*]. April 19.

Cements; asphalts; concretes.—Relates to the manufacture of cements or bituminous compounds for use in the formation of roads, pavements,

floors, roofs, or for coating, enamelling, or japanning metallic or other surfaces so as to protect them from the action of the air, water, acids, alkalies, alcohol, and other chemical agents. A hard bituminous compound found in Ritchie county and known as Ritchie coal, crystallized petroleum, or grahamite is used, either alone, or mixed with any material of a tarry, resinous, balsamic, pitchy, or asphaltic nature. Heat is applied during the mixing of the compound. The best material for admixture is crude turpentine, and the composition may be scented by adding small quantities of a fragrant balsam or resin, such as storax, gum benzoin, frankincense, &c. Cheap compositions of this class may be made by combining with the grahamite, common coal or gas tar, petroleum tar, "still bottoms," and other varieties of tar. Resin, pitch, asphalt or common roofing cement may be added. The compositions may be used for cementing the joints and coating the walls of reservoirs, tanks, cisterns, sinks, and casks; for making all varieties of concretes, either alone or by admixture with sand, gravel, clay, lime, or plaster for building and paving purposes, also for making water pipes, aqueducts, drain pipes, also for coating and waterproofing bricks and other porous materials; for coating and saturating canvas for tents, waterproofing blankets or tarpaulins, also paper and felt to be used for roofing, and for making water &c. pipes; for caulking boats and ships; for coating or japanning iron and other metals, and for an electrical insulating composition. Compositions for roofing, paving, and similar purposes are made by melting asphalt with powdered Ritchie mineral or albertite and thoroughly mixing the same. Sand, gravel, broken stone, &c. may be added to the mixture to give it the necessary body. In compositions for roofing, paving, &c. which have coal tar or pitch as a base, Ritchie mineral, grahamite, albertite, and solidified petroleum are mixed with the tar or pitch, so as to make a heat-resisting composition.

1185. Hughes, E. T., [*Weinrich, L., and Schröder, J.*]. May 3.

Casting sugar. For refining sugar the boiled juice is cast into shapes adapted to be arranged in rings in the centrifugal machine so that the machine, when packed, will be balanced. Fig. 4 shows a convenient form of mould. The moulds may be perforated and several of them arranged in contact in a case so that the juice, when poured in, will distribute itself evenly among the moulds.



1186. Crease, J. F. May 3.

Cements.—A cement coating to be applied with a trowel to metallic and other surfaces is made by mixing into a pasty mass, Portland, Roman, or

other cement, or mixtures of these, with the principal acids found in coal tar, namely carbolic and cresylic acids, and according to the Provisional Specification, xylylic, "phlorylic," "rosolic," and "brunolic" acids, together or singly.

1315. Macomber, D. O. May 16.

Asphalts.—A composition applicable for paving, walls, floors, &c. consists of pitch, ashes, and sand. Sifted ashes are mixed with sand, heated, and hot pitch is added. The composition may be applied direct or may be made up into blocks for use or storage.

1522. Griffiths, T. June 8.

Stone, preserving.—Relates to a method of preserving wood, brick, stone, cement, plaster, &c. The process may be applied to treat the walls and foundations of houses, railway arches, bridges, tunnels, viaducts, stations, and other buildings to protect them from moisture. A mixture of oxide of iron and resin with petroleum, naphtha, spirits of wine or other solvent is applied to the surface by a brush. In another process iron oxides and resin are melted alone or with wax and applied while hot to the surface, which is also heated. The composition is burnt in by means of a blowpipe jet from a spirit lamp.

1598. Clifford, G. June 16. [*Provisional protection only.*]

Refractory substances for making crucibles. Thirty per cent., more or less, of emery, corundum, or other forms of anhydrous alumina, are added to the mixture usually employed in making clay or plumbago crucibles; such additions to be employed either with or without the presence of graphite, plumbago, coke, or other forms of carbon.

1628. Galloway, G. B. June 21.

Slags, treatment of.—The slag or scoræ from the manufacture of iron is mixed with clay and remelted, soda, potash, or other alkali being added to cause the slag and clay to assimilate. Before tapping, red lead, copperas, or other metallic colouring-mixture may be added. The compound may be used for making sea walls, piers, breakwaters, and for paving flagging and building purposes. When coloured the compound may be used for making chimney jambs, mantelpieces, door steps, stable floors, garden walls, ornaments, &c.

1690. Jensen, P., [*Erichsen, J.*]. June 28.

Asphalts.—A mastic for coating special roofing is composed of coal tar free from water, Limmer

or other asphalt or bituminous earth, Portland cement or hydraulic lime, and Farnham rock. Or coal tar is mixed with Portland cement or hydraulic lime and "dry silicate."

1737. Bessemer, H. July 4.

Asphalts for paving roads, stables, floors, &c. Asphalt and other bituminous and tarry matters (including coal tar) are fused together and pulverized limestone, chalk, sulphate of lime, Portland or other cement or other mineral material added. The bituminous matters and the limestone &c. are heated separately and delivered hot into a pug-mill of special construction. The composition is applied hot, and may be treated with heated rollers or rammers. To render it more fluid, petroleum (which afterwards evaporates) may be added. It may be laid on concrete or stone, or on iron plates roughened on the surface, so that a thin layer of composition suffices.

1757. Galloway, G. B. July 5.

Asphalts; concretes.—Street pavings or paving-blocks are made by compressing and drying a mixture of bitumen or other adhesive matter, lime, and cement, together with calcareous matter, scoria, or slag, calcined or crushed to a coarse powder. Fibrous matter and acids may be added.

1761. Farrel, J. July 6. [*Drawings to Specification.*]

Fireproof compositions for picking safes consist of a mixture of gypsum, hydraulic cement, and Epsom salts.

1783. Tibbitts, A., and Fullwood, E. July 7.

Asphalts; fireproof compositions.—For paving roads and paths and for covering roofs and floors, a composition is used consisting of coal pitch or tar, fine sand, soapmakers' lime waste, ground ironstone, and raw gypsum. In place of soapmakers' lime waste or slaked lime, soda waste, the lime waste from gasworks, or cement, may be used. Burnt pyrites may be used instead of ironstone, and cement or ground Bath, Portland, or lias stone may replace the whole or part of the gypsum. Salt may be added to render it fireproof. For paving roads, the composition is made in a pulverulent form, and, when laid, is consolidated by heat and pressure. For paths, floors, and roofs, the composition is made sufficiently fluid to flow from a ladle by using more tar.

1795. Skinner, R. July 8. *Drawings to Specification.*

Concretes.—Relates to concretes for making blocks for pavements, roadways, submarine and other walls, &c., and sewers, pipes, tiles, &c., and consisting mainly of earthy, bituminous, and pitchy substances combined with calcareous rock, the whole being calcined or granulated by heat, and then formed into blocks by moulds or dies. Calced asphaltum in a heated, inclined, revolving cylinder is mixed with pulverized coal, slag, and coke, granulated or pulverized calcareous rock, and mineral tar. Moisture is expelled from these materials before adding them to the asphaltum, and the tar and calcareous rock are incorporated together while the rock is hot and before mixture with the other ingredients. In some cases, the slag and coke may be dispensed with, and the proportion of tar consequently decreased. The product from the cylinder is cooled somewhat in a revolving pan and then pressed into blocks for pavements or submarine walls. The blocks are united by a similar material containing a larger proportion of the calcareous rock. For pipes, sewers, and tiles, the proportion of calcareous rock is varied according to the degree of toughness or hardness required.

1827. Moffatt, W. B., and Henley, G. M. July 12.

Stone, preserving; stone, colouring; statuary.—Building stone and statuary are burnt in airtight chambers provided with regulating-apertures, which are partially or entirely closed to retain the gases generated in the course of firing, and to exclude the air while the articles are cooling. By this means the articles are obtained of a gray colour and are rendered more durable. Statuary and pottery manufactured from terra-cotta, or a mixture of terra-cotta and other compounds, can be made a gray colour by re-firing them in this way.

1838. Brown, J. July 13. *Drawings to Specification.*

Cements.—Enamelled metal plates used for sheathing ships and other submerged structures are fixed by a cement composed of asphalt pitch and oil combined with twenty per cent. of silicates of magnesia, such as talc or French chalk.

1842. Groskey, J. R., [McKinley, A.] July 14.

Asphalts; cements; concretes.—A composition for paving and other purposes is made by mixing bituminous matter with refuse gas lime, burnt clay, and pulverized limestone or similar materials. The lime is boiled, dried, pulverized, and sifted. The clay is also burnt, pulverized, and sifted. The bitumen is heated to 300° F. and the lime added. After a certain time the clay is also added and the

mixture stirred. To make the composition more liquid, petroleum residues may be added, or coal tar, or vegetable oils. The composition may be applied in its heated state, or run into moulds and pressed to form blocks for subsequent use by reheating, or for direct use as paving blocks. It may be combined with sand, gravel, or broken stone to form concrete, these substances being heated before mixing. The composition may be used for drain pipes, subaqueous walls, foundations, wells, vats, insulation for telegraph wires, roofing, and other similar purposes.

1897. Fenton, F. July 20.

Cements.—Substances precipitated from acid sewage waters are used "for the manufacture of cements by calcination."

1985. Paul, B. H. July 28.

Asphalts.—An asphaltic material for paving, road-making, &c. is made of ground stone, such as lias limestone and Bath oolite, and bitumen obtained from the residues from the distillation of coal, shale, peat, &c. To obtain the bitumen, the acid, tar, &c. is stirred up with water in a vat. Steam may be blown into the water during the process, or the mixture may be heated to melt the bitumen. The bitumen is heated, to drive off the water and the remaining oil, either in an open pan, or, if the oil is to be collected, in a still. In the distillation of paraffin oil, the process may be stopped at such a stage as to produce a greasy tar known as "bottoms," which may be treated similarly to the acid tar. To make the paving material, ground stone, such as crystalline limestone, loamy, calcareous, or sandy earth, or burnt clay &c. is incorporated with the bitumen under edge runners, or in a mortar mill, water being added as required. Natural bitumen may be partly or wholly substituted for the tar. The mass after drying is ready for use.

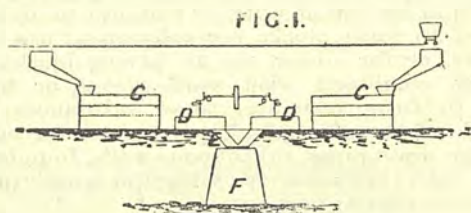
2096. Bonneville, H. A., [Guerriero, A., Cadoux, L. A., and O'Connell, E.] Aug. 9.

Asphalts.—An asphaltic composition for paving roads, streets, terraces, and other places, is composed of refined bitumen, Spanish white or other calcareous substance, colophony, raw asphalts, fire-clay, slag or puddlers' offal, linseed oil, and tallow, mixed and melted together. The mixture is moulded into cakes, and when required for use is remelted and mixed with a proportion of fireclay and Spanish white or other calcareous substance to adapt it to particular climatic conditions.

2120. Cochrane, A. A. Aug. 11.

Casting.—For making large blocks of asphalt concrete for use in building breakwaters, sea walls, &c., shingle is brought in wagons to chambers C arranged radially round two mills D. It is heated in the chambers and then delivered to the

mills, where tar and bitumen are added and the whole stirred by rotary stirrers. The mills are heated by superheated steam or by furnaces. The



heated mixture is fed down the shoots E into a mould F which may have hollow walls for water to circulate in, to hasten the setting of the concrete.

2158. Douglas, C., and Watson, D. M.
Aug. 16.

Stone, preserving.—Stone and other porous building-materials are preserved and rendered less pervious to moisture by applying coatings of materials which form a precipitate of resin and alumina &c. on the surface and in the pores. The liquid forming the first coating is obtained by boiling resin or colophony in a solution of sodium carbonate or other alkali. The material is then coated, preferably before the first coating is dry, with a solution of alum, or a solution containing alumina, or other suitable earth. A solution obtained by lixiviating alum cake, or calcium chloride, may be employed. By the reaction of the materials of the two coatings, an insoluble compound of the resin with the earth of the second coating is precipitated on the surface in the pores of the substance treated, while the alkali of the first coating forms a soluble salt with the acid of the second coating. The treatment may be treated twice or more often, the soluble salt produced being washed away with water between each treatment.

2188. Emmens, S. H. Aug. 19.

Stone, artificial; asphalts.—Artificial rock or stone is made by mixing decomposed granite either with silicates, sulphates, chlorides, alkalies, lime, and

limestone, or with a bituminous material. In one method, a mixture of decomposed granite with an alkaline solution is boiled and then triturated with lime or a calcium salt. The supernatant liquid is poured off, and the residue is cast into shape in moulds, or otherwise applied to surfaces &c., and may be set by "firing." In a second method, a mixture of decomposed granite with a soluble silicate is moulded or applied, and then treated with lime water until it sets. In a third method, decomposed granite is mixed with chalk and then treated with sulphuric acid, after which the substance is dried at a high temperature, and set as required by lime water. In a fourth method, an asphaltic cement is formed by heating decomposed granite with bituminous substances, and the mixture is moulded or applied while hot, for example, for use in building, paving, &c., and before it is quite cool the surface may be finished off with hot irons. In making this mixture, preferably mineral tar is heated in a vessel and gradually mixed with raw or burnt decomposed granite. Extra heat is applied to drive off the more volatile constituents of the tar, and then bitumen is added, and sometimes fatty or oleaginous matter, and where hardness is required, the composition is mixed with sulphur, or lead carbonate or other metallic salt or oxide, or both sulphur and a salt &c.

2196. Fleming, A. B., MacLagan, R. C., and Irvine, R. Aug. 21.

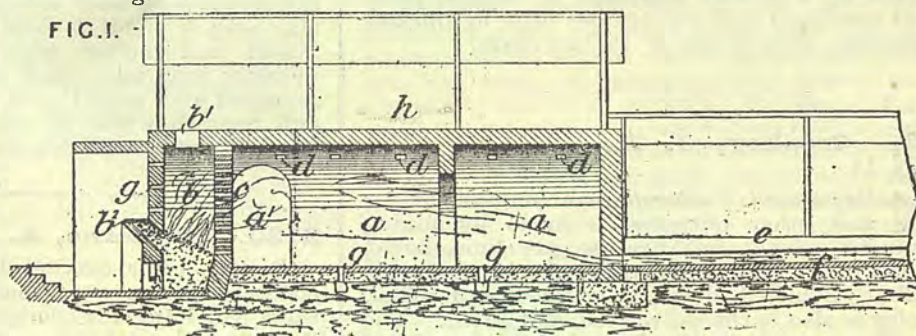
Fireproof compositions.—Compounds of alumina, tin, titanium, or ammonium, or other compounds capable of arresting combustion, are added to special compounds employed for lubricating fibres prior to heckling, carding, and spinning.

2237. Dann, J. T., [Ahrens, W.]. Aug. 25.

Cements; stone, artificial.—Magnesium-chloride solution, obtained in the manufacture of barium sulphate, is treated with caustic lime to precipitate magnesium hydrate. The precipitate is calcined and used in the preparation of magnesia cement. The magnesium chloride may also be used for preparing cements or artificial marble.

2243. Scott, H. Y. D. Aug. 26.

Cements.—Relates to the production of cements &c. from sewage. The chemical matters contained in sewage are precipitated by means of quicklime, insoluble compounds such as calcium carbonate and phosphate being formed. The



solid matter is collected and dried on hot plates or in slip kilns as in the manufacture of Portland cement &c., or it may be partially dried and made into perforated bricks, which may be kept without giving off any disagreeable odour, and the final drying may be allowed to take place slowly. The material is subsequently calcined, in heaps or in a kiln or oven, to expel the carbonic acid. The cakes, bricks, or lumps of dried precipitate are placed in an arched compartment *a* provided with a doorway or opening *a*¹ which is bricked up when the kiln is charged. The firing is commenced by means of a fireplace *b* fed through an opening *b*¹, or a mouth *b*², and separated from the calcining-compartment by a perforated wall *c* of firebrick or the material to be calcined. Steam escapes and air is admitted through openings *d*. Air to support combustion enters by inlets *g*. The space above the fuel in the fireplace may be filled up with dried precipitate. The heated gases from the chamber *a* pass along a hollow floor, or flues *f*, beneath a shallow vessel *e* in which the wet slip is placed to be dried. The vessel *e* may be covered with a galvanized iron roof. A drying-chamber *h* may be situated above the calcining-chamber. Part of the gaseous fuel driven off from the precipitate may be conducted into a separate chamber, and burned with air, the heat being employed to calcine chalk or limestone, to be used in the preparation of quicklime. A double kiln may be employed, the precipitate being calcined in one compartment while caustic lime is produced in another compartment. When the precipitate is subjected to distillation in closed retorts, before being calcined, the gases produced may be used for various purposes, and the calcination may be completed by the admission of air into the retorts, or otherwise igniting the carbonized compound. When properly calcined, the precipitate consists of quicklime, calcium phosphate, &c., and is pulverized and used as mortar for building. When the sewage waters contain iron sulphate and sulphurous acid, iron oxide mixed with silicious and calcareous matter and useful for gas purification and for a cement, is obtained. To obtain a cement, some quicklime, slaked to a fine powder, is preferably mixed with the precipitate before calcination, or gas lime, as it comes from the gas works, or a mixture of lime and chalk, is used as the precipitant. Other disinfecting and precipitating materials, such as iron oxide, sulphate, or chloride, alumina, soluble or partially soluble sulphates, and clay, may be used in connection with the lime so as to produce a cement and precipitate the flocculent matters. By using clay a hydraulic cement may be produced. Calcium sulphate, in a finely divided state, or sulphuric acid or some soluble sulphate may be added to the precipitated sewage while wet, to improve the quality of the cement. Small quantities of sodium or potassium salts may be added to the cement to increase its rapidity of setting. In making Portland cement, the material is burnt with a freer access of air than when making a "tender burned" cement. In using gas lime or other lime refuse, if rich in thiosulphates, the soluble salts are first washed out and the residue is calcined. To obviate the necessity of using expensive mixing and agitating machinery, the chemicals are preferably added at points of the sewer distant from the outfall. When the organic matter in the sewage is abundant or fuel is very cheap, a quantity of chalk and clay may be added in the proportions used in the manufacture of Portland cement.

2247. Zenger, K. W. Aug. 26.

Refractory substances.—Graphite, suitable for making crucibles, retorts, bricks, and other articles of refractory material, and for use, either alone or in admixture with clay &c. in lining furnaces, may be produced by distilling coal in retorts at a low temperature, and carrying the products of distillation into a second series of retorts which is heated to a higher temperature, but not exceeding 960° C. In the second series of retorts the products are decomposed and graphite is deposited. In order to increase the amount of service the retorts of the second series contain partitions or lumps formed of powdered graphite or coke-dust mixed with tar, or of any refractory substance. In another method, tar is distilled in admixture with coke, graphite, or clay. The deposited graphite may be separated from the partitions &c., to which it adheres, or the whole may be ground up together.

2325. Zengeler, J. Sept. 2. [Provisional protection only.]

Stone, colouring.—Relates to processes for colouring or staining and fixing designs on marble and similar substances. An oily paste to be applied

with a brush is prepared by dissolving one or more of the various colouring materials derived from coal tar and the like, in dried or anhydrous naphtha, benzol, aniline oil, oily and volatile products in the distillation of coal tar, petroleum, &c., or in mixtures of two or more of these. To hasten the process the stone &c. can be heated before applying the colour. The colouring-matter may be applied without the use of heat if the surface to be coloured is free from moisture. After the painting is finished, the stone &c. is preferably heated to evaporate the solvent.

2385. Livesey, J. Sept. 9.

Asphalts.—Iron is mixed with asphalt or a similar composition in order to give it greater durability. Iron borings, filings, or turnings, or iron cast or made into the form of small shot, or larger pieces, or cubical forms, may be incorporated with the composition. The material thus produced is used for tiles for paving, rails for tramways, and stairs or steps for building &c.; it may also be used for sleepers, and for traction engines to run upon.

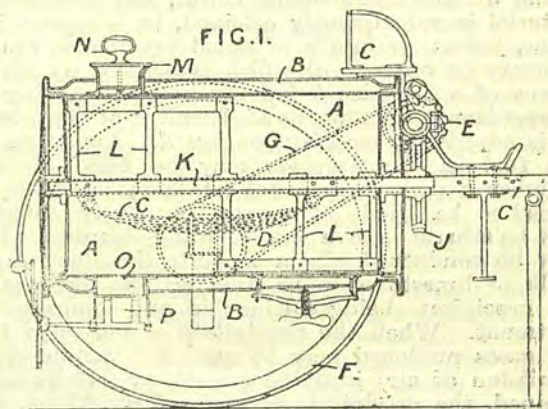
2402. Bunning, H., and Chapman, J.
Sept. 12. [*Provisional protection only.*]

Asphalts.—A compound for street and other pavements is made by heating pitch or other bituminous substances in a cauldron, and then stirring in pulverized or crushed granite, and, if desired, lead oxide or other metallic oxides.

2407. Bresson, A. Sept. 12.

Asphalts.—Relates to a vehicle for carrying bituminous matters in a sufficient state of fusion for paving. The body consists of two concentric cylinders A and B, the space between which is filled with charcoal or other non-conducting material. It is mounted on the carriage C, the wheel F of which drives the wheel D which in turn, drives the wheel E by an endless chain G. The wheel E gives motion to the wheel J mounted on the shaft K which passes through the cylinder A, and carries beaters L. The melted material is run in through the funnel M, which is then closed by the cap N, and, as the wagon is drawn along, the material is kept in agitation by the beaters L. At the bottom of the wagon is an opening O, closed by a trap P, by which the contents can be drawn off

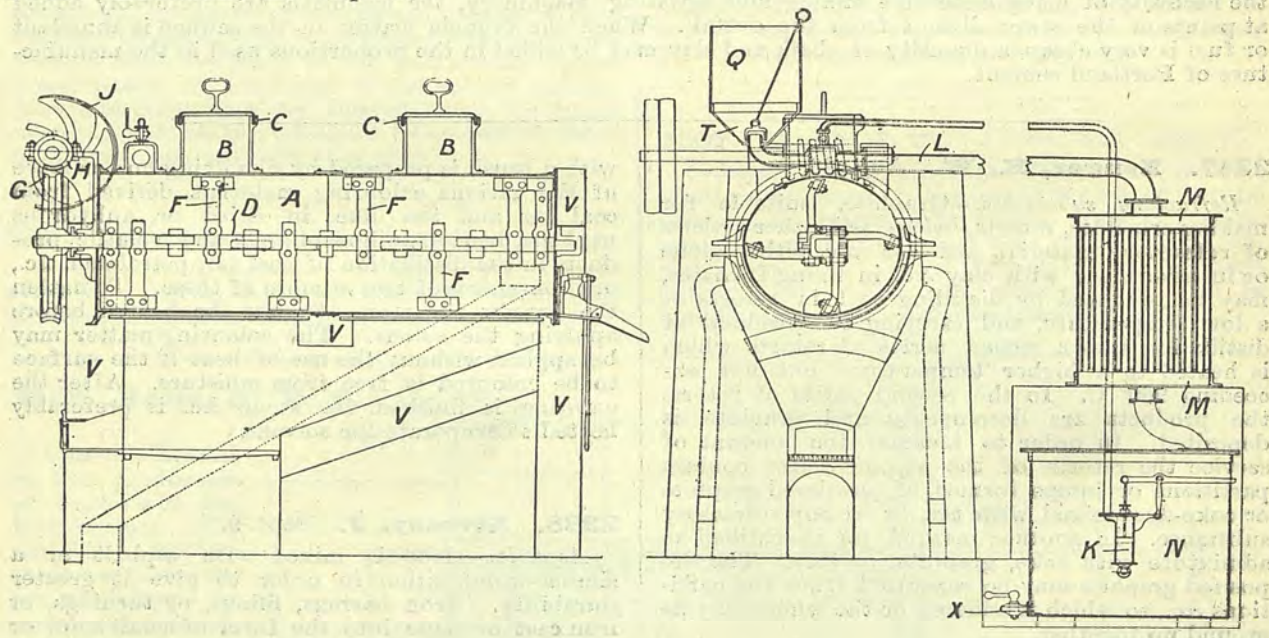
into buckets or otherwise. When the wagon is at rest the stirrers may be kept in motion by a winch.



2478. Wilson, A., and Wood, G. B.
Sept. 20. *Drawings to Specification.*

Refractory substances.—The bottoms and linings of converters for the manufacture of Bessemer steel are made of refractory stone, preferably "fire stone," or of moulded artificial stone.

2541. Bresson, A. Sept. 27.



Asphalts.—Powdered bitumen is mixed with powdered calcareous stone and liquid bitumen, schist, or naphtha in a special mixing machine, and petroleum, benzene, naphtha, or other similar liquid, which will dissolve the bitumen, is injected under pressure. To produce a harder material, pulverized iron ore may be added. The Figures show the mixing machine employed. The strong iron container or cauldron A is set above a furnace V. An iron spindle D, carrying arms F, has rotary motion communicated to it from pulley J through a worm H and a worm-wheel G. The lids of feed openings B

are fitted with hydraulic joints C. A force pump K is used to feed the solvents into the container, and a pipe L leads the vaporized solvents to a tubular surface condenser M, whence they pass to a tank N from which the feed pump draws its supply. Condensed water falls to the bottom of this tank and can be drawn off by a cock X. The liquid bitumen is supplied from an upper tank Q provided with a valve T operated by a rod.

2553. Davey, G. Sept. 28.

Stone, artificial; stonework, ornamental; casting.

—In the manufacture of slabs or variously shaped pieces of artificial marble, Keene's or other suitable cement is poured over a glass table, composed of pieces of plate glass on frames &c., on which have previously been laid silk &c. threads and fibres containing colour. These threads are drawn out before the cement sets, leaving the colour in the cement. Colours may be added to the cement, or portions of coloured cement may be placed on the glass before adding the bulk of the cement. A backing of canvas is then applied, and on that a layer of coarser cement. Various articles, such as table tops, panels, mouldings, pilasters, or columns, may be moulded by placing a mould of suitable form on the glass, and pouring in cement as before. The plaster, colouring matter, &c. are placed in each part of the mould separately, when a mould in several pieces is employed. Ornamental designs of wood, metal, glass, ivory, or porcelain may be inlaid into the surface of the marble by laying them on the glass, and pouring the cement round them. The devices are made with levelled, slotted, indented, or rough sides, to give the cement a hold. They may be secured in their places by pins, wires, or rods, which may be removed or allowed to remain. Bricks or the marble may be ornamented by embedding in their surfaces designs made of heat resisting material. Bricks may have a surface of the marble applied to them. The surface of the marble is rubbed down and polished or enamelled in the usual manner. The marble may be sawn and cut into various shapes &c. and polished.

2554. Lake, W. R. [Vandemark, A. B., and Scharf, S. R.] Sept. 28.

Asphalts.—Bitumen &c., paraffin oil &c., and pulverized calcareous stone, such as limestone, chalk, or marl, are heated and agitated together to form an artificial asphalt for paving and roofing.

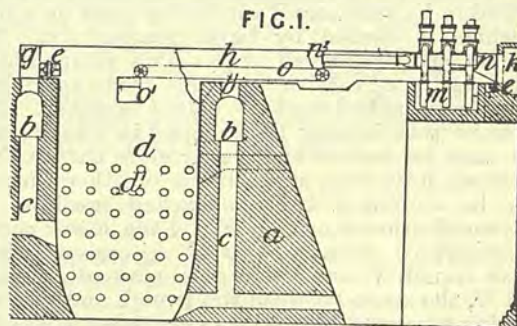
2586. Rogers, J., and Soares, G. de M. Sept. 30.

Asphalts for paving. Blue or green oils, pulverized caustic lime, pitch, sawdust, desiccated chalk or grit or iron slag or a combination thereof are heated together with foreign rock or natural asphalt, and thoroughly mixed.

2598. Goreham, W. Sept. 30.

Cements.—Relates to improvements on the invention described in Specification No. 385, A.D. 1871. In a kiln for making Portland cement, the

slip is dried on annular plates, surrounding the chimney and rotating in a flue through which the heated gases from the kiln pass, and is delivered from them in to the kiln by a fixed scraper. The

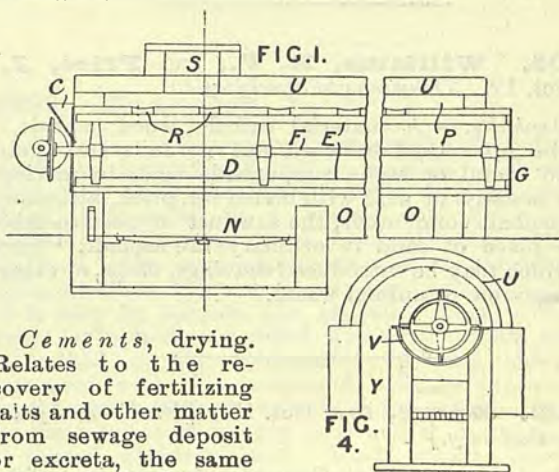


flue from the kiln is mounted on a solid partition and conducts the heated gases to the annular flue. The waste gases may be used to heat air or steam which may be mixed with, or driven through the slip, or the slip may be dried by being projected, in the form of spray, into the heated gases. Similar arrangements may be fitted to ordinary kilns.

2625. Candy, F. Oct. 4.

Asphalts.—For making roads, ways, and floors, kaolin refuse, ironstone or iron oxide, and bitumen are mixed with melted natural asphalt, the kaolin refuse being first dried in ovens or kilns. The composition is laid in the usual way on a concrete foundation.

2696. Milburn, R., and Browning, T. Oct. 11.



Cements, drying. Relates to the recovery of fertilizing salts and other matter from sewage deposit or excreta, the same being obtained in a

dry or partially dry state, and the invention being also applicable to the drying of cement and other matters. The sewage deposit &c. is fed in at *c*, Fig. 1, to a cylinder or retort *D* which is mounted on the side walls of a long oven or chamber and is covered or enclosed by an arched wall *U*. The heated gases from a furnace *N* flow through a lower flue *O* to the further end of the retort, where they pass through side flues into the return flue *P*, escaping by the flue *S* to a chimney, together with vapours &c. from the apertures *R* in the retort. The matters in the retort are kept in motion by agitators *E* carried by arms on a shaft *F* which is turned by bevel gearing &c. The matters are discharged at *G*. The retort may be of fireclay or of cast or wrought iron, and it may be made in flanged sections bolted together. Two or more retorts may be enclosed in one chamber and may be heated by one or more furnaces; or the waste heat from steam-boiler or other furnaces may be employed for the heating medium. In the modification shown in Fig. 4 the lower part of the retort or oven consists of a semi-cylindrical metal trough *V* and the upper part of an arched wall *U*, the space between the trough and the wall forming a return flue discharging through the flue *Y* to the chimney.

2703. Brannon, P. Oct. 12. *Drawings to Specification.*

Fireproof compositions; stone, artificial.—Ornamental fireproof surfaces for walls, floors, &c. are formed of cement or plaster, coloured with burnt clays and fireproof pigments, blended together to represent marble, or otherwise, and mixed with fibre of asbestos, or glass, or other lithic or vitreous materials. Sea walls, piers, embankments, and marine engineering works are built of iron wirework, filled with sand, which subsequently becomes converted into ferruginous sandstone, through the oxidization of the iron.

2705. Williams, R. P., and Price, J. Oct. 12. *Drawings to Specification.*

Asphalts.—A material called "wood asphalt," to be interposed between railway rails and their rigid metal or stone supports, is made by mixing dry sawdust or peat with boiled tar, pitch, bitumen, or asphalt compounds, the sawdust or peat to take the place of sand in ordinary tar asphalt, "into" which may be introduced shavings, chips, or other "vegetable or animal waste."

2722. Burge, G. Oct. 13. [*Provisional protection only.*]

Asphalts; cements.—Cements, for use in paving and the construction of railroads, tramroads, and

submerged or other works or structures, are made of asphalt, bitumen, tar, or pitch, and Puzzolana cement, Portland cement, blue lias lime, or Abethaw lime. Any two or more of the cements are mixed with the asphalt, bitumen, tar, or pitch, and crushed slag, ashes, gravel, sand, or chalk is added.

2738. Emmens, S. H. Oct. 16. [*Provisional protection only.*]

Asphalts; concretes.—Paving-blocks and tiles are made of raw or burnt fireclay, tar, and bitumen, heated, mixed, and pressed into prisms &c. A foundation for paving is made of a mixture of hot burnt Cornish killas or clay and mineral or vegetable tar or other bituminous materials, termed ballast asphalt.

2772. Mulholland, F. G. Oct. 18. [*Provisional protection only.*]

Asphalts.—A composition for coating, covering, or laying roadways, footpaths, flooring, roofing, &c. is made as follows:—Bituminous shales are crushed or rolled and screened, but when impregnated to an unusual extent with bitumen, oil, or wax, the shale is preferably subjected to a system of boiling, strong or weak acid solutions being added. In some cases where calcium carbonate preponderates, calcination reduces the mass to the required state. The shale thus treated is mixed with pitch and coal tar and heated gently while being stirred. Gypsum may be added.

2829. Granville, C. W. Oct. 23. *Drawings to Specification.*

Asphalts for pavements. Bitumen is melted with coal tar, and blue lias lime and pulverized iron ore are added.

2906. Claus, C. F. Oct. 30.

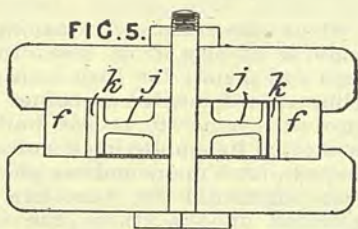
Casting; slags, treatment of.—In preparing slag for making building-blocks, a molten silicious slag from a blast furnace is run into damp moulds, or air or steam is blown through it so as to produce a cellular structure. Sand, calcareous clay, ferruginous sand, small coal, wood, sawdust, valueless iron ore, or even water, slaked lime, highly spongy, hairy, or woolly slag, or other substances may be incorporated with the molten slag in tanks or pools lined with a non-conductor of heat, or in a fixed or rotary reverberatory furnace, so as to disengage gases which, in escaping, will produce a cellular structure in the slag. The moulds used in casting the slag blocks are lined with a non-conductor of heat, or are made of infusorial silica, lime, or any suitable light porous substance, or substances. The slag may be sawn or cut into blocks.

2908. Johnson, J. H., [*Seville, C. F.*]. Oct. 30. *Drawings to Specification.*

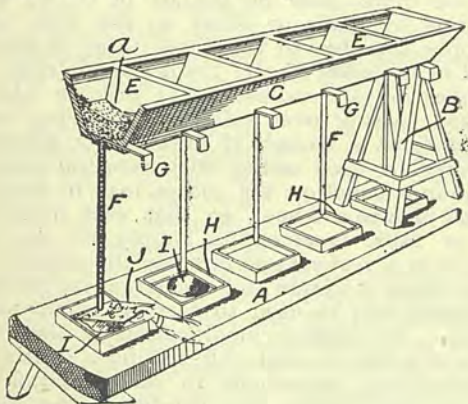
Asphalts.—In the manufacture of a composition which may be employed in the form of blocks or applied in a heated plastic condition for paving and asphaltting roads, streets, and footways, pulverized slate refuse, natural asphalt, limestone or powdered Paris white, purified or refined bitumen, and a solid, greasy or fatty material, such as tallow, suet, or resin, are well mixed together and heated so as to form a paste. The paste is run into cubical or other moulds to form paving blocks, or it may serve to form the top and bottom surface of such blocks, the intermediate portions being made up of sand, pebbles, and gas tar, together with chalk, ochre, and the materials used in the first-named composition; or the composition may be laid on a bed composed of a mixture of gas tar or mineral pitch sand or pebbles. The composition may contain pulverized waste from slate quarries and schist mines, and dried and crushed argillaceous earth.

2910. Clark, A. M., [*Lavater, M. L. J., and Michel, A.*]. Oct. 30.

Casting.—Relates to the coverings of spinning-machine rollers. To rollers of metal, wood, or ceramic material are applied bands *k* of hard or elastic rubber, the material being run into the space between the roller *j* and a mould *f*, the inner surface of which may be fluted, if desirable.



2934. Clark, A. M., [*Morse, G. F.*]. Nov. 1. [*Provisional protection only.*]



Stonework, ornamental.—The surfaces of stone &c. are ornamented or dressed by the action of

falling corundum and emery. A box *C* is mounted on supports *B* over a work bench *A* and openings therein are fitted with tubes *F*, and slide valves *G*. A mixture *a* of corundum, and emery powder, is filled into the compartments or hoppers *E* and allowed to fall through the tubes *F* on to the surfaces *J* to be ornamented or dressed thus cutting the stone &c and giving it a grained appearance. To produce designs upon the surfaces, the required patterns cut out in paper, cloth, textile material, metal, paper, gelatine, parchment, rubber, gutta-percha, collodion film, or other substance that will resist the action of the dressing material are placed over the surfaces *J*, so that the latter are only cut in parts. By continuing the action of the dressing material for some time raised or intaglio patterns or depressions are produced. The powder is received into trays *H* and cushions *I* are provided to support the stone &c. *J*.

2949. Brown, J. H. Nov. 3. [*Provisional protection only.*]

Asphalts; concretes.—A composition for use in the construction of roadways, footpaths, &c. is prepared by mixing and combining, with the aid of fire or steam, pitch, tar, resin, asphalt, or other bituminous substances, and granulated carbonaceous materials and other hard substances, such as igneous rock, slag, clinker, limestone, lime, coke, and cement, so as to form a compact, durable, and homogeneous mass. Stone, gravel, grey lime, and grit flint, with tar and sand, are used to make concrete for foundations.

2951. Grindley, R. D. Nov. 3.

Asphalts.—A composition for use in making roads, paths, &c. consists of ground granite and pitch, bitumen, or other binding material. The ingredients may be ground together or separately and are mixed and heated.

2992. Macintosh, J. Nov. 7.

Asphalts.—A waterproof compound for covering roadways, footpaths, floors, &c. consists of fibrous materials, wood fibre, &c. reduced to fragments, dried, and mixed in a vessel, with hot pitch, asphalt, or bitumen freed from grit or earthy matters. The composition may be moulded into slabs, blocks, or planks to serve as paving blocks, or it may be applied like asphalt. Rags, cotton waste, jute, hemp, or other fibrous materials may be added to the compound. Coarse cloths, saturated with the compound may be cemented together and formed into slabs for paving. Soft gas-tar pitch is preferably used and is liquefied in a heated cauldron with dried woody fibrous substances, the whole being well mixed.

3006. Lürmann, F. Nov. 8.

Slags, treatment of; cements.—Blast furnace scoria or slag, granulated by running into water while hot, or ground by mechanical means, or granulated and then ground, is mixed in a mortar-mill or other machine, with or without the addition of quicklime or other caustic substances or cement, and is then cast in a plastic state or moulded under pressure into bricks and building-blocks. Caustic magnesia or an alkali may be added to the slag, in addition to the lime.

3015. Holmes, J. E. Nov. 8.

Asphalts; cements.—In the manufacture of an asphalt and cement for paving streets, foot walks, yards, stables, &c., "tar rock" is ground and heated to drive off the more volatile constituents. For roadways where there is heavy and continuous traffic, the pulverized "tar rock" is thoroughly and evenly mixed with broken and pulverized red iron clay, grey fireclay, rock chalk, unburned lime, or plaster of Paris, and crude tar or natural or manufactured tar or pitch. The mass thus formed is treated in the same way as the "tar rock." In preparing the compound it is heated in revolving iron stills or retorts provided with condensers so as to save a quantity of oil and condense all odorous vapours. An iron roller covered with spikes or prongs is placed in each retort to stir and agitate the material and prevent it from adhering to the surface of the retort during heating.

3094. Spencer, G. Nov. 16. [*Provisional protection only.*]

Asphalts; concretes; cements.—Emery, in powder or small pieces, is mixed with asphalt or sprinkled on the surface of asphalt paving of roads or pavements when laid. The emery is combined with natural or artificial bitumen and purified mineral tar and may be made into paving-blocks. Reference is made to Specification No. 3111, A.D. 1868, which relates to a similar material for paving. The road or path is first covered with cement composed of Roman cement, river sand, and small pebbles or gravel, water being added to bind and slake the cement.

3095. Price, A. P., [*Martins, C. A.*]. Nov. 16. [*Provisional protection only.*]

Asphalts.—Materials for paving and similar purposes are prepared from asphalt, bitumen, pitch, or tar, or mixtures of these, or similar compounds, and iron residues obtained in the production of aniline from nitro-benzole by using wrought or cast iron in a fine state of division. The materials employed with the iron residues may be mixed with them in a fluid or in a finely divided condition, and, when so incorporated, may be heated.

3124. Hyatt, T. Nov. 18. *Drawings to Specification.*

Fireproof compositions; mortars; plasters.—Buildings are rendered fireproof by the application of materials capable, when heated, of generating steam for extinguishing fire. A filling to be applied in tubes and interspaces of a special flooring or roofing, or in hollow or cellular tiles or other airtight vessels built into or laid over the walls, partitions, floors, ceilings, and roofs, consists of water solidified with plaster of Paris as described in Specification No. 1289, A.D. 1870; or a dry mixture of alum and plaster of Paris or hydraulic cement; or one or more of salts containing water of crystallization, such as alum, Glauber's salts, or soda. Asbestos may be mixed with the materials to bind the mass together when solidified or hardened by heat. Mixtures of alum or equivalent salts and plaster of Paris, cement, clay, or other absorbent earth are used for making compressed bricks, blocks, or cakes, and for making mortars or plasters for the lathwork of walls and ceilings.

3204. Bell, T. Nov. 27. [*Provisional protection only.*]

Slags, treatment of; casting; concretes.—The removal of slag from blast furnaces, in suitable sizes and shapes for easy transport and to be distributed or deposited as refuse or used for admixture with concrete or for building operations, is facilitated by employing a series of flat or trough-shaped plates upon endless chains or belts passing over segmental &c. tumblers, drums, or rollers mounted upon a frame, the tumblers &c. being driven by steam or other power. One end of the frame is close to the slag spout of the blast furnace, so that the molten slag can be run into or upon the plates in succession and become solidified as the plates travel towards the other end of the frame, from which the blocks, slabs, or sheets can be tumbled into a cart or other vehicle. The plates may have partitions to limit the sizes of the blocks &c. Instead of being attached to the chain, the plates may be pushed or drawn along the frame by studs or claws on the links or by wire ropes, the edges of the plates riding in grooves, formed in the sides of the frame, or on rails. In a modification an endless metal belt or band is employed passing over rollers and having raised edges to form a trough if desired. A segmental wheel may be used either with separate plates or a continuous band, or the plates may be slung by eyes and pins to a wheel, so that each plate, as it rises or falls, receives its supply of slag and carries it in a vertical and circular direction to the vehicle where it upsets and discharges its contents. Two wheels may be used to carry the slabs to any distance. In another modification a disc or a portion of a disc is employed, having a continuous or intermittent movement in one direction and being so shaped that the solidified slag can be scraped off or otherwise removed when cooled down. The disc, which may be formed of separate plates, is moved in a circular direction by a central

shaft or spindle or it may move eccentrically and either continuously or in a reciprocating manner. The cooling may be accelerated by water or a current of cold air upon the surface of the slag or against the underside of the plate. The plates are preferably half filled with slag, and, when it has set, they are completely filled with water.

3273. Payne, S. J. Dec. 5. *Disclaimer.*

Refractory substances.—A composition or combination of materials for use in the manufacture of firebricks, crucibles, retorts, and other burnt or unburnt refractory goods, is made from such materials as gannister, stone, lime or limestone, red marl, clay, or stone, soapstone, fullers' earth, blast furnace slag, gravel of all kinds, iron ore, kaolin or China clay, ground fire-bricks or saggars, quartz sand, fire-sand, mica, sandstone, any conglomerate stones, felspar, roofing slate, drawing slate, hornblende, basalt, greywacke, flint, granite, and any other silicious materials, plumbago, calamine, baryta, steatite, magnesia, fireclay, loam, chalk, Dorset clay, pipeclay, alumina pure or in any ingredient containing it in proper proportions, coal, coke, hair, sawdust, shale, black band, plaster of Paris, Portland cement, potash, rock alum, lias clay, clunch clay, Kimmeridge clay, plastic clay, London clay, argillaceous gault, Wealden clay, potters' clay in every form, porcelain clay, clay-stone, shale clay, common clay, meagre clay, calcareous clay, "Ludi Helmontii" clay, sulphuric acid, sulphur, manganese, German clay, asbestos, gluten, and salt. The materials, either burnt or unburnt, are dissolved or chemically treated and mixed by the ordinary methods of grinding,

pugging, &c. by machinery or hand power, hot or cold pure water, or water mixed with any of the ingredients, being added. The moulded goods are dried by artificial heat or in the open air. The materials are burned separately or in combination.

3338. Jupp, H. J. Dec. 11.

Asphalts.—Relates to a composition for roads, blocks and drain-tiles, or for lining cisterns and covering roofs, bridges, &c. Dried and pulverized clay is mixed with mineral tar at a temperature of 300° to 400° F., a small quantity of sulphuric or nitric acid is added, and the heat kept up for a certain time. Black oxide of manganese may also be added along with the acid.

3357. Evans, G. Dec. 12.

Asphalts.—An asphalt composition for paving &c. is made as follows:—Clinker, slag, ironstone refuse, metallic refuse from furnaces, sand, lime, shingle, and tar reduced to pitch, are mixed together, the clinker, slag, or metallic refuse being crushed and heated to a red heat in a retort or oven, or by the combustion of breeze mixed with it. When using ovens or retorts the drying of the remaining ingredients, excepting the tar, is carried on separately. The lime is added to and thoroughly mixed with the ingredients, then the tar or pitch is added, and the whole mass is again thoroughly mixed. The proportions of shingle and the clinker or metallic refuse are varied to suit heavy or light traffic.

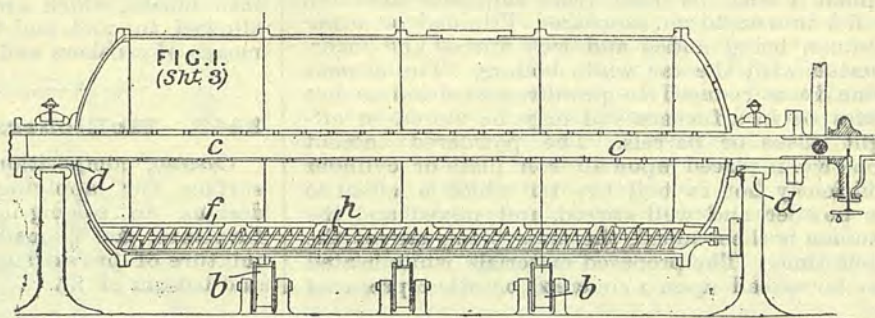
3359. Pinkus, H. Dec. 12.

Refractory substances.—

A puddling-furnace is lined with a combination of "decarbonized lime," pulverized and reduced pottery or crucible plumbago, powdered talc, and asbestos. The mixture is laid on in a pasty condition and is then covered with a mixture of burnt pottery clay, oxide of zirconium or native zirconia, and "carburet" or metallic iridium which

is pressed and rolled with rollers having projecting points to unite the two layers. When fired, the outer layer forms an incombustible glaze on which the fettling for puddling can be laid.

Asphalts; slags, treatment of.—An artificial asphalt for paving and like purposes is prepared by mixing the furnace slag and cinder and the slag silicate of pig moulds produced in iron and steel works with a proportion of bituminous shale and asphalt rock, or "decarbonized lime," or blue lias, or Bath stone, or cement, impregnating the mixture with bituminous matter distilled from shale or fluid bitumen, and then treating the mixture with fluorine and nitric acid gas or titanitic acid gas obtained in the process of purifying molten iron by the addition of fluorspar and sodium nitrate or "titanic granulates," as described in Specification No. 2440, A.D. 1869, [*Abridgment Class Iron &c.*].



These gases are stated to have a vitrifying effect. The slag and cinder are crushed by a ball mill and a steam hammer which may also be used for crushing the shale. The crushed shale is placed in a rotating cylinder shown in section in Fig. 1, Sheet 3, and is dried by hot air supplied from a blast furnace stove, the material being turned over by cups, corrugations, or shelves on the cylinder walls, as described for puddling and other furnaces in said Specification. The air is then exhausted from the cylinder, and the vapour distilled from the shale admitted. When the vapour has condensed and mixed with the slag &c., the gases from the iron-purifying crucible are admitted and absorbed by the material which is finally discharged from the cylinder by means of a worm *h* enclosed in a tube *f*. The cylinder is provided with a hollow axle *c* mounted in bearings *d*, and is also supported by rollers *b*. The axle is connected at the ends with supply and exhaust pipes and cut-off valves, and is perforated at the part inside the cylinder. The air is exhausted from the cylinder by connecting it alternately with two other cylinders in which vacua are formed by driving out the air with steam and then condensing the steam by water jets. The steam for this purpose may be produced by the steam generators described in Specifications No. 2792, A.D. 1867, [*Abridgment Class Steam generators*], and No. 2440, A.D. 1869, [*Abridgment Class Steam generators*]. The retorts for distilling the bituminous matter are supplied by the regulating-apparatus described in said Specification No. 2440, A.D. 1869, [*Abridgment Class Furnaces &c.*]. The vapour distilled is superheated before admitting it to the mixing-cylinder. The process and apparatus may also be used for treating other substances such as gas purifier-waste and residues to form asphaltic compositions or for effecting improvement in rock asphalt by either adding or removing bitumen as the material may require. The artificial asphalt may be produced and utilized in combination with or in connection with the processes and apparatus described in Specifications No. 5926, A.D. 1830, Nos. 8207 and 8653, A.D. 1840, and No. 2096, A.D. 1865, and those referred to above.

3383. Ellis, G. H. Dec. 14.

Asphalts for roads, floors, &c. Bitumen is heated with glue and quartz or other grit, bichromate of potash being added to the glue to render it insoluble in water.

3398. Pender, J., and Rae, M. Dec. 15.

Asphalts.—In the manufacture of artificial asphalt, cement stone, limestone, trap rock, raw or calcined ironstone, iron ore, shale, slag, and clay are mixed with shale or other mineral or vegetable tar and bituminous shale. The shale tar is obtained as a residue in refining crude paraffin oil. To render the shale tar suitable for use as a substitute for other tars in the manufacture of asphalt it must be freed from sulphuric acid and boiled in a cauldron, powdered Trinidad or other bitumen being added and well stirred and incorporated with the tar while boiling. The cement stone &c. is reduced to powder and dried on hot plates or in a furnace and may be stored in air-tight casks or barrels. The powdered cement stone &c. is placed upon an iron plate or cylinder sufficiently hot to boil the tar which is added to the powder and well stirred and mixed and the bitumen is then added, the mass being stirred the whole time. The prepared materials while heated may be spread upon a concrete or other prepared

surface and is then beaten down and consolidated by means of hot iron beaters and the surface smoothed over with hot iron plates. The composition may be used for covering roofs and arches, or any place where there is a constant vibration due to machinery.

3434. Reid, H. Dec. 19.

Cements.—In making Portland and other cements, the ashes or waste, produced in the manufacture of lime from carboniferous and other limestone, is mixed with shale, containing alumina and silica, soda, and iron oxide. Calcium carbonate and magnesia may also be used. The mixing is effected in a mortar mill with a finely-perforated bottom. The powder thus produced is moulded into blocks, which are dried and burnt in a kiln, allowed to cool, and then ground to a powder by means of crushers and horizontal millstones.

3446. McElcheran, W. H. Dec. 20.

Casting, compositions for. A flexible printing surface for applying ornamental lettering or designs to sewing-machines, chairs and other furniture, &c. is made by casting in a mould a mixture of brown sugar, glue, glycerine, pine tar, and balsam of fir.

A.D. 1872.

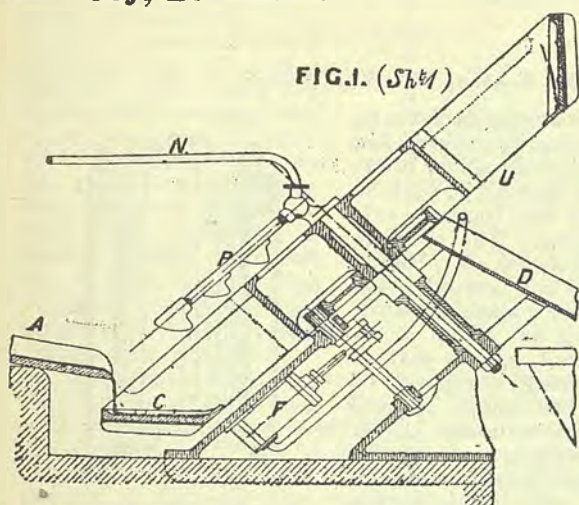
31. Lyttle, W. A. Jan. 4.

Asphalts for paving. Asphalt mixed with oil or fat and pitch is incorporated with powdered chalk, brick dust, burnt ballast, &c. The solid materials are heated on a furnace hearth or in a revolving cylinder through which the products of combustion pass. All the ingredients are mixed in a pug mill or mortar mill. The composition may be laid in a pasty state or in powder.

182. Smith, A. Jan. 19. [*Provisional protection only.*]

Refractory substances.—Cylinders for containing charges of molten iron in a puddling-furnace are constructed of blocks or bricks supported in a wrought-iron frame. The bricks are formed by moulding a mixture of about equal parts of calcined "pottery mine" (a kind of ironstone), pulverized hæmatite ore, calcined fireclay or old firebrick or old crucibles. Sometimes raw fireclay may be added to render the mass more plastic.

199. Joy, D. Jan. 22.



Slags, treatment of; casting.—The slag from a blast furnace runs from the shoot A into moulds C

carried in the rim of a wheel rotating on an inclined axis. During the revolution of the wheel the slag and moulds are cooled by air and water delivered by pipes N, P, and when each mould arrives at its highest point the slag in it falls out through an opening U in the wheel on to a shoot D from which it falls into a wagon to be conveyed away for storage. The moulds are formed with inclined ridges or projections which shape the slag so that it will be easily broken when it falls on to the shoot D. The wheel may be rotated by a hydraulic engine F the exhaust from which may be employed to cool the shoot D and the wheel. In other forms the axis of the wheel is horizontal, the slag being delivered into inclined recesses or moulds either on the inside or outside of the rim.

203. Stone, R. Jan. 22. [*Provisional protection only.*]

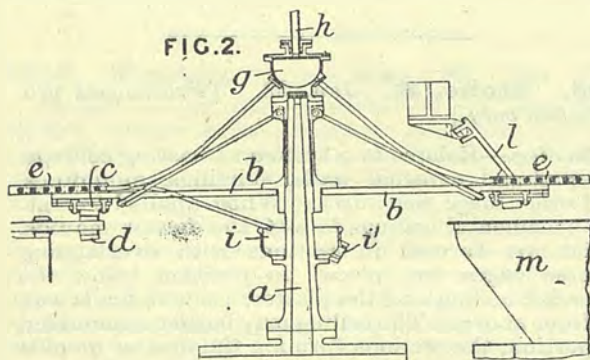
Casting.—Relates to a system of casting ceilings, internal and external walls, skirtings, mouldings, and other large structures. When applied to casting ornamental ceilings *in situ*, the dies or moulds, which are formed in sections with overlapping jointed edges, are placed in position below the intended ceiling and the plaster, cement &c. is run in from above. The ceiling may be cast or moulded in portion, the sections forming the dies or moulds being removed, as each portion is set, and transferred to the next part of the ceiling to be moulded. The system is specially applicable to the system of flooring or roofing described in Specification No. 2709, A.D. 1869. In the case of ordinary plaster or cement, laths or fibrous material may be introduced, and the moulds may be first faced with a layer of fine material and then filled up with a coarser and stronger substance such as fire-resisting cement or coarser plaster. Iron or other wire netting or open wirework may be embedded in the plaster or cement, and if desired, will enable a layer of sand to be placed on the top of the ceiling or roof, to act as a non-conductor of heat. In case of fire, the ceiling would descend in a sheet, damping or extinguishing any fire below. In applying plaster or ornamental work to buildings, dovetail bricks or their equivalent are built into the walls, to hold the materials. Enrichments can be secured to walls already built by cutting out cavities or inserting T-headed iron projections in the walls, and cavities may be left between the walls and the

plaster panels by placing core pieces against the walls and withdrawing them as the work proceeds.

279. Lake, W. R., [Schott, E. F. A.].
Jan. 30. [Provisional protection only.]

Cements.—A gypsum cement is prepared by reducing natural anhydrite to a coarse or fine grained powder and mixing limestone powder or chalk with it. The mixture is heated on the body of a puddling-furnace with liquid, and is then crutched, by means of iron tools, through a side opening and cooled. A Siemen's furnace, such as is employed to puddle pig iron, may be used, the melting being effected at a full white heat. If the limestone is difficult to pulverize, it may be burned and reduced to powder by slaking. Other materials, consisting of calcium sulphate, may be used. The resulting mass is reduced to powder. The coarser grains are principally used as hydraulic cement, while the fine powder is used for stucco-work.

302. Wood, C. Jan. 31.



Slags, treatment of.—Blast or smelting furnace slag or scoria, as it runs from the furnace, is cooled and loaded, in a solid state, into wagons or trucks by means of the apparatus shown. The slag falls from the furnace runner or spout on to the outer part of a revolving circular cast-iron table or trough *e*. The slag spreads out, and before the table has completed its revolution, the partially-cooled slag comes into contact with a fixed shovel or scraper *l* which removes it from the table into wagons *m*. The shovel can be lifted out of action by a handle. If not sufficiently cool when it reaches the shovel, water is run on to the slag. The table revolves on an axis or central post *a* embraced by a hub connected by a wheel *b* to the table, which is operated by a pinion *d* engaging a rack *c* beneath or above or fixed to a bowl *g*. The table slabs are cast on wrought-iron zig-zag pipes for conveying cold water from a bowl *g* having a feed-pipe *h*. The water escapes into a trough *i* having an outlet *i'*.

When the table is formed with a fixed rim forming a trough, the scrapers are formed so as to raise the slag over the rim. In a modification, the part of the table which supports the slag is cast hollow and kept full of water. In another modification, this portion of the table revolves in a stationary water trough.

410. Bear, T. Feb. 8. [Provisional protection only.]

Fireproof coverings.—The wooden and iron parts of fire-escapes are protected with laminated mica fixed with rivets &c. either outside or between canvas &c.

459. Young, J. Feb. 14. [Provisional protection only.]

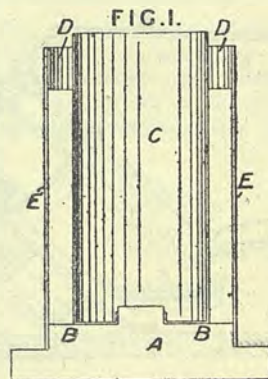
Asphalts.—Solid or semi-solid "hydrocarbons" known as natural bitumens are melted by heat, agitated by ordinary agitators or dashers, and treated with gaseous hydrochloric acid. The materials are treated in vessels of stone or other material which will resist the action of the acid.

498. Racey, G., and Young, J. Feb. 16.
[Provisional protection only.]

Fireproof coverings.—Fire-escapes are protected on three sides by small overlapping pieces of mica or talc connected by copper rivets, or by pieces of woven asbestos joined together. Drop curtains for theatres and other buildings are made of similar pieces of mica or talc applied crosswise, or of woven asbestos.

525. Lake, W. R., [Seibert, J. H.]. Feb. 17.

Casting.—Relates to a drum or package for enclosing acids, alkalis, and salts, such as zinc and copper sulphates. The package is formed of plaster-of-Paris mixed with flour, marble dust, &c., or other compound, and is cast in a mould composed of a bed plate *A* and metal cylinder *C*. A wrapping of paste-board, paper, or muslin *E*, which forms the outer surface of the package, is placed upon the projection *B* of the



bed-plate, and the plaster is poured into the space D to the height shown. The mould is withdrawn and the cast is dipped in plaster to fill the space in the wrapping to form the bottom, or for this purpose the cast may be supported on a tray and plaster poured in. The interior of the package is now coated with resin or sealing-wax, and is filled with the material to be packed. A coated disc is placed upon the top, and the remaining portion of the space D is filled with plaster, which may be covered with a wooden &c. disc to form the head. The package may be divided into compartments by discs coated with resin or sealing-wax. The package so formed protects the contents from fire, and against the action of moisture and of the atmosphere.

542. Nickson, P. H. H. Feb. 20. [*Provisional protection only.*]

Fireproof coverings.—Safes are lined with sheets of mica, dovetailed into one another.

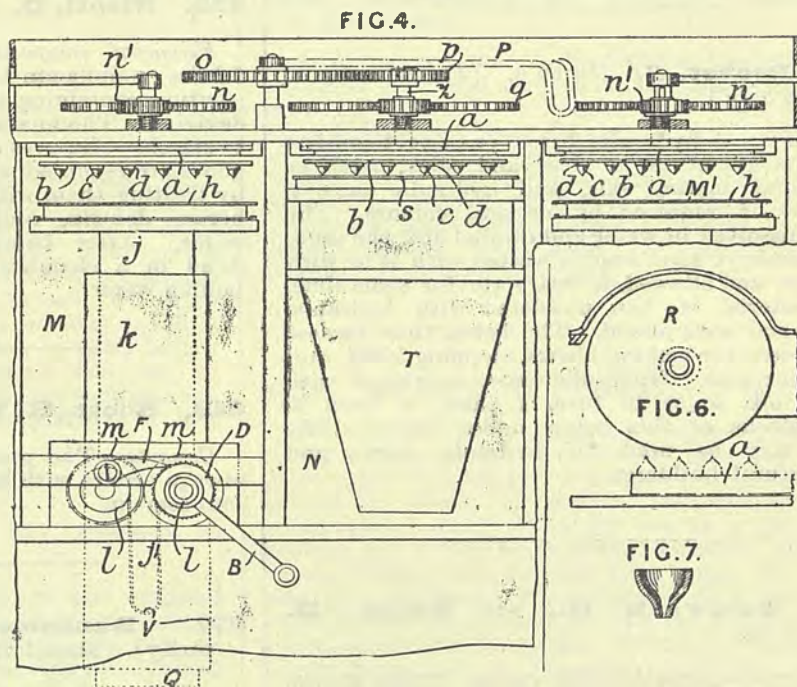
567. Rust, J. Feb. 22.

Stone, artificial.—In making blocks &c., suitable for building, sanitary, pictorial, or decorative purposes, glass is ground and mixed with sand, ground flint, sandstone, or other analogous material, with or without the addition of felspar, iron slag, iron furnace refuse, and colouring materials such as used by glass makers. The mixture is fused in a reverberatory &c. furnace, and then reduced to powder and pressed into moulds, either in a dry state, or damped with water or any glutinous liquid, such as starch, glue, or silicate of soda. The blocks are then baked in a kiln in the same way as pottery ware, and when cold may be polished, painted, glazed, or otherwise decorated. In a modification, the material as it comes from the reverberatory furnace is powdered and mixed with sand or ground flints and China or other clay, the mixture being pressed into moulds and finished as before. In some cases the glass is not ground before fusion, and in other cases the treatment in the reverberatory &c. furnace is dispensed with.

574. Roquencourt, V. A. Feb. 22.

Casting.—The apparatus is for manufacturing the calyxes of artificial flowers, more especially roses, from a thick paste of gum, water, and colouring matter. The moulding frame consists of mandrels *c, c* carried on a plate *a* and passing through tubes *d* in a plate *b*. The plates *a* and *b* are fitted together by guide pins which allow the lower plate to be raised and lowered. The frame is provided with a handle at one side and a spindle at the other for resting and rocking the frame on any support. The moulding machine has three compartments, two, *M* and *M'*, being alike and containing a shallow tank *h* mounted on a column *j* sliding vertically in a guide *k* by means of a chain *V* which embraces a projection *j'*

on the column *j* and passes over two pulleys *l, l* to a weight *Q*. The pulleys *l, l* are connected together by gearing *m, m* and are turned by a winch handle *B*. A ratchet *D* and pawl *F* keep the tank *h* raised. The moulding frames are placed in slides above the tank *h* with their plates *a, b* close together. The tank *h* which is charged with the paste is raised until the mandrels *c, c* are immersed in the paste and is then lowered and raised again several times to ensure a uniform deposit of paste on the mandrels and is finally left lowered. The plate *b* is then slightly depressed by screws operated by a handle through gearing *n, n'* to cause the tubes *d* to equalize the upper lips of the gum deposits on the mandrels. The frame *a, b* is next placed in an inverted position



under a roller R, Fig. 6, which is rotated to scrape off the points of the moulded calyxes. The moulds are then dried in a chamber and the frame is finally placed in the upper part of the compartment N, and the plate *b* is further lowered by screws *z* operated by a handle P acting through gearing *o, p, q*, thus causing the tubes *d* to slide over the mandrels *c, c* and push off the moulded calyxes which are gathered by a rack S into a receptacle T. Fig. 7 is a section of one of the finished calyxes.

668. Fothergill, B., and Rumble, T. W.
March 4. *Drawings to Specification.*

Fireproof coverings and compositions.—Fireproof and burglar-proof safes or other rooms are constructed with an outer wall of Craigleith, gannister, &c., and an inner wall of gannister with a lining of metal plates on its outer side; and the air space between it and the outer wall may be filled with steam or water &c. A third wall is placed within the second and the space filled with spiegeleisen &c. or molten slag, or slabs of slag with wires &c. cast in them for stability. The metal plates are of iron or copper. The iron plates may be partly converted into steel, or may be welded, riveted, or bolted to steel plates. The walls have fireproof wood linings; or are painted or galvanized as a protection against corrosion.

689. Drevet, J. March 6. [*Provisional protection only.*]

Cements.—A hydraulic beton or cement consists of a mixture of sea or river sand, silix, earth, or river mud, marine salt, and hydraulic cement, coloured if required by mineral colours. The salt is dissolved in water and diluted and the sand, silix, earth, or river sand is wetted with it or with sea water and allowed to macerate for some time. The material is then powdered with hydraulic cement and well mixed. The beton thus formed can be used for making blocks, stopping leaks, and other purposes. Hydraulic lime, moistened with drying oils so as to form a paste, is used to unite blocks of this beton under water. The beton may be used for hydraulic works and architectural buildings.

771. Gregg, S. G., and Evans, D.
March 14.

Concretes.—A material for paving, bridge arches, columns, &c. consists of small pieces of granite, silica, pebbles, slag, &c. mixed with lime or cement and tan, with sometimes iron oxide, the whole being formed into a homogeneous mass by solution of silica.

793. Thomas, F. S. March 15.

Asphalts; casting, compositions for. An asphalt compound for paving footways, roads, or for floors for buildings, is prepared by melting india-rubber, gutta-percha, or alpha gutta with hot water, spirits, or preferably pitch, until a cohesive mass is formed, which is allowed to cool and is then pulverized. This cohesive powder is mixed with a non-cohesive powder, such as sawdust, coal-ashes, pulverized granite, or by preference for roads "fossil ironstone" in a triturated form. The mixed compound is put down while in a heated state, and either rolled, pressed, or beaten into a compact mass; it may also be cast into blocks.

836. Nicoll, D. March 19.

Fireproof compositions.—To render washing fabrics unflammable they are treated with a solution containing starch, sodium tungstate, and dextrine. The mixture is used in a similar manner to starch. Mixtures of wool and cotton, or woollen goods are rendered waterproof and unflammable by treating them with a solution containing alum, borax, dextrin, sodium tungstate, and soapy water. After being saturated the fabrics are dried in a chamber heated to a temperature of boiling water.

849. Scott, H. Y. D. March 20.

Cements.—The precipitate, formed by treating sewage waters with lime, is calcined and converted into cement.

877. Ransome, F., [*Ransome, E. L., partly.*] March 22.

Stone, artificial.—In place of using silicate of soda as described in Specification No. 1233, A.D. 1870, soda uncombined with silica, preferably in the form of soda-ash, is employed together with finely divided silica or a soluble silicate. These are mixed with lime or Portland cement, chalk, sand, or other usual constituents of artificial stone. Potash may be used instead of soda, and magnesia instead of lime. The composition is moulded in

the usual manner and the blocks dried at a temperature of 212° F. They may be washed or boiled to avoid efflorescence of the salts.

908. Snelus, G. J. March 25.

Refractory substances.—Relates to a lining for cupola-furnaces also applicable for the beds of reverberatory furnaces. The lining is made entirely of some basic body, preferably lime or magnesia or mixtures thereof, with sometimes a little oxide of iron to unite them and to form a glazed surface. This mixture is well burnt, and while hot is rammed in between the core and the iron casing of the vessel to be lined. If bricks are used the lining should be separated from them by a mixture of coke-dust and lime, the proportion of coke-dust being greater near the brickwork. Or an unburnt mixture as above is ground to a stiff paste, with water, and rammed into the space to be lined which is afterwards dried and fired. The high temperature glazes the surface and for some depth converts it into lime; the carbonic acid given off escapes by holes drilled through the casing. The use of the lining prevents the wearing away which occurs when silicious substances are used.

1053. Danks, S. April 9.

Refractory substances.—A lining for rotary puddling furnaces such as are described in Specifications No. 370, A.D. 1869, and No. 2397, A.D. 1870, [both in *Abridgment Class Furnaces &c.*], consists of a compound of lime and oxide or silicate of iron, or other metallic oxide such as "heating furnace cinder," "best tap," native oxide of iron, oxide of titanium, or oxide of manganese to which may be added soda, potash, or other alkali or common salt. If soda, potash, or salt is to be used it should be dissolved in water before mixing with the lime; pulverized iron ore, or other oxide or silicate is then added in such amount as will give the compound the consistency of stiff mortar.

1115. Stone, R. April 15. *Drawings to Specification.*

Castings.—Ceilings, arches, internal and external walls, skirtings, chimney-pieces, floors, mouldings, and other large surface structures are cast or moulded *in situ*. The dies or moulds are formed in sections, with overlapping jointed edges to hide the joints in the work. The moulds are placed in position below the ceiling or against the wall and the cement poured in from above. The ceiling, walls, &c. may be cast in portions, the sections of the moulds being removed as each portion of the cast ceiling &c. sets, and transferred to the other part of the ceiling to be moulded. This system is specially applicable for the flooring and roofing

described in Specification No. 2709, A.D. 1869, [*Abridgment Class Buildings &c.*]. In the case of ordinary plaster or cement, laths, fibrous material, or wire netting may be introduced into the cement to increase the strength of the surface. When these are added the moulds are first faced with a layer of fine material and then filled up with the coarser and stronger, which may be a fire-resisting cement. Sand may be placed on the top of the ceilings to act as a non-conductor of heat. In the case of fire, causing the ceiling to fall, it would descend in a sheet and extinguish the fire. In applying the plaster or ornamental work to buildings, projecting dovetail bricks or their mechanical equivalent are fixed in the walls at intervals, and the cement sets round these projections and support the weight of the moulding. Other methods of support are obtained by making cavities in the walls, or inserting T-iron projections. A space may be left between the wall and the plaster by using core pieces and withdrawing them as the work proceeds. When the moulding surrounds metal beams, joists, or rafters, these are perforated in several places, and the plaster or cement forms one amalgamated whole by connection of the two sides through the perforations.

1149. Norton, J. L. April 17. *Drawings to Specification.*

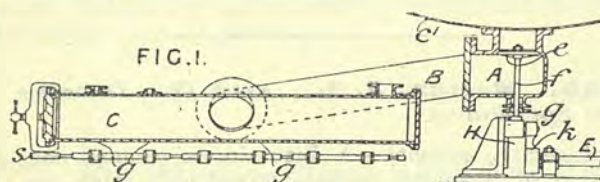
Asphalts; cements.—A bituminous cement consisting of Trinidad asphalt mixed with pitch, tar, ground Portland stone, ironstone, and sand, or any other bituminous cementing material, bitumen, or asphalt is used to separate the inner and outer portions of a wall, forming a damp-proof separation. Tie bricks for hollow walls and bricks for paving are made of a cement consisting of bituminous cement, ashes, sand, or gravel, ground Portland stone, and ironstone.

1215. Gray, J. W., [Reno, F.] April 23.

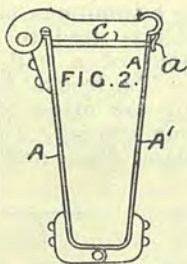
Cements; mortars; plasters; fireproof compositions; stone. artificial; stone, colouring and preserving.—Relates to the treatment of potassium silicate to obtain a fireproof, waterproof, and weatherproof composition for use as a paint or coating for stone, brick, slate, concrete, plaster, wood, metals, cloth, leather, felt, paper, &c., and also as a medium for colours and as a basis for cements, mortars, plasters, stuccos, &c., and artificial stone, marble, slateware, &c. Potassium silicate in a gelatinous state is evaporated and then mixed with materials more or less rich in potash or silica as requisite to form a tribasic silicate. Flexibility is imparted by adding glycerine, preferably a product obtained from the liquors left after saponifying tallow with lime. The proportions of glycerine and silicate are determined by a test experiment obtaining a coating which does not cause paper to curl. Where hardness is required, powdered materials are added to form double salts identical

with felspars &c., forming at the same time a coloured and a covering basis. Such materials include manganese, magnesium, and aluminium silicates, potassium aluminates, and refractory earths such as fireclay, all or any of which can be used pure or associated with sulphides, chlorides, &c. Ochres or ultramarines may be similarly used. Pigments recommended include stone colours from aluminates and zinc salts, blacks obtained by calcining precipitates formed by treating copper sulphate with ammonia, powdered bricks, composite grey and pink phosphates, zinc grey combined with calcium phosphates and extreme green, grey and white zinc mixed with Meudon white and yellow ochre, and green ultramarine. Fine sands, gravel, powdered marble, &c. may also be added. After applying the mixtures as coatings or forming or moulding them into blocks &c., they may be further hardened with a wash of hydrofluosilicic acid or a lime solution, and may be finally polished.

1229. Kleberg, C. G., [*Tsherikovskiy, N.*]. April 24.



Casting sugar. One of a series of moulds for casting sugar into blocks as it comes from the vacuum pan is shown in cross-section in Fig. 2A. The slides A, A' are of sheet iron, joined at the bottom by a hinge, the catch *c* holding the halves together at the top when in use. The moulds are lined with varnished cloth or calico, one end of which is doubled over and fastened to the edge *a* by a bar and bolts. The mould is divided into compartments by transverse brass plates. The moulds are placed on wagons so that one comes under each opening of the distributor *c*, Fig. 1, and pipes from a fan are placed above the moulds so as to send a stream of cold air over the surfaces.



1264. Lyttle, W. A. April 27.

Asphalts; stone, artificial.—In order to avoid the evolution of offensive gases from natural or artificial asphalt when being heated for laying down as pavement &c., the asphalt is placed in a pugging-machine capable of being closed airtight except at two openings. One of these openings is at the bottom, and admits hot air or furnace gases

forced in by a pump. The other opening is at the top, and allows the waste gases to pass off direct to the furnace of the engine which does the pugging, to a fireplace, or into the atmosphere. The hot furnace gases used are produced by causing an air pump to force air upwards through the burning fuel of an airtight furnace in the way generally followed in certain hot-air engines. These gases pass by a tube from the top of the furnace to the pugging-machine. When asphalt is required for roofing, coating, or flooring the surface of ships' decks or the interior or exterior surfaces of their hulls, &c., its tendency to crack under sudden strains is diminished by thoroughly mixing with it, when hot, any fibrous material such as coco-nut fibre torn short, spent tan dried and torn into shreds, cotton or linen waste, or any other vegetable or ligneous fibre such as peat, or short hair. The asphalt described in Specification No. 31, A.D. 1872, is preferably used, the amount of mineral ingredients used being reduced and the amount of bituminous wax being increased. The asphalt thus produced may be used for house flooring &c. as a substitute for wood, and can be moulded into ornamental forms as a substitute for carved wood, stone, or terra-cotta. Fibrous asphalt may be shaped or rolled out into rectangular &c. sheets like slates and packed in cases with any dry powder to prevent the sheets from adhering together. The sheets, when warmed so as to be rendered slightly plastic, can be laid like slates for roofing, the nail holes being made with a hot boring tool.

1307. Bradley, L. May 1.

Cements.—A cement, adapted to resist moisture, set rapidly, and prevent the escape of gases and disagreeable odours, consists of aluminium, iron, calcium, or magnesium silicate, manganese, bitumen, asphaltum, petroleum, and the residues from the distillation of coal free from sulphur and phosphorus. In making a cement for foundations or works under water, the silicate and manganese are mixed and fused so as to drive off the sulphur, phosphorus, and carbonic acid. The fused mass is run into cold water and ground to powder. The powder is mixed with the asphaltum &c. and ground for several hours in a mill heated to 212° F. Bitumen is then added until the whole mass is thoroughly mixed, when it is taken out of the furnace and run or moulded into blocks. When producing cement for other purposes petroleum is added.

1330. Finlay, F. May 2.

Stone, preserving.—In order to preserve stone, slate, and plaster from decay, they are coated with pitch or tar, put on with a brush &c., and then with hot or cold asphalt, hot irons being used to incorporate and form a surface when required.

1352. Newton, H. E., [Anderson, J.]. May 3.

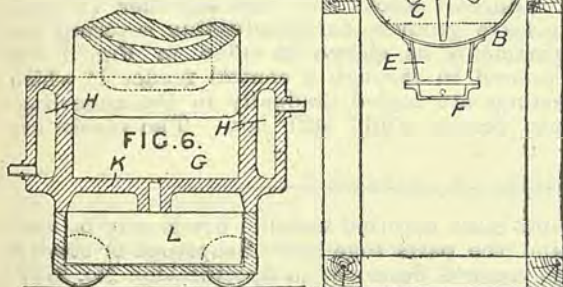
Cements; stone, artificial.—A composition for use in the manufacture of drain &c. pipes, tiles, artificial stone, &c., is made as follows:—Resin is melted by heat, hot and perfectly dry sand is added, and the whole is well stirred. Kaolin or fireclay is now added, and the whole mass is stirred until thoroughly incorporated. Lime, having been previously air slacked, is heated and mixed with the mass, and a small amount of sulphur may be added. The mixture while hot is packed or rammed tightly into moulds. Any natural silicate may be substituted for sand, and strontia, baryta, or magnesia may be substituted for lime.

1396. Turner, H. May 7.

Concretes.—Portland or Roman cement is mixed with river or quarry sand and stone chippings or broken stones and broken-up hard-burnt clay or cinders.

1443. Davey, G. May 11.

Stone, artificial.—Relates to a composition for making artificial or imitation coral, malachite, marble, and other ornamental substances. A material called "xylo-



"dine" is first obtained from linen rags or other fibrous materials, which are divided into fluff, soaked in a mixture of nitric and sulphuric acids and water, and transferred to a press to remove any acid and form the mass into a hard cake, which is then disintegrated, washed in running cold water, and dried. Pigments and oils are added to the xylodine as required, and the mass is then treated with a mixture of methylated spirit and benzol, naphtha spirit, or other solvent, or with the vapours of these. An apparatus for the application of the vapours comprises a chamber B, Fig. 4, fitted with a hopper A and an agitator C, and communicating through a perforated bottom with a receptacle E, which is heated by a steam jacket F and supplied with vapour from a retort. The plastic mass obtained is strained by forcing it through discs of wire gauze placed on a perforated bottom K, Fig. 6, of a vessel G heated

by a steam jacket H. The bottom K may be further heated by a steam coil placed underneath. The material passes into a receptacle L. In some cases the mass instead of being strained is rendered uniform by the action of masticating rollers. The plastic mass is then rolled into sheets of various densities, which are combined longitudinally or diagonally to produce a wavy or irregular grain effect, or cut into blocks or moulded into various forms and coloured in imitation of mosaics, and left to dry. For making sheets two rollers enclosed and connected to a condenser for recovery of the solvent are preferably used.

1460. Monckton, E. H. C. May 14. *Drawings to Specification.*

Slags, treatment of.—Slag obtained when an impure iron ore is fluxed with a mixture of coal, common salt, and lime, and treated in a furnace, and consisting of a compound of silica, soda, and lime is run into a reservoir of cold water; it is then reduced to "bean shot" and may be used for road making, or by fusing it again with soda a soluble silicate of soda and lime is obtained and may be used for making artificial manure. By using an excess of salt at first the slag is more fusible and more readily soluble.

1492. Christy, T., and Bobrownicki, A. May 16.

Cements.—A residue of calcium sulphate and silicate utilized for making cements is obtained by mixing quicklime with a product "silicoid" obtained by treating ammoniacal gas liquor with silica as described in Specification No. 1327, A.D. 1872, [Abridgment Class Sewage &c.], when the silica is liberated with sulphuric acid.

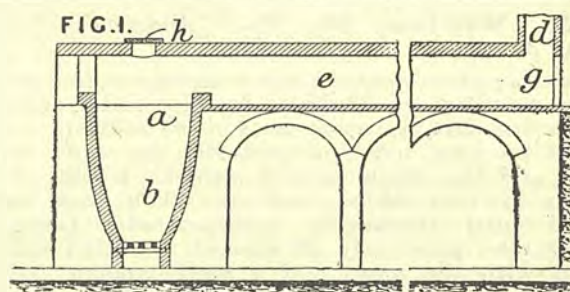
1533. Groskey, J. R. May 20. [*Provisional protection only.*]

Casting.—Paving-blocks and the like with a facing of asphalt or bituminous composition are made by casting in moulds. The bottoms of the moulds are formed with ridges or projections to produce indentations in the asphalt surface, and broken stones or the like are glued to the bottoms of the moulds so as to become embedded in the asphalt surface and adhere to it when it has set. The moulds are made with detachable metal bottoms and detachable sides of wood and metal combined.

1583. Johnson, I. C. May 23.

Cements.—The moist mixtures, from which Portland and other cements are made, are dried in a chamber through which the products of combustion from a kiln, furnace, or oven *a, b* pass to a chimney *d*. The floor is inclined towards the kiln,

so that the slip can run down it. The chamber can be partitioned off so that the slip when dry may be shovelled direct into the kiln by workmen. The chamber may be divided longitudinally by a partition. A damper *h* regulates the draught. The upper part of the kiln has an arched roof. The wet slip is charged at the aperture *g* by means of trolleys, barrows, boxes, &c. The chamber *e* may be constructed so as to cause the smoke or vapour to travel in a zig-zag path. The drying chamber may be arranged to utilize the waste heat from coke ovens.

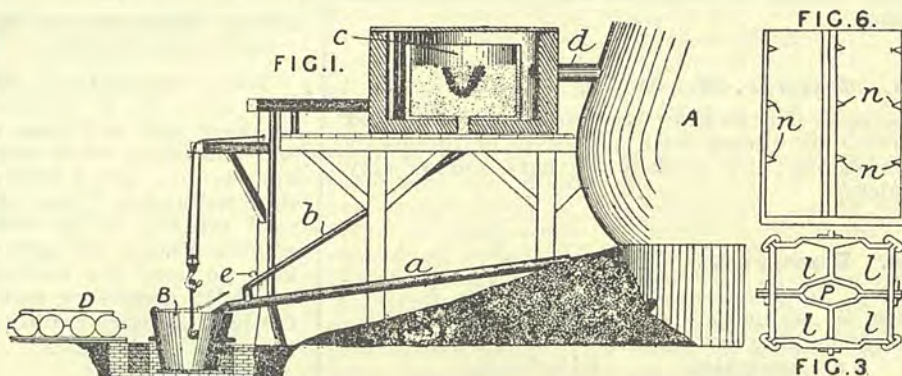


1585. Lake, W. R., [*Luckenbach, F. A.*]. May 23.

Slags, treatment of; casting.—The slag from iron-smelting furnaces is cast into building, paving, and like blocks. The slag is mixed with silica and alumina while in a molten condition to make it harder and tougher.

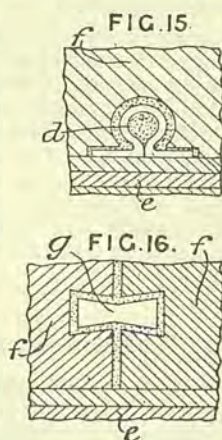
The slag is run direct from the furnace *A* through a loam-lined trough or pipe *a* into a ladle *B*. Silica and alumina are supplied from a box *C* by a pipe *b*, the proportion being regulated by a cock *e*. The box *C* is heated by a hot blast supplied by a pipe *d*. The slag is freed from enclosed gases by running it over a corrugated surface, by stirring it, or by injecting hot blast.

The ladle is run upon a truck *D* to the moulds, which are made of iron, firebrick, slag, or other suitable material and are kept hot in an annealing-oven. Several blocks are cast together in each mould, ridges *n*, Fig. 6, being formed on the moulds to leave grooves for facilitating severing the castings into blocks. The moulds are arranged in compartments as shown in plan in Fig. 3, the sides being detachable and the tops open. The slag is poured in through a central feeder *P* which opens at the bottom into the compartments *l*. The castings are cooled gradually in the annealing-ovens, but are removed from the moulds and split up into blocks while still hot. The blocks are then stacked together to cool gradually.



1611. Hobbs, A. C., and Hart, J. M. May 28.

Fireproof coverings and compositions.—Relates partly to a method of applying fireproof coverings to safes, columns, girders, doors, &c. An angular or hooked piece of metal *d*, Fig. 15, is fixed by screws &c. to the metal portion *e* and projects into the incombustible portion *f*. A cement &c. fills up the parts between the hook and the incombustible material. The forms of connecting-pieces may also be Z-shaped, I-shaped, &c. Dowels *g*, Fig. 16, are used to connect the slabs of incombustible material together.



In some cases external metallic bands may be used to bind the parts together. Soapstone or steatite or the material described in Specification No. 2759, A.D. 1868, may be used as the incombustible material.

1657. Nicoll, D. May 31.

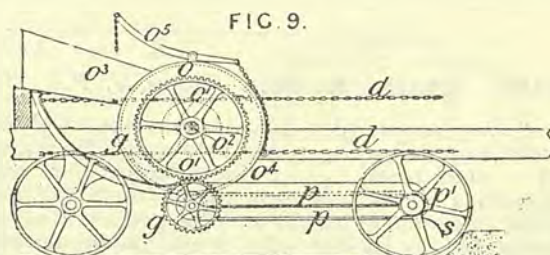
Fireproof compositions.—A fireproof composition to be applied like ordinary starch to cotton and linen fabrics is composed of sago and rice flour coloured with ultramarine and mixed with borax, dextrin, and ammonium sulphate. Paper is rendered fireproof by the application of a solution of alum, dextrin, and ammonium sulphate in water.

1669. Tucker, J. C. June 3. *Drawings to Specification.*

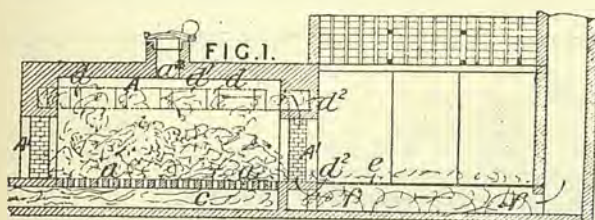
Asphalts; cements.—A composition made of asphalt or its equivalent and the slag from blast or

other furnaces, with or without broken stone or gravel, is used for paving and may be applied in the same way as concrete or in separate blocks. The composition may be used for artificial stone, tiles, walls, sea walls, and roofing. The slag is rendered anhydrous and should be broken or crushed and placed, with the asphalt &c., in a hollow cylinder &c. and subjected to heat and friction or agitation. The cylinder may be made to rotate rapidly. The mixed mass in a warm and plastic condition is run into moulds or dies and subjected to pressure.

operating the lever o^5 . The apparatus below the drum is for spreading the asphalt.



1877. Burge, G. June 21.



Cements.—Cement ingredients, lime, &c. are dried by means of the waste gases from the burning kilns. The waste gases from the calcining chamber *A* pass by openings *d*, lateral flues *d*¹, and end vertical flues *d*², through flues *f* beneath a drying floor *e*. This floor may be left open or covered in to form a chamber, and it may be raised above the level of the kiln floor. Or it may be placed on a level with the roof, or the roof of the kiln may form the floor, the flues being formed in it.

2007. Stones, J., and Castle, J. July 3.
Drawings to Specification.

Sound-deadening coverings.—Shutters and partitions for buildings are prevented from transmitting sound by the use of sound-deadening materials placed either on one side or in the core. The materials preferred are hair felt, kamptulicon, linoleum, boulinikon, cork carpet, corium, and like materials, gutta-percha, india-rubber, cork, sail cloth, baize, leather, cloth, woollen, and other non-conducting textile fabrics.

2014. Parlour, J. T. July 3.

Asphalts.—Relates to an apparatus for mixing and spreading asphalt &c. in paving streets. The asphalt is fed by a hopper o^3 into a drum o where it is mixed by rotary blades o^1 on the shaft o^2 . The shaft o^2 is driven by a chain d acting on a spur-wheel. At the bottom of the drum is a door o^4 which is opened for discharging the asphalt by

2015. Payne, S. J. July 3.

Refractory substances.—Relates to the process of manufacturing firebricks, crucibles, retorts, and other fire-ware goods, described in Specification No. 3273, A.D. 1871, the object being to employ a large proportion of silica or silicious material. Finely-ground flint mixed with Dorset blue clay or other suitable material is used for the body of the articles, and in the process of moulding, the surfaces of the articles are coated with calamine, which is mixed with the sand used in sanding the moulds. This coating forms a tough skin under the action of heat.

2097. Hill, H. C. July 11.

Fireproof compositions.—Wood paving-blocks, tramway sleepers, &c. are made fireproof &c. by pickling or saturating them, under pressure or otherwise, in certain solutions. The solutions employed are preferably solutions of silicates with or without tungstate or a base of tungstate or phosphates or baryta by which the soluble silicates are transformed into insoluble silicates; or sulphates, sulphites, chlorides, or a solution of india-rubber mixed with tar may be used to preserve the wood from dry-rot and render it non-inflammable, the wood being also steeped in a solution of glue or size chemically prepared, and afterwards steeped in a pit containing tanning solutions.

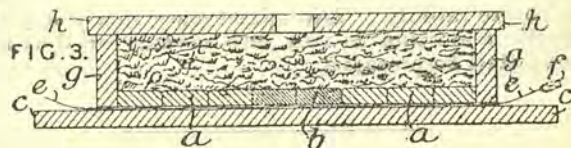
2119. Lake, W. R., [Schott, E. F. A.]. July 13.

Cements.—A gypsum cement is prepared by mixing natural anhydrite or calcium sulphate, in a coarse grained or fine powder, with limestone powder or chalk. The mixture is heated in a puddling furnace until liquid, crutched with iron tools through a side opening, and cooled. A Siemens' or other furnace is used. If the limestone is difficult to pulverize it may be burned and reduced by slaking. The cement is reduced to

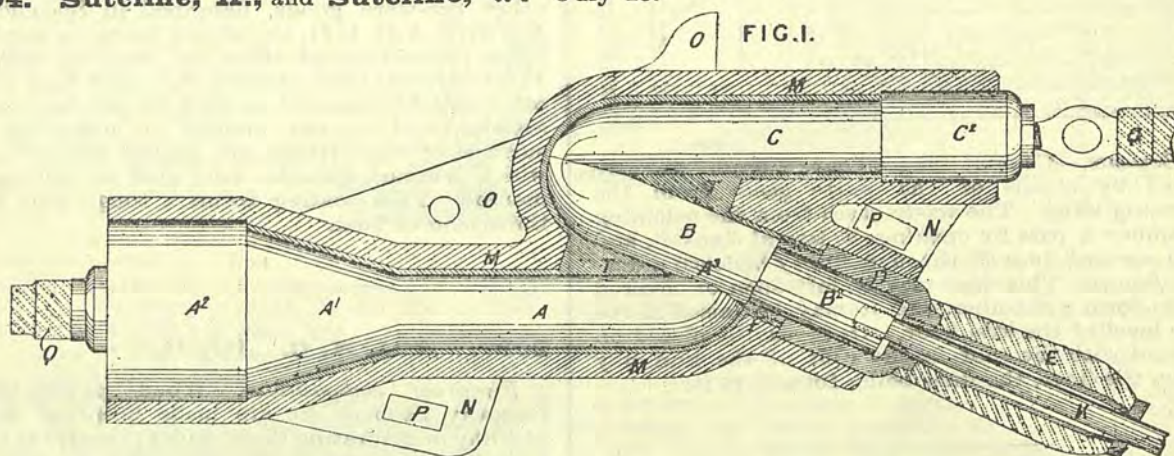
powder of different sizes, the coarser grains being chiefly used as hydraulic cement and the fine powder being applied to stucco work.

2187. Clark, A. M., [*Simons, J. P.*]. July 22. [*Provisional protection only.*]

Casting mosaic tiles, quarries, or slabs. Coloured stone-ware tesserae *a, b* are laid upon the squares of a thin metal, sheet india-rubber, or other pattern *e* which has been placed upon the loose plate *c* of a metal mould *g*. The pattern *e* is then withdrawn by its stiff edge *f* and the mould filled up with silex, pebbles, gravel, furnace slag, or other coarse material. Cement is then run into the mould through its perforated cover *h*. The sides of the mould are rabbeted together to allow the removal of the tile when set.



2194. Sutcliffe, H., and Sutcliffe, W. July 23.



Casting.—Relates to the casting or moulding of earthenware stench traps and siphon pipes or traps for sewers and water-closets. Stench traps are cast whole by the use of three cores A, B, C. The core A is hollowed out at the end A³ to fit the central core B, and is formed with a funnel piece A¹ and a piece A² overlapping the mould M. The core B is curved at the end joining the core C, and the other end B² is rounded and of smaller diameter than the core, and receives a socket D having a screw tap for forming a plug-hole F with the trap. A piece C² of the bottom core C overlaps the mould. The cores A, C are fitted with handles Q, and the core B with a rod K which passes through a handle E of the socket D and is of sufficient length to allow unscrewing of the socket D. The mould M is cast with brackets N, O, and the brackets N have slots P for wrenching levers. The runners are made with bevelled edges. Strengthening webs T are cast through openings in the mould. Siphon pipes are formed by using two cores meeting at the bend and having at each end a larger part to form the socket of the pipe. Strengthening webs are cast at the bend.

2266. Milburn, R., and Jackson, H. July 30. *Drawings to Specification.*

Cements.—Apparatus for drying cement &c. comprises an iron or other floor heated below by furnace gases, steam, &c. and enclosed or not by a roof or removable covering. A frame, which moves to and fro and also rises and falls, carries a series of scrapers and disintegrators for moving the material along the floor and for breaking it up. The scrapers may be hinged, so as to yield in one direction, or they may be carried by endless chains operated so as to be moved to and fro and also progressively forward.

2276. Bennett, W. B. G., and Watt, J. C. July 30.

Asphalts; concretes.—Asphalt for use in making roads, pavements, footpaths, &c. is heated in the liquid or powdered state and mixed with hard lead, zinc, or other metal turnings, filings, chippings, or particles in pots or cauldrons, &c. Bone dust and calcium sulphate are added to the composition which may be spread or made into blocks cast in moulds. The upper part of each block is made of this composition while the remainder is made of clean ballast, gravel, broken stone, or clay previously burnt, mixed with tar and pitch, or English made asphalt, and heated. Calcium sulphate, chalk, and grit are also added.

2331. Du Motay, C. M. T. Aug. 5.
Drawings to Specification.

Refractory substances.—The internal linings of converter furnaces are made of magnesia strongly compressed into bricks and baked in an oven.

2361. Jaynor, A. Aug. 8. [*Provisional protection only.*]

Stone, artificial.—Artificial stone is made of gypsum or plaster of Paris, resin, sand, gravel, sulphur and petroleum. The resin is melted and gypsum stirred in, crude petroleum is then added and afterwards sand and gravel which has been previously treated with sulphuric acid. A proportion of sulphur is finally added and colouring matter if desired. The composition may be moulded into statuary or other ornaments, or used for building and other purposes.

2426. Joy, D. Aug. 14. [*Provisional protection only.*]

Slags, treatment of.—Slags and other impurities from furnaces are carried away and disintegrated by an induced or direct current, or blast of air, steam, or gas, with or without water. The lighter material is carried away and the pure metal falls down and remains. An ejector placed near the runner of slag, draws it up and disintegrates it. Guide plates around the currents guide the slag as required.

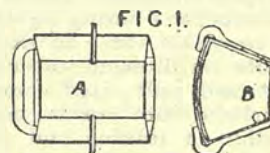
2451. Emmens, S. H. Aug. 16. *Drawings to Specification.*

Asphalts.—"Ballast" asphalt for use in paving floors for buildings, roadways, paths, &c. is composed of bitumen, vegetable or coal tar or pitch, and burnt clay or broken bricks. For heavy traffic, the asphalt is composed of bitumen, vegetable or coal pitch, decomposed granite or crushed limestone, and ironstone or bricks. The asphalt may be used as a waterproofing composition for wood blocks &c.

2456. Hughes, E. T., [Langen, E.].
Aug. 17. *Disclaimer.*

Casting sugar.

Coarse sugar solution, evaporated to the required consistency is placed in moulds, which are formed as segments of a cylindrical ring,



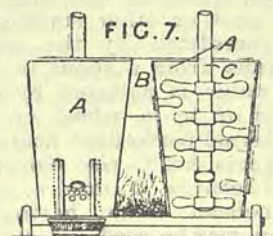
A, B, Fig. 1, and fitted with movable bottom plates secured by slip-bolts. A sheet of caoutchouc is interposed between the bottom plate and frame and a handle is fitted to the mould. When the solution in the moulds has sufficiently congealed, the bottom plates and india-rubber packings are removed, the moulds are placed with their handles uppermost in the compartments or divisions between the stays and the sieve plate of a centrifugal drying machine. By the centrifugal action the moulds are pressed towards the sieve till all the green syrup is forced out. The interstices formed by the removal of the syrup are then filled with claying liquor to clear the crystals of their yellow brown colour. To effect this the bottom plates and packings of the moulds are replaced and the moulds are put into a closed vessel containing the claying liquor; the air is exhausted from the vessel and fresh air is afterwards admitted to assist the capillary action by which the interstices are filled with the liquor. The moulds are then treated again in the centrifugal machine to drive out the claying liquor.

2473. Stone, R. Aug. 20. [*Provisional protection only.*]

Cements; concretes.—Slag from iron smelting works or other ferruginous material, slate, shingle, stonedust, the refuse of copper ore, or refuse from chemical or glass works is pulverized and then mixed with Portland &c. cement, hydraulic lime, or coal tar &c. to produce a flinty substance or concrete for paving roadways, footways, and other purposes. Sawdust or tanner's bark &c. is sometimes used to give elasticity and softness. The compound is preferably applied in the manner described in Specification No. 1115, A.D. 1872.

2491. Seville, C. F. Aug. 22.

Cements.—Porous beton for making agricultural drain pipes, water conduits, shoots, &c. consists of river, pit, or other sand and dry gas tar or bitumen. Non-porous or water-tight beton for



making pipes for water conduits or hollow bricks consists of argillaceous or sandy earth, termed furnace clay, fine river or surface sand, and dry gas tar or bitumen. Beton for fountains, vases, or recipients for filtering liquids consists of river sand and vegetable tar. In sanitary filters, the plates or slabs for filtering water consist of washed river or pit sand, pulverized charcoal, and vegetable tar compressed into porous material. Fig. 7 shows a kneading or mixing and cooking machine. The mixing is effected in conical wrought or cast iron cylinders A having agitators C and heated by coke, peat, coal, or other fuel on a grate B. Two or more kneaders may be combined.

2518. Lochhead, W. Aug. 24.

Fireproof coverings and compositions.—To render safes fireproof, the finer and silkier varieties of asbestos are pulped either alone or with other fibrous materials, rag-pulp, or size, and applied as plaster on the outside and inside of a safe consisting of a single shell, or packed between the shells of a safe consisting of a double shell. The asbestos may also be applied in its natural state, or reduced by stamping or crushing, or mixed with cement or fireclay. The safe may also be protected by embedding it in the material in a recess in a wall.

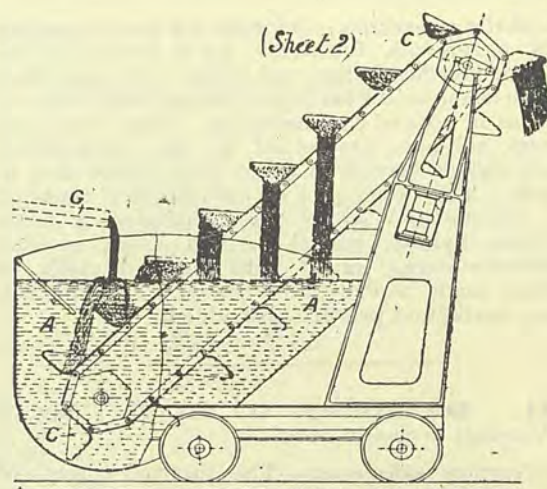
2538. Scott, H. Y. D. Aug. 26.

Cements.—In cleansing and decolorizing the polluted waters of towns and factories by the removal of dissolved organic substances and suspended impurities, and the extraction of fertilizing elements from sewage matters, the grosser impurities, in the case of liquid sewage, are precipitated with lime. The precipitated matters are converted into agricultural lime or cement by calcination as described in Specification No. 2243, A.D. 1871. A double kiln may be used, having one compartment for making agricultural lime or cement and supplying heat to effect carbonization in the second compartment.

2618. Wood, C. Sept. 3.

Slags, treatment of.—Slag or scoria, as it flows from blast or other smelting furnaces, is cooled and granulated by the apparatus shown. The slag falls from a spout G into a water tank A. The water is agitated by keeping the tank in motion or by a wheel or chain having internal or external perforated floats, buckets, or agitators. The floats &c. C also elevate the granulated slag and discharge it into a spout or wagon. An archimedean screw, having an agitator at the bottom, may be used. A continual stream of water

runs into the tank which is fixed or carried by wheels, and may consist of a metal wheel or



cylinder partially closed at its ends by sheet metal rings.

2638. Drevet, J. Sept. 5.

Cements.—Hydraulic beton is made of sand, silex, or river mud, marine salt or sea water, and iron oxide, together with hydraulic cement powdered and mixed together. The beton may be made into blocks, which may be united beneath water with paste consisting of hydraulic lime moistened with drying oil. This paste may be used for hydraulic coverings, various coloured frescoes, and coating buildings and edifices to preserve them from damp. The beton mixture may be coloured with mineral colours and may be applied to hydraulic works and architectural constructions.

2712. Johnson, J. H., [Forquignon, J. B. L., and Ehrmann, L. M.]. Sept. 12.

Slags, treatment of.—Metals &c. may be separated from the slags &c. of furnaces by treating the slags with electric currents. The slags are dissolved in mercury, lead, zinc, and copper sulphide infusion, or any fusible material which serves as a vehicle and as a conductor to the electricity.

2782. Smith, G. H. Sept. 19.

Stone, preserving; plasters.—Relates to a method of hardening and waterproofing bricks, sandstone, porous stone, unburned clay, chalk, plaster of Paris, and other like porous materials used for building and other purposes. The materials are immersed in boiled coal tar, melted pitch, or the

like, or in a combination of such substances which becomes hard when cold. The materials may be heated previous to immersion. A small quantity of lime, chalk, clay, alum, or the like may be added to the tar &c. The material becomes capable of a high polish and may be used for decorative purposes.

2881. Fottrell, J. Sept. 30.

Asphalts.—Asphalts for pavements are made by mixing finely-ground stone with Val de Travers rock, the proportions being one ton of rock to from seventy to ninety per cent. of stone according to the bituminous richness of the rock. Bituminous shale may also be added. The Provisional Specification gives the proportions as three parts of stone to one part of rock.

2953. Gardner, W. Oct. 7. *Drawings to Specification.*

Fireproof coverings and compositions.—A composition for packing the walls of safes is described in the Provisional Specification. It consists of a mixture of Roman or Portland cement with a small quantity of lampblack and water. It is placed in the safe in a wet state and generates steam when exposed to heat.

3028. Scott, H. Y. D. Oct. 14.

Cements.—Sewage sludge, filtered in a special apparatus, is dried and converted into cement. For this purpose the filtering-trough may be made of brick or iron to allow heated air to be forced through flues beneath it and through the porous passages formed by the filtering-medium. A small quantity of coke or coal may be introduced into the porous passages.

3090. Rogers, J. Oct. 19. *Drawings to Specification.*

Asphalts.—In wood paving, the asphalt for filling the interstices is softened by the addition of vegetable or mineral oils. Or the substitute for asphalt described in Specification No. 1336, A.D. 1868, [*Abridgment Class Paints &c.*], is employed, consisting of a mixture of the residual products obtained in the treatment of vegetable oils and the distillation and refining of crude mineral and bituminous products.

3115. McDonald, J. Oct. 22.

Stone, artificial; concretes.—In the manufacture of artificial stone for architectural and other purposes, sand, gravel, and broken stone are mixed with Portland, Roman, Keen's, or other cement and moulded into any required shape. The moulded shapes may be strengthened by the introduction into the material, when moist, of pieces of wood, iron, &c.

3182. Davey, G. Oct. 26. [*Provisional protection not allowed.*]

Stone, artificial and imitation.—Artificial marble is made of pulverized stones, concretes, and cements, treated with certain vitreous substances in a plastic condition, coloured and veined by machinery. The patterns, designs, or veins of marble are produced on artificial compositions in facsimile of mineralogical specimens.

Cements.—"Consists of petrifying and hardening cements, and of treating them with colours."

3212. March, T. C. Oct. 30.

Stonework, ornamental.—Glass, china, &c. ornaments are fixed to surfaces of marble, slate, &c. by means of a plastic material composed of water, glue, whiting, resin, and linseed oil; gutta-percha or mixtures of resin, wax, and bituminous substances may also be used for the same purpose. Bevelled pieces of glass &c. are first fixed to smooth surfaces by a cement of gelatine dissolved in acetic acid, or other adhesive cements.

3272. Williams, J. R. Nov. 4. [*Provisional protection only.*]

Cements.—In the manufacture of a cement for use in contact with iron, finely-divided zinc, to which a little mercury may be added, is mixed with Roman, Portland, or other cement, or plaster of Paris.

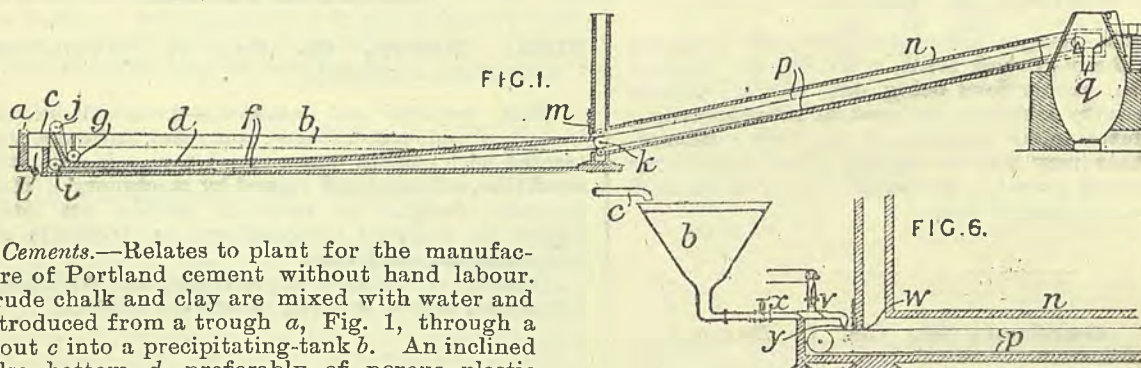
3278. Glazier, W. Nov. 5.

Fireproof coverings and compositions.—Fireproof sheets or slabs for ceilings, partition walls, roofs, floors, flats, gutters, coated fabrics for floor coverings, wainscots, dados, &c. are made of a plastic composition consisting of a mixture of scrap or refuse leather, fibrous refuse from wool, cotton, flax, and jute manufactures, spent dyewoods, and animal carbon or carbon refuse, the composition being also applicable for protecting girders and columns and wood or iron surfaces generally, from fire, and for making buckets, coffins, skips, closet tubs, portable receptacles, tanks, finger plates, door knobs, &c. The sheets or slabs may sometimes be made by spreading the composition on a paper sheet and rolling it,

another sheet being then placed on it, coated with the composition, and rolled, and so on until the desired thickness is attained. In the case of slabs on which asphalt is spread for floors, flats, gutters, roofs, &c., the surfaces are roughened to give the asphalt better hold. According to the Provisional Specification, the fibrous materials

may be felted together to form sheets which are then saturated by a cementing-composition made by boiling the leather scraps with soda &c., a layer of the plastic composition being then spread on it; the whole is then rolled, a second saturated sheet of felt is then applied, which is coated and rolled, and so on.

3371. Michele, V. D. de. Nov. 12.



Cements.—Relates to plant for the manufacture of Portland cement without hand labour. Crude chalk and clay are mixed with water and introduced from a trough *a*, Fig. 1, through a spout *c* into a precipitating-tank *b*. An inclined false bottom *d*, preferably of porous plastic material, is fitted in the tank, and one or more inclined endless bands *f* passes above and below the false bottom. The band is kept almost in contact with the false bottom by an adjustable roller *g*, and passes over guide-rollers *i*, *j*, *k*, the last of which is the driver and is placed above the level of an overflow-wall *l*. The slip settles on the band, and is carried under a gauge-plate *m* into a flue *n*, where it is conveyed by one or more endless bands *p* or a continuation of the band *f*, and falls into one or other of two shoots *q* of corresponding kilns to which the flue *n* is common. Coke is introduced into the kiln by a shoot *s* simultaneously with the slip. The precipitating-tank is applicable for separating solids from liquids generally. The burnt mass from the kilns is ground between stones, or falls between pairs of rolls of graded gauge and is lifted by buckets on an endless chain or belt and filled into casks or bags. Coke is dispensed with by carrying the slip from the flue *n* into a reverberatory furnace, and thence down an incline to crushing-rolls. A boiler for generating steam for working the rolls and bands is arranged over or in the roof of the furnace. In another arrangement, shown in Fig. 6, the slip is supplied by a nozzle *c* to a precipitating-tank *b*, from which it is drawn off by a pump *v* and forced through a spreader *y* on to one or more endless bands *p* in a flue or drying-chamber *n*, the slip being levelled by a scraper *w*. The quantity of slip is regulated by a sluice valve *x*. A travelling belt &c. may be fitted in the tank *b* to receive the material prior to its passage to the pump. The pump may be replaced by a siphon &c., and the material allowed to run into a small "tank of carriages" with wire-gauze &c. bottoms.

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3389. Mills, B. J. B., [Wood, J. F., and Skinner, F. F.]. Nov. 14. *Drawings to Specification.*

Cements; stone, artificial.—Artificial stone or cement formed of emery, burr-stone, powdered glass, or millstone grit, and zinc oxide, mixed with a solution of zinc chloride is used for coating parts of the surfaces of the cone and beaters of a machine for scouring, cleaning, or smutting grain and seeds. The zinc compounds may be replaced by the corresponding magnesium compounds, as described in Specification No. 3119, A.D. 1865. The cone and beaters may be moulded directly from the cement.

3505. Jenner, R. F. L. Nov. 23.

Refractory substances.—Clay, millstone grit, and other materials for making "Dinas" firebricks are ground to a fine powder and are employed without the addition of lime, being moulded by the machine described in Specification No. 2073, A.D. 1868, [Abridgment Class Moulding &c.]. When the bricks are for use in "hollow fires" a small quantity of alumina or, according to the Provisional Specification, lime and alumina is added in order to adapt them for cooling.

3557. Bodmer, J. J., and Bodmer, L. R. Nov. 26.

Refractory substances.—Blast-furnace slag in the form of sand or powder is used with other materials for making refractory bricks, and other

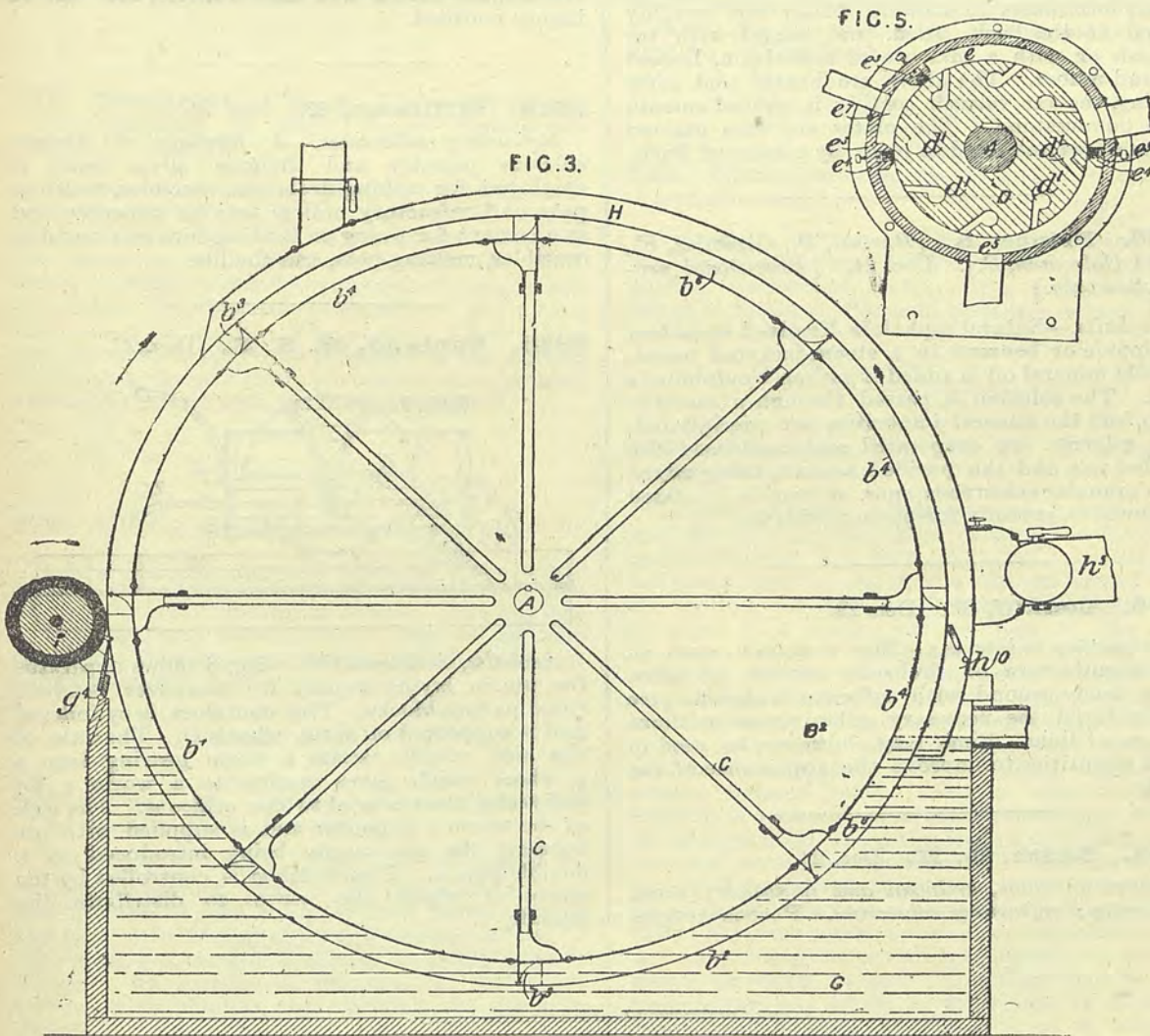
articles. The slag is preferably disintegrated by passing it, as it flows from the furnace, direct through a pair of rolls as described in Specification No. 1041, A.D. 1866, or it may be disintegrated by water or other means. More or less refractory material such as common clay, culm, shale, loam, gannister, or fireclay &c. is added to the slag and the articles are burnt or calcined at a high temperature.

3642. Siemens, C. W. Dec. 3. *Drawings to Specification.*

Refractory substances for lining furnaces. The chamber of a rotary puddling-furnace is preferably lined with bauxite which has been calcined, reduced to powder, and mixed with 10 to 15 per cent. of plumbago, graphite, and other dense carbonaceous

matter, and also with sufficient binding-material such as clay, lime, cement, or alkaline silicate, to give cohesion. If the bauxite does not contain sufficient oxide of iron to render it fusible, the carbonaceous matter may be dispensed with. The mixture is formed into bricks or blocks and burnt in a kiln in a reducing-atmosphere. The blocks may be built into the chamber with cement made from the unburnt mixture, but they are preferably built in loosely, the crevices between them being filled with melted pure ore or hammer scale at a white heat while the chamber is slowly rotated. The ore or scale, besides binding the blocks together, forms a glaze over them which excludes air. Instead of using the blocks, the mixture may be laid or rammed in moist, and dried and baked in its place, after which the ore or hammer scale is applied.

3734. Hart, W., and Hart, J. Dec. 9.



Cements.—A drum formed of two discs B², Fig. 3, connected together at the edges by wire gauze or other straining medium b², rotates in a tank G containing the cements or other fluid or semi-fluid

substance to be dried. The drum is divided into a series of shallow chambers b^3 by curved plates b^4 , having ribs for supporting the covering b^2 , and these chambers communicate by central bent pipes C with ports d^1 formed in a cylinder D, Fig. 5, on the drum shaft A. During the rotation of the drum, these ports are successively put into communication with fixed chambers e^3, e^6, e^7 , which are isolated from each other by grooved ribs e^3 and india-rubber packing e^4 , and are respectively connected to a suction pump for liquids, an exhaust pump for air, and a force pump for cold air. Hot air is supplied by a pipe h^5 , and is confined by an external casing H. The substance is thus caused first to adhere to the surface of the drum, on which it is spread evenly by a hinged flap h^{10} ; it is then dried by hot air drawn through the casing H; and it is finally loosened by the blast from the force pump, and removed by a hinged flap g^4 and a rotary brush I. Hot or cold air may be forced through the chambers b^3 by a pump or fan, in which case the air exhaust pump may be dispensed with. If cold air is drawn through the chambers, the casing H may be dispensed with.

3831. Magnus, G. E. Dec. 18. [*Provisional protection only.*]

Stone, artificial.—Artificial marble for consoles, pilasters, tiles, &c. is composed of cement treated with sulphate of iron and nitric acid. The material is cast into plates in moulds, deeply and roughly scored at the back, dried, and coated with tar varnish or with a mixture of asphaltum, linseed oil, and umber. The plates are heated and, after cooling, the tar varnish coating is rubbed smooth with pumicestone. The plates are then painted and marbled and fixed in place by plaster of Paris.

3886. Prince, A., [*Barthel, P., Capitaine, F., and Holzmann, P.*]. Dec. 21. [*Provisional protection only.*]

Asphalts.—Natural asphalt is dissolved in carbon bisulphide or benzene in a steam-jacketed vessel. A little mineral oil is added if carbon bisulphide is used. The solution is passed through a metallic sieve, and the mineral impurities are precipitated. The solvents are evaporated and condensed for further use, and the purified asphalt, being mixed with granular calcareous spar, or marble, in stated proportions, is ready for paving roads &c.

3895. Conniff, P. Dec. 23.

Refractory substances.—The materials used in the manufacture of firebricks consist of silica stone finely ground with sufficient water to give the material the necessary adhesiveness without the use of lime. Lime may, however, be used in small quantities to improve the appearance of the bricks.

3915. Smith, G. H. Dec. 24.

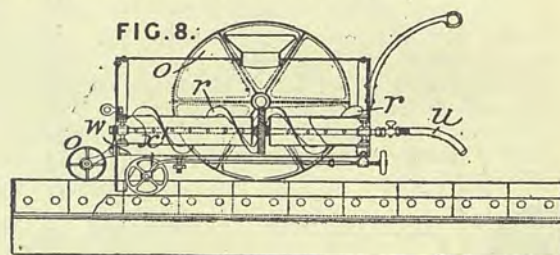
Statuary; stone, artificial and imitation; stone, preserving; refractory substances.—Porous articles

such as statues, ornaments, &c. or the like or porous substances such as dried clay, plaster, chalk, &c. are treated with tar, pitch, or other hydrocarbons and then baked to expel the volatile portions of these materials. The materials, when treated, are harder and more durable, and can be highly polished.

3919. Williams, T. Dec. 26.

Refractory substances.—A mixture of broken silicious pipeclay and Belgian silver sand is employed for making firebricks, crucibles, melting-pots, and refractory hollow articles generally and as a cement for lining or fettling furnaces, cupolas, crucibles, melting-pots, and the like.

3925. Copland, H. S. S. Dec. 27.



Asphalts, cauldrons for. Fig. 8 shows apparatus for use in laying asphalt in interstices between wood paving-blocks. The container is cylindrical and is supported on three wheels O. The axle of the side wheels carries a worm gearing into a wheel which gives motion to a worm r for delivering the material to the orifice w . The axle of the worm r is hollow and is supplied with gas burners, the gas supply being introduced by a flexible pipe u . The orifice w is controlled by the wheel x^1 which also serves to distribute the asphalt.

A.D. 1873.

- 52. Lyttle, W. A.** Jan. 4. *Drawings to Specification.*

Cements; concretes.—Cement or concrete for use in covering special flat roofs or for use in paving is strengthened by the addition of blood.

- 310. Bonneville, H. A.,** [*Schenck & Hayek, Administrators of Weiss Cement Actiengesellschaft*]. Jan. 27.

Cements, mortars, and plasters.—A cement or hydraulic mortar used for making artificial stones, bricks, tiles, troughs, and conduits, and also used for plastering walls is made of magnesian limestone, or minerals chiefly composed of magnesium carbonate, or chemical preparations containing magnesium carbonate. The material is burnt at a temperature of 408° C. as indicated by the melting of zinc in a zinc-antimony pyrometer, then ground, and finally mixed with water when required.

- 368. Clark, A. M.,** [*Laurette, L.*]. Jan. 30.

Stone, artificial. — Pulverized furnace slag is mixed with hydraulic or other lime, cements, plasters, or other binding materials. The mixture is moulded into blocks, which may be suitably coloured. The material may be used for columns, balustrades, &c.

- 539. Noad, J.** Feb. 13. [*Letters Patent void for want of Final Specification.*]

Refractory substances.—Crucibles are made by mixing the powder, which is left as a residue in the manufacture of lead sulphide from liquid sulphur and lead, with fireclay and burning the mixture.

Cements.—A cement for fixing ironwork pipes is obtained by melting a mixture of the above powder with sulphur, and allowing the gases to escape.

- 569. Patison, J.** Feb. 15. *Drawings to Specification.*

Refractory substances.—The ash and cinders resulting from the combustion of the residues from the destructive distillation of coal shale, peat, wood waste, hydrocarbons, or other organic material for the production of gas and oils are used for making firebricks.

- 623. Chamberlain, H.** Feb. 19. [*Provisional protection only.*]

Concretes; mortars. — Waste lime from gas purifiers is substituted for ordinary lime in making mortar, concrete, or beton. If a very hard substance is required, Portland cement is mixed with the waste lime.

- 665. Goreham, W.** Feb. 21. *Drawings to Specification.*

Cements.—Storing-chambers are provided on each side of a series of kilns arranged as described in Specification No. 2588, A.D. 1871, so that the hot gases from the top of one kiln are passed into the bottom of the next kiln. The kilns are arranged in a circle, and the tops of the side chambers form a platform for charging the materials into the kiln. The burnt cement from the kilns is discharged into the inner tunnel, and is conveyed by an endless travelling band into a hopper connected with the grinding apparatus located at the centre. The millstones deliver the ground cement into a common receiver, from which it is delivered into an inclined pipe, which, on being rotated, cause the cement to be delivered into the outer storing-chamber. The travelling band and the delivering pipe can be shifted around the series of kilns from opening to opening by providing separate bearings and supports at each part, or by mounting the grinding apparatus on a turntable. In order to cool the cement as it is conveyed away, jets of air or water may be directed against the exterior of the pipe, or it may be surrounded by a water or air casing, or a stream of air passed through the interior of the tube. For drying the "slip," the Provisional Specification

states that the revolving plates described in the former Specification are dispensed with, chambers being formed around the sides of the kilns, the chambers being provided with openings communicating with the kilns. A series of shelves on which the "slip" is placed, are arranged in the domes of the kilns.

684. Rowbotham, S., and Richardson, G. Feb. 24. [*Provisional protection only.*]

Stone, artificial and imitation; cements.—Plaster of Paris, Keene's cement, &c. is mixed with a solution of albumen such as the white of egg, or that obtained from the blood of animals, or from fish or vegetables, and the albumen is coagulated either by heat or by saturating the mixture with carbolic acid, mercuric chloride, tannic acid, arsenious acid, creosote, alcohol, or any other substance which will coagulate albumen. The composition obtained is suitable for cement and for the manufacture of artificial marble or stone to be moulded into baths, cisterns, chimney pieces, pillars, monuments, tablets, statuary, picture frames, slabs, tiles, billiard tables, furniture, coffins, &c.

752. Buchanan, J. March 1. [*Provisional protection only.*]

Cements or mortars for building purposes are made by grinding sand, gravel, rock, slag, waste glass, ashes, &c. with the waste from alkali manufacture.

759. Smith, G. March 1. *Drawings to Specification.*

Cements are dried in sheds heated by the waste gases from drying or burning kilns. The gases pass through flues situated at the bottom or sides of the shed.

835. Forbes, G. H. March 8.

Cements.—Chalk or limestone is combined with coal, wood, peat or mineral tar and in some cases with peat and naphtha or mineral oil to form a compound suitable for making lime after combustion. The peat, chalk or limestone, and tar may be ground together in either a mortar or drug mill, or the chalk and peat may be ground up with water and pressed into blocks which are then caused to absorb the tar. The blocks are baked in an oven and plunged in the tar while hot, or the blocks may be placed with the tar in an airtight chamber from which the air is exhausted, so that

the tar is forced into the blocks when the atmospheric temperature is restored. If peat is not used the chalk may be ground with the tar, or the tar may be absorbed by lumps of chalk by the methods described above.

1004. Coddington, T. B., [Witt, G. de, and Fairman, J.]. March 19. *Drawings to Specification.*

Concretes.—Railway sleepers, blocks, pillars, tubes, slabs, pavement, roofing-tiles, &c. are made by casting or moulding concrete in a woven metal frame. Stone, gravel, iron-slack or other hard refuse materials are mixed and made plastic with cement, and placed in the metal frame inserted in a mould so that the metal may become more or less introduced or woven into the materials and form a permanent casing serving to strengthen and protect the materials from disintegration. The outer faces of blocks, slabs &c. may be ornamental, the mould being of any convenient design, or the metal frame formed to any required shape.

1130. Barlow, H. B., [Galland, N. J.]. March 26. *Drawings to Specification.*

Asphalts, cauldrons for. The Provisional Specification states that the top of a furnace for generating a mixture of combustion products and steam for melting or removing pitch or tar from the interior of casks, and otherwise purifying them, may be closed by the cistern in which the pitch for coating casks is heated.

1191. Forbes, G. H. March 31.

Cements; plasters.—The substances usually employed in the manufacture of cements and fine plasters are mixed with sufficient combustible matter to form a fuel, by which means the heat ordinarily wasted in burning cements may be utilized. The materials such as chalk, clay, &c. used in making Portland, Roman, or Parian cement are ground in a mortar-mill with peat, sufficient water being added to mix the mass thoroughly. The mass is dried sufficiently to be formed into blocks which are then baked at a high temperature. The blocks may then be ground with coal or other tar or pitch and pressed into blocks suitable for fuel; or the blocks of chalk &c. and peat may be heated to a temperature just short of ignition and placed in a bath of the tar where they absorb sufficient of the liquid. Any natural clay or rock of about the same composition, or the natural cement stones used in the manufacture of Roman cement, may be used in place of the chalk and clay. The peat may be

omitted, and the clay or stone is then ground with the tar or is plunged in red-hot pieces into the tar. Natural pozzuolana or similar volcanic products, or natural clays used in the manufacture of artificial pozzuolana or calcium sulphate, alum, and borax, or used in the manufacture of Parian cement may be mixed with the peat. In some cases peat charcoal, naphtha, petroleum, or animal fats and oils are used. The ash from such fuels is ground in the ordinary way to form a cement. A cement, convertible into fuel by the addition of peat, is formed by combining, in the manner described, chalk or limestone, silicious rock, tar, &c., and animal or vegetable fats or oils.

1204. Forbes, G. H. April 1.

Cements; plasters; stone, artificial.—Compounds for use as cements, plasters, or stone are obtained by burning a mixture composed of chalk or limestone, coal, wood, peat or mineral tar, or pitch &c., vegetable or animal oil, or fat or fatty matter and a small quantity of naphtha; in some cases petroleum may be added. The mixture is effected by grinding and mixing the materials in a mortar, or by the process of absorption described in Specification No. 835, A.D. 1873. When mixed in a mortar, the compound is cut, moulded, or pressed. The mixture is thoroughly burned, powdered, mixed with water and used as a cement, plaster, or stone.

1261. Stone, R. April 4.

Asphalts; cements.—Pulverized lead ore is mixed with cement, fine ground flint, or Halkin mountain or other hard stone, and pitch, tar, resin, or the like to form an asphalt for roads &c. The composition may be used in conjunction with any asphalt or concrete used for road-making or may be used as a surface layer on the top of roadways constructed in any manner. Pulverized lead ore, flint, and hard stone may be burnt together or separately, and formed into a cement for surfacing roads of asphalt &c.

1360. Clough, S. W. April 15. *Drawings to Specification.*

Cements.—A cement for uniting various parts of stoves, ranges, grates, &c. is made by mixing finely sifted quicklime with turpentine and boiled linseed oil, adding a little white or red lead for steam-pipe joints.

1407. Forbes, G. H. April 18.

Cements; stone, artificial.—Tar, pitch, or other bituminous substances, either separate or together,

are mixed with ordinary cement-making materials, such as clay or rock containing oxide of iron, soda, silica and alumina. Petroleum, naphtha, or fatty matters, and sulphate of lime or limestone &c., may be added. The materials are ground, calcined if necessary, and made into blocks for use as cement or for making artificial stone.

1414. Tooth, W. H., and Tooth, W. H. April 18.

Refractory substances; cements.—Relates to the use of silica and alumina in various proportions for the manufacture of firebricks, gas-retorts, cements, &c. For gas-retorts fine sand is washed, calcined, and then mixed with potters' clay which has previously been washed, the proportions being determined by analysing a sample of the clay before mixing. Flints, calcined and powdered, may be used instead of sand. In preparing fire-clay for laying the bricks in furnaces, a mixture of alumina, sand, and burnt mineral carbon is used, the proportions varying according to the working temperature of the furnace. Magnesium silicate &c. may also be used.

1451. Amnéus, A. J., [Almén, A.] April 22.

Casting.—In casting gelatinous substances, *e.g.*, lozenges &c., a plate of slate, glass, metal, &c. is divided into equal squares or other figures; to prevent the gelatine from sticking to the plate, the latter is smeared with tallow, dissolved in oil of petroleum, ether, &c., and then warmed to render the surface smooth. When the mass has set, the plate may be suspended near a stove to dry, after which the gelatine may be detached.

1461. Haggett, W. April 23. *Drawings to Specification.*

Stone, artificial.—Blocks of artificial stone are built up from corrugated or undulated slabs, and are used for paving and for constructive purposes generally.

1599. Ward, J. May 3. [*Letters Patent void for want of Final Specification.*]

Cements.—In the manufacture of Portland cement by the wet process, instead of running the liquid mixture of chalk and clay into backs or reservoirs until sufficiently solid for drying, it is rendered solid by mixing it with quicklime in a mixing-machine. When thoroughly mixed the

whole is removed to the drying ovens and when dry is burnt and ground in the ordinary manner.

1645. Henderson, A. C., [*Edgcome, T. L. B.*]. May 7.

Refractory substances.—A lining for rotary or other puddling or boiling furnaces, consists of ferruginous sandstone, or of sandstone such as is employed for firestone and for hearthstone in blast furnaces, or coarse sand containing not more than 90 per cent. of silica and about the same proportion of alumina, magnesia, potash, and soda as is contained in firestone &c. A mixture of the above materials may also be used. The sandstone is reduced and pulverized in a pan with revolving wheels, or in a revolving pan, or the like, and is then mixed with water to form it into the consistency of mortar. The lining may be applied while the furnace is at its ordinary heat.

1667. Downing, S. May 8.

Concretes ; casting.—Concrete bricks are made of a mixture of sand, beach shingle, and Portland cement mixed together with water and moulded without pressure. The moulds used are made in pieces to facilitate the removal of the bricks, and are greased before use.

1764. Forbes, G. H. May 14. [*Provisional protection only.*]

Cements.—A cement, which may be used as a substitute for plaster of Paris, is made by adding coal tar or the like to powdered chalk or limestone, together with a small quantity of sulphur, the mixture being then compressed, burnt, and pulverized.

1816. Forbes, G. H. May 19.

Cements ; plasters.—Cement or plaster is made from the refuse lime of gasworks by grinding it in a mortar mill and mixing it with coal tar. The mixture is moulded into blocks or balls and burnt. A small quantity of coal may be added. The powdered lime may be made into a paste with water and dried, after which it is mixed with tar as before. Or pieces of lime after drying may be saturated with tar and then burnt.

1832. Forbes, G. H. May 20.

Cements.—Chalk or limestone and lime which has been used in the purification of gas are mixed with tar to form a fuel, the residues from which may be utilized in the manufacture of cements. The chalk and lime may be ground either separately or together and then re-ground with the tar after being dried. The mixture is then pressed into blocks. The residues, after burning, are crushed to a powder and mixed with water, the resulting substance being then treated as a cement, artificial stone, or a substitute for plaster of Paris.

1893. Watson, J. May 26. *Drawings to Specification.*

Refractory substances.—Clay for making the inner dome-shaped casing of a portable stove is mixed with horse droppings to render it porous.

1940. Bresson, A. May 29.

Asphalts.—Asphalt is manufactured from soft calcareous stone, such as Bath stone, Portland stone, chalk, &c., by breaking up the stone, calcining it, and heating it in a bath of mineral pitch. The mixture in the bath or cauldron is stirred by machinery, and the resulting material is reduced to powder which may be used for paving &c. Gas tar may be used instead of mineral pitch.

1990. Willans, J. G. June 3.

Refractory substances.—Compounds for making crucibles &c. are produced by mixing pitch, tar, resin, oil, or other compounds of carbon and hydrogen, either solid or in solution, with sand, clay, alumina, or other refractory material.

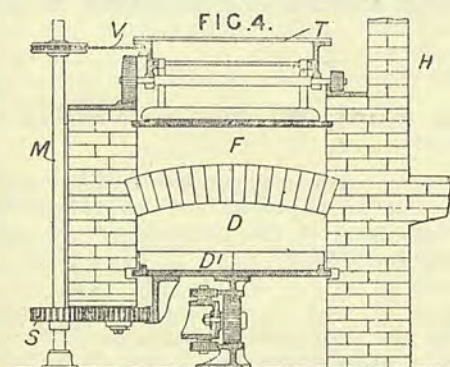
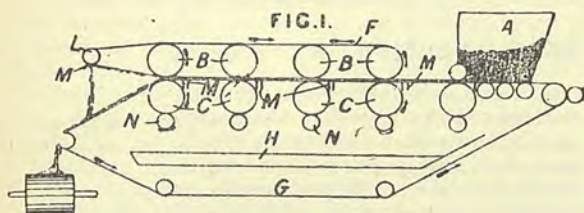
1999. Forbes, G. H. June 4.

Cements.—Refuse lime from gas, soap, or chemical works is ground with marl, clay, or chalk in a mortar mill, water being added. The mixture is dried and ground with tar, liquid pitch, or other bituminous substance, and then moulded into blocks. The blocks are calcined and reduced to a powder for use as a cement.

2026. Bodmer, J. J., and Bodmer, L. R. June 6.

Cements.—Moisture is extracted from materials used in the manufacture of cement, cementing compounds, &c. by delivering the material from a

hopper A to a travelling belt G, which passes with another belt F between a series of pressure rollers B, C. One or both belts may be made of absorbent material, or the rollers C may be covered



with absorbent material, in which case squeezing-rollers N remove the moisture. Scrapers M are provided to assist in discharging the moisture before the rollers C, and to peel off the partially dried material at the tension roller L, and a pan H receives the expressed liquid. In drying thin slip, a broader belt is used in place of G, and is folded over at the edges to prevent the slip from escaping. The belts may be arranged in zig-zag fashion or vertically. The partially dried materials are further dried, and, if desired, burnt or calcined in a rotary furnace comprising an annular calcining-chamber D and a drying-floor above it. The travelling bottom D' of the chamber D is operated by gearing S from a vertical shaft M, which also drives the travelling scrapers T around the drying-floor by means of a chain V. The furnace gases from an adjacent firegrate pass first through the chamber D, and then by a short flue into the annular flue F, from which they pass to the central stack H. The materials are fed upon the drying-floor, and, after being carried around by the scrapers T, are deposited through a slit into the calcining-chamber, from which they are finally discharged at the side by a waterbosh scraper.

2076. Bopp-du-Point, L. June 11. [*Provisional protection only.*]

Fireproof coverings and compositions.—Thick felt fabric, which serves as the non-conducting material in a food-warmer, is coated with blackened silicate of potassium and stony oxide of zinc.

"The felt fabric is besides magnetized, which renders it unattackable by the action of fire or damp." Straw paste-board is placed over the fabric and is fastened to the zinc of the food-warmer with white of ceruse, "which renders it adherent and impermeable. The whole is fixed by means of glue with alkali or spirit (such as resinous gum lac heated by steam and dissolved in alkali) serving to homogenefy and solidify the felt so as to avoid its deterioration."

2116. Robbins, E. June 16. *Woodcuts.*

Cements; concretes; stone, artificial; stone, preserving.—Cements &c. are made by combining calcareous and argillaceous materials with "every description of material, animal, vegetable or mineral." The materials specified include minerals, such as lime, sand, gravel, clay, &c.; fibrous materials such as grass, straw, silk, &c.; chemicals such as carbonates, chlorides, silicates, &c., and sulphuric and other acids; gums and glues &c., oils, resins, wood, bone, wire, &c. The materials may be moulded with the aid of a pump for exhausting air or water from the moulds or may be used for coating ironwork, woodwork, stone, paper, &c. They may be ornamented by pigments &c., by polishing the surfaces, or by attaching fibres such as floss silk, and may be impregnated with ingredients for colouring, hardening, water-proofing, rendering them translucent or otherwise improving them. An air pump may be used to facilitate impregnation.

2147. McGrigor, A. B., [Robertson, J. M.] June 19.

Cements, hydraulic. Infusorial limestone and basalt or other plutonic rock previously ground to powder are mixed together with the addition of water, and the plastic mass obtained is moulded into blocks which are dried and burnt in the kiln described in Specification No. 657, A.D. 1871, [*Abridgment Class Furnaces &c.*], or other suitable kiln or furnace, after which they are ground into powder for use as a cement.

2303. Hide, C. July 3.

Stonework, ornamental; cements; plasters.—The surfaces of walls and buildings are floated with a stucco of Portland or other cement mixed with clean sharp drift or other sand, and are set out with the desired pattern. Screeds are then run and rules fixed for the floating in of a facing composition of Portland or the like cements, clean sand, and pigments such as ochres &c. Parts of the design are then removed with templets and replaced with other coloured facing-compositions, this process being repeated until the desired effect

is obtained. The work is completed and finished off in sections and may be pointed in imitation of brickwork or stonework.

2475. Macomber, D. O. July 18.

Fireproof compositions.—In order to render wood unflammable and to preserve it from decay, or destruction by worms, insects, &c., a liquid is employed containing iron protoxide, potassium sulphate, sulphuric acid, aluminium sulphate, iron protosulphide, and, if desired, sodium hydrochlorate, the liquid being forced into the pores of the timber and the sap expelled. This may be effected by cutting the log to be treated nearly through at its centre, at which part it is supported by suitable means, so as to form a wedge-shaped opening; into this opening is introduced a cord or wire, and the opening is then closed by removing the support. A hole is then bored from the top of the log to the sawn portion, and into the hole is inserted the end of a pipe from an elevated reservoir containing the liquid referred to, the driving out of the sap and the impregnation required being thus effected. When it is desired to cut the timber into long deals, for ship-building &c., an enclosed space or receptacle may be formed at the end of the log and the liquid forced in by hydraulic, steam, or other power. In some cases, rotary steam pumps may be used for forcing the liquid in at one end and exhausting at the other.

2598. Barnett, F. July 31. [*Provisional protection only.*]

Cements.—A cement composed of equal portions of "brai" and asphalt is used to unite asphalt &c. slabs for paving.

2739. Kenyon, H., and Swindells, I. Aug. 19. [*Letters Patent void for want of Final Specification.*]

Cements.—Hydraulic and other cements are made from the residuum of alkali makers' waste after burning with air and steam, by adding silicate of alumina and making up any deficiency of lime.

2760. Hugan, W. H. Aug. 20. [*Provisional protection only.*]

Cements.—Peat, sawdust, coal, coke, seaweed, or other vegetable matters are mixed with town, domestic, or farm refuse, sweepings, or ashes, and with clay, sand, cement (sulphated or otherwise), magnesia, magnesium limestone, or salt or mixtures

of these, and the mixture, having been moulded into blocks, is then carbonized by destructive distillation. The residue is stated to constitute a cement.

2802. Cunliffe, W. Aug. 26.

Cements.—Relates to a cement for connecting together the plates end hollow column shown in Fig. 2, and for filling in hollow walls, partitions, &c. Melted pitch or asphalt is mixed with sulphur and thickened with a mixture of gypsum &c. and sand.

FIG. 2.



2944. Hunt, W. Sept. 8. [*Drawings to Specification.*]

Mortars.—A mortar consisting of burnt flint and salt water is employed for cementing together chambers used in the manufacture of sodium or potassium sulphate.

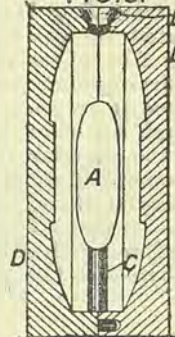
3037. Jones, T. Sept. 16.

Fireproof compositions.—Wood for building and other purposes is impregnated with a solution of sodium tungstate, in order to render it unflammable and to prevent dry rot and decay. The impregnation may be effected by soaking, or by the use of exhausting-tubes as in the creosote process.

3054. Toner, J. Sept. 17.

Casting soap. One or more hollow or solid blocks of wood, papier mâché, &c., are embedded in a soap tablet to preserve it at a convenient size for washing the hands &c. The block A is arranged on a stem of soap C previously fitted in half moulds D which are bound together, the liquid soap being poured through an opening E. The block may be laid on pins standing on the bottom plate or mould, and liquid soap run into the mould till the block is embedded, the tablet being shaped by a plunger pressing on its upper surface. Metallic boxes containing scents &c. may be embedded in the tablet.

FIG. 5.



3086. Fottrell, J. Sept. 20.

Stone, artificial.—Relates to a composition or artificial stone for use in the construction of tubes or pipes for conveying water at high pressure, or of conduits &c. for sewage or land-drainage purposes, or for gas, brine, and other saline liquors, or of tanks, cisterns, or troughs for agricultural and other purposes, or of cold lixiviating-vats for chemical operations, or of telegraphic insulators &c., or of columns, pillars, capitals, pedestals, bases, or other useful or ornamental objects. The composition consists of finely-powdered stone or sand together with shale oil or equivalent, Trinidad bitumen, and bituminous rock, the whole being mixed and stirred while boiling, and being then run into moulds. To give greater density or sharpness in the castings, pressure may be applied to the moulds.

3110. Forbes, G. H. Sept. 23.

Cements.—Relates to a fuel which is made by saturating chalk or porous limestone with pitch, tar, or other bituminous matter as described in Specifications Nos. 835, 1191, 1204, 1816, and 1832, A.D. 1873, and which is used, after burning, in the manufacture of limes or cements. When the material has not been sufficiently burnt to enable it to be used for this purpose, it is again treated with bituminous matter and burnt, the process being repeated if necessary. Foul lime from gas works may be used instead of chalk or limestone.

3205. Forbes, G. H. Oct. 3.

Cements ; plasters ; stone, artificial.—Relates to improvements on the processes described in certain prior Specifications. Peat is used instead of tar in the processes described in Specifications Nos. 1816 and 1832, A.D. 1873. The peat is ground and mixed with the other materials and water. The paste is cut into small portions and dried for the manufacture of cement, plaster, or artificial stone. In the process described in Specifications Nos. 1407 and 1999, A.D. 1873, for the manufacture of Portland cement, peat is mixed with the mixture of chalk and clay and the mixture obtained is dried and made into lumps which are first baked, and then burnt in a kiln with coal &c., after which they are reduced to a fine powder for use as cement. The lumps may be saturated with tar &c., or with a mixture of tar and petroleum, before being calcined. Hard dense peat is used the ash of which contains a large proportion of lime and is free from earthy impurities. The proportion of chalk &c. used is reduced. The proportion of peat used in the process described in Specification No. 835, A.D. 1873, is increased, and the compound of peat and the other materials is baked only long enough to dry the blocks.

3255. Wood, C. Oct. 7.

Cements ; mortars ; concretes.—Granulated slag made by the process described in Specification No. 2618, A.D. 1872, is mixed with iron ore and lime or Portland or other cement. The materials are ground either together or separately. Instead of iron ore, refuse from the treatment of pyrites may be used. Such cement mixed with slag may be used for making concrete blocks or concrete walls or flooring. Alkalies and acids may also be mixed with the materials.

3256. Hyatt, T. Oct. 8.

Fireproof coverings and compositions.—Fine wire is wound with asbestos filaments or threads or with strips of asbestos paper, or is coated with asbestos pulp or dough, or is otherwise embedded in asbestos. The wire, thus covered, may be braided or woven into sheets, ribbons, bands, &c., and employed in making sunblinds, fireproof sheet revolving shutters, tubes, packing, lamp wicks, table covers for use in plate-glass works &c., and frames for windows, pavement lights, &c. The woven, twisted, or braided material may be used for making or covering roofs &c. in place of sheet metal and may be covered with waterproof material or thin metal. Boards or planks may be made from the canvas, as well as beams for flooring, joists, and partitions. In the form of lace or netting, the covered wire may be incorporated with glass, to ornament and strengthen it and make it fire-resistant. The invention further consists in making asbestos felt by feeding asbestos flock, alone or with other fibres, against a perforated form, air exhaustion or pressure &c. being made use of, as in felt-hat making. The felt may sometimes be made on a wire-netting foundation ; or it may be made upon a corrugated sheet metal foundation studded with projections, and employed for shutter laths, roofing-shingles, wall coverings, &c. Asbestos pulp may be consolidated on a wire-netting foundation, the pulp being mixed with white clay or lime putty &c. or treated with caustic alkali. The asbestos may also be worked into dough form and mixed with flour and forced through apertures to form wire rope, ribbon, and the like, or otherwise made into various articles. Or the mixture may be consolidated upon concealed woven wire, or on a netting, grating, or roughened metal sheet, and utilized, like papier mâché, to form or to enclose "strong boxes." Asbestos fire-brick may be made from the dough or the canvas.

3280. Williams, R. P. Oct. 9. *Drawings to Specification.*

Asphalts.—A composition for making railway sleepers consists of boiled tar, pitch, bitumen, or asphalt compounds mixed with sawdust, peat, sand, or stone, to which may be added shavings, chips, or other vegetable or animal waste. In some cases, the composition may consist of asphalt

and sawdust, with or without sand or grit. Reference is made to Specification No. 2705, A.D. 1871.

3380. Hyatt, T. Oct. 18.

Fireproof coverings.—Lead-plated iron or other metal plate for various purposes is made fireproof by roughening the surface and applying asbestos by pressure or otherwise, or ribs or mushroom-headed knobs may be formed on the lead surface, or honeycomb or like recesses in it, for holding fireproof material applied in a plastic condition or in the form of compressed slabs or tiles.

3684. Hyatt, T. Nov. 12.

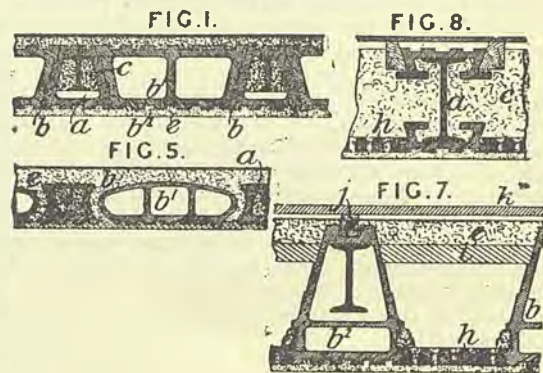
Fireproof coverings and compositions; refractory substances.—Asbestos is applied as a protector in the form of a hollow box or cap to fit over the ends of beams which of necessity approach chimney flues. Asbestos is also applied as a covering for wrought-iron ties of cast-iron beams, and as a covering for the parts of beams or girders generally to prevent the action of fire.

Cements; mortars; stone, artificial.—Asbestos is applied as a fireproof mortar for plastering wood and other surfaces in buildings. Long, strong asbestos fibres are used for binding purposes in the mortar instead of cow's hair. To mix the asbestos more completely with the other materials forming the mortar, pure asbestos in a fine flour-like condition is added. Another form of asbestos, prepared "under the name of asbestos gravel" is also mixed with the mortar. This "gravel" is prepared from the asbestos flour, in some cases a small portion of agglutinous material, such as soluble glass, being added. The asbestos, thus mixed or pure, is compressed into stone-like blocks which are then broken into suitable sizes for mixing with the materials forming the mortar. By this means an asbestos stone for building &c. is made. Asbestos may also be employed with those artificial stones which are based on the silicates.

3714. Hornblower, L. Nov. 15.

Fireproof coverings.—Relates principally to the construction of fireproof walls, floors, partitions and roofs described in Specification No. 2848, A.D. 1871, [*Abridgment Class Buildings &c.*], for dwelling-houses and other buildings in which iron or steel, hollow earthenware, and concrete or cement are employed in combination. Metal girders, joists, rafters, pillars, and the like are protected from fire by enclosing them in earthenware or clay pipes or hollow tiles *b*, Fig. 1, connected together in lengths and filled with concrete, cement, or other non-conductor of heat *c* as shown. Hollow earthenware tiles or tubes *b*¹ with stepped wedge-shaped sides fit between the stepped sides of the tiles *b*, and have dovetails or projections *b*² to ensure the adhesion of the concrete, cement,

or plaster *e*. In a modification, the tiles or tubes *b*¹ have a small passage without a partition so that the girders can be spaced closer together. In a second modification, the tiles or tubes *b* project



above the tubes or tiles *b*¹ to allow the top concrete or cement layer *a* to be made deeper. In a third modification, the tiles or tubes *b*¹ are arched upon their upper surfaces. In a fourth modification, suitable for light roofs and floors, tie-rods *a*, Fig. 5, are embedded in concrete or cement in tiles or tubes *b*, which, together with arched tiles or tubes *b*¹, are embedded in concrete *e*. In a fifth modification, the enclosing tiles or tubes *b*, Fig. 7, have air chambers *b*² and support perforated tiles *h* and tiles *i* covered with concrete *e*. Floor boards *k* are secured to joists *j*. In a sixth modification, the enclosing tiles *b*, Fig. 8, are formed in two parts *b*. The sides and flanges of a box girder may be enclosed by tiles dovetailed together at their edges.

3742. Scott, H. Y. D. Nov. 18.

Cements.—Lime is added to sewage waters coloured with dyes and other impurities. Cements are prepared from the resulting precipitate.

3750. Britten, B. Nov. 19.

Slags, treatment of.—Relates to the manufacture of glass for bottles, slabs, sheets, tiles, &c. from slag. The slag from the smelting of iron or other ores is mixed in the fused condition with sand, cullet, soda, potash, or metallic oxides, the proportions varying with the quality and colour of the glass required. To remove carbonaceous and other impurities, arsenic or mineral oxide may be employed, and lead oxide, zinc, or barium is used to facilitate the manipulation. Sodium sulphate mixed with ground coke or charcoal may also be added. The materials may be introduced in the form of powder or in the fused condition, and the molten mass is either further heated in a stationary furnace, or run into vessels which may be lined with non-conducting materials, provided with furnaces, and mounted on wheels for conveying the metal to the glass works.

3783. Forbes, G. H. Nov. 20.

Cements; stone, artificial.—Relates to the manufacture of the compounds described in Specifications Nos. 1816 and 1832, A.D. 1873, to be used as fuel and, after burning, for making cement and artificial stone. Refuse lime from gas or soap and chemical works is mixed with tar from coal, peat, or wood, or with mineral tar, pitch, or similar bituminous substances together with chalk or limestone, and either with or without petroleum or similar hydrocarbon oil. The materials are mixed in the required proportions by grinding, and formed into blocks either by hand or by machinery. These blocks may be burnt as a fuel, the residue being ground up for making cement and artificial stone. Lumps of lime, without chalk or limestone, may be saturated with the tar &c., for making a cement capable of burning first as a fuel.

3788. Hyatt, T. Nov. 20. [*Provisional protection only.*]

Stone, artificial.—Artificial "stones or rocks of any kind and dimensions" are made by dissolving a binding material in water, into which the other materials are placed, and then "applying the direct pressure of a column of water causing the solid material in the mass to descend." In this way "the moulds or chambers" containing the material act "as the cylinders of hydrostatic pumps." The mass thus consolidated is placed in a vessel and charged with carbonic-acid gas, or other vapour or gas under great pressure. The inventor proposes sometimes to introduce the gas "into the vessel in which the stone has been formed and charge it by means of the liquid in which it is immersed"; or the "gas pressure" is put on "in connection with the hydraulic pressure." Similarly "solid or hollow, ornamental or plain" articles are made "of the materials themselves only and entirely, or upon strengthening cores, frames, gratings, and surfaces of metal or wood for building purposes" such as for "roofs, floors, walls, partitions, and pavements for streets; and as building materials in the shape of sheets, tiles, plates, and shingles for roofs or walking surfaces"; the processes may also be used in the manufacture of the "fronts of buildings, columns, pillars, piers, cornices, window frames"; also for "hearths, chimney backs, and mantels in buildings."

3865. Ford, A. Nov. 26. [*Provisional protection only.*]

Asphalts.—To prevent asphalt paving from becoming slippery, fibrous materials are mixed with the asphalt, which is thinned down with tar or other suitable hydrocarbon, and may have added to it sugar of lead, alum, or bay salt.

3961. Holland, W. T. Dec. 3.

Refractory substances.—Relates to fettling for rotary and other puddling and boiling furnaces. The fettling is made of a silicious base in combination with some vitrifiable material. The base may consist of sandstone or silica, millstone grit, firestone, gannister, silver sand, white or native silica and its combinations, calcined flint stones, quartz, stoneware, fire and other clays after being fired and pulverized, or other similar materials, or potters' saggers, old firebrick, or other materials may be employed, including pulverized earthenware, china and parian, made or produced from broken pitchers in biscuit state as well as glazed. To prevent such a fettling from being too vitreous, sand may be mixed with it. The vitrifiable cements or materials may be either Cornwall or Jersey china stone, Middleton Hill stone, felspar, fluor-spar, soda, potash, ground glass, glassy slag from ironworks, pumicestone, boracic acid and its combinations, or other similar substances. Sometimes such materials as soda, potash, or boracic acid may be mixed in a liquid state with the base of the fettling. To produce a fettling, a base material, sandstone for example, is pulverized and then screened, and a vitrifiable material such as Cornwall china stone is also pulverized, preferably by grinding it in water and then drying and screening. The sandstone and china stone are then thoroughly mixed. From 6 to 7 per cent. of the china stone will produce a good and durable fettling material that will set firmly with the heat of the furnace, but the proportions must be regulated as required. A small proportion of manganese is sometimes added, and in some cases a little clay or a farinaceous or other mucilage is added to cause the better adhesion of the particles together. When pulverized fired articles are used as a base, they may be so mixed or combined as to dispense, partially or wholly, with the addition of any vitrifiable cement or material. The fettling may be applied to the furnaces when cold, or when at work. To fettle a rotary furnace, such as Danks' revolving puddling-furnace, the interior is washed over with a coating of ground china stone to which a little dissolved crystal soda has been added; a fettling formed of roughly crushed firestone and Jersey china stone, with mucilage to assist adhesion, is then applied and well rammed in between the flanges or hollow ribs, which are covered to the depth of one or two inches. The lining is dried and then heated quickly for fusing the vitrifiable cement. A second layer or lining of similar or different material may be applied, and transverse ribs may be formed across the cylinder or ribs may be carried round it. During the firing and fixing of the raised or second lining, fired rings or tubes of fireclay with fireclay packing may be used to sustain the lining in position. According to the Provisional Specification, salt, and oxides and carbonates of lead, may be used as vitrifiable materials.

3985. Vigouroux, P. Dec. 4.

Asphalts.—An artificial asphalt is obtained by heating a mixture of dry coal tar, Nile alluvium

deposit or other analogous deposit, and hydrochloric acid.

4039. Stanford, W. H. C. Dec. 8. *Drawings to Specification.*

Cements.—A cement, composed of sulphur, ground earthenware, and sufficient gas tar or other elastic material to prevent the compound cracking in cooling, is used for jointing earthenware drain and other pipes.

4099. Scott, H. Y. D. Dec. 12.

Cements.—Gas lime and clay are pulverized and mixed together. Powdered coal or coke is added and the mixture calcined, after which calcium sulphate may be added. Lime dust may be used instead of gas lime, and brassy coal, or powdered iron pyrites and coal, instead of the sulphate. Peat or peat charcoal or sewage sludge may be used instead of clay and coal.

4216. Holland, W. T. Dec. 23.

Cements ; refractory substances.—Fireproof cements are made essentially from a combination of silicious and vitrifiable materials. The silicious materials may consist of sandstone, cribbathstone, millstone grit, firestone, gannister, silver sand, white or native silica, slate, quartz, calcined flintstones, fire or other clays after being fired and pulverized, or similar materials ; also, fired potters' saggers, salt glazed ware, old firebrick, and other fired fireclay articles, and such as are made from Dorset and Devon clays, earthenware, china and parian, broken pitchers, glazed and not glazed, or

other highly refractory material. The vitrifiable materials may consist of Cornwall and Jersey china stone, Middleton Hill stone, felspar, fluorspar, alkalies, ground glass, iron ore, pumicestone, boracic acid and its combinations, or equivalent substances. The silicious and vitrifiable materials are reduced to powder by grinding in the dry or wet way or otherwise ; or the latter materials may sometimes be used in a liquid state. A small proportion of china or other clay may be added to facilitate spreading and plastering. Small portions of manganese in its different states may be mixed with cements used for the hearths of mill, reheating, balling, refinery, reverberatory, Siemens' regenerative, and other furnaces, and for lining cupolas, ladles, Bessemer converters, and other furnaces used in the manufacture of iron and steel. A small proportion of powdered anthracite, or stone coal, or culm may be added to assist the vitrification with less fire and to render the mass less dense. Salt may be used for glazing the cement used for linings and the protection of metals.

Stone, artificial, may be manufactured from the silicious substances described above. The moulds may be dusted with a mixture of fine sand and ground china stone or Middleton Hill stone to assist the withdrawal and to improve the surface when fired. Salt may be introduced through the fire and top of the kiln for glazing the stone.

4241. Hyatt, T. Dec. 24.

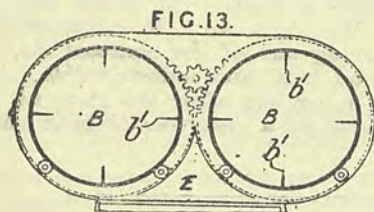
Stone, artificial.—"Asbestos stone" is made by mixing or combining asbestos when in combination with plaster of Paris, or earthy material, or animal or vegetable fibre, or paper pulp, or fine wire, or spun glass, with an additional proportion of any earthy base capable of forming an artificial stone similar to the "Victoria" or "Ransome" stone when treated with soluble silica &c., the mass being moulded under pressure &c. in suitable moulds.

A.D. 1874.

34. Forbes, G. H. Jan. 2.

Cements; plasters.—Relates to the compounds described in Specifications Nos. 1816 and 1832, A.D. 1873, for use as fuel or cement, plaster, &c. Refuse gas lime is mixed with coke, with or without chalk or limestone, and tar, pitch, &c. The resulting compound may be used as fuel and the ash used for the manufacture of cements, plasters, and artificial stone. The proportions of the materials used vary according as the compound is to be used for cement, plaster, or artificial stone, and the coke is made from coal selected accordingly to give an ash more or less rich in silicate of lime and alumina, alumina, and iron oxide. Coke breeze separated from the larger pieces of coke by using only that which floats upon water may be employed, being ground up with the lime &c. The mixture is then dried, calcined, and again ground to powder. Petroleum or other hydrocarbon oil or spirit may, according to the Provisional Specification, be mixed with the other ingredients.

50. Gibbs, W. A. Jan. 3.



Cements.—Relates partly to inventions for drying cements &c., described in Specifications No. 2145, A.D. 1870, [*Abridgment Class Brushing* &c.], and No. 314, A.D. 1872, [*Abridgment Class Drying*]. Two rotary cylinders B, Fig. 13, of perforated sheet metal or woven wire may be mounted at opposite sides of the duct E for heated air from a stove &c., the substance being fed into them and agitated by tines b' or shelves. Tines and shelves may also be applied to the interior of cylinders furnished with central air ducts, as described in the prior Specifications. Revolving feeding-tubes may be mounted inside the cylinders at an inclination opposite to that of the cylinders themselves, so that the substances are heated on their way to the upper ends of the cylinders.

124. Truman, E. T. Jan. 9.

Casting.—The wire joints of insulated telegraph wires are covered by casting gutta-percha or other insulating-material round the joint by means of a mould consisting of two hinged portions closed by screws &c. The gutta-percha is forced into the mould and apertures &c. permit a part of the heated gutta-percha to escape, a rib or partition preventing the injected gutta-percha from impinging directly on the wire joint.

201. Wood, C. Jan. 15. *Drawings to Specification.*

Slags, treatment of.—In revolving slag-granulating machines, such as those described in Specification No. 2618, A.D. 1872, the cylinder, instead of having carrying wheels, is fixed to a shaft and driven by worm gearing connected to a steam engine, or by other means, and the delivery spout is perforated, or made of wire or rods, to allow any escaping water to pass into another spout, which returns it to the apparatus. A separate rotary or vibratory agitator may be fitted to fixed granulating-machines.

328. Dyer, E. Jan. 26. *Drawings to Specification.*

Fireproof compositions.—The hemp side ropes of a fire-escape ladder are saturated with a solution of sodium tungstate, sodium phosphate, or neutral alum, &c. either before or after manufacture. The treads if of wood &c. are treated with a bath of borax solution and then dried and coated with a composition of silicate of soda and whiting.

422. Browne, A., [*Foundries and Forges Co.*]. Feb. 2.

Refractory substances; cements.—The bricks used to form the hearth of a furnace for the manufacture of alloys of iron with carbon, manganese, silicon, tungsten, titanium, &c. consist of carbon, lime, magnesia, &c. mixed with coal tar. A cement of

the same composition is used to secure the bricks together.

478. Hyatt, T. Feb. 5.

Fireproof coverings and compositions; cements; stone, imitation; refractory substances.—Relates to the treatment and application of asbestos. Crude asbestos is treated with hydrofluoric acid or otherwise, in order to separate silicious impurities. The shortest fibres are then selected and disintegrated and placed with water in cisterns. The mass is stirred and the heavier portions are allowed to subside, the liquid with the lighter portions being run into a vessel, which may have a gypsum bottom for absorbing the liquid and leaving the residuum or may be fitted with a pneumatic filter; or the liquid &c. may be put into woven bags, from which the water may be readily expressed. The asbestos slip, paste, or sediment thus obtained may be used in various ways and for all or most of the purposes mentioned in Specifications Nos. 3256, 3684, and 4241, A.D. 1873. If desired, gum arabic or like substance which may be easily removed, may be combined with the asbestos, to facilitate its reduction to slip. The slip may be used as a plastic fire-resisting material in the form of a coating or cement for wood and metal. Combined with asbestos or vegetable fibre or both, it forms fireproof paper or papier mâché. In a state of powder, the material may be used as a substitute for whiting and like substances when mixed with size as a fireproof glaze for papers, and a number of such sheets may be combined under pressure to form an asbestos pasteboard; these boards may be made of any thickness to serve as fireproof roofing and flooring materials. The boards may also be moulded into form and set with glass for illuminating purposes. When the material is used for roofs, its face may be made to imitate ornamental slate. The asbestos slip may be mixed with porcelain clays and other clays for making heat-resisting glazed or unglazed tiles and bricks and other fired ware. The asbestos may be used as a mortar for the fettling of furnaces, or for making saggars, crucibles, and glass-melting pots. The asbestos is used in a moulded porous form as a water filter which may be cleaned after use by burning out the dirt; the porous asbestos is also used for burning gas in gas stoves. According to another part of the invention, the mineral asbestos is combined with gelatinous silica alone or in conjunction with magnesia, baryta, alumina, or lime, or mixtures thereof, employed preferably as soluble salts, and with or without an acid, and this mixture may be combined with fire-resisting clays to make tiles, bricks, or other building or fireproofing materials. The asbestos may be mixed with sodium silicate and with earths or bases containing lime, to form a fibrous artificial stone or material for roofing &c. Asbestos may also be used in the fibrous form for filters and coffee strainers, or in chenille rope or other form &c. for packing the doors of fireproof safes and for other packings &c.

525. Deléon, J. Feb. 10.

Stone, artificial.—Artificial stone is made by mixing powdered limestone, with or without the addition of calcined clay, with magnesia, adding successively magnesium chloride and sodium carbonate and stirring, the whole being moulded by pressure. When making artificial marble for statues, columns, vases, chimneypieces, clock cases, pedestals, tessellated pavements and mosaics, enamels, &c., powdered marble is substituted for the powdered limestone, ochres or mineral colours being sometimes used. Drainage pipes are made of a material obtained when sand is added to the powdered limestone before mixing with the other materials.

552. Goater, J. Feb. 13. *Drawings to Specification.*

Fireproof coverings and compositions.—Safes, strong-rooms, &c. are rendered fireproof by a powdered mixture of Portland, Roman, or Keene's cement, &c. with alum, soda, or other mineral which emits steam when heated, or by using alum, soda, &c. separately in thin boxes or cases of wood, papier mâché, cardboard, perforated sheet iron or tin, &c. surrounded by the cement.

745. Batstone, W., and Batstone, C. Feb. 28. [*Provisional protection only.*]

Refractory substances.—A compound used for lining grates, stoves, furnaces, &c. consists of a mixture of fireclay, Dorsetshire white-clay, vegetable charcoal, coke, coal, and cement, which are made into a paste with water and applied directly to the stove &c. It is stated that the gradual burning out of the charcoal &c. renders the compound hard and indestructible, and that the porous lining left after the charcoal &c. has burnt out acts as a reservoir of heat when the fire is lit.

825. Hubmann, G. March 6. [*Provisional protection only.*]

Stonework, ornamental.—Relates to a method of applying and fixing copper letters, signs, &c. in marble, granite, slate, &c. The design is drawn on the marble, and the parts to be reserved are coated with varnish. The marble is immersed in a bath of dilute acid until the design is eaten in to the depth required. The hollows are then coated with varnish, and, when the varnish is half dry, plumbago is applied with a hard brush. Copper rivets are fixed in the parts to be covered with copper, and the marble is placed in a galvanic bath and copper deposited. The marble may be afterwards gilded, silvered, or bronzed.

931. Muratori, C. March 14.

Fireproof coverings and compositions.—Relates to a fireproof anti-rusting and heat non-conducting composition for use in the construction and decoration of buildings, bridges, ships, boats, carriages, furniture, boilers, girders, cylinders, pipes, safes, &c. It consists of a mixture of waste cuttings and scrapings of skins, or of glue, with alum, gum, and water, concentrated by boiling, to which is added powdered wood, stone, glass, coal, or metal. Pieces of wood are rendered non-inflammable by placing them in a cold bath of alum and then uniting them by the composition. It easily attaches itself to india-rubber, gutta-percha, and canvas and other fabrics.

983. Tugwood, J. March 20.

Asphalts.—Relates to a cement for use in preserving railway keys and sleepers, telegraph posts, iron or brickwork, the bottoms of ships and boats, roofs and walls of houses, &c. from moisture, heat, &c. The cement consists of a mixture of tar, pitch, turpentine, resin, and sand or grit, boiled together. The keys &c., may be dipped in, or coated with the cement, and, in some cases, the sand or grit may be applied separately, in order to produce a roughened surface. The Provisional Specification mentions the application to wooden pegs employed for securing chairs to sleepers.

1096. Lyttle, W. A. March 30. *Drawings to Specification.*

Cements.—Lime or chalk and clay in the proportions required for making hydraulic cement are mixed with coal dust, and lumps of the mixture are coked, powdered coke and hydraulic cement being produced.

1145. Gleghorn, J., and Paterson, T. G. April 2. [*Provisional protection only.*]

Fireproof coverings and compositions.—Relates to the treatment, preparation, and application of asbestos or amianthus. Paper, millboard, paste-board, or felt is made of asbestos pulp mixed or not with talc or mica or with other materials, and is cut into strips, which may be coated or not with india-rubber, and are then twisted into strands, yarns, or twine, two or more of these being then twisted into larger twine, cords, or ropes, with or without cores of india-rubber &c. Or the strands may be braided or plaited into tapes, braids, bands, &c., which may sometimes be of a round or polygonal section and with or without an elastic or flexible core. The various products thus obtained may be used as heat-resisting packing for the stuffing-boxes of piston and valve rods, pistons and other parts of steam engines, &c., pipe joints, man-hole doors of wood-pulp boilers, retorts, stills, &c. The yarns or threads may sometimes be woven into fabrics, which are indestructible by heat &c.

The fabrics may be used for making pipe and other joints, mail and despatch bags, window blinds or curtains, coverings, &c., and may be coated with earthy or mineral paints, silicates, or porcelain enamels, on which to produce paintings &c.

1246. Brannon, P. April 10.

Cements; concretes; stone, artificial; fireproof coverings.—A building-material composed of concrete, cement, and earthy materials is strengthened by combining vegetable and animal fibre and cohering substances with the concrete for forming buildings, structures, and parts of same with wooden skeletons. The material may be grouted in, or may be cast into slabs, blocks, sheets, &c.; thin layers may alternate with seams of long fibre, or a short-fibre mixture may be used in irregular masses. Long-fibre seams may be laid obliquely or transversely to each other. When intended to suit hold nails or screws, solutions of gums and glues, or resins, caoutchouc, gutta-percha, pitch, or tar in oil or turpentine may be mixed with the concrete. The short and long fibres are arranged to suit the stresses in the structures, long fibres being arranged on the surfaces of a partition or the like in opposite diagonal directions. The material may be employed as a shielding or casing against fire, damp, &c. by bolting it in the form of sheets to the surface to be protected. The various structures formed may be treated with any non-combustible or non-decaying preparation.

1425. Horne, R. R. April 24.

Refractory substances.—Gannister, "galliard," or firestone is ground and mixed with fireclay. The mixture may be formed into bricks or blocks by heating masses of it, in furnaces or kilns, sufficiently to produce a glaze on the blocks; or it may be applied as a plaster or cement for lining blast and other furnaces, in which case it is glazed by heat after being laid on the interior of the furnace.

1472. Brannon, P. April 28.

Stonework, ornamental.—In one method of producing pictorial decorations on the facings of natural and artificial stone, marble, &c., facsimiles of engravings &c. are obtained by solidifying, pressing, and drying powdered cement, plaster, or other facing-materials in moulds consisting of electrotype, stereotype, or other casts of the engravings &c. The impression is filled in with very finely ground cements and colours or inks, either as monotint or polychrome, and is either rubbed off and polished in the manner of copper-plate printing, or filled in, dried, hardened, rubbed down, and polished as in marble polishing. To engrave the stone directly, the slab or piece is covered with finely-ground material mixed with gums, oils, or resins, as described in Specification No. 1246, A.D. 1874, and the design is stamped or

cut in the material before or after setting, the design being filled in and finished as in the first case. In another method, the stone is covered with a material on which the pictorial design is afterwards etched, the design being sometimes sketched with pen, pencil, or brush before applying the covering-material to the stone. The etched surface is filled in and polished off as in the first case, the filling-materials being mixed with water, or with gum, gelatinous solutions, oil, &c. This method is applicable to slabs for walls, doors, panelled work, &c.

1524. Muratori, C. April 30.

Fireproof coverings.—A cotton, linen, woollen or other fabric is immersed in a saturated solution of alum and salt. The chemicals react and form aluminium chloride, which "unites" with the fabric to form a waterproof and fireproof material, which may be used as a substitute for leather. The cloth is dried, and is immersed in a bath prepared by dissolving waste pieces of glove leather or glue in water, and then boiling the solution and adding alum. The material may be used for boot uppers, clothing, &c. Moleskin fabrics or canvas treated by this process may be used for boots and shoes, gaiters, &c. Bags, coverings for furniture, &c., are made from linen or cotton goods similarly treated. The material made from woollen fabrics is used for articles of clothing, and that made from canvas may be used as bands for driving machinery.

1601. Newton, A. V., [Babbitt, B. T.]. May 6.

Asphalts.—Asphalt is moulded, in a state of fusion, into balls, blocks, slabs, or cakes, suitable for storage or transport, and coated with turpentine to protect them from the air. The turpentine is kept melted in a tank, heated externally or by steam pipes arranged internally, provided with an airtight removable cover from which the balls, blocks, &c. are suspended by wires cast into them. The cover is secured in place and the air exhausted from the tank. The balls &c. are finally dried, and a coating of a weak solution of glue or starch may be applied over the turpentine coating to prevent stickiness in warm weather.

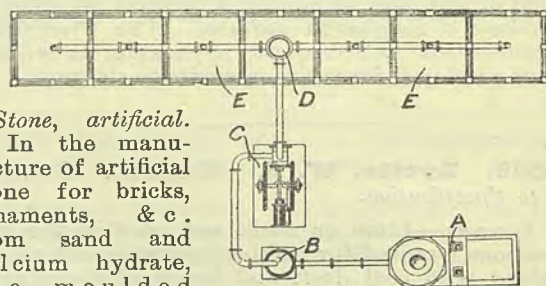
1612. Willans, J. G. May 7.

Cements.—A hydraulic cement is obtained by burning an intimate mixture of finely-ground lithomarge and lime or its carbonate. The wet or dry lithomarge and slaked lime may be ground separately or together, and are left in a moist condition for some time before being burnt.

1674. Rae, M. May 11.

Cements; asphalts.—In the manufacture of cements or asphalts for paving, flooring, walls, and marine structures, the crude tar or waste product obtained in the distillation and refining of oil from bituminous shale is, after the removal of sulphuric or other acids, washed with lime water and a portion of the light oils and water are distilled off. The tarry product is mixed, preferably in the heated state, with clay and sand or grit. The tarry product may be prepared from coal tar obtained in gas manufacture, or in the production of coal oils or paraffin oils described in Specification No. 3308, A.D. 1872, [Abridgment Class Fuel, Manufacture of]. When used for street pavements, the paving-blocks are bedded in the asphalt &c., the interstices between the blocks are filled with gravel &c., and the asphalt &c. is poured upon it. When employed for breakwaters, piers, embankments, and other marine structures, the asphalt may be mixed with chalk &c.

1763. Wise, W. L., [Preusser, F.]. May 18.
[Provisional protection only.]



Stone, artificial.

—In the manufacture of artificial stone for bricks, ornaments, &c. from sand and calcium hydrate, the moulded blocks &c., after being air-dried, are subjected to the action of carbonic-acid gas in order to convert the calcium hydrate into calcium carbonate. The gas is drawn off from the lime-kiln A by a pump C, and passed, through washers B filled with gravel and water, to an accumulator D, whence it is admitted to the impregnating-chambers E through openings at the top. The air driven out of the chambers escapes through openings at the top, and gas flames placed near these openings indicate when the chambers are full of carbonic acid. A similar arrangement is adopted to test the presence of carbonic-acid gas when the operation is completed.

1821. Ransome, F. May 22. [Provisional protection only.]

Stone, artificial.—Relates to the invention described in Specification No. 1233, A.D. 1870. Sand or other material containing silica, preferably "Farnham silica" or "white moulding sand," is mixed with caustic soda and heated, the mixture being covered with water. The bulk of the sand

used to form the stone is then added, together with lime or cement, and any chalk, colouring-matter, &c., if necessary.

1901. Shum, E. G. H. May 30.

Asphalts.—Rock lava, bitumen or mineral tar, and Portland cement are heated together to form a composition for paving roads &c. In some cases the cement is omitted.

1959. Hugban, W. H. June 5. [*Provisional protection only.*]

Cements.—The ash of a fuel prepared by mixing peat, pulp, sand, clay, and lime, is stated to be "a good Portland cement."

2023. Brannon, P. June 10. *Drawings to Specification.*

Fireproof compositions for forming the linings of safes and the skins and other parts and fittings of ships and boats. The composition consists of crushed "ballasting," burnt clay, bricks, pottery, clinkers or slag, combined with lime, cements, oils, resinous, bituminous or asphaltic matters, and in some cases mixed with fine wire, asbestos or slagwool, the whole being compressed into slabs and sustained by a continuous embedded network. In some cases, crushed ballast, sandstone, limestone, ironstone, chalk, flint, or grit and strong fibre with a bonding-net of cordage may be used. Comminuted wood sawdust, spent bark, and coco-fibre refuse mixed with oil, tar, bitumen, resin, or asphalt, and cemented together with grit, fibre, or metallic filaments may be used.

2029. Brannon, P. June 10. *Drawings to Specification.*

Fireproof compositions; stone, artificial.—The internal and external casings of fireproof safes, strong-rooms, &c. are made of artificial fibrous stone composed of cemented mineral substances, such as crushed slag, clinkers, bricks, felspar, granite, or silicious grits, mixed with mineral or metallic fibres united in a plastic state with cements, such as Portland and gypsum cements, potassium, sodium, &c. silicates, the whole being bound together by embedded metal wire or other fabric and sustained by framing of T-iron or angle-iron. Pillars, girders, brackets, &c. for supporting safes are constructed of the above materials, or as described in Specification No. 2703, A.D. 1871.

2047. McGrigor, A. B., [Robertson, J. M.]. June 12.

Stone, artificial; cements.—Sand, gravel, glass, burnt clay, &c. are treated with a solution of a chloride, bromide, iodide, or fluoride, preferably calcium chloride, and dry powdered hydraulic lime or cement is added. The materials are thoroughly mixed together, and the composition is formed into blocks by pressure. The blocks are placed on wet sand beds and allowed to harden until they form a hard artificial stone. The hardening is accelerated by placing the blocks or stone in a solution of calcium chloride when they are sufficiently set. The moist composition may be used as a plaster or cement for coating walls, ceilings, floors, pavements, &c., the surface to be coated having been previously moistened.

2123. Brannon, P. June 18. *Drawings to Specification.*

Stone, artificial.—Relates to an artificial stone or concrete composed of concrete or cement and fibrous substances as described in Specifications No. 2703, A.D. 1871, and No. 1246, A.D. 1874. The materials are combined with gypsum, lime, gum, or any oily, resinous, or bituminous medium, or aluminous, saline, or metallic substances according to the nature of the work. For work exposed to damp, oily or resinous materials are used; for fireproof work, aluminous, saline, and metallic substances are employed.

2272. Beatson, W. June 30.

Cements.—The residues obtained after making alum from burnt clay or shale are ground with lime, magnesian lime, limestone, or chalk. After drying, the mixture is calcined and ground to powder. Oxide of iron or manganese, or alkaline silicates, may be added.

Stone, artificial.—The residues above mentioned are ground with lime or limestone. Alkaline silicates, oxide of iron, and calcium or magnesium chloride may be added. Blocks moulded or cast from this mixture can be dried and hardened by slow natural drying, or may be heated in kilns.

2374. Forbes, G. H. July 7. [*Letters Patent void for want of Final Specification.*]

Cements.—Coke or coke breeze is mixed with the materials used in making cement before calcination. Chalk and clay or other suitable materials are ground up with water, the coke is added, and the grinding continued. Tar, pitch, &c. may also be added.

2470. Holland, W. T. July 15.

Cements; refractory substances.—For manufacturing dinas or silica firebricks without lime, ordinary

dinas bricks are crushed and mixed with a special silicious clay and water, the mixture being passed through a pug-mill, moulded, and dried as usual. The clay may be replaced by weak solutions of hydrochloric or sulphuric acid, or dissolved alum. A coating-powder for firebricks and fireproof cements consists of a mixture of felspar or one of the cements described in Specification No. 4216, A.D. 1873, with emery or corundum. The powder may be dusted over the surfaces of wet bricks, or mixed with water and used as a wash for dry bricks, or spread as a mortar. Powdered anthracite coal or culm, coke, charcoal, china or other clay, mucilage, &c. may be used in the mixture.

2500. O'Friel, J. July 17.

Stone, artificial; cements.—An artificial stone suitable for pavements, facings of buildings, for roofings, coverings of yards or floors, and linings for iron ships, reservoirs, and tanks, consists of a cement containing carbonate of lime, alumina, silica, potash, soda, and a solution of iron, mixed with sand or silex and an aqueous solution of silicate of soda. Portland or other cements containing like substances may also be employed. The plastic mass is spread over the surface to be coated and a solution of silicate of soda is applied; a wash of sulphuric or hydrochloric acid may afterwards be laid on. Silica may be added to the mixture to hasten the setting. Blocks, tiles, or slabs of the material are treated in a bath of nitrate of lime, the soluble nitrates which are formed being afterwards washed out. The effect of the bath may be increased by the use of "an exhaust" while setting. The surface of the stone may be stamped with a pattern, and colour may be added in the mixing.

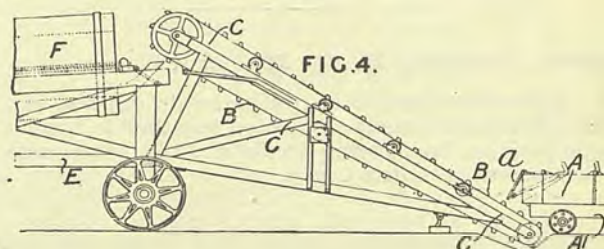
2523. Jensen, P., [Meidell, F. V. B.]. July 18.

Fireproof coverings and compositions.—To render fireproof safes or receptacles containing valuables a mixture of chalk, pipeclay, and sawdust of beechwood is stirred up with water glass to a paste, which is well kneaded, dried by exposure to air, and then placed in equal layers on the outside of the safe, which, if made of wood, millboard, or paper, is previously prepared with water glass. Each layer is exposed to an increasing heat, and afterwards gradually cooled in a bath of water glass, the inner layers being covered when nearly dry with a thin layer of rice, shells, or sawdust. The layers are arranged so that there are air spaces between two adjacent layers and between the inner layer and the surface of the safe &c. The finished preparation is dried and may be covered with millboard, paper, iron, or other material.

2594. Le Mesurier, W. H. July 24.

Concretes.—In the manufacture of concrete, broken stone &c. is delivered from a crusher or

shovelled into hoppers A, Fig. 4, revolving on a turntable. When a hopper comes over an elevator or travelling band B, a door *a* is opened and the materials are discharged on to the elevator &c.,



which delivers them to a rotary mixer F. The mixed concrete is delivered either through a shoot to the place where required, or through a short swivelling shoot into barrows. The hoppers may be mounted on a bogie A¹ and the mixer on a frame E having wheels, a frame C carrying the elevator B being hinged at one end to the frame E and suspended to the bogie at the other end. The broken stone &c. may be carried by a travelling band from the ground near the crusher direct to the mixer.

2734. Abel, C. D., [Langen, E.]. Aug. 7. Disclaimer.

Casting.—In the manufacture of loaf sugar, a strong sugar solution, or the pan liquor as it runs from the charcoal filters, is mixed with raw or purified crystals of sugar, and the mixture is charged into moulds, preferably such as are described in Specification No. 2456, A.D. 1872, which, to produce loaf sugar in slabs convenient for breaking up, are divided in the direction of the drainage by thin plates.

2822. Forbes, G. H. Aug. 15. [Provisional protection only.]

Cements.—Relates to modifications in the process of making cements described in Specification No. 2374, A.D. 1874. Coke, coal, or breeze is ground up with chalk, limestone, or quicklime, sufficient water being added to mix the materials; tar or other bituminous matter may be added. The compound is dried, calcined, and pulverized. It is preferred to use coke containing little sulphur, but a proportion of iron oxide.

2945. Macintosh, J. Aug. 28.

Slags, treatment of.—Consists in the application of the method of hardening iron, steel, or alloys, described in Specification No. 1714, A.D. 1874, [Abridgment Class Iron &c.], to harden slag &c. The fused slag is run into metal moulds, which are suddenly cooled by means of a mixture of iced water and salt, or by any other cooling-mixture.

3007. Deane, T. Sept. 2. [*Provisional protection only.*]

Stone, artificial.—To manufacture artificial marble, lead oxide, sand, pearl ash, nitre, borax, white arsenic, and cryolite are mixed together and fused in a pot. The molten mass is then rolled upon an iron table and the slab produced is annealed in a furnace and may be afterwards ground and polished. The fused composition may be moulded in iron moulds.

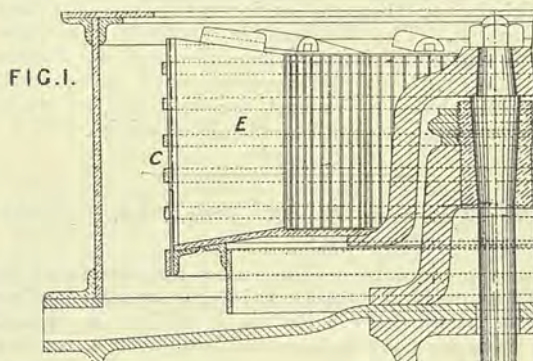
3008. Røttger, W. C. A. Sept. 2.

Cements; stone, artificial.—In the manufacture of artificial marble, the body of the material is composed of a white cement prepared by burning blocks of Iceland or calc-spar in kilns, cooling the blocks and placing them in a solution of aluminium, borax, copper, iron, potassium, sodium, &c. silicates, sulphates, or other salts in water. The blocks are withdrawn from the bath, dried, re-burned, and reduced to powder. Alabaster, marble, cements, or other substances containing calcium sulphate mixed with alum or metallic sulphates may be used for the cement, the cements containing alum or sulphates being hardened by mixing them with oxygenated water. To produce white marble the cement is mixed with zinc oxide; to produce black marble manganese peroxide is used, and for coloured marble mineral oxides are employed. In operation the cement is mixed with water, the colouring-matters are added, the mixture is passed through a sieve, and the paste produced laid upon the body of the slab or other article in layers, until the desired thickness is produced. The surfaces are smoothed with a trowel, and to extract the superfluous water a cloth is laid upon the surface and covered with coarse, dry cement, plaster of Paris, sifted ashes, sand, or cement mixed with the colouring-matters. For thin articles a piece of canvas saturated in a potassium or sodium silicate solution or a copper-sulphate solution is placed upon the second layer and the coarse cement laid upon it. The air bubbles are driven out of the layers of wet cement by means of a brush having wire or wooden pins in the place of the bristles. The surfaces are polished with pumice and "snake" stones and water, and rubbed with oil when dry. If necessary the surface is washed with dilute hydrochloric acid and afterwards polished with a mixture of potassium or sodium silicate, olive oil, and water, applied along with tin ashes or emery powder, by means of a soft rag.

3027. Martineau, G. Sept. 4.

Casting.—Loaf sugar is made in moulds in the basket of a centrifugal machine. The basket C is fitted, round the inside of the cage, with wedge-shaped boxes E, open at the back and the front, each divided into cells by thin vertical partitions movable in grooves. Each box is slotted at the top to receive a lifting-handle. The cage

is rotated and the boiled crystalline sugar, as it comes from the vacuum pan, is run into the cage, filling the boxes. The speed is then increased to drive off the syrup adhering to the sugar. The



contents of the boxes are subsequently removed in the form of compact cakes. The partitions, which may be fixed in the basket of the machine and separated by distance-pieces, may be ribbed to facilitate breaking the cakes into strips.

3182. Forbes, G. H. Sept. 17. [*Provisional protection only.*]

Cements.—In the manufacture of Roman or similar cement, coke or coke breeze is mixed with the cement-making materials and water by grinding the materials in a mortar mill &c. The compound is then dried, calcined, and powdered. The process is similar to that described in Specification No. 2374, A.D. 1874, for the manufacture of Portland cement.

3217. Skinner, R. Sept. 19.

Asphalts.—Relates to the preparation of asphalt suitable for roofing, flooring, building, footpaths, roadways, reservoirs, docks, sea walls, fortifications, &c. Carbonate of lime, limestone, chalk, &c., are pulverized and fed into a jacketed trough heated by steam or hot air. Tar is added, and the saturated carbonate is discharged into a combined mixer and conveyer where it is mixed with pulverized bitumen. The composition may be formed by pressure into tiles, blocks, kerbing, &c., or it may be spread over surfaces and solidified by heated irons &c.

3325. Paterson, H. C. Sept. 29.

Casting slag. Bricks, blocks, pipes, tiles, slabs, columns, and other like articles are made from the slag produced in smelting or melting iron or other ores. The slag is cast direct from the furnace into moulds of sand or loam or cast iron, and may be compressed in the moulds. The slag may be mixed with pulverulent or fragmentary material, such as

sand, gravel, quarry chips, mine dust, ground clay, ground blaes, slate, shale, or like substances containing carbon or hydrocarbon. The additional material may be mixed with the molten slag in a separate receptacle, or it may be injected into or sprinkled over the slag as it travels to or enters the moulds. The articles are removed from the moulds while still hot and are indurated by immersion in a bath of hydrocarbon, such as mineral, vegetable, shale, or animal tar or pitch, or crude oils of mineral, vegetable, or animal origin.

3340. Forbes, G. H. Sept. 30. [*Provisional protection only.*]

Cements.—Relates to the compound described in Specification No. 34, A.D. 1874, for use as fuel or cement, plaster, &c. Refuse gas lime is mixed with coke or coke breeze and water in a mortar mill &c. The resulting compound is dried, calcined, and powdered for use as a cement.

3553. Newton, W. E., [*Donner, J. O.*]. Oct. 15.

FIG. 5.



FIG. 6.



Casting.—In refining sugar by the use of a centrifugal machine, the magma of the raw sugar is first cast into moulds B¹, placed within outer cases S¹. The moulds B¹ with the contained blocks of raw sugar are then knocked out of the cases S¹, and arranged within the basket of the centrifugal machine with the perforated bottoms towards the circumference and with their longer sides vertical. The moulds B¹ may, otherwise, be open at the bottom and the cases curved to cause the blocks of sugar to fit against the perforated screen or basket of the machine, and may also be tapered in the reverse direction, filling-blocks being inserted between the moulds and their cases.

3583. Murdoch, H. H., [*Honnij, M. L.*]. Oct. 17. [*Provisional protection only.*]

Statuary.—Spent tan is dried in a gas-retort, with or without the admission of a hot or cold air blast, and is then used instead of dried wood &c. in statuary manufacture.

3634. Gedge, W. E., [*Granjon, J. B.*]. Oct. 22. [*Drawings to Specification. Provisional protection only.*]

Casting.—Cement or other conduits or pipes are moulded in position by means of hollow mandrels,

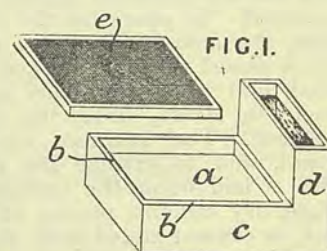
the internal dimensions of which are the same as those of the finished pipes &c. The mandrels are successively placed in position and surrounded with the material; they may be formed of sheet iron bent so that the edges simply overlap, or they may be riveted. The mandrels may be withdrawn when the cement has set, or they may be left to waste away by oxidation.

3641. Horne, R. R. Oct. 22.

Refractory substances; cements; plasters.—A refractory material, which may be used as a plaster or cement for constructing gas, oil, or other retorts, pipes and flues for furnaces, and for lining the fireboxes of boilers &c., consists of ground gannister, fire-stone, ground fireclay, quartz, and slag or sand, mixed and combined by water. The material may be used to form the articles, or used as a plaster or cement for covering iron, fireclay, or other retorts internally and externally. The ground gannister and fire-stone may be used without the fireclay &c., being mixed with water. To produce a hydraulic cement, lime, with or without "iron borings or rust," is mixed with the material.

3717. Chandor, J. A., [*Leonard, W. A.*]. Oct. 27.

Casting.—Relates to a method of forming a composition of colloid compound and camphor into sheets, which are afterwards cut into strips for use as cigar lighters &c. The material is run into a shallow tray *a*, preferably of soapstone, forming part of a hollow receiver *c* formed with a raised part *d* having an opening for the admission of water &c. for cooling, which flows beneath the slab *a*. A woven-fabric cover *e* stretched over a frame is placed on the raised edges *b* of the slab and over the material to check evaporation.



3830. Shell, B. Nov. 6.

Casting.—In the manufacture of paving-blocks, blocks of wood are placed at intervals in an iron frame, the spaces between the blocks are filled with broken granite, and the materials are bound together by pouring into the frame a composition prepared by mixing together, and boiling, pitch, chalk, and sand, tar oil being added to the mixture during the boiling. The blocks are turned out of the frame when cool.

3840. Smyth, S. R., and Simpson, J.
Nov. 7. *Drawings to Specification. Disclaimer.*

Refractory substances.—Bricks or blocks, for use in iron and steel refining apparatus, furnaces, &c., are made from a compound containing 80 to 90 per cent. of silica, 5 to 10 per cent. of plumbago, and 5 to 10 per cent. of asbestos, the materials being mixed with blood, and dried, baked, and annealed. For a lower class of material, silica is used, cemented together by alumina containing iron oxide.

3876. Forbes, G. H. Nov. 10.

Cements.—Relates to the processes described in Specifications Nos. 2374 and 2822, A.D. 1874. Raw Portland cement is mixed with coke, coke breeze, or coal dust, and with tar, pitch, or the like, to form artificial fuel. The ash from this fuel is ground and forms cement. The clay is treated in the usual way and mixed with chalk. The slip is then intimately mixed in a mill with the coke or the like and dried in ovens. It is then re-ground with tar, pitch, or the like, or is placed in molten tar or other liquid bituminous materials, which it absorbs to form a fuel.

3884. Oppenheimer, D., [*Hirsch, H.*].
Nov. 11. [*Provisional protection only.*]

Stone, artificial.—Sand is heated in a trough and mixed with resin, asphalt, or the like; clay is then added to the coated sand, and sulphur is introduced to harden the mass. Limestone, carbonate of lime, or marble may be combined with resin to form the cementing-substance. The mass is cooled before being moulded.

3926. Ransome, F. Nov. 13.

Stone, artificial.—In a modification of the method of manufacturing artificial stone described in Specification No. 1233, A.D. 1870, sand, or a silicious mineral, is boiled with caustic soda to form a poor silicate of soda, which is mixed with clean sharp sand or other material, powdered lime, or lime cement, and, if desired, chalk, colouring-matter, &c. are added. The mixture is made into a plastic mass with water, moulded, and afterwards hardened in chambers in which a warm moist heat is maintained.

Stone, preserving.—The blocks may be hardened by treatment first with sodium-silicate solution and then with calcium-chloride solution.

3993. Holden, T. Nov. 20. [*Provisional protection only.*]

Cements.—Shale is substituted for clay in the manufacture of cement. The shale and limestone are first mixed, then passed through a stone breaker, and afterwards ground between stones.

4194. Smith, G. H., and Paterson, H. C. Dec. 5.

Concretes.—Broken stone, shingle, broken slag, sandstone, &c. is mixed with tar or other hydrocarbon. Clay and pitch are added to the mixture, and the whole is heated. Sawdust or other absorbent material may be used instead of broken stone &c.

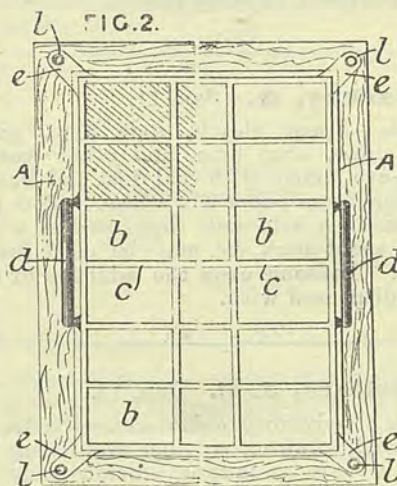
4195. Sellars, J. C. Dec. 7.

Stone, preserving.—Blocks &c. of artificial stone made by moulding a mixture of sand or other granular substances, Portland or other cement, and powdered lime or clay are hardened by immersion, after exposure to the atmosphere, in lime-water for ten or twelve days, the lime-water being occasionally agitated, and in some cases heated, to expedite the action.

4305. Scott, H. Y. D. Dec. 14.

Cements.—In the production of cements, sewage, after the removal of the suspended matters, is treated with milk of lime, and the calcium carbonate precipitate is calcined for use in precipitating fresh quantities of sewage. When the calcined precipitate becomes too poor in lime for precipitating purposes, it is used in the manufacture of cement, as described in Specification No. 2243, A.D. 1871. Lime is used to deodorize the solid matters deposited from the sewage, and the mixture may be calcined to form a cement, or the ammonia may be distilled off and the residue, after use in precipitating the effluent, is used in the production of cement.

4428. Charpentier, P. E. Dec. 23.



Casting.—Raw sugar heated and mixed with water, syrup, or alcohol, &c., is poured into the compartments of a frame C placed over a metal

plate *b* on a table *A* ; to make the sugar take the shape of the moulds pressure may or may not be applied. The frame *C* is then lifted on its guiding lugs *e* and pins *l* by means of handles *d* and, as the partitions are thicker at the top than

at the bottom, the frame *C* rises easily from the sugar, which may then be dried in a stove &c. The partitions may be made with cutting-edges, so that blocks or cakes may be formed by depressing the frame *C* upon it.

A.D. 1875.

43. Siemens, C. W. Jan. 5. *Drawings to Specification.*

Refractory substances.—A thick paste of bauxite, fireclay, or ferric oxide, mixed with about 20 per cent. of lime, is used for fixing and filling up the interstices of the chemically-prepared wood lining of a rotary metallurgical furnace.

60. Wilkinson, A. Jan. 6.

Cements.—A waterproof cement for coating brick walls &c. is made by grinding and mixing together in a peat machine wet peat with lime, Roman, Parian, Portland, or other cement.

91. Mackay, G. Jan. 11.

Cements.—Spent bleach, soda lime, gas lime, tanner's lime, soap lime, and other waste lime products are mixed with coal dust and waste alkaline liquors from paper &c. works. The mixture is calcined in a kiln and then used as a cement. Sawdust, spent bark, &c. may be used instead of coal dust. In some cases the addition of alkaline liquor is dispensed with.

112. Sellars, J. C. Jan. 12.

Cements ; refractory substances.—Plastic cement for repairing, coating, setting, and lining gas retorts &c. is made by mixing silicious sand or pulverized stone with sodium or potassium silicate. If the cement is to remain plastic, the use of sand or stone containing lime, alkaline earths, &c. is avoided ; but if the quick-setting cement is required, lime, alkaline earths, &c. are used. In a

modification, barium sulphate is mixed with silicious sand and a soluble silicate.

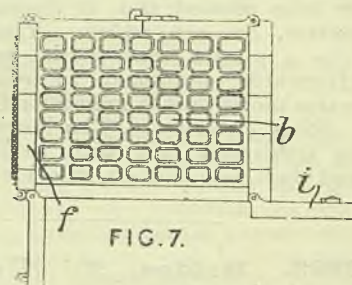
129. Green, W. Jan. 13.

Casting soaps. Machinery for interlacing, plugging, pouring, cutting, and figuring soaps consists of (1) a series of intermittently-actuated travelling frames, containing vessels with orifices from which soaps of different colours may be run or projected by pressure, so as to become interwoven, to form checks, plaids, &c., and (2) a series of plugs or dies, operated so as to indent or cut out portions of the slabs or blocks, and means for filling the indents or holes with soaps of different colours.

243. Luckenbach, F. A. Jan. 21.

Slags, treatment of ; casting ; castings.—Blocks of slag for building, paving, making drain and sewer pipes, fireproof deposit vaults, &c., such as are described in Specification No. 1585, A.D. 1872, are annealed by slow cooling. To effect

this, the moulds *b* are placed in casings *a* and the molten slag is poured between them as well as into them. The moulds are made with apertures *b*¹, Fig. 2, at the bottom, so that they fill from below ;



they may have internal ribs, so that grooved blocks are cast and may be divided into three or more for use. The moulds may be carried by trucks *d* through chambers *c*, which may be fitted with

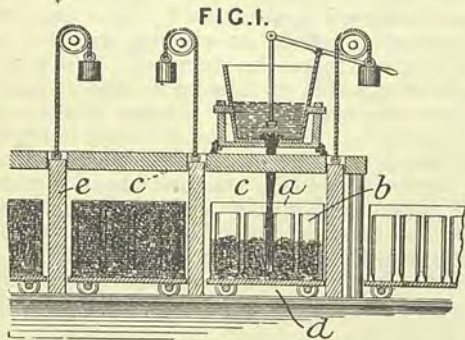
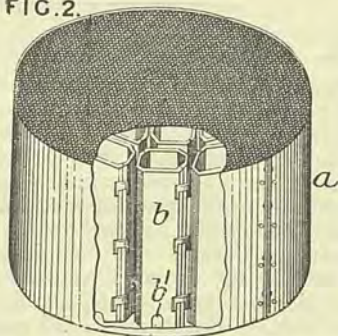


FIG. 2.



doors *c*. The first chamber, in which the casting takes place, is heated to 600° or 800° F. The moulds *b* are made from wrought or cast iron, preferably from sheet iron, by stamping. The casing *a* may be of thin sheet iron when annealing-chambers *c* are used. The chambers *c* may be dispensed with, and the casings constructed as shown in Fig. 7. These casings are mounted on trucks, or are stationary on a fixed foundation. They may be lined with a non-conducting coating *f* of fire-brick, slag, &c. and their sides consist of hinged doors *i*.

420. Loewenberg, H. Feb. 4. [*Provisional protection only.*]

Stone, imitation; castings; fireproof coverings and compositions.—Fabrics and paper are coated with a solution of a mixture of glue, glycerine, soap or oil, and colouring-matter, all in stated proportions, to imitate leather, stone, wood, &c. The mixture is poured into a mould of the pattern to be imitated, and, before the solution has set, the greater portion is poured off, so as to leave a layer in the mould of the desired thickness. The mould is made of a mixture of crude glycerine and glue solution, and is treated with chromic acid or iron acetate &c. to prevent the cast from adhering to it. The cast, after removal from the mould, may be similarly treated to render it waterproof and heat-resisting. The cast can be attached to any suitable

material, such as textile fabrics or paper, by applying the material to the back of the compound in the mould before it has set. Imitation leather, wood, &c. are produced in a similar manner.

850. Ross, J. March 8.

Cements; concretes.—Clay, concrete, cement, iron dross, plaster, asphalt, or artificial stone, or a mixture of all or some of these materials is used in making blocks &c. for walls, copings, finials, ornamental or other edgings, and devices or borders for gardens, carriage drives, and pathways, and for doors, windows, and other openings. The materials may be used especially in making blocks for, or in the construction of walls, foundations, arches, ventilators, pots for earth drains, spouts, platforms, flooring, cisterns, stages, arches, pipes for air and water, pillars, supports, &c. of green-houses, conservatories, vineries, forcing houses and pits, and fruit-tree houses, &c.

951. Holt, H. P. March 15.

Casting.—For making special cement or concrete building-blocks, having vermiculated or other ornamental work upon them, the moulds are so made and adjusted by wedges, cottars, &c. that the block can be easily withdrawn without damage. Fig. 1 shows a sectional elevation and Fig. 3 a plan of one half of the mould. The casing is shown at *a*; a flexible core at *b*, which is held together by bands *c* and stretchers, and is kept in position by a bar *d* which leaves holes in the blocks to facilitate the bonding of them together and their hoisting into position.

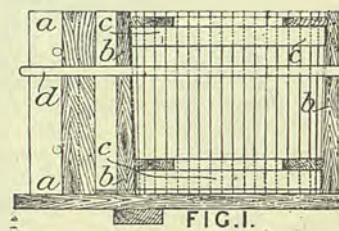


FIG. 1.

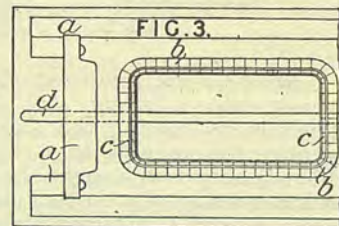


FIG. 3.

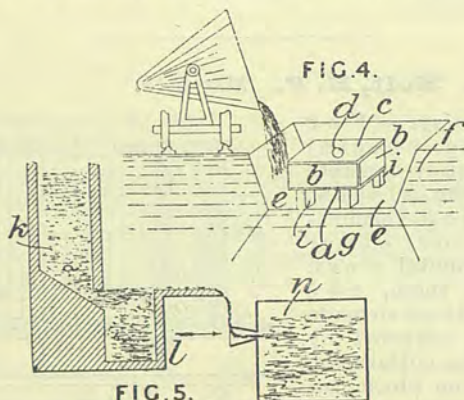
959. Wirth, F., [Kreittmayr, J.] March 15.

Casting, compositions for. White talc, previously heated, poured into water, and ground, is mixed with hydrate of lime and the mixture mixed with fluor-spar, quartz or glass powder, carbonate of lime or chalk or marble powder, and talc, all finely-ground, and afterwards made into a syrup with a concentrated solution of potassium silicate. The liquid mass is run into moulds composed of glue and glycerine; and the castings when air dry are brushed alternately with dilute solutions of

potassium silicate and hydrofluoric acid. A mixture in stated proportions of fluor-spar, quartz or glass powder, fine sand, carbonate of lime or chalk or marble powder, and talc, after treating with a solution of potassium silicate, produces castings resembling ivory. For some purposes a mixture of finely-pulverized fluor-spar and quartz or glass powder with potassium silicate is preferred.

Fireproof compositions.—Wood is preserved and rendered incombustible by coating it, first with dilute potassium silicate until it is saturated, and then, when air dry, with a more concentrated solution, then with pure potassium silicate, and finally with dilute hydrofluoric acid. If the wood is to be painted, glass powder and fluor-spar are mixed with the colours and the mixture treated with concentrated potassium silicate. Decorations of theatres, linen, and dresses, may be similarly treated.

1052. Dahne, F. W. March 22.



Casting; slags, treatment of.—Glassy slag is converted into a stony slag having a crystalline structure by casting the slag in hot moulds and keeping the moulds at a high temperature for about twenty-four hours. In one method, moulds, each consisting of a bottom plate *a*, Fig. 4, two side pieces *b*, and a covering-plate *c*, are arranged on supports *i* in a pit or trench *e* constructed in sand &c., and slag is poured into the pit or trench until the slag reaches the top of the moulds and enters openings *d* in the top plates. When the moulds are filled, the whole is covered with ashes or sand and allowed to cool. The sides of the pit &c. may be constructed of bricks or stony slag, and, when the sides have acquired a high temperature, the slag may be cast direct into the pit, &c. The moulds may be placed on a plate arranged on supports in a wagon &c., and is then surrounded by a movable iron mantel. Granulated slag for use in water filters and for covering steam boilers or pipes is obtained by directing a jet of steam *l*, Fig. 5, against slag as it issues from a furnace *k* so that the slag is forced through a bell-mouth opening into a receptacle *n*.

1054. Bodmer, J. J., and Bodmer, L. R. March 23.

Slags, treatment of; stone, artificial; cements; mortars; plasters; concretes; refractory substances.—Slag or scoria from blast furnaces or other smelting-furnaces is granulated by directing jets of water against the fluid or viscous slag &c. as it issues in a steam from the furnace. The slag &c. flows into trucks &c., or falls upon fixed or movable screens, and the water, after contact with the slag, is guided away by plates when the slag is required more or less dry. The granulated slag is used in making cements, mortar, artificial stone, concretes, plasters, refractory bricks and other articles as described in Specifications Nos. 1041 and 1970, A.D. 1866, No. 615, A.D. 1868, and No. 3557, A.D. 1872, and also for the purposes described in Specification No. 590, A.D. 1873, [*Abridgment Class Mixing &c.*].

1126. Gardner, D. R. March 27.

Fireproof compositions.—Preservative and fire-proof compositions for treating timber consists of solutions of phosphates of ammonia, or ammonia and sodium, sulphates of ammonia, aluminium, copper, zinc, and potassium, bisulphate of soda, sulphites of ammonia and sodium, proto-chlorides of tin and ammonia, carbonates of sodium and potassium, borates of calcium, sodium, and ammonia, or boracic acid, sodium tungstate, borax, alum, caustic soda, sal-ammoniac, tincal, or "pink salt." Sulphuric acid may be used with the sulphate solutions. The solutions may be replaced by a mixture of sulphuric acid, liquid ammonia, or other alkali and water.

1230. Clark, G. April 5. [*Provisional protection only.*]

Asphalts.—A composition similar in character to native rock asphalt, for paving and other use, is formed of asphalt combined with carbonate of lime or lime, silica, alumina, and broken stone. When an elastic composition is required, sawdust is added, and fibrous material such as hair, wool, &c. The materials are mixed with the asphalt in a copper, the asphalt being first melted with the aid of a solvent such as petroleum or residuum oil from the distillation of petroleum &c., or green oil or pitch obtained from the distillation of fat.

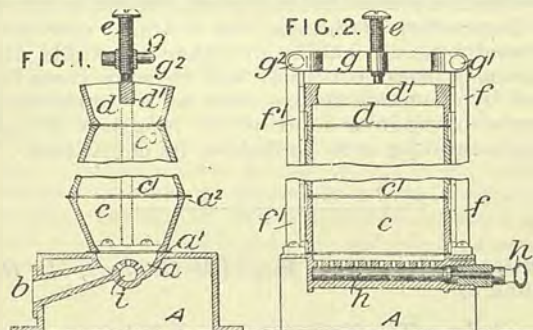
1397. Murdoch, H. H., [*Honnaij, M. L.*] April 16. *Drawings to Specification.*

Statuary.—Spent tan is dried in closed retorts, and is used in the manufacture of statuary &c.

1439. Newton, A. V., [*Matthiessen, F. O.*] April 20.

Casting.—Raw sugar is cast into blocks and

liquored or cleansed in a series of alternately-reversed moulds $c, c', \&c.$, placed above a semi-cylindrical cavity a in the table A , and held down between guides f and f' , engaging in grooves in



their sides, by a screw e , which passes through a cross-bar g and presses upon another cross-bar d' formed on the uppermost or surplus mould d . Elastic packing $a', a'', \&c.$, is placed between the edges of the moulds, and the moulds are then filled from the top or through the nozzle b with the sugar from the vacuum pan. The cleansing-liquor is passed upwards through the moulds from the pipe i , and, when the operation is completed, the surplus mould d is removed and the others are placed in the centrifugal drying-machine. The moulds, instead of being alternately reversed as shown, may be each placed with the smaller opening downwards, perforated plates being also placed between them.

1466. Denniston, P. April 22. [*Provisional protection only.*]

Fireproof compositions.—To protect the wood-work and the inside of ships against fire, they are coated with sodium silicate concentrated by boiling to a thick consistency and applied by a brush. The silicate, with or without the addition of a mineral poison such as arsenic or its compounds, may be used for coating the woodwork of buildings for the same purpose.

1502. Brock, J. April 23.

Casting.—In order to obtain perforated blocks of common salt or potassium chloride suitable for use in the manufacture of sodium sulphate or potassium sulphate by the direct action of sulphurous-acid gas, the crystals of the salt &c. are lifted from the boiling-pan in a perforated skimmer, and are placed in moulds of wood &c., which are provided with tapered vertical pegs extending to the top of or above the moulds. The bottoms of the moulds may be fixed or removable, and the pegs, when smaller at the bottom than at the top, may be removable and may extend above the mould in order that they may be easily withdrawn when the blocks set, and before they are turned out of the moulds. The

blocks are finally carried to a drying-stove upon a carriage, which, if of iron, is covered with a layer of salt.

1595. Hughes, E. T., [*Bergius, M. E.*]. April 30. [*Provisional protection only.*]

Slagwool, preparation of.—Relates to a method of preparing silicate cotton from blast-furnace slag. A jet of slag, about an inch in diameter, is separated from the stream of slag flowing from the furnace, and a jet of high-pressure steam is introduced into it as it leaves the channel and runs to the floor. The falling slag is divided into hair-like threads, and silicate cotton thus produced.

1635. Varley, F. H. May 3.

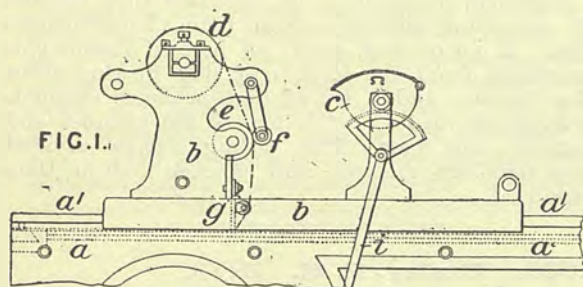
Casting.—Relates to a process of casting discs or other forms of accurate and uniform size. A mould is made by clamping together in a frame a number of iron, steel, or other plates of the same thickness as the discs required, and then drilling one or more cylindrical holes through the whole pile. The plates are arranged to project from the pile alternately on opposite sides, and each set of alternate plates is kept together by bolts, rods, or pins. The material is run into the hole, and the two sets of plates are then pulled in opposite directions by a hydraulic press or by screws or levers so as to divide the column of liquid material into separate discs. After the material has solidified, the plates are returned to their original position and the discs forced out. The material is preferably run into the mould at the bottom by means of a U-shaped pipe made of sufficient height to produce dense castings by the pressure of the column in the pipe. Hydraulic pressure is employed when great density is required. The mould may be heated, and is preferably placed in a casing to prevent oxidation. Hydrogen or other non-oxidizing vapours or gases may also be circulated through the casing during the heating of the mould. If several moulds are employed, they may be heated in reverberatory or gas furnaces to obtain uniform heating. The inlet and outlet pipes of the mould are made in sections so that the cast material left in them can be taken out and re-used.

1710. Humy, P. R. de F. d'. May 8. *Drawings to Specification.*

Stonework, ornamental.—The surface of stone is ornamented by means of strips, rods, tubes, or prisms of glass, ceramic, or other substances, used in single or double layers crossing each other obliquely or perpendicularly to produce refractive effects. The rods &c. are interspersed with coloured or silvered glass, tinsels, or papers, or are laid upon a ground of silvered glass, tinsel, or coloured paper. The rods &c. may be replaced by plates or pieces of corrugated or embossed glass.

When spaces are left between the ground and the rods, the rods are supported by glass fillets, and coloured paper patterns or transfers are placed in the spaces.

1837. Loewenberg, H. May 19.



Stone, imitation; casting; fireproof coverings and compositions.—Relates to the production of coated fabrics in imitation of stone, &c. as described in Specifications No. 1068, A.D. 1865, and No. 420, A.D. 1875. The coating-composition used consists of a mixture of glue, glycerine, soap or oil, and colouring-matter. The composition used in forming the mould into which the coating-composition is placed consists of glue and glycerine. When taking the cast, which is to be used as the mould, the surface of the mould is coated with chromic acid or iron acetate, &c. to prevent the composition from adhering. The enamelled surface of the coated fabric may be finally similarly treated to render it waterproof and heat-resisting. The mould is finally placed on a level table *a* provided with raised edges *a'* along which a frame *b* may be moved, carrying with it the trough *c*, containing the heated and fluid composition, and the roll *d* of paper or fabric which is to form the backing of the compound fabric. The paper &c. passes down between rollers *e*, *f* and under an adjustable knife *g*, which spreads the composition equally over the mould; the paper is fixed at one end of the table. A sloping rail at one side of the table acts on a lever *i*, so as to tilt the trough *c* more and more as it approaches the end of the table, in order to ensure a uniform discharge of the composition.

1924. Velge, G. May 26. [*Provisional protection only.*]

Slags, treatment of.—Slags obtained in the manufacture of iron are powdered and mixed with sodium chloride. The mixture is raised to a red-heat in a reverberatory furnace, and when it ceases to disengage chlorine it is allowed to fall, while at a red-heat, into water acidulated with hydrochloric acid, which dissolves out the phosphate and leaves the iron.

2015. Hyatt, T. June 2. *Drawings to Specification.*

Fireproof compositions; plasters.—The Provisional Specification states that in plaster, cement, or mortar for fireproofing buildings, the ordinary cowhair is replaced by cut manila or other vegetable fibre previously made rot-proof and in some cases fire-proof by chemical means, such as by burnetizing, or by steeping in a solution of tungstate of soda, or by saturating with asphalt or its equivalent.

2080. Lake, W. R., [McClintock, J. R.]. June 5.

Asphalts.—Trinidad or Cuban asphalt is dissolved in turpentine, benzene, naphtha, &c. to form a liquid or semi-liquid for use in paving, roofing, &c. Powdered natural asphalt is added to all paving compositions in which coal tar or "artificial asphaltum" is used.

2196. Cooke, B., and Thompson, W. P. June 15. [*Provisional protection only.*]

Stone, artificial.—An artificial stone for foundations in sandbanks and shifting sand is produced by injecting into hollow piles solutions of sodium silicate and sodium chloride, which combine together and with the sand to form a solid mass.

2225. Fryer, A., and Alllott, J. B. June 17. *Drawings to Specification.*

Casting.—For producing sugar similar to loaf sugar, the boiled sugar or massecuite is prepared for treatment in a centrifugal draining-machine by passing it into vessels or moulds in the form of truncated cones, each of which has a loose false bottom and a number of loose plates for dividing the mass into layers or leaves. A cylindrical hole is formed along the axis, and, as soon as each vessel is filled, a closely-fitting cover is placed upon it and the whole allowed to stand until the sugar becomes hard. The loose bottom and cover with the sugar are then withdrawn, and placed in the rotating vessel of the centrifugal machine.

2347. Nicoll, D. June 28. [*Provisional protection only.*]

Asphalts; concretes.—In the manufacture of a material for paving roads, paths, and the basements of houses, waste or refuse hay, straw, tan, hop-bines, wild grass or esparto grass, nettles, leather, cuttings of trees, gorse, broom, and other vegetable fibrous materials are cut and crushed "so that they will absorb gas tar, pitch, or bitumen

"in a heated condition." Sand, gravel, chalk, dried scrapings of roads, burnt clay, ballast, or other similar substances used in making roads are mixed, preferably after crushing or pulverizing, with the materials in a cauldron, and, after heating, the compound is poured into moulds to form slabs, the moulds being lime-whitened to prevent adhesion. Sawdust and road scrapings, or sharp sand and bitumen are then boiled together in a cauldron and poured out in lumps, which are pulverized and placed upon the foundation formed of these slabs. Broken granite is then spread over the pulverized material. Shingle or gravel and flint or granite crushed to the size of peas are heated together and mixed with hot liquid gas tar, and the mixture is poured into the interstices and over the surface of the paving.

2359. Hyatt, T. June 29. [*Letters Patent void for want of Final Specification.*]

Fireproof coverings.—Wood surfaces are protected against fire by a covering consisting of firebricks or tiles formed with reeded faces and perforated to admit air to the wood.

2423. Bowling, J. July 5.

Cements.—Slurry is converted into slip by forcing it in or on to a filtering-medium by means of centrifugal or other pumps, or by other suitable means for exerting and maintaining a pressure on the slurry while in contact with the filtering-medium.

2467. Haseltine, G., [*Grasser, C.*]. July 8.
Drawings to Specification.

Casting.—Relates to a method of casting and moulding metals by means of wax patterns. After the formation of a mould the wax pattern used is melted out. The wax patterns are prepared by means of a permanent vulcanized india-rubber mould made from the original pattern or model, which may be a figure or statuette for example. This original pattern may be made of iron, type metal, or lead, or plaster of Paris, marble, or other mineral substances. If made from metals or compositions which would be affected by the vulcanizing process, it is first coated electrolytically with lead or iron to protect it. The india-rubber mould is made by brushing the pattern over with rubber solution and then applying several layers of thin sheet rubber until a suitable thickness is obtained. The pattern with the rubber around it is then placed in a rubber vulcanizer which is adapted for vulcanizing under water pressure, the pattern and mould being enclosed in a vessel which can be supplied with water under pressure by a force pump and heated at the same time by a steam-jacket. After vulcanizing, the rubber mould is slit open sufficiently for removing the pattern,

and the pattern having been removed, a suitable hole is cut for the introduction of melted wax, resin, paraffin, or other suitable material. The slit is closed up with rubber solution, and the mould is then suspended in cold water while the melted wax is poured in. If a hollow wax pattern is required, the surplus wax is poured out after a sufficient thickness has solidified on the inner surface of the mould. The mould is then torn open along the slit previously made and is removed from the wax pattern. It can be used over and over again for producing a number of such patterns.

Refractory substances.—A valve for drawing-off molten metal from a melting-pot is made of a mixture of Ceylon blacklead, kiesselguhr, kaolin, and felspar. The same composition may be used for making melting-pots and other articles employed in the manufacture of metals.

3095. Rees, T. H. Sept. 3.

Casting.—Relates to means for reproducing raised or sunken designs on thin sheet-metal plates from patterns by dies and pressure. A thin sheet of metal is placed upon the pattern and is made to conform to it by pressure applied by a hand-pad or soft rollers. The embossed sheet is then used as a mould for casting a die and a matrix, which may be made either flat or curved according as the mould is spread out flat or bent into a curved form during casting; or the die and matrix may be made thin enough to allow bending after casting.

3300. Harpin, H. Sept. 21.

Stone, imitation.—The exposed faces of bricks for the outer walls of buildings are made in imitation of "rock-faced or pitch-faced" stones, and are formed in moulds, the sides of which are roughly hollowed, suitably shaped, and removable. One side of the brick may be roughened by making the face of the plunger of the ordinary machine of the desired character. White clay is preferably used for the bricks.

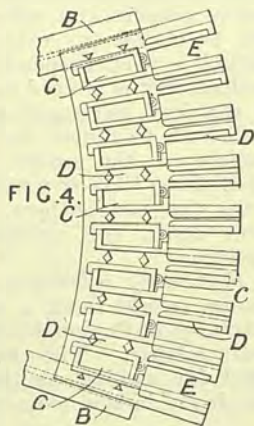
3433. Raine, W., Raine, J., and Raine, B. W. Oct. 2.

Refractory substances.—According to the Provisional Specification, tank waste obtained from soda manufacture is used as a substitute for sand bottoms in mill furnaces.

3467. Caddick, D. R. Oct. 6.

Casting.—In a machine for making bricks, blocks, tiles, and other similar articles from slag or scoria by casting, the moulds C, Fig. 4, are carried upon taper guides D formed in the rim B of a circular rotating table, the bottoms of the

inner ends of the guides forming the mould bottoms. Each mould is made in two parts, which separate when the moulds are drawn radially outwards on the guides, and drop the brick &c. through the opening E upon a carriage. The lug c on each mould is used to facilitate its withdrawal. The moulds are cooled by a jet of water playing beneath the rim B. The wheel is constructed of T-iron, and mounted upon wheels, each mould being successively brought beneath the taphole to receive the slag.



3469. Hosmer, J. R., [*Shepard, W. A.*]. Oct. 6. [*Letters Patent void for want of Final Specification.*]

Fireproof coverings.—A fireproof covering for a casket, wardrobe, safe, closet, rack of pigeon holes, &c. consists of a mixture of powdered asbestos with sodium-silicate solution, plumbago being added to produce colour. Felt or paper treated with alum and sodium silicate, may be covered with the mixture.

3640. Caddick, D. R. Oct. 20. [*Provisional protection only.*]

Casting.—In an apparatus for casting bricks, blocks, tiles, and similar articles of slag or scoria, the moulds are mounted between angle-iron bearings upon a circular table, which is mounted upon wheels and revolved about a vertical axis. The slag is run from the taphole into each mould, and when cool the moulds are turned over, to discharge the brick upon a carriage, by means of a key mounted upon guides and fitting the elongated spindle of the mould.

3712. Hall, J. Oct. 26. [*Provisional protection only.*]

Stone, artificial.—For making artificial hearth-stones, the green sandstone found above the gault clay in Surrey and elsewhere is ground to powder, mixed with Portland cement, and moulded into blocks. The brick-making machine described in Specification No. 3743, A.D. 1874, or any other suitable moulding-machine, may be used. The sandstone and cement in powder may be allowed to fall together into the hopper of the machine, a spray of water being directed upon them; or the materials may be mixed while being ground. Suitable proportions are 7 parts of sandstone to 1 of cement.

3902. Clark, G. Nov. 10. [*Provisional protection only.*]

Asphalts.—Pulverized clay, slate, and stone are used instead of, or in addition to, the chalk and sand or grit in the manufacture of the asphalt mastic described in Specification No. 1230, A.D. 1875. Instead of preparing the mastic at the place where the work is to be executed, three kinds of asphalt mastic, termed respectively "solvent mastic," "complete mastic," and "tempering mastic" are previously prepared, and are melted together for use when required, in proportions depending upon the work to be executed. These mastics consist of pulverized asphalt, pitch, carbonate of lime or clay or slate, and silica, in different proportions; and, in the case of the "solvent mastic," liquid solvent, preferably a mixture of dead or green oil of tar and Stockholm tar. For paving carriage roadways the mastic is composed of asphalt, clay, or slate, and crushed stone, partly pulverized and partly in small angular pieces. The stone is mixed with molten asphalt and pitch, and cast into blocks ready to be placed in the melting pot with solvent and "complete mastic."

3966. Clark, G., and Spiller, A. F. Nov. 15. [*Provisional protection only.*]

Asphalts.—Asphalt mastics suitable for the flooring or paving of skating-rinks consists of mixtures of asphalt, coal or wood pitch, clay, chalk, slate, and stone, all finely-ground and mixed in various proportions depending on the desired qualities of the compound. The clay or the chalk is sometimes omitted. The asphalt used should contain a large proportion of pure mineral bitumen; and slate or blue lias limestone is preferred to chalk. The ground asphalt is mixed with the molten pitch contained in a pot over a fire, and then the chalk is stirred in. The clay or slate is next added, and then the solvent, consisting of dead oil of tar or creosote, mixed or not with Stockholm tar, or petroleum residue may be used, and afterwards the powdered stone is stirred in.

4067. Baggeley, H. Nov. 23. [*Provisional protection only.*]

Stone, artificial and imitation; cements.—A mixture of copper dross, brasses or clinkers, limestone or pearl-ash, ground flint, plaster of Paris, and nitre is melted in a furnace and the molten mass run into moulds to form bricks, tiles, columns, steps, mouldings, &c. for building-purposes, and also blocks, slabs, frames, &c. for paving-purposes. Or the ingredients may be reduced to a powder, and the powder made into a plastic mass with water and applied to walls as a plaster, or moulded to any required form and then allowed to set. The material may be toughened and rendered pliable by the addition of metallic copper before melting. A cement for uniting blocks &c. of the above material and for general purposes consists of a mixture of quicklime, gypsum, plaster of Paris, sand, and broken brick or burnt clay, all finely-ground and treated with water.

4189. Ramsden, J. C. Dec. 3. [*Provisional protection only.*]

Castings.—A fabric, described in Specification No. 3110, A.D. 1875, [*Abridgment Class Fencing &c.*], and composed of alternate right and left handed helically-twisted metal rods interlaced together and held by metal, wood, or other pins, is used as a core or skeleton into or on which concrete, cement, or other composition may be run; or the fabric may be used as an external jacket or covering.

4206. Lake, W. R., [*Tenac, C. L. van.*] Dec. 4.

FIG. 43.
(*Stt. 2.*)

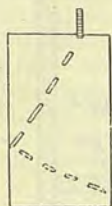


FIG. 34. (*Stt. 2.*)

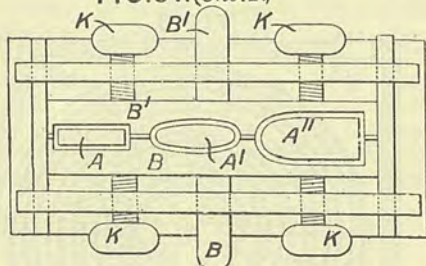


FIG. 42. (*Stt. 2.*)

Casting.—Silver-chloride plates for portable galvanic batteries are cast in special moulds. Fig. 34 shows cores A, A', A'' in moulds B, B' held in place by screws K. When the silver chloride is required in the form of a tube, the core is screw-threaded to facilitate its removal. A silver or platinum wire is embedded in the casting; it is preferably undulated and twisted round in a helix, as shown in Figs. 42 and 43.

4223. Thomlinson, J., and Salkeld, J. Dec. 6. *Drawings to Specification.*

Cements.—Instead of burning gypsum as described in Specification No. 3373, A.D. 1869, it is

calcined out of contact with fuel in a kiln or oven. The roasted lumps of gypsum are brushed to remove dust and then crushed and sifted, and afterwards mixed with potash alum, borax, or tartar, previously powdered and sifted. Borax is used when a slow-setting cement is required. Finely-powdered pigments are mixed with the alum &c., or with the gypsum, when coloured cements are required.

4393. Dresser, F. Dec. 18.

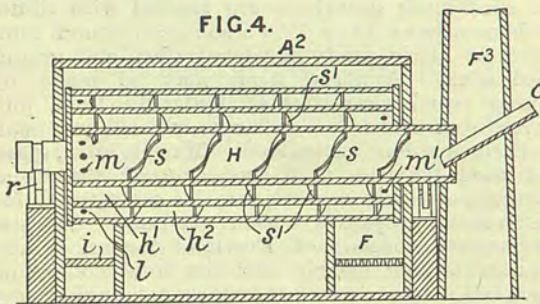
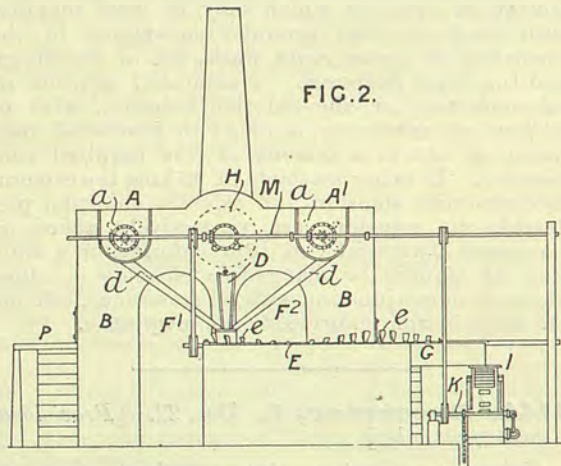
Cements.—Magnesite is employed in the manufacture of cements, which may be used together with sand or other granular substances in the formation of floors, roofs, walls, &c. of buildings, and for other purposes. A saturated solution of sal-ammoniac, or zinc-chloride solution, with or without sal-ammoniac, is added to powdered magnesite to obtain a cement of the required consistency. In other methods of making the cement, sal-ammoniac solution and calcium chloride, preferably in solution, are successively added to powdered magnesite; or iron chloride, or a solution of stannic or manganese chloride is added alone or in conjunction with sal-ammoniac, calcium chloride, or zinc chloride, to the magnesite.

4444. Ducournau, J. Dec. 22. [*Provisional protection only.*]

Cements; concretes; stone, artificial.—Cements &c. containing quicklime are treated with dilute nitric or other acid or with a solid compound composed of nitric, finely powdered silix, and granulated silix. Artificial stone may be made by mixing equal quantities of hydraulic lime, pulverized soft stone, and water to which 5 per cent. of nitric acid has been added. Marble, silix, glass, and sand may be used in place of the stone. Portland or other cement may be substituted for the lime, to prepare a harder product. "Plastic concrete" consists of Portland cement, water, silix or broken marble and the solid compound described above. After the concrete is laid, it may be allowed to harden and then be polished like mosaic.

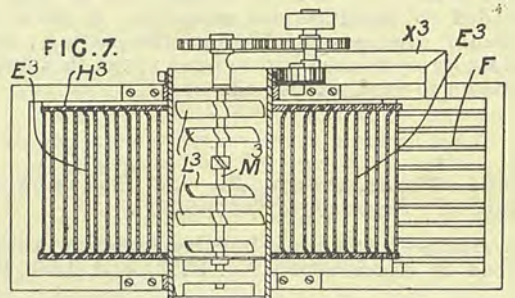
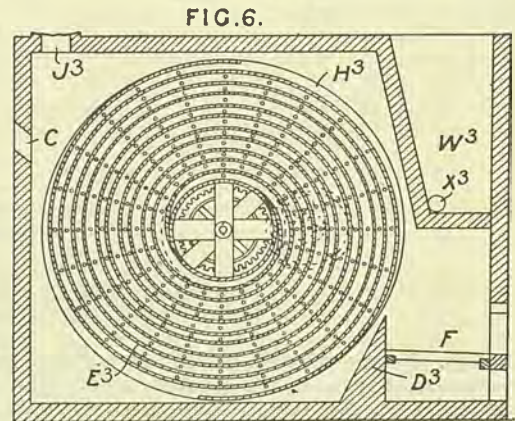
A.D. 1876.

75. Barlow, C., [Cook, T]. Jan. 7.



Asphalts; concretes; stone, artificial.--Relates to machinery for heating, drying, and mixing the asphalt, tar, pulverized stone, sand, and other materials used in the manufacture of concrete, artificial stone, paving-material, &c., which machinery is combined with a press for moulding the concrete &c. into building and paving-blocks. In the rotary heater shown in Fig. 4, the material is fed through the shoot *c* to the central cylinder *H*, along which it is passed by the internal screw threads *s* to the opposite end and through holes *m* to the annular space *h*¹. Screws *s*¹ pass the material back and through holes *m*¹ to the annular space *h*², from which the material passes through holes *l* to the inclined floor *i* and is conveyed to suitable receptacles. Hot air, or the products of combustion from the furnace *F*, pass around the outer cylinder and through the holes *l*, *m*¹, *m*, spaces *h*², *h*¹, and cylinder *H* to the chimney *F*³.

The heater shown in Figs. 6 and 7 consists of a sheet-metal scroll *E*³, open to the central cylinder at one end, and to the heating-chamber at the other end, and held together by perforated heads *H*³. The materials are fed through the shoot *C* to



the heating-chamber, and are picked up by the mouth of the scroll and conveyed, as the scroll rotates, to the central cylinder, in which it may be mixed with asphalt or other substances by means of arms *L*³ on the shaft *M*³, which is rotated in the opposite direction to the scroll by spur-gearing. The asphalt or tar is melted in the chamber *W*³, and conveyed to the central cylinder by the pipe *X*³, the mixture being discharged by the arms *L*³. The materials may be passed from the centre to the outside of the scroll. The bridge *D*³ prevents the ashes of the furnace *F* from mixing with the material to be heated. The products of combustion pass around the scroll and escape through the opening *J*³, or may be drawn through the scroll and escape through the central

cylinder. The heater is mounted, as shown in Fig. 2, in a brick structure B having a furnace at one end, and furnaces F¹, F², for heating the asphalt vessels A¹, A, which are provided with rotary agitators *a*. The material from the heater passes through the pipe D to the mixing-vessel G, and the asphalt from one of the vessels A, A¹, passes through one of the spouts *d*, one vessel heating the charge while the other vessel is supplying the mixer. The shaft E in the vessel G has blades *a* to mix the materials and to convey them to the moulding-press I, from which the blocks are carried off automatically by a conveyer. The mixing-vessel may be heated by a separate furnace, or by a flue from one of the other furnaces, or by steam or hot-water pipes. A single furnace may be used for the whole apparatus, the heat being conveyed to the different parts by flues, or pipes for hot air, water, or steam. The agitator shafts may be hollow and heated by superheated steam. A platform P is provided for the workmen. The feeding-shoot of the heater H may be provided with a conveyer. The heater H and agitators *a*, *e* are driven by bevel and belt gearing from the shaft M, which, together with the press I and the conveyer for carrying off the blocks, is driven from the shaft K.

229. Collins, J. Jan. 20. *Drawings to Specification.*

Refractory substances.—The bottoms of Bessemer converters are moulded under great pressure from powdered gannister containing 92 per cent. of silica. From 3 to 12 per cent. of fireclay is preferably added.

357. Clark, A. M., [Folacci, P.]. Jan. 28. *Drawings to Specification.*

Fireproof compositions.—A composition, for use in fireproofing and waterproofing wood for telegraph posts and other purposes, consists of zinc sulphate, American potash, ammonia alum, manganese oxide, sulphuric acid, lime, common salt, and river water. The wood is boiled in the composition.

405. Baggeley, H. Feb. 1.

Refractory substances.—Acidproof and heat-resisting crucibles, retorts, vats, pans, &c. are made of a compound containing fireclay, and Cornwall or china stone or other similar stone, including killas or clay slate, with or without calx or the calcined residue of zaffre or other similar substance, calcined bone dust, and burnt fireclay dust. A little asbestos and aluminium silicate are sometimes added.

612. Haggett, W. Feb. 15. *Drawings to Specification.*

Cements.—Relates to the manufacture of special fuel blocks, which may contain chalk, gypsum, lime, marl, and clay. These blocks when burnt leave the materials named in a state for use in general building operations, after, or without, grinding or crushing.

732. Stewart, R. Feb. 22. *Drawings to Specification.* [Provisional protection only.]

Fireproof coverings.—Relates to methods of utilizing silicate cotton for lagging or covering fireproof rooms, safes, &c., and arresting the spread of fire. The silicate cotton is filled into a long bag made of canvas, sail-cloth, linen, or similar material, or wire gauze, and the bag is stitched, forming "mattresses," which are sewed together and placed over the surface to be covered. They are secured by strips of galvanized wire fencing or netting, and by iron hoops, and the whole is coated with tar. Strips of wood may be placed over the covering. The netting may be replaced by perforated sheets of galvanized iron secured by iron bands.

763. Castelberg, J. A. B. von, [Petit-pierre, F.]. Feb. 23.

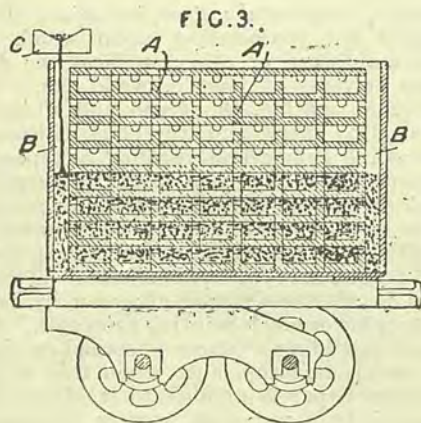
Stonework, ornamental; stone, imitation.—Relates to methods for reproducing upon wood, stone, metal, ceramic ware, or other surfaces the decorative grain or veins of marble, wood, &c. To reproduce green marble, the green and white veins are removed by nitric acid, the black silicious surface remaining intact and forming a typographic printing-surface. A copy in black lithographic or other ink or paint is printed on transfer paper and dried, or the impressions may be printed lithographically by transferring to a stone an impression obtained from the typographic surface. The veins are filled in with two shades of green by hand or by typographic or block-printing processes. A coat of varnish or gilding-mixture is spread on the surface to be ornamented, and, when this is sticky, the transfer paper is applied to it, damped, and rolled, and is then removed, leaving the marbling on the surface. The ground on which the transfer is applied gives a third green. Other colours and other marbles may be used. To reproduce the grain of oak and other woods, the plank is heated to form veins on it, and is coated with transfer ink. The superfluous ink is scraped off, leaving only the ink in the veins. An impression is taken on a sheet of China paper, and is transferred to a stone, from which a reproduction is printed on transfer paper. The transfer is then effected as in treating marble, and the ornamented surface is dried and varnished.

776. Newton, H. E., [Macbay, A. J.]. Feb. 24.

Stone, artificial and imitation.—Hard substances, resembling or serving as substitutes for wood,

stone, clayware, &c., are made from jute, flax, tow, hemp, sunn, rhea, cotton, coir, aloë, palm, plantain, and coco-nut fibres, grasses, leaves, straw, bark, pine needles, woody matter, bran, husks, wool, silk, hair, rags and waste pieces of woven, netted, or felted fibres, and other animal and vegetable fibrous materials, in the raw or finely-divided state, or reduced to pulp, or after being scutched, heckled, carded, spun, woven, or otherwise prepared. The materials may be compressed in moulds or otherwise, with or without the addition of resins, pitch, tar, gums, size, glue, shellac, rubber, gutta-percha, turpentine, petroleum, or other hydrocarbon oils, paraffin, wax, tallow, farina, starch, gluten, glutinous matter of seeds, grain, pulse and tubers, lime, chalk, sand, clays, earths, plaster of Paris and other cements, &c., according to the product required. To produce a circular article, such as the centre of a railway wheel, the fibres, in the raw state or made into yarn, thread, twine, cord, or rope, or woven into cloth, canvas, or tape, are wound on a spindle or drum between guides, or upon the boss of the wheel &c. and then compressed in moulds, &c.; or, to produce a slab, canvas, cloth, or felt may be pressed, sheet upon sheet, to the required thickness.

795. Wood, C. Feb. 25.



Casting.—Blast-furnace slag is cast into bricks, paving-blocks, and ornamental goods in sand moulds A arranged in tiers upon the removable flat top of a truck, or in a well built up of bricks or sand moulds near the furnace. The moulds have three sides and are made separately or in pairs, and are provided with gits. The space B acts as the main runner and receives the slag from the spout C. The bricks are self-annealed while cooling.

946. Laroque, E. de. March 4.

Stone, artificial.—Artificial marbles, granites, &c. in the form of panels, mouldings, columns, statues, &c. are built up with cement on a polished table or in a mould. The cement consists of gypsum

and alum mixed with pure water or plaster mixed with gum water, portions of it being tinted with suitable colouring-matters. The veins in the marble are first traced on the table or mould by means of silk threads dipped in colour or coloured cement. Coloured cements are then poured into the moulds or placed by hand on the veins. The coating is then smoothed with a trowel and the silk threads are withdrawn. The material is again smoothed and stirred to get rid of air bubbles. Excess of water is next removed by the application of dry cement or plaster, which is removed as soon as the moisture is absorbed. Canvas or the like is then applied to the material and fixed with liquid cement. A final coating of stiffer cement is afterwards applied by means of a trowel. When the slab or article has hardened, the veins are filled up and the surface is polished. In making large articles, the parts of the mould are all laid out together on the operating table, and the parts are prepared and then joined together by means of canvas and plaster. Details are given as to the shades of materials required and the operations to be employed in the production of certain specified marbles. Spotted parts are formed by dropping tinted material through a sieve, the material falling with sufficient force to penetrate the background. In some cases a net of silk fibres is used in preparing the veins. When there are "notches" on the veins, they are formed by hand or with a spoon or by means of a silk thread having bundles of fibres in places. In some cases, notched veins are prepared separately on a sheet of glass, and parts are removed, by slipping a knife under them, and are placed on the operating surface. Large slabs are preferably prepared on a table balanced on an axle so that it can be turned to a vertical position when a slab is to be removed.

1029. Booth, F. W., and Holcroft, G. March 9.

Refractory substances.—A composition containing the silicates of alumina, potash, lime, and other suitable silicates, natural compounds of silica, and the protoxides of iron and manganese, is used for constructing or lining furnaces, cupolas, bakers' ovens, ships' ovens, and for making retorts, crucibles, bricks, &c. When employed in furnaces, the proportions of the silicates are varied according to the metal under operation.

1049. Barnett, J. March 10.

Concretes; cements; mortars; refractory substances.—Clay or other similar substance is boiled in a solution of salt, and, when the material is sufficiently impregnated with salt, it is used as a "concrete," the material being allowed to set in casings shaped like the structure required. Earthy matter saturated with a saturated solution of salt is used as a cement or mortar in the construction of the firebrick portions of furnaces, and for filling the space between the thicknesses of brickwork or

for coating the outside of the brickwork to prevent the conduction of heat. The material is also used for filling the interstices of the brickwork of locomotive fireboxes, and for coating the upper side of the bricks. An iron arch coated with the material may be substituted for the brickwork.

1186. Morgan-Brown, W., [Sainsbury, H.]
March 20. [*Provisional protection only.*]

Fireproof compositions.—A preserving, hardening, and fireproofing liquid, for use in saturating wood or timber, consists of a solution of alum, copper sulphate, sodium bromide, and sodium iodide.

1242. Nevill, W. H. March 23. [*Letters Patent void for want of Final Specification.*]

Slags, treatment of.—The slag or cinder obtained from puddling, heating, and other furnaces used in the manufacture of iron is treated, while in a molten state in a reverberatory or other furnace or receptacle into which it is tapped, with a current or currents of air or steam, or both, or other gaseous substances. The mass is then broken up and preferably burnt before being utilized for repairing puddling-furnaces or reduced in the blast furnace. A similar result may be obtained by the mechanical agitation of the slag or cinder and subsequent treatment as above described.

1398. Clark, A. M., [Audouin, M. E. P.].
March 31.

Refractory substances; stone, artificial and imitation.—Chromium oxide, either pure or allied with iron oxide as in chrome iron ore, is employed either alone or combined with agglomerating-substances, such as aluminous or other earths, for the linings, hearths, and other parts of puddling, glass, and other furnaces, also for making crucibles, muffles, gas retorts, tuyères, potteryware, and all kinds of bearings and taps, sharpening and other stones, and moulds used for casting metals. The material may be pulverized, compressed, burnt if necessary, and made into blocks and tiles for paving and other purposes.

1428. Dowding, J. April 3. [*Provisional protection only.*]

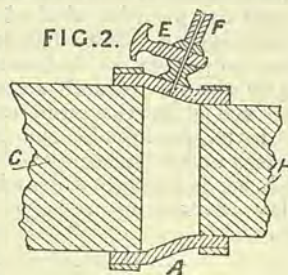
Concretes.—The concrete used in laying the foundation for the wood-blocks in paving streets &c. consists of Thames ballast and hydraulic lime or cement in the proportions of five parts of ballast to one of the lime &c.

1554. Smale, W., Crickmay, E., and Farthing, W. T. April 12. [*Letters Patent void for want of Final Specification.*]

Cements.—Clinkers, slags, cinders, culm, or coke, or mixtures of these are ground and mixed with Portland or other cement or blue lias lime. The material may be moulded to any required form. When it is used for paving, sand may be added. In the construction of a skating-rink floor, pulverized coke alone is mixed with the cement.

1560. Lake, W. R., [Thilmany, W.].
April 12.

Fireproof compositions.—Vegetable and animal fibre, such as cotton, wool, hair, silk, flax, wood, &c., and ships' sails, cordage, textile hose pipes, canvas, awnings, and timber piles, logs, masts, &c., are preserved and rendered to some extent fireproof by impregnating with a hot or cold solution of copper sulphate under pressure or otherwise, running between pressure rollers to squeeze out excess, impregnating with a solution of barium chloride under pressure or otherwise, and again passing between pressure rollers. Barium sulphate and copper chloride are thus formed in, and unite with, the material treated, which may be in the raw or manufactured state. Damp and unseasoned timber or woody fibre is subjected to steam in a closed chamber to remove the moisture and render the sap non-decomposable, the steam being exhausted from the chamber before the treatment with copper sulphate &c. The apparatus used in the impregnation of timber consists of an india-rubber ring A which is drawn over, and clamped to the ends of two pieces G, H of the timber. A hose F passes from a receptacle containing the impregnating-solutions to a stop cock E secured to the ring A, and the solutions are admitted separately, and under pressure if required, into the space between the timbers.



1790. Legge, J. April 28. [*Provisional protection only.*]

Refractory substances.—Fettling for furnaces is formed by treating the slag or cinder produced in puddling and other like furnaces. The cinder, while still very hot, is subjected to a blast of air; and then "chloride of ammonia, oxide of iron, "antimony, lime, or other such like chemicals" are added to remove phosphorus, sulphur, &c. and to reduce the silica. The mass, after cooling, is broken in pieces, or ground to powder, for making and mending the bottoms and other parts of the furnaces.

1869. Hoyle, J., Richards, J., and Heyes, W. May 4. [*Provisional protection only.*]

Plasters; fireproof compositions.—Commercial alum, sulphate of alumina, or hyposulphite of soda is added to plaster employed for ceilings and lath partition walls in order to increase its fire-resisting properties.

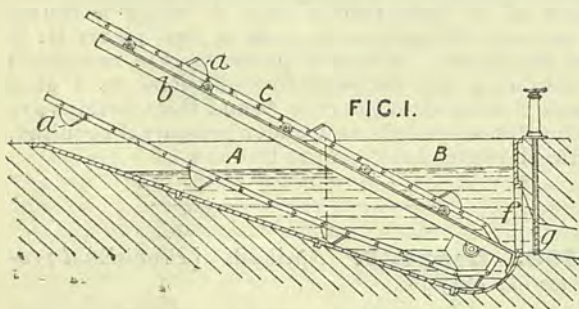
1878. Wallace, R. W. May 4.

Refractory substances.—A fire-resisting compound for making firebricks, gas retorts, crucibles, glass pots, and other articles consists essentially of fire-clay and the peculiar kind of sand found at Mow and Hanley in Staffordshire, or sand possessing similar properties. "Infusorial silicate" or horse dung or similar animal excrement, and bone dust are mixed with the sand and fireclay, and, for a very infusible article, the proportion of sand is increased and a little milk of lime added. A very hard brick is made of Cornish silicious shales, and fireclay containing a large proportion of iron oxide.

1938. Lascelles, W. H. May 11. [*Provisional protection only.*]

Concretes.—Sleepers for railways and tramways are constructed of concrete composed of ground coal ashes or coke and Portland cement, or of sand or burnt clay, with the addition of lime or "Scott's selenitic cement," or other suitable cementitious substance. Coarse gravel or broken stone may be used in such parts of the sleepers as will not be required to receive nails, spikes, or screws.

2039. Williamson, W. S. May 15.



Slags, treatment of; concretes; mortars.—Molten slag from blast furnaces and puddling-furnaces is granulated by running it into cold water, and is then used in the manufacture of mortar, concrete, and béton. It may also be used instead of gravel or cinders for making roads or footpaths, and as ballast for making railroads. The molten slag is run into a tank A B having a sloping bottom and through which cold water circulates, the flow of water being regulated by a sluice valve *g* fitted

outside a grating *f* at the deep end of the tank. The granulated slag is removed from the tank by an elevator C consisting of perforated metal buckets *a* connected together by metal chains or links, which are supported upon wheels carried by beams *b*. Instead of an elevator, the water may be run out of the tank, and the granulated slag afterwards removed by shovels. Two or more tanks may be employed, the slag being run into one while the other is emptied.

2070. Johnson, J. H., [Smith, W. H.]. May 16. *Drawings to Specification.*

Stone, artificial.—Pulverized stone, sand, slag, or the like is mixed with powdered lime or cement. The mixture is damped and placed in a mould and then compressed by blows from a steam hammer. After removal from the mould, the blocks formed are exposed to the air and are moistened from time to time with water.

2078. Hague, E., Wright, J., and Wray, T. May 17. [*Provisional protection only.*]

Concretes.—Concrete for fireproof floors, ceilings, and columns is composed of gypsum and Portland cements, broken bricks, calcined cinders and coke, and other porous materials.

2154. Wallace, R. W. May 20.

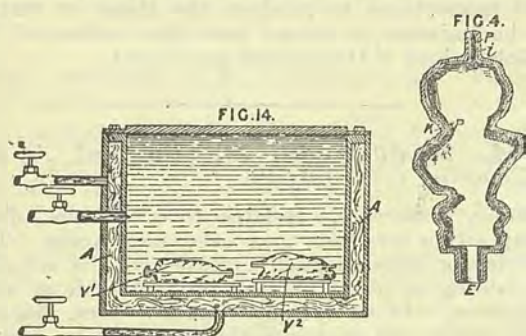
Refractory substances.—Vessels &c. for resisting the action of acids and other chemicals at a high temperature are made from a composition formed by adding ground plumbago to a solution of borax or other flux to form a "slip," and then adding ground felspar, ground Cornwall or china stone or other similar fusible mineral, and also German, Stourbridge, or other fireclay. Borax may be omitted if the vessels are baked in muffles, kilns, or saggars. Sodium sulphate may be added if it is desired to bake the articles at a low temperature as in the case of retorts. In making crucibles for melting metals, silver sand or pure ground silica is substituted for the felspar or china stone. The same composition may be used for bricks, ground coke being substituted for plumbago if a cheap brick is required.

2450. Gerhard, F. W. June 14.

Refractory substances.—Basalts, diorite, and other suitable igneous rocks are used with or without the addition of aluminium silicate and lime for lining the bottoms and sides of puddling, re-heating, or other furnaces used in the manufacture of iron.

2496. Zoller, J. G., and Scott, D.
June 16.

Casting; asphalts.—Slabs, tables, mantelpieces, baths, cisterns, vessels, and ridges or cresting are made of a mixture of asphalt with a small percentage of bitumen. The articles are cast in wood or other moulds, the internal surfaces of which are coated or treated with tallow, soap, milk of lime, founders' blackening or plumbago &c.

2500. Lake, W. R., [Grasser, C.]. June 16.

Casting.—Relates to the use of flexible patterns made of india-rubber, glue, gelatine, or printers' roll composition, for producing moulds in wax, plaster of Paris, and other inelastic materials, in which statuettes and other works of art are cast. In order to produce the flexible pattern, a mould in wax faced with copper is first made by the electrotype process from a wooden or soft-metal model of the statuette &c. This mould is formed in halves separated by flanges; it is subsequently plated with brass, and finally with tin by the electrotype process to protect the copper from the action of the sulphur in the rubber. A coating of soapy water or collodion is applied to the mould to prevent adhesion of the rubber after curing, and, when dry, a coating of a solution of rubber in benzene is applied to produce a sticky surface. The rubber is now introduced in layers, small pieces being first pressed into the cavities. The two parts of the mould are then pressed together to squeeze some of the rubber P, Fig. 4, between the flange *i*, and are secured by screws through the flanges. Water is introduced to the rubber through a hole E¹, and the mould is surrounded with a layer K of rubber, and is subjected to hydraulic pressure in a vulcanizing-vessel, Fig. 14. The pressure water enters the mould through the opening E¹ and forces the rubber into the cavities, and the rubber is cured by admitting steam to a space A surrounding the pressure vessel. After cooling, the pressure is removed, and the pattern withdrawn by cutting the layer K from the flanges *i* and the end of the hole E¹, and parting the mould. To prevent distortion of the pattern when making moulds from it, it is supported by embedding one half of it in moist moulding-sand contained in a flask, the flange of the pattern resting on the margin of the flask. On the upper and exposed half of the pattern is placed another flask to form one half of the final

mould. Plaster of Paris is then applied by a brush into the cavities in the upper part of the pattern, and the upper flask is filled up with the plaster. After the plaster has hardened, the whole is turned over, and a plaster-of-Paris mould is made from the other half of the pattern. When the plaster has set the mould is parted and the pattern removed. Other moulds are made from the pattern as it rests first in one half and then in the other of this mould. The pattern is coated with soapy water before the plaster is applied to it. In producing a mould in wax, or in a mixture of wax and paraffin, the pattern is first coated with a solution of ammonium chloride and glycerine to prevent it from adhering to the wax &c. and the mould is produced by pouring the melted wax or mixture into a flask in which one side of the pattern is placed. A mould of the other side of the pattern is obtained in a similar manner. Figures, pots, vases, &c. in plaster are made in one piece by bringing the flasks containing the moulds together and holding in position by steady pins while the plaster is run in. Plaster-of-Paris moulds may be made from flexible models made of gelatine, glue, or printers' roll composition if the model is coated with a solution of caoutchouc in chloroform, or if a strong solution of alum is mixed with the plaster.

2651. Hughes, E. T., [Blythe, J. B.].
June 27. *Drawings to Specification.*

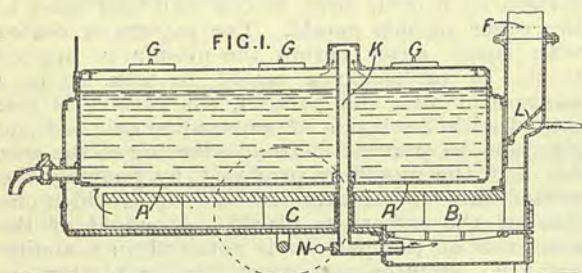
Fireproof compositions.—Vegetable fibres, cordage, sailcloth, and wood, are treated in ovens to preserve them from decay by subjecting them to a mixture of high-pressure steam and the vapour of carbolic acid, coal or wood tar, and heavy hydrocarbon oil. These materials are rendered incombustible by saturating them with the condensed residue from the ovens. This residue is condensed, the lighter parts are run off, and more oily or tarry matter is added to the remainder, which is then forced into the ovens under pressure, to saturate the fibres. Specification No. 3437, A.D. 1873, [Abridgment Class Wood &c.], is referred to.

2701. Hyatt, T. June 30. *Drawings to Specification.*

Cements; concretes.—According to the Provisional Specification, hair for use in mortar and plaster is cleansed, dried, beaten, and made up into small packages or layers which are then packed together into bales. Animal hair or wool is mixed with vegetable fibre, preferably manila grass or the like cut into suitable lengths, by spreading successive layers of hair or wool and vegetable fibre on a floor and mixing the whole as in haymaking. The mixture may be made up into packages or bales. Asbestos or wire may also be used. The fibre may be cut into short lengths to form a "flock" for use in mortar, cement, and concrete. Metal filaments or threads, cut from sheet iron by means of a cutter

resembling a lawn-mower, may be mixed with concrete for slabs or blocks. Metal wool for the same purpose may be blown from molten lead by means of an air or steam blast.

2733. Healey, B. D. July 3.



Asphalts.—Relates to cauldrons for boiling tar, creosote, pitch, &c. The gases are drawn off from the pan A and conveyed to the grate A by a tube K. The top of the pan is preferably flat, and is provided with charging-holes G having suitable covers, and a small stirring-hole in each cover is covered by a slide. The gases from the grate pass through a central flue C, and then, by side flues, to the hinged chimney F, provided with a damper L. The central flue is formed of curved fireclay blocks, and the side flues are lined with firebricks. The valve N in the pipe K is kept closed until the tar &c. begins to vaporize. The cauldron is carried on wheels, and movable shafts, fitting in sockets at the front of the cauldron, are provided. In the case of existing boilers, the gases are burnt, by means of a special fire, at the open end of a tube fixed to the top of the pan. According to the Provisional Specification, the gases from the pan may be conveyed to the chimney.

2807. Woodhouse, J. July 10. *Drawings to Specification.*

Concretes.—A concrete for making building-blocks is composed of pounded shingle, burnt clay, crushed scoria-clinkers, cement, and other materials.

2866. Deiss, A., and Scaife, R. July 13.

Asphalts.—In a process for purifying india-rubber and gutta-percha, also applicable to bitumen and asphalt, the material is treated with a suitable solvent in a steam-jacketed vessel provided with a stirring-apparatus. The solution obtained is run out through a pipe near the bottom of the vessel into a filtering-apparatus consisting of a closed vessel provided with a perforated bottom containing the filtering-media, such as sawdust, charcoal, bran, moss, &c. The filtered solution is received in an evaporating-pan, where the solvent is separated and condensed for re-use. When the material is to be used as a solution, the

evaporating process is dispensed with. Solutions of different gums or bitumen are mixed and employed as electric insulating-compositions.

2922. Brock, C. July 17.

Stone, imitation.—Relates to a method of producing imitations of malachite, lapis lazuli, and other stones, in pottery, also applicable to architectural columns, bosses, panels, inlays for furniture, columns for busts, vases, &c. A mixture of various earths and oxides, of the proper colours and proportions to produce the stone or marble to be imitated, is spread over the surface of the article, which is then glazed and burnt.

2964. Haddan, H. J., [Du Bled, A., and Dujardin, C.]. July 21.

Stone, preserving.—Relates to a waterproofing-composition for stone and other substances. The articles or substances are treated with a solution containing sulphate of zinc, protochloride of zinc, magnesia, "fucus crispus" mallow root, linseed, gum arabic, and stearin; the composition is used with a mordant consisting of a solution of acetate of soda; the mordant may, however, be omitted.

3125. Fryer, A. Aug. 5. *Drawings to Specification.*

Mortars.—The mixture of cinders, ashes, solid excreta, liquid, &c. collected in ashpits is treated in a centrifugal draining-machine, and the solid portion of the mixture is burnt in a furnace, the slag or ash remaining being ground up with lime in order to make mortar.

3194. Clark, A. M., [Stierlin, C.]. Aug. 12. *Drawings to Specification.* [Provisional protection only.]

Cements.—Cement, mixed with a small percentage of iron oxide, is used for the manufacture of blocks carrying longitudinal sleepers on a railway.

3277. Bolton, F. J., Beaumont, F. E. B., and Ashwell, W. H. Aug. 21. *Drawings to Specification.*

Casting.—According to the Provisional Specification, building and paving blocks are cast from slag in moulds, which are heated by suspending them in a pit into which molten slag is poured. Or the moulds may be lowered gradually into a pit containing molten slag which enters the mould when the mouth becomes submerged. The pit may be also heated by a furnace, and the moulds may be heated by an air blast.

3379. Weldon, W. Aug. 28.

Refractory substances.—Blocks or bricks of consolidated magnesia are used for lining furnaces, crucibles, retorts, and other apparatus employed in the manufacture of potassium and sodium sulphides. A mixture of finely-powdered magnesia and a small quantity of gas tar is moulded under pressure, and the blocks obtained are heated in a muffle furnace. Starch, flour paste, or any other agglutinating-body, which leaves a residue of carbon on being subjected to destructive distillation, may be used instead of tar.

3450. Péaud, L. L., [*Rocheman, E.*]. Sept. 1.
[*Provisional protection only.*]

Asphalts.—Fossil clay of Egypt, or other similar clay is powdered, and, after drying, if necessary, is melted with pitch. A charge of pitch is first melted in the boiler, and then the clay and pitch are added alternately. The molten mass is run into moulds to form cakes or blocks. When applying the asphalt, sand or gravel is stirred into the molten mass before running it on to the ground or surface to which it is to be applied. Old bricks, pottery, crockery, and porcelain, after being broken and pulverized, may be used instead of clay.

3579. Hyatt, T. Sept. 12. *Drawings to Specification.*

Concretes; cements.—In order to lessen the weight of concrete used for making floors, ceilings, roofs, &c., sawdust or other light granular material is used for the part which forms the ceiling; or silicated cotton, coco-nut fibre or other fibre may be used. Fireproof "aggregates" for concrete are formed of clay prepared in sheets which are then burnt and broken into small pieces. The pieces are assorted and kept together in bags. Part of the invention consists in the use of "white clay of Hanover" or equivalent infusorial silicious materials combined with Portland or equivalent binding-cement, as a concrete having fire-resisting properties.

3671. Wallis, C. W., [*Finco, E.*]. Sept. 19.
[*Provisional protection only.*]

Cements; concretes.—Hydraulic cement and powdered lime are mixed with blood, oil, and lime water to form a cement, or when further mixed with granite chippings, or with gravel, pebbles, sand, &c., to form a concrete. The composition may be used for paving terraces, roads, paths, skating rinks, and the like, or for walls, pillars, steps, mantelpieces, mosaic work, reservoirs, and hydraulic work generally.

3673. Greenwood, A., Davis, G. E.,
and **Speakman, J. J.** Sept. 19. [*Provisional protection only.*]

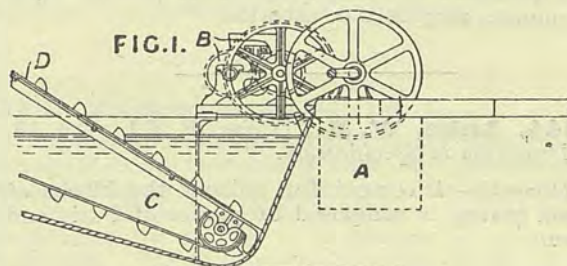
Cements.—The fine ash and clinkers and a portion of the cinders of house or other refuse is mixed with lime or calcium carbonate, and calcined to obtain cement.

3686. Brode, L. A. Sept. 20.

Stone, artificial.—Artificial marble or stone consisting principally of Keene's cement is made by mixing together Keene's cement, finely-ground glass, and salt or alum, preferably with the addition of hot water. Pulverulent or liquid colouring-matter is also added.

3803. Barbier, J. P. Sept. 30. *Drawings to Specification.*

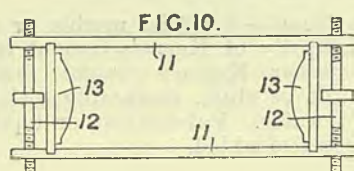
Stone, artificial.—Building-blocks of all forms and sizes are made from artificial stone, composed of Portland cement, local cement, hydraulic lime, quicklime, river sand, and stones, such as quarry refuse. The cement, lime, and sand are mixed in an ordinary mill, and the mould is filled with the mixture to a depth of about one-third. Stones are then placed in the mould to a similar depth, and rammed down, after which the mould is filled up with the mixture, and the block is allowed to dry in air. The moulds may be made of wood, metal, or other materials, and are treated with a solution of soft soap before and after filling. The moulds may be filled by hand, or machinery. Ornamental and other blocks for doorways, windows, arches, mouldings, walls, cornices, entablatures, pilasters, columns, flutings, &c., may be made in this manner.

3816. Williamson, W. S. Oct. 2.

Slags, treatment of; concretes.—In Specification No. 2039, A.D. 1876, a method of treating slag is described. According to the present invention, cinders and other refuse from iron furnaces are treated, as well as slag. The cinders &c. are

thrown into the cistern A, and are taken out and crushed between rollers B. The crushed cinders fall into the tank C, into which the slag is run. The crushed cinders and disintegrated slag are together removed from the tank by the elevator D. They are used in place of gravel for roads, as ballast for railways, or for making concrete.

3824. Sellars, J. C. Oct. 3.



Casting.—In making concrete blocks having the faces of concrete or cement slabs while the interior is filled with coarse concrete, the moulds employed have expansible sides to form blocks of various lengths or widths. Fig. 10 shows such a mould in which the sides 11 are secured by bolts 12 having right and left handed threads. By introducing different distance-pieces 13, the thickness of the block can be varied. In order to form keying-recesses in the blocks, plugs are passed in through the sides of the mould, and to facilitate the setting, hardening, and weathering of the blocks, the bottom of the moulds are perforated and the moulds so supported that air or fluid can circulate underneath. In making hollow blocks, cores in three parts are used, a central wedge piece being driven between two side pieces.

3923. Grünbaum, H. A. O. E. Oct. 11.
Drawings to Specification. [Provisional protection only.]

Fireproof compositions.—Magazines for gun-powder and other explosives consist of one or more cases surrounded by a fireproof composition, such as waterglass and calcined magnesia, pumice and quicklime or cement, or a loose powder, such as pumice, magnesia, or asbestos.

4044. Lake, W. R., [Crim, W. T]. Oct. 19.
Drawings to Specification.

Cements.—A cement for uniting the blocks of wood paving is composed of plaster of Paris and glue.

4137. Greatorox, J. E., and Hall, T. P. Oct. 25.

Stone, artificial.—Slabs, paving-quarries or tiles, landings, steps, sills, arch stones, coping-caps,

sewer blocks, kerbing, channelling, and other articles are made from a mixture of Portland or hydraulic cement or lime and sand, clinkers, flints, shingle, gravel, furnace slag, or other hard materials. To the mixture is added as an outer coating, or with it is incorporated, a preparation of cement or lime and disintegrated iron or steel turnings, borings, or filings, or iron oxide. The mixture is wetted and placed in a mould, where it is subjected to pressure by hydraulic or other means to consolidate it. The materials may be mixed with iron sulphate before being placed in the mould. The material is then exposed to the air and immersed in dilute sulphuric acid, which dissolves part of the iron and impregnates the mass with the sulphate. Blocks made in this way may be used for sea walls, docks, barn and other floors, platforms, piers, wharfs, or other walls or pavements.

4273. Galloway, G. B. E. Nov. 4.

Asphalts.—Old asphalt from roads is mixed with oakum, bark, esparto grass, or peat, and relaid.

4343. White, R. O., and White, J. B. Nov. 9.

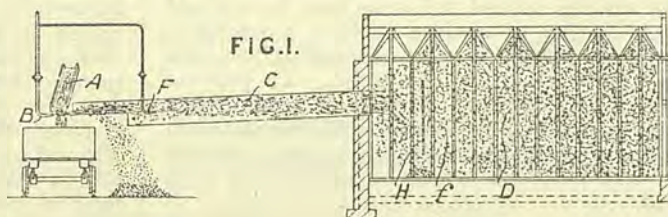
Cements.—In the manufacture of Portland cement, chalk and clay without the admixture of water are passed between fluted crushing-rollers and thence between pairs of plain rollers. The materials are afterwards formed into bricks, preferably in that class of machine in which the moulds formed in a revolving table are filled as they pass under a box into which the materials are fed by rollers, the moulds being emptied after passing beyond the box. The bricks are burnt in a Hoffman's or similar kiln without being mixed with the fuel, and with or without preliminary air-drying.

4363. Alexander, E. P., [Du Mont, H. D.]. Nov. 11.

Fireproof compositions.—Wood blocks for floors and paving are rendered non-inflammable and waterproof by impregnating them with a composition containing lead sulphate, ammonium phosphate, calcium chloride, hydrochloric acid, and carbonate of soda. The ingredients are heated in a water-jacketed boiler until they are dissolved, when the blocks are immersed in the solution and dried in the open air. They are then coated with a composition made by mixing together, in a water-jacketed boiler, hydrocarburet of resin and colophany, the mass being afterwards mixed with litharge, silicate of iron, and superphosphate of lime in a finely-divided state. The blocks, as soon as they are coated, are enveloped in sand.

4372. Wood, G. Nov. 11.*Slagwool, preparation of.*

Two air or steam jets are employed, one to make the slag-wool, and the other to draw it through a tube into a chamber or cage. An air or steam jet B is placed on one side and underneath the slag runner A, while a large tube C leading to a chamber D is placed on the other side of the runner. The end of the tube C near the runner A is cut away at the lower part, so that the "shot" present in the wool may fall into any suitable receptacle. The wool is drawn through the tube C by an air or steam jet F. The chamber D is constructed with a series of frames *f* made of wire netting, so as to catch the wool, and to allow the air or steam to escape. The wire netting is arranged in a V-shaped, corrugated, or other form so as to form a



series of bags, and boards, plates, or other deflecting-appliances are fixed to the ends of the V's or bags, so as to check the current of air or steam, and to allow the fine wool to settle behind them in the angles formed by the V-shaped netting. A board or plate H is placed opposite the end of the tube C to stop any "shot" present in the wool. The chamber may be provided with a wire-netting or other roof.

4480. Gibbons, R. A. Nov. 20. [Provisional protection only.]

Cements.—In a process for the manufacture of Portland cement, the chalk and clay, instead of being washed in wash mills, or treated as described in Specification No. 1963, A.D. 1870, is passed through a series of incorporating-rollers and without the addition of water. The stiff paste or pug obtained is taken direct to the drying-floors, and afterwards burnt in kilns; or the paste or pug may be moulded into bricks or other required shapes before drying.

4514. Wirth, F., [Matern, J., and Matern, J.]. Nov. 21. [Provisional protection only.]

Cements.—In drying cements, lime, &c., the materials are loaded into trucks, and run through a long channel or chamber which is heated by steam pipes. The chamber is inclined, and is provided with doors at its upper end, but is open at its lower end. At the upper end of the chamber there is a chimney, which acts as a ventilator and carries off the moist air. The channel or drying-chamber may be in duplicate, built with two rows of piles with a centre row acting as bearers. The rows of piles are double-planked, and the spaces formed are filled with sawdust or other non-conducting material. The top of the chamber is closed in with beams and planking and covered with some light non-conducting material. The bottom of the chamber is provided with steam piping, which commences at the upper end, and runs nearly the whole length of the chamber. The piping is provided with safety-valves and pipes for carrying off waste steam and condensation water. The trucks occupy the entire cross-section of the chamber, and have shelves for the material to be dried. The steam pipes heat the air, and cause an upward circulation through the chamber.

4614. Ferguson, H. Nov. 29.

Cements.—Portland or Roman cement for protecting the interior surfaces of high-pressure boilers and other surfaces liable to expansion and contraction is mixed with coal tar, pitch, asphalt, or other viscid material and bran, ground chaff, or other pulverulent absorbent material, forming a hard elastic mass which flows into crannies, leaks, &c. in the boiler shell or other plate and sticks to the surface and prevents access of water. For use in marine boilers, cast-iron borings are added to the cement.

4621. Warren, F. P. Nov. 29.

Cements.—A cement for building operations is composed of Stockholm or Archangel tar, gas tar, and pulverized lime. Naphtha, benzoline, or paraffin is used instead of Stockholm or Archangel tar, when a quick-drying cement is required. For some purposes the mineral tar is dispensed with, and a mixture of Stockholm or Archangel tar, or both, and lime is employed. The vegetable tar is not allowed to boil when mixing it with the other ingredients. The proportion of lime present in the cement is increased when the cement is required to withstand a high temperature.

4768. McKenzie, G. R. Dec. 9.

Fireproof coverings and compositions.—Relates to compositions for fireproofing wood and preventing the spreading of fires in buildings. Wood, preferably in the form of boards or joists, is treated for fireproofing by boiling in a solution of sodium carbonate. The boards &c. are piled in the tank with distance-pieces or pins between them, and held down by clamps, screws, chains, weights, or other convenient means. The process is conducted in two operations, after which the boards are taken out and dried in piles by forced or natural currents of cool air. The solution is made stronger or

weaker for different kinds of wood, and the process may be conducted under pressure. In some cases, the wood is soaked for some time in the cold liquid. A coating of sodium carbonate combined with glue and oxide of iron or other metallic oxide may also be applied to the wood. To prevent spreading of fires, ground crystals of sodium carbonate are mixed with sawdust and filled in between the ceilings and floors, and also in the internal spaces of wall partitions lined on either side with thin wood.

Sound-deadening compositions.—The mixture of sodium carbonate and sawdust applied in the manner described above is also applicable for deadening sound.

4792. Mills, B. J. B., [*Haws, A. J.*].
Dec. 11. *Drawings to Specification.*

Refractory substances.—Perforated blocks to act as tuyères for blast furnaces and Bessemer-steel converters are made of fireclay and silicious stone.

4881. Pass, E. de, [*Leathers, L. L.*].
Dec. 18.

Stone, artificial.—Artificial stone is composed of sand and cement moistened with a saponaceous

mixture or solution before tamping. The saponaceous mixture or solution is prepared by boiling hard-wood ashes with water to obtain a weak lye, which is then boiled with some fatty, oily, or resinous matter, water being occasionally added to prevent concentration. Hot water is then added, and the liquor again boiled, after which it is strained through a sieve into another vessel, and allowed to cool. Lard is preferred, but any of the oily or fatty substances used in soap manufacture may be used. A solution of alum is mixed with the saponaceous liquid, which is then added to the mixture of sand, or sand and gravel, and cement.

4922. Michele, V. D. de. Dec. 20.

Cements.—Relates to the cement drying and burning kiln described in Specification No. 1583, A.D. 1872, and consists in utilizing the roof of the slip or slurry drying chamber or flue extending between the kiln and the chimney, as a floor for drying the wet slip or slurry before it is charged into the drying-chamber. The floor is covered by a light roof and openings are formed in it for charging the chamber and also for cooling it before discharging.

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