

PATENTS FOR INVENTIONS.

ABRIDGMENTS OF SPECIFICATIONS.

CLASS 22,
CEMENTS AND LIKE COMPOSITIONS.

PERIOD—A.D. 1855-1866.



LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE
By LOVE & MALCOMSON, LTD., 4 & 5, DEAN STREET, W.C.
PUBLISHED AT THE PATENT OFFICE, 25, SOUTHAMPTON BUILDINGS,
CHANCERY LANE, LONDON, W.C.

1905.

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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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Stucco-work Artificial. *See* Stonework, Ornamental.

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CEMENTS AND LIKE COMPOSITIONS.

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

A.D. 1855.

- 19. Gaskell, J., and Holcroft, G.** Jan. 3.
[Provisional protection only.]

Cements; mortars; refractory substances.—Relates to the manufacture of cement and mortar from gas lime. The lime may be mixed with sand, with or without the addition of sulphuric acid, soda ash, or alkali crystals. Roman cement, plaster of Paris, or ground flints may be added. For fireproof cement, ground pumicestone and sand are mixed with the lime.

- 21. Stocker, A. S., and Darling, S.** Jan. 3.

Stone, imitation.—A pasty mass consisting of glue, resin, oil, whiting, farinaceous or like material, and colouring-matters is kneaded and rolled into sheets with variegated surfaces imitating marble, malachite, and other stones.

- 23. Venables, J., and Mann, A.** Jan. 3.

Casting pottery &c. Relates to inlaid ornamentation or designs for china, earthenware, &c. A transfer is produced by filling in grooves in a deeply-engraved plate with a plastic composition consisting of linseed or other vegetable oil, sulphur, red lead, and resin, boiled into a glutinous condition and mixed with earthy or colouring-materials. A layer or backing of fabric is pressed against the plate, and adheres to the

plastic composition, which is removed with the backing. The design in relief thus produced is pressed into plastic clay, clay dust, or other material within a mould, or the transfer is placed inside or outside the mould, or form, and clay slip or semi-fluid material is cast about the figure or design. A thin film or coat of slip or dust may be applied to the ornamented surface after, or during, the moulding process. The form or colour of the design is visible through the coating after the article is burnt or hardened.

- 96. Claudot, J.** Jan. 13.

Cements; stonework, ornamental.—Stucco-work resembling marble is produced by applying successive layers of milk of lime to surfaces of stone, plaster, wood, iron, or other material, and compressing or polishing the work with a trowel, brush, or woollen rubber. The surface may be moistened with water charged with carbonic acid, or the paste of lime may be charged with the gas under pressure. Colours may be mixed with the milk of lime to produce surfaces imitating coloured marbles or fresco paintings, and gum or size may also be added.

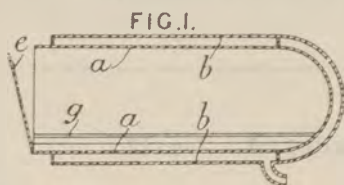
Stone, artificial and imitation.—A mixture of paste of lime, charged with carbonic acid, and powdered shells, quartz, or silicious or calcareous substances, is moulded into articles, which are hardened by carbonic-acid gas and polished with emery and oil.

137. Pidding, W. Jan. 18. [*Provisional protection only.*]

Concretes; stone, artificial. Sand, broken stone, pieces of coke, pumicestone, porcelain, china-ware, earthenware, glass, shell, bone, and earthy and metallic materials are cemented together in various proportions by a silicious cement, formed by dissolving in a digester under great pressure pulverized silica in a concentrated alkali solution rendered caustic by lime. The materials are afterwards moulded, dried, and gently heated.

145. Isaacs, S. Jan. 19.

Stone, artificial.—Relates to the manufacture of artificial coral. Alabaster or other porous mineral is subjected to the action of weak acid, and is then impregnated with oil or grease and colouring-matter. According to one process, the rough stone, or finished articles made therefrom, are immersed in dilute acid for 48 hours and dried at a temperature of 250° F. They are then placed for 5 hours in a warm bath of suitable dye, and after polishing are placed again in dye for 24 hours. The articles are then dried for 48 hours in air at ordinary temperatures, and are immersed in oil for 6 hours, being subsequently washed and polished. The sequence of the steps of the process described, and the duration of the treatment, may be varied. In the case of hollow articles, the dyeing is effected by placing in the interior a paste of powdered natural coral and iron carbonate made up with grease, and heating at 250° F. for several hours.

302. Ransome, F. Feb. 8.

Cements.—Brick, tiles, and other articles of cement, or other plastic material, are dried in a closed chamber which is heated to a comparatively-high temperature before the vapours are allowed to escape. An iron cylinder *a* is preferably used, with doors *c* at one or both ends, and heated by a steam jacket *b*. The doors *c* are perforated near the top. The articles to be dried are piled on trucks and run on to rails *g* in the drying-chamber.

320. Bellford, A. E. L., [*Kuhlmann, F.*], Feb. 10.

Cements; stone, preserving and colouring.—Relates to the application of soluble potassium or

sodium silicate in cements &c. A cement or mastic for filling up surfaces to be pointed is made up of a mixture of a concentrated solution of the silicates and a fast-drying substance, such as white lead, barium carbonate, calcium phosphate, chalk, ochre, or iron or manganese oxide. The colouring-oxides, barium carbonate, or other materials, which render the silicates insoluble, may be mixed with the solution when it is to be used for the joints in mosaics &c. A mixture of the dry silicates and quicklime, iron &c. oxide, and sand is used for making mouldings, for rendering lime hydraulic, and for repairs and restorations &c. Hydrofluosilicic acid is used to fix the potash in paints made from the silicate solution after they have hardened, and its application to hardening calcareous stones, and for fixing the potash in stones which have been hardened by the application of potassium silicate, is also claimed. Stones and other substances containing calcium carbonate are coloured or dyed by immersion in boiling solutions of sulphates of insoluble oxides, and the colours are "fixed" by means of an alkaline silicate. According to the Provisional Specification, monuments and sculptured objects are restored by the application of successive layers of a paste made up with the silicate solution, powdered stone, and mineral colours as desired; the objects may otherwise be tinted and then covered with the clear silicate solution.

326. Kerr, R. Feb. 12.

Casting.—Loaf sugar is divided into uniform lumps by saws, stamps, &c. For this purpose, the loaves may be cast in rectangular form, or slabs, sticks, or lumps may be cast at once.

481. Iles, C. March 3.

Castings. The cements obtained from plaster of Paris or gypsum, preferably Keene's cement, are used to form a coating on, or the whole of, knobs or handles of doors, castor rollers, reels for cotton and thread, table legs, pillars, tubes, &c. The cement is cast in a mould, preferably of metal, in which a tube or core may be supported. The solid or coated article is then turned and polished. The cement may be coloured, and when imitation veined marble is required, fibres of silk, cotton, &c. are mixed with the cement as hair is mixed with mortar, or as described in Specification No. 12,587, A.D. 1849.

645. Ransome, F. March 23.

Stone, artificial; cements.—Relates to the preparation of soluble silicates for cementing sand, pulverized stone, earthy and other matters to form artificial stone. Instead of using the

soluble silicates as described in Specification No. 10,360, A.D. 1844, the materials, consisting of 10 parts of sand, 8 of soda ash, and 1 of charcoal; or 15 of sand, 10 of potash, and 1 of charcoal, are fused into a glass, which is then broken up, dissolved in boiling water, and concentrated to a specific gravity of 1.7. The soluble glass may be ground and mixed directly with the other substances and water. Articles moulded from the compound are finally fired.

685. Hutchison, W. March 28.

Stone, artificial; stone, colouring.—Artificial stone is made of dried sand, loam, chalk, gravel, shingle, plaster, cements, lime, &c. mixed with melted resin, if a light-coloured stone is required, or if one of dark tint is to be made, with tar or the like freed from oily matters. The materials are moulded while heated, and layers or facings of different colours may be moulded together. Hardened tar or resin may be ground and mixed with the sand &c. instead of being added in the molten state.

Cements; asphalts.—The artificial stone described above may be ground to a fine powder and mixed with about one-quarter its weight of lime "or other plastic material" to form a cement.

855. Johnson, J. H., [a communication].
April 18. [Provisional protection only.]

Casting.—Relates to machinery for casting india-rubber, gutta-percha, or compounds thereof, or other fusible materials. In one arrangement, melted india-rubber, contained in a horizontal cylinder, is forced into a mould by means of a screwed piston or plunger working in a fixed nut. The mould is carried on a table, which is first adjusted vertically, and then the mould is secured to a tubular piece fitted on the end of the cylinder and provided with a stop valve. When a vertical cylinder is employed, the material is forced into the mould by a vertically-moving piston or plunger.

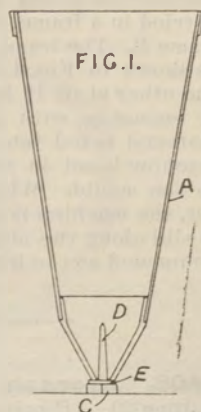
875. Johnson, J. H., [a communication].
April 19.

Statuary.—Statues and statuettes are moulded from india-rubber or gutta-percha, or compounds of them, and are hardened by steam-heating or vulcanization while in the mould or subsequently to removal.

Casting.—Solutions of india-rubber or gutta-percha in carbon bisulphide or other solvents are run into moulds for making various articles, which, after setting, are vulcanized.

1065. Steele, J. May 11.

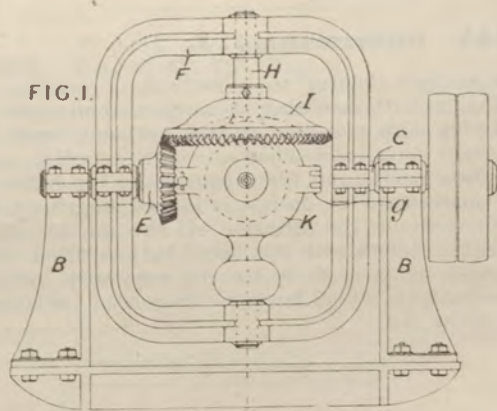
Casting.—For the purpose of draining moulded sugar, the mould A is fitted with a plug or stopper C, having a spike or projection D, which is inserted into the mould prior to the deposition of the sugar therein, and is withdrawn when the sugar has sufficiently solidified. The plug is provided with a leather or other washer E, so as to make a tight joint.



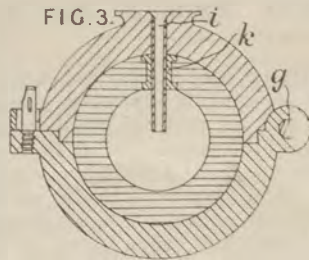
1211. Fullwood, B. May 28. [Provisional protection only.]

Asphalts.—"Relates to the purification of such "mineral, vegetable, and animal matters as contain oily, bituminous, resinous, ammoniacal, and "aqueous qualities," by treatment with "alum, "alumina, or aluminous or argillaceous clays, in "connection with soapstones, ochres, or clayey "oxides, or carbonates of magnesia or lime; or "alum, alumina, or aluminous or argillaceous "clays, in connection with oxide of copper, oxide "of iron, chloride of lime, potash, or alkaline or "calcareous earths."

1308. Peters, R. June 7.



Casting.—Relates to a casting-machine for producing hollow-ware centrifugally by simultaneously rotating the mould about two axes at right-angles. The mould K is made in halves, hinged



together at *g*, and is mounted upon a spindle *H* carried in a frame *F*, which is pivoted in a fixed frame *B*. The frame *F* is rotated from the shaft *C*, as shown in Fig. 1, and motion is transmitted to the other shaft *H* by means of a bevel-wheel *I* on it engaging with a fixed bevel-wheel *E*. The material is fed into the gate *i*, Fig. 3, and, as the machine is set in motion, it is thrown outwardly in the mould. When the material is sufficiently set, the machine is stopped and the bevel-wheel *I* is slid along the shaft *H* to enable the mould to be opened at the hinge pin *g*.

1408. Gernon, J., [a communication]. June 20. [Provisional protection only.]

Asphalts.—Asphalt, for setting clay paving-blocks, is prepared by mixing burnt and ground potters' clay with pitch, manganese, and sand.

1409. Gernon, J., [a communication]. June 20. [Provisional protection only.]

Cements.—In the manufacture of plaster of Paris or cement, "the plaster or cement stones" are crushed by a steam hammer, and coarsely powdered by rollers, the powdered material being then passed through a heated revolving retort. The material is afterwards reduced to an impalpable powder, and again roasted. In some cases, the raw material is finely powdered and roasted in any suitable oven or retort.

1445. Silberman, I. J. June 23.

Casting.—Relates to a method of combining printing, with moulding or casting, applicable to articles with plane or curved surfaces, such as globes, maps and charts, sugar articles, wax candles, labels, and for ornamenting the walls of an apartment. A design is etched, engraved, or embossed on the interior of the mould. The design is inked, and the mould is then filled with cement, plaster, glass, stearin, wax, soap, resins, sealing-wax, caoutchouc, gutta-percha, gelatine, pipeclay, &c.

1525. Pym, J. July 7. [Provisional protection only.]

Stone, artificial; cements; asphalts.—Relates to an asphalt concrete, which is moulded into blocks for general building purposes. Bitumen, powdered carbonate of lime, and coarse sand or grit are heated together with a small proportion of sal-ammoniac. Resin, shellac, glue, or pitch may be added. When making railway sleepers, coco-nut and other fibres, or wood shavings, may be introduced.

1571. Bousfield, G. T., [a communication]. July 13.

Casting lasts for boots and shoes. In the manufacture of boots and shoes greater accuracy of fit is obtained by using a last which conforms exactly the shape of the foot. To obtain such a last, the foot is covered with a laced-up cover or gaiter, over which plaster is placed in order to obtain from it a mould, in which a last of gutta-percha is cast; the last is enlarged at the point to afford room for the toes to spread.

1600. Pidding, W. July 17.

Stone, artificial; concretes; cements.—Powdered coke, pumicestone or other stone, porcelain, stoneware, glass, shells, bones, sand, and earthy or metallic matters are mixed with a cement formed of pulverized silica, dissolved in an alkaline solution rendered caustic with lime. The mixed materials are moulded into building-blocks, which are dried in the air and gradually heated in an oven to a temperature not exceeding that of boiling water. Another composition is formed by compressing in moulds a mixture of any ordinary cement with coal, coke, peat, charcoal, stone, or wood, the particles of which have previously been coated with papier mâché. The mixture is subsequently baked. Peat may be moulded alone, or combined with coke, cinders, &c., the moulded mass being carbonized.

1637. Potin, J. B. M., and Lingée, A. G. N. July 24. [Provisional protection only.]

Cements. "Volcanic cement" for coating iron, wood, stone, metals, &c. is made by melting together sulphur and oil, and slowly raising the temperature till boiling takes place. A brown mass is formed which becomes solid and elastic. The composition is applied mixed with oil.

1765. Johnson, J. H., [Potin, N. E. T.]. Aug. 3. [Provisional protection only.]

Fireproof coverings.—Metallic cloth or wire gauze is steeped in, or coated with, a water-proofing-mixture to render it both airproof and waterproof, and is then coated with sand to render it fireproof.

1985. Chance, J. T., and Adcock, H. Sept. 3. *Drawings to Specification.*

Casting.—Relates to means for casting slags. The moulds are heated in an oven, slowly at first, and then to a red heat. The slag is run in

through openings in the top of the oven, and the castings remain in the oven for some considerable time.

2085. Hill, D. Sept. 15.

Refractory substances, especially suitable for lining puddling and other furnaces. Limestone is combined and melted with iron-stone, or with the cinder from puddling, ball, or mill furnaces. A suitable proportion is one-sixth part of limestone to two-thirds of iron-stone or cinder.

2143. Roberts, J. Sept. 25. [*Provisional protection only.*]

Cements.—Relates to the preparation of coloured cements. Ground colours, such as lampblack, venetian red, and yellow ochre, are mixed with Portland or other cement, and the mixture is passed through a fine sieve.

2316. Crossley, W., and Beaumont, S. Oct. 17. [*Provisional protection only.*]

Cements.—Litharge, red lead, whiting, and sand are ground and mixed in suitable proportions with boiled oil.

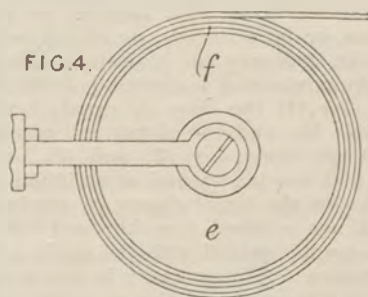
2343. Gilbee, W. A., [a communication]. Oct. 19.

Stone, preserving; statuary; cements.—Calcareous and other stones, and monuments, statues, and sculptures made of these materials, are hardened and preserved by treating with potassium silicate. The stone &c. is first dried by means of hot air, if necessary, and the potassium silicate is then injected by means of pumps, the stone &c. being afterwards re-dried. Monuments &c., previously coated with a waterproofing-composition, are washed with an alkaline solution before applying the silicate. New or decayed statuary marble may be similarly treated. For joining stones, hydraulic cement mixed with potassium silicate is employed, the joint being afterwards treated with hot air. Detached portions of stone, marble, &c. are replaced by a paste or cement formed of the same kind of stone, broken and sifted, and mixed with a silicate solution. Weak joints of lime cement may be strengthened by impregnating with potassium silicate, and afterwards applying acetic or pyroligneous acid, followed immediately by a spray of water.

2359. Parkes, A. Oct. 22.

Plasters.—A solution of guncotton, either with or without the addition of gums and resins, is employed for waterproofing plaster.

2369. Bellamy, J. Oct. 23.



Stonework, ornamental.—Relates to ornamenting surfaces by means of the embossed rollers described in Specification No. 10,880, A.D. 1845, and to improved apparatus for ornamenting. The rollers may be provided between the outer layer of cut leather or fabric and the core, with a layer of vulcanized india-rubber, treacle, and glue, or other elastic material to enable the rollers to be used on cornices, mouldings, or other bodies having irregular surfaces. The length of pattern may be increased by forming it on a length of leather &c. *f* adapted to be rolled up on a core *e*, as shown in Fig. 4. In graining glass or slate, a coat of the graining-colour is brushed over the surface, the lights are taken out by passing a roller over it, and, when dry, a coat of colour forming the ground colour of the object to be imitated is laid on. In marbling, the first coat is laid on by the marbling-roller &c. In treating slate, the surface is first polished and then grained and varnished &c. The slate can then be used for inlaying walls, for chimneypieces, for lining baths, for table tops, &c.

2478. Page, H. C. Nov. 5.

Stone, colouring and preserving; stonework, ornamental.—Marble and other stone is preserved by wetting the surface with a solution containing lime and pearlash, drying by heating gradually, and then applying white beeswax to those parts not to be coloured. The colours are then applied, and finally the whole is heated and treated with wax. For common stone, the surface is painted with a solution of beeswax dissolved in naphtha or camphene.

2659. Coignet, F. Nov. 26.

Stone, artificial; concretes; cements; casting.—Relates to concretes or cements for making artificial stone to be used for general building purposes. Three compositions are described viz:—(1) Sand, grits, metals, broken stones, and crude clayey soil are mixed with ordinary or hydraulic lime. (2) Sands, grits, metals and broken stones, cinders, scoriae of coals and metals, burnt clayey earth, and natural or artificial puzzuolana are mixed with ordinary or hydraulic

lime. (3) Fine sand, coal, or metals, cinders and scoriæ, burnt clayey soil, natural or artificial puzzuolana, or burnt marly or clayey sands are mixed with ordinary or hydraulic lime. Preferably the mixture of materials is carried out as follows:—for (1) the lime is crushed with the sands, grits, &c., and the clayey soil mixed in by a second grinding; for (2) and (3) lime, coal cinders, and scoriæ, natural or artificial puzzuolana, and also the burnt clayey or marly sand, if employed, are crushed together and the mortar thus obtained is mixed with the sands, grits, and broken stones. The concrete is cast *in situ* into walls &c. After setting, the concrete is washed

with a solution of lime bi-phosphate to increase its hardness and render it impermeable.

2816. Poitevin, A. L. Dec. 13.

Casting.—In a photo-mechanical process for preparing plates for printing &c., a cast in plaster of Paris is taken from a gelatine mould. Before taking the cast, a solution of ferrous sulphate is poured over the gelatine and excess is washed off. When several casts are taken from the same mould, the treatment with ferrous sulphate is repeated before each.

A.D. 1856.

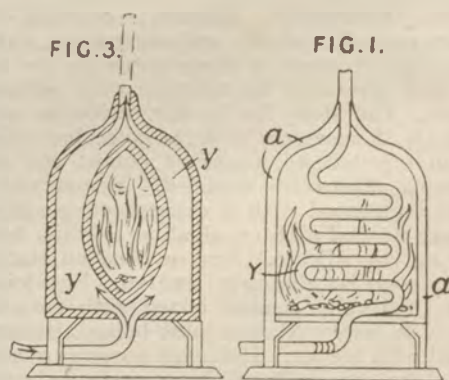
14. Haines, F. Jan. 3.

Sound-deadening coverings.—Cork is used to cover floors of warehouses, and in connection with steam hammers, engines, and machinery generally to deaden sound, and to reduce vibration.

91. Oudry, C. F. L. Jan. 12.

Stone, preserving.—Relates to the electrolytic application of a covering of copper or other metals or alloys to stone. To the surface to be plated is applied a composition consisting of metal, or metal salts, combined with essential oils or greases, and resins, gums, bitumen, or asphalt. This composition may have graphite, or copper or other metal in the form of powder added to give it conductivity. After the application of this coating, the article is immersed in a bath of copper sulphate for two or more days and plated in the ordinary way. The sheathing, which may consist of other metals or alloys, may be secured to the stone by bolts, or by projecting pins having barbed stems to give a good hold to the deposited metal. Should the sheathing be accidentally removed, the composition protects the stone.

110. Bakewell, T. H. Jan. 15.



Casting.—For drying moulds or castings, a “perforated tube of peculiar construction” is employed. For heating the air, the “calorian,” shown in Figs. 1 and 3, may be employed. In either case, the air is passed through a chamber *y*, or a tube *Y*, which is heated externally by fuel situated in a suitable casing. Instead of the “calorian,” the cold air may be passed over, or under, any solid body that is heated, or through an iron tube fixed in, or near, the grate of a kitchen fire. The heating-medium in the “calorian” may be fire, gas, steam, hot water, or other agency.

419. Jackson, C. S. Feb. 19.

Fireproof compositions.—Timber, vegetable matters, &c. are rendered fireproof by a mixture of the solutions of zinc chloride and ferric chloride. The wood, &c. may be successively impregnated with the two solutions.

450. Diment, J. Feb. 21. [*Letters Patent void for want of Final Specification.*]

Cements.—Zinc sulphate and lime are combined with plaster of Paris; fatty and oily matters, magnesia, French chalk, or sand, may also be added.

533. Francis, A. March 1.

Cements; plasters.—Consists of a mixture of about 40 to 50 lb. of finely-powdered dry borax with a ton of calcined gypsum or other calcareous substance.

544. Venables, J. March 3.

Casting pottery.—Ornamentations in relief, consisting of leaves, feathers, the wings of insects, &c., are produced on plates &c. by gumming natural leaves &c. to a block or form, and casting a mould in plaster of Paris or the like about the form. For producing intaglio or recessed designs, a second mould is obtained from the first with the sunk parts now in relief.

629. Oldham, W. March 15. [*Provisional protection only.*]

Cements.—Lias lime, with or without clays, is powdered, rendered plastic, formed into suitable shapes, calcined, and powdered.

654. Cohen, B. S. March 19. [*Provisional protection only.*]

Stonework, ornamental.—The ornamental parts of buildings are made from fullers' earth, which is ground with water, mixed with colouring or other material, moulded, and fired.

883. Symonds, J., and Fell, T. M. April 14. *Drawings to Specification.*

Refractory substances for resisting the effect of fire, sulphur, &c. in special ore-roasting furnaces, are composed of "cotel," fireclay, burnt slag, bone ash, and cow dung beaten together with a little water.

915. Scott, H. Y. D. April 17.

Cements.—Cement is made by first heating lime between two perforated walls in a reverberatory kiln, then introducing slowly-burning sulphur, the latter process being continued for about six hours. The heated lime may be placed on perforated floors.

953. Maugham, W. April 21.

Fireproof compositions.—Ammonium phosphate, with or without a small quantity of ammonium chloride, is added to starch in order that fabrics treated with the starch may be rendered fireproof. The materials may be added to the starch while it is wet in the process of manufacture, or after it has been dried. The ammonium chloride is used only when coarse fabrics are to be treated.

960. Newton, A. V., [*Beach, A. E.*]. April 22.

Cements; asphalts; stone, artificial and imitation.—Some of the products obtained from the distillation of oil at about 212° F. from coal, shale, and bituminous substances covered with sand or earths will, when mixed with sulphur, harden on exposure to the atmosphere, forming artificial stone, &c., which may be used for roofing.

1091. Jardin, L. L., and Blamond, J. May 9.

Stonework, ornamental.—The stone is etched with hydrofluoric acid "in a liquid state" instead of the usual vapour. The surface is coated with wax and turpentine or a varnish, the design drawn with a steel point, and the liquid acid then poured on. For deep etching the stone &c. is washed, the sides of the etched parts protected with varnish, and then again etched. To obtain an etching with the lower parts wider than at the surface, the edges of the etched part are covered, and a stronger acid is used. The etched parts may be filled with wire or plates of gold, silver, platinum, alumina, &c. to produce an ornamental effect. Or the sunk parts may be filled with powdered glass, coloured or not, and then heated to melt the glass. The etched parts may also be filled by the electrolytic process.

1189. Maugham, W. May 20. [*Provisional protection only.*]

Fireproof compositions.—Cotton and other fabrics and paper are rendered non-inflammable by impregnating them with an aqueous solution of ammonium phosphate, or with sodium phosphate combined with an ammonium salt.

- 1270. Owen, L. D.,** [a communication]. May 28.

Stone, artificial.—Building-blocks are formed by mixing 1 part of slaked lime with 6 to 12 parts of sand or pulverized furnace scoria, brick, or the like, and with the minimum amount of moisture; the lime may be slaked after mixing it with the sand. The mixture is then submitted to a pressure of three tons per square inch in a mould, and is finally dried by exposure to the air.

- 1276. Brooman, R. A.,** [Boulard, —]. May 28. Drawings to Specification. [Provisional protection only.]

Fireproof compositions for coating wood, metal, cloth, and other surfaces. A mixture of sand, raw soda, lime, and wood charcoal is treated in a furnace, and then with a mixture of lead sulphate, alum, and water, the resulting product being concentrated by boiling.

- 1645. Ortet, B. F.** July 12.

Stone, artificial; casting.—A compound termed "ferreine" is obtained (1) by passing sulphur from a pyrites still into another still containing powdered pyrites or iron ore; (2) by adding sulphur to melted pyrites without distillation; (3) by mixing other sulphides with the pyrites; (4) by similarly treating ores containing sulphur and iron in any proportions. The compound may be moulded or cast, and is applied to the manufacture of cisterns, basins, water pipes, pavements, floorings, roofs, foundations of houses, the coating of surfaces generally, and other purposes.

- 1649. Petrie, W.** July 12.

Cements; stone, artificial and imitation; asphalts; concretes; casting.—A composition, which may be used for many purposes, consists of a matrix of sulphur containing particles of a more refractory substance. A mixture of well-dried sand, of a uniform size, and sulphur is melted till of a uniform consistency and moulded in a suitable vessel. If the material is required to be porous, water may be cautiously thrown on, or the substance may be cast over a "tail" of a similar material; the sulphur settles into the "tail," which can be cut off afterwards. Instead of sulphur, a mixture composed of clay, which has been dried, finely-powdered, and baked, or a powder of silicious or hard carbonaceous matter, may be used. A small proportion of resinous matter, *e.g.*, pitch, wax, gutta-percha or shellac, will improve the composition. For a solid material, proof against water and acids, sand grains of mixed sizes should be used. For chemical purposes, the above-mentioned materials

are preferred, but for other purposes, other refractory materials, *e.g.*, granite and porphyry, may be employed. The composition may be used to make chemical apparatus, *e.g.*, vessels, pipes, shoots or troughs, drain pipes, roofing-tiles, tombstones, paving-stones, blocks, slabs, or ornaments for architectural purposes, and almost any kind of vessel or article for which stone, stoneware, or earthenware is used. It can be used as a cement for building and for fastening metal into stone, as a preservative coating for metal, wood, and stone, for lining tanks, and may be spread like asphalt to form roofs or the surface of paths and roads, whether porous or not. A concrete may be so formed and used for hydraulic works. The articles manufactured may be afterwards trimmed by scraping, &c. combined with the use of a rasp or hot iron. In casting a composition with a large amount of sulphur, the mould should have a head in which the surplus sulphur may collect.

- 1805. Holcroft, G., and Johnson, P.** July 31.

Cements.—Relates to the manufacture of cement from sulphur combined with sand, gypsum, or other suitable material, and to the application of sulphur alone for cementing the joints of stones and for like purposes. The sand is added to the melted sulphur in a proportion varying from equal quantities to three of sand and one of sulphur. Instead of sand, ground coke, pulverized bricks, gypsum, or similar material may be used.

- 1898. Brooman, R. A.,** [a communication]. Aug. 14. [Provisional protection only.]

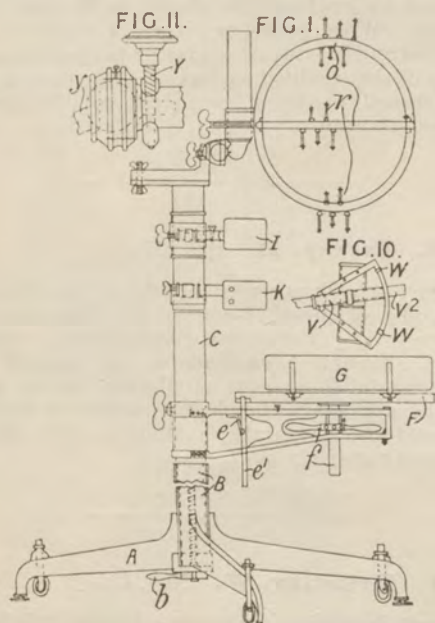
Stone, artificial; asphalts; refractory substances.—Relates to the manufacture of artificial stone, asphaltic stone, refractory building-materials, firebricks, mosaics, and artificial marble. Artificial stone is made by mixing lime and ashes or cinders with a pulverized earthy oxide obtained by heating clay or natural stone, and afterwards adding water and sand to the mixture. When making asphaltic stone, an asphaltic oxide is substituted for the sand, and dried powdered peat or other fuel is added. A refractory material for building purposes and for firebricks is obtained by mixing a refractory earthy oxide with sand. Mosaics and artificial marbles are produced by combining under pressure two or more of the above-mentioned compositions.

- 1976. Mennons, M. A. F.,** [a communication]. Aug. 25.

Cements; asphalts.—The base is formed of various clays kneaded with water, to which are added some 6 per cent. of oily substances

together with from 1 to 5 per cent. of oil sediment, fat, animal and vegetable charcoal, glue or the like, sawdust, waste hair, a decoction of log-wood, together with soot. For cold surfaces, plaster of Paris is added to the mass. When the surfaces are exposed to the direct action of fire, the substances liable to combustion are omitted. For pavings and foundations, a compound of the following ingredients is employed:—Various clays with water, bitumen and tar, river sand, sawdust, sawdust which has been employed in the purification of oil, soot, oil residue, fat, glue or the like, and vegetable charcoal.

2053. Hart, J. T. Sept. 4.



Statuary.—Relates to adjustable apparatus for use in modelling statuary from life and for measuring and copying statuary &c. Fig. 1 shows a stand fitted with a seat F, for supporting a living model, or the marble, clay, or material to be operated on, adjustable body-rests or pieces K, I, and jointed elliptical frames O for supporting, gauging, or taking measurements of the head. A vertical shaft C, to which the devices are clamped, is adjustable within a hollow pillar B of a tripod stand A by a handle b and screw. The seat is adjustable by a screw f and a rod e¹, which is clamped in a circular slot in the seat and is held by a spring e. Sides G are secured to the seat by clamping-screws. To allow the pieces to be moved into contact with the model, the clamps, arms, and rods are formed with sliding, pivoted, and ball-and-socket joints, fitted with clamping-screws, and the head frames O are constructed of curved jointed members fitted with adjustable pivoted sliding radial needles, or blunt-padded bearing-rods or supports r. Fig. 10 shows a rod V² clamped in a sleeve V, which is pivoted at the centre of a quadrant and moves into, and

out of, action to an extent limited by stops W. A spring clip of the quadrant holds the arm in any position between the stops. Fig. 11 shows a method of clamping a ball-jointed rod y by means of a conical screw Y, which bears against the ball, or against a cup in contact with the ball. For arranging and measuring drapery, a plate or support is attached to a U-shaped rod secured to a stand on castors similar to A. In modelling clay, the needles are pressed into the plastic material, and in cutting marble statuary, they serve as gauges. The shaft C may be fixed to an angular frame with legs adapted to enter sockets of a fixed table. Ribs of the table engage with grooves in the frame.

2083. Fontaine-Moreau, P. A., Comte de, [a communication]. Sept. 6.

Stone, artificial; refractory substances.—Relates to an artificial stone for statuary, handles for porcelain ware, imitation granite and marble for pavements, chimneypieces, table tops, &c., and as a substitute for baked earths for retorts, boilers, and other chemical vessels. The composition consists of pulverized red ochre or iron ores mixed with one-fifth of argil and sprinkled with acidulated water. The material is moulded and the articles dried and fired at a high temperature, producing a bluish colour and partial vitrification.

2119. Oldham, W. Sept. 10.

Cements.—Lias limestone is powdered by horizontal millstones, mixed with clay or other earthy matters, rendered plastic, and then formed into blocks, which are calcined and subsequently pulverized. Previously to the second grinding there is added a colouring-matter formed by wet-grinding coke, breeze, coal, coal slag, or charcoal.

2186. Jacquemier, L., [Campana, Marquis]. Sept. 18.

Stone, preserving; stone, colouring.—Relates to a method of hardening and colouring alabaster and other stones and earths. The stone is heated to about 212° F. to expel the moisture, and is afterwards plunged several times in clear water or other suitable hardening-liquid, suitable colouring-materials or minerals, such as iron or copper sulphate, being added to the water to impart colour to the stone. The stone is afterwards exposed to the air for several days.

2262. Thom, D., and Phillips, G. A. Sept. 27. [Provisional protection only.]

Casting.—Tie-rods for soap-frames are made with slots to receive wedge-shaped cottars by which the frame is held together when the parts are in place.

2267. Ransome, F. Sept. 27.

Stone, artificial.—Relates to those artificial stones formed by mixing sand, clay, &c. with a soluble silicate, and consists in the use of a substance more readily fusible than sand. A preferred composition is made by mixing the following ingredients:—30 parts of sand, 10 parts of finely-powdered silica, 5 parts of "solution of silica" prepared as described in Specification No. 10,360, A.D. 1844, and 5 to 10 parts of pumice-stone prepared by moulding, fusing, and grinding finely-powdered pumicestone and silica solution. All the materials are mixed and treated as described in the prior Specification referred to. Fusible glass is sometimes substituted for the pumicestone and is made by fusing together 100 parts of sodium silicate and 100 parts of lead oxide.

Stone, colouring; stone, preserving.—Building-materials are preserved by using two solutions mutually decomposing one another, such as a soluble silicate and calcium chloride, an insoluble substance being thus deposited in and on the materials. The strength of the solution of a silicate is increased, and the number of coatings diminished, with the porosity of the material. For some stones, such as sandstones and freestones, aluminium sulphate and baryta are used. The solutions can be applied by a brush or by dipping. To colour, soluble salts of "chrome or iron" are mixed with the solutions. To prevent the efflorescence of soluble salts contained in some descriptions of building-materials, they are indurated with "a solution of barium or calcium."

2282. Bousfield, G. T., [a communication]. Sept. 29.

Stone, artificial.—Ordinary chalk, 80 to 85 parts, and slaked lime, 20 to 15 parts, are pulverized and mixed into a paste, which is moulded by pressure into blocks or tiles and allowed to dry in the open air.

2326. Gardissal, C. D., [a communication]. Oct. 3.

Cements.—Equal parts of lime and clay, or of marl, clay, and slaked lime, 20 to 15 parts, are mixed with water containing salts, such as carbonates or sulphates of magnesium, potassium, or sodium, preferably common salt, in the proportion of 1 to 3 lb. to every 100 lb. of cement. The materials are calcined and ground in water, then partially dried in reservoirs, and, when plastic, are moulded into bricks, which are burnt before they are quite dry. The salt may be derived from sea-water, liquor from salt manufactories, or the washings of ashes from wood or coal. Common salt may be used in two other ways, viz. (1) the mixture of lime, clay, and salt may be exposed for several days in a damp place, so that the lime and salt

decompose; (2) if ferruginous clay is used, the iron perchloride produced volatilizes and leaves the soda and silica or alumina combined. Colours may be produced by suitable metallic oxides. Artificial puzzuolana is produced by burning and pulverizing a mixture of salt and clay.

2494. Desachy, L. A. Oct. 23.

Statuary.—Relates to the manufacture of plaster or cement architectural mouldings, ornaments, and other works of art. A thin coating of plaster or cement is applied to a mould, and, while wet, is covered with canvas or the like in one or more layers forming a backing, which is secured by coating the plaster with size, glue, oil, &c. Wire, hooks, or pieces of wood may be inserted in the canvas or plaster to facilitate the fixing of the moulded surfaces. The canvas may be fastened to a block or shape and the plaster applied thereto.

2515. Ferrey, B. Oct. 27.

Stonework, ornamental.—Relates to means for producing ornamental effects in plastering and stucco-work. Perforated ornamental pattern plates, similar to stencil plates, are pressed into the moist finishing coat of plaster, or the plate may be applied to the plastic surface of the wall &c. and the perforations filled in with plastic coloured material.

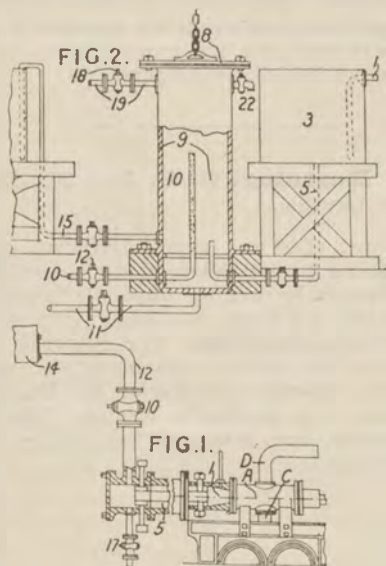
2727. Brindley, W. Nov. 19.

Sound-deadening coverings.—Papier mâché is used after preliminary treatment, for roofing, partitioning, floorcloths, sound-deadening, &c. The papier mâché is prepared as usual in sheets of any required thickness, and, while still soft, is embossed, figured, or corrugated, by means of metal, papier mâché, or other stencil plates or moulds. In another process, the sheets of papier mâché are coated with fabrics of wool, hair, &c. to render them noiseless when trodden on. A layer of fabric may be secured between two or more sheets of papier mâché.

2751. Brooman, R. A., [Boulard, —]. Nov. 20.

Cements; plasters; fireproof compositions; stone, preserving; stonework, ornamental.—Relates to the preparation of soluble glass, and to its use, with or without the addition of colours or other materials, for making wood, paper pulp, fabrics &c. fireproof and damp-proof, and for hardening and preserving limestone, plaster,

stucco, and building-materials. A mixture of about 20 lb. of sodium carbonate, 30 lb. of pure white sand, and 2 lb. of charcoal is fused in a furnace, the product is reduced to powder, dissolved in water, boiled down and filtered, and is then ready for use. Fig. 1 shows apparatus for impregnating pieces of timber 1 with the solution. The receiver 5 is exhausted by a pump A provided with a suction valve C, pressure gauges, and an escape pipe D, and the exhaustion is aided by superheated steam admitted through a pipe 17. The solution is then run into the receiver from a reservoir 14 through a pipe 12 fitted with a stop cock 10, and enters the pores of the wood. For external application to wood, paper, fabrics, theatrical decorations, furniture, &c., the solution is boiled down to the required density and boiled with pigments or colouring-matter, such as zinc



white, verdigris, ochres, sodium phosphate, barium sulphate, manganese borate, salts of copper or iron, or a composition described in Specification No. 1271, A.D. 1854. The composition is applied like ordinary paint, or it may be deposited by means of a galvanic battery, or it may be used in dyeing. A salt of magnesia may be used instead of sodium carbonate. A suitable size for application to the surface before the composition consists of 4 lb. of flour, 4 lb. of carbonate of lime, and 2 gallons of water. Fig. 2 shows steam chambers 3, 9 for dissolving and boiling the soluble glass in water. Steam is admitted to the first chamber 3 by a pipe 1, and to the second closed chamber 9 by pipes 10, 19 fitted with stop cocks 12, 18. The chamber 9 is connected with the chamber 3 and a receiver by pipes 5, 15, and is fitted with a gauge cock 22, waste pipe 11, and a detachable cover 8 suspended by a chain from a crane.

2762. Jacobs, W. Nov. 21.

Cements; refractory substances.—A composition for bedding and rendering bricks in furnaces

is composed of the following ingredients:—loam, pulverized chalk flints or sharp sand, and slaked hydraulic or stone lime. There may be added ground malm bricks, and breeze or fire ashes. Instead of the lime, Portland cement may be employed.

2872. Newton, W. E., [Nègre, C.], Dec. 3.
[Provisional protection only.]

Stonework, ornamental.—Stone surfaces are ornamented by transferring designs printed by specially-prepared printing-surfaces and then electrodepositing metal thereon. Or a transfer, printed in a fusible and volatile matter mixed with a metallic oxide, may be applied, and fixed by heating.

2956. Headley, J. H. Dec. 12.

Stone, artificial; stone, colouring.—Relates to a process for making artificial granite and for coating it with artificial marble. Sand, gravel, or any pulverized silicious matter, is intimately mixed with finely-ground and freshly-burnt lime. The proportions may vary, but usually 10 or 12 parts of sand are mixed with one part of lime. Granulated marble is mixed with ground unslaked lime and moistened. A metal mould is lined with the marble composition and then filled in with the silicious composition and subjected to pressure. The stone hardens by absorbing carbonic-acid gas from the air, or is hardened by heating to 300° F. after saturation with soluble glass. For pavements, baths, tombstones, sinks, &c., hydraulic lime is used instead of quicklime. A mixture of iron ore and iron oxide is used for colouring the stone.

2960. Sherwin, G. Dec. 12.

Refractory substances; mortars.—Fireclay is ground, mixed with water into slip, and sieved. Another slip is formed by grinding crude or burnt flint, sand, quartz, or other silicious matters in water. The two slips are mixed together and an additional quantity of calcined, ground, and slipped fireclay is added. The mixture is kilned until it is of proper consistency to act as mortar, or it may be rendered plastic and moulded into bricks, tiles, &c.

3017. Loos, E. Dec. 20.

Cements; mortars; concretes; stone, artificial; stone, preserving.—Hydraulic cement or mortar is prepared by mixing lime in measured quantities with materials containing silica and burnt or raw clay, and is tested by immersion in water in perforated iron vessels. The materials may be mixed

and used in a cold state, or they may be heated on a red-hot plate, to produce an energetic cement. For concretes, the materials are sifted, and different grades are mixed in definite proportions with pure lime and hydraulic bases or setting-material in a state of fine powder or meal, obtained by sifting or washing. Calcium or other carbonates or sulphates may be added to the cement, and any of the following materials may be used, viz:—Puzzuolana, calcined pit coal, schist, shale, basalt, burnt clay, ferruginous freestone, granite, porous argillaceous sand, clinkers, slag, cinders, gravel, pebbles, flints, quartz, and the refuse of bricks, tiles, crockery, stone, &c. Roman or compound building-stones are produced either separately, or *in situ*, by layers of hydraulic cement, and bricks, laid so as to break joint. The mould may be formed in one piece, or of several pieces solidly united, and it may be shaped to produce plain blocks and mouldings, or ornaments of architecture or sculpture. A solution of gelatine, alum, milk, potash, and yellow ochre may be added to the cement, or applied to the surface after the cement has set, or it may be applied to wood, iron, &c. to prevent dampness, and resist corrosive action. A solution of silicate or phosphate of lime may be applied to the cement surface to prevent dampness. Preservative damp-proof solutions for wood, iron, copper, bricks, stone, &c. are obtained by heating 56 lb. of shale, mineral oil, or tar, with 1 cwt. of dry pitch and tar, mixed rosin, bitumen, or other resin, and adding either (a) 2½ lb. of iron sulphate and 56 lb. of cement or sand, or (b) 56 lb. of schistous oil or the like. The substances or materials to be protected are immersed in a hot bath of the composition. A hot coating of the bituminous cement (a) may be applied by a brush or spatula to unite substances or parts together. The iron sulphate may be

omitted, and the cement or sand may be replaced by resin, gum lac, pitch, or tar.

3040. Newton, W. E., [Hegnaner, J.].
Dec. 23. [Provisional protection only.]

Casting.—A number of cores are first cast of an easily-fusible material, such as stearin, spermaceti, or wax. The cores are formed in a mould-frame, fitted with transverse blocks set in pairs, in each of which is cut a half mould, so that when brought together each pair forms a series of complete moulds. The moulds are filled by small pipes, one to each core, projecting from the underside of the vessels containing the molten stearin, &c. When the cores have cooled, a frame, carrying spindles, is lowered over the mould, and each core impaled on a spindle. The cores are then dipped into liquid gelatine, and when the gelatine is dry, the frame is turned over, the cores melted away, and the capsules left on the spindles.

3060. Rostaing, C. S. Dec. 26. *Drawings to Specification.*

Cements; plasters; stone, artificial.—Consists in producing mastic, coloured stuccos, cements, or other plasters by mixing pigments consisting of zinc oxide coloured by other mineral oxide present, with drying-oils. For coloured marbles and stuccos for mosaic, the pigments are mixed with zinc chloride solution of 55° Bé., and the whole run into moulds to harden. The stuccos and marbles are rendered harder by soaking with drying-oils.

A.D. 1857.

23. Szerelmey, N. C. Jan. 2.

Cements; asphalts.—A cement for rendering walls and other structures waterproof, is obtained by boiling together water, blood, ground bricks, powdered copper and iron slags, argillaceous

earth, and caseous matter. Another preparation is obtained by boiling gas or coal tar, linseed oil, resin or asphalt, with hydraulic lime, grit, and calcined flint. These cements may be used separately, but preferably in succession.

107. Gossage, W. Jan. 13.

Cements.—A composition is prepared, for use in lining sulphuric-acid chambers, by adding to molten Sicilian sulphur an equal weight of sand, and, for each hundredweight of sulphur, about $\frac{1}{4}$ of a cubic foot of hard, crushed, well-burned coke. The whole is stirred while heating to about 340° F. The plaster is used at a temperature of 300 to 340° F.

160. Walton, F. Jan. 20. *Drawings to Specification.*

Statuary.—Busts and statuettes made of a

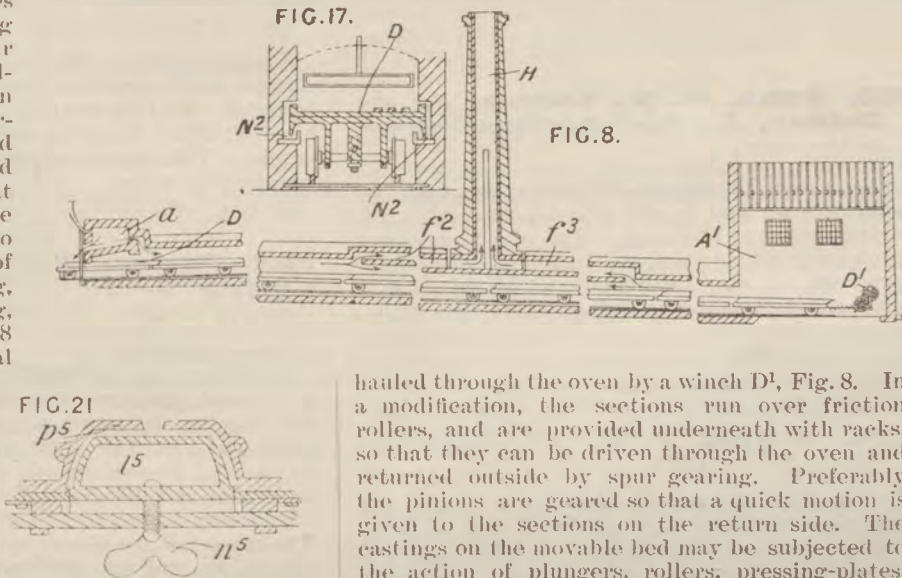
special plastic composition are ornamented by placing devices of gold, silver, brass, or other metals, mother-of-pearl, ivory, glass, or other substances in recesses in the dies or moulds in which the articles are moulded.

355. Skertchly, J. Feb. 7. *Drawings to Specification.*

Refractory substances for making potters' saggers. From 35 to 75 per cent. of fireclay is mixed with marl, and from 3 to 5 per cent. of manganese may be added to toughen the material.

398. Pitman, J. T., [a communication]. Feb. 11.

Casting.—Relates to a system of working metallic ores and their products, both metallic and mineral, in two successive furnaces. The second furnace may be placed under the first, so that metal and slag can be run direct into it to undergo operations of refining, casting, moulding, annealing, cooling, &c. Fig. 8 shows a longitudinal section of this furnace, which is heated from lateral grates. A central shaft H, through which the products of combustion, and also air drawn in for cooling-purposes, are discharged, is connected to two points in the furnace by regulating-dampers and flues f^2 , f^3 in the roof. The molten metal or slag is received in the first part of hearth *a* where suitable conditions for refining or colouring may be introduced. Then it is cast on to a movable bottom D, which carries the products through a long sloping or horizontal chamber to a warm packing-room or stovehouse A¹ at the end. The movable bottom D may consist of fireclay-topped wagons with overlapping ends and flanged sides working in a sand seal N² in the sides of the chamber, as shown in Fig. 17. The wagons are connected by draw-bars, and are



hauled through the oven by a winch D¹, Fig. 8. In a modification, the sections run over friction rollers, and are provided underneath with racks, so that they can be driven through the oven and returned outside by spur gearing. Preferably the pinions are geared so that a quick motion is given to the sections on the return side. The castings on the movable bed may be subjected to the action of plungers, rollers, pressing-plates, &c., in the chamber to give any desired form. One arrangement includes a number of rollers bearing patterns in relief, and the depressions produced in the casting are filled with material of different colours. A roller may be placed between two inclined pressing-plates. Other arrangements of mould-boxes or forms, with removable tapered or other divisions or cores, are also described, so that the castings can be freed after they have set and prior to annealing. Fig. 21 shows a mould with two sliding top sections p^5 , and a core l^5 adjustable by a screw n^5 for casting hollow articles. Long castings, such as columns of molten mineral product, may be cast.

453. Cowper, C., [a communication]. Feb. 17. *Drawings to Specification.*

Casting.—In a method of constructing sewers, a tunnel with vertical shafts having been bored,

hollow cylindrical cores or mandrels are placed in the vertical shafts and tunnels, and cement or other substance run into the annular space round them and allowed to harden, when the cores are withdrawn.

491. Scott, H. Y. D. Feb. 19.

Cements.—Relates to improvements upon the invention described in Specification No. 915, A.D. 1856, according to which cement is formed by subjecting burned lime to the action of sulphurous acid. According to the present invention cement is formed by mixing unslaked lime with a small percentage of sulphate of lime, iron, or magnesium, or of sulphuric acid, diluted or as a vapour. The Provisional Specification states that sulphurous acid or its salts may be used instead of sulphuric acid.

558. Spence, J. Feb. 25. [*Provisional protection only.*]

Stone, artificial.—Artificial coral articles are made from vegetable ivory dyed by boiling in a composition of lac dye, cochineal, and "a solution of tin," and washing in a strong solution of soap.

605. Smith, W. H., Cadman, J., and Cadman, J. March 2. [*Provisional protection only.*]

Refractory substances.—Clay is taken from the mine or heap and is cut into blocks, which are dried and burnt or boiled. The clay is however preferably pulverized and moulded dry under pressure. It may be boiled, and be mixed with dry sand before the moulding operation. Silica &c. may be added.

626. Newton, W. E., [a communication]. March 3.

Cements.—Relates to a waterproof cement particularly intended for roofs. The following are the ingredients:—A solution of india-rubber in turpentine; a solution of gum shellac in alcohol; a solution of gutta-percha in linseed oil; a mixture called "puzzolan," consisting of pulverized glass, quicklime and plaster of Paris, or marble dust or any vitrified and pulverized clay; a mixture called "smalt," consisting of glass, sand, flint, gravel, and pounded earthenware; and naphtha or coal tar. The warm solutions of rubber &c. and naphtha are mixed with the "puzzolan," and the mixture applied to the roof, the "smalt" being sifted on before the composition dries. Wood is covered before treatment with coarse canvas or sacking.

646. Ansens, A. March 5. [*Provisional protection only.*]

Casting sugar. Moulds for sugar loaves are made of square or oblong shape, with a cornice at their bottom part, gradually tapering until within

a short distance of the top. The diamond-shaped end is provided with a central drainage hole.

696. Dyar, N. A. March 9.

Fireproof compositions; asphalts; cements.—A composition for applying to the sides and roofs of cellars and other buildings is prepared by adding to 32 gallons of gas tar, 180 lb. of yellow ochre and one gallon of whale oil. Then about 50 lb. of sulphuric acid are added to the mixture, the quantity of acid being increased if it is desired to use the composition for steep or upright surfaces. Phosphoric or arsenic acid may be used instead of sulphuric acid. Oil of turpentine may be added to form a quick-setting composition. Sand is sifted over the composition after application to the surface.

803. Hemming, F. S. March 21. [*Provisional protection only.*]

Stone, artificial.—Peat is triturated, washed to remove earthy matters, and mixed with fibrous material. To this mixture is added a hot combination of oil, resin, tar, india-rubber, and gutta-percha. This compound when moulded is used as an artificial stone.

1228. Barteau, P. A., Guy, G., and Corroy, C. May 1. [*Provisional protection only.*]

Stone, artificial; casting; concretes; mortars.—Artificial stone for building purposes, millstones, &c. is made from iron slag, bricks, rubble, and the like, broken in small pieces and cemented together by a mixture of 20 parts of hydraulic lime, 30 parts of Roman cement, 10 parts of iron oxide or filings, and 40 parts of rough broken plaster reduced by water to the consistency of mortar. The materials are placed in a mould with the slag, bricks, &c. and are surrounded and bound by the mortar or cement. The slag, bricks, &c. may be omitted when the blocks are to be used under water or under ground. Artificial stone may also

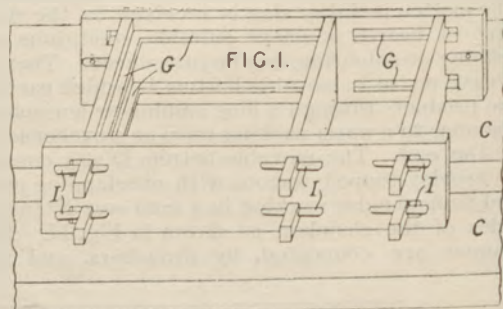
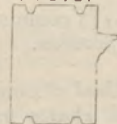


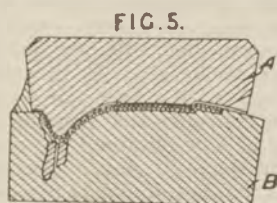
FIG. 5.



be formed from 10 parts of unslaked hydraulic lime, 24 parts of Roman cement, and 966 parts of plaster cement, mixed dry and reduced by water. Colours may be added as desired. The building-stones are bound by means of a liquid mortar of the same composition. The stones may be formed with recesses, as shown in Fig. 5, by means of projections G, Fig. 1, in the mould; a rib may be formed by slightly separating the loose base-boards C, and a moulding by inserting a suitable pattern between the same parts. The sides of the mould are removed by striking the wedges I.

1232. Blandy, A. A. May 1.

Casting.—The moulds in which the metal plates of artificial teeth are cast are specially made to secure an accurate fit and correct articulation of the teeth. In order that no expansion or contraction may take place, the moulds are formed of a mixture of about equal quantities of plaster of Paris and felspar. Casts of the gums having been taken, they are covered with a pattern plate of rolled wax lined with metallic foil, and rims of wax are placed upon the alveolar ridges. The wax rims having been trimmed into shape while in the mouth, the double cast or articulator is formed upon the pattern plates and the teeth arranged upon the rims, all wax which is not to be replaced by metal being removed. The pattern is then placed upon the original cast A and the lower part of the mould B made by pouring the composition over it.



1258. Way, J. T. May 4. *Drawings to Specification.*

Refractory substances.—Jets from which mercury or fusible metal is delivered in an electric lamp are made of pipeclay, the infusibility of which is increased by adding from one-third to one-half of precipitated silica or phosphate of lime; they are moulded and burnt as tobacco pipes are made. Cups may be made of such material to hold mercury electrodes, as described in Specification No. 2547, A.D. 1856, [*Abridgment Class Electric lamps &c.*].

1389. Ellis, J. May 1st.

Cements; slags, treatment of; stone, artificial.—Two methods of making artificial stone are described. According to the first method a cement for the production of artificial stone is obtained by mixing powdered marble, shells, calcined bones,

granite, porphyry, malachite, slate or other natural stone, or slag with lime and a solution of silicate of potash or soda, or both, the mixture being moulded or spread upon walls. According to the second method, the alkaline silicate is omitted, and finely-powdered lime or carbonate of lime is mixed with finely-powdered slag, burnt clay, or stone, the mixture being damped with water and moulded. According to the Provisional Specification, various metals and salts may be used in the formation of the artificial stone by the first method, and the blocks, after formation, may be soaked in oils or tarry matters, or exposed to the action of steam or extreme heat.

1504. Danne, L. J. A. May 27. [*Provisional protection only.*]

Stone, preserving.—A composition for coating stone is made by melting gutta-percha, rosin, and litharge together, and adding, if required, to the still-fluid mass some hard powdered substance, such as glass, sand, emery, pumice, &c.

1710. Sorel, S. T. M. June 19.

Fireproof compositions.—Wood, paper, cloth, or similar substances are rendered fireproof by being coated with a mixture of zinc chloride or similar chloride, a tartrate, hydrochloric acid, a starch, gummy, or gelatinous material, and water, or some of these substances, the following ingredients and proportions being preferred:—Hydrated zinc chloride 30 parts; cream of tartar or potassium bitartrate 1 part; hydrochloric acid 1 part; the fecula of potatoes 4 parts; and water 64 parts. The ingredients are mixed together and heated; borax or boracic acid may be added.

1785. Pelez, A., [a communication]. June 25. [*Provisional protection only.*]

Stone, artificial and imitation; asphalts.—The ingredients are as follows:—Resin 10lb., plaster of Paris 20lb., "vitrified" coal 4lb., clean dry sand 10lb. The resin is melted and the other substances added in the order given above. Flints and an additional quantity of sand may be used in moulding large articles. "Rectified" coal tar may be substituted for resin. If the coal be omitted a white substance is obtained. The moulds for casting the composition are of iron, and are sprinkled with plaster of Paris. Mosaics may be produced by pouring the composition over pieces of marble arranged in a mould. A substance called "white asphalt" has the composition:—Resin 10lb., plaster or chalk 20lb., pulverized flint 10lb., oil of resin 2lb.

1835. Newton, W. E., [Nègre, C.]. July 1.

Stonework, ornamental.—Relates to a photographic process for producing ornamented metal,

marble, stone, and other surfaces and also intaglio or relief printing-surfaces. A metal surface is coated with light-sensitive organic materials, which are also capable of protecting the surface from acids or electrolytic action. Bitumens dissolved in essential oils, gelatine and benzene, or albumen and gums, with the addition of potassium bichromate, are suitable coating-materials. The coated surface is exposed in a camera or under a photographic negative or positive. The parts of the coating not acted on by the light are then washed away by a solvent such as oil of naphtha, benzene, water, &c. The remaining parts act as a reserve in the further treatment of the surface. The exposed parts of the surface may be eaten away by sulphuric, nitric, or other acid, or by means of an electric current. In the latter case, the plate is used as an anode in an electrolytic cell containing a solution of a salt of the metal to be removed, or of a metal of the same nature. In operating upon zinc, steel, &c. to obtain a relief engraving, a reversed photographic negative is used. After the first part of the engraving process, the parts attached are wetted with gum solution, and the gelatine &c. coating is covered and strengthened by ink applied by means of a roller. A steel plate engraved in this manner may be used as a matrix from which designs may be struck. A relief engraving may also be produced by exposing a coated copper or silver plate under an ordinary photographic negative and removing the soluble portions of the coating. A copper deposit then produced by electrodeposition on the plate is removed, and a proof is taken from it in printers' ink on thin and lightly-sized paper. This proof is applied to a metal, marble, stone, &c. surface to act as a reserve in the deposition of another metal coating. The original metal plate, if polished, may otherwise have the parts not covered by the photographic reserve covered with a protecting-film by exposure to air to act as a reserve in the removal of the gelatine and the underlying parts of the plate by acid.

1837. Danchell, F. L. H., and Kimber, H., [Buring, C.]. July 2. [Provisional protection only.]

Asphalts; refractory substances.—Carbonized substances, such as coke, charcoal, graphite, soot, and the like, alone or mixed with bituminous matter, such as rosin, tar, and the like, are moulded into fireproof and waterproof plates, crucibles, and the like, which are afterwards baked in pottery ovens.

2023. Bouvert, J. J., and Pascal, F. I. J. July 23.

Refractory substances; cements.—Firebricks and coking retorts or shoots, for use in the construction of steam-generator or other furnaces, are made of a refractory composition containing clay, cement, and white sand. Plastic clay is

divided into fragments, and burnt, and, while hot, is discharged into water. The material is then pulverized and sifted to produce a regular and uniform quality of cement. The same kind of clay is selected, cleaned, mixed with water, and strained to free it from pyrites and small calcareous stones. The clay is then separated by decantation and mixed with the cement, the whole being worked up and puddled. The composition may be saturated with carbon.

2108. Prince, A., [a communication]. Aug. 4.

Fireproof coverings and compositions.—A composition which may be employed for coating wood, metal, glass, paper, straw, linen, cloth, and other substances, and stone, brick, and other walls, to preserve them from fire, is formed of silicious and basic materials. It is produced by melting a silicate with a base; or by dissolving a silicate in a concentrated caustic alkaline solution. It may also be obtained "as a secondary product in the shape of slag." According to another process, powdered quartz is mixed with soda, potash, and powdered charcoal, and the mixture melted. When cold, it is powdered, washed, and dissolved in boiling water, a little copper oxide or litharge being added to react with any potassium sulphide that may be present. The solution is evaporated to a jelly, and, when required for use, is mixed with cold water. According to the Provisional Specification, the silicic acid is precipitated from the solution in boiling water by hydrochloric acid, washed, and dissolved in a strong alkaline solution.

2772. Schuessel, J. J., and Thouret, P. J. Oct. 31.

Fireproof coverings and compositions.—A fireproofing-solution is obtained by mixing together 16 parts by weight of phosphoric acid and $2\frac{1}{2}$ parts by weight of ammonium carbonate, filtering, adding 6 parts of sal-ammoniac and 1 part of gum arabic to the solution, and again filtering. It is used for fireproofing wood, paper, and textile fabrics, such as paperhangings, pasteboards, and tapestry. Wood may be immersed in, or covered with, the solution, or may be treated with glue dissolved in the solution. Wood for roofs is covered with canvas saturated in the solution and fixed to the wood by glue boiled in the solution. When starching linen and like articles, the starch is prepared with the solution instead of with water. According to the Provisional Specification, 10 parts of bone ashes, 8 parts of sulphuric acid, and 120 parts of water are mixed together, and, after being allowed to stand for some time, the mixture is saturated with ammonium carbonate; the supernatant liquid is then poured off and used for fireproofing linen, woollen, silk, cotton, hempen, or similar fabrics, wood, paper, pasteboard, parchments, documents, &c. The solution may be mixed with the materials used in the manufacture of paper or pasteboard.

2825. Wilson, W., and Field, J. J. J. Nov. 7.

Casting.—When casting soap tablets, night-lights, short candles, balls, gutta-percha, wax, syrup, &c., the moulds are carried by an endless chain, band, &c., so that they dip into or communicate with the material to be cast. When casting candles and other analogous articles, a wick or the like, on which stops may be fixed at intervals, is drawn through a vessel containing liquefied materials and thence through tubes connected therewith, the temperature being regulated by air, water, or the like. The cast lengths are afterwards divided at the stops.

2925. Bensen, G. J. Nov. 21.

Casting.—Crystallized sugar, which has been separated from the syrup, is mixed with the clear syrup produced from refined sugar, and, after the mixture has been heated to about 170° F., it is filled into moulds, the lower ends of which are closed. After the sugar has hardened in the moulds, their lower ends are removed to allow the syrup to drain away down an inclined plane, and the sugar in the moulds is stoved. The syrup may be filtered through charcoal and used again.

3045. Westendarp, C. Dec. 9.

Stone, artificial and imitation.—Artificial coral or other stone, suitable for forming pavements and the mouldings and other decorative features of buildings, is prepared by mixing ivory dust with white lead or zinc white, and soaking the mixture in a solution of white shellac, or copal, in spirits of wine. The whole is well mixed at about the temperature of boiling water, and the alcohol evaporated. The stiff paste is pressed into a solid mass in a pair of dies heated from 230° F. to 280° F. and, when cool, may be worked and polished like ivory. Another method consists in powdering white shellac and white colour, prepared from bismuth, lead, or zinc, with ivory or bone dust. The powder is passed through rollers heated from 230° F. to 280° F., and the soft mass obtained is moulded. Instead of ivory, steamed and powdered bones, wood, glass, cotton, and porcelain may be used, together with gum dammar, gum copal, gum sandarac, mastic, bleached india-rubber or gutta-percha, beeswax, camphor, and turpentine, with or without shellac.

3063. Puls, F. Dec. 12. [*Provisional protection only.*]

Stone, artificial.—Relates to stone suitable for grindstones, whetstones, oilstones, hones, or the like, also for lithographic stones, and as a substitute for meerschaum. Stone for lithographic or ornamental purposes is made from powdered emery, flint glass, ruby, diamond, melted alumina, iron oxide, or similar hard substances, mixed with lime, barium oxide, plaster of Paris, or chalk and potassium or sodium silicate, or solutions of other potassium or sodium salts. As a substitute for meerschaum, magnesium oxide or carbonate, or a mixture of both, is mixed with potassium or

sodium silicate, to which may be added small proportions of slaked lime, chalk, or clay.

3164. Burleigh, B., and Danchell, F. L. Dec. 24.

Refractory substances.—Retorts, muffles, crucibles, &c. are made from carbonaceous substances, such as coke, charcoal, gas carbon, soot, lampblack, and the like, either used alone or rendered plastic by the admixture of moist bituminous, resinous, saccharine, glutinous, or other cementing-substances. The materials are stamped in moulds by a steam hammer or other percussive machine, or by hydraulic or screw pressure, and are then baked in closed vessels. A silicious glaze is applied to the moulded articles.

3179. Thomson, H. Dec. 29. [*Provisional protection only.*]

Cements.—Sodium and potassium silicates are used as substitutes for cement in the making of roads, pavements, and floors.

3185. Ward, F. O., [*Wynants, F., partly.*] Dec. 30.

Cements.—Consists in making a hydraulic cement by heating together at a bright-red heat calcium fluoride, lime, calcium carbonate or the double calcium-magnesium carbonate, and an alkali-bearing silicate, such as orthoclase, albite, pumice, lava, &c. If the silicate is poor in alumina and rich in quartz, a clay rich in alumina may be added, either before heating, or else to the residuum resulting from the lixiviation of the frit with boiling water. In either case there must be enough alkaline earth in the mixture before heating, in the form of lime or calcium carbonate, to provide three equivalents of base for each equivalent of alumina and silica. The residuum, after lixiviation, is re-calcined, and, if desired, ground and sifted for use as a hydraulic cement, or else converted into puzzuolana, which only differs from cement in being more argillaceous, by adding a silicate of alumina, preferably burnt clay. Or the clay may be burnt with the residuum in such quantity as to give about 80 parts by weight of silica and alumina to about 20 parts of earthy base in the mixed product. Alkaline fluosilicates may be treated with calcium fluoride &c. in the same way.

3194. Buhring, C. Dec. 31.

Refractory substances.—Fireproof and water-proof bricks and similar articles are made by mixing powdered carbonized animal or vegetable materials, such as coke, charcoal, boghead ash, or peat coal, or powdered carbonizable materials, such as wood, bone, dried blood, or peat, with from one-third to one-tenth their weight of powdered pitch, asphalt, sugar, rosin, gum, wax, or bitumen, or a mixture of them, and adding mineral matter, such as fireclay, and heating to 212° F. The articles are moulded in a press, and are baked or burnt, after which they are packed in lime and raised to a white heat.

A.D. 1858.

120. Basford, W. Jan. 22. *Drawings to Specification.*

Refractory substances.—The bricks and tiles of which the parts of kilns or ovens for burning bricks, tiles, or earthenware are constructed, are made of fireclay and flint chippings, or calcined flints, pounded until the material will pass through a sieve of one-quarter inch mesh. Rough sandstone, or a refractory mixture coarsely pounded, may be used.

186. Hay, W. J. Feb. 1.

Asphalts.—A waterproof composition for roofs, floors, &c. is made of asphalt, vegetable tar, and oil naphtha, with or without caoutchouc. Instead of naphtha, rough creosote, spirit of turpentine, or any essential oil may be used. The asphalt and tar are melted and mixed together, cooled, and then mixed with a reducing-liquid consisting of vegetable tar and oil naphtha, or one of the above-mentioned substitutes in which some india-rubber is dissolved.

220. Candelot, L. F. Feb. 6.

Cements.—Relates to the use and application of four cements applicable as preventatives of moisture &c. and as cements for flagging &c. The "anti-nitrous" cement No. 1 consists preferably of 6 lb. of painters' or boiled oil, 14 or 15 lb. of colophony, 26 or 25 lb. of turpentine, 1 lb. of wax, and 2 lb. of stearin, with the optional addition of $\frac{1}{2}$ lb. of liquid india-rubber or gutta-percha. A fine powder is added containing 25 lb. of glass or silex, 9 lb. of chalk, 8 lb. of grey zinc oxide, 6 lb. of talc or sulphur, 2 lb. of slack lime in powder, and, if desired, 1 or 2 lb. of colophony or resin; 2 lb. of varnish may be added and some ether. The liquid and powdered parts are mixed together, strained, and applied with a brush to cleaned surfaces which should be washed with an alkali if unpainted. Holes are filled up with the ordinary mixture, plus $\frac{1}{15}$ th to $\frac{1}{20}$ th part of lime and some coarser glass. White lead and like painting may be executed on this cement, but it is preferred to add one or more coatings of cement No. 2 consisting of a liquid and a solid part as before. The liquid contains about 4 lb. of thick painters' oil, 1 lb. of linseed oil, 6 lb. of turpentine, 1 lb. of wax, and $\frac{1}{2}$ lb. of gutta-percha. The powder may consist of 32 lb. of glass or silex, 20 lb. of chalk, (or 16 lb. of chalk, and 6 lb. of talc) and 6 lb. of white zinc oxide. The mixture is laid on with a knife, the proportions being preferably, 1 part of liquid to 5 of powder, but, if it is too thick, the cement may be thinned with turpentine either alone or mixed with a little wax and "fat"

varnish. For indoor work, $\frac{1}{10}$ th part white lead or zinc white may be added and both No. 1 and No. 2 cements may be coloured. No. 3 cement is made of a solution containing about 4 lb. of boiled oil, 14 lb. of "arcanson" or colophony, 3 lb. of tallow or stearin, and 1 lb. of wax; and of a powder preferably made up of 20 lb. of glass or silex, 15 lb. of chalk, 15 lb. of ore or coal, and 4 to 5 lb. of slack lime; or 30 lb. of glass and 20 lb. of chalk, if no ore is taken. It is used for woodwork and 5 per cent. lithargum makes it more siccative, while 12 lb. of resin or pitch and 5 lb. of gutta-percha make it suitable for ships. It may be first dissolved in the solution for cement No. 1 to make it damp-resisting. No. 1 and No. 3 cements are made more durable by heating both the wall or the substance to be coated and the cement. A mixture to be applied to Roman cement &c. and then coated with cement No. 2, contains about 1 lb. of gelatine, $\frac{1}{2}$ lb. of vinegar, and 2 oz. of alcohol, and is applied warm. A similar waterproof mixture consists preferably of 3 lb. of gutta-percha, and 2 lb. of wax melted together and added to 25 lb. of turpentine. Slack lime and sulphur may be added, and the solution brushed on. A composition called "neolith" for footpaths &c. may contain about 15 to 20 lb. of linseed oil, 75 to 80 lb. of resin, 2 lb. of india-rubber or gutta-percha, 3 lb. of tallow, stearin or gutta-percha, 250 lb. of sand, granite, or coal-dust, 150 lb. of chalk, 5 lb. of slack lime and 500 lb. of pebbles &c. broken small. The pebbles are thrown last into the mixture, and the whole is powerfully heated and run out like asphalt. Either this or cement No. 3 in a layer $\frac{1}{2}$ inch thick stops the dampness in foundations.

440. Barham, A. G. March 5. [*Provisional protection only.*]

Cements.—The water of crystallization is rapidly expelled from raw gypsum, for the general purposes of plaster, cement, stucco, &c., by the action of high-pressure steam.

473. Casentini, M. March 9. [*Provisional protection only.*]

Plasters; stone, preserving.—A slow-setting hard plaster, free from efflorescence, is produced by mixing ordinary plaster with water containing 1 pint of muriatic acid and 1 lb. of American potash to 11 pails of water. About 1 lb. of glue may also be added to every 6 pails of water. In order to prevent efflorescence, brickwork and plastered surfaces are washed with a solution containing: arsenic, 1 lb.; muriatic acid, 1 pint; sulphuric acid, 2 gills; milk, 2 quarts; and water, 6 or 8 gallons.

- 534. Henry, M.,** [Briggy, J. B. J. L.]. March 16.
[Provisional protection only.]

Plasters; stone, artificial; stonework, ornamental; statuary.—A stucco, coating, or composition, for artificial marble, frescoes, columns, walls, and ornamental and artistic surfaces and objects, consists of pulverized marble, preferably white, mixed with twice the quantity of lime and brought to a paste. Mineral or other colours, ground in albuminous matter and cleared with water, are applied to the stucco, and the surface is polished by a trowel &c., tale being applied to facilitate polishing. The work may be gilded and varnished.

- 639. Bérard, P. H. G.** March 26.

Stonework, ornamental.—Concentrated colloid, manufactured as described in Specification No. 1883, A.D. 1857 [Abridgment Class India-rubber &c.], for use with or instead of common oil paints or varnish, is made of alcohol, ether, azotic cotton, and castor or other oil, and is capable of receiving a polish so "that walls or other surfaces covered with it may be made to resemble stucco."

- 896. Ryder, W.** April 23. [Provisional protection only.]

Casting.—Two patterns or sets of patterns are used. One portion of each set is sunk in a bed of sand, cement, or like material, and transfers are taken from the patterns thus prepared. Moulding-boxes are then placed over the transfers, and the sand is rammed as usual. Any number of patterns are thus prepared without removing the patterns from the transfer. The pins and sockets for moulding-boxes are attached to flanges which are bolted to the upper and lower boxes, respectively, thus affording means of adjustment.

- 1099. Harrison, C. W.** May 17. *Drawings to Specification.*

Refractory substances.—Infusible nozzles and tubes for use in mercury electric-arc lamps are made from a mixture of equal quantities of lamp-black or graphite and precipitated silica, washed china clay, or rottenstone; the mixture is moulded under pressure and baked at a high temperature in a closed retort.

- 1110. Casentini, G. M.** May 19.

Plasters; casting; castings; stone, artificial.—Plaster of Paris or other cement having calcium sulphate as a base, is rendered hard and its rate of setting controlled by mixing it with an aqueous solution of borax obtained by adding water to a concentrated solution. According to the Provisional Specification, plaster so prepared is applicable for seagliola work.

- 1132. Henry, M.,** [Vasseurs & Houbigant]. May 21.

Cements; mortars.—Cements, mortars, and the like are preserved in a damp condition and protected from the frost by treating them with glycerine.

- 1154. Clark, W.,** [Pallard, F.]. May 22.
[Provisional protection only.]

Casting.—Relates to the making of cement paving-blocks or squares, flags, bricks, sculptured ornaments, pipes, &c. The cement is pressed into a mould and, when set, the bottom of the mould is removed by means of a machine consisting of a lever, cam, and treadle. For moulding pipes or conduits, two concentric tubes are used, "having a longitudinal hinge which forms a core. In order to remove the pipe from the mould, the movable axis is removed from the hinges, which allows of the core being withdrawn; the pipe is then taken out of the exterior mould all in one piece."

- 1221. Girerd, J. B., and Wohlgemuth, P. F.** May 31. [Provisional protection only.]

Stonework, ornamental.—Consists in decorating stones, and fixing thereon an imperishable stain by the agency of metallic salts and oxides. Designs, letter press, type printing, or writing are placed on the substance, "thus effectually acting in such a manner (by the instrumentality of light and shade on the surface)" as to preserve uniformly the original ground "forming the drawings, shapes, or configurations, as are sought to be reproduced from the influence of daylight or solar rays, at the same time modifying any colours that may be placed, or that may be existing thereon." The process is completed by varnishing or polishing.

- 1282. Vigers, E.** June 7.

Refractory substances.—A refractory substance is produced by mixing 50 parts of London clay with 25 of ash produced by calcining Torbane mineral, and 25 of road scrapings. A portion of the clay may be replaced by old firebrick material.

- 1284. Hicks, R.** June 7.

Refractory substances.—A composition, which may be employed in making crucibles, furnaces, and stoves, consists of black schist, carburet of iron in the form known as shining or shiny ore, and plumbago of commerce, mixed together in specified proportions.

- 1330. Cheavin, S.** June 11.

Cements.—Red ore or hæmatite iron ore together with slag cinder, scale, or refuse obtained

from the rolling or working of iron, are finely ground. The powder is mixed with whiting, sand, plaster of Paris, calcium sulphate, &c., and some suitable liquid. A cement or mastic is thus obtained. Colouring-matters may be added. A suitable liquid consists of boiled linseed oil, size or glue dissolved in water, turpentine, and coal-tar naphtha. The consistency may be such that the composition is applied either with a trowel or brush.

1356. Dembinsky, A., and Engert, A. C. June 15. [*Provisional protection only.*]

Fireproof compositions.—A fireproof wash consists of sulphuret of potassium, silica, ground quartz or flint, soda of commerce, powdered charcoal, and "pyroxalic acid," or other acid. The ingredients are mixed, fused, and diluted with boiling water.

1415. Spencer, T. June 23.

Cements; mortars.—"Magnetic carbide of iron," stated to be a compound of iron oxide and carbon, is mixed with lime, sand, or clay to form a cement or mortar capable of being applied under water.

1746. Davies, G., [a communication]. Aug. 2. [*Provisional protection only.*]

Cements; asphalts.—Bituminous mastics for hydraulic and general building purposes are composed of crude resin or like oil, West-Indian native asphalt, and dry, powdered, earthy, or calcareous matter in the proportions of 10, 30, and 60 parts, respectively, for an elastic compound; or 5, 35, and 60 parts for an impervious compound. Native asphalt, 40 parts, and earthy matters, 50 parts, may be used in forming a very hard compound. The oil should not distil at a temperature lower than 250° C.; 10 to 15 per cent. of argil may be added, and for very elastic mastic, tow or the like may be used with the earthy matter.

1755. Davies, G., [a communication]. Aug. 3. [*Provisional protection only.*]

Asphalts.—The residue obtained from the destructive distillation of the native bitumen of the West Indies may be used in the composition of bituminous mastics.

1912. Buono-Core, C. Aug. 23. [*Provisional protection only.*]

Fireproof coverings and compositions.—A paint-like composition is made by mixing the following ingredients:—Solution of alum, 20 parts; extract of archicouta, 30 parts; "fluoric" acid, 50 parts; "a solution of glass," 100 parts.

2021. Fullwood, E. Sept. 7. [*Provisional protection only.*]

Cements.—A small proportion of iron sulphate is mixed with lime.

2146. Henson, H. H., and Henson, W. F. Sept. 24.

Fireproof compositions.—Leather, woven fabrics, fibrous and other materials, such as yarn, thread, felt, &c. are rendered fireproof and waterproof, whilst still retaining their ventilating properties, by passing them first through a solution of zinc chloride. They are then treated with solutions of a mixture of hydrated protoxide of lead and aluminium sulphate or acetate, or both, or any soluble aluminium salt, or a mixture of potassium or sodium silicate and hydrated protoxide of lead, or a mixture of lead nitrate and acetate and aluminium sulphate. Instead of or in conjunction with the last mixture, soda alum, manganese alum, or any of the double sulphates may be used.

2401. Casentini, G. M., and Barnard, J. O. Oct. 28.

Cements.—Relates to a composition for regulating the time of setting of plaster of Paris and similar substances. The composition is prepared by adding 64 parts of commercial borax to 1 part of a boiling solution of cream of tartar. The liquid is evaporated to the consistency of a thick paste and rolled. The composition is prepared by allowing finely-ground borax to steep for a long time in the solution of cream of tartar. About 1 lb. of the composition is dissolved in 6 gallons of water and used for mixing the plaster of Paris or similar substance. Articles made in the ordinary way from plaster of Paris may be immersed in a solution of the composition to impart compactness and hardness to them.

2431. Henson, H. H., and Henson, W. F. Nov. 1.

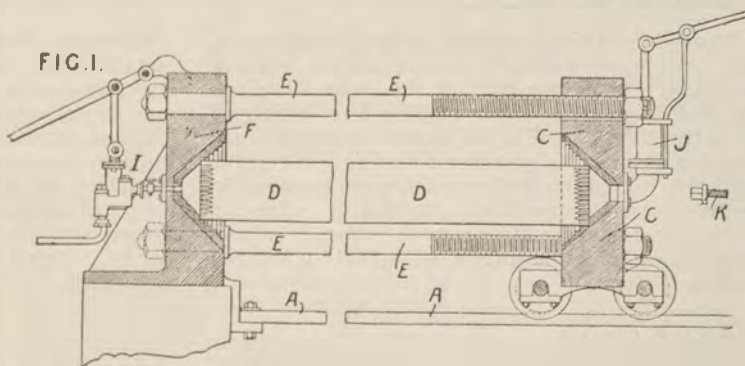
Fireproof coverings and compositions.—An alkaline silicate, such as sodium or potassium silicate, or any preparation of it, either alone or mixed with farina, flour, or rice, or other suitable substance, is used as a starch, which is to some extent flame-proof.

2448. McDougall, A. Nov. 2. [*Provisional protection only.*]

Asphalts; stone, artificial.—Reservoirs, tanks, culverts, and sea-walls are constructed of bricks or blocks made of asphalt or the like mixed with sand or gravel, and cemented together by means of molten asphalt or the like.

2566. Clark, W., [*Casult, F.*] Nov. 15.

Stone, colouring.—Relates to a method of colouring wood, which is stated to be applicable also for colouring marble. In the apparatus shown, a piece of timber D to be coloured is held between a fixed head F and a carriage C, secured together by stays E. The carriage C moves on rails A. The liquid is injected at one end by a pump I, and withdrawn at the other end by a pump J. The pores of the marble are first opened by an injection of citric acid.

**2639. Brooman, R. A.,** [*Robert, A. F. E.*] Nov. 20. [*Provisional protection only.*]

Statuary.—Dolls and other figures are made by enclosing a ball or sac of caoutchouc in a mould and plunging the whole into hot vulcanizing-composition. Another method is to form the upper and lower parts of the body separately and insert articulated wooden or metal joints. The two parts of the body are then joined together. Statuettes and figures of animals are manufactured in this way.

felspar, and with glass to assist in fusing, are powdered, pressed into moulds, then removed and baked. If desired, the articles may be coloured by means of metallic oxides, carbon, &c. before moulding, or by means of organic colouring-matters after firing. In this way marbles, agates, and other substances may be imitated.

2667. Hess, R. H. Nov. 24.

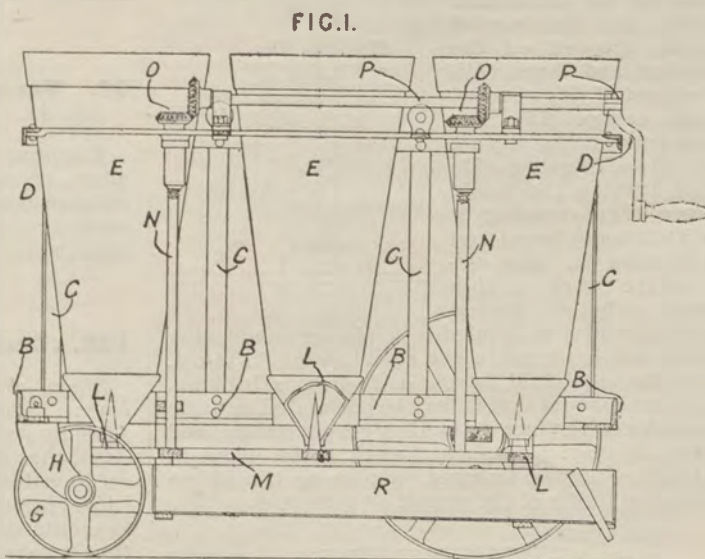
Stone, artificial; cements; stone, colouring.—Magnesium silicates are used to make pipes, mantelpieces, taps, and other articles. The silicates, such as talc, steatite, &c., which may be mixed with kaolin, alumina, lime, barium carbonate,

2737. Loach, J., and Cox, J. Dec. 1. [*Provisional protection only.*]

Stonework, ornamental.—Chimneypieces are ornamented by applying to portions of the surface strips of perforated metal, and then several coats of japan or other paint, so as to embed the metal ornament. After stoving, the whole is polished, the metal is painted with transparent colours and with scrolls, and is then varnished.

2755. MacKirdy, L. Dec. 2.

Casting sugar. Sugar moulds are filled directly from the syrup heater. The moulds E are mounted in the frames B and D of a carriage with suitable arrangements for attaching lifting-gear. The carriage is run under the heater, which is provided with two or more spouts so as to fill two or more moulds simultaneously. The moulds are preferably formed with truncated apices, with holes in their bottoms, into which fit the spikes L, preferably three to each mould, on the frame M. The frame M is carried by rods N, which screw into the bosses on the bevel-wheels O. By rotating the shaft P, the frame M may be lowered, and the molasses allowed to drain off into the tank R.



2840. Kiallmark, G. W. B., and Time-well, W. T. Dec. 10.

Cements.—Animal matters, such as hoofs, horns, &c., are combined with materials for making cements before burning, or the gases obtained by distilling the animal matters are conveyed into the kiln in which the cement materials are being treated; the powdered distillation residue may be mixed with the cement materials. In some cases, the residue, obtained by charring animal matters, shoddy, or wool refuse, is mixed, after being finely powdered, with finely-powdered calcined stone.

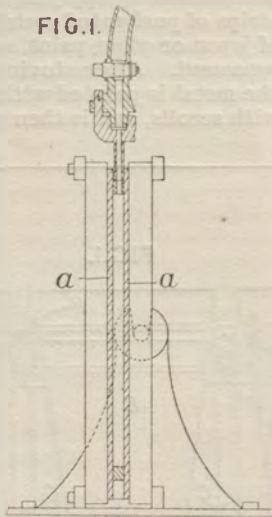
2389. White, W., and Parlby, J. Dec. 16.
[Provisional protection only.]

Cements.—Relates to improvements in making and treating carton-pierre and the like for covering walls, partitions, &c. The material may be waterproofed by applying cement powder, alone or mixed with pitch, tar, resin, gutta-percha, india-rubber, and the like; or the carton-pierre itself may be incorporated with these materials, alum and sand or lime being added when required. When dry, the surface is sized, whitened, and finally coated with the waterproof material described.

A.D. 1859.

19. Skinner, G., and Whalley, J. Jan. 1.

Casting.—Ornamental and other tiles, slabs, or the like for pavements, tablets, panels, coverings for brick pillars, &c. are formed by pumping semi-fluid clay into a mould *a* mounted on trunnions and having detachable sides, consisting of wood, grooved on the surface and faced with perforated zinc covered with calico. The tiles are removed for drying by detaching one side and turning the mould over, then covering it with a loose board and reversing it. For decorative work, a thin sheet or bat of coloured or other clay is applied to a plaster mould, and, when set, is placed in the mould shown in Fig. 1, and the semi-fluid forced in to form a backing. The ornamental design may be perforated or made broader at the base to facilitate manufacture and hold the clay. Ornamental work, to be inlaid in the tiles, may be fastened by pins or threads to the zinc lining of the mould.



64. Versmann, F., and Oppenheim, A. Jan. 8. [Provisional protection only.]

Fireproof compositions.—Articles such as wood, paper, fabrics, yarn, and raw fibrous substances, are fireproofed by treatment with solutions of tin, zinc, or antimony salts (other than zinc chloride), alone or in combination with starch, the salts preferred being tin phosphate, borate, or chloride, zinc sulphate or aluminate, antimony chloride, potassium antimoniate, or tin and ammonium chloride or bichloride.

88. Versmann, F., and Oppenheim, A. Jan. 11.

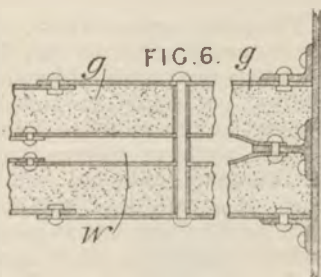
Fireproof compositions.—Ammonium sulphate, alone, or mixed with size, starch, or the like, or with ammonium chloride or carbonate, or other substance, is used for fireproofing wood, cotton, linen, nets, gauzes and other fabrics, &c.

128. Eccles, J. Jan. 15.

Stone, artificial.—Cornices, mouldings, string courses, blocks, window tops and sills, &c. are made by moulding clay with hollows or perforations, then drying by currents of hot or cold air as described in Specification No. 2989, A.D. 1857, [Abridgment Class Drying], and finally burning in a kiln out of contact with the flames. Clay thus treated is free from cracks, and may be used as a substitute for stone.

170. Reid, J. C., and Milner, W. Jan. 20.

Fireproof compositions.—Iron plates secured to the decks, sides, and bottom of a ship by angle-irons are spaced apart to form chambers fitted with a fire-resisting composition which comprises wood dust or the like mixed with crystals of soda, alum, or other matter which will liberate steam or moisture on the application of heat. Fig. 6 shows two bulkheads having the "resisting" fillings *g* and separated by the water space *w*.

**200. Drouin, L. A.** Jan. 22. [*Provisional protection only.*]

Fireproof coverings.—Doors, windows, venetian blinds, and panels are covered with various metals and alloys, to render them stronger and damp and fireproof. A stretching or drawing bench or a screw press is employed. The parts of the articles are cut so as not to expose the wood when they are fitted together. Strips of wood are superimposed to prevent bulging or crumpling. Articles of wood, the patterns of which are repeated and are capable of being made in a continuous manner, can be coated with sheets of metal by the drawing-bench.

293. Henry, M., [*Moissant & Co.*] Feb. 1. [*Provisional protection only.*]

Asphalts.—Substitutes for ordinary bituminous mastics, and products suitable for use in the manufacture of varnish, are obtained by the distillation of chapapote or West Indian bitumen.

443. Scott, H. Y. D. Feb. 17.

Cements.—The lump cement described in Specifications No. 915, A.D. 1856, and No. 491, A.D. 1857, is ground down with dry soft chalk or lime slaked to a fine dry powder, in equal or other proportions. The cement may be ground separately and mixed with the chalk or lime in a rotary drum having beaters rotating counterwise.

943. McDougall, A. April 14.

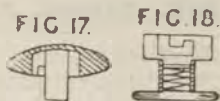
Asphalts.—A mixture of bituminous substance, such as asphalt, pitch, or other product of coal tar distillation, with sulphur and beeswax, is used for coating cast-iron pipes. With or without the sulphur and beeswax it is used for coating lead

pipes or sheets, telegraph &c. wire, and other metallic surfaces. The mixture described is composed of one part by weight of sulphur dissolved in 2 parts of heavy oil of tar or other solvent of sulphur, such as spirits of turpentine or resin oil. In the solution of sulphur are dissolved 5 parts by weight of pitch or asphalt and to 100 parts of this mixture are added 5 parts of beeswax.

1240. Valda, J. May 20.

Stonework, ornamental.—

Rosettes or other sculptures in stonework are attached to ceilings and cornices by a stud, shown in Figs. 17 and 18. The head and shank shown press down the spring in the bottom part, and are secured by a pin and bayonet joint.

**1300. Patrick, H. W.** May 26.

Stone, artificial and imitation.—A plastic material, which may serve as an artificial coral, is prepared from amber, Canada balsam, gum kauri, and potato flour or fecula, combined with meerschaum, paper pulp, calcined bones, "fluorite of silica," sulphide of mercury, arsenic, or other metals, chlorides of zinc or other metals, "alkaline preparations," asbestos, fluxed or fritted colours, finely-powdered pumicestone, sulphur, india-rubber, and similar gums. The gums are dissolved in naphtha, methylated spirits, chloroform, essential oils, or other solvents, and the other substances are mixed with the solution, or the gums may be fused before being mixed with the other ingredients. When the composition has been shaped or moulded it is hardened by heat. One of the compositions used is:—Amber 12 oz., kauri 3 oz., these being dissolved in the above solvents, and 7 oz. of meerschaum added. Another composition is prepared by dissolving amber 9 oz., kauri 1 oz., gum animi $\frac{1}{2}$ oz., and gum copal 5 oz., and mixing with the solution 7 oz. of meerschaum, 1 oz. of paper pulp and $\frac{1}{2}$ oz. of "fluorite of silica." Zinc chloride, cream of tartar, or asbestos may be used instead of some of the ingredients. When bleached india-rubber or gutta-percha is used, an equal quantity of sulphur is added. Any desired colouring-matters may be added to the composition.

1498. Buckwell, W. June 22. [*Provisional protection only.*]

Stone, artificial; concretes.—Coarse concrete is rammed in moulds and a fine facing-layer is applied and rolled on and into the surface. The following materials may be used in the manufacture of the concrete, viz.:—Portland cement, "granitic breccia cement," limestone, sea-beach gravel, brick or earthenware fragments, clinker, slag, lime, tar, resin, and sand,

- 1511. Hughes, E. T.,** [*Pavin de Lefarge, L., and Pavin de Lefarge, E.*]. June 23.

Stone, artificial.—Refractory sand or quartz, and baked or calcined refractory earth, together or singly, are mixed with aluminous earth, all being finely powdered, to form artificial sandstone. The mixture may be subjected to considerable pressure in moulds, or be damped and worked up into a paste, then moulded, dried, and finally burnt in the same manner as clay bricks.

- 1586. Simon, J.** July 4.

Casting; asphalts; statuary.—A composition to be used as a substitute for asphalt for tanks and reservoirs, for bas-reliefs, statuary, slabs, &c. consists of sulphur and powdered stoneware such as demijohns and powdered glass. The powdered materials are stirred into the molten sulphur and the mass is run into moulds. Slabs of the composition are united by running the molten composition in between the slabs.

- 1863. Evaux, A.** Aug. 12.

Stonework, ornamental.—Zinc white is used for the grounds, and albumen ("albumine") is mixed with mineral colours to imitate marble.

- 1902. Wilson, F., Wilson, E. B., and Power, F. A. D. N.** Aug. 18. [*Provisional protection refused.*]

Refractory substances.—The residuum accumulating in the retorts of gas works is combined with fireclay &c., and used for making crucibles, retorts, lining furnaces, &c.

- 1917. Taylor, J. J. O.** Aug. 22.

Refractory substances.—A mixture of two kinds of clay, the basis of which are principally magnesia and oxide of iron without much silicon, is used to face the silicious lining of furnaces in which iron is obtained from the ore or is re-melted.

- 2022. Bakewell, F. C.,** [*Pemberton, H.*]. Sept. 5. *Drawings to Specification.*

Refractory substances.—Porous firebricks used for filtering caustic lyes consist essentially of a silicious clay, which does not readily fuse, or clay or sand united into a mass by partial vitrification or the reciprocal action of the silicates on each other. When the bricks have become partially choked with lime &c., they may, after being washed be used for the usual purposes of firebricks.

- 2077. Versmann, F., and Oppenheim, A.** Sept. 12.

Fireproof compositions.—Relates to solutions for fireproofing fabrics &c. The article is dipped in stannous or stannic chloride solution, and then in sodium, potassium, or ammonium hydrate or carbonate, or in sodium or potassium stannate; thus, fabrics, such as canvas, are soaked for two days in stannous-chloride solution, containing two parts of crystallized salt to one of water, and are then laid for one day in a concentrated solution of sodium stannate; they are subsequently dried and washed. The articles may be treated with sodium or potassium stannate, and then with an acid or salt to precipitate the hydrated oxide. Articles that are not to be permanently fireproofed are dipped in a solution containing $2\frac{1}{2}$ lb. of sodium tungstate, and 6 oz. of sodium phosphate, to each gallon of water; potassium or ammonium tungstate may be used, and phosphoric acid in place of the sodium salt. The coating may be applied during the starching-process, by stirring into cold water 3 parts of sodium tungstate with 2 parts of starch and a little French chalk, in the proportion of 1 part of chalk to 16 parts of sodium tungstate; boiling water is then added.

- 2214. Sonneborn, E.** Sept. 30.

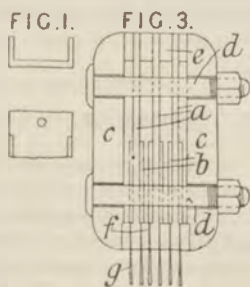
Cements.—Cements containing iron oxide are mixed with finely-powdered sal-ammoniac. If the cement contains 3 to 15 per cent. by weight of oxide, from 1 to 5 per cent. of chloride is added. Iron and "iron waste" may also be added.

- 2280. Hind, A., and Lowenthal, J.,** [*Gumpel, G.*]. Oct. 6.

Casting.—Pottery and china-ware are made by running slip into moulds made of plaster of Paris, fireclay, or other material which will absorb the water. The moulds are shaped on matrices, and may be in one or more pieces. The slip is preferably composed of 80 parts of German clay, 10 of fireclay, 5 of common salt, and 5 of ground chalk, reduced to a fluid state and contained in reservoirs provided with agitators, whence it is delivered into the moulds running on rails beneath the reservoirs. The subsidence due to absorption of water in the mould is compensated for by a funnel fitted in the mould and containing slip. When sufficient thickness has been deposited, the excess material is run off by inverting the mould or removing a plug, and the whole is carried to a drying-chamber, the articles being finally burnt and partially glazed by the salt in the slip.

2383. Newton, W. E., [*Longh, C. de.*] Oct. 18.

Casting.—Gills or combs are constructed with a hard-metal backing of channel-section, Fig. 1, in which the teeth *g*, Fig. 3, spaced and held in a holder, are secured by running in cementing-material. The holder for six rows of teeth is constructed with three gauge-plates *a* grooved on opposite faces to receive the teeth, which are pressed up against stop plates *b*. Filling-pieces *e*, *f*, of metal and leather, respectively, are placed as shown, the whole being clamped between cheeks *c* by bolts *d*. The roots of the teeth so clamped are placed in liquid cementing-material in the channel of the backing and held until the material sets. In repairing a broken tooth, the holder is applied to the teeth and the cement is softened to release them. The Provisional Specification states that sealing-wax may be employed as the cementing-material.

**2483. Brooman, R. A.,** [*Lippmann, Schenkenburger, & Co.*] Oct. 31.

Casting; cements; stone, artificial and imitation.—Relates to plastic compositions which may be used for building and decorating purposes instead of marble, stone, brick, and cement. In making one composition, 14 oz. of potassium sulphate are dissolved in 16 quarts of hot water and 2 lb. of gum arabic are added. With this solution is mixed 20 lb. of cement, 20 lb. of powdered marble or alabaster, and 5 lb. of slaked lime, the whole being mixed in a mortar until none of the composition adheres to the pestle. When castings or mouldings are made, a thin layer of the composition above described is placed on the greased surface of the mould, and this layer is backed by another produced by mixing the cement, marble, and lime with the solution of potassium sulphate and gum arabic with which has been boiled hemp, tow, or other fibre. A water-resisting composition is made by using lime slaked with linseed oil. The markings of marble are imitated by incorporating metallic colours, powdered slate, iron scales, or copper or other metallic filings. Wood, iron, or bronze are imitated by using finely-sifted iron filings. The moulds used in moulding the composition are made of marble or of the composition itself strengthened with fibrous material. The material may be used for panels, walls, partitions, ceilings, roofing for buildings, for horticultural frames, medallions, and statuary.

2564. Brooman, R. A., [*Demangeot & Co.*] Nov. 11.

Fireproof compositions.—Fabrics, filamentous

materials, pulp, wood, oil, &c. are rendered non-inflammable by the application of a substance obtained by the treatment of ammonium sulphate in a specified manner. To purify the ammonium sulphate, and combine it with other reagents, it is heated in a reverberatory furnace until all the organic matters are destroyed and sulphuretted hydrogen is evolved. The cooled mass is next boiled with specified proportions of calcium chloride and lime acetate, to obtain a crystalline deposit. The crystals are heated in a furnace to a dull red heat, and the compound when cooled is adapted for use in rendering matters non-inflammable. In preparing a non-inflammable starch for application to muslins, linens, &c., the prepared salt or compound is dissolved and added with ammonium to the starch, the whole being treated in a specified manner. Fabrics, for theatrical decorations &c., may be rendered non-inflammable by coating the back of the material with size and "Mendon white," and when dry coating with the non-inflammable starch dissolved in baryta. In rendering oils, such as linseed, non-inflammable, hydrated protoxide of manganese is added to the oil and heated, and when afterwards cooled the prepared salt is added, and a current of electricity is passed through the mixture until the salt is dissolved. In treating tar, a soap solution having a soda base is prepared, and this being added to the prepared salt and tar, the mixture is heated and the supernatant liquid removed. In rendering filamentous materials non-inflammable, the prepared salt is dissolved in water containing ammonium sulphate, and to this is added a solution of lime carbonate, the solution thus prepared being adapted for treating the fibres.

2617. Blinkhorn, W. Nov. 19.

Refractory substances.—Firebricks are made from the waste sand produced by grinding plate glass, either alone or mixed with clay, lime, iron oxide, and quartz. Plaster of Paris is used for the manufacture of tiles, either alone or in combination with the materials specified above.

2622. Bosc, C. Nov. 19. [*Provisional protection only.*]

Stone, artificial and imitation.—Artificial marble is made by dissolving $\frac{1}{2}$ lb. of gelatine in 1 pint of water and mixing potato or rice starch or talc with the solution. The paste is spread upon greased marble or metal sheets, and the veins are produced by pouring the required colours on to the surface.

2751. Short, C., Smeeton, T. B., and Bowler, W. Dec. 5.

Slags, treatment of; casting.—Slags for the manufacture of bricks, tiles, slabs, and drain-pipes are cast in ornamental or other moulds, and annealed for several days.

2757. Coignet, F. Dec. 6.

Concretes.—The lime is partially slacked, and the slacking is then completed by grinding with a very small quantity of water before adding any other ingredient. Sandy matters, before being added to the lime, are dried by means of heated air, or the excess of moisture may be extracted by combination with puzzuolanas, cinders, or other absorbents. Cements may be combined with the above substances. The ingredients when united are subjected to an excessive mixing and pressing operation effected by machinery until the composition is in a plastic and homogenous condition. Earth may be combined with the lime, and double-headed nails, or other pieces of iron may be introduced as binding-agents. The material is made applicable to impervious hydraulic works by using baked earth and less sand.

2891. Smith, J. Dec. 19.

Stone, artificial and imitation; stone, colouring.—Jewellery or ornaments and cases for jewellery, photographs, &c. are formed by moulding a composition of shellac, ebony dust, asphalt, and charcoal when a black product is desired. If a coloured material is to be made, colouring-matter may be employed, such as brown asphalt and rouge. For light colours, boxwood dust and light pigments take the place of the darker ingredients. The mixture may represent artificial stones, such as malachite, marble, or onyx, and artificial gems &c., which may be homogeneous, streaky, &c. The composition is moulded to the required shapes, the shells or sides being hinged or riveted together and provided with locks or fastenings.

2923. Abel, F. A. Dec. 23.

Fireproof compositions.—Textile materials are rendered fireproof by impregnating them with insoluble metallic silicates. The material is

preferably first dipped in a solution consisting of a metallic base, such as lead or zinc, which is adapted to form with a soluble silicate, a double insoluble silicate. After being exposed to the air for some time, the material is immersed in a hot solution of alkaline silicates.

2947. Smith, J. Dec. 24.

Stone, artificial and imitation; stone, colouring.—Buttons and other dress fastenings are made from a plastic composition containing ebony dust and shellac, together with charcoal or other colouring-matter, such as lampblack, boxwood dust, rouge, brown or black asphalt, pigments, &c. The shellac is melted and the ebony dust and colouring-matters are mixed therewith, the degree of mixing depending upon whether it is required to produce a uniform colour, or a streaked or veined colour in the article, in imitation of marbles, onyx, malachite, or other stones. The plastic material is placed in suitable dies and moulded to the required form in a press.

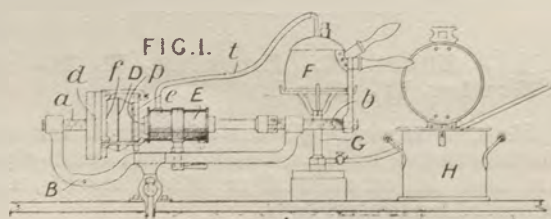
2962. Rostaing, C. S. Dec. 28. *Drawings to Specification.*

Stone, artificial and imitation; casting.—Compositions containing gutta-percha, mineral colouring-matters, gums, tannin, and essential oils are used to make artificial coral picture frames, to imitate marble, and to make moulds into which plaster is run.

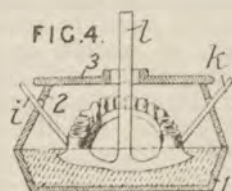
2981. Smith, W. Dec. 30. [*Provisional protection only.*]

Refractory substances.—To increase the refractory nature of gas retorts, ground quartz and calcined fireclay are added to the ordinary fireclay, together with a small quantity of coke or other carbonaceous matter.

A.D. 1860.

4. Dewar, H. A. Jan. 2.

Casting.—In forming a vulcanite base for artificial teeth, a plaster model is prepared from a wax cast of the jaw to be fitted and is set in plaster in the lower part 1, Fig. 4, of the moulding-flask. A wax or like model of the vulcanite base, with the teeth adjusted thereto, is then mounted on the plaster



cast, and the part 2 of the flask placed in position. Two or more wires *i, k* resting on the wax project through holes in the side of the part 2, and a stick of wax or a thick wire *l* stands up from the model. Plaster is next run into the flask, and the top or cover 3 put on. The wires *i, k, l* are withdrawn when the plaster is set, and the flask inverted in a suitable receiver and placed in a small oven H, Fig. 1, where it is heated until all the wax has run out. The flask D is afterwards clamped between two plates *e, f* and placed between a disc *d*, carried by a screw *a* working through a boss in the end of the frame B, and a steam-jacketed cylinder E containing india-rubber, the nozzle *p* of the cylinder being inserted in the opening in the cover 3 of the flask. By means of a screw *b*, working through a boss in the other end of the frame B, the piston of the cylinder E is advanced and the molten rubber forced into the flask D. The jacket of the cylinder E is supplied with steam by a pipe *t* from a small boiler F heated by a gas burner G, over which the oven H can be mounted when desired. The flask when full of rubber is removed from the frame B, and, after plugging up the hole in the cover, is placed in the oven and heated until the rubber is hard. Instead of melting the wax out of the mould in the oven, it may be effected by a current of hot air or steam, or by forcing a hot alkaline solution through the flask. In a modified apparatus, the moulding-flask has a hole in its side instead of in its cover.

7. Rowbotham, S., and Gratton, T. Jan. 2.

Fireproof compositions.—Linen, cotton, silk, &c. are rendered fireproof. Biborate or borate of soda, potassium, magnesium, or other base is mixed with the mucilage or jelly of quince, marsh-mallow, linseed, tapioca, dextrin, gum, &c. To this may be added, according to the base used, carbonate of soda, potassium, or magnesium, to neutralize the excess of boracic acid. The mixture is thoroughly incorporated with starch and well dried and ground, the starch thus treated serving to render the fabrics non-inflammable, or it may be used as a varnish for paper &c. The boracic-acid compounds may be also used alone.

41. Videgrain, R. C. Jan. 6. *Drawings to Specification.*

Stone, artificial; stone, preserving.—Artificial marble for making water receptacles, wall coatings, columns, chimneypieces, "vessels," furniture, plate warmers, stove cases, shop counters, &c. is made from iron, calcium sulphate, lime or calcium carbonate, mixtures of wood and coal ashes, alum previously heated in a furnace with alabaster or plaster, and colouring ochres. The materials are made into a paste by means of gum, potassium silicate, and aluminous-ferruginous solutions, and dilute sulphuric acid, and the paste is kneaded, moulded, pressed, dried, polished, and immersed in waterproofing-baths containing oil or other

fatty matter. The articles are finally coated with amber solution. The moulds are preferably lined with metal sheeting.

46. Harland, E. J. Jan. 6.

Cements.—Corrugated decks of ships are made flush by filling in with cement, which may be Portland or Roman cement, sand, sulphur, asphalt, marine cement, or other material or combination of materials. Ordinary iron decks are also covered with a composition consisting of stone, stoneware, earthenware, gravel, tiles, bricks, metal borings, wood-paving blocks, either used singly or in combination, which are held together and to the decks by asphalt, vegetable or mineral pitch, resin, sulphur, &c.

118. Brooman, R. A., [*Paraf-Javal, B.*] Jan. 17.

Fireproof compositions; stone, artificial.—Gluten made by a special process is employed for giving a finish to and for preparing threads, tissues, leather, or paper. As the gluten can be rendered insoluble, the substances thus treated will be made incombustible. It is also used for making artificial coral, and articles manufactured from like materials.

308. Smith, J. Feb. 4.

Stone, artificial and imitation.—The handles of sticks, umbrellas, parasols, swords, knives, forks, small-arms, &c. are moulded from a mixture of shellac, ebony dust or boxwood dust, colouring-materials, &c., which may be imperfectly blended to imitate marble, onyx, malachite, &c.

698. Ripley, A. March 16. [*Provisional protection only.*]

Fireproof coverings and compositions.—The refuse from the manufacture of leather, the parings of hides and leather, and old waste leather are reduced to small pieces and, if desired, are pulped in a centrifugal apparatus. The material is then mixed with india-rubber, gutta-percha, or the like, and passed between pressure rollers, after which the mixture may be either rolled to form sheets or fabric, or moulded to any shape. To the mixture may be added coke dust, iron filings, or the like for hardening purposes, sodium salts, barium salts, or the like for fireproofing purposes, and colouring-matter.

718. Bielefield, C. F. March 19.

Cements; plasters; stone, artificial.—One composition consists of 1 part by weight of fibrous materials, 3 of water glass, 1 of lime, 2 of clay, 1 of sand, ground glass, pumicestone, marble,

quartz, calcium sulphate, calcium carbonate, zinc or other metallic oxides, magnesia, or ochre; other proportions may, however, be employed. The materials are well ground and mixed, and are used for making pipes, ornaments, floors, roofs, wall coverings, panelling, bas-reliefs, statuary, &c.

775. Martin, C., and Pidding, W. March 26. [*Provisional protection only.*]

Casting; fireproof compositions.—In the manufacture of paper-pulp ornaments, head coverings, wearing-apparel, furniture, bags, envelopes, boxes, bottles, casks and other articles, vehicles, houses, ships, and boats, the pulp or material is passed on to a perforated metal or wire-gauze cylinder or mould connected by a hollow spindle &c. to a vacuum chamber or to a compressing-apparatus, so that the liquid is extracted and the pulp is moulded into a box, cask, or furniture &c. of the desired form. The pulp may be sized or combined with liquid caoutchouc, and animal and vegetable fibre, sawdust, glue, resin, caoutchouc, lime, fatty and colouring matters may be used to render the composition hard, elastic, or non-inflammable.

912. Newbold, C. April 12. *Drawings to Specification.*

Asphalts used in the manufacture of paper tubes and the like are composed of the solid matter deposited from the distillation of coal tar mixed with any of the tempering liquids used therewith, and solid silicious or other earthy matter.

968. Iongh, C. de. April 17. [*Provisional protection only.*]

Casting.—Needles, guides, and points used in knitting and lace-machinery are cast in leads by a process similar to that described in Specification No. 2383, A.D. 1859. The needles &c. are clamped in a notched holding-bar at equal distances apart, and their stems &c. are then inserted in the receiving-bar, preferably of trough-shape, containing molten metal or cement, which is then allowed to set.

988. Sebille, C. F. April 20. *Drawings to Specification.*

Asphalts.—Relates to three compositions employed in making pipes, conduits, coffins, urinals, mangers, sugar moulds, washers, basins, and in paving. The first contains 70 to 80 parts of pulverized slate, 30 to 20 of resin or pitch, with 1 part of dissolved caoutchouc, if desired. The second has 74 parts of slate, 25 of resin, and 1 of pigs' bristles, while the third is made up of 32 parts of slate, 24 of resin, 37 of sea-sand, 5 of sulphur, and 2 of vegetable fibre or animal hair. The proportions may be varied, and pulverized sandstone, ground scoria, and powdered sand or

coal cinders may replace the slate. Wax may be added to cause the compositions to flow better under pressure.

1283. Boussois, F. J. E. D. de. May 23. [*Provisional protection only.*]

Asphalts; cements.—Relates to means for extracting bitumen from rocks and like substances, and to the employment of the residuum in hydraulic constructions, the paving of roads, and the like. Calcareous rocks containing bitumen are either broken by mechanical power or are reduced by muriatic acid and water, the remaining bitumen being washed in lukewarm water to free it from salt or acid. Quartzzy, silicious, or aluminous rocks are ground, stamped, or broken by mechanical power, heated, and introduced into moulds or receptacles, from which the surplus bitumen is expressed by hydrostatic or other pressure. The bitumen remaining in the residue imparts to it sufficient elasticity, tenacity, compactness, and hardness to render it suitable for use in hydraulic works, the paving of roads, &c. The broken quartzzy, silicious, or aluminous rocks may, however, be placed in conical receptacles, from which the bitumen is melted out by a current of heated air or gas, such as the gases obtained by the combustion of ordinary fuel.

1395. Brown, J. June 7.

Refractory substances.—Firebars, retorts, and other appliances connected with furnaces &c. are made from a mixture of white, black, or other clay, "corrosion," and burnt sand, burnt in a furnace and baked.

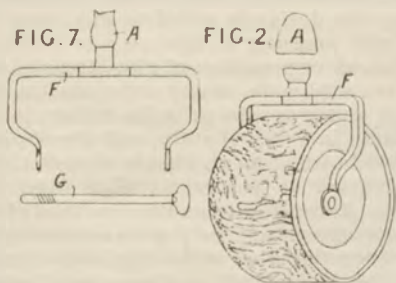
1448. Spence, W., [*Vanderburgh, G. E.*], June 13. *Drawings to Specification.*

Cements; stone, artificial and imitation; fireproof compositions.—Consists in using a fluid silicate, prepared by the action of superheated steam and an alkali, such as soda or potash, upon a silicious substance, like sand, as the binding-material in making pudding stone, sandstone, marble, and other artificial stones, and as a water-proof cement in building walls. It may also be used for fireproofing planks, boards, and wooden articles, and for theatrical scenery, the canvas of which is saturated with the fluid and then painted with a silicated paint; it is also used as a substitute for size or starch in making fireproof roofing.

1476. Kershaw, T. June 18.

Stone, artificial and imitation.—Relates to means for imitating granite and marble on painted deal, stone, slate, iron, zinc, paper, glass, &c. by means of an engraved leather-covered cylinder, as described in Specification No. 10,880, A.D. 1845. The leather is engraved with the required design, cut to the proper length, and

the ends are cemented together. It is then placed on a cylinder, preferably of zinc, having one end removable so that smaller cylinders may be carried inside. The cylinder turns on a screwed pin G carried by a forked cross-bar F, Fig. 7, attached to a handle A. To imitate marbles and woods, the engraved leather surface



is ground down in places to imitate the half lights. In any case, the colour or colours may be applied to the surface to be ornamented or to the cylinder. In some marbles, when several colours are placed on the cylinder, after being transferred to the surface they are blended together with a softener.

1503. Smith, J. June 21.

Stone, artificial.—Relates to improvements in the compositions described in Specification No. 2891, A.D. 1859. The composition consists of shellac and ebony dust, to which asphalt and ivory black or charcoal or lampblack are added for making a black product. For colours, colouring-matter may be employed with the shellac and ebony dust, such as brown asphalt, and rouge for chocolate or brown. For light colours, boxwood dust and light pigments take the place of the dark ingredients, and for very light colours barytes may be added. The mixture may represent malachite, marble, onyx, or artificial gems, and may be homogeneous or streaky. To obtain a strong light composition, vegetable fibre, such as cotton or velveteen shearings, hemp, flax, or paper pulp, may be added. The composition is moulded to the required shapes.

1513. Buckwell, W. June 21. [Provisional protection only.]

Cements, for hydraulic structures, may consist of "carbonate limestone" in fragments, or clean "sea-beach," or both. With the latter about one-tenth of pulverized carbonate of lime should be used, thoroughly mixed with "granitic breccia cement" of 112 lb. or more to the bushel, or with Portland cement of not less than 100 lb. to the bushel.

1514. Jutteau, A. June 22. Drawings to Specification.

Cements.—A cement employed for setting stone veneers used in re-facing buildings is mixed whilst dry with yellow ochre and soot to give it the colour of stone.

1549. Cartwright, M. June 26.

Casting.—The vulcanite palates of artificial teeth are coated with gold, platinum, or tinfoil. A wax mouthpiece with the teeth attached thereto is prepared in the usual manner, and, the mould having been lined with gold leaf &c., is placed in position in the mould and its upper surface covered with gold leaf &c. Rods of wax are stood on the wax mouthpiece, holes having been made through the gold covering, and the upper half of the flask is put on and filled with plaster. When the plaster is set, the flask is placed in boiling water, lid downwards, until the wax has run out. The flask is then washed in boiling water containing a little soda, and filled with vulcanite, which is ejected from a heated cylinder by a piston actuated by a screw. The vulcanite is afterwards hardened, the rods cut off, and the exposed parts covered with gold &c. The metallic covering may be thickened by electrodeposition if desired. In another method, the wax mouthpiece is fixed in the lower half of the flask with plaster, and the gold leaf applied to its upper side, the upper half of the flask being then put on and filled with plaster. When the plaster is set, the upper half of the flask with the mouthpiece is placed in boiling water, and the wax melted out. The mould in the lower half of the flask is heated, and then lined with gold leaf, while the cavity in the plaster cast in the upper half is filled with vulcanite. Both parts of the flask are then heated and clamped together, and the vulcanite palate hardened.

1559. Latta, M. J. L. June 27.

Fireproof compositions.—Textile fabrics and articles of dress, curtains, and other substances are rendered non-inflammable by treatment with certain compositions or solutions. Starch or farina to be used in stiffening or dressing the fabrics is mixed with sodium chloride, carbonate, bicarbonate, baborate, phosphate, or biphosphate in specified proportions, with magnesium sulphate, carbonate, or chloride, or with zinc salts. Instead of this composition, aluminium sulphate, either alone, or in combination with the potassium or sodium salts, may be used with the starch or farina; or ammonium chloride, carbonate, or bicarbonate, calcium carbonate, or steatite, or antimony salts, may be used with the starch, either separately or combined. The foregoing ingredients may be combined in various specified ways. Stearin, or prepared wax, may be added to the mixtures. When starch is not required in dressing the fabrics &c., the salts may be used alone.

1661. Zoubtchaninoff, S. July 10. [*Provisional protection only.*]

Cements.—A waterproof cement is formed by mixing together 15 parts by weight of colophony, 6 of linseed oil, 5 of "English siccativ," 1 of caoutchouc, 8 of turpentine, 8 of red lead, and 8 of Roman cement. The ingredients are melted together, mixed, and allowed to cool, when the cement may be used for waterproofing reservoirs, vases, boats, walls, papers, and canvas.

1676. Pizzi, P. July 11.

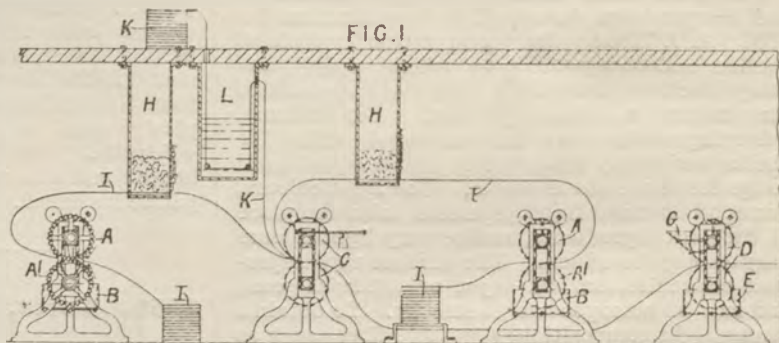
Stone, artificial and imitation; stone, colouring.—A thin coating of mortar is applied to monuments or the interiors and exteriors of buildings, and then a second coating composed of fine sand, lime, and water. After drying and hardening, the surface is washed with a hardening and preserving solution made by mixing the following ingredients, preferably in the proportions stated:—Lime about 10 parts, soap 1 part, soapstone or French chalk 1 part, alkali or "liquid salt of ammoniac" $\frac{1}{3}$ th part, and water. The surface is painted or coloured to represent marble or stone, and polished with a trowel, &c.

1747. Shaw, I. B., and Shaw, J. E. July 19. [*Provisional protection only.*]

Casting.—In making elastic printing-surfaces for printing on earthenware, porcelain, glass, and other articles, a mould is made by working the required design in relief on a piece of laminated metal from which a plaster cast is taken, or by forming the design in relief on wax, soap, clay, or wood, and pressing it into clay or other plastic material. A composition of glue, treacle, salt, and corrosive sublimate, or any other elastic material, such as gutta-percha or india-rubber, is run into the mould in a liquid state, and the design thus obtained in relief on an elastic material. In some cases, leather or papier mâché is used for this purpose. According to another method of forming the printing-surface, the plastic composition is run in between the oiled surfaces of two glass plates, the design being cut in the material when cold. The rollers used for distributing the colour on a flat surface in the process of printing on the articles are cast in earthenware moulds which are made in two parts. Similar moulds may be used for casting rollers for letterpress and other printing.

1969. McKibbin, R. D. Aug. 14.

Fireproof coverings for roofings &c.—Two webs of paper, canvas, or similar material I are passed between two pairs of hollow iron rollers A, A¹, where they are coated on their underside by bituminous matter from the boxes B. The coated sides pick up tow, felt, flax, and other waste in passing through the slotted boxes H, and the webs are united by passing between the hollow iron rollers C. The flannel-covered wooden rollers D coat the fabric on its upper and lower side with a non-inflammable composition from the boxes E and G. This operation may be repeated between two more rollers, which are preferably indented and ribbed,



respectively, to indent the fabric. A third web or net K may be added between the other two at C after passing through bituminous matter in L. The boxes are kept hot by irons or other means. The fabric may be wound up to a loft to be dried.

1985. Petrie, W. Aug. 16. *Drawings to Specification.*

Cements.—A cement for use in connecting together the several parts of a sulphuric-acid making cylinder and for a steam jet, is formed by slowly heating in a pot a mixture of 1 part of sulphur and $2\frac{1}{2}$ parts of fine sand, until the mixture begins to turn brown.

2030. Lillie, Sir J. S. Aug. 23.

Stone, artificial.—Blocks for use in constructing walls, tunnels, arches, sewers, &c. are formed by casting in moulds a mixture of broken stone, flints, bricks, clinkers, shingle, or like hard materials, together with bituminous or other cements.

- 2091. Kirrage, W., and Ripley, A.** Aug. 30.

Stone, artificial and imitation.—A plaster composition, for use as an imitation marble, consists of vegetable gluten, made of rice, arrowroot, or wheaten flour, mixed with cements or plaster of Paris, and china clay or French chalk.

- 2142. Ransome, F.** Sept. 5. [*Provisional protection only.*]

Stone, preserving; cements.—Rosin, shellac, and the like, in alkaline or saline solutions, and mixed or not with soluble silicates, are used for preserving stone, bricks, or other porous building-materials and for cementing ground or pulverized stone, sand, &c. in the manufacture of blocks and the like. When used for preserving purposes, the coating may be rendered insoluble as in the case of silicate coatings.

- 2249. Barnwell, S., and Rollason, A.** Sept. 15.

Stone, imitation; castings.—Compositions containing pyroxilin, oils, gums, resins, india-rubber and gutta-percha, salts, colours, and animal, mineral, and vegetable matters are used for lining or coating plaster casts, and for imitations of artificial coral for jewellery.

- 2346. Taylor, J. J. O.** Sept. 27.

Refractory substances.—A refractory material for building and lining bricks for furnaces, cupolas, stoves, and other apparatus, and for making crucibles, pots, and other vessels, consists of 180 lb. of clay composed of one-quarter Derby and three-quarters Stannington or like clays; 75 lb. of old unglazed crucibles or pots; 10½ lb. of kaolin; 1½ lb. of lampblack; 73 lb. of calcined Derby clay, and 18 lb. of ground coke; 6 pounds of coke are also added during mixing. The clays are dried and slaked, and the whole mixed to the desired consistency by treading and otherwise. The mixture may be applied in a moist state for lining furnaces &c. According to the Provisional Specification, equal parts of old crucibles, dried Derby blue clay, kaolin mixed with lampblack to the colour of lead, and calcined Derby blue clay are reduced to a dry powder, mixed together damp, and applied as described above.

- 2414. Brocchi, A.** Oct. 5. [*Provisional protection only.*]

Cements; asphalts.—The first distillate which comes over when "pitch of oil, boghead or peat" is gently heated, is mixed with powdered sulphur and quicklime, and strongly heated. The composition thus prepared is incorporated with sand or gravel to form a paving-material, or it may be used as a protective covering for ships' bottoms or other surfaces subject to the action of water.

- 2507. Stevens, G.,** [*Desaint, L. C.*]. Oct. 15. *Drawings to Specification.*

Cements.—The dust formed in sawing and drilling calcareous stone is washed, and "on being subjected, when dry, to the action of oil or coal tar at a high temperature, becomes more adherent and less liable to be acted on by the frost."

- 2608. Barff, F. S.** Oct. 26.

Stone, artificial.—The composition is formed of powdered pumicestone, soluble silicates, such as those of sodium and potassium, and lead or zinc carbonates, or other materials capable of combining with the silicates. Chalk, sand, or other cheap material may be added.

Stone, preserving; stone, colouring.—Natural stone surfaces are treated with a solution of an alkaline silicate, and are then coated with zinc carbonate &c., colouring-materials being optionally added. A final coating of alkaline silicate is applied.

- 2700. Hinton, G.** Nov. 3. *Drawings to Specification.*

Refractory substances.—To protect the hearth or to line a blast or cupola furnace, a coating of ground calcined boulders, pebbles, or flint stones mixed with fireclay is used.

- 2833. Barrett, B.** Nov. 17. [*Provisional protection only.*]

Stone, artificial; stone, colouring.—(1) Pulverized stone, pearl-ash, saltpetre, borax, lime, lead oxide, clay, and calcined flint, or, (2) pulverized limestone or sandstone, unslaked lime, water, alum, beer-grounds, hydrochloric acid and any desired colouring-matter, are mixed together, pressed into moulds, dried, and then subjected to a red heat to form artificial stone.

Stone, preserving; stonework, ornamental.—Artificial or natural stone is hardened by the application of a fused mixture of pearl-ash, saltpetre, borax, and arsenic, and a subsequent stoving. A coating of turpentine and copal varnish, or an enamelling-mixture containing lead oxide, flint, glass, and clay, may then be applied and the stone again stoved. Stone to imitate black marble is treated with a mixture of coal tar, varnish, turpentine, and vegetable black, stoved, rubbed down with pumicestone, then coated with coal tar, varnish, or japan black, again stoved and rubbed down, and polished with rottenstone or putty powder. Imitation coloured marble is obtained by applying a mixture of colour, copal varnish, and spirits of wine, then a coating of turpentine and varnish. After stoving and rubbing down, additional coatings of turpentine and varnish may be applied, the stone being stoved after each, and finally polished by hand.

2846. Pochin, H. D. Nov. 21. [*Provisional protection only.*]

Cements.—A building-material is made by casting iron, copper, or other slag while fluid, and finally annealing the mass.

2866. Venables, J. Nov. 23.

Stonework, ornamental.—Coloured earthenware or vitreous ornamentations, either in relief or inlaid, are produced on the surfaces of earthenware, slate, stone, or other articles by means of cut-through pattern plates or thick stencils, used directly and alone, or in connection with moulds and presses or transfer papers; the ornaments are hardened or fixed by firing. The ornamenting clay or material may be applied in a plastic or powdered state.

2879. Hale, T., and Wall, A. Nov. 23. [*Provisional protection only.*]

Refractory substances.—Bricks, &c. for air chambers erected in furnaces, and for other purposes, are made of clay mixed with a paste of asbestos, pumice, or lava fused with salt, and then powdered, and mixed with magnesia and bone-ash. Or this preparation, made into a paste with carbonate of soda or potash, may be used to coat the bricks used.

2909. Robertson, R. Nov. 27. [*Provisional protection only.*]

Asphalts.—In an apparatus for making asphalt, air is heated in tubes placed over the fire of the cauldron, and is then led into the top of the pan above the asphalt.

3003. Wheble, J. J. Dec. 7.

Stone, artificial.—Dry rubbish, sand, gravel, and shingle are ground, mixed with lime and water, and placed in lubricated moulds. Colour may be mixed with, or applied to, the stone.

3006. Morris, W., and Radford, J. Dec. 7.

Refractory substances.—Boulders, or pebbles, or the "gravel rock" found near Rednall, Worcestershire, either calcined and reduced to small pieces or powder, or in their natural form, are mixed with from about 1 to 50 per cent. of their weight of fireclay, marl, loam, clunch, or other stiff clay, and enough water to form a stiff mass. The composition may be used as a substitute for emery, for lining puddling and other furnaces, for making firebricks and refractory blocks, and otherwise in place of fireclay. A finer clay or composition containing more fireclay, clunch, or loam is used in making crucibles and retorts.

3058. Reynolds, J. G. Dec. 13.

Stone, colouring; stone, preserving.—The surfaces of stonework, &c. are coloured and preserved and the pores closed, by means of a lacquer made by boiling amber in linseed oil and adding turpentine. The surface treated is dried or baked, care being taken to exclude dust during the process. The surface is coloured by passing it through or over a clear flame, and a blowpipe is used to give a darker tint to some parts. Additional coatings may be applied, the surface being heated after each application to unite the successive coatings. The above-mentioned lacquer may be mixed with, or replaced by, copal and other varnishes, resins, fish glue, or any other gelatinous or glutinous substances which may be applied as a coating. Colouring-matters may also be introduced into the lacquer.

A.D. 1861.

- 63. Brooman, R. A.,** [*Collard, P. A.*]. Jan. 10. [*Provisional protection only.*]

Cements; stone, artificial.—Lava, puzzuolana, and other volcanic materials are fused, as powder, and if desired with fluxes. The fused mass is pulverized, and moulded, with or without heat, into tables, slabs, tablets, tiles, &c.

- 106. Lark, J.** Jan. 14. [*Provisional protection only.*]

Cements.—Portland cement is dried on a sheet-iron floor, heated by steam circulating through parallel pipes, or the cement may be placed directly on the pipes.

- 213. Mushet, R.** Jan. 26.

Refractory substances.—Crucibles for melting iron and steel &c. are made from a mixture of china clay, black or grey fireclay, scrap crucibles, and coke. The ingredients are preferably powdered to pass a 64 or 100 sieve, and are mixed with water and moulded in the ordinary way.

- 217. Clark, J.,** [*Eydt, A.*]. Jan. 28.

Statuary.—Wood paste or pulp is moulded to form statuary and the like. The wood is ground to form a paste, which is compressed, kneaded, moulded, and dried. Plaster, china clay, or the like may be mixed with the paste.

- 271. Arrieta, J. J. de.** Feb. 1.

Cements; asphalts; stone, artificial and imitation.—A bituminous substance obtained from Cuba, and known as chapapote, is used for facing and cementing brickwork and masonry, and for covering and paving roads, and a compound of dry paper pulp and chapapote is stated to be suitable for constructive purposes. Substances to be coated with chapapote are preferably first coated with coal tar, oils, &c. The chapapote is used alone or mixed with oils or hydrocarbons, lime, clay, powdered brick, or argillaceous, aluminous,

silicious, or earthy substances, wax, gutta-percha, caoutchouc, resins, gum resins, alcohol, wood spirit, agents for resisting combustion, &c. Outer surfaces of chapapote may be covered with paper, fabric, colour, stucco, &c. A composition for paving and other purposes consists of chapapote, coal tar or liquid chapapote, and a mixture of powdered and fragmentary mineral matter.

- 493. Brooman, R. A.,** [*André & Co., C. E.*]. Feb. 26.

Casting.—Moulds for sugar casting are made of unoxidizable materials, *e.g.* cardboard, pasteboard, leather cuttings, paper, caoutchouc, and other fabrics, rendered impermeable by suitable coatings. According to one process, sheets of cardboard or other material are glued together around a core shaped like a sugar loaf. When dry, the edges of the mould are fitted with iron rings, one outside and one inside higher up, the latter being turned down over and riveted to the former. A metal socket and eyelet is placed at the point of the mould. The mould is then varnished and dried at 212° F. A suitable glue consists of gelatine, rye flour, and fecula, and a suitable varnish of essence of turpentine, boiled oil, and copal varnish. The moulds may also be made of pulp with the aid of pressure, or may be formed with a metal exterior and a cardboard or other interior.

- 505. Ransome, F.** Feb. 27. [*Provisional protection only.*]

Stone, artificial.—Blocks are moulded from fine chalk and alkaline silicates, the soluble silicates contained in the block being rendered insoluble by washing the surface with aluminium, iron, or alkali chloride. Sometimes the soluble salt is mixed with the composition before use.

Cements; plasters.—Chalk and silicates are employed, alone or with quicklime and sand. The chalk may be replaced by clay.

- 513. Hay, W. J.** Feb. 28.

Asphalts.—The composition described in Specification No. 186, A.D. 1858, consisting of asphalte or the like, and oil, naphtha, or creosote, with or without caoutchouc, and vegetable tar, pitch, or

resin, is made more elastic and freer from odour, by substituting resin oil for the oil, naphtha, or creosote.

626. Coombe, J. C., and Wright, J. March 14.

Stone, preserving; cements; mortars; stone, artificial; fireproof compositions.—Stone, bricks, slate, &c. are dried and impregnated (or, according to the Provisional Specification, covered) with fluosilicic acid. The materials may undergo a preliminary treatment with a solution of lime or other earthy oxide. Cements, mortars, &c. are mixed with precipitated silica, and may then be used in the manufacture of artificial stone. Wood and other inflammable substances are impregnated with a solution of a barium salt and then with fluosilicic acid, by which treatment they are rendered fireproof.

783. Griffiths, J. March 30. [*Provisional protection only.*]

Concretes; cements.—Relates to cements which are applied to battens to form a concrete, which is a substitute for slates for roofs, gutters, cupolas, domes, cisterns, floors &c. The battens are first secured in the required positions, and then covered with cement. The material is applied in layers. The first layer, prepared with "alcal" or other lime or cement, hair, and fine cinders, is left to dry with "the top scratched"; the second layer is similar, but sprinkled over with riddled cinders, forced about half-way into the cement; the third layer is of hydraulic or other lime or cement mixed with finer ashes or cinders; and the fourth layer is of hydraulic or other lime.

796. Briggs, J. March 30. [*Provisional protection only.*]

Asphalts; cements.—Consists of a mixture of coal pitch 10 parts, lime 1 part, and gravel 50 parts. Tar, asphalt, or dead oil may be substituted for the pitch, and sand or grit for the gravel.

853. Ghislín, T. G. April 6. [*Letters Patent void for want of Final Specification.*]

Stone, imitation.—A marine plant, *eiklonia buccinalis*, is used in imitation of coral.

877. Ransome, F. April 9.

Cements; plasters; stone, artificial.—A mixture is made of powdered chalk, lime, sand, or clay with sodium or potassium silicate. The cements

are used for coating surfaces and the stone is moulded into blocks. When dry the surface is brushed over with calcium chloride or other soluble salt of an alkaline earth, aluminium, or iron. It desired all the constituents may be mixed together in the first place, but in this case the cement sets very quickly. The following are some of the proportions used:—Chalk 5 parts, quicklime 1 part, sodium silicate 1 part; chalk 2 parts, sand 8 parts, slaked lime 1 part, clay 1 part, sodium silicate 2 parts; chalk 6 parts, sodium silicate 1 part, calcium chloride 1 part; sand 6 cwt., pipeclay 1 cwt., and 7 gallons of sodium silicate.

929. Eden, F. M. April 16. [*Provisional protection only.*]

Cements.—Silicate of lime or hydraulic cement is manufactured by intimately mixing carbonate of lime or rich lime with aluminium silicate or fireclay, both being dry and powdered, and then burning the mixture. The product is finely ground before use.

943. Dixon, W. A. April 17.

Plasters.—Walls and ceilings are covered with thin moulded plaster plates, joined together by a mixture of plaster of Paris and plasterer's putty; the surfaces are finished with sand or plaster of Paris and run lime. After a few days the usual coat of whiting may be applied. The plates are composed of fibrous and plastic substances, such as gypsum, ashes, manilla hemp, coco-nut fibre, and sawdust, mixed in specified proportions.

1228. Brooman, R. A., [*Quéruel, J. B. J.*]. May 14. *Drawings to Specification.*

Casting.—A sugar refinery has a shaft, with a hoisting-device therein, communicating with each floor. The sugar is run from a pan on the bottom floor into a jacketed filling-pot, provided with a spout and cover, the jacket being packed with charcoal or other non-conductor. The filling-pot is then run on a truck into the shaft and hoisted to one of the floors on which the moulds are arranged, where it is placed upon another truck, so arranged that carriages, fitted with pivoted frames for the moulds, may be run underneath the filling-pot, and the moulds filled in succession. The moulds are formed with an aperture at the base, into which screws a metal spile, terminating internally in a button on which rests a washer.

1269. Ponton, A. C. May 18. [*Provisional protection only.*]

Stone, artificial; cements; mortars.—Silicious stoneware is composed of ground flints, ground quartz, or Lynn sand, or Tripoli or silicious powder from any other source, and as much

melted sulphur as is necessary to unite the silicious particles. Colouring-matter may be added. The composition is used for gas and other pipes, sewers, fountains, statues, busts, vases, utensils, reliefs, dies, moulds, &c. and for walls, ceilings, ornamental stonework, roofs, floors, mouldings, &c.

1344. Hale, T., and Wall, A. May 29.
[Provisional protection only.]

Refractory substances; fireproof coverings and compositions.—A preparation to be added to clays for the manufacture of firebricks and the like, or for use as a refractory or fireproof composition, is made by treating powdered asbestos and pumicestone, or lava, in a furnace or crucible with muriate of soda. When sufficiently treated, the mass is removed and reduced to powder, and powdered magnesia and bone-ash are added, and the preparation is ready for use. Or it may be reduced to a paste or paint with water, either pure, or mixed with adhesive matter, and with or without carbonate of potash or soda, and is then used to coat bricks, or other articles or structures formed of clay, earthenware, stone, or metal.

1407. Standfast, S. June 4.

Stone, artificial, is made of burnt clay or loam, iron dust, brick rubbish, gravel, lime, cement, vegetable fibre, hair, and sand mixed in suitable proportions with water and run into moulds, in which are placed iron hoops and wire to stiffen the cast blocks.

1428. Rust, J. June 6. [Provisional protection only.]

Stone, preserving; cements.—Stones and cement are hardened and preserved by coating them with a hot solution of barium hydrate, or magnesium bicarbonate, or both, and then with a solution of hydrofluosilicic acid, or a fluoride of alumina, or a potash or soda solution of alumina or silica.

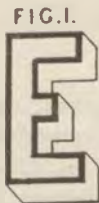
1549. Clark, W., [Murray, T. L., and Holthausen Bros.] June 17.

Stonework, ornamental.—Mica, in differently coloured or metallized sheets, is employed for making letters, designs, armorial bearings, &c., which can be applied to stone for use for other decorative and useful purposes. The mica is split into thin sheets and cleaned. The sheets are coloured with oil colours, spirits of wine, and oil varnish, or are metallized with gold, silver, platinum, or other metal leaf. Or coloured or metallized paper or fabric may

be pasted at the back. For letters, the back of the mica may be painted, and subsequently varnished. The sheets are cut to the required shapes with a hollow punch or pattern plate, and are then filled in with colours. The pieces are then affixed on a sheet of mica with white spirit varnish. Any required design is cut in the mica sheets with scissors &c. Several pieces of different colours are then superposed to form any letter or design, the pieces increasing in size from above downwards. For example, the letter shown is formed of three differently-coloured pieces, a smaller upper one, an intermediate one, and a lower larger piece. The letters &c. are affixed to the surface to be decorated by an adhesive material. For gold or silver letters, fish glue with water or gum is used. A gutta-percha solution may be used for attaching letters, or Venice turpentine which has been boiled until it will solidify when cold. The latter is applied with a stick to the back of the letter, and the letter is afterwards pressed on to the surface by a hot iron. Letters may also be formed by "punching openings in cardboard, leather, or other material, the parts which are to be coloured are then lifted by means of a little brush; the back of the sheet is then coloured with the colour desired, after which it is varnished and superposed, as desired."

1603. Johnson, J. H., [Kessler, L., and Michiels, J. A. X.] June 21.

Casting.—Printing-surfaces, engraved plates, mouldings, bas-reliefs, statuettes, bronzes, &c. are reproduced on either a reduced or enlarged scale, or of the same size, by taking a cast or moulding of the article in gelatine, gluten, coagulated albumen, plastic or dissolved india-rubber or gutta-percha, isinglass, gum dragon or tragacanth, fibrine, ceramic paste, or other plastic substances, and acting on such cast or moulding with chemicals, solutions, or vapours, to contract, expand, or harden the material. The reproductions may be placed at once on the market, or serve as moulds or matrices for obtaining durable copies by electrotyping, moulding in plastic material or wood, or for reproducing other copies in a similar manner on a further diminished or enlarged scale. According to one method, a gelatine cast is taken of an oiled or soaped engraved metal plate or wood block, and is contracted and hardened by treating it with solutions of alcohol of increasing strength and iron sulphate or a mixture of iron and copper sulphates. Other salts or solutions may be used, such as salts of aluminium, copper, iron, manganese, or silver, and a deposit of copper, silver, gold, &c. may be precipitated on the surface, or a coating of plumbago may be applied to receive a deposit of copper. The gelatine may be mixed with a tannate, such as tannate of lime, ammonia, lead, or barium, and dipped in an acid to render it insoluble. An impression may be taken of the gelatine cast in stearin, gutta-percha, or an amalgam of silver, copper, cadmium, or gold, or a



first cast may be taken in gutta-percha and a second in gelatine. India-rubber mouldings may be enlarged by securing them in a distended state to a backing of sheet rubber, or by the action of solvent vapours.

1607. Johnson, J. H., [Tolijon, S.].
June 22.

Cements.—Flooring-tiles and paving-blocks are moulded from a mixture of hydraulic lime and fine sand, preferably in the proportions of three to one. The lime is broken into fragments and arranged in alternate layers with the sand, each layer of sand being added immediately after slaking the previous layer of lime. The materials are allowed to stand for about 45 days and are then thoroughly mixed and finely sifted. Alternatively the materials may be mixed after a rest of 15 days, the mixture being left for 15 days more before being moulded into tiles &c.

1709. Williams, O. July 5.

Fireproof compositions.—A fireproofing-composition consists of the following ingredients, used preferably in the proportions stated:—1000 gallons of hot water, 2,000 lb. of soda, 650 lb. of commercial alum, 570 lb. of "roach alum (or "mineral salt)," 1,750 lb. of common salt, 250 lb. of borax, 17 lb. of zinc chloride, and 30 gallons of oil of vitriol. The composition is used for fabrics, wood, paper, &c.

1738. Barff, F. S. July 9.

Stone, preserving; stone, artificial; cements.—A mixture of alkaline silicates and potassium aluminate in solution is used for indurating and preserving stone, bricks, tiles, cements, or like absorbent materials. The liquid may be used with powdered pumicestone for making artificial stone for building and other purposes. According to the Provisional Specification, zinc aluminate is used instead of potassium aluminate.

1793. Palmer, W. July 16.

Casting.—Relates to manufacture of cupped pistons or plungers for pressure lamps. The pistons are made of a composition of equal parts of glue and treacle, either alone or with other material, strengthened internally and externally by linings of leather or woven material. The glue is soaked in water to soften it, treacle is added,

and the mixture is heated in a water bath. The mould used consists of a concave and a convex part, between which is a space for the linings and the desired thickness of composition. The external lining, previously coated with composition, is placed in the concave part of the mould, which is then filled with composition. The convex part of the mould, over which is placed the internal lining similarly treated, is then pressed in, being prevented from entering too far by suitable stops, and held in that position until the composition is cold. The edges are then trimmed and the piston finally coated all over with composition. Washers for joints of lamps are also made of this composition, either alone or strengthened by a sheet of leather or woven material.

1886. Hare, Sir J. July 27. [Provisional protection refused.]

Casting.—Consists in manufacturing and baking sugar in blocks, either square, round, oval, hexagonal, octagonal, or other regular shape, and of various sizes, and casting them in moulds of metal, glass, china, or other suitable material.

1901. Allen, M. July 30. [Provisional protection refused.]

Concretes; casting.—A material for constructing stairs, staircases, floors, roofs, lintels, mouldings, cornices, and other parts of buildings is made by mixing about three parts of burnt clay, cinders, slags, coke, culm, clinkers, or like calcined material with one part of cement or lime. The moulds in which the material is cast are faced or lined with metal, such as zinc.

2031. Bethell, J. Aug. 15.

Refractory substances.—Crucibles and melting-pots are made of steatite, either by cutting them out from the solid material or by compressing powdered steatite in moulds. The crucibles may be calcined like potteryware.

2034. Kain, F. A. Aug. 15. [Provisional protection only.]

Stone, artificial.—Bricks, tiles, retorts, railway sleepers, and other articles are made of artificial stone or earthenware composed of the under-mentioned ingredients, used preferably in the proportions stated:—24 lb. of pulverized slate,

3 oz. of magnesium carbonate, $3\frac{1}{2}$ lb. of fine sand, $5\frac{1}{2}$ oz. of ground silica, 9 lb. of wet clay, and sufficient water to form a plastic mass. The articles are moulded, and fired by heating gently for 24 hours, then gradually raising to a white heat, which is maintained for about two days to produce vitrification; the kilns are then slowly cooled. Chalk or limestone may be placed in the kiln to glaze the articles, or sugar of lead or other glaze may be applied.

2162. Matthews, J. S. Aug. 30. *Drawings to Specification.*

Fireproof compositions.—Starch is rendered incombustible or non-inflammable when used with all kinds of fabrics, by one of the following compositions:—(1) 500 parts of the finely-divided double salts of zinc and ammonium or aluminium sulphates, and 300 parts of ammonium and zinc or barium chlorides. (2) 500 parts of the double salts of zinc and ammonium or magnesium sulphates, and 200 parts of barium and ammonium or calcium chlorides. (3) 500 parts of the double salts of zinc and ammonium sulphates, and 200 parts of ammonium and sodium biborates, with an excess of ammonia. The Provisional Specification gives the following mixtures:—(1) 100 parts of borax, 75 parts of sodium sulphate, 50 parts of sodium tungstate, and 50 parts of sodium phosphate. (2) 100 parts of borax, 75 parts of ammonium chloride, 75 parts of ammonium phosphate and 50 parts of ammonium sulphate. (3) 100 parts of borax, 75 parts of sodium sulphate, 75 parts of ammonium sulphate, and 50 parts of ammonium phosphate.

2306. Clark, W., [Cavenne, L. A. A., and Holthausen, F.]. Sept. 16. [Provisional protection refused.]

Stonework, ornamental.—Stone surfaces covered with leaf metal are protected by cementing mica thereon, and may be ornamented by gilding and silvering the back of the mica covering.

2335. Coombe, J. C., and Wright, J. Sept. 19.

Stone, artificial; statuary.—In making artificial stones, bricks, tiles, and terra-cotta casts of statuary, a slightly-acid mixture of lime or chalk with hydrofluosilicic acid is added to the usual constituents. Potassium fluosilicic acid is added

to give the required consistency. Reference is made to Specification No. 626, A.D. 1861.

2952. Hulard, J. B., and Poupel, L. G. Nov. 25.

Stone, preserving.—Natural and artificial stone, plaster surfaces, &c. are coated or indurated with a hardening and waterproofing composition formed by the admixture of the following ingredients, viz.:—Slag, borax, white lead, aluminium sulphate, lead acetate, zinc sulphate, potassium or sodium silicate, kaolin, linseed oil, and water. The metallic salts and borax are separately dissolved in hot water, then mixed together, and subsequently incorporated with the oil and powdered slag, kaolin, and white lead, a homogeneous liquid being formed. The specific proportions preferably used are stated in the Specification.

3108. Tooth, W. H., and Yates, W. Dec. 11. *Drawings to Specification.*

Refractory substances.—The bricks, linings, and other parts of furnaces are made from mixtures containing from 10 to 25 per cent. of carbonaceous matter, such as coal, charcoal, coke, or pitch, from 25 to 50 of iron cinder or scale, or oxide of iron, from 30 to 60 of aluminous earth or clay, and sometimes 5 or 10 of lime. The composition is moulded into bricks or used in a molten or plastic state.

3141. Brooman, R. A., [Beauregard, F. A. T. de]. Dec. 13. *Drawings to Specification.*

Cements.—Relates to apparatus for superheating steam and gases and for projecting them, combined with air, upon ignited combustible matter. The apparatus is applicable, more especially as a substitute for the blowers of blast and other furnaces, and the application to blast furnaces is illustrated in the Specification. It is, however, stated that the method of superheating steam or gases may be employed in the burning of plaster. After traversing a drying-chamber, the steam or gases to be heated are passed through horizontal tubes, contained in a superheating-vessel, which is placed in and across a heating-furnace, which is fitted with vertical tubes for the passage of the products of combustion from the grate of the furnace. From the superheating-vessel the steam or gases issue into an outlet pipe, the nozzle of which enters a tube having a funnel-shaped mouth. The mixture of steam or gases and air passes through the said tube into a blast furnace or elsewhere.

A.D. 1862.

- 76. Darvill, H.** Jan. 10. [*Provisional protection only.*]

Stone, preserving.—Chalk is cut into the required forms for building, and is dried, and immersed successively, under pressure or otherwise, in two solutions which react and deposit a hard insoluble salt in the pores of the chalk. The first solution may be sodium or potassium silicate or tungstate, and the second, calcium chloride.

- 126. Moss, B.** Jan. 17. [*Provisional protection only.*]

Refractory substances.—Steatite is powdered, mixed with water, which may contain potash or other chemicals, and is made into bricks, firebricks and blocks, and sieges for pots in glass-houses; it is also applied to furnace construction and lining generally. Clay may also be added.

- 211. Warren, W. W.** Jan. 27. [*Provisional protection refused.*]

Concretes.—Graves and vaults are filled in with a mixture of cement, lime, asphalt, or the like with ballast, gravel, burnt clay, or other silicious matter.

- 220. Church, A. H.** Jan. 28.

Stone, preserving and colouring; cements.—Stone, slate, cement, and other surfaces are preserved and hardened by giving them alternate coatings of baryta water and a solution of silica. The baryta water is prepared by slaking barium oxide and adding water to bring it to the consistency of cream; this paste is then boiled with water so as to give a saturated solution. Alternatively, the crystallized hydrate may be dissolved, or strontia may replace the baryta. The solution of silica is prepared from a dilute solution of silicate of potash or soda, by adding it to a strong solution of a suitable mineral acid, and then dialysing it. When the surface is to be coloured, paint or other coloured preparation is added to the baryta solution.

- 228. Bodmer, R., and Wilson, W.** Jan. 28.

Stone, artificial and imitation; stone, colouring.—In order to accelerate the process of induration in the making of artificial stone by the method described in Specification No. 1270, A.D. 1856,

about one pound of sal-ammoniac or other ammonium salt is added for every ton of material. Artificial stone is made entirely of hydraulic or other limes or combinations of limes designed to stand the action of water and heat, sal-ammoniac being used as before described. Dark-coloured stone is made of powdered coal or other forms of carbon with such a proportion of lime or cement as will give sufficient hardness after compression in moulds in the moist state.

- 244. Allen, M.** Jan. 30.

Stone, artificial; casting.—A fireproof material for floors, roofs, steps, slabs, lintels, chimney-pieces, and the like consists of cinders, slag; coke, culm, clinkers, or other calcined substances, three parts, and Portland or other cement, one part. The material is cast in moulds faced with zinc or other suitable metal, and is strengthened by iron ribs or bars placed on edge.

- 288. Clark, W.,** [*Sperl, H., Hagen, R., and Springer, W.*]. Feb. 3. *Drawings to Specification.*

Fireproof compositions.—Common salt or a basic salt such as iron protoxide and water glass applied in succession, are used for fireproofing wood.

- 397. Dodson, A. J.** Feb. 14. [*Provisional protection only.*]

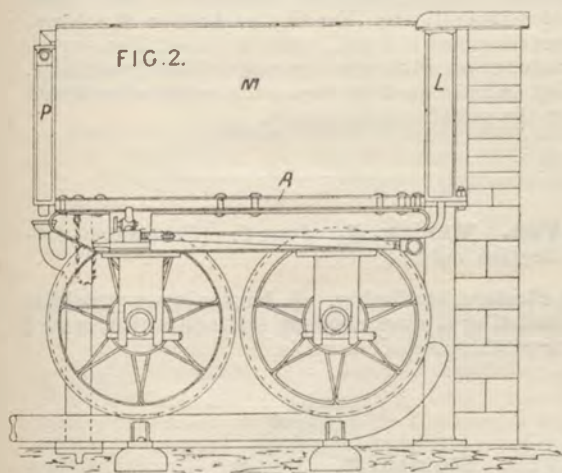
Cements.—A mixture of pulverized slate with vegetable or mineral pitch is used as a cement, "and as a substitute for metal in certain constructive purposes." Tar may also be added to the composition.

- 643. Bennett, W. J.** March 10.

Stone, artificial and imitation; stone, colouring; stone, preserving; cements; plasters.—A quick-setting cement or artificial stone for figures, vases, mouldings, and other building details is produced by mixing the cementitious materials with a solution of sodium carbonate, or its equivalent, sal-ammoniac and alum, or an equivalent aluminium

salt. The proportions preferably employed are as follows:—To 60 gallons of water is added a solution of 2 lb. of sodium carbonate, or 3 lb. of potassium carbonate in 2 quarts of water, with 1 oz. of sal-ammoniac and 2 oz. of alum or equivalent aluminium salt. A little acid indigo solution is added to improve the colour. Plastering cement requires a larger proportion of water but hydraulic cement less water, say only 40 gallons. "Dead" cement, and cement for use in cold climates, both require a larger proportion of the fluid compound; a smaller proportion is required for that used in hot climates. Moulded work may be steeped in a bath of the fluid compound to improve surface appearance and moisture-resisting properties.

684. Hunter, J. March 13.



Casting.—Slag is cast into blocks, for removal from furnaces, on the water-cooled platform A, of a bogie, which forms the temporary bottom of a water-cooled box. Three sides M, L of this box are fixed, and the other side is formed as a door P for egress of the block. The platform and sides are hollow or cellular for circulation of water through them.

720. Scott, H. Y. D. March 15.

Cements.—"Scott's cement," containing a small proportion of lime sulphate, is prepared by heating lime in contact with sulphurous-acid gas. The pulverized quicklime or partly-slaked lime falls from a revolving sieve down a firebrick shaft, and flames from a reverberatory furnace and sulphur dioxide from a louver-board ashpit floor, are drawn into the shaft at the top. The descent of the lime is delayed by feather-edged fire tiles, with their broad faces steeply inclined. Additional air for oxidizing purposes is admitted by perforations in the wrought-iron casing of the lime sieve, while the draught is obtained from an expanding chimney, which allows the finer par-

ticles of cement to fall back. The lime may be continually carried to the top of a rotating cylinder and allowed to fall, at the same time being acted on by the heated ingredients of sulphuric acid. ["Scott's cement" is probably that described in Specifications No. 915, A.D. 1856, No. 491, A.D. 1857, and No. 443, A.D. 1859.]

834. Taylor, W. J. March 26. [*Provisional protection only.*]

Cements.—Portland cement is mixed with one or more colours and used for plain or ornamental plastering for walls, buildings, and mouldings.

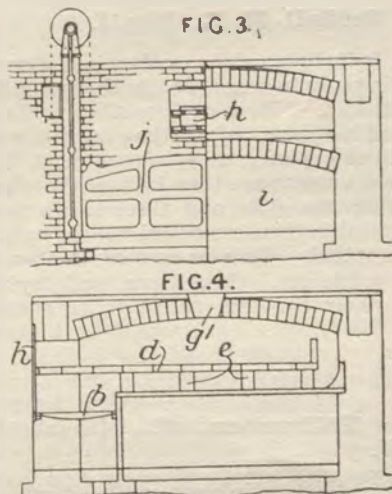
888. Jordan, J. March 31. [*Provisional protection only.*]

Mortars for jointing and bedding armour plates and backing are composed of clean river sand, Portland and Roman cement, or powdered porcelain, clay, and quicklime mixed with well-boiled linseed oil and litharge, linseed oil, and Japan size or shellac varnish.

1005. Copley, T., and Wright, J. April 8.

Refractory substances.—The coarse silicious residue from a wet metallurgical treatment of gold and silver ores is mixed with a solution of magnesium chloride and moulded into fireproof or building blocks &c.

1014. Langston, J. April 9.



Cements.—In the manufacture of Portland cement, instead of grinding the "mud" and chalk

with a large quantity of water and running into settling-ponds, the "mud" is mixed by stirrers with sufficient water to allow sand and other impurities to settle, and is then passed through a sieve, and mixed in a pug-mill with chalk, which has been hand-picked, roughly ground between rollers, passed through a reciprocating sieve, and finely ground between a second pair of rollers. The paste formed is dried on the floor *d*, Fig. 4, of the oven, which is supported on arches *e*, the mixture being introduced at the opening *g*¹ and withdrawn by the door *h*. The heated air passes from the firebars *b* under the floor, through the drying-chamber into the flue at the front of the furnace, and through the roof into the stack at the back. These ovens alternate with others, Fig. 3, adapted for the formation of coke in the fire hole *i*, which is situated under the floor and is provided with a counterbalanced door *j* for withdrawing the coke. The coke so formed is used in burning the cement.

1038. Trimen, A. April 10. [*Provisional protection only.*]

Stone, preserving.—Magnesian limestone and other stones are made waterproof by being saturated and coated with lac dissolved in naphtha or spirits.

1278. Prince, A., [*Weimar, J. P.*]. April 30.

Stone, artificial; castings.—An artificial marble or gypsum for casting statuary &c. consists of powdered minerals mixed with solutions of potassium or sodium silicates, and colouring-matters.

1505. Bridell, E. J. May 17.

Stone, imitation; stone, colouring; cements.—Cement is made to resemble marble by the following treatment. Fibres of floss silk or silk waste are soaked in colour, and are then fixed on a smooth surface in the veining or figure required. Patches of coloured cement are then laid on the glass, and after a time the glass and threads are removed. The material is then smoothed, and a backing of canvas applied. Coarser cement is then added and allowed to set. On removal and drying, the block is ready for final polishing or enamelling.

1588. Tolhausen, F., [*Heinhold, E.*]. May 27.

Statuary.—Bas-reliefs are made of wire gauze or other metallic fabrics or asbestos fabrics with the interstices filled with suitable substances such as varnish, gelatine, india-rubber, gutta-percha,

and plaster of Paris. Putty, tar, pigments, and the like may be applied to render the materials impervious. Or the fabrics may have their interstices filled with vitreous or ceramic substances, and then be fired.

1652. Sullivan, W. K. May 31. [*Provisional protection only.*]

Stone, colouring; stone, preserving; cements.—To render stone and cement impervious to damp, solutions of magnesium or zinc fluosilicate, or other soluble fluosilicate, and of potassium or sodium aluminate, or potassium or sodium silicate, or both, or aluminium silicate in alkaline solution, are applied. The solutions are applied by brush or immersion. For cements, the sand is mixed with potassium aluminate, and then potassium silicate. For the production of colours, certain metallic fluosilicates are used, alone or in conjunction with zinc or magnesium fluosilicate. Any colours used for frescoes may be substituted for the metallic fluosilicates.

1704. Verity, J. June 6. [*Provisional protection only.*]

Plasters, hardening. A hardening-composition consisting of lime, common salt, and water, is used for plaster and other walls.

1717. Hottin, E. June 9. [*Provisional protection only.*]

Fireproof compositions.—A composition containing 14 parts of salts of tartar, 5 parts of starch, fecula, tapioca, or other gum, and 1 part of sodium sulphate is used in cold solution as a fireproofing-composition for cotton, linen, and other fabrics, and for woodwork.

1757. Longbottom, A. June 13.

Stone, artificial, for cleaning &c. is made by mixing the following powdered substances, preferably in the percentage proportions stated:—Dehydrated calcium sulphate 60, calcium oxide or hydrate 20, steatite 10, and zeolite 10, or silica 8, and sodium hydrate 2. Suitable colouring-matter is added, if required, and sufficient water to render the mixture plastic. On setting, a hard stone is formed.

1827. Fabbriotti, B., [*Vanderbilt, G. R.*]. June 21. *Drawings to Specification.*

Cements.—Liquefied quartz is employed as a

cement or binding-material to be mixed with emery or other grit for the manufacture of polishing-bands.

2018. Gannal, A. A. July 14. [*Provisional protection only.*]

Cements; asphalts; concretes.—Bitumen or tar, or both substances, are mixed with dried earth or river sand, at about 254° to 318° F., the proportions preferred varying from 8 to 25 parts of bitumen to 100 parts of sand. The temperature is then raised to 360°–424° F. The cement thus made is applied with a trowel and beaten with a heated stamper, superficial excess of bitumen being taken up by very fine sand.

2044. Dickson, J. July 17. *Drawings to Specification.*

Cements.—A cement for securing a carbon anode in an electrolytic cell may be formed of mixture of silica, precipitated barium sulphate, and asbestos.

2148. Hughes, E. T., [*Langen, E.*] July 29.

Slags, treatment of; cements.—Molten slag, from blast, puddling, re-heating, and other furnaces, is run into a large body of water or other steam-producing fluid. The product is used instead of sand in making mortar or cement, or in admixture with lime or cement for the manufacture of bricks, stones, slabs, ornaments, &c.

2258. Westmacott, C. M. Aug. 12.

Cements; mortars; plasters.—Lime is mixed with twice its weight of powdered chalk, to which is added sand, plaster of Paris, or clay, according to whether a mortar or plaster is required.

2269. Tussaud, J. R., and Tussaud, F. C. Aug. 13.

Statuary.—The surfaces of figures, busts, or other representations formed in wax or compositions thereof with other materials, and optionally coloured or tinted, may be protected from discolouration by the atmosphere, or injury by cleaning, by being coated first with a solution of shellac, gelatine, or albumen, or with white hard or other varnish, preferably colourless or nearly so, and then with one or more coatings of wax, spermaceti, stearin, or similar fatty matter, or of the composition of which the representation is formed, dissolved in benzol or other suitable solvent.

2272. Peters, J. Aug. 13. [*Provisional protection only.*]

Cements.—Hydraulic cement is made by burning in a kiln, "grey stone" containing roughly clay 16 per cent., and limestone 84 per cent., and pebbles containing roughly silica 90 per cent., and clay 10 per cent. The calcined materials are finely ground.

2318. Boetius, H. Aug. 18. [*Provisional protection only.*]

Refractory substances.—Asbestos is used together with fireclay or plumbago, or both, and with or without crushed firebricks, for making crucibles, melting-pots, &c. The asbestos is soaked in water to form a pulp, which is then mixed and kneaded with sufficient of the other materials to produce a mixture having the consistency of soft clay.

2339. Boubée, A. Aug. 21. [*Provisional protection only.*]

Stone, artificial.—In the manufacture of glass objects in imitation of polished stone, molten glass is rolled in pulverized enamel, and is subsequently moulded.

2461. Snider, J. Sept. 6.

Fireproof compositions.—Consist of graphite and linseed oil, with or without beeswax treated as described in Specification No. 3024, A.D. 1861, [*Abridgment Class Paints &c.*]. The articles are immersed in a hot bath of the composition, dried, and then coated with a graphite paint.

2645. Ellis, H. Sept. 29.

Fireproof compositions.—Soluble double silicates, specially prepared, are employed for rendering textile and other fabrics non-inflammable. For delicate fabrics, the compound silicates of sodium or potassium, and aluminium, magnesium, or iron are used. A suitable mixture consists of 80 parts of sodium (or potassium) and magnesium silicate, 15 parts of the corresponding double silicate of calcium, 2 of that of aluminium, and 3 of that of iron. Another consists of 96 parts of sodium or potassium and magnesium silicate, and 4 of the corresponding double silicate of iron. Either of these solutions is diluted, the fabric is steeped therein, and before it is dried it is steeped again in a dilute solution of alum, the operation being repeated until the fabric is sufficiently mineralized.

Cements; stone, preserving.—A double soluble alkaline silicate, to which newly-prepared hydrated iron oxide may be added, is applied to

the stone or cement, and is decomposed therein as an insoluble silicate by means of a chloride or other suitable solution. In some cases, the stone or cement may be covered with a coating of artificially-prepared alumina or corundum. Jets of lighted gas may then be turned on the stones, bricks, &c. so treated to glaze the coating.

Stone, artificial.—The solutions for hardening and preserving stone may be used for making artificial stone, by adding thereto powdered earthy and mineral substances, and heating. To imitate minerals, the ingredients of the mineral to be imitated are precipitated out of the soluble silicate solution, and then dried, heated, mixed, and added to a concentrated soluble silicate, and finally heated. A mixture for making artificial stone may be formed of 6 parts of silica, or any powdered silicious earth or mineral, 1 of a carbonate, and 1 to 2 of a saturated solution of compound silicate. A mixture for preparing a slate-coloured stone consists of 12 parts of fine slate dust, 2 of calcium carbonate, 1 of sodium-calcium silicate solution, and, of sodium-aluminium silicate. Any desired pigments may be added, or the colours may be afterwards applied. A mixture for a very hard white stone consists of 6 parts of silica or flint powder, 2 of barium carbonate, and 2 of sodium-barium silicate. For a softer slate stone, 8 parts of slate dust, 2 of magnesium carbonate, 2 of a saturated solution of sodium-magnesium silicate are used. The proportions in all these may be varied according to requirements. The plastic mass may be moulded, and subjected to a graduated heat. If subsequently coated with a silicious paint, the latter may be turned into a glaze by heat.

2692. Page, R. Oct. 6. *Drawings to Specification.*

Stone, artificial and imitation, for the floors of stables, kennels, and fish houses, is made by adding water to a mixture of 1 part of Portland cement and 3 shingle, or the shingle may be wholly or partly replaced by clinkers, in which case 1 part of fine sand is added. The quantity of fine sand may be halved, and the shingle or clinkers doubled. This stone may be rendered non-absorbent by boiled linseed or other oil.

2750. Chatwood, S. Oct. 13. *Drawings to Specification.*

Fireproof compositions.—The door chamber of safes &c. is filled with carburet of iron, sulphate of barytes, sulphate of lime, or a mixture of two or more of these. Hermetically-sealed vessels of glass, china, &c. containing carbon bisulphide, sulphurous acid, &c. are embedded in the above filling, so that, when excessively heated, they will burst.

2756. Thomas, C. Oct. 13. *Drawings to Specification.*

Stone, artificial.—An artificial stone is produced by combining a solution of sodium silicate of a

density of 1750° Twaddell with black-ash waste from alkali manufacture or with burnt iron pyrites. These materials may be used separately or together, and form, with about 20 or 30 per cent. of their weight of silicate solution, a soft mass capable of being moulded or made into blocks for building or other purposes.

2802. Nelson, E. Oct. 16. *Drawings to Specification.*

Refractory substances.—For making a heating-coil for steam, air, &c., there is employed washed and sieved fireclay to which is added burnt fireclay, horse-dung, or other carbonaceous matter, gluten dissolved in a decoction of malt, barley, beer, sodium borate, or caustic potash or soda. To ensure humidity while fabricating the apparatus in the making of which the refractory substance is employed, sugar, molasses, or other organic or mineral matter that will keep the clay moist are added, while to prevent fermentation bichloride of mercury or other substance is used.

2837. Duke, J., and Cleaver, J. Oct. 21.

Cements; plasters.—Calcareous material, which may be calcined, is mixed with clay, and the powdered mixture is suspended in water, allowed to settle, and then burnt in a kiln until the lime and clay combine, the cement formed being finally powdered. The preferred composition contains 3 to 4 parts of calcined white or blue lias or mountain lime, or 6 parts of unburnt soft carbonate of lime, mixed with one part of slate clay, potters' clay, pipeclay, porcelain clay, fireclay, or other aluminium silicate. If there is a deficiency of silica, 5 to 7½ per cent. of powdered flint or glass is added. One part of dehydrated gypsum, added to 2 parts of the cement, render it suitable for the plaster.

2865. Groux, L. Oct. 24. *Drawings to Specification.*

Casting.—A star-shaped &c. bar of soap is placed upright in a cylindrical mould and melted soap of another colour is poured around it to form a two-coloured bar, which may be cut into tablets.

2997. Newton, A. V., [Schulze, P., and Billing, F. W.], Nov. 5.

Casting.—A mould for a die in which to cast a seal or like stamp is prepared as follows:—A glass or other hard plate is grained by grinding and coated with an alcoholic solution of shellac, and a drawing is made upon it in ink soluble in water, such

as a mixture of an aqueous solution of gum arabic, sugar, and lampblack, ivory black, or other colouring-matter, or of glue water and colouring-matter. The surface is then coated with beeswax softened with turpentine, or, preferably, with a composition containing beeswax, asphalt, resin, and thin varnish or linseed oil. The coated plate is then soaked in water, and the ink is washed out in a stream of water. The ground is raised, if necessary, by dusting with lycopodium and applying more composition with a roller. Broad

spaces may be raised by applying beeswax or asphalt.

3320. Breckon, J. R., and Douglas, T. Dec. 11.

Refractory substances.—Powdered ganister is mixed with fireclay in the proportion of 4 to 5 parts of the former to one of the latter, and the composition is used for making firebricks and other refractory articles.

A.D. 1863.

89. Leproux, L. H. E., [*Jaffary, F.*] Jan. 10. [*Provisional protection only.*]

Stone, artificial; cements.—Slabs for preserving walls, plinths, and foundations from the effects of damp, are made of the following substances, preferably in the proportions stated:—8 lb. each of resin, plaster, and sand, 48 lb. of gravel or flint. The joints between slabs are filled up with the same composition.

126. Johnson, W., [*Macfarlane, T.*] Jan. 14. *Drawings to Specification.*

Refractory substances.—A hearth for a reverberatory furnace is prepared by mixing 100 parts of ground quicklime with 16 parts of basic or other slag or glass.

157. Sabel, E., [*Sépulchre, J.*] Jan. 19.

Casting; stone, artificial and imitation.—Molten or fluid slag from a blast or other furnace is run into a trough with inclined sides, or into sand moulds contained in metal frames heated to a red heat, and is allowed to cool down slowly. The moulded mass may resemble marble or porphyry, and may be cut and worked like natural stone and used for buildings, paving, macadamizing, millstones, grindstones, &c.

184. Boubée, A. Jan. 21. *Drawings to Specification.*

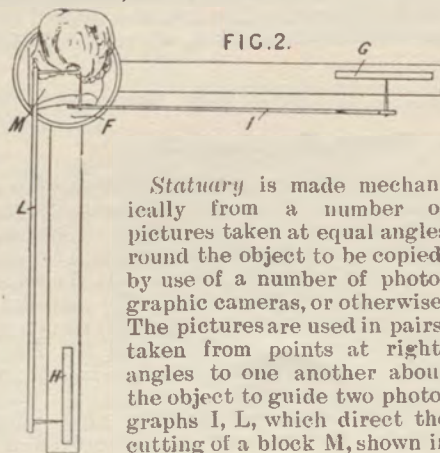
Stone, artificial. Powdered stones, saltpetre, and "salt of potash" are mixed together and

heated in a glass furnace for about nine hours. A little powdered malachite or the like is then added, and the whole mass thoroughly fused. The result is a composition which can be moulded into imitation of marbles, gems, &c.

232. Henson, H. H. Jan. 27.

Asphalts.—Relates to fabrics mainly coated with waterproof material for covering floors, walls, roofs, and other surfaces. The material may consist of a mixture of fibrous substances with asphalt or the like, and may be attached to the fabric either by pressure or by glue, cement, rubber solution, or other adhesive substance.

256. Clark, W., [*Willème, F.*] Jan. 28.



Statuary is made mechanically from a number of pictures taken at equal angles round the object to be copied, by use of a number of photographic cameras, or otherwise. The pictures are used in pairs, taken from points at right-angles to one another about the object to guide two photographs I, L, which direct the cutting of a block M, shown in plan. The block is mounted

on a graduated turntable F, and is turned the proper angle when a new pair of pictures is inserted. The pictures are carried on boards G, H. The photographs may be of any ordinary construction, and carry points, drills, or scrapers to cut the block, which may be of marble, stone, wood, ivory, plaster, or other material. The process may be used for making sculpture from life, or for copying sculpture or bas-reliefs. Caricatures are obtained by distorting some of the original pictures, by mounting them on a sheet of india-rubber, stretched in a frame, and allowing it to contract. In another method, each picture is used to give an outline on one surface of a separate strip of wood, pasteboard, metal, or other material, of wedge-section; the strips are cut to the outlines, and then arranged in order about an axis, to reproduce the original. Moulds may be thus made. Spaces between the strips may be filled up with clay. Each strip may be repeated in large numbers by stamping, or by turning cylinders made up of a number of strips held at the ends, or solid cylinders of wood or clay may be turned, and afterwards sawn, or cut by wires, into strips. Blocks of wood may be formed and afterwards divided into strips.

279. Gedge, W. E., [Wittmann, F.]. Jan. 30.
[Provisional protection only.]

Casting.—Cones for moulding sugar are made in one piece. The edges are thinned down and riveted together, the heads of the rivets filed down, and the joint soldered and brazed, so as to give the mould a perfectly-smooth internal surface.

319. Russ, B. Feb. 4.

Cements.—A compound, stated to be sometimes employed for filling the spaces between the outer and inner or intermediate plating of ships, consists of pitch, tar, resin, asphalt, clinker or tough stone in about equal proportions by weight, the whole being mixed, boiled, and poured in the spaces, while liquid and hot, where it solidifies.

735. Lever, E. March 19.

Fireproof coverings and compositions.—To render canvas and other materials non-inflamable, they are saturated with a solution of ammonium sulphate and coated with a composition consisting of lime, glue, whiting, gum, arabic, Epsom salts, and alum, dissolved in water. The material can be used for the ventilation of shafts or mines, for tarpaulins for roofing sheds, and for fireproof coverings. According to the Provisional Specification, the materials are coated with a composition consisting of lime, glue, whiting, ammonium sulphate, and alum dissolved in hot water.

752. Wyldé, F. de. March 20.

Cements.—Roasted gypsum in small lumps is soaked in a solution of an alkaline silicate, preferably prepared by dissolving 31 oz. of potassium silicate, and 9 oz. of potassium carbonate in one gallon of water. The indurated gypsum is roasted and ground; it may be made slow-setting by adding potassium sulphate, and it may be coloured. The wasted gypsum may be mixed with the alkaline-silicate solution just prior to use, instead of employing water.

928. Lark, J. April 13. [Provisional protection only.]

Cements.—The ground residue of a special fuel makes cement similar to Roman cement. The fuel is made by calcining limestone, chalk, cement, stones, &c. and then saturating the porous mass with gas tar, bituminous matter, &c., and, if necessary, paraffin and other oily matters are added to increase the inflammability.

940. Brooman, R. A., [Fioravanti, P. N. B.]. April 14.

Stone, preserving; stone, colouring.—Gypseous limestones, sandstones, &c. are dressed to shape, and then dried out of contact with the air, at 120° to 250° F. After cooling, the stone is immersed in a solution of lime water, iron sulphate, cyanides, alumina-potash, soda, or vegetable substances "combined with minerals obtained from alkaline matters." For hardening, the stone is removed from the solution, heated to 105° to 120° F., then replaced and finally exposed to the air. For colouring, marbling, &c., the prepared stone is treated with solutions of copper or iron sulphate salts, or with colours, such as logwood, gall nuts, "fernambuc," and alumina. Stone thus treated may be used for walls, balustrades, columns, tombstones, mantelpieces, friezes, and decorated or ornamental architectural details.

1015. Daines, J. B. April 24.

Stone, preserving.—Two compositions, the first containing animal gall, liquor calcis, and liquor from boiling potatoes, and the second, sulphur, camphor, mineral and linseed or other oils with or without creosote, are applied to stone, plaster, &c. for the purpose of preserving them. The surface may be previously cleansed with a solution of alkali, and the alkali neutralized with a weak acid. In the case of statuary, the solutions "may be injected by means of an exhausted receiver."

1073. Scott, H. Y. D. April 28.

Cements; mortars.—Marly limestones and the like, after calcination, are either exposed to steam, or immersed in hot or cold water to secure hydration. They are then dried and pulverized, and are ready for use without further slaking.

1086. Henry, M., [Coignet, F.]. April 29.
Drawings to Specification.

Concretes; stone, artificial and imitation; stone, colouring.—Relates to the concretes and artificial stone described in Specifications No. 2659, A.D. 1855, and No. 2757, A.D. 1859. Powdered theil or blue lias lime and dry Portland cement, together or separately, are combined with sand, broken or powdered marble, glass, granite, silex, flint, &c., or some of these, and with mineral colour. The materials are mixed in a special machine, a little water being added. The mass is then agglomerated by ramming, indurated by drying, or by exposure to the air or by coating with biphosphate or bicarbonate of calcium or sodium, or with phosphates, silicates, or other salts and rubbed with any or all of the following:—Sandstone, grit, emery, trip, rouge, &c. If the hard surface produced is removed by the rubbing, the mass is again hardened. The proportions preferred are 20 parts of sand, crushed marble, &c. to 4 or 5 of lime, and 3 or 2½ of cement. Coloured artificial stone is produced by mixing in, preferably at the surface only, coloured sands, granite, &c. Vases, basins, pedestals, balusters, columns, tablets, panels, &c. can be moulded from the compositions. Jambs and styles of doors and windows, and other parts of buildings, fortifications, arches, aqueducts, &c. are made from the concretes described here or in the prior-quoted Specifications, mixed with textile materials, metallic web, or wire cloth, or with nails, hooks, or other metallic fragments. Sculpture, busts, and other statuary, cornices, mouldings, &c. are produced by compressing the composition into plaster moulds coated with oil or treated with alum, or into moulds of the composition described, or of Portland cement, or similar material. The composition used may be coloured.

1389. Barff, F. S. June 3.

Stone, preserving; stone, colouring.—Stone, stucco, brick and similar surfaces are preserved, by applying, with a brush, a composition of 2 parts of barium sulphate and 1 of calcium carbonate in water mixed with either potassium silicate of specific gravity 1.2, or with sodium silicate to the proper consistency. The material is further saturated with silicate, and umber, ochre, &c. may be mixed in to produce colouration.

1521. Purdie, T. June 17. [Provisional protection only.]

Plasters; stonework, ornamental.—Walls and ceilings are decorated by coating the wet mortar with colour and water, rubbing the surface with a stone, polishing with a cloth, and then plastering with ordinary stucco or with a mixture of lime and marble powder.

1908. Bibby, R. E. Aug. 1.

Cements; plasters; refractory substances.—Fire-proof cement, for walls, ceilings, roofs, floors, &c. is made by steeping calcined sulphate of lime in solutions of aluminium sulphate or alum, sodium tungstate, gum tragacanth and glue, then calcining again, and finally grinding up with silica mixed with "lapis ollaris" or steatite, freed from iron, unless a moisture-resisting cement is required. The following proportions are suitable:—Sulphate of lime 45 parts, "lapis ollaris" or steatite 15 parts, silex 25 parts. A refractory composition for bricks, quarries, or tiles for lining furnaces, kilns, &c. and for crucibles and melting-pots, is made by mixing the following substances, with water, the proportions varying according to the intended use and the amount of heat to be resisted:—"Lapis ollaris" 15 parts, steatite 25 parts, alumina 40 parts, silex 20 parts. The mixture is moulded and burnt.

1998. Dennett, C. C. Aug. 13. *Drawings to Specification.*

Concretes and sound-deadening compositions for arches, floors, ceilings, &c. consist of sulphate or carbonate of lime, broken calcined cinders, bricks, or other porous materials.

2065. Spencer, G., [Eaton, R.]. Aug. 20.
[Provisional protection only.]

Stone, preserving.—A solution for use in the preservation of stone is made by dissolving resin or laes or gums in benzol, eupion, or in any of the refined oils or hydrocarbons and naphthas obtained from petroleum, bitumen, wood, coal, or the like, as also in alcohol or like spirits. The addition of a hydrocarbon solution of india-rubber or gutta-percha renders the liquid more suitable for preservation purposes. It may be applied either by coating or impregnating the substances under treatment. Wax, paraffin, tallow, or like fatty matters dissolved in benzol may be employed in lieu of oils.

2535. Stuber, F. G. Oct. 16. [*Provisional protection only.*]

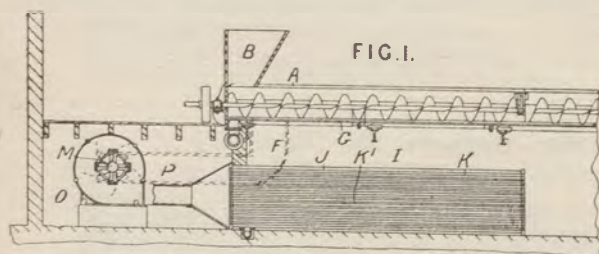
Stone, preserving.—Relates to a blast-lamp burning gaseous or liquid fuel and a blast-stove burning solid fuel, for glazing or hardening the surface of stone to prevent or retard the absorption of moisture. In a lamp, the flame is deflected as required by a blow-pipe connected by elastic tubing to the hollow handle, which forms a reservoir for compressed air. The lamp consists of a narrow metal box in which the wicks are arranged obliquely. In a stove, air from double bellows, a rotary blowing-machine, or the like is passed under and through the fire, and the flame is deflected by the curved or arched roof of the stove.

2549. Monckton, E. H. C. Oct. 17.

Refractory substances.—Furnaces are lined with clay mixed with mica or asbestos and their solutions, the clay is also mixed with black oxide of iron and silica.

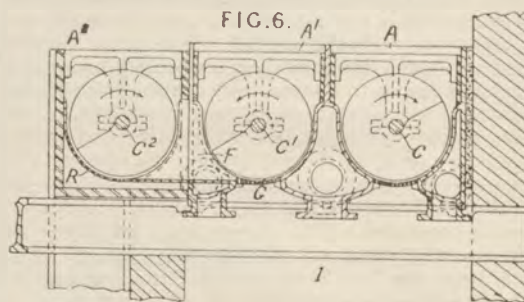
2550. Wyldé, F. de. Oct. 17.

Stone, preserving; cements; stone, artificial.—Relates to preserving stone, cement, stucco, bricks, and the like, and to the manufacture of artificial stone. The stone or the like is first coated with an aqueous solution of alumina, or of alumina and lead, and, when this is dry, with a solution of sodium or potassium silicate. Artificial stone is made by mixing sand, chalk, lime, or the like, with the above-described two solutions in turn.

2602. Weems, J. Oct. 22.

Plasters.—Relates to apparatus for drying, cleaning, and cooling pulverized clays, whiting, stucco, and all other earths used for manufacturing purposes, "by steam, or steam and flue-heated air combined, by the use of curved "round, or square steam pipes or plates, and "wrought by screw motion." Fig. 1 is a partial longitudinal section of one form of apparatus, in which screws convey the material through troughs formed by cast-iron steam pipes F and perforated plates G of the form shown in section in Fig. 6.

The troughs are fixed at the top of a rectangular chamber I of masonry, in which is fitted the heating-apparatus J described in Specification No. 1489, A.D. 1855, [*Abridgment Class Drying*]. The bottom of the third trough A² consists of a perforated plate R, below which is a passage communicating with a duct P, Fig. 1, leading to the closed chamber O, in which is the fan M for forcing air through the tubes K¹ of the steam heater K. The material is fed into the hopper B and passes forwards along the trough A, back along the trough A¹, and thence into the cooling-trough A², from which it is discharged. It is heated and dried in the troughs A, A¹ by means of the steam pipes F and heated air from the heater J, or other source, passing through the perforated plates G. It is cooled in the trough A² by the cool air which is being drawn in by the fan M. The currents of air tend to expel the dust. The screws C, C¹, C² may be set at any elevation, and the spaces for



admission of hot air may be dispensed with. Square or flat pipes, with or without spaces between them, may be used. In one modification, screw-bladed shafts revolve in double-cased receptacles heated by steam, steam-heated air, flue-heated air, or a combination, the lower parts of the trough being preferably semicircular in section. The inner case may be perforated, so that the heated currents may pass through, the material being dried by fanners or other means. In another modification, a double-cased cylinder is employed in a vertical position. Its inner casing is perforated and provided with inclined annular plates in positions corresponding to the spaces between circular, flat, or coned plates on a rotary central shaft. The material passes downwards through the cylinder and is continually thrown by centrifugal force upon the inclined annular plates, from which it passes back to the plates on the shaft. In this case, cold or heated air may be forced or drawn into the ends of the inner cylinder or through the perforations. In another modification, a rotating double-cased cylinder is employed, the material being placed in chambers formed between the perforated inner and outer walls, and the heated currents passing outwards from the interior of the double cylinder. The compartments may be covered with cloth or wire gauze, and different materials may be placed in each. The compartments in the cylinder may be dispensed with, and it may be rotated in a hot-air chamber with or without a fan blast or other current.

2629. Brown, J., Way, J. T., and Evans, T. M. Oct. 24.

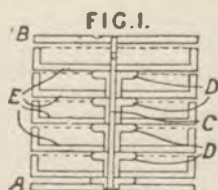
Asphalts; cements.—A composition for making pavements, &c. is formed by mixing asphalt, pitch, or oils, or mixtures of them with calcined bones or "silica rock," found at Farnham, Surrey, and described in Specification No. 1034, A.D. 1852. Paving-blocks may be formed of equal parts of asphalt and silica rock with a little cotton-seed or linseed oil added to reduce brittleness.

2690. Russ, B. Oct. 30.

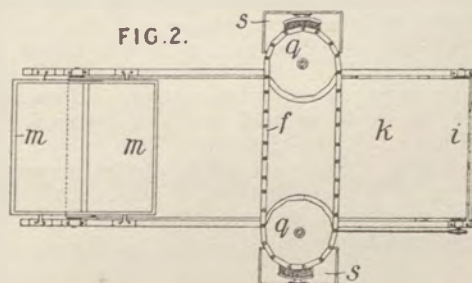
Fireproof compositions.—In the construction of ships' hulls, batteries and fireproof safes, a metal framework is used the compartments of which are filled with wood or ebonite or a composition of pitch, tar, resin, and asphalt, with or without coke, clinker, or stone.

2882. Kimpton, T. C. Nov. 18.

Statuary.—A stand for statuary is used as a case for an apparatus for displaying tables of figures or letters of the nature of calendars or fare, distance, or arithmetical or other calculating-tables, and is provided with openings through which any desired figures &c. may be exposed. In one arrangement, apparently for use as a calendar, the figures &c. are marked on the peripheries of a number of loose wheels E which rest on central wheels or supports D strung on a pivot C projecting from a base A and provided with a cap-plate B. The wheels E in a modification are all of different internal diameters, and rest on a stepped cone, which also supports within and between the wheels a second series of smaller wheels. The wheels E may also be replaced by movable bands placed on a metal drum between circumferential ridges formed on it. According to the Provisional Specification, the wheels E may be revolved by means of a key or handle acting on vertical toothed wheels in



gear with toothed wheels attached to them. Calculating-apparatus of the same general character as the apparatus described above are also described, the wheels being recessed into one another with their upper surfaces in the same plane and being marked with figures which show through openings in an upper cover-plate.

3107. Morgan, T. V. Dec. 9.

Refractory substances.—Relates to purifying plumbago for crucibles and the like, by freeing it from iron and calcium salts. The ground plumbago is heated with carbon, and the iron is removed either by magnetic action, or by heating in chlorine and washing out the iron chloride. Calcium sulphate is calcined to sulphide, and calcium carbonate is converted into chloride by hydrochloric acid, these soluble salts being removed by washing. Fig. 2 is a plan of the apparatus for removing iron by magnetic action. The plumbago is fed by the hopper m to the travelling belt k, which carries it under the ring of magnets f, driven by rollers q. The attracted iron is removed by brushes s, and the purified plumbago by a scraper placed below the roller i.

3196. Saunders, R. Dec. 18. *Drawings to Specification.*

Fireproof coverings for buildings and parts of buildings, carriages, ships' bulkheads, &c. are formed of coco-nut waste or dust &c. packed between iron sheets supported by grooved wooden or iron standards.

A.D. 1864.

- 66. Gibbins, J.** Jan. 11. [*Provisional protection only.*]

Fireproof compositions.—Whiting, pipeclay, or other argillaceous earth, dried and free from grit, is mixed with oxides of lead and zinc, and a solution of copal, caoutchouc, and other gums in vegetable oil. Beeswax, palm oil, tallow, lard, or other similar oleaginous matter, with lamp-black or other colouring-matter, is then added, and the whole ground and well stirred in an ordinary mill, and the composition is applied for rendering tarpaulins, rick cloths, covers and aprons of canvas, leather, or other material for gigs, omnibuses, and all other carriages, water-proof and fireproof.

- 339. Toussaint, J.** Feb. 9. [*Provisional protection only.*]

Cements; stone, artificial.—The following powdered substances are mixed together, preferably in the proportions stated, viz.:—Dry sand and limestone, each 4 parts; chalk lime and stone lime, each 1 part.

- 414. Scott, H. Y. D.** Feb. 17.

Cements.—Argillaceous lime is burnt, mixed with 3 to 6 per cent. of gypsum, and then partially hydrated in a machine provided with revolving perforated arms, through which steam is passed. Modifications are described, in which the calcium sulphate is formed by burning sulphur in the presence of the heated lime, or by the addition of sulphuric acid. Magnesium sulphate, ferrous sulphate, zinc sulphate, or other sulphates, or manganese sulphite or nickel sulphite, may be added to the lime, or limes containing sulphur may be used. Steam may be passed into a chamber containing lime in lumps to effect partial hydration. Specification No. 915, A.D. 1856, is referred to.

- 476. Parry, G.** Feb. 25.

Cements; stone, artificial; slagwool, preparation of.—Jets of steam, air, or water are forced in the form of a sheet into the molten slag as it leaves the blast furnace, the pressure preferred being from 10 to 12 lb. per square inch. To prevent loss of the slag, the treatment may be carried on in a tapering chamber. Old slag may be re-melted and treated. The product may be used as a manure, or for making bricks, artificial stone, and cements.

- 485. Bonneville, H. A.,** [*Alibert, J.*]. Feb. 26. [*Provisional protection only.*]

Stone, artificial; stone, colouring.—Artificial marbles are made by heating a block or other mass of gypsum in an oven, cooling, and immersing in a bath of salt water, to which a dye is afterwards added. The dyes should be heated, and, in the case of mixtures, the whole should be boiled.

- 488. Gedge, W. E.,** [*Begué, J.*]. Feb. 27. *Drawings to Specification.*

Stone, artificial.—Three compositions are described. (1) An artificial granite, suitable for monuments, paving, flagging, panneling, &c. consists of 20 parts of common earth, 25 of calcareous earth or stone, 38 of fine sand, 10 of potters' clay, 3 of peat, 2 of coal, and 2 of a compound salt made by boiling down 2 parts of urine and one of salt. Two more parts of peat are added to accelerate fusion. (2) An artificial marble composition consists of 1 ton each of powdered bottle glass and common pit sand with 11 lb. of coloured broken glass. For fine marbles, window glass and white sand are used instead of the commoner varieties. Manganese dioxide and black oxide of iron give a black ground, and pulverized burnt bones a white ground. (3) Another artificial stone consists of 33 parts of broken glass, 66 of clay, and 1 part of porcelain clay, the whole being dissolved in urine or a salt solution. The glass may be replaced by a mixture containing 10 parts each of ferruginous sand and calcareous earth or stone, 3 parts of ferruginous clay, and 2 of common salt or "salt of urine." The compositions are baked in special kilns or furnaces.

- 490. Ransome, F.** Feb. 27.

Stone, artificial.—The process described in Specification No. 877, A.D. 1861, consists in precipitating an insoluble from a soluble silicate by calcium chloride or a similar soluble salt. According to the present invention another solution, such as one of the carbonates of soda, is added to precipitate an insoluble salt in the pores, so as to prevent any excess of chloride from dissolving out and rendering the stone porous.

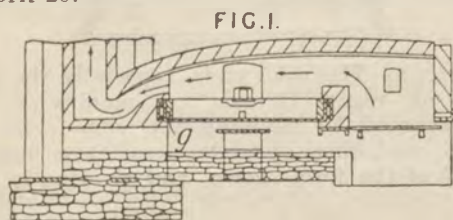
- 700. Jones, D.,** [*Labayen, S.*]. March 19. [*Provisional protection only.*]

Casting.—Sugar funnels or moulds, consisting of sheet-iron cores open at either end, are strengthened by encircling them at their ends with iron rings, the edges of which are bent into a trough-like figure, concave towards the centre.

- 841. Martin, S., and Young, E.** April 5.
[Provisional protection only.]

Refractory substances; cements.—Rutile, ilmenite, or other titanium ore is mixed, preferably with pure gannister or silica, in about equal proportions, or with carbon, steatite, alumina, aluminium silicate, or other suitable material in various amounts. The mixture is moistened with milk of lime, water, or potassium-sulphate solution, and fluor-spar or other flux is added. The cement thus made is used as a lining for all classes of furnaces, fireplaces, &c., or is moulded, dried, and burnt to form firebricks, tuyères, crucibles, gas retorts, &c.

- 988. Johnson, J. H.,** [Williams, J.].
April 20.



Refractory substances; cements.—A “cinder cement” for lining puddling-furnaces is composed of cinders from puddling or heating furnaces, or from a squeezer or hammer machine, or iron scales from rollers, together with lime, salt, and sandstone or fine sand. The materials are mixed by hand, or by means of a pug-mill, water being added in sufficient quantity to bring the mass to the consistency of stiff clay or mortar.

- 1067. Papengouth, C. O.** April 28.
Drawings to Specification.

Cements.—A cement, composed of india-rubber and cork, is used for rendering ships water-tight and preserving the armour-plate and other metal parts from rust.

- 1072. Ghislin, T. G.** April 28.

Statuary.—Statuettes are made from compositions containing seaweed, treated as described in Specification No. 2035, A.D. 1862, [Abridgment Class India-rubber &c.], gums, india-rubber, gutta-percha, resins, bituminous substances, paraffin and oily or fatty substances, together with fibrous materials, potassium or sodium silicates, powdered chalk, talc, metallic oxides, gelatine, farina, alum, tungstic acid, powdered charcoal, and similar substances.

- 1073. Mennons, M. A. F.,** [Viel, J.].
April 29.



Casting.—In making gelatinous and other capsules containing fluid medicines, the plastic matter is first made into bands by casting. The hot material is placed in a sliding box P, having a narrow slit controlled by a key Q, and mounted on a tablet O with a ridge along each edge. Bands of paste are obtained by running the box along the tablet, the thickness being regulated by means of a slide piece R worked by a screw S.

- 1124. Potter, J.** May 4. Drawings to Specification.

Stone, artificial.—Sand is mixed with finely-divided iron, such as borings, filings, &c., or with iron powder obtained direct from ores, such as hæmatites &c., by heating with carbonaceous matter in the presence of a flux. The preferred proportions are:—10 to 14 parts of sand to 1 part of iron, but the amount of iron may be increased in order to produce a harder stone. The mixture is moistened with water or solution of common salt, sal-ammoniac, or copperas, and is cast into blocks in moulds, being afterwards indurated by applying milk of lime or other preservative composition. The blocks may be used for general building purposes, or sea-walls, foundations, parts of embankments, &c., or may be formed by casting large masses of the stone *in situ*.

- 1169. Empson, J. F.** May 9.

Stone, artificial and imitation; asphalts.—Imitation slate is made by applying to sheets of waterproofed paper, felt, or other fibrous material, alternate coatings of, or a mixture of, gas tar, pitch, or asphalt and pounded slate, brick, sand, &c. The ingredients may be mixed into a plastic mass and moulded to shape. Suitable proportions for the bituminous coating are:—gas tar 7 parts, pitch 2 parts, asphalt or the like 1 part, or tar 6 parts, and pitch 1 part. The plastic composition is made by adding to this mixture sufficient slate &c. to form a thick paste, which is then bound by one-eighth its weight of hay, chaff, flax, cotton, &c., colouring-matter being added, if required. Slabs, tiles, drain pipes, pots, vases, &c., may be made of this material.

- 1241. Etesse, P. G.** May 17. [*Provisional protection only.*]

Casting mouldings for picture frames &c. A roughly-shaped base of wood is placed in liquid composition contained in a gelatine or flexible mould, where it remains until the composition has set.

- 1310. Brown, J. H.** May 26.

Fireproof coverings and compositions.—Animal fibre, incorporated with other suitable matters, such as woollen waste, or other non-inflammable fibrous matter, or with tanners' leather shavings, may be used for covering floors, powder magazines, laboratories, and for other similar uses, and for ordinary floors in general. The fibre is obtained from the skins and skin-cuttings of various animals, by successively soaking in water, crushing with stampers &c., and reducing to a pulp or fibre in ordinary paper-making machinery. These coverings may be tanned by passing through a tanning-solution at 70° F.

- 1334. Etesse, P. G.** May 30. [*Provisional protection only.*]

Cements for mouldings to be applied to wood &c. are made by mixing together the following ingredients, preferably in the proportions stated:—Melted double size 200 parts, moist unsized paper 3 parts, alabaster plaster 5 parts, and fine plaster 100 parts. Roman cement and water are added if the cement is intended for outdoor use.

- 1375. Ward, F. O.** June 2.

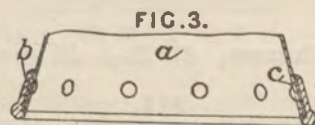
Cements.—The residues from the process described in Specification No. 3185, A.D. 1857, and from modification thereof in which lime is partially replaced by limestone or by the vulcanous residue of the cryolite process, are lixiviated, and used to form cements, bricks, &c. The residue may be mixed with river mud and chalk.

- 1780. Swindella, I.** July 15.

Cements.—Alkali or chrome waste, or a mixture of these, or slag, are used in making cements. Alkali waste, freed from rough soda ash, is sifted under water, preferably boiling. The solution contains calcium sulphide, and may be used in the manufacture of sulphur and sulphurous acid. The sediment is ground up with lime and clay, about 20 per cent. of each, and the mixture is burnt or calcined, preferably in a reverberatory furnace, the setting pro-

perties being tested at intervals; the process is completed by grinding. Chrome waste and coal, slack, cinders, &c., preferably in the proportion of 8 to 3, are ground up to a pasty mass, and then dried and calcined. Sulphur and additional carbon may be added. A mixture of equal amounts of alkali and chrome waste is treated in the same way. A mixture is also made of 4 to 6 parts of pulverized iron slag, 3 to 4 parts of lime, and 1 part of coal or slack, about 25 per cent. of clay being added to render the cement hydraulic.

- 1855. Dixon, T., [Bea, M.]** July 26.



Casting.—The open ends, especially the wide end, of sugar funnels or moulds *a* are strengthened by doubling the edge *c* of the mould, and then springing over it a metallic hoop *b* of the form shown, and riveting it on.

- 1937. O'Connor, B.** Aug. 4.

Fireproof compositions.—A fireproof solution, composed of any of the salts of magnesium to which a little bromine may be added, is used for rendering fabrics non-inflammable, the solution being applied independently, or mixed with the starch or other stiffening-matter used in finishing the fabric. Instead of magnesium salts, any of the following may be used, alone or in combination with potash or soda:—Ammonium sulphate, carbonate, chloride, or "muriate", sodium silicate or borate; potassium borate; tin phosphate and borate; tin and ammonium chloride and bichloride; potassium antimoniate; antimony chloride; zinc sulphate; zinc aluminate; calcium carbonate; potassium sulphate; sodium, potassium, or ammonium tungstate; sodium chloride, carbonate, bicarbonate, phosphate, or bisulphate; and aluminium sulphate.

- 1957. Hottin, E.** Aug. 6. [*Provisional protection only.*]

Fireproof compositions.—A fireproof composition, made of ammonium phosphate and silicic acid or silex, which are prepared in a specified manner and reduced to powder, is added in a specified proportion to the gum, starch, or other dressing used in finishing fabrics.

2116. Fontaine-Moreau, P. A., Comte de, [L'usquin, U.]. Aug. 27.

Stone, artificial; stonework, ornamental; casting.—Building-blocks of artificial stone are made by placing in the moulds, and separate from one another, small hollow or solid balls made of tarred canvas sprinkled with sand &c. or of the baked earth or composition used for making the blocks. The balls are fitted on iron rods, which, after the baked earth or other material has dried, are drawn out and the holes they leave filled up with cement or similar substance. Before the blocks are dried, grooves or channels widening inwards are made on their surfaces and filled in with thin slabs or plates of stone, marble, stucco, &c. The blocks may be joined together by key-pieces and cemented together. The Provisional Specification also states that courses may be made, partly of baked earth and partly of the artificial stone, and that passages may be left in the masonry.

2137. Stenhouse, J. Aug. 31.

Fireproof coverings and compositions.—Felted and other fabrics, leather, yarns, &c., which have been treated with a waterproofing and preservative composition consisting of paraffin or similar wax-like bodies mixed with fats or oils, are rendered less inflammable by steeping them, before or after treating with the paraffin mixtures, in solutions of alum, borax, or ammonium chloride or sulphate, combined with drying-oils.

2320. Young, E. Sept. 21. [*Provisional protection only.*]

Refractory substances; cements.—Fire-resisting cements and materials are produced by mixing rutile, ilmenite, or other titanium ore with gannister or powdered silica and milk of lime, or with carbon, steatite, alumina, or aluminium silicate and water containing potassium sulphate or fluor-spar. The materials may be used for making crucibles or pots, tuyères for blast furnaces, Bessemer vessels, cupolas, forges, bricks for lining steel and like furnaces, puddling-furnaces, glass furnaces, and gas and other retorts. The material may also be used unburnt as a plaster or cement for lining furnaces and fireplaces.

2324. Dorvault, F. L. M. Sept. 22.

Casting.—Capsules are made from a solution formed by dissolving 4 parts of gelatine, and 1 each of gum and sugar in 6 parts of hot water;

mandrels with lenticular-shaped ends are steeped in the warm viscous liquid and removed when cold, the capsules being formed on the ends.

2354. Wheeler, G. P., and Gloyn, J. F. Sept. 26.

Cements; concretes.—A cement for covering the outsides of buildings, road surfaces, &c. is made by grinding and sifting the slag produced from smelting copper, iron, or silver. It is either used alone or mixed with other cements, and, in combination with lime &c., is used as a concrete.

2360. Harrison, J. A. Sept. 26. [*Provisional protection only.*]

Slags, treatment of.—Furnace slag, alone or with other substances, is moulded into bricks and pipes, which are then annealed in ovens. The bricks are used for marine buildings, roofs, paving, and the like, and the pipes for conveying gas, water, or sewage.

2485. Gardner, W. Oct. 10. *Drawings to Specification.*

Fireproof compositions for safes. The composition consists of about equal proportions of charcoal, whiting, alum, and sawdust.

2668. Charlton, J., Charlton, H., and Christian, J. O. Oct. 28.

Fireproof compositions.—Yarns or fabrics of cotton, linen, silk, wool, or other fibrous materials, and paper, are rendered fireproof by treatment with "hydrochlorate of baryta," or barium chloride, which may be used independently, or with the dressing, stiffening, or filling compositions, or may be mixed with the pulp in the manufacture of paper.

2974. Gâche, V. Nov. 29. [*Provisional protection only.*]

Cements for encasing stone paving-blocks are composed of sand and bitumen, asphalt, potters' clay, Roman cement, or fat lime, slightly wet.

- 3084. Brooman, R. A.,** [Miller, F.].
Dec. 13. [Provisional protection only.]

Cements; stonework, ornamental; fireproof coverings and compositions.—Compositions for these purposes consist of solutions of sodium silicate combined with silicates or metallic oxides and silica, such as mixtures of equal parts of silica and calcium carbonate, or silica, calcium carbonate, and zinc oxide. When used as a coating, the article is also coated with a solution of ammonium, calcium, or other chloride. Coloured metallic oxides may be incorporated when required.

- 3094. Hancock, C., and Silver, S. W.**
Dec. 14.

Casting.—Relates to the manufacture of ornamental sheets and surfaces. The sheets are obtained from milk of balata alone or in combination with the milk of caoutchouc, with the admixture, if required, of any pigments, dyes, or colouring-matter; they are applicable to book covers, boxes, articles of furniture, &c. The milk is poured into moulds of any suitable material and shape or over plain or figured surfaces, and it is removed when dry and

sufficiently set. To manufacture articles of additional strength, a piece of muslin or other open fabric, or some cotton wadding, is laid on a mould and brushed over with the milk with sufficient pressure to force it through the fabric and to fix the fabric to the mould; more milk is added from time to time until a sufficient coating has been applied. More fabric is added in the same way if still greater strength is required, and, when all is thoroughly set and dry, it is gradually drawn off the mould, and, if needed, backed up or filled in with any suitable material or compound.

- 3221. Cleaver, J.** Dec. 28.

Cements.—Portland cement is made from any silicious aluminous deposit, such as river mud, by analysing it and adding silica until the mixture contains from 60 to 65 per cent. of silica and from 30 to 35 per cent. of alumina. The mixture is reduced in a wash mill and mixed with 3 to $3\frac{1}{2}$ times its weight of lime, or 6 to $6\frac{1}{2}$ times its weight of chalk, and the resulting mixture is heated to a high temperature to form a silicate of lime and alumina.

A.D. 1865.

- 196. Drevelle, A.** Jan. 23. [Provisional protection only.]

Sound-deadening coverings.—The extremities or feet of furniture, china, glass, or pottery, or similar articles may have small pieces of suitably-shaped cork, india-rubber, &c. attached to them to deaden the sound of the impact of the article with other objects.

- 224. Mushet, R.** Jan. 26.

Refractory substances for furnace linings &c. The compound ore of titanium and iron called ilmenite, when pulverized and mixed with refractory substances, such as quicklime, slaked

lime, sand, silica, kaolin, calcined iron slag, magnetic iron ore, or hæmatite iron ore, and sometimes with salt or other alkaline matter, is used for the purpose of lining and repairing the sides and bottoms of puddling-furnaces, balling-furnaces, hollow fires, gas furnaces, and other furnaces or converters employed in the manufacture of iron or steel.

- 313. Hottin, E.** Feb. 4.

Fireproof compositions.—Calico, linen, silk, and other woven fabrics are dressed and rendered non-inflammable by treatment with a

composition consisting of ammonium phosphate and silicic acid, prepared and mixed in a specified manner, and then added in specified proportions to the gum, starch, or like dressing.

318. Richardson, R. Feb. 4. *Drawings to Specification.*

Asphalts.—A composition for filling cellular iron railway sleepers, to increase their dead-weight, is made of lime, sand, and tar, forming a compact and elastic concrete.

387. Atherton, C., and Renton, A. H. Feb. 11. *Drawings to Specification.*

Fireproof compositions.—Shavings or fragments of cork or other light bark, light woods, or hollow wooden blocks, &c., for use in the construction of ships and of floating bodies generally are rendered non-inflammable by impregnating them with ammonium sulphate or tungstate previous to being waterproofed with a mixture of bitumen and tar &c. The material is placed in a closed tank from which air can be exhausted and into which the solutions may be introduced, and, in order to facilitate absorption, either the solutions or the material itself may be heated.

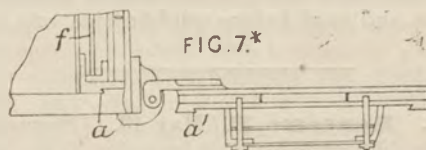
441. Kirtage, W. Feb. 16.

Stone, artificial, for building-blocks, copings, sills, sinks, landings, chimney tops, columns, &c. Sulphate of iron, or a similar sulphate or salt is mixed with silica and cements or limes. The silica may be contained in gravel, brick, or pottery refuse, burnt clay, ground chalk, or other waste material; Portland cement is preferred, but blue or grey lias lime or Dorking or other stone lime may be used. The proportions vary from 4 to 5 lb. of silica to 1 of the lower quality limes, to 8 to 12 lb. of silica to 1 of cement.

630. Nimmo, G. March 6. *Drawings to Specification.*

Refractory substances.—A refractory material for crucibles consists of 2 parts of sand, $3\frac{1}{2}$ of clay, 1 of China clay, and 8 of old ground plum-bago crucibles.

695. Tann, J. March 11.



Fireproof coverings and compositions for safes, and strong rooms, warehouse doors, &c. One or more partitions, *f*, of wood or papier mâché are placed between the inner and outer casings of the safe &c., and the chambers thus formed are filled with alum or other deliquescent salt or non-conducting material.

699. Atkins, J. March 13. *Drawings to Specification.*

Statuary.—Busts and figures are made by filling a thin shell of brass or other metal with cast iron.

864. Le Roy, F. March 27.

Cements.—A heat non-conducting cement is composed of slimy glutinous earth, fireclay, sand, coal ashes, wood charcoal, wood sawdust, cow hair, wheaten flour, water, and cotton foot oil or similar fatty matter. The ingredients are mixed together, so as to form a paste.

1049. Bickford, J. S. April 12.

Fireproof compositions.—A "varnish" for coating the blasting and mining fuzes described in Specification No. 6159, A.D. 1831, is made by dissolving 1 part each of alum and glue in hot water, and mixing with this 17 parts of potters' clay and 1 part of red lead, so as to form a paste.

1058. Cotterill, C. F. April 13. *Drawings to Specification.*

Asphalts.—Relates to a composition for spigot and socket or sleeve joints of earthenware or iron pipes for conveying water or gas. It consists of one part of pitch and two parts of sand melted and mixed together.

1260. Mitchell, J. May 5.

Concretes.—A foundation concrete for roads and pavements consists of screened Whimstone metal or broken stones, washed if necessary, clean sharp sand, and Roman, Portland, or other equivalent cement. These are mixed in

stated proportions with water, and, after being laid, are rolled and grouted with a mixture of cement and sand before solidification sets in.

1337. Ransome, F. May 13. [*Provisional protection only.*]

Stone, artificial; stone, preserving.—A stone, which adheres firmly to iron, is composed of sand or grit mixed with sodium or other soluble silicate or other substances, and hardened by immersion in a solution of calcium chloride or other salt.

1775. Longbottom, J., and Longbottom, A. July 5.

Fireproof coverings and compositions.—Relates to the manufacture of a fireproof material or composition, which may be used alone for wall paper, roofing, shipbuilding, &c., or for additional strength, layers of fabrics, wood, or metal may be inserted between two or more thicknesses of the material, while it is stated that by submitting blocks of peat or turf to a steeping process in the compositions named below, they are rendered elastic and fireproof. To a solution of india-rubber and ground shellac in coal-tar naphtha, is added a mixture of water, alum, ammonium sulphate, boracic acid, glue, molasses, linseed oil, and ammonium chloride. The blended solutions are then mixed with woody or fibrous material, prepared by heating flax, cloth, flock, or silk waste, hemp, cotton, blanket, plush, velvet, wool, hair, peat, cork, ground leather, or rags, &c., in a solution of the double sulphate of potash and alum, sulphate of iron and borax, and for this purpose, the machine is preferably enclosed in a steam jacket on the principle of the mixing-machine described in Specification No. 11,136, A.D. 1846. On leaving the mixing-apparatus, the homogeneous mass is worked in a heated masticator, passed through a series of rollers kept at gradually-decreasing temperatures, and finally submitted to a cold bath of metallic salts. When the "kampakaon" thus made is intended for roofing, fine dry sand, or pebbles, or gravel, together with lime, chalk, gypsum, or plaster of Paris, is incorporated in the mixing-machine, while for other purposes the material may be painted, embossed, engraved, or printed in the usual way.

1946. Pepper, T. July 26.

Fireproof compositions.—Textile fabrics of all kinds, such as lace, linen, muslin, and sheeting, are rendered unflammable when treated with the composition described below, which may or may not contain starching-material. The fabrics are soaked from five to ten minutes, de-

pending on their closeness and thickness, in an aqueous solution of suitable proportions of ammonium sulphate, zinc sulphate, and either ammonium or calcium sulpho- or phosphoglycerate or glycerine stearate and ammonium or sodium tungstate, and are finally wrung out and dried. If stiffening is required, with the above materials are incorporated suitable quantities of starch, farina or fecula, albumen, gelatine or gum, and glycerine. Boiling water is poured rapidly on to a paste made from the composition with warm water, and the fabrics are soaked and wrung out or rolled ready for ironing.

1991. Ransome, F. Aug. 1. *Drawings to Specification.*

Stone, artificial.—Roofing-tiles are made of artificial stone consisting of a mixture of 5 parts of sand and 1 of limestone, to which sodium silicate of density 1.7 is added, in the proportion of 1½ gallons to every bushel of the above mixture. After being moulded, the composition is hardened first by pouring on calcium-chloride solution and then by boiling the tiles in the solution.

2068. Sumner, J. W., and Scott, C. A. Aug. 9. [*Letters Patent void for want of Final Specification.*]

Casting; concretes; stone, artificial.—Bricks and building or other blocks are made in moulds of glass, metal, or wood with hinged removable sides. The materials used are stones, broken bricks, sand, gravel, clinkers, &c., with Dumball, Aberdeen, Leicester or other limes, and colouring-matter, if desired. A composition preferred is:—3 parts of Leicester and 1 of Aberdeen lime, 3 parts of coarse gravel, and 9 of sand. Water is added, and, after mixing and moulding, the blocks are allowed to set.

2071. Blanchard, M. H. Aug. 10.

Stone, artificial.—Terra-cotta or vitreous stone for buildings, pottery, and other purposes, is made from furnace slag, granite or slate scrap, pottery scrap, chalk or lime, and silica or shells of fish. These materials are ground, sifted, and mixed with clay, alumina, alkali, and water.

2505. Duke, J. Sept. 29.

Cements.—Slaty or schistose materials of a calcareous nature, such as limestones, are mixed in the raw or burnt state with clay, and then burnt and ground. The components are

mixed in such proportions as to give a product containing, preferably, 7 parts of lime, 2 of silica, and 1 of alumina. Ordinary lime is added, when necessary, to make up for a deficiency in the limestone, and silica, fine sand, or ground flints are employed instead of clay to correct an excess of alumina.

2625. Bull, W. Oct. 11. [*Provisional protection refused.*]

Fireproof compositions.—Phosphoric and tungstenic acids and their compounds are used for fireproofing wood for buildings, structures, furniture, &c.

2638. Barwick, W. Oct. 12.

Cements; plasters.—Powdered chalk, sulphur, and red-fir or other sawdust are mixed with water into a stiff paste in the following proportions:—Chalk, 1 bushel, sulphur, 1 lb., sawdust, 1 gallon. This paste is made into blocks, which are dried and burnt in a kiln together with lumps of chalk. The burnt cakes are powdered and used as a plaster or cement for forming mouldings, cornices, and other decorative architectural details.

2768. Sequelin, S. Oct. 27. [*Provisional protection only.*]

Castings, compositions for. Animal and vegetable wax, stearin, spermaceti, paraffin, and other solid waxy and fatty substances are purified and prepared for the manufacture of statuettes &c. The substance is melted at 180° F. and isinglass is added, the impurities being thereby precipitated. In order that the substance may mould without cracking and to impart to it a good polish, powdered loaf sugar and alcohol are added, and the mixture is allowed to settle at 160° F. and is then run off into moulds.

2863. Grason, T., and O'Donoghue, J. Nov. 7. [*Provisional protection only.*]

Cements.—Mixtures of 3 parts of waste prussiate of potash, 4 parts each of waste potash, waste alkali, and soap of tanners' waste, and 2 parts each of zinc sulphate and clay are dried, calcined, and ground, and used for constructing and ornamenting buildings, breakwaters, viaducts, and railway bridges, and in lining iron vessels. Another composition consists of calcium sulphate saturated with a solution containing 8 parts each of ammonium carbonate and baryta, 1 part of indigo, and 2 parts of sodium tungstate. After saturation, the whole is calcined and ground.

2867. Barker, D. Nov. 7. [*Provisional protection only.*]

Stone, artificial.—Marble dust or other waste substances are mixed with a mucilage prepared as described in Specifications No. 1842, A.D. 1864, and No. 1547, A.D. 1865, [*Abridgment Class Fuel, Manufacture of*]. The mucilage is prepared by mixing starch, or yeast with water or limewater and adding potash, soda, tannic acid, iron sulphate, or other similar substances.

2891. Newton, W. E., [Gibson, W.] Nov. 9.

Fireproof coverings and compositions.—To the surface of wood, leather, glass, porcelain, earthenware, metals, india-rubber, gutta-percha, fabrics, and canvas is applied an adhesive mixture comprising one or more gelatinous substances and clay or other aluminous matter or zinc oxide. When dry, the article is treated with an astringent solution and finally passed through calendering-rolls. Such enamelled surfaces will be fireproof and waterproof, and will be capable of being ornamented by photographic or other prints.

2967. Speyser, L. G. Nov. 17.

Cements.—Bricks or building-blocks are made of a composition consisting of 1 measure each of slaked lime and Roman or Portland cement, 2 measures each of charcoal or peat ashes, and scoria, and 6 measures of powdered stone, gravel, or sand. Gravel may be substituted for the ashes and one-half of the scoria, the cement being increased by half a measure. After grinding the lime with water to the consistency of a thick soup, the other constituents, except one-third of the cement, are added, and mixed in a barrel to the consistency of clay. It is then placed in a heap for 10 to 15 minutes, replaced in the barrel, and the remaining cement added without water. After about 12 minutes it is ready for moulding.

3042. Lake, W. R., [Watkins, W. B.] Nov. 27.

Cements; plasters.—Powdered marble and alkaline silicates are mixed in the following proportions, viz.:—Marble 2 parts, alkaline silicate, 25°–30° Bé, 1 part, with sand, pebbles, etc. The mixture is used to apply on stone or brick or to produce artificial stone, the surface being coated with a varnish composed of the two constituents first referred to.

Stone, artificial.—In the production of artificial marble, an enamel containing equal parts of marble and alkaline silicate is employed, and the product is heated to 300° F. when dry. A coat of varnish is then applied, but if the temperature employed is low, the varnish is added before heating.

3110. Brooman, R. A., [*Paraf-Javal, M.*]. Dec. 4. [*Provisional protection only.*]

Cements, plasters, &c. are retarded in setting by cooling.

3119. Brooman, R. A., [*Sorel, S., and Menier, E. J.*]. Dec. 5.

Cements; stone, artificial.—Basic magnesium chloride, used in the formation of cements, is prepared by mixing magnesia with magnesium-chloride solution, or powdered dried magnesium chloride with magnesia in the proportions of 12 parts of the former to 100 of the latter. The mother liquor from salt works may be used for making the cement, or may be first further concentrated to remove the sodium chloride and magnesium sulphate. The cement so formed is employed for mixing with (1) sands, grits, granite, and pebbles to form slabs and blocks for building purposes; (2) silix, grits, granites, emery, pumicestone, or other materials to form mill or grindstones; (3) Kaolin, talc, barium sulphate, calcium sulphate, iron pyrites, ochre, and lead sulphate to be moulded into statutes, ornamental vases, and other objects, to take impressions, or be made into crucibles and other vessels; (4) sawdust to form slabs for inlaid flooring and ornamental objects, and to preserve objects from damp; (5) wool or cotton shearings, powdered leather, and bone or ivory waste, to form a stone-like substance. Other substances with which the cement may be mixed are pipeclay, sulphur, calcium carbonate, and argillaceous and colouring matters; other applications are:—Imitation marbles and mosaics, parquet tiles, chimney pieces, tables or panels, monumental sculpture, and water shoots.

Plasters.—A mixture for use as a wall plaster consists of chemical equivalents of magnesium oxide and chloride, and powdered grit.

Petrifying articles.—The cement described above may be applied to the petrification of mineral, vegetable, or animal matters.

3325. Newton, W. E., [*Wurtz, H.*]. Dec. 23.

Casting; stone, artificial.—Consists in the manufacture of insoluble substances, suitable for making artificial stone by heating together aqueous solutions of glue or gelatine, and chromic acid or an alkaline bichromate, and allowing the liquid to gelatinize. Before this treatment, the glue or gelatine solutions may be mixed with heavy powders to give weight to the product, with sand, clay, emery, glass, red oxide of iron, or Tripoli powder to give hardness, or with chopped fibre, such as cotton, hair, spun glass, asbestos, or the like, to give strength and toughness. Thin sheets are prevented from becoming brittle, in dry or cold atmospheres, by rubbing with glycerine, which becomes absorbed by the sheets. Greasy or resinous powders are moistened with dilute alcohol before being added. Alcoholic solutions of castor or other oil, shellac, gum mastic, or the yellow resin of gamboge may be added. Suitable colouring-matters may be used. By the addition of "green verditer", an imitation of green malachite is produced. The products are softened by heat or steam. Polished impressions of glass, metal, or other moulds may be produced by pouring or spreading the liquid over the surfaces of the moulds and allowing it to gelatinize and dry. If the layer of liquid is thick, wire gauze is applied and pressed on it before it becomes dry. Several layers may be applied, and the layers may be backed with wood, metal, or the like cemented thereto. The surfaces of the moulds are preferably treated with oil or fat to prevent adhesion. The moulding is sponged with water when removed, and is then dried under pressure. The composition may be cast in large moulds, and then sliced into sheets, which are dried partially on oily metal plates. When no longer adhesive, the sheets are dried completely between layers of wire gauze.

A.D. 1866.

- 23. Starbuck, G., and Sellars, J. C.** Jan. 3. [*Provisional protection refused.*]

Cements; refractory substances.—A cement for luting the joints of oil, spirit, gas, or other retorts or stills, or for other connections exposed to a high temperature, is composed of any substance or substances, such as "the salt or oxide of iron, carbon, magnesia, manganese, lime, strontia, baryta, soda, potash, alumina, chromium, sand, or zinc," combined with ammonium, sodium, or potassium silicate, separately or mixed.

- 235. Watt, J. M.** Jan. 24. [*Provisional protection only.*]

Cements.—A mixture of sodium sulphate and Portland, Roman, or other cement, together with sodium silicate, boiled linseed oil, and paraffin is used as a preservative composition. A composition containing a large proportion of cement is used for preserving the interior of ships' bottoms, &c.

- 300. Lake, W. R.,** [Marquard, F.]. Jan. 31.

Stone, imitation.—In order to produce imitation coral articles, a solution of india-rubber, gutta-percha, or similar gums, preferably in chloroform, is bleached by ammonia gas or ammonium chloride, and is afterwards washed by agitating it with hot water, the chloroform being simultaneously or subsequently evaporated off. The product is pressed, dried, made pasty by the addition of chloroform, mixed with powdered calcium phosphate or zinc carbonate and pigments, and pressed in hot moulds. The Provisional Specification also states (1) that articles in imitation of marble may be similarly produced, (2) that chlorine may replace ammonia; and lime, calcium compounds, zinc oxides, or white lead may replace the phosphate in the above-described operations, and (3) that the evaporation of the chloroform may precede the washing operation.

- 576. Spencer, T.** Feb. 24. [*Drawings to Specification.*]

Refractory substances.—The Provisional Specification states that a mixture of gannister and clay is used for making crucibles, melting pots, saggars, or the like, but the Complete Specification disclaims this as being of no utility.

- 580. Welch, W.** Feb. 24. [*Provisional protection refused.*]

Cements.—Natural or artificial cements, moistened with mineral acids, liquids, and salts, are used for building, for imitating stone, metal, &c., as preservative, waterproof, and anti-fouling coatings for iron in marine structures, and for other purposes.

- 702. Willans, J. G.** March 8.

Refractory substances.—For lining puddling-furnaces, blocks are cut from suitable minerals, &c., in their natural state or after they have been burnt. In all cases crushing and moulding are dispensed with. Amongst suitable materials, mention is made of bauxite, fireclay, rocks, or beds in the coal measures, and some clay slates; also silicates of magnesia or alumina, and limestone or magnesian limestone may be used if they are sufficiently compact after firing.

- 975. Pearce, T. W.** April 5. [*Provisional protection only.*]

Concretes; asphalts.—An asphaltic concrete for use in covering floors, railway and other arches, &c. is formed by the admixture of the following ingredients, preferably in the proportions stated:—4 parts of gravel or sand, 1 part of ground quicklime, and 2 parts of heated gas tar. The composition is laid with heated trowels.

- 1041. Bodmer, J. J.** April 12.

Slags, treatment of; cements; mortars; stone, artificial.—Slag from accumulations, or straight from the furnace, is run in the molten state

upon a pair of water-cooled rolls revolving at the same surface velocity, or one roll faster than the other; or one roller, acting against a fixed plane or curved surface, may be used. The slag issues in the state of scale, and falling into a receiver filled with water or upon a carrier belt generally passing through water, becomes friable. Sometimes it drops on to a second pair of rollers, for further disintegration. Slag so treated is used for making motars and artificial stone. Cements are produced in this way from fusible or semi-fusible materials.

- 1150. Plimsoll, H. D.** April 23. [*Provisional protection only.*]

Stonework, ornamental; stone, artificial.—For ornamenting the inner walls of buildings, artificial stone, &c., titaniferous iron sand is applied. The surfaces, coated with glue or other adhesive substance, are sprinkled with sand, which may be slightly pressed by a roller. Indentations of the requisite patterns may be formed in the surface, or the sand may be worked into the material.

- 1156. Russell, G. F., and Carbines, W. H.** April 24.

Refractory substances.—Earthenware may be used for the construction of retorts for distilling nutshells to obtain gas.

- 1177. Haseltine, G.,** [Shaffner, T. P.] April 26. [*Provisional protection only.*]

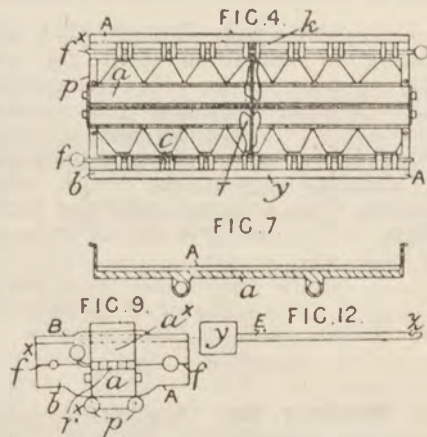
Fireproof coverings and compositions.—Consists in coating or impregnating fabrics and fibres with metals, plumbago, paint, or wax for preserving and fireproofing them. Fabrics, ropes, wood, and other vegetable fibrous substances are immersed in a solution of rubber or wax in benzene or turpentine, the solvent is allowed to evaporate, and the fabrics, &c., covered with dry plumbago, which adheres to them. They are then coated electrolytically with copper or other metal. Alternatively, plumbago or metallic solution or powder may be forced into the pores of the fibres by pressure or exhaustion.

- 1537. Paraf, A.,** [Paraf-Javal, M.] June 2. [*Provisional protection only.*]

Cements; plasters.—Mixtures of plaster and water cements, and similar materials, which set

quickly at ordinary temperatures, are kept soft by maintaining them at a temperature below zero.

- 1546. Rogers, M. C.,** [Jones, M.] June 4.



Casting.—Relates to apparatus for casting copies of artificial teeth for use in obtaining fitting surfaces. Fig. 4 shows a plan and Fig. 7 a longitudinal section of one part A, and Fig. 9 an end view of two connected parts A, B, when closed together. The part A, consisting of a central plate *a* and side plates *b* secured together by pins *p*, is filled with plastic material, and, when perforated or "tube" teeth are employed, the teeth are secured by means of pins *E*, shown on an enlarged scale in Fig. 12, having enlarged tubular heads *y*, and recesses *z* near the ends. Two teeth *T* are placed on each pin, and the pins are arranged in a row with their heads in recesses *k* and level with the eyes *c*. A long pin *f* is passed through the eyes *c* and pinheads *y*, and a second pin *f'* is passed through the other row of eyes *c* and over the recesses *z* in the pin ends. The teeth are pressed into the plastic substance, the pins *f*, *f'* are withdrawn, and the part B is attached, as shown in Fig. 9, by means of the pins *f*, *f'* passed through eyes *c*, and pins *p* passed through eyes *rx*, and plastic material is introduced to obtain impressions of the upper parts of the teeth. The moulds thus produced are used for casting copies of the teeth in sulphur &c. When "American" or unperforated teeth are used, they are fixed to plates before producing the sulphur copies, and the teeth are placed with the lingual surfaces entirely in the part A and the labial surfaces in the part B, the rest of the process being the same as for tube teeth.

1568. Sellars, J. C. June 7. [*Provisional protection refused.*]

Cements.—A cement may be formed from the substance produced by heating or burning the residue left from the distillation, calcination, or combustion of coal, shale, &c., particularly the coke made by calcination in iron or baked earthenware retorts. The oxidation of the iron present in the material may be quickened by the use of water, steam, &c.

1698. Cotterill, C. F. June 26. [*Provisional protection only.*]

Cements for filling-in the space between concentric pipes are formed of a hot mixture of pitch, gar tar, plaster of Paris, and sand.

1699. Holliss, C. P. June 26. *Drawings to Specification.*

Sound-deadening coverings.—To prevent noise and vibration, the frames, bolts, and other parts of machinery and vehicles are packed with india-rubber, cork, felt, leather, cloth, or other elastic material to prevent contact between the parts. The packing is applied between the floor, foundation, or table and the supports, legs, or frame of a machine.

1794. Kunstmann, R. July 7. [*Provisional protection only.*]

Cements.—Apparatus, stated to be applicable for drying cement and described with reference to drying bricks, consists of a close chamber, perforated at top and bottom, and having a chamber arranged beneath the bottom, into which hot air from the firing kilns, and cold air, are fed, and mixed by means of a set of revolving blades, previous to entering the drying-chamber. An exhauster at the top of the chamber draws off hot air and moisture.

1859. Mignot, L. July 16. [*Letters Patent void for want of Final Specification.*]

Stone, artificial.—A composition for use in manufacturing artificial stone is made by concentrating liquid alkaline silicates to 30° 35° Bé., and then mixing with various mucilaginous matters, preferably that obtained

by boiling linseed with water. If desired, sand, or similar granular mineral matter, may be added to the mixture.

1970. Bodmer, J. J. July 31.

Cements; slags, treatment of; plasters; stone, preserving.—Slag, cinder, or scoria from blast, copper-smelting, and other furnaces is mixed in powder with powdered dry slaked lime to form cements. Seven parts of slag are preferably used for each part of lime, and the materials may be mixed before pulverizing. Unslaked lime is sometimes used, the cement produced being especially suitable for concretes and stucco-work. The slag in the above-described cements is sometimes replaced by a compound consisting of silicious and argillaceous materials, to which limestone or other calcareous substances and slag may be added, mixed, smelted, and afterwards ground. Cements may be made from slags, or these compounds, by mixing them with calcareous materials, with or without the addition of alumina, and then calcining and grinding. The slag in this case may be run straight from a furnace into another furnace, where it is heated with the added materials. After leaving this furnace, it is disintegrated by being passed through rolls, as described in Specification No. 1041, A.D. 1866, and it may also pass through rolls on its way from one furnace to the other. Ground slag &c. is sometimes treated by adding to, say, 1 cwt. of it, 3 to 4 gallons of acid, preferably sulphuric acid, which produces a powder. Water may be added with the acid or to the powder forming a gelatinous mass, which is used in a dry or diluted form to indurate stonework and for cements, plaster, &c. Specification No. 476, A.D. 1864, is also referred to.

1972. Gedge, W. E., [*Sticht, C.*]. July 31.

Stonework, ornamental. — Calcareous "matters" of isinglass or gelatine, or resinous matters are mixed with salts, preferably acetates and sulphates in solution, and applied in a thin coating to plaster. On treatment with a stream of sulphydric acid they are said to give mother-of-pearl effects, which may be modified by the use of chromhydric, isdhydric, and similar acids. Or without such treatment the effects are said to be produced with a coloured foundation by transparency. The structure of the imitation mother-of-pearl surfaces is regulated by the use of pointed instruments.

- 2084. Baxter, C. F.** Aug. 14. [*Provisional protection only.*]

Plasters; stone, preserving.—Stucco and like substances are immersed in melted paraffin "to preserve them from weather, or to render them "capable of holding water." Terra-cotta, brick, and like substances are preserved by treating them in a similar manner.

- 2152. Minns, H. R.** Aug. 22. *Drawings to Specification.*

Fireproof compositions for safes. The composition is composed of one bushel of sawdust steeped in solution of 3 lb. of alum and 6 oz. of sugar of lead. The alum may be mixed with the sawdust in the form of powder.

- 2168. Welch, W.** Aug. 23.

Cements; asphalts.—Relates to improvements in the cement described in Specification No. 580, A.D. 1866. The cement consists of rocks, metals, bitumens, oxides, salts, acids, oils, liquids, or gases. The solids, after being ground, may be treated by calcination &c. *e.g.* in jacketed airtight revolving vessels, and are kept from atmospheric influence until required for use. The composition may also be used as an artificial stone, for imitating metals, for ornamenting, and as an antifouling-composition for iron, wood, and other substances in marine structures. It is applied by brushes or by roller machines, and ordinary cements &c. may be afterwards applied.

- 2230. Davis, J.** Aug. 29.

Cements; mortars; plasters; concretes; stone, artificial; stone, preserving; casting.—Mortar, plaster, concrete, or cement, to be used in the construction of fortifications and redoubts, houses, churches, bridges, archways, vaults, &c., are made by mixing caustic lime, obtained by the calcination of magnesian or other limestone, potash, or soda with aluminous, silicious, and ferruginous earths. Sufficient water is used to bring the mixture to the consistency of mortar for use as such, and a thinner mixture is made if it is to be cast in moulds. A small proportion of sulphuric acid is added in the latter case to cause the moulded objects to set quicker and become hard. To preserve stone and to render it capable of resisting fire and water, it is immersed in water, which contains the above substances, in an airtight vessel. Carbonic-

acid gas is passed in, and the substances are dissolved and enter the pores of the stone, solidifying there when atmospheric air is admitted.

- 2320. Bathoe, C.** Sept. 10. [*Provisional protection only.*]

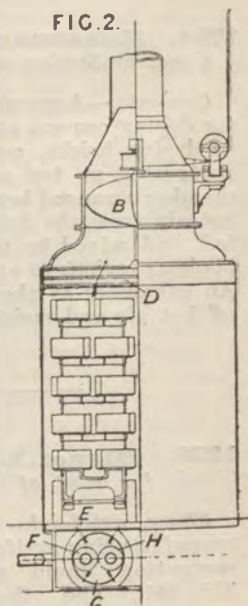
Stone, artificial.—Putty is mixed with plaster of Paris, chalk or lime, meerscham, steatite, or talc and metallic oxides, combined with boiled linseed oil in the proportions of 3 parts of putty to 2 of oxide, 2 of plaster of Paris, chalk, or lime, and 2 of steatite, meerscham, or talc, the last being applied as a polish. The composition is used for all purposes for which marble, serpentine, or scagliola have been applied, the articles produced receiving a final coating of sodium silicate.

- 2418. Crump, C.** Sept. 20. [*Provisional protection only.*]

Asphalts.—Tetrachloride of carbon is used as a solvent for asphalt.

- 2453. Kunstmann, R.** Sept. 24.

Cements.—The drying of cements and other substances is effected in a closed chamber, in which a partial vacuum, or an increased pressure, is maintained, by passing a current of air or dry steam through the chamber. In one form of apparatus, a fan B, or other exhauster, is placed in communication with the chamber, and air or steam is admitted through the wire gauze E, which has finer perforations than the gauze D, through which the air or steam leaves the chamber. In order to regulate the temperature in the chamber, hot and cold air are admitted, in proportions regulated by cocks or valves,



through the pipes F, H, respectively, into the perforated cylinders G, from which it passes into the chamber. When an increased pressure is maintained in the chamber, the perforations at the bottom are made larger than those at the top. In another arrangement, the chamber is made of brickwork, and the air or steam is admitted through perforations in the top.

2464. Duckett, J. Sept. 25. [*Provisional protection only.*]

Stone, artificial.—Scouring stones are made of 14 lb. of ground stone, sand, or the like, 2 lb. of cement, and 1½ lb. of boiled lime, mixed with water, and then moulded. The proportions may be slightly varied.

2470. Derburgh, G. E. v an. Sept. 25.

Stone, artificial; cements; mortars; plasters.—Relates to the production and use of calcium silicate in cements &c. The silicate is formed in the body of the artificial stone or other composition by mixing dry quicklime with moist sand, reducing the mixture to a paste by adding water or steam, and allowing it to stand in a moist state out of reach of carbon dioxide. Cement, gypsum, &c. are then added. To hasten the production of the silicate, the mixture may be heated by superheated steam, or otherwise. Bricks, blocks, tiles, pipes, &c. may be moulded out of the composition before it is allowed to stand. A moulded article is quickly hardened by soaking it in dilute alkaline silicate and so producing calcium silicate as before described. The Provisional Specification states that the hardening may be finished by the application of barium, calcium, or other sulphide, and also that the calcium silicate may be formed separately.

2472. Lundy, J. J. Sept. 25. [*Provisional protection only.*]

Asphalts.—The acid or alkaline residues resulting from the purification and distillation of mineral oils are treated for the production of useful materials. In one process, the acid tar is mixed with pulp lime and water, or the soda refuse, or oil foots or bottoms obtained in purifying oil with alkali, and then heated and the upper portion skimmed off, the residue being boiled down and used for asphaltting.

2764. Fisher, J., [*Jappa, H.*]. Oct. 26.

Castings.—Wax models for the formation of complicated moulds for metals are cast in india-rubber, gutta-percha, gelatine, or other elastic moulds. If the model will leave a rigid mould, the mould is made of copper or plaster of Paris.

2900. Haseltine, G., [*Hill, A.*]. Nov. 7.

Stonework, ornamental; statuary.—Consists in ornamenting marble and similar stones by applying two or more substances which produce effects insoluble in water. The marble is polished, the design drawn thereon, and the reagents applied with a brush or pointed stick, the lower surface of the stone being heated by steam, or the whole block is immersed in the solutions. After a time the surface is washed and polished. Various combinations for producing colours, such as copper or iron sulphate and potassium ferrocyanide, and cochineal and tannin dissolved in ammonia, are described. Photographs are produced on the stone by applying a solution of silver nitrate and printing from a negative. The process is applicable to ornamenting mantels, walls, marble articles, statuary, marble buildings, and for lettering and ornamenting tombstones, tables, and monuments.

2960. Hawkins, A. Nov. 12.

Stonework, ornamental.—Relates to a method of copying sculptures, or ornamental devices, in marble, stone, or the like. An iron or steel mould or reverse pattern is made and is fitted in a frame so that it can be actuated by cams and act with a percussive effect on the stone block. The surface of the stone is supplied with sandy water so that the sand cuts into and wears away the stone until it corresponds to the mould. The block may be roughed out before it is acted on by the mould.

2972. Clark, W., [*Nöggerath-Temmerman, R.*]. Nov. 13.

Plasters, ornamenting. Statuettes and other plaster articles are (1) treated with a solution of potassium silicate, or immersed in size, resin, pyroligneous acid, pyrolignite of iron, gum, creosote, salt of benzoïn, or similar materials to harden them. Lead chloride, a solution of galipot in spirits of wine, casein, or a mixture of one part of milk of lime with five parts of decomposed albumen can be used, as also can a

cheap varnish; (2) hardened by drying, and moulded in a mould, preferably coated with a fatty or soapy substance; (3) painted or immersed in a dye bath; (4) coated with a neutral varnish or with gum lac; (5) metallized by any known chemical or electrical means; (6) cleaned and heated; (7) dipped in a finishing-bath for gilding, silvering, or bronzing. The method of metallizing preferred is as follows:—The material is immersed in a solution of silver nitrate in ether or alcohol, then drained and hung in a closed box exposed to the fumes of a solution of phosphorus in carbon bisulphide, and finally soaked in the phosphorus solution. Solutions, other than silver nitrate, can be used, and the coating may be effected by electrolysis. Imitations of gold, silver, &c. are produced by diluting gold, silver, or other powders in white varnish, or by sprinkling the powders on a coating of varnish before it has dried. White or black glass, woollen flock, sand, rice, &c. can be applied in the same way. A yellowish coat of varnish may be applied to the silvered or gilded surface to produce a golden lustre.

3086. Coleman, J. J., and Coleman, T. H. H. Nov. 23. [*Provisional protection only.*]

Cements.—The residues resulting from the distillation of cannel coal and oil-bearing shales are mixed with lime, limestone, or chalk, calcined in a furnace, and used as a hydraulic cement. The residues may be calcined before mixing with the other materials.

3388. Toussaint, J. Dec. 24. [*Provisional protection only.*]

Cements.—Pulverized unburnt freestone, sandstone, marble, or other non-argillaceous stones are mixed, either separately or collectively, with “any kind of lime or plaster in “about equal proportions.”

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