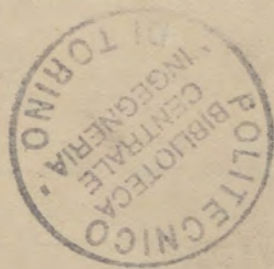


PATENTS FOR INVENTIONS.

ABRIDGMENTS OF SPECIFICATIONS.

CLASS 22,
CEMENTS AND LIKE COMPOSITIONS.

PERIOD—A.D. 1877—83.



LONDON:
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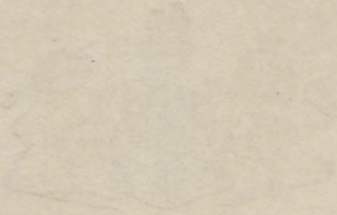
IN THE UNITED STATES OF AMERICA

APPENDICES OF SPECIFICATIONS

OF

CEMENT AND LIKE COMPOSITIONS

Patented—A.D. 1877, No.



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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, and for a list (with prices) of the Abridgment Classes for the period A.D. 1877-83, reference should be made to the *Abridgment-Class and Index Key*, published at the Patent Office Sale Branch, 38, Cursitor Street, Chancery Lane, E.C., price One Shilling, postage (parcel post) Sixpence.

It should be borne in mind that the abridgments are merely intended to serve as guides to the Specifications, which must themselves be consulted for the details of any particular invention. Printed Specifications, price Eightpence, may be purchased at the Patent Office Sale Branch, or ordered by post on the Patents Form C¹ (to be obtained from any Post Office), no additional charge being made for postage.

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CEMENTS AND LIKE COMPOSITIONS.

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

A.D. 1877.

166. Baggeley, H. Jan. 12.

Refractory composition for firebricks. Chalk, 100 lbs.; pipeclay, 64 lbs.; horse dung, 4 lbs.; asbestos, $\frac{1}{2}$ lb. Instead of the asbestos, 6 lbs. of flints and 6 lbs. of ordinary green glass may be advantageously introduced; the glass increases the hardness of the bricks, but makes them rather less refractory, and may be reduced or omitted. The bricks are made as usual and fired for 48–60 hours.

Abridged also in Classes *Electricity &c., Div. II.; Metals and alloys; Moulding &c.; Pipes &c.*

225. Hill, W. Jan. 17.

[Provisional protection only.]

Composition especially suitable for flooring and other bricks, paving and roofing tiles, &c. It consists of Portland cement with ground gray lime, fine shingle or coarse sand, and a pigment such as Venetian red, chrome yellow, or ochre. One part of Portland cement is mixed with 2 of lime and 2 to 4 of shingle or sand; these materials are made into a thin paste with water and coloured with the required pigment, and then poured into moulds and allowed to set.

Abridged also in Class *Moulding &c.*

289. Hyatt, T. Jan. 23. Drawings to Specification.

Concrete or artificial stone.—Stone chippings, agate, coloured marbles, glass fragments, &c. are mixed with cement to form concrete, and moulded or pressed into blocks, bricks, and tiles of any suitable shape. The blocks are hardened by soaking in water. The surfaces may be rubbed down and polished. The concrete may be bonded together and made porous by the admixture of coco-nut fibre, silicated cotton, asbestos, hair, sawdust, vegetable fibre, or other suitable material.

Abridged also in Classes *Buildings &c.; Chimneys &c.; Furniture &c.; Glass; Moulding &c.; Ornamenting; Railway &c. vehicles; Roads &c.; Road vehicles; Ventilation.*

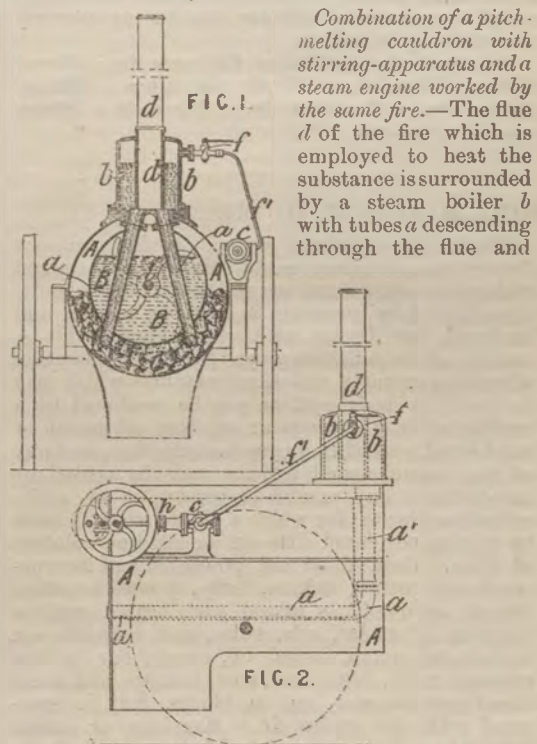
365. Hill, H. C. Jan. 27.

Fire and damp proof compositions.—Materials for the construction of portable buildings and other

structures are rendered non-inflammable and impervious to wet or damp by applying, or by steeping under pressure in, suitable salts and solutions, such as the salts of sodium, potassium, chlorine, sulphur, ammonium, tannin, tungstates, tungstic acid, silicon, aluminium, &c., which are used in coloured solutions of the tint required.

Abridged also in Classes *Buildings &c.; Electricity &c., Divs. II. and III.; Fire, Extinction &c. of; Furniture &c.; India-rubber &c.; Medicine &c.; Paints &c.; Roads &c.; Road vehicles; Ships &c., Div. I.; Sifting &c.; Toys &c.; Ventilation; Waterproof &c. fabrics.*

654. Crochet, P. Feb. 17.



Combination of a pitch-melting cauldron with stirring-apparatus and a steam engine worked by the same fire.—The flue *d* of the fire which is employed to heat the substance is surrounded by a steam boiler *b* with tubes *a* descending through the flue and

projecting into the firebox. The steam from this boiler works the small steam engine *c*, of which the fly-wheel shaft is geared with the shaft of the revolving

stirrers. If reciprocating stirrers are used, the fly-wheel is dispensed with, and the piston rod attached to an arm on the rocking shaft carrying the stirrers.

Abridged also in Classes *Mixing &c.*; *Roads &c.*; *Steam generators.*

667. Hewitt, D. B., and Davis, G. E. Feb. 19.

[Provisional protection only.]

Artificial stone.—Vat or alkali waste from soda manufacture is mixed with waste silicious material, and the mixture shaped and burnt into bricks, tiles, quarries, copings, window sills, &c. The silicious refuse may consist of furnace clinker, cinders, ashes, town refuse, road détrit, sewage sludge, &c. The proportions are 50–70 alkali waste, 40–20 silicious refuse, and about 10 clay or shale.

Abridged also in Classes *Acids &c.*, *Div. II.*; *Moulding &c.*

700. Dudgeon, A. Feb. 20. *Drawings to Specification.*

Refractory substance for lining furnaces, cupolas, crucibles or apparatus for fusing metals, stoves, and for other analogous purposes. Asbestos is ground, without the admixture of clay or earthy matter, and mixed with a solution of silicate of potash or soda, stannate of soda, or other similar chemical bodies, and then with or without pressure moulded into bricks, tiles, or other required form and burned at a high temperature. Fibrous asbestos or coloured material may be added.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys*; *Metals, Cutting &c.*; *Moulding &c.*; *Pipes &c.*; *Steam engines*; *Stoves &c.*

845. Russell, J. C. March 2.

Blocks for building, paving, girders, railway sleepers, &c.—Various waste substances are mixed with agglutinating-solutions and preservative agents, consolidated by pressure in suitable moulds, and hardened by drying with or without heat. A number of formulæ are given for the preparation of various resinous and other mixtures which may be used. A hard surface may be produced by a coating of iron borings or by bars of metal or hand-wood pressed in during manufacture, and any of the manufactured articles may be coated by immersion in any varnish or cement, or by a silicization process for which a liquid paste is made by mixing powdered lime in an alkaline solution of silica. Peat, dried and powdered and incorporated with cotton, oakum, twigs, grasses, or other fibrous material, is mixed and heated with a selection of resins, oils, gums, and solvents, e.g. asphalt, tar, pitch, boiled oil, caoutchouc, spirits, common resin, lime, sand, iron borings, and fresh blood; or the peat, cut in blocks, may be saturated with the resins &c. Shavings or similar materials, such as cane crushed between rolls, barks and twigs macerated or shredded, straw and paper pulp, and with which sawdust may be mixed, are saturated with Stockholm tar, dried and then

coated with lime; these limed shavings are mixed with fresh blood either alone or with any preserving or hardened liquid, or they may be soaked in a hot solution of glue and pyroligenous acid, or in a solution of borax and shellac. It is stated which of the formulæ given are suitable for mixing with the different materials.

Abridged also in Classes *Buildings &c.*; *Fire, Extinction &c. of*; *India-rubber &c.*; *Moulding &c.*; *Paper &c.*; *Railways &c.*

1176. Grünbaum, H. O. A. E. March 26.

Fireproof composition for lining receptacles for containing gunpowder and preventing it or other combustibles from exploding during storage and transit. The receptacles are generally made with an outer case of metal and an internal case of wood, leaving a space between the outer and inner cases, which is filled with calcined dolomite coarsely powdered, and made into a stiffish paste, with water or a silicate; or, instead of using silicate, a few small pieces of alum are introduced into the powdered dolomite. As a substitute for the dolomite paste, a composition of equal parts of calcined limestone and coal ashes may be used, either in dry powder or mixed with silicate. The wood case may be covered with strong calico, saturated with silicate. Graphite, pumice, lime, or a loose powder may be used as an isolator.

Abridged also in Classes *Buildings &c.*; *Fire-arms &c.*, *Div. II.*; *Fire, Extinction &c. of*; *Railway &c. vehicles*; *Ships &c.*, *Div. I.*

1188. Batchelor, H. C. March 26.

Stone-preserving composition.—A certain mineral pitch from Ecuador and the borders of Peru is dissolved in bisulphide of carbon, petroleum spirit, benzoline, or other hydrocarbon. In applying it to casks, the solution is run over the dry interior; after draining and drying the coating is insoluble in water and alcohol, and in most acids and alkalies, even at 212° F.

Abridged also in Classes *Casks &c.*; *Paints &c.*

1195. Lockwood, W. March 26. *Drawings to Specification.*

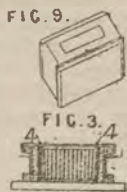
Fireproof composition.—Relates to a method of moulding and using concrete facing blocks for the building of walls for dwellinghouses and other structures, and to the composition of fireproof concrete for making the said blocks and for other purposes. Fireclay and Portland cement, pulverized stones, ashes, &c. are mixed together to the proper consistency with a suitable quantity of water. Other well-known material may however be used. The composition is stated to be applicable to other purposes wherein a fireproof lining or material is required.

Abridged also in Classes *Buildings &c.*; *Fire, Extinction &c. of*; *Furniture &c.*; *Moulding &c.*

1378. Sellars, J. C. April 9.

Casting concrete blocks.—Concrete building-blocks have a body of coarse material and one or more faces of fine material or tiles. They are formed in moulds having one or more spaces, formed by a division plate or plates, to which the fine material is fed from a trough through which passes a rammer or rammers. The blocks are made waterproof by cementing the inner surface of the faces, such cement being also washed with certain binding-solutions when lime is used for the body of the block, to ensure adhesion of the materials. Many forms of blocks may be made as above. Fig. 9 shows a form of block which is preferably used. Cement, plaster, gravel, fine stones, or other fine material, or tiles are placed in the space formed between a division plate or plates 4, Fig. 3, and one or more sides of the mould. The inner space is then filled in with concrete or stones after withdrawing the division plate by means of handles. The division plates are preferably perforated or made in the form of an open-ended grid and are made in accordance with a previous Specification No. 1379, A.D. 1877. The fine material is fed to the said spaces from a trough, divided by a central partition and having one or more rods with a perforated rammer at the end working through it. The interior surface of the facing or facings is coated with cement, whether the blocks are made as above described or under a previous Specification No. 3824, A.D. 1876. Two or more layers of cement or fine material may be used. Binding-solutions are used consisting of sulphate of zinc, alum, protosulphate of iron, glue, size, gelatine, or gum solutions.

Abridged also in Classes *Buildings &c.*; *Moulding &c.*



is finished with a float to imitate a grained surface like worked stone, or cut-bricks, and the block is removed from the mould and dried. The blocks are faced with ground burned clay, ground lime, and fine sand, or other soft substances, when it is desirable to carve or ornament them *in situ*. The concrete may be composed of gravel, stones, brick, ballast, coke, breeze, &c., mixed with lime or cement, and oxide of iron may be added to form a red brick. The bricks and blocks are used for ornamental mouldings, string-courses, cornices, &c.

Casting concrete tiles or slabs.—The tiles are made with a glazed or polished surface by placing a sheet of glass, glazed earthenware, or other polished surface upon the bottom of the mould. The mould is divided by partitions when forming tessellated paving-tiles. To make the tiles with an inlaid or incised pattern, core prints are placed on the bottom of the mould, which is then filled in with fine concrete. The tiles are removed, and after drawing out the core prints the recesses are filled in with a suitably-coloured cement.

Abridged also in *Class Moulding &c.*

1701. Robbins, E. May 2.

[Provisional protection only.]

Fireproof materials, cements, and wares.—Cornwall china stone is used as a binder to form firebrick or fireproof cement either with silex, quartz, biscuit, gannister, or pottery alone or in combination also with pure silicate or silicate of soda, or potassa with a small percentage of lime, Portland cement, plaster of Paris, oxide of zinc, or magnesite, sulphate of lime, or sulphate of baryta, in varied proportions.

Imitation marble.—The surface of the mould employed is deluged with water or other liquid, charged with chemicals, colours, and dyes in any desired form or arrangement, by means of the floss silk or other process, the colours &c. being first applied to the silk and afterwards transferred to the mould. A peculiar softening and blending of the tints is thereby produced. The silk or other fibrous material may be charged through stencils or a special wire-gauze netting or webbing. A translucent waterproof surface is given to the slab or cast by applying to the surface of the mould a solution of silicate or other suitable material, which takes up with and indurates the solutions first applied.

Abridged also in Classes *Buildings &c.*; *Fire, Extinction &c. of*; *Furniture &c.*; *Glass*; *Lamps &c.*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*; *Oils &c.*; *Paints &c.*

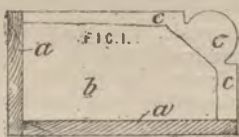
1379. Sellars, J. C. April 9.

Casting concrete blocks.—Consists, firstly, in making moulds or frames for forming ornamental blocks &c., of paraffin or similar wax-like substance, alone or mixed with sand, charcoal, or other fine material; secondly, in making the moulds of wood, metal, or other rigid material and coating the surfaces with lac, mastic, or other varnish, with japan or enamel, or with paraffin or other wax-like substance alone or mixed with sand, charcoal, &c., which latter may be also added in the form of patterns to the moulds for forming embellished and ornamental blocks.

Abridged also in Classes *Buildings &c.*; *Moulding &c.*

1535. Lascelles, W. H. April 19.

Casting concrete bricks and blocks.—A wood or other mould formed of sides, bottom, and back *a*, *a*, is partly filled with rough concrete, as at *b*, and is subsequently filled up with fine material *c* of a suitable colour. The surface

**1884. Ponton, A. C.** May 14.

Artificial stone.—A concrete made by mixing molten sulphur with gravel, sand, particles of slag, glass, clay, loam, flint, carbonate or sulphate of lime, felspar, Cornish stone, or other suitable earthy mineral or metallic substance. To reduce the volume of interstices, a fine-grained powder may be mixed with a coarser one before adding the sulphur. The materials are pressed into porous or perforated moulds, which are then plunged in molten sulphur. The moulds are sometimes placed

in a receiver heated to 240° F., and connected with an air pump, the air being removed before or during their immersion in the molten sulphur. Portland cement may be used with the other materials to render them fireproof.

2198. Reid, H., and Smith, W. June 6.

Portland cement.—Manufacture of Portland cement from the "calp" limestone of Ireland. A stone of suitable composition is dried and ground so as to pass through a fine sieve. The powder is then compressed into bricks which are dried and fired in a kiln. After calcination the bricks are ground to powder.

2236. Clark, A. M., [Elbers, A. D.]. June 8

Preparation of slag wool for manufacture into wadding, felting, paper, &c. The mineral wool is separated from globules and collected in pans to form sheets of the required size, by means of an arrangement shown in Fig. 1. The liquid slag runs from a conduit A into the chamber C, where it meets a jet of air, steam, &c. issuing from the pipe B, whereby it is blown into woolly fibres and carried in the direction shown. It is afterwards subjected to the action of a lateral current issuing from D, the strength of which current is so adjusted that the light wool is blown into the upper part of the chamber or into another compartment E, while the heavy globules fall to the floor. The lateral current may be produced by an exhaust apparatus placed as at F. The pans G are made with loose bottoms *a* and when reversed may be used to compress the wool, as shown in Fig. 2. To make the sheets compact, they are treated with glue or a mixture of glue and glycerine. To render the fibre waterproof and protect it from the action of the atmosphere, and also to decompose the calcium sulphide which it may contain, it is treated with bituminous, resinous, or gummy substances either by melting the latter on the sheets and then if necessary heating to carbonize, or by placing the bituminous or like substance in the chamber E, where it is volatilized by the heat and condensed on the wool. The calcium sulphide may also be decomposed by treatment with dilute acids or acid vapours. If the wool is to be used in the manufacture of paper &c., it is first treated with dilute acid to soften the fibre, and then agitated to separate the heavy portions, and the fine fibres are mixed with paper or other pulp and worked up in the ordinary way.

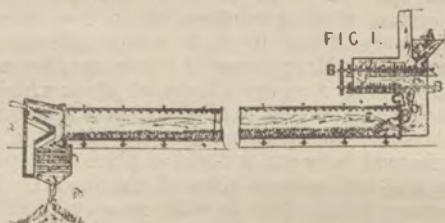
Abridged also in *Classes Fabrics, Dressing &c.; Fire, Extinction &c. of; Heating; Paper &c.; Waterproof &c. fabrics.*

2259. Bale, T. S. June 9.

Cements and plaster, colouring.—The application of metallic oxides and various substances for colouring, dyeing, or staining cements &c. is mentioned.

Abridged also in *Classes Agricultural appliances for the treatment of land &c.; Buildings &c.; Moulding &c.; Roads &c.*

2438. Crampton, T. R. June 22.



Kilns applicable for drying slurry.—The kiln consists preferably of a revolving, circular, or polygonal chamber E, Fig. 1, lined with firebrick, and placed either horizontally or inclined at a small angle to the horizontal. In the former case it is provided with projections by which the charge is moved forwards as the chamber rotates, the material traversing the chamber in an opposite direction to the products of combustion. The chamber is preferably heated by the injection of air and finely-powdered carbonaceous material. The materials may be supplied in a moist condition, and the cement as it leaves the chamber may be made to fall through a stream of air entering the furnace, or it may be brought in contact with pipes through which air is passing to the furnace: or the hot cement may be cooled by passing it into the end of a long trough and screwing it along a sufficient distance to cool it, the trough and screw being kept cool by the circulation of air or water: or the cement may be cooled by pouring a small quantity of water on it. The cement material may be mixed with fuel in the chamber. The process may be conducted intermittently, and a fixed furnace may be used, the charge being turned over by hand or otherwise. The waste heat may be utilized in drying the slip or in firing boilers. The whole operation may be made continuous. The materials, being supplied to the hopper A, are mixed in the chamber B, through which the products of combustion are made to pass. The charge then falls on the rollers C by which it is crushed and delivered to the chamber E. The burnt materials are delivered from E and cooled as described. The slip may be dried by the waste products of combustion, by passing them through the pugging trough or otherwise, or the drying-chamber may be a continuation of the revolving furnace, the material being supplied wet and gradually moved forwards, or the drying may be effected by passing the material on a series of moveable webs in a closed chamber, or by screwing it in a zig zag direction through a closed chamber.

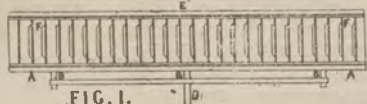
Abridged also in *Classes Drying; Furnaces &c.; Steam generators.*

2477. Hayward, S. June 27.

Casting concrete blocks.

—Transverse partitions F, F slide into grooves formed in two opposite

sides of an oblong box E to form the moulds. The detachable front A is secured by claws, on the bottom of the box, engaging with clams B, B operated by the rod D. The interior of the mould is brushed over with soft soap &c., and sprinkled with fine sand. Liquid concrete is poured in and, after setting, the front A is detached to remove the bricks.

**2495. Hyatt, T., and Rickett, T.** June 28.

Fireproof or heat-resisting compositions.—Finely-powdered sulphur, iron pyrites, or “other equivalent chemical agent or material” is mixed with Portland or other hydraulic cement, at any stage of its manufacture. The composition may be used for main structures, or to cover other materials.

Abridged also in Class *Fire, Extinction &c. of.*

2525. Newton, W. E., [*Hosmer, H. G.*]. June 30.

Artificial marble.—Limestone, or other stone having lime for its basis, is worked into the desired form and the shaped articles are enclosed in a pressure boiler and subjected to the action of hot water or steam under pressure, (5 to 7 “degrees of atmospheric pressure”). If the stone is to retain its natural colour, the articles are then immersed in an alum bath, or the alum may be dissolved in the water in the boiler, in which the articles must remain for twenty-four hours after the pressure returns to the normal. If the stone is to be coloured, the articles are steeped in suitable dye baths, instead of the alum bath. The composition of a number of suitable dye baths is given in the Specification.

2548. Charlton, W. July 3.

[*Provisional protection only.*]

Scoria-brick casting-boxes.—The molten scoria is run into a metal moulding-box hinged to a bracket on the table of rotary or other scoria-brick making machines. The box is then opened to allow the brick to slip out by releasing a retaining-catch, and is reclosed by the action of a counter-balance weight.

2694. Woodcock, F. T. July 12.

[*Provisional protection only.*]

Refractory composition for lining or repairing

furnaces. This consists of fireclay and sand, ground and incorporated with water into a plastic condition. The proportions preferred are two of fireclay to one of sand; when the composition is used to repair cracks, 5 p. c. of borax is added. To construct a furnace or tank of this material, an iron or other casing is put together and a lining of the composition rammed into place. Successive coatings are added to a thickness of 14 to 18 inches. The furnace is afterwards fixed very gradually, and the cracks which appear are filled with fresh composition, and the furnace again fired.

Abridged also in Class *Furnaces &c.*

2735. Heaton, E. July 17.

[*Provisional protection only.*]

Portable apparatus for melting asphalt.—The pan is made cylindrical with a closed top and is provided with a manhole, through which the charge is introduced, and which is provided with an airtight cover. A stirring-apparatus is used which can be actuated without removing the cover. A shaft is made to work in bearings within the pan, one end of the shaft passing through a stuffing-box and carrying a lever by which it can be rocked. To the shaft within the pan are fixed arms, each carrying a paddle or blade which moves near the curved bottom of the pan. Other forms of stirrers may be used, provided they can be actuated without opening the pan.

2760. Browne, A., [*Lehrkind, A.*]. July 19.
Drawings to Specification.

Cement for attaching lugs to slates is composed of ground slate, sand, water glass, plaster of Paris, tar, and resin. The joints are then treated in an acid bath containing dilute hydrochloric acid and broken marble.

Abridged also in Class *Buildings &c.*

2968. Hyatt, T. Aug. 2. *Drawings to Specification.*

Concrete.—Sulphur or equivalent material is added to concrete or cement in a per centage of from two and a half to ten p. c. to render it additionally fireproof.

Abridged also in Classes *Buildings &c.*; *Chimneys &c.*; *Fencing &c.*; *Furniture &c.*; *Moulding &c.*; *Roads &c.*; *Ventilation.*

3126. Russell, J. C. Aug. 16.

[*Provisional protection only.*]

Artificial stone, and composition for preserving stone and wood.—Chalk or limestone is converted into artificial stone by mixture with an alkaline solution of silica, and then immersed in water, (pure or acidified with hydrochloric or carbonic

acid, or mixed with magnesian solutions, such as the mother liquor of salt manufacture), to remove the alkali. The silication and immersion may be repeated several times, or the magnesian compound may be mixed with the chalk or limestone and alkaline silicate at the outset. This composition, dried, calcined if necessary, pulverized, and mixed with water or other vehicle, may be used as a protective paint for stone or wood.

Abridged also in Class *Paints* &c.

3460. Ditch, J. A. Sept. 14.

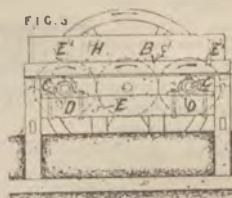
A substitute for slate for building or writing purposes is made by coating surfaces with a mixture of flour of emery, gum-shellac, and methylated spirit or its equivalent. For writing-slates, powdered glass, rotten stone, or pumice is added to the mixture, together with lampblack or Paris green as colouring-matter, and the composition is used to coat millboards. Chalk, brick, slate, or stone may also be added to give body or an abrading-surface.

Abridged also in Class *Writing-instruments* &c.

3509. Hodges, J., and Butler, J. W. Sept. 18.

Composition for paving slabs, blocks, pipes, emery wheels, grindstones, &c.—Oxide of magnesium and sulphur are mixed with emery, silix, or other materials used in making the articles, the whole being mixed with a solution of sal-ammoniac and chloride of magnesium. For pipes, emery wheels, and grindstones, finely-divided asbestos may be mixed with the materials used in their manufacture. The above compositions, or any suitable cement such as Portland cement, are introduced into a suitable mould H placed on a table B, which receives a tremulous or shaking movement by cams D, D acting on the under side of the table. The cams are keyed on shafts C, actuated from band pulleys by means of tooth gear E, E'.

Abridged also in Classes *Grinding or abrading* &c.; *Moulding* &c.; *Pipes* &c.



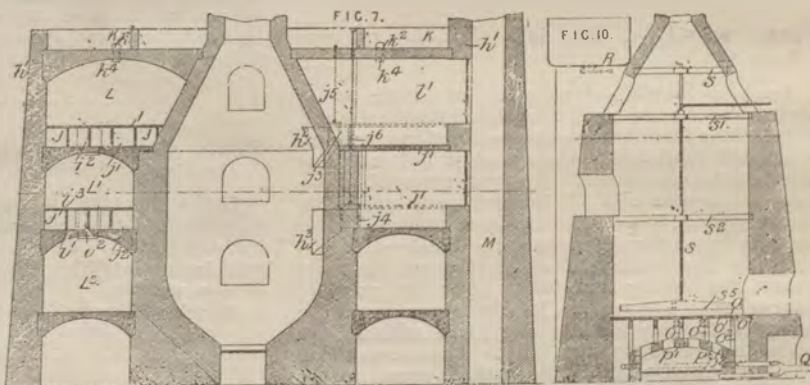
3596. Joy, W. Sept. 25.

Backs or settlers.—

Cement "backs" or settlers are formed with bottoms sloping towards the centre. At the lowest point is a pipe, passing through the bottom, closed with a valve and covered with sloping boards, so as to prevent the slurry settling on the top of the valve. The pipes from the "backs" lead into a main pipe closed at one end, and opening by the other into an airtight chamber. When the slurry in the "backs" has sufficient-

ly settled, air is withdrawn from the airtight chamber; the valve is opened and the slurry is forced along the pipe into the airtight chamber. The slurry is then forced from this chamber to the drying-floors by means of air pressure. In place of the airtight chamber, a pit at a lower level than the backs may be used, the slurry being run into it by the action of gravity, and the slurry may be conveyed to the drying-floors by any convenient method.

Kiln and drying-floors.—The arrangement of the kiln is shown in Fig. 7. The kiln of the ordinary form is surrounded by a wall h^1 , the space between the kiln and this wall being divided into a series of chambers L, L', L² by arches of brickwork. A radial wall is built across these chambers at one part, near the chimney M. The drying-floors are made in the chambers L and L'. These consist of flat floors I and I', supported on circular brick walls i^1 so as to make a series of flues J, J'. These floors I, I' do not extend quite round, a space being left near the wall, above mentioned, by which the flues J, J' communicate with the chambers above the floors. The upper floor or roof K of the concentric space round the kiln forms a tank for the reception of the slurry. The kiln is provided with a damper by which the top can be closed, and with flues h^2, h^3 , provided with dampers j^2, j^3 , by which the hot products of combustion can be admitted into the flues J, J'. The kiln is charged and lighted in the usual way, the products of combustion being allowed to escape. The slurry is delivered into the tank K, and then by means of the ball-valve K³ is allowed to run onto the floor. The top damper of the kiln is now closed and the dampers j^2, j^3 are opened. The hot gases pass round by the flues J, J', then up into the chambers, back over the surface of the slurry, and away by the chimney M. In some cases, instead of forming the flues

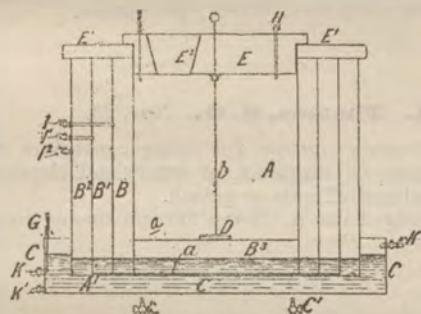


as described, the slurry is spread over perforated floors formed over furnaces, the products of combustion being forced through the slurry.

Kiln for drying and burning.—This kiln has a bottom formed of perforated slabs of fireclay O, Fig. 10, supported on arches O², O² built over the crown of the furnace P. The furnace crown is also perforated with holes p², p². Q is a blast pipe for the supply of air. Beams s, s¹, s² pass across the kiln; to these are fixed bearings in which works a vertical screw shaft S¹, which carries at the bottom end a spreader s². The slurry is pumped up into a tank R, from which it can be delivered into the kiln by a suitable shoot. The fire is lighted in P, the slurry is run in, the shaft S being set in motion, the leveller spreads and levels the slurry. When sufficient quantity has been put in, it is dried by the volatile products of combustion which pass up through it. More slurry is then added, levelled, and dried, and so on. When the kiln is full nearly up to s², this is disconnected from shaft and removed from the kiln, and more slurry is then added; the beams s¹ and s and the shaft and spreader being removed, when necessary. The fuel required may be mixed with the slurry either in the tank R or after it has been put into the kiln. When the kiln is full, the temperature is increased, the fuel in the lower layers ignites, and the burning is continued in the usual manner.

Abridged also in Classes *Drying; Furnaces &c.*

3640. Smith, G. H. Sept. 29.



Stone, colouring.—Designs marked on the surfaces of articles, in colours or in corrosive pigments, are fixed by exposing the articles to heat and vapour in the apparatus shown in section in the figure. C is a water or other hot bath, heated by burners C¹. In this is placed the hot chamber A, surrounded by the spaces B, B¹, B² to prevent radiation of heat. Perforations a, a in the lower edges of these chambers allow the hot liquid to circulate. The cocks K, K¹, K are for regulating the water supply and I, I¹, I² for allowing the escape of hot air or vapour. An opening E is provided through which the articles are introduced, and D is a valve for admitting vapour from B³ into A. A being filled with the articles is heated to say 100° F., and the valve D then opened; the heating is continued until the water in the bath reaches 212° F., the temperature then lowered quickly or slowly, and these operations repeated until the colour has penetrated sufficiently. If temperatures above 212° are required, the apparatus is constructed to withstand pressure. Alcohol and ammonia are sometimes used in A instead of water.

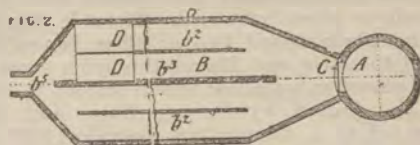
Abridged also in Classes *Bleaching &c.; India-rubber &c.; Ornamenting; Printing other than letter-press &c.; Wood &c.*

3762. Cornish, P. Oct. 10.

Concrete for building blocks.—The blocks are stated to be made of tile or other hard substance, burnt ballast, and clinker, mixed with cement and sand.

Abridged also in Classes *Buildings &c.; Fire, Extinction &c. of; Heating; Mining &c.; Moulding &c.; Ventilation.*

3961. Wilson, D. Oct. 26.



Slurry, drying.—The flue B, of which *b* is the outer wall and *b*², *b*², *b*³ are the partition walls, is connected with the kiln A, used for burning previously-dried slurry, and with the chimney by the exit flue *b*³. The compartments of the said flue are covered by ribbed sheet-iron plates D, preferably hinged on one side to plates built into the walls. The slurry to be dried is spread or run from pipes on to the drying-floor after the cover plates have been removed or turned back, and these on being replaced are also covered with slurry; the sliding damper C is then opened, and a damper at the top of the kiln closed, and the drying proceeds. For drying sewage deposits &c. where the heat from a kiln is not available, the same flue arrangements are used with a separate furnace.

Abridged also in Classes *Drying; Furnaces &c.*

3999. Potter, T. Oct. 29. *Drawings to Specification.*

Concrete castings.—Relates to the construction of concrete and compound walls and various parts thereof, and to concrete castings partly for use with the above, and partly of more general application. As a mould a wood plank is used, having a side piece fixed to one edge; a similar piece is hinged to the opposite edge to facilitate the removal of the casting metal guides with grooves are fixed to the sides to receive sheet-metal cutters which gauge the article cast to the required length. Hollow castings are made by casting concrete into wood, metal, or metal lined moulds of the required shape, with wood cores. The cores are made in sections (and wedge-shaped) to facilitate removal after the concrete has set. The cavities may then be filled with inferior material. Copings, cornices, kerbs, mouldings, troughs, sinks, and similar articles are stated to be so made.

Abridged also in Classes *Buildings &c.; Moulding &c.*

4030. Baatsch, C. Oct. 30.

Preparation of slagwool for buildings, fire and sound proofing, &c. by coating the said slagwool with alkaline silicate, whereby the emission of sulphuretted hydrogen and dust is prevented. In covering floors, roofs, or partitions to render them fire and sound proof, the ordinary slagwool is laid upon, and covered with, cloth or paper saturated with alkaline silicate.

Abridged also in Classes *Buildings &c.; Fire, Extinction &c. of; Heating; Moulding &c.*

4085. Way, J. T. Nov. 2

Mineral gum applicable to the manufacture of cement.—Phosphate of alumina, (either redonda phosphate or alta vela phosphate), is placed in a lead-lined wooden vessel and treated with dilute sulphuric or phosphoric acid. Steam is passed in, and the whole boiled two or three hours, then allowed to settle, and filtered through a press. It is then placed in a shallow leaden pan set in brick-work and heated by furnace flues, and there evaporated at a temperature between 150° and 180° F., until a dry gum soluble in water is obtained. To avoid excess of acid, the gum may be digested with a further quantity of acid or neutralized with lime, soda, or ammonia, or their phosphates or carbonates, precipitated alumina, or bauxite may be used. The gum may be used as a substitute for gum, for glue in bookbinding, for stiffening in the manufacture of papier maché, paper, cardboard, and fabrics of cotton, linen, and wool, for glazing paper, and varnishing wood; also in combination with plaster of Paris as a cement.

Abridged also in Classes *Acids &c., Div. II.; Fabrics, Dressing &c.; Paints &c.; Starch &c.*

4220. Gedge, W. E., [Rolland, P.] Nov. 12.

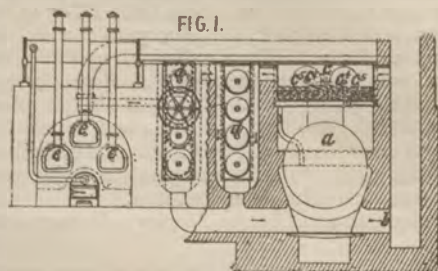
Fireproofing-solution.—The liquid is a solution containing five parts of sulphate of iron, three of sulphate of alumina, and two of bay salt (chloride of sodium). Substances may be impregnated therewith to preserve them from fire. In the Provisional Specification, a solution is described containing 70 p. c. of sulphate of iron, 20 of chloride of sodium, and 10 of carbonate of lime.

Abridged also in Class *Fire, Extinction &c. of.*

4286. Kidd, J. H. Nov. 16.

Mortar.—A system of treating excremental and faecal matters, town refuse, &c., comprising burning, concentrating and drying, and utilizing the products obtained for gas making, and for producing manures and mortar. The combined plant is shown in longitudinal section in Fig. 1, in which *a* is a steam boiler running at right angles to the rest of the apparatus, and heated or partly heated by the dried excremental matter, town refuse, or cinders sifted from the same, or by hot gases from the retorts *e, e, e*. The furnace gases

from the steam boiler pass directly to the chimney *b*, or may be diverted to heat the drying-chamber *d, d*, or the plates of the concentrating chamber *c*, or both. The residue from the retorts may be used either for making manure or mortar.



Abridged also in Classes *Acids &c., Div. II.; Drying; Gas manufacture; Sewage &c.*

4422. Thomas, S. G. Nov. 23.

Refractory material for lining converters, made of limestone, magnesia, or emery and clay mixed with silicate of soda or potash.

Abridged also in Classes *Manufacture of iron &c.; Metals and alloys.*

4513. Hyatt, T. Nov. 30. *Drawings to Specification.*

Concretes.—Asbestos, slag, bricks, Rowley Rag or other suitable rock are reduced to powder and combined by means of soluble glass. Another concrete consists of crushed Rowley Rag rock and Portland or other hydraulic cement.

Abridged also in Classes *Buildings &c.; Chimneys &c.; Hydraulic engineering; Moulding &c.; Roads &c.*

4558. Clark, A. M., [Michel, O.] Dec. 1.

Hydraulic cements.—The raw materials are calcined at a high temperature so as to overburn the products. The first lime which is in excess is, if necessary, extracted, and the nodules and underburnt remainder are treated with dilute hydrochloric or other acid. When effervescence ceases, they are dried in a furnace and ground in the ordinary way. The materials may be treated with acid before or after burning, and the acid may be used either in solution or in the form of vapour.

4925. Gibbons, R. A. Dec. 29.

[Provisional protection only.]

Drying slurry.—The hot gases from each kiln pass through two or more symmetrically-arranged flues to a common chimney or to separate chimneys. The lower parts of the chimneys are floored over

with removable plates, preferably of iron, the floor forming the covers of the flues. The oven or chamber thus formed is roofed over and the hot gases, after passing through the flue, may be made to return between the floor and roof. This is a convenient arrangement when a central chimney is used for all the flues. The floor over a flue having been charged with slurry, the hot gases from the

kiln are sent into that flue and the slurry thus dried. The hot gases are then shut off by suitable valves or dampers and directed into another flue ready charged with slurry, and so on. The dried slurry is charged into the kiln, which is continuously worked, the cement being removed at the bottom from time to time.

Abridged also in Class *Furnaces &c.*

A.D. 1878.

- 66. Clark, A. M.,** [*Baulonnet, E.*]. Jan. 4.
[*Provisional protection only.*]

Sound-deadening lining or composition for carriage bodies and window sashes. The body or window sash is covered with a thin sheet of gutta-percha or a composition having a base of gutta-percha.

Abridged also in Classes *Paints &c.*; *Road vehicles*; *Starch &c.*

- 72. Smith, W.** Jan. 5.

[*Provisional protection only.*]

Concrete; stone, artificial or natural.—Rendering waterproof and airtight by soaking the materials with pitch and creosote or other heavy oils obtained in the destructive distillation of tar.

- 289. Thomas, S. G.** Jan. 22.

Refractory substances.—Reference is made to a subsequent Specification No. 908, A.D. 1878. Finely-ground highly-magnesian limestone, mixed with about 8 or 10 p. c. of its weight of a solution of silicate of soda, may be rammed round the bottom of a furnace to form the hearth. This magnesian limestone may be replaced by aluminous limestone, not containing sufficient alumina or oxide of iron to render it fusible, nor much silica. Highly-calcined magnesian lime bricks, made from magnesian limestone mixed with a little clay or highly-aluminous limestone, may be used for making the interior of the furnace or those parts which come in contact with the molten metal and slag. When silica bricks are used for other parts of the furnace, they should be separated from the basic materials by a layer of plumbago bricks, coke mixed with clay and sometimes silicate of soda, or other non-fluxing refractory material. Bessemer

converters may be lined with similar magnesian lime bricks.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys.*

- 908. Thomas, S. G.** March 6.

Refractory substances.—Converters, open-hearth, and other furnaces are lined with a basic refractory material preferably consisting of magnesian limestone or a mixture of the limestone with clay slag or aluminous shale. Magnesia or carbonate of magnesia with suitable binding-materials may replace the limestone. The Provisional Specification states also that ore-furnace slag, borax, silicates of magnesia, or cements may be added, and carbonate of baryta substituted for the limestone.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys.*

- 1166. Schœnfeld, J., and Guilmét, A. R.** March 23.

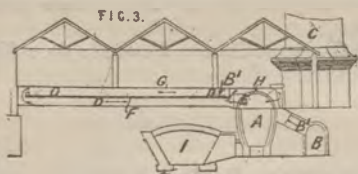
[*Provisional protection only.*]

Statuary.—Making objects in imitation of bronze, such as statuettes, vases, &c. India-rubber is moulded hollow, hardened, fettled, polished, and even chiselled, and is scraped smooth, if necessary. It is next covered with plumbago or black lead, and electrolytically coated with copper or brass uniformly, or so that some parts receive a red and others a yellow deposit. It can then be bronzed, and be further ornamented by any process of gilding, silvering, nickeling, bronzing, &c.

1258. Jeyes, J. March 30.

[Provisional protection only.]

Cements; compound for paving, building, &c.—Powdered pitch, gum, resin, &c. is mixed with coarse or fine earthy or sandy particles, preferably, in about equal portions. For use, it is thoroughly mixed with powdered or coarse particles of slate or other earthy matter, moistened with any suitable solvent such as naphtha, petroleum, turpentine, &c., &c. The mixture forms a compact mass by beating or pressing without the application of heat. The compound may also be made by mixing a suitable proportion of earthy matter with a solution of gum, resin, pitch, or the like, and may be used for paving or as a cement for building purposes. When made plastic by spirit or other solvent it may be used as a protective coating for iron, wood, stone, &c., and as a mortar, and also for coating the inner surfaces of ships, barges, boats, tanks, and other structures.

Abridged also in Classes *Paints &c.; Roads &c.***1347. White, J. B., and Glover, A.** April 4.

Portland cement.—Relates to combined kilns and drying-chambers for use in the manufacture of Portland cement. The kilns are constructed below the ground level. They are of the usual form, but of small size (about 11 feet deep and 10 feet in diameter at the top), so that they can be fed and drawn without the necessity of men entering them. Each kiln A is covered with a semicircular dome, provided with a feed opening H and with passages E communicating with a horizontal flue D, which is divided into two parts by a horizontal division F, the top of the flue being covered by plates G. The products of combustion pass from A through E into D along under the division to the end of the flue, then back over it to the flue B, and thence to the chimney C. The slip or slurry, containing say 40 p.c. of water, can be pumped on to the horizontal division F, where it will be rapidly dried, and an additional quantity can be dried on the upper surface of the flue G. The kilns are charged as usual through the opening H, and the calcined charge is withdrawn into a tunnel I through which it can be conveyed away. The horizontal division F in the drying-chamber may be dispensed with, and the slurry pumped only on the upper surface of the flue; in that case vertical partitions may be used to cause the gases to travel backwards and forwards under the drying-floor.

Abridged also in Class *Furnaces &c.***1390. Meyer, E.** April 8.

Composition for castings, cementing, &c.—The invention depends on the decomposition which occurs between alkaline silicates and fluorine compounds in the presence of water. Powdered fluorspar or cryolite is mixed with soluble glass, either powdered or in solution, water being added if necessary to bring the mixture to a paste which may be cast in moulds or used as a cement for joints, surfaces, &c., or as a waterproof coating for wood, brickwork, stone, metals, &c. Or the fluorspar and soluble glass may be applied to any surface in alternate coats. Any suitable mineral powder or colour may be added. Papier mâché, clay, potter's earth, powdered plaster of Paris, &c. can be mixed with fluorspar or cryolite previous to casting, or afterwards gone over with a fluorspar mixture, and the products can be hardened and made waterproof by treating the surface with soluble glass solution. Castings of a mixture of fluorspar and gypsum can be similarly hardened. A mixture of ground soluble glass and fluorspar can be used for many purposes, being hardened by treatment with water. Ornaments and castings may be made by coating the inner surface of moulds with a mixture of fluorspar and soluble glass, and strewing sand over the coating. After drying the process is repeated till the article is sufficiently strong. Any fluorine compound may be used instead of fluorspar or cryolite. Fluorine compounds may be advantageously applied to all kinds of soluble glass coatings, and the chemical reaction may also be utilized in other ways. The use of soluble glass as a protection from fire is facilitated by the addition of fluorspar &c., which can be easily applied to combustible stuffs.

Abridged also in Classes *Fire, Extinction &c. of; Paints &c.***1417. Nallsworth, S., and Bailes, R.** April 9.

[Provisional protection only.]

Mortar.—Calcined sewage sludge containing lime is mixed with about two parts of ground coal, ash, or sand.

Abridged also in Classes *Drying; Gas manufacture; Medicine &c.; Sewage &c.***1602. Guelton, R., and Sandeman, D. G.** April 20.

Artificial and waterproof marble.—Relates to the casting of artificial marble in the form of slabs, mouldings, sculptures, chimneypieces, columns, pedestals, niches, archways, brackets, &c. For slabs the mould consists of a smooth surface of glass, polished cast iron, plaster or cement; for curved objects the mould is made of plaster, cement, wood, or iron. Keen's cement or other suitable material is diluted with water and coloured to the required tint, portions being separately coloured for the veins or markings. The veins are traced with the coloured cement on the surface of the mould, or nets of fibres of silk or other material are soaked in the cement and

spread on the surface of the mould. The veins may also be traced in wax spread on a piece of cloth (silk preferred); these traces are soaked with the coloured cement and pressed on the flat surface of the mould. When the veins are traced a layer of the cement is spread over the mould, and smoothed with a trowel. On this is spread a piece of very open canvas, and on this a layer of dry cement which is removed when it has soaked up the superfluous moisture. For columns, a skeleton is made of wood; this is covered with coarse cement. A piece of paper or oil cloth is spread on a smooth surface and on this is spread the marble prepared as above, which is then stuck on the shaft and when set hard is "levelled" on a lathe, stoned, and polished. To reproduce marbles with breccia or brèche, pieces of pasteboard of the required shape are placed on the face of the mould; the marble is filled in, the pieces of the pasteboard are removed, and the spaces are filled with cement of the required tint. For waterproofing, fibres of hemp or other fibrous material are soaked in fused asphaltos and are stuck to the marble by asphaltos or wet cement. Or a coat of a liquid solution of tar or other material with tinfoil or other adhesive material may be applied at the back of the slabs.

Abridged also in Classes *Buildings &c.; Furniture &c.*

1626. Morgan-Brown, W., [*Hyatt, J. W.*]. April 23.

Artificial stone for statuary &c. A solution of silicate of soda &c. is added to finely-pulverized &c. bone, hoof, horn, ivory, ivory nut, &c., and is mixed therewith by means of heated &c. rollers; or the silicate and bone dust &c. may be ground together in a paint mill. The produced paste is formed into sheets &c., which (whole or divided) may be shaped and dried in porous moulds; or the sheets &c. may be dried by evaporation, or they may be pressed between absorbent material, such as blotting-paper, and then placed in heated moulds. Preferably the sheets &c. are partially dried by atmospheric exposure &c., and are then reduced to powder, which is placed in heated moulds; simultaneous heat and pressure can be employed. If the composition is to be moulded from the sheet &c. without having been previously pulverized, it should not be exposed to atmospheric evaporation. The moulded material is wholly or partly saturated with a solution of chloride of calcium, and colouring-agents may be applied; or colouring-matter may be added to the ingredients when first mixed. Or the chloride may be mixed with the silicate and bone dust &c. in a dry, pulverized state, and the mixture is then heated and pressed. The moulded material may be used without the chloride treatment, and the composition may be formed into bars &c. and may be used with or without the chloride treatment; or fragments of the composition, before or after the chloride treatment, may be crushed and re-treated with the silicate, and the moulded material may be bleached. The material ultimately formed may be cut and polished, and may be used in the manufacture of billiard balls, buttons, brushes, crockery, jewellery, sculpture, and stationery, &c.; it can be moulded upon or about a metallic &c. core. If the

material is required in a pulverized state, the silicate-bone &c. compound is reduced to a syrup, which is brought in contact with the surface of a large heated drum upon which it hardens; it is then removed, and is reduced to powder by means of blades &c. approximately placed, the rotation of the drum causing a constant production of the powder.

Abridged also in Classes *India-rubber &c.; Wearing-apparel, Dir. IV.*

1713. Collins, D. L. April 29.

[*Provisional protection only.*]

Artificial stone and marble is prepared by mixing crushed chalk and hydraulic lime or cement, with or without the addition of crushed flints, shingle, or stones, with water or with silicate solution, casting or compressing the mixture in moulds of a suitable shape, and hardening the blocks thus formed by immersion in a solution of silicate of soda or other soluble silicate. To make artificial marble the blocks are faced by grinding and are then glazed.

1717. Lake, W. R., [*Thorpe, J. H.*]. April 29.

Artificial stone.—Finely-divided soapstone, carbonate of magnesia, sesquioxide of iron, litharge, and gypsum are stirred up with water, and mixed with solutions of asphaltum in alcohol and of silicate of soda and alum in water. For fireproof stone or retorts, pulverized flour-clay or fireclay is mixed with the above ingredients. The ingredients are thoroughly incorporated by stirring, and are then mixed with clean sharp sand or sand and gravel and cement, so as to make the mixture of such consistency that it can be tamped in the ordinary way. The stone after being made should continue to be damped with water for about six days.

Abridged also in Class *Moulding &c.*

1771. Lake, W. R., [*Wethered, J. S.*]. May 2. *Disclaimer.*

Concrete.—Relates to the manufacture of concrete materials from a mixture of furnace slag &c., limestone or other calcareous material, and asphalt in any proportions and with or without the admixture of other substances. The crushed slag or other material is heated to a temperature sufficient to expel all moisture but insufficient to calcine it. The material, while still hot, is mixed with the heated asphalt and other ingredients in any suitable apparatus. A convenient apparatus consists of a horizontal cylinder of iron mounted on bearings and made to revolve round a shaft provided with radially-projecting arms for mixing the mass. The cylinder should be heated during the process of mixing. The concrete is now in a proper condition to spread as a sidewalk pavement and rolled smooth. When the concrete is to be made into blocks it is put into moulds, and while still hot is condensed under heavy pressure. To prevent crumbling the block is chilled by cold

water, whilst in, or as it comes from, the mould, or the mould may be chilled by circulating water.

Abridged also in Classes *Mixing &c.*; *Moulding &c.*; *Roads &c.*

1865. Gobin, A. M. A. May 9.

Asphalt.—Bitumen from schist, and pitch from coal, are melted together in boilers, and when all the moisture has been driven off, a mixture of coke and limestone, which has been powdered and dried by heat, is added while still hot. Fine gravel, also dry and hot, is then added. If the asphalt is made far from the place where it is used, the gravel is omitted and is added at the time of using, the mastic being re-melted for that purpose. In a similar way mastics may be made from natural asphalt and from other artificial asphalts. The artificial asphalt can be used instead of natural asphalt for pavements &c. It can also be moulded into blocks, the proportion of gravel being in this case increased. These blocks may be used for roadways, being set on a layer of gravel or sand and beaten or compressed by a machine. If the blocks are well placed the joints may be left, but if required they can be filled with bitumen or with hot or dry sand impregnated with coal tar or resin oil. In some cases the bitumen from schist may be replaced by similar bitumens, by tallow petroleum, or "Trinity bitumen," the last material being specially used for hot climates.

Abridged also in Classes *Moulding &c.*; *Roads &c.*

1943. Browne, W. May 15. *Drawings to Specification.*

Silicate cotton cloth.—The silicate cotton or slag-wool, in sheets or bands, is woven in an ordinary hand loom, with or without a back of hemp, jute, wire, or other material, or with strong cords projecting from the selvages, and it can be used for covering steam pipes, boilers, and other vessels; also as coverings, linings, or intermediate layers of walls, ceilings, or other purposes, rendering the same more proof against fire, heat, cold, sound, and the ravages of vermin.

Abridged also in Classes *Buildings &c.*; *Fire, Extinction &c. of*; *Heating*; *Weaving &c.*

2038. Greenacre, T., and Young, C. F. T. May 22. *Drawings to Specification.*

Fireproof material for use with fire-escapes.—Asbestos fabric, constructed as described below, is placed between two sheets or webs of metal gauze or netting and used to protect persons using fire-escapes from the flames or heat. To form the fabric, the asbestos fibres are placed, parallel to each other, on a web of wire gauze, canvas, or other material in such a manner that the fibres shall interlap. A corresponding web is then placed over the layer and the whole passed through a press. The webs are then removed and the fibres coated on both sides with a thin solution of some elastic varnish. Thick sheets may be formed of

two or more of the above sheets pressed together, or the sheet made of the required thickness in the first case by two or more layers of asbestos, the fibres of which lie at right angles. The fibres may be worked wet or dry, cold or warm, as may be best.

Abridged also in Classes *Air and gases, Compressing &c.*; *Bearings &c.*; *Fire, Extinction &c. of*; *India-rubber &c.*; *Pipes &c.*; *Steam engines*; *Valves &c.*

2062. Scott, M. May 23. *Drawings to Specification.*

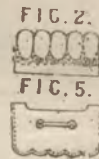
Slag trucks for conveying the slag from furnaces &c. consist of a box or receptacle mounted on trunnions on a wheeled frame. Two sets of trunnions are employed, one set at the lower corners on one side, on which the box is canted for tipping out slag; the other set being near the centre for tipping out metal when required, the lower trunnions having their pins then removed.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals, Cutting &c.*; *Railway &c. vehicles.*

2294. Neuberg, A., [Zadig, P.] June 8.

Casting paving-blocks.—Relates to the application of blocks formed of cobble stones set in asphalt. The blocks, which are of a rectangular shape, slightly tapering from the base, as shown in Fig. 2, are made by placing cobble stones, which have been previously heated, on end in parallel grooves at the bottom of a mould, pouring in hot asphalt to three-quarters of the depth, and filling up the mould with small stones, which are compacted and rolled at the surface. The moulds for forming the blocks are made with a grooved bottom, as shown in Fig. 5, for supporting the cobble stones.

Abridged also in Classes *Hand tools &c.*; *Moulding &c.*; *Roads &c.*



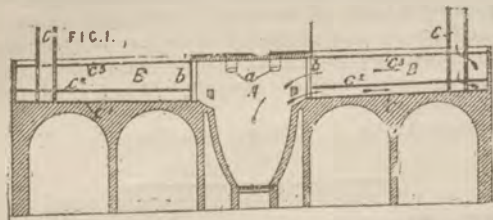
2458. Dechend, F. von. June 20.

Casts.—The object of the invention is to make plaster casts and ornaments waterproof and washable. A solution of borax, alum, or other suitable substance is applied, and then the pores are filled up with insoluble precipitates, salts of barium, strontium, and calcium being suitable for this purpose. The one operation need not precede the other. One method of procedure is as follows:—A hot saturated borax solution is spread over the objects any required number of times by a brush; then a hot solution of hydrochlorate of barytes is similarly applied and repeated if necessary, and then hot soap solution is applied, any excess being removed with hot water.

2514. Gibbons, R. A. June 24.

Cement kiln combined with floors for drying the slurry.—A is the kiln, which is charged through

the openings *a* in the crown, the charge being withdrawn from time to time at the bottom, so that the kiln is worked continuously. *B, B* are the drying-chambers, which are provided with



drying-floors *c¹, c², c³*, of removable plates, preferably iron, at different levels, and with dampers *b* by which the products of combustion from the kiln can be admitted or cut off. The floors of one of the chambers are covered with slurry, the valves connecting it with the kiln and also with the chimney *C* are opened, the hot gases pass over and under the floors as shown, and the slurry is dried. While the contents of the one chamber are thus being dried, the other chamber can be cut off from the kiln, so that the dried slurry can be removed and fed into the kiln, and a charge of fresh slurry put on the floors. If desired several drying-chambers may be constructed round the kiln, and the products of combustion may be made to return above the floors *c³*, and made to pass into one central flue.

Abridged also in Class *Furnaces &c.*

2835. Thomas, S. G. July 16.

[Provisional protection only.]

Refractory substances.—The tuyères and bottoms of Bessemer converters and sometimes the entire lining of the converters are made of nearly pure silica (sandstone, sand, or gannister), the particles being cemented together by a solution of alkaline silicate (preferably silicate of soda) sometimes with a little fireclay.

Cement.—A similar but thinner mixture may be used as a slurry and as a cement when silica bricks are employed for linings.

Abridged also in Classes *Manufacture of iron &c.*; *Moulding &c.*

2895. Jefferies, J. E. July 20.

Fireproof composition for coating fabrics &c. Either before or after printing on cloth, paper, or other material, it is coated or saturated with a melted mixture of wax and borax, and subsequently varnished. The mixture is spread on a heated metal plate, on this the fabric or material is laid, and a further coating applied. The Specification states that by this means the material is rendered waterproof and less inflammable, and that the brilliancy of the printed colours is increased, whether used transparently or otherwise. In place of borax, alum or pearl ash may be used. Instead of wax and borax, paraffin or other hard greasy substance can be employed, or a varnish containing white resin, methylated spirit, Canada balsam, oil

of thyme, turpentine, and jappanners' gold size, with or without wax.

Abridged also in Classes *Advertising &c.*; *Buildings &c.*; *Cutting &c.*; *Fire, Extinction &c.*; *Furniture &c.*; *Glass*; *Lamps &c.*; *Ornamenting*; *Paints &c.*; *Paper &c.*; *Printing, Letterpress &c.*; *Printing other than letterpress &c.*; *Waterproof &c. fabrics.*

3276. Lake, A. W., [Hyatt, T.]. Aug. 20.
Drawings to Specification.

Cements, paving. Powdered flint, soapstone, corundum clay or other material combined with wax, tallow, resin and paraffin, by the aid of heat, is used for wearing-surfaces of illuminating gratings, or a surface may be composed of clay or other material converted into a sort of asphalt by a hydrocarbon and heat.

Artificial stone.—Soluble glass is used as a matrix in combination with Portland cement, slags, pumice, mineral wool, or suitable material, combined with tie metals with or without glass, for illuminating gratings, or for use as a stone face dividing a series of gratings.

Artificial marbles.—Coloured cements are allowed to harden into cakes, which are then broken and the fragments combined with grouting and afterwards ground and polished.

Abridged also in Classes *Buildings &c.*; *Moulding &c.*; *Roads &c.*

3318. Akerman, W. S. Aug. 22.

Cement.—Relates to a method of making hydraulic cement from shales and limestones. The shales and limestones are selected so that the mixture may contain the proper proportions of lime, alumina, and silica; they are then burnt in ordinary kilns, either together or separately, to the inferior limit of calcination, and the burnt products are ground, care being taken that they are thoroughly mixed in the process. The powder is then allowed to "drink in" as much water as it will absorb, and in a few days becomes hard. The product is again burnt, this time to the superior limit of calcination, and is ground, after which it is fit for use as hydraulic cement.

3383. Edwards, H. Aug. 27.

Cements capable of resisting heat are made by calcining flint stones in a kiln, crushing the calcined flint, and grinding and mixing the crushed flint with nearly clear lime-water in a pan wherein edge-runners revolve. The resulting plastic composition is dried and ground. The lime should not exceed 3 p.c. of the mixture, as it is only used to make the composition plastic and binding.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

3476. Lake, W. R., [Hunter, T. A.].
Sept. 2.

Imitation marble.—The material used is glass, and the articles are cast in moulds or blown into the required form. The surface is then subjected to the action of acids, or the sand blast, or ground to produce the desired effect. The veined and mottled markings are produced by adding colouring-materials in the process of manufacture, the colouring-matters being generally metallic oxides. To imitate white or statuary marble, an opaque glass is made from 2 parts of silica free from iron, 1 part soda and 3-7 p. c. phosphate of lime; or a mixture of 10 parts sand, 4 parts cryolite, and 1 part oxide of zinc may be used. The opaque black glass to imitate Belgian black marble is made of flint batch 600 parts, manganese 12 parts, oxide of iron 7 parts, zaffre $\frac{1}{4}$ part. The invention is stated to be applicable to the manufacture of statues, medallions, statuettes, busts, urns, vases, and other works of art; cornices, brackets, balusters, balustrades, centre pieces, mouldings, pedestals, columns, altars, monuments, fountains, panels, mantel pieces, table and washstand slabs, wainscoting, ornamental tiling, and caskets.

Abridged also in Classes *Glass; Moulding &c.; Ornamenting*.

3605. Stone, T. C. Sept. 12.

Artificial stone; cement.—Chalk, lime, hydraulic lime, waste lime, or limestone, or other materials of equal strength, are mixed with prepared river mud or clay and then dried and burnt. After burning, the clinkers are mixed with flint, iron or other metallic slag, spar, marble, slate, or granite chippings, in any desired proportions. The whole is then ground under rollers or burr stones, which, preferably run in "concaves" in opposite directions, mixed with water and moulded under continuous pressure. The flint, spar, slag, &c. can also be burned at the same time as the lime, limestone, clay, &c., and the whole be then ground together; or they may be burnt separately, ground separately, and then mixed. Combining the materials in the state of powder and amalgamating them thoroughly together, as above described, form essential features of the invention. The composition is stated to be applicable as a concrete, mortar, or artificial stone for forming flags, tiles, bricks, arches, heads, sills, copings, steps, building blocks, caps, hearthstones, floors, balustrades, engine beds, kerbs and sets, channel stones, cisterns, rollers, table slabs, retorts, and for like purposes where Portland or other cement is used; also applicable as a cement.

Abridged also in Classes *Grinding, crushing, &c.; Moulding &c.*

3715. Wells, C. A. Sept. 20.

Fireproof coverings &c. of asbestos for brattices as used in colleries &c. For brattices &c. which are made of wire the asbestos is treated so that it may be interwoven between the layers of wire &c.

Abridged also in Classes *Fire, Extinction &c. of; Mining &c.; Sifting &c.; Wearing-apparel, Div. II.*

3762. Moysey, J. Sept. 24.

[Provisional protection only.]

Casting paving-slabs of asphalt combined with stone known as "road metal." The slabs are made by placing a layer of the stone, preferably heated, in the bottom of a shallow box or tray of suitable form, lubricated with mud or other substance, and filling up with melted asphalt. When cold the slab is turned out.

Abridged also in Classes *Moulding &c.; Roads &c.*

3828. Stephenson, G. Sept. 28.

Stonework, ornamental.—Comprises means for producing patterns for photographers, silversmiths, and other workers in metal, glass, china, wood, stone, leather, &c. The desired design is cut obliquely on a card of metal sheet by a short-bladed knife which is turned while cutting, to throw up the design. Leatherwork may be ornamented by similarly cutting a design upon it. A photographic negative may be taken from the paper or metal plate or patterns for workers in metal, or plastic materials may be cast therefrom, or such plate may form a model from which to carve wood or stone.

Abridged also in Classes *Glass; Leather; Metals, Cutting &c.; Moulding &c.; Photography; Stone &c.; Wearing-apparel, Div. IV.; Wood &c.*

3900. Brewer, E. G., [Daguzan, V. L.].
Oct. 3.

Asphalt.—Gas or wood coal tar is heated in a boiler until it is anhydrous. Clayey or other earths, marble, calcareous yellow or blue stone dust, or other analogous substances are sifted, dried, and mixed with the tar. During the manufacture, oxide of iron, silicate of potash, barytes, sulphate of lime, phosphate of lime, and salts of soda, alumina, potash, manganese, and the like may be added.

3920. Seville, C. F. Oct. 5.

[Provisional protection only.]

Bituminous compounds for paving. For streets and ways, refined mineral bitumen, powdered slate, and powdered chalk or limestone, are mixed in the proportions by weight of 1, 5, 4 respectively. For footpaths and yards the above materials together with powdered tiles are mixed in the proportions by weight of 6, 7, 2, 5, respectively. The ingredients are intimately mixed and heated to about 212° F. The compound is applied in layers by pressing or rolling.

Abridged also in Class *Roads &c.*

3933. Young, W. Oct. 7.

[Provisional protection only.]

Fireproof coverings &c.—A liquid containing alum and clay, limewash, or other non-inflammable material is applied to coal and to wood surfaces &c.

Abridged also in Class *Fire, Extinction &c. of.*

3975. Thomas, S. G. Oct. 9.

Refractory substances.—Open-hearth, converter, and other furnaces are lined with basic blocks made from magnesian or similar limestone, which is fired at a high temperature.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys.*

4019. Rowan, A. Oct. 11.

Cement manufactured from black-ash refuse, or waste of soap or other alkali manufactures, which may be used for building blocks, floors, hydraulic work, and other purposes. The waste is ground to a coarse powder, washed with water, and heated to redness in a kiln, after which it is treated with sulphuric acid, thoroughly dried, and ground in a mill with lime, magnesia, alumina, silica, and peroxide of iron in the required proportions. The Provisional Specification refers to the use of manganese.

Abridged also in Class *Moulding &c.*

4083. Thomas, S. G. Oct. 14.

Refractory substances.—For lining open-hearth and other furnaces, bricks are made by firing blocks moulded from a mixture of magnesian limestone and oxide of iron or clay, or from magnesian limestone alone.

Cements.—A basic cement for the bricks may be obtained by grinding some of them and adding silicate of soda in solution.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

4089. Bernheim, G. Oct. 15. *Drawings to Specification.*

Fireproofing-solution.—A fire-extinguishing solution,—consisting preferably of chlorides of calcium, ammonium, and sodium, sulphate of magnesium, borax, bicarbonate of potassium, and tungstate of soda, dissolved in water,—may be used for rendering materials incombustible.

Abridged also in Class *Fire, Extinction &c. of.*

4343. Waterfield, W. H. Oct. 29.

[Provisional protection only.]

Refractory substances.—Gornal freestone, Gornal silica, and Gornal sand may be used in constructing and repairing the bridges, back walls, sides, jambs, necks, and flues of all furnaces for “heating and “smelting iron in mills and forges” to increase their resistance to heat. The freestone may be used in blocks, or be ground and mixed with the silica and sand, and formed into bricks.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys.*

4411. Salwey, E. R. Nov. 1.

Refractory substances; cements.—To produce silicious firebricks or cement for setting the bricks or for furnace linings, flints (including flint rock or pebbles) are cleaned, calcined, and reduced to fine powder, which is thoroughly mixed with water or with about 2 p. c. of chalk lime contained in water as milk of lime. The resulting mortar is formed into bricks by tempering, moulding, drying, and burning in kilns.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

4664. Ransome, F. Nov. 16.

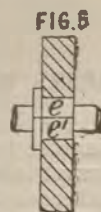
Cement.—Relates to the production of a cement which is colourless, and which will not become discoloured on exposure to the air. China clay and chalk, or preferably white marble, are ground together and intimately mixed. If the China clay is deficient in silica, soluble silica, either natural or artificial, is added, so that the composition of the mixture after burning shall be about lime 60 parts, alumina 12 parts, and silica 22 parts. The composition is burnt in muffle kilns or retorts at a bright red heat. After burning it is ground fine and treated in the usual manner. If a coloured or tinted cement is required, the necessary pigment, such as ochres or iron oxides, is added during the first grinding. Hydraulic cement is prepared by treating lime of “tiel,” or other similar lime containing silica, with alumina. The lime is slaked either with a solution of sulphate or other salt of alumina or with hydrate of alumina suspended in water. Cement is prepared from slag by mixing the artificial sand from blast furnace slag with chalk or other calcareous mineral, and in some cases also soluble silica.

Artificial stone.—These cements are applicable to the production of moulded articles of artificial stone. They are mixed with sand, and reduced with water to a proper consistency for moulding.

4761. Gibbs, R. R. Nov. 22.

Refractory substances for insulating hot-water pipes. Where circulating pipes &c. have to pass through inflammable partitions they are insulated by non-conducting pieces *e*, *e'* of porcelain or the like.

Abridged also in Classes *Fire, Extinction &c. of*; *Furnaces &c.*; *Heating*; *Stoves &c.*

**4780. Riley, E.** Nov. 23.

Refractory substances for bricks, linings, crucibles, &c. Burnt lime, preferably magnesian lime, is ground with from 5 to 15 p. c. of crude petroleum oil, coal oil, rosin oil, or like liquid, which, without hydrating the lime, will moisten and render it plastic or cohesive. Sometimes a little coke may be ground with the lime. Some oxide of iron, burnt clay, silica, alumina, magnesia, and the like

may be added to render the material when burnt more coherent. After moulding into bricks or other forms, the same may be heated in close vessels to distil off the oil for use again. Afterwards the bricks may be burnt in a kiln with a lime or limestone bottom. A pressure of a ton to the square inch is desirable in moulding, when a strong brick is wanted. For lining a Bessemer converter, furnace, or cupola, the bricks, burnt or unburnt, may be built into it or the plastic lime may be rammed round a mould or core: also a furnace may be provided with a lime or basic hearth. A fire is then made, and iron scale or oxide may be thrown in to obtain a glazed surface. Crucibles, tuyères, and other metallurgical articles may be rammed or pressed into moulds and burnt like bricks.

Abridged also in *Classes Manufacture of iron &c. : Metals and alloys : Moulding &c.*

4852. Aronson, J. N. Nov. 28.

Cement, artificial stone, &c.—Luminous effects are produced by the employment of phosphorescent substances such as calcined oyster shells combined with sulphur, arseniate of baryta and gum tragacanth formed into a paste, or sulphate of strontium or barium combined with a small percentage of magnesia.

Abridged also in *Classes Buildings &c. ; Cutting &c. ; Fabrics, Dressing &c. ; India-rubber &c. ; Paints &c. ; Paper &c. ; Waterproof &c. fabrics.*

4925. Bernheim, G., and Croston, J. Dec. 3.

[Provisional protection only.]

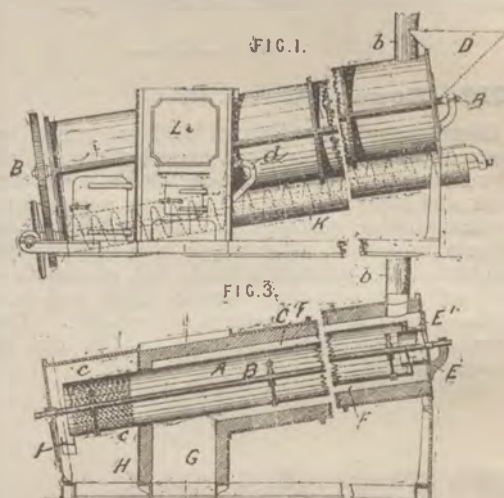
Fireproof coverings and compositions.—Composed of a solution in water of chloride of calcium, borax, bicarbonate of potash, tungstate of soda, muriate of ammonia, and sulphate of magnesia.

Abridged also in *Classes Agricultural appliances for the treatment of land &c. ; Fire, Extinction &c of ; Hydraulic machinery &c. ; Pumps &c.*

4932. Beauchamp, W. B. Dec 3.

Asphalt.—Apparatus for preparing asphalt suitable for roofing, paving, &c. by admixture of gravel, ashes, or other materials with tar, pitch, or other similar substances. Figs. 1 and 3 show side and sectional elevations of the apparatus, which consists of a drying-cylinder A free to rotate on an inclined axis B and encased for most of its length in an outer casing C. The cylinder A is heated by a fire in G, the products of combustion from which pass around A and escape by the chimney b. The fire also keeps the tar melted in the pot L. The end c of the cylinder A, which projects beyond the furnace, is perforated with holes by which dust can escape into the receptacle H. Gravel or other similar material is charged into A from the hopper D by the feeding-worm E,

and by the rotation of A it is gradually worked forwards. The dust escapes at c, and the gravel is delivered into the trough I, by which it passes to the lower end of the mixing-trough K. This trough is provided with an archimedean screw by



which the materials delivered at the lower end are carried upwards and discharged at the upper end. Tar is also delivered into this trough from the pot L by the tube d, which is provided with a valve to regulate the supply. If desired the heating-cylinder may be stationary and be provided with internal propellers, or it may be placed horizontally and may be heated by an internal flue or otherwise, and the relative positions of the parts may be altered in various ways.

Abridged also in *Classes Drying ; Mixing &c.*

5039. Johnson, J. H., [Gouault, A.]. Dec. 9.

[Provisional protection only.]

Stone, preserving and ornamenting.—Enamelling articles of natural sandstone. Articles of any required shape formed of natural sandstone are glazed or enamelled in any colour, and are either plain or decorated in the same manner as articles of china or pottery. Such articles are suited for the internal and external decorations of houses, ornamental casings for stoves, chimneypieces, balustrades, pillars, &c.

Abridged also in *Class Moulding &c.*

5087. Hannay, J. B. Dec. 12.

[Provisional protection only.]

Stone, preserving.—A preservative liquid is formed from the following materials—hydrocarbon spirit, resin, galipot, and caoutchouc; boiled vegetable

oil (such as linseed) and colouring-matter may also be added. The articles to be treated are either painted with or dipped into a bath of the liquid.

Abridged also in Classes *India-rubber &c.*; *Paints &c.*; *Wood &c.*

A.D. 1879.

- 117. Clark, A. M.,** [*Martin, A. J., and Tessier, E.*]. Jan. 10.

Fireproof coverings and compositions.—The following substances are employed in admixture in stated proportions for the purposes named (1) For fabrics, sulphate of ammonia, carbonate of ammonia, boracic acid, borax, starch, and water. (2) For theatrical scenery, woodwork, furniture, door and window frames, &c., boracic acid, sal-ammoniac, potash, felspar, gelatine, size, and water. A body is imparted to the mixture by a calcareous substance. (3) For coarse canvas, sails, cordage, straw, and wood, boracic acid, sal-ammoniac, borax, and water. (4) For paper, sulphate of ammonia, boracic acid, borax, and water.

Abridged also in Class *Fire, Extinction &c. of.*

- 127. Streubel, O.** Jan. 11.

[*Provisional protection only.*]

Fireproof composition.—A composition which is incombustible and impermeable, and which may be used to make imitation ivory, shell, coral, caoutchouc, leather, and various other substances. Cellulose is treated with sulphuric acid, well washed, dried, granulated, and reduced to a fine powder. The powder is put into a mortar (pile) similar to those used in paper-making, and is thoroughly mixed with a resinous soap, which is then precipitated by sulphate of alumina. The mass is drained in a receptacle of metallic cloth and compressed into cakes in a hydraulic press. The cakes are cut up and pressed into the required forms. To make the material absolutely incombustible, the paste is treated with sal-ammoniac, silicate of lime, or borate of soda or potash.

Abridged also in Classes *Fire, Extinction &c. of*; *India-rubber &c.*; *Leather.*

- 131. Thomas, S. G.** Jan. 11.

Refractory substances for basic bricks, linings, &c. for furnaces, converters, and vessels. The inventor's prior and subsequent Specifications Nos. 289, 908, and 3975, A.D. 1878, and No. 1313, A.D. 1879, are

referred to. Magnesian limestone, preferably containing from 4 to 7 per cent of silica, 3 to 5 of alumina and oxide of iron, and at least 30 of carbonate of magnesia, is fired (in blocks or lumps of small thickness) at a very intense white heat, thereby producing a hard, compact, and highly-shrunk structure. A mixture of the crushed product and liquid tar may be moulded, preferably under great pressure, to form bricks and tuyères, which, after being dried at a sufficient heat to prevent subsequent softening in the kiln, are burnt at an intense white heat. The mixture may be also used for ramming open-hearth furnace hearths (including some furnaces having sides of lime bricks) and converted bottoms, and as a cement for bricks &c. An admixture of the unburnt magnesian limestone or ordinarily burnt magnesian lime may be sometimes used, and crude naphtha or other cheap oil or pitch may be mixed with the tar. If ordinarily burnt magnesian lime be wholly employed, the bricks produced must be fired at a higher temperature and for a longer time.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

- 257. Thomas, S. G.** Jan. 22.

Refractory substances for bricks and furnace linings. The inventor's prior Specifications Nos. 908, 3975, and 4063, A.D. 1878, are referred to. The hard, very highly fired, shrunk lime, produced by calcining aluminosilicious dolomite (preferably containing from 3 to 5 p. c. of silica, about 4 or 5 of alumina and oxide of iron together, and over 27 of carbonate of magnesia) or equivalent artificial mixtures, may be mixed with enough crude petroleum or naphtha, heavy tar-oil, or similar cheap oil to moisten the mass, which may be used for ramming furnaces, particularly converter bottoms, but is preferably moulded under considerable pressure into bricks and tuyères. The latter are fired in a kiln gradually up to a very intense white heat, maintained for at least 24 hours. Imperfect basic bricks, made in accordance with prior Specifications, may be ground up and utilized. A little ordinary magnesian lime or finely-ground unburnt limestone may be used, and sometimes 1 or 2 p. c. of oxide of iron. Some tar or ground pitch may be mixed with the oil employed.

Cement.—Liquid tar or crude creosote may be mixed with magnesian lime &c., for making bricks and to obtain a cement for bricks.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

304. Young, W. Jan. 24. *Drawings to Specification.*

Fireproof composition.—A liquid containing alum and clay wash, lime wash, or other unflammable substance, is used for applying to the coal faces and woodwork in coal mines.

Abridged also in Classes *Fire, Extinction &c. of*; *Mining &c.*

379. King, J. T., [*Averell, W. W.*]. Jan. 30. [*Provisional protection only.*]

Asphalt formed by mixing Trinidad or other asphalt with petroleum residues, heavy petroleum oil, or wood or coal tar, is used alone or in combination with silicious sand or coal dust, and calcareous and aluminous matter. The asphalt is refined by heat, the sand &c. is heated, thoroughly incorporated with the melted cement, in any suitable apparatus, transported to the street where it is to be used in heated carts, rapidly spread, and preferably stamped with hot iron stampers. The foundation should be firm, and on it may be laid "a cushion coat" of asphalt concrete composed of coarse sand mixed as above with the asphalt cement.

Abridged also in Class *Roads &c.*

775. Henwood, F. G., and Chapman, J. H. Feb. 26. *Drawings to Specification.*

Sound-deadening compositions.—The principal component is wood fibre or pulp in the state known as "half-stuff" (when used in paper-making) prepared by the apparatus described in Specification No. 2466, A.D. 1871. The pulp is mixed to the required consistency and then pressed into moulds of the required shape, or between flat surfaces, or rolled out, to expel the moisture and consolidate it. It is then dried by exposure to heat or sometimes by heating the moulds &c. mentioned above. In cases where the packing will be in contact with steam or water it is soaked in linseed or other oil either alone or in combination with other water-proof materials. In some cases various metals may be worked up with the pulp into sheets, or wire gauze or flax or cotton canvas may be combined with it. The sheet may be cut into the desired section and a suitable thickness obtained by employing several layers pressed or cemented together either with or without the metals or gauze &c. between.

Abridged also in Classes *Bearings &c.*; *Buildings &c.*; *Heating*; *Nails &c.*; *Pipes &c.*; *Railway &c. vehicles*; *Railways &c.*; *Road vehicles*; *Ships &c.*, Div. I.; *Steam engines*; *Valves &c.*

983. Henderson, W. March 12.

Refractory substances.—To prepare the carbon lining of a smelting-furnace, hard burnt coke of best quality (after being treated to expel all moisture) is ground in a pan or mortar mill, and sufficient well-boiled coal tar is added to slightly soften the mass, which should be dry enough to ram solid without adhering to a smooth-faced tool, a fire being placed under the pan. A perforated segmental iron core, shaped for the interior of the furnace and coated with whitewash to prevent adhesion, is now placed in the centre of the hearth and the carbon lining rammed in; tapered moulds to represent the tuyères being embedded in the carbon. The structure is then gradually raised to cherry redness in an oven or furnace and kept so until the tar is thoroughly coked; after which this part of the furnace is fixed in its place. Again the lining may be formed by baking or coking, in perforated moulds, blocks forming segments of the several parts; the cement consisting of coke and tar finer ground and softer, and all the blocks being coked into one solid mass by heating up the furnace.

Abridged also in Classes *Acids &c.*, Divs. I. and II.; *Manufacture of iron &c.*; *Metals and alloys.*

1089. Pitt, S., [*Harmet, II.*]. March 19.

Basic refractory substances.—Dolomite containing as little silica as possible is calcined, the temperature not being allowed to reach whiteness; it is then ground, adding or not, according to circumstances, lime, graphite, coke, or other carbonaceous material. Enough water is added to form a hydrate, and the mixture is shaped into bricks, either by hand or with a press. In the majority of cases it is advisable to add, before moistening, some oxide of iron or cast iron borings sifted through a zinc sieve. The bricks may be set in a mortar of lime or better of calcined dolomite. The material may be used for the manufacture of tuyères, and for furnace linings.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

1138. Jensen, P., [*Vereingte Gummiwaasen Fabriken Harburg-Wien.*]. March 21.

[*Provisional protection only.*]

Imitation slate.—Relates to the manufacture of a homogeneous material suitable for writing-slates and other purposes, and for covering blackboards. Pumice stone and boneblack are ground, and mixed in a suitable machine with purified india-rubber and sulphur. Flint, powdered glass, or other material may be used in place of the pumice stone. The composition is rolled out into sheets, the sheets are placed between layers of tin plate or paper, and the piles thus formed are strongly compressed and heated by steam to 260° to 290° F. The sheets are then individually pressed, heated, and when cool polished with pumice stone. For veneerings to wall tablets, the sheets receive before heating a cover of linen or similar adhering-material

on one side, to facilitate the adhesion of the sheet when glued to the wooden boards.

Abridged also in Class *Writing-instruments &c.*

1462. Johnson, J. H., [*Gouault, A.*]. April 15.

Stone, preserving.—Natural sandstones, especially the red and white sandstones of the Vosges, are worked or cut into any desired shape and then glazed or enamelled, plain or in any desired style of decoration, by the same processes as are employed for pottery. This glazed or enamelled sandstone is applicable to house decorations, buildings, monuments, linings or ornamental casings for stoves, furnaces, and chimneypieces, balustrades, pillars of stair cases, balconies, gutter stones, plates or panels for lining ovens, &c.

Abridged also in Classes *Buildings &c.*; *Moulding &c.*

1510. Watson, J. April 17.

Portland cement is manufactured from blast-furnace slag, raw chalk, and clay. The slag is powdered, mixed with the other ingredients, and the mixture is washed, dried, calcined, and ground by any suitable processes.

1552. la Sala, P. P. de. April 19.

Fireproofing-compound.—Wood veneers, wood shavings, fabrics, fibres, and other vegetable matters are treated with an alkaline solution, preferably consisting of carbonates of soda or potash mixed with hydrate of calcium to saponify the resins.

Abridged also in Classes *Fire, Extinction &c. of*; *India-rubber &c.*; *Wearing-apparel, Div. I.*; *Wood &c.*

1682. Dering, G. E. April 29.

Refractory substances for furnace linings &c. Sawn blocks of gas-retort carbon, cemented together by a mortar made of ground coke and tar, form hard and dense carbonaceous linings. A converter, vessel, or furnace may be lined with calcareous, aluminous, or other basic or neutral materials (especially when subject to great shrinkage from heat) by compressing the same, in a pulverulent or plastic condition, into place by tools or surfaces actuated by a hydraulic press or other sufficiently-powerful mechanical appliance for considerably reducing the bulk and increasing the density of the lining, which is preferably highly fired before use. Iron turnings, borings, or small scrap, sometimes previously rusted on the surface, may be mixed with basic lining-materials to bind and hold them together.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys.*

1691. Chaloner, G. April 29.

[*Provisional protection only.*]

Mortar for lime bricks; refractory substances.—The highly-fired magnesium lime, or the ground

basic bricks, referred to in Specifications Nos. 908, 3975, and 4063, A.D. 1878, are moistened with boiled oil, and the mixture is moulded under pressure, or rammed into the position desired and then fired at an intense heat. Other lime, particularly magnesian, and linseed oil or other cheap vegetable or animal oils or fats, may be used. A little oxide of iron may also be added. The lime is ground in a mortar mill or otherwise.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

1870. Claus, C. F. May 10.

Refractory substances for furnace linings &c. Specification No. 1074, A.D. 1868, is referred to. Furnaces and apparatus for the conversion of pig iron into malleable iron or steel may be constructed of or lined with non-silicious materials; viz., lime, magnesia, or alumina, or mixtures thereof; and the cohesion of their particles is produced by using non-silicious materials, including the chlorides of calcium, magnesium, iron, and sodium, and fluoride of calcium, in solution or in fine powder; or the lime &c. may be exposed to the action of liquid or gaseous hydrochloric acid or chloride of iron. The lime should be very highly burnt, and mixtures containing alumina (bauxite) should be intensely heated to render the material denser and more unalterable. Sometimes the mixtures are obtained in other ways, as by decomposing chloride of aluminium by lime. The prepared materials are best suited for "ramming," but may be made into bricks or blocks.

Abridged also in Classes *Acids &c., Divs. I. and II.*; *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys.*

2004. Crossley, W. May 20.

[*Letters Patent void for want of final Specification.*]

Refractory substances for furnace &c. linings. A "basic lining made of lime, limestone, magnesian limestone, or magnesian limestone lime," or mixtures thereof, in combination with aluminate of soda or of potash, or both, may be used for furnaces, converters, or like apparatus for making iron and steel, and may be rammed to the shape of the furnace or moulded and burnt into bricks. The aluminate acts as a cementing-material, and the intentional introduction of silica is dispensed with.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys.*

2361. Althans, E. F. June 14.

Refractory substances for the manufacture of crucibles, furnace linings, &c. Limestone, marble chalk, or dolomite, as free as possible from acid impurities such as silica &c., is selected and ground. The powder is moistened with a solution of magnesium chloride and is well kneaded. It may then be used for lining converters or furnaces, or may be moulded into bricks, and dried at a moderate temperature. In place of magnesium chloride, calcium

chloride, or hydrochloric acid, or the chlorine compounds of aluminium, iron, or manganese may be used. Burnt lime or dolomite may be added, and if a fusible material is required alkaline chlorides may be used.

Cements.—The above material may be used as a cement.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys*; *Metals, Cutting &c.*; *Moulding &c.*

2535. Stone, T. C. June 24. *Drawings to Specification.*

Cement is made of chalk or lime and clay in suitable proportions. The materials are washed and the liquor is received in boxes laid in pits. These boxes are provided with spikes, bars, or rods to cause perforations in the blocks, which when sufficiently dry are turned out and afterwards burnt in kilns. The burnt material is drawn and ground by corrugated rollers. Or the materials may be laid in layers in deep tanks, flooded with water, and let stand until well dissolved. The compost is then run between corrugated rollers and passed through revolving sieves or gratings to a settling-tank, from which after settling it is run on to drying-floors or received into boxes in which it is pressed. The blocks can be dried by hot or cold air or in ovens.

Abridged also in Classes *Drying*; *Furnaces &c.*; *Grinding, crushing, &c.*; *India-rubber &c.*; *Moulding &c.*; *Roads &c.*

2560. Vaughan, G. E., [Farrington, E.]. June 26.

Asphalts &c. Solidifying pulverized asphaltum and similar materials for paving and other purposes. The material is powdered and is then mixed with bisulphide of carbon, or with certain liquid and volatile hydrocarbons such as naphtha or benzene which have a solvent action on the material. The product is stored in airtight vessels till it is required for use, when it is spread and compressed by the usual methods, the solidification being completed by the spontaneous evaporation of the solvent. For some asphaltums such as those of "Scysoel Pyrimont" and the Val de Travers, a calcareous porous stone is impregnated with bitumen by the aid of heat; to this is added the solvent, and the whole is mixed with the asphaltum.

Abridged also in Class *Roads &c.*

2706. Spence, J. B. July 3.

Compositions for casting; cements.—Natural metallic sulphides, preferably those of copper and iron, are reduced to an impalpable powder and mixed with molten sulphur to produce a hard tenacious material with a metallic lustre. The material may be cast into various forms such as statuary, medallions, vases, columns, mouldings, cornices, &c., tiles and gutters for roofs, slabs, and blocks for building purposes generally, and used for making drain or other pipes, alone or in combination with other materials. It may be used for the reproduction of complicated

works of art by casting in elastic moulds, for taking impressions of engraved copper or steel plates, and for making stereo plates; also in place of cement for plastering purposes generally, being worked hot with a trowel. Fibrous materials may be mixed with the material to give it greater strength, and colouring-matters may be added.

Abridged also in Classes *Acids &c., Div. II.*; *Electricity &c., Div. II.*; *India-rubber &c.*; *Moulding &c.*; *Paints &c.*; *Pipes &c.*; *Preparing &c. cork &c.*; *Printing other than letterpress &c.*; *Rolls &c.*; *Steam engines*; *Waterproof &c. fabrics*; *Wood &c.*

3030. New, A. J., and Thomas, S., [Thomas, D.]. July 25. *Drawings to Specification.*

Refractory substances.—Linings for blast, cupola, and other furnaces and crucibles are made of ground flint and fireclay, preferably in about the proportion of four of flint to one of fireclay.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys*; *Metals, Cutting &c.*; *Moulding &c.*

3063. Day, W. July 28.

Hydraulic cements.—Consists in mixing Portland cement, with granulated or powdered bitumen or pitch, with or without the addition of sand, chalk, and the like substances. In order to make the cement adhere to surfaces of metal, they are coated with a preliminary layer of bituminous pitch or tar varnish, or in some cases rosin and resinous varnishes. This cement may be used as a substitute for paint for steel-plated ships or like purposes.

Abridged also in Class *Paints &c.*

3271. Simon, H., [Leuffgen, G.]. Aug. 13. *Drawings to Specification.*

Artificial stone for footpaths, paving stones, &c. By means of a casting-furnace, combined (or not) with a cupola furnace, or by means of a cupola furnace only, molten glass may be run over disintegrated stones, gravel, or sand arranged on an underlying surface in mosaic &c. patterns, thus producing a rough surface, applicable for footpaths, paving-stones, &c.

Abridged also in Classes *Buildings &c.*; *Furnaces &c.*; *Metals and alloys*; *Metals, Cutting &c.*

3391. Jefferies, J. E. Aug. 22.

Artificial marble.—Relates chiefly to methods of printing with flexible printing-surfaces, reference being made to Specifications No. 2874, A.D. 1876, and No. 2895, A.D. 1878. Slate is printed with gelatine printing-composition rollers charged with aniline inks from a marbling-trough. The surface of the roller is formed with a slightly-embossed wood grain pattern, by which means a double pattern is obtained. To make the colours

work better, on the surface of the bath a small quantity of oil of vitriol is added.

Abridged also in Classes *Cutting &c.*; *Printing, Letterpress &c.*; *Printing other than letterpress &c.*; *Writing-instruments &c.*

3413. Bradshaw, C. W. Aug. 25.

Asphaltic macadam.—Suitable hard stone blocks, riddled to the required sizes, are heated in a kiln, for three hours at about 240° F; after which a compound of pitch, shale, oil, and powdered asphalt is added.

Abridged also in Class *Roads &c.*

3454. Roeckner, C. H. Aug. 27. *Drawings to Specification.*

Refractory substance.—Paper pulp or other animal or vegetable fibre is mixed with clay and fired.

Abridged also in Classes *Filtering &c.*; *Furnaces &c.*; *India-rubber &c.*; *Moulding &c.*; *Sewage &c.*

3489. Althans, E. F. Aug. 30.

Basic refractory substance for metallurgical purposes. The inventor uses caustic alkalis or their carbonates, or chlorides of alkalis or of alkaline earths, with or without the addition of fluor spar or cryolite, as binding-ingredients for a refractory material having for its body finely-ground limestone, marble, chalk, or like substances or mixtures thereof, as free as possible from silica, alumina, oxides, &c. The mixture is moistened and used in a plastic state directly as a lining for furnaces or as a cement, or is formed into bricks, slabs, crucibles, or other receptacles and dried, being gradually warmed and then heated up before use. The material becomes hard on firing.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys.*

3700. Bradbury, S. W., and Goodison, B. Sept. 15.

[*Provisional protection only.*]

Casting cement and concrete.—Moulds for forming concrete and other composition or plastic building blocks; also useful for building purposes and for moulding ornamental bricks and the like, artificial monoliths and similar structures, and terra-cotta, clay, and other plastic materials. A box is made, preferably with its sides or ends grooved for the other parts to fit into, and its parts are secured together by means of hooks or otherwise. When of wood, as many sides of the box as is desirable are taken, and metal loops or fasteners are secured thereto, or flat-headed nails are driven into them. A pattern of the desired shape is then placed in position and a composition of plaster of Paris and Portland or like cement is run around it. The composition takes hold on the loops &c., and

forms sections which are thus secured to the respective sides. The sections are then dressed and fitted together to form the complete mould. When the box is made of iron, brass, &c., each section and side is preferably cast in one. The mould is attached to mechanism which may be arranged to reverse it on a board &c. The bottom and sides are then removed. The central part of the block is, preferably, formed of common material, such as stone concreted together by cement or other binding-material, and the outside of ground stone or sand mixed with cement &c.

Abridged also in Class *Moulding &c.*

3735. Westmacott, M., and Perceval, C. J. Sept. 17.

Protecting plaster articles.—The articles are dipped in a solution of biborate of soda with or without sulphate of baryta in suspension, or if they are too large to be dipped the solution may be applied with a brush, and the articles are dried by artificial heat. After this they are treated with a clear solution of shellac in methylated spirit either by dipping or with a brush; in place of this a solution of copal varnish in spirits of turpentine may be used. Finally the articles are immersed in melted mineral wax such as paraffin. In place of the biborate of soda solution, a solution of silicate of soda mixed with an oil such as resin oil or with varnish, and with or without the addition of ground glass, may be used.

Cement.—This consists of a mixture of sulphate of lime (plaster of Paris) and sulphate of baryta. It is adapted for walls for painting in fresco, or otherwise. The cement is treated according to the process above described. For cements, stones (natural or artificial), and marbles other than sulphate of lime, the treatment with biborate of soda is omitted.

Abridged also in Classes *Buildings &c.*; *Paints &c.*

3806. Edwards, G. S. F. Sept. 22.

Stone, preserving.—Two compositions are described and these are applied in separate coatings. The first coating contains the following ingredients—boiled linseed oil, amber resin, pure oxide of zinc, oxide of iron, American spirits of turpentine, heptane and its homologues, mineral naphtha, tar (Archangel or Stockholm), slaked lime, shellac, and pine oil. In the Provisional Specification baryta and lime compounds are also mentioned. The second coating contains the following ingredients—boiled and refined linseed oil, amber resin, pure oxide of zinc, oxides of iron, varnish (Foots'), American spirits of turpentine, refined red lead, white arsenic, heptane and its homologues, mineral naphtha, tar (Stockholm or Archangel), carbolic acid, slaked lime, shellac, pine oil, and corrosive sublimate. In the Provisional Specification, ground litharge, arsenic, and baryta and lime compounds are also mentioned. The two compositions have different colours so that it can be readily ascertained if both have been applied to the surface under treatment.

The Provisional Specification states that a little washing-soda is added to each cask of paint to prevent sediment forming.

Abridged also in Class *Paints &c.*

4261. Tennent, J. Oct. 21.

[*Letters Patent void for want of final Specification.*]

Fireproof composition.—The liquid for extinguishing fires described by G. Bernheim in Specification No. 4089, A.D. 1878, is applied to various substances to render them fireproof, by saturating or impregnating them therewith. Wood, fabrics, fibres, felt, or felting-materials are mentioned as being thus treated.

Abridged also in Classes *Fire, Extinction &c. of; India-rubber &c.; Wood &c.*

4312. Thomas, S., and Thomas, D. Oct. 23. *Drawings to Specification.*

Refractory substances.—Linings for puddling-furnaces are composed of cinder or slag melted together with lime or brimstone in a special furnace.

Abridged also in Classes *Furnaces &c.; Manufacture of iron &c.*

4470. Clark, J. L., and Standfield, J. Nov. 1. *Drawings to Specification.*

Casting concrete blocks.—The blocks are formed in iron moulds in parts, mounted on wheels or trolleys which are provided with apparatus for detaching the bottom of the mould, and derrick cranes for lifting the back of the mould. The front of the mould forms a frame to which the sides are hinged, and is fixed on a trolley which may carry mixing mills and the like. The blocks may be moulded in contact with each other, the finished block, protected by tarred paper, boards, or the like, forming one side of the mould for the succeeding block.

Abridged also in Classes *Hydraulic engineering; Lifting &c.; Moulding &c.*

4806. Glaser, F. C., [*Vereinigte Koenigs & Laurahuetten*]. Nov. 25.

Refractory basic substances for furnace and converter linings. Dolomite or magnesian limestone or lime artificially mixed with silicate of magnesia is used. The materials are pulverized, mixed with sulphate of magnesia or sulphate of soda and chromate of iron, and the mixture is incorporated with animal blood alone or mixed with a solution of green vitriol. The resulting mixture is not plastic, but loose, and from it the articles, such as bricks, tuyères, &c., are pressed and dried at a moderate heat. The material may be used either in the burnt or unburnt state; after burning they are hard and firm like stone.

Abridged also in Classes *Manufacture of iron &c.; Moulding &c.*

4807. Glaser, F. C., [*Vereinigte Koenigs & Laurahuetten*]. Nov. 25.

Refractory substances.—Basic material suitable for furnace and converter linings, bricks, tuyères, &c. Dolomite or ordinary limestone is burnt at a white heat, the purer the limestone the higher being the temperature required. The limestone may be mixed with impure limestone, silicate of magnesia, fluorspar, chromate of iron, sulphate of magnesia, or similar fluxes, in which case the materials are pulverized, mixed with thinned animal blood or a solution of green vitriol, moulded into blocks, and burnt. The burnt material is pulverized, mixed with tar, solution of bitumen, linseed oil boiled with litharge, or with syrup, and the objects to be formed are pressed from the mixture, or the mixture may be allowed to become somewhat dry and then be mixed with blood thickened with sulphuric acid. The moulded objects are then fired in a furnace or kiln. In the case of tuyères, converter bottoms, &c., they are enclosed in closely-fitting cases of light sheet iron. As the temperature increases, the casing burns away, leaving the article with a clear exterior surface on which no traces of the iron are left.

Abridged also in Classes *Manufacture of iron &c.; Metals and alloys; Moulding &c.*

4904. Dering, G. E. Nov. 29.

Refractory substances.—Either dry lime, slaked lime subsequently heated to drive off moisture, lime moistened by exposure to the vapour of petroleum or other non-corrosive liquid, limestone or chalk moistened slightly or not with water, is submitted to a pressure of from seven to forty tons on the square inch, in a strong cast-iron or steel mould, fitted with a steel plunger. The moulds are lubricated with a mixture of petroleum and plumbago. The moulded article is subsequently fired, and may be moulded with a facing of powdered magnesia or other refractory substance. Ground coke, plumbago, burnt clay, oxide of iron, or other binding and refractory substances, and colouring-matter, may be added to the above material. The articles are also similarly moulded from burnt gypsum, or highly-calcined or slightly-moist plaster of Paris.

Abridged also in Classes *Manufacture of iron &c.; Metals and alloys; Metals, Cutting &c.; Moulding &c.*

5253. Haddan, H. J., [*Moysan, G.*]. Dec. 23.

[*Provisional protection only.*]

Slag, treatment of.—Slag or similar residuum of blast furnaces and kilns is refined and then cast into bricks, roof &c. tiles, and like articles, which are subsequently annealed. Silicate of iron or equivalent substances, with or without alkaline compounds, are added to the molten slag if desirable, or a mixture of the alkalis and molten slag may be added to the mass of molten slag. The molten slag from the blast or the refining-furnace

is run into the mould, preferably of metal, of a press similar to the presses used in the manufacture of terra-cotta. The tiles may be subjected to the pressure of a roller in a manner similar to the rolling of molten glass.

Refining furnace.—The slag is run from the blast furnace into a cylindrical furnace, having contracted ends. The furnace is lined with refractory material and is encased with sheet metal and slowly revolved on rollers in a frame which may run on rails. The heated gases and flame from a hearth or focus enter the furnace through one of its ends and the molten slag is rabbled or stirred. The slag may be melted in the furnace itself and the waste gases may be utilized for generating steam, heating the annealing-ovens, or for heating the air which is used for combustion.

Annealing-oven.—The bottom of the oven is inclined and provided with rectilinear grooves or conduits, along which the articles pass. The bottom is raised to a dull red heat, and a slight internal pressure is maintained to prevent the influx of cold air to the furnace. The furnace may be built of refractory earthenware plates. An ordinary glass annealing-furnace may also be used.

Abridged also in Classes *Furnaces &c.*; *Moulding &c.*

5302. Thomas, S. G. Dec. 29.

Refractory substances.—Specifications Nos. 289 and 908, A.D. 1878, are referred to. The calcareous basic slag (with less than 15 p.c. of silica) produced in the converter or open-hearth furnace in the inventor's basic process of making steel, may be sometimes used in admixture with lime and boiled or Siemens' tar for forming converter bottoms; or in admixture with lime or limestone for repairing Siemens' hearths. The mixtures should contain under 15 p.c. of silica, alumina, and oxide of iron.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys.*

5324. Bull, H. C. Dec. 31. *Drawings to Specification.*

Refractory substances.—Refractory basic bricks for lining furnaces are made by mixing china clay or similar substance with about 10 p.c. of lime, thoroughly burning the bricks, and then dipping them in a slurry made of about 70 p.c. of clay and 30 of lime, and burning them again.

Abridged also in Classes *Acids &c., Div. II.*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

A.D. 1880.

10. Furstenhagen, J., [*Haarmann, L.*]. Jan. 1.

Refractory substances for firebricks. Ground dolomite is mixed with a small portion of quicklime and the mixture is formed into bricks which are "kilned under a high temperature."

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

388. Gilchrist, T. S. Jan. 28.

[*Provisional protection only.*]

Refractory substances.—Relates to materials referred to in Specifications Nos. 289 and 908, A.D. 1878. Basic linings for furnaces are made by mixing lime or (preferably magnesian) limestone with sulphate of lime or magnesia and using as a rammed lining, or in the form of bricks which are highly fired. Phosphate of lime may be added especially for tuyères, to check shrinkage.

A mixture of about 100 parts of limestone and 60 of salt may be used for basic bricks, which are exposed to a high temperature. A rammed lining may be likewise formed.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys.*

650. Wirth, F., [*Schenk, B. von, and Schenk, R. von.*] Feb. 14.

Plasters.—Plastic compound to be used as a substitute for plaster of Paris. Sulphate of lime, coal or coke, and iron shales or forge scales, are finely powdered and thoroughly mixed, the whole being then passed through a hair sieve. The compound is mixed with water and used in the same way as plaster of Paris.

Abridged also in Class *India-rubber &c.*

- 677. Bonneville, H. A.,** [André, E.]. Feb. 16.

[Provisional protection only.]

Refractory substances for firebricks. The cement used is obtained by slaking burnt lime, and when it is hottest, adding a stated proportion of concentrated sulphuric acid. The calcium sulphate thus produced is stated to have highly plastic and cementing qualities. Articles for metallurgical, chemical, or architectural purposes may be made from a 'basic paste' prepared from limestone or dolomite with the described calcium sulphate, and with or without a stated proportion of fluorspar. Basic fireproof bricks for lining iron and other furnaces are made by strongly heating impure lime or dolomite, with addition of silica, alumina, or iron oxide if necessary to obtain a slagged mass, which is made into small bricks and reburnt, withdrawn and wetted while hot, when the slagged portion is stamped and ground, and worked up with the cement of calcium sulphate to any required form.

Abridged also in Classes *Acids &c., Div. II.; Manufacture of iron &c.; Metals and alloys; Moulding &c.*

- 726. McLean, A., and Green, G.** Feb. 18.

Casting cements.—Moulding ornamental and coloured slabs or panels in imitation of incised or inlaid work for decorating walls and other internal work of buildings, tables, &c. A design or picture is transferred, in any convenient manner, to a smooth slab of plaster of Paris, or it may be of soft wood, stone, clay, or other suitable material, and is incised thereon with a graver or other tool. After rendering the slab non-absorbent by coating with a preparation of shellac, oil, or other substance, a cast is taken from it, preferably in Keen's cement, or it may be of paper pulp or other material. The cast is used as a mould for producing the slabs or panels and is coated with shellac or other varnish after each moulding process. The space, circumscribed by the design in the prepared mould, is filled in with coloured cement and the whole mould is covered with another coloured cement to form the ground work and the back of the slab or panel. The slab or panel is removed and air holes or blemishes are filled in and the slab is rubbed smooth with a stone. The outlines of the picture or design are left in intaglio and are then filled in with, preferably, a dark-coloured cement. The slab may then be polished in any convenient manner.

Abridged also in Classes *Furniture &c.; Moulding &c.*

- 738. Bloomfield, J. C.** Feb. 19.

Cements.—To obtain a white cement a limestone which burns milk-white is calcined, mixed with sulphate of lime—such as plaster of Paris,—or other sulphates, and the mixture powdered and mixed with ground flints or silica.

- 741. Gedge, W. E.,** [Hoopes, W. H.]. Feb. 19.

Artificial stone.—A mixture of silica (in the form of sand), ferric oxide, alumina (in the form of clay), kaolin or the like, and magnesia is calcined and ground; it is then mixed with a solution of pearl-ash to which is added tungstate of soda, tartaric acid, bicarbonate of soda, and tartrates of potassium and sodium. The mixture thus obtained is mixed with Portland or Rosendale cement and silica till the mass has the desired consistency. Instead of using cement the substances may be mixed in water with selenite, rotten stone, chalk or other ingredients of cements, and sand, allowed to settle, dried, heated to redness, and then ground and sifted. The mass is stamped or pressed as usual in suitable moulds. Instead of making the material into stones it may be thinned so as to be applied to walls &c. with a trowel or brush. For imitation marble gypsum is used instead of cement. To produce veins, hair is soaked in colouring matter and spread on the surface on which the slab of stone is to be formed, a layer of the composition is spread over it, the coloured fibres are drawn up through this, and leave coloured vein-like markings. The Provisional Specification also states that chalk, selenite, rotten stone, &c. may be used in place of ready-made cement.

Abridged also in Classes *Paints &c.; Waterproof &c. fabrics.*

- 776. Wise, W. L.,** [Brault, A., Watkins, J., and Smith, D. S.]. Feb. 21.

Artificial stone.—Sulphur is melted, and is then mixed with stone, marble, ivory, bone, or other material previously ground. The compound may be at once poured into moulds and is ready for use. Any colouring-matter may be mixed with the compound to give it a required tint.

- 840. Solvay, E.** Feb. 25.

Cements.—When calcium chloride is heated with an aluminium silicate, as clay, to obtain chlorine or hydrochloric acid, a residue of calcium silico-aluminate is left. If a clay free from foreign matters is used, in the smallest effective proportion, and if the decomposition is conducted at the lowest convenient temperature, a soft calcium silico-aluminate remains, which if mixed with lime and calcined (if necessary) produces a cement.

Abridged also in Class *Acids &c., Div. II.*

- 850. Dade, D. H.** Feb. 26. *Drawings to Specification.*

Cements.—Silicate cotton is mixed with plaster of Paris, and applied as a paste mixed with water. Liquid glue may be added, and a coat of silicate paint be given after application.

Abridged also in Classes *Buildings &c.; Cooking &c.; Filtering &c.; Heating; Hydraulic engineering; Medicine &c.; Moulding &c.; Preparing &c. cork &c.; Wearing-apparel, Div. II.; Weaving &c.*

- 1018. Justice, P. M.,** [*Kerpely, A. von.*].
March 9.

[*Provisional protection only.*]

Refractory substances.—Relates to basic bricks and furnace linings described in Specifications Nos. 908 and 4780, A.D. 1878. Lime (preferably dolomitic) is slowly mixed with pyroligneous acid and water, using, say, 25 cubic centimetres of wood vinegar and of water, and 112 grammes of lime. This plastic material may be used for binding lime or dolomite, but is preferably mixed with powdered dolomite or limestone which has been treated with hydrochloric acid. The prepared material, sometimes mixed with uncalcined dolomite, may be formed into bricks, which, after pressure and drying, are fired at an intense white heat for some hours.

Abridged also in Classes *Furnaces &c.*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

- 1044. Drake, C.** March 10.

[*Provisional protection only.*]

Concrete is formed of burnt ballast, shingle, or broken stone or pottery, mixed with cement. The aggregate is selected for its texture so that the concrete produced can be cut or carved without difficulty.

Stonework, ornamental.—A coloured aggregate and cementing material is used and when the concrete has set, the surface is removed by rubbing, cutting or other means, to expose the colours of the interior. The new surface may be polished, varnished, oiled, or coated with silicate or other stone solution. A gritted face is produced by oiling the moulds and dusting sand on them. The sand adheres to the face of the concrete when it is moulded.

Abridged also in Classes *Buildings &c.*; *Moulding &c.*

- 1104. Hyatt, T.** March 15.

[*Provisional protection only.*]

Fireproof compositions.—Slabs for ceilings and partitions are formed of perforated or corrugated sheet metal encased in a combination of sulphurized Portland cement with lumps of alum or other salts containing water of crystallization, such lumps having been previously coated with shellac, varnish, or other waterproofing-material, so as to be fit for admixture with the cement in its plastic condition. The waterproofed salts are also used in combination with cements, mortars, and concretes for general building purposes.

Abridged also in Classes *Buildings &c.*; *Fire, Extinction &c. of*; *Metals, Cutting &c.*; *Moulding &c.*

- 1141. Baatsch, C. L. A.** March 17.

[*Provisional protection only.*]

Slag.—Relates to the treatment of furnace slag and the preparation of slag wool &c. Fused sodium

or potassium carbonate is mixed with molten slag, either in proportion to form water-glass, or in a smaller proportion, to render the slag less brittle when run into moulds or blown into wool. When the larger proportion of alkali is used, the water-glass formed is blown into a wool, which may be dissolved in boiling water. For annealing slag wool, it is caused to cool slowly by covering it while yet hot with slag felt (described in Specification No. 4030, A.D. 1877), or with slag wool, or other bad heat-conductor.

Abridged also in Class *Acids &c., Div. II.*

- 1195. Lake, W. R.,** [*la Roche, C. de.*].
March 19.

Refractory substances; artificial stone.—Talc, schist, or similar rocks employed in manufacturing glass are calcined together with solvents before being put into the crucible, and produce substances which, under pressure, yield refractory &c. substances suitable for bricks, mill-stones, paving-stones, and filtering-blocks &c. The waste materials resulting from the operation are suitable for the production of glass.

Abridged also in Classes *Filtering &c.*; *Glass*; *Grinding, crushing, &c.*; *Moulding &c.*

- 1291. Lake, W. R.,** [*Braconnier, A.*].
March 27.

Refractory substances for firebricks. Liquid residues of manufacturing processes, containing ammonium chloride and "metallic chlorides, with " or without hydrochloric acid in a free state," are treated with such a proportion of calcined dolomite, that only the lime contained in the latter may be dissolved, thus leaving magnesia as a residue. Magnesia so obtained is dried, slightly calcined in a magnesia-brick kiln, powdered, made into a stiff paste with water, moulded, and the bricks strongly pressed. After drying, the bricks are baked for a certain time, at the highest heat obtainable, in regenerative furnaces constructed of magnesia bricks, in which gaseous fuel is used.

Abridged also in Classes *Acids &c., Div. II.*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

- 1763. Groth, L. A.,** [*Weström, A. H.*].
April 29.

[*Provisional protection only.*]

Fireproof compositions.—The exterior plates of safes are fitted with solid non-conducting plates consisting of common ashes mixed with solution of water-glass, formed into blocks by hydraulic pressure, and having a plain surface at the edges for the lining of the door to close upon. Against this non-conducting lining is an inner metal lining, within which is placed the safe receptacle formed of wood with coating of cattle-hair, felt, or cloth, impregnated with fireproof chemical mixture. The door consists of a double outer plate enclosing the locking-mechanism. On the inner surface are

raised edges within which is placed a non-conducting block formed of asbestos, ashes, and water-glass.

Abridged also in Classes *Fastenings, Lock &c.; Fire, Extinction &c. of.*

1832. Moreing, C. May 5.

Stone, hardening.—Sandstone or other silicious stone is soaked in a solution of an alkali, such as soda or potash, or of an alkaline salt, such as the chloride, nitrate, sulphate, carbonate, silicate, or the like, and then dried and baked almost to vitrification. When extreme hardness is not required the solution may contain alum. Various colours may be imparted to the stone by mixing with the hardening-solution metallic salts, such as nitrates of iron, tin, and the like, or oxides of iron, manganese, or other metals.

1886. Hickman, H. T. May 8.

[*Provisional protection only.*]

Refractory substances.—Three parts of ground slate are mixed with one part of clay, preferably fireclay. The mixture is moulded into firebricks, blocks, gas retorts, and the like.

Abridged also in Classes *Metals and alloys; Moulding &c.*

2050. Engel, F. H. F., [*Reinhold, H., and Drucke, C. H.*]. May 20.

[*Provisional protection only.*]

Imitation slate.—A compound for coating wood and other materials, to protect them from moisture and for the preparation of imitation slate. The compound consists of solutions of copal in ether, and of shellac and sandarac in alcohol. The solutions are mixed, and lamp black, ultramarine, Venice turpentine, and emery are added. The compound is laid on with a brush like paint. For producing imitation boards of slate, the board is covered with the composition which, while wet, is set on fire; after the flame is extinguished a second coating is applied which is allowed to dry; the surface is then rubbed down with pumice stone, sand paper, or other suitable material, and is then washed.

Abridged also in Classes *Paints &c.; Writing-instruments &c.*

2214. Warren, C. M. May 31.

Asphalts &c.—Improved extraction of anthracene from coal tar &c. The improvement consists in injecting towards the end of the distillation hot petroleum residuum, petroleum tar, or "wax" tailings, arising from the distillation of petroleum. The portion of anthracene oil coming over after this addition is collected by itself since it contains petroleum oils and solid paraffin. The solid paraffin may be extracted by petroleum oil of

medium density and the anthracene purified by hydraulic pressure at increasing temperatures. The compound still residuum is used for asphalt making &c. The proportions mentioned are 45 barrels coal tar to 7½ barrels hot petroleum residuum.

Abridged also in Classes *Acids &c., Div. III.; Bleaching &c.; Oils &c.*

2326. Batonnier, G. L., [*Batonnier, E. A., and Michel, P. A.*]. June 9.

Artificial stone.—Applying colours usually employed in dyeing fibres to bone, wood, celluloid, and other absorbent materials, in imitation of woods and stones, and for decorative purposes; including also the manufacture of crayons to be used in the process. For veining, the colours mixed with solution of gum or dextrine, &c. are blown over the surface of the paste by bellows. Or, the colours are applied to the article by a brush, the paste carrying only the ground colour. Or, the article is coated with albumen, on which the pattern is drawn with brush or crayon, and the whole is steamed. When crayons are used with paste, the designs are drawn on the article. The colours may be absorbed by wood or other dust, which is used like the colours in powder. If necessary, mordants are applied to the article. Besides dyes, metallic salts which give coloured precipitates by double decomposition may be used, with suitable fixing-baths. Crayons for carrying out the above process are made of aniline or other colours, and plumbago or other inert powder mixed with viscous liquids, such as gum or dextrine, and moulded. A mordant and a hygroscopic substance may be added.

Abridged also in Classes *India-rubber &c.; Ornamenting; Paints &c.; Writing-instruments &c.*

2359. Clark, A. M., [*Fabre, C. F.*]. June 10.

Cements &c.—The sand or other similar material such as freestone grit, or other substance usually employed in the manufacture of mortar, plaster or cement, is washed to remove impurities. A milk of lime is made, coloured by any suitable colouring-matter, and mixed with the washed sand. The surplus liquid is allowed to drain off; the coloured cement is dried either by exposure to the air or in kilns, and is reduced to a fine powder, with which is then mixed a quantity of slaked lime.

2439. Wenger, A. F. June 16. *Drawings to Specification.*

Casting ceramic ware.—Slip is forced up through an aperture in a receiver or vessel into a plaster mould which is pressed down upon an india-rubber joint-ring, or equivalent device, by a screw or otherwise. The mould is removed ready for jollying. Several moulds may be secured to one receiver and a number of receivers may be connected by pipes, provided with stop-cocks, to a reservoir supplied with slip by a pump or other suitable means. The slip may be poured into

plaster moulds having slightly raised edges and be then jollied.

Abridged also in Classes *Filtering &c.*; *Manufacture of iron &c.*; *Mechanism &c.*; *Moulding &c.*

2535. Wetter, J., [*Moysan, G.*]. June 22.

[*Provisional protection only.*]

Slag &c. refining in furnace.—The furnace, preferably cylindrical, is formed of sheet-metal and lined with refractory material. It is mounted to run on rails and is revolved on rollers. One end is placed before a hearth or focus and the other conducts the waste gases away; both ends are contracted. The waste gases may be used to heat the air used in combustion, generate steam, or heat the annealing furnace described further on. The furnace is charged with molten blast-furnace slag or the residuum of kilns, and the mass is rabbled or stirred, with the addition of iron silicates or equivalent substances, with or without alkaline compounds.

Moulding or casting process.—Slag, either from the blast furnace or the refining furnace, is collected in ladles and run into a mould under a press similar to those used in making terra-cotta. To roughen the surface of roofing-tiles to prevent slipping, sand is placed in the moulds. Tiles may be pressed by a roller in a manner analogous to the rolling of molten glass.

Annealing slag bricks &c.—The articles, while hot, are passed along longitudinal conduits or grooves in the inclined bed of a furnace, which may be built of refractory earthenware plates. A slight internal pressure is maintained to prevent the influx of cold air. Any ordinary glass-annealing oven may be used when manufacturing in small quantities, or intermittently.

Abridged also in Classes *Furnaces &c.*; *Moulding &c.*

2777. Dade, D. H. July 7.

[*Provisional protection only.*]

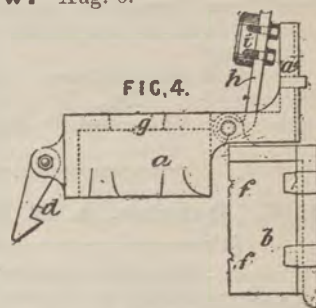
Sound-deadening compositions.—Bricks, slabs, or sheets of silicate cotton are covered by steeping, painting over, or otherwise, with plaster of Paris and clay, or either, mixed with Irish moss decoction, liquid glue, or other gelatinous or binding substance; or clay or Irish moss is used alone. To protect the slag against acids the coating is covered with soda-solution, or previously combined therewith. To prevent mildew and give pliability Peruvian bark or other tannic extract is applied. The bricks &c. may be formed of silicate cotton and plaster of Paris, mixed or not with gelatinous material, and silicate cotton be filled into a recess or recesses in the middle or faces thereof and the top and ends be coated with one of the aforesaid solutions. The silicate cotton may be placed in a wire box mould, with hinged sides and lid, when dipping or coating it with the solutions. The bricks, slabs, or sheets are applied for building walls or partitions to prevent radiation of heat and transmission of sound.

Abridged also in Classes *Buildings &c.*; *Heating*; *Hollow-ware*; *Moulding &c.*; *Paints &c.*; *Pipes &c.*

3216. Batten, W. Aug. 6.

Casting slag or scoria to form paving &c. bricks, slabs, and blocks. One half *b* of a box or mould is hinged to a fixed half *a* and secured by a catch *d*. The closed top of the mould is provided with an opening *g*, preferably oblong, into which fits a plunger or kick *i* carried by a hinged lever or arm *h*. The plunger or kick is forced down into the opening *g*, after pouring in the slag, whereby a frog is formed in the brick, slab, or block, excess of slag is expelled through opening *f* in the mould sides, and the bricks &c. are formed of a uniform size. The moulds are attached, by means of brackets *a'*, preferably to the circumference of a horizontal wheel which can rotate around a vertical pillar on a carriage running on a tramway. The wheel is formed of an outer ring, which is connected by rods to a cap pivoted on the top of the pillar, and a central ring provided with anti-friction rollers bearing against the pillar. The rings are constructed of angle bars and are connected together by radial stay bars.

Abridged also in Class *Moulding &c.*



3337. Buchholz, G. A. Aug. 17.

Artificial stone.—Relates to a porous material applicable for making grindstones for grain mills, for hulling grain &c.; also for sharpening tools and grinding glass and other hard substances, for filtering and absorbing liquids, and for lamp wicks. Grain or seeds or small pieces of sieved cork or fine twigs or soft wood reduced to small pieces in a chaff cutter and rounded in a pearl barley mill, are saturated with water, and mixed with plastic porcelain clay. The mixture is moulded to the required shape, dried, and fired at a moderate temperature. The article may be trued in a lathe or otherwise to correct the warping which may have taken place, and then receives its final firing, up to a temperature at or about that at which fusion commences. The process is modified according to the article to be produced; for grindstones for tools and hard substances poppy seed or fine grains of cork, or for lamp wicks fibres, are used.

Abridged also in Classes *Filtering &c.*; *Grinding, crushing, &c.*; *Grinding or abrading &c.*; *Lamps &c.*

3376. Pitt, S., [*Johns, H. W.*]. Aug. 19.

Fireproof coverings.—Flexible asbestos sheets are made. (a.) By treating the surfaces of a layer of fibrous asbestos, alone or mixed with other fibres, with adhesive matter such as size, sodium silicate, lime-water, &c., and subsequently pressing between rollers. (b.) By attaching these sheets by means of adhesive material to sheets of hair, felt, canvas

or paper, &c. (c.) By uniting fibrous asbestos free from impurities and dust by means of sodium silicate to one surface of "pure asbestos sheathing."

Abridged also in Classes *Cutting &c.*; *Fabrics, Dressing &c.*; *Fire, Extinction &c. of*; *India-rubber &c.*; *Waterproof &c. fabrics.*

3380. Douglas, A. H. J. Aug. 20.

[Provisional protection not allowed.]

Cements.—Relates to the treatment of limestone for the preparation of cements. The stone is pulverized in any convenient form of stamp, press, or crusher.

Abridged also in Class *Sewage &c.*

3393. Wedekind, H., [Bollinger, H.]. Aug. 20.

[Provisional protection only.]

Refractory material for converter or furnace linings, crucibles, retorts, and firebricks, is formed of asbestos (chrysotil or serpentine) made plastic with soluble glass. The moulds for forming articles from the composition are preferably coated with magnesium chloride, and furnace &c. linings are coated with the same solution.

Cements.—The composition is also used as a binding material for the joints of firebricks.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys.*

3554. Parry, E., and Cobley, T. H. Sept. 1.

[Provisional protection only.]

Cements.—Silicate of magnesia obtained by a special process is used, either alone or mixed with silicate of lime, as a cement in the manufacture of silica bricks and other fire-resisting goods.

Abridged also in Classes *Acids &c., Div. II.*; *Glass*; *India - rubber &c.*; *Metals and alloys*; *Moulding &c.*

3631. Clarke, F. C., and MacAusland, R. Sept. 7.

[Provisional protection only.]

Cements.—Relates to compositions for filling depressions or cracks in wood, metal or other materials and for producing level and suitable surfaces for the reception of paint. The shale which usually forms an upper layer covering the slate strata, or the same or similar substance otherwise found in connection with slate is reduced to powder. This powder is mixed by grinding with such materials as boiled oil, raw linseed oil, turpentine, terebene, gold size, and varnish; or the shale is ground with these materials.

3644. Bloomfield, J. C. Sept. 8

Cements.—In Specification No. 738, A.D. 1880, a method of making a white cement from calcined limestone, sulphate of lime or other sulphate and silica is described. By substituting ground burnt red brick clay or by preference old red brick-bats for the silica a pink cement is produced, and by the use of burnt shale a yellow cement is obtained.

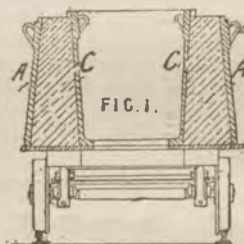
3650. Sachs, J. J. Sept. 8.

Cements.—Sulphur mixtures for taking castings, for cement &c. Sulphur is melted with some other substance or substances (which are not metals or metallic sulphides), such as coal, silicates, metallic salts in general, emery, asbestos, ultramarine, powdered minerals, wood, fibrous materials, &c., &c. The product may be used for castings, cements, foundations, lining cisterns, and, generally, as a substitute for Spence's metal. When the powders are very finely ground the product gives delicate castings of gelatine reliefs, especially if the cast is allowed to cool in a vacuum.

Abridged also in Classes *Fire-arms &c., Div. II.*; *Grinding or abrading &c.*; *Hydraulic machinery &c.*; *Photography*; *Pipes &c.*; *Printing, Letterpress &c.*; *Printing other than letterpress &c.*; *Railways &c.*; *Steam engines*; *Writing-instruments &c.*

3812. Birkbeck, J. A. Sept. 20.

Slag, casting, cooling, and breaking up. The slag is run from the furnace into a casing or receptacle A, within which are inserted centrally or otherwise one or more plugs or cores C of cast iron, wrought iron, or other material, so that the slag will surround the cores and cool rapidly, the hollow or recessed block or ring produced, when it sets, being convenient for breaking up. The latter operation may be further aided by providing the cores and casing with projecting ribs. The cores may be conical or of other shape, suitable for their separation from the slag, and they, as well as the casing, may be made hollow to contain water or other liquid to facilitate the cooling of the slag. The apparatus may be set on a bogie or other machine for removing the slag to the place of final deposit. The arrangement of apparatus may be variously modified.



Abridged also in Class *Manufacture of iron &c.*

3990. Groth, L. A., [Barthel, A. E.]. Oct. 2.

[Provisional protection only.]

Fireproofing.—A method of treating wood so as to protect it from atmospheric and other destructive agencies and parasites, and to make it incombustible. The wood is exposed to the action of

steam in a closed vessel, a vacuum is then created in the vessel by means of an air pump, and a solution of sulphate of soda or magnesia is run in, the surplus liquid is discharged and a solution of chloride of barium is forced into the wood. For large articles the solutions may be forced into the wood by hydrostatic pressure.

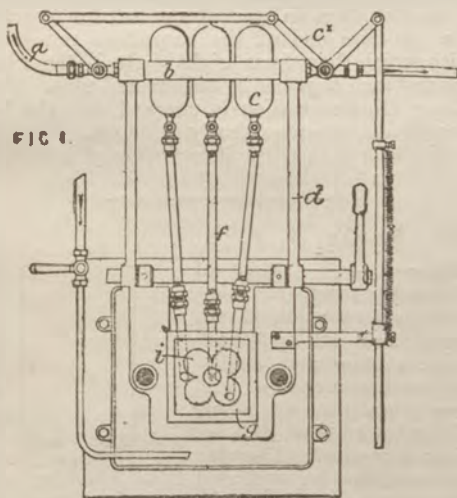
Abridged also in Classes *Fire, Extinction &c. of; India-rubber &c.; Wood &c.*

4026. Lake, W. R., [*Magaud, A.*]. Oct. 4.

Cements; colouring and preserving stone.—The materials are treated with a solution of sulphate of copper, iron or zinc, or of these mixed, colouring or odoriferous matter being added if necessary. The solution may be applied to articles of cement, lime, plaster, and some kinds of stone, directly with a brush or by similar means, or by immersing the article in the solution. In treating wood, metals, and some kinds of plaster and stone, a layer of cement is first applied, and this is treated with the solution. Blocks or bricks for building or ornamental purposes such as reliefs, cornices, statues, and other decorative work, may be made by mixing sand, stones, hammer-slag dross, and waste materials with cement, to which some of the solution has been added. The solution may be used for mixing with cement or other material used for making moulded objects.

Abridged also in Classes *Metals and alloys; Wood &c.*

4097. Webb, H. C. Oct. 8.



Stone, colouring.—Colours or dyes are forced, in definite patterns, into the pores of various materials, such as stone or wood. Fig. 1 shows in plan a staining-apparatus. A block, say of wood, cut across the grain, is forced by a press against a pattern-plate *g*, made with partitions *i*, the upper edges of which are "knife edges" or flat. The colour-reservoirs *c* are raised, and the colours flow separately through tubes *f* into the compartments

of *g*, and, on air being forced through *a*, *b* into *c*, the colour is driven into the wood. The air-pressure is cut off, the reservoirs are lowered, and compressed air is sent, through suitably-arranged tubes, against the upper or lower surface of the block, which can thus be removed without blurring. The air passes back from *g*, through the liquids in *c*, and keeps them agitated. The automatic working of the valves which control the supply of air to *c* is preferably effected by means of a rod *c'* moving backward and forward as the frame *d* is raised and lowered. The stained block is planed, and the "bodging in" may be done by forcing shellac &c. into the pores by air-pressure. When the partitions on *g* are square-edged the wood is pressed on them to form hollows. The surface is then covered with paper or other material, colours mixed with sawdust &c. are forced into the hollows, and the surface is levelled. If parts of the block are to be left unstained the corresponding compartments of *g* are supplied with colourless liquid. The pressure on the liquids may be obtained, without using compressed air, by carrying supply tubes to a sufficient height, or a vacuum pump or hydraulic power may be used. If deep staining is not wanted a composite tube containing the colours may simply be inserted on the block. Or the colours are filled from measuring-devices, into a frame from which they soak into the wood.

Abridged also in Classes *Buildings &c.; Cutting &c.; India-rubber &c.; Leather; Moulding &c.; Paper &c.; Printing other than letterpress &c.; Roads &c.; Wood &c.*

4178. Parker, F. Oct. 14.

[*Provisional protection not allowed.*]

Cements.—Relates to the utilization of a calcareous marl containing between 60 and 75 per cent. of carbonate of lime found in Cambridge and its vicinity. The marl is dried and ground, and the powder is pressed into bricks under great pressure; these bricks are burnt in a kiln and are afterwards ground.

Abridged also in Class *Moulding &c.*

4239. Windsperger, M., and Schaedler, A. Oct. 18.

Fireproof composition.—A composition or liquid consists of common salt, powdered alum, silicate of sodium, red chalk and water, in stated proportions. In combining these ingredients, the water is first placed in a vessel and the first and second ingredients added successively; the mixture is agitated, and then allowed to stand until the solids have been dissolved. The third ingredient is next gradually added, the mixture meantime being stirred, and the fourth is then similarly added.

Abridged also in Class *Fire, Extinction &c. of.*

4235. Thomas, S. G., and Gilchrist, P. C. Oct. 21.

Refractory substances for making and repairing basic linings for Bessemer converters and other

furnaces. Shrunken lime for lining metallurgical furnaces may be produced by burning magnesian limestone or magnesian lime in a basic-lined cupola; or ordinary limestone or lime can be used, but should contain more silica and alumina (about 4 or 5 per cent. together) than is requisite with dolomitic lime. Coke is first charged, and afterwards about equal volumes of coke and of dolomite (preferably broken to about the size of a fist). Plenty of hot blast should be admitted by numerous tuyères placed within a few inches from the bottom, which may be a circular flat wrought-iron plate, covered with lime and tar, and fastened to the shell of the cupola by bolts and cottars. Charging is continued, sometimes using less coke, till the lower part of the cupola is full of shrunken dolomite and the charges descend very slowly, an intense white heat being requisite. After all the coke is burnt out, the said bottom may be slid on one side; and a truck to receive the burnt material can be run under the cupola, if supported on pillars. A cupola of larger section below than above is preferred. Instead of a coke or coke and coal cupola, a gas cupola may be employed, gas from a generator being burnt with blast. The blast may be passed through a cupola in which a charge of dolomite has been burnt, but has not had time to cool; or regenerators may be used for heating the blast. To operate cheaply and quickly in making and repairing basic linings for furnaces without ramming, the inventors prepare a liquid or semi-liquid mixture of hard shrunken magnesian lime and tar (say, 3 parts of good shrunken lime to 1 of boiled tar). The coarsely ground lime may be mixed with the tar in a mill, which is advantageously steam jacketed. Modes of lining Bessemer converters and of making converter bottoms are described; and furnace hearths and cupola linings may be made or repaired in an exactly similar manner. A Bessemer converter may be placed vertically with either the throat or the bottom upwards, the then uppermost section being removed for the insertion of a pattern or mould of cast or wrought iron or steel. The mould consists of pieces, which are fastened in position inside the converter by the aid of cross bars &c., so that the exterior of the mould has the shape to be given to the interior of the lining. A mould in one piece may always be used if the taper of the lining is considerable. A fire is made inside the mould and a little blast applied to thoroughly heat it. The lime and tar mixture, preferably heated enough to keep it liquid, is poured or thrown between the mould and the shell, so as to fill the intervening space. The fire is kept up till the liquid lime mass sets hard, which will take from 2 to 4 hours. In the case of a converter bottom, a lime mixture (less liquid than that used for lining) is thrown into the ordinary circular iron bottom mould, round the tuyères or tuyère pins, and the bottom (with a heavy iron plate thereon) is coked in an oven or stove for several days, preferably at a low red heat. Changeable sections of converters may be likewise lined, or without stove-drying.

Abridged also in *Classes Furnaces &c.; Manufacture of iron &c.; Metals and alloys.*

4292. Dawe, D. S. W. Oct. 21.

Portland cement made from limestones and marls found in the Eocene deposits of the Isle of Wight. The materials are mixed in the required proportions, dried and finely ground, mixed with sufficient water to make the mass plastic, and then moulded into blocks, dried and burnt to "clinker" in a cement kiln. The clinker is ground, and is then ready for use. In place of mixing dry the materials may be ground in a mill with sufficient water to form a plastic mass.

4709. Cornthwaite, M., and Cornthwaite, J. Nov. 16.

Slag boxes.—Cast-iron slag boxes or bogies, for removing slag from blast furnaces, and steel ingot moulds, used in making steel rails may be constructed "circular

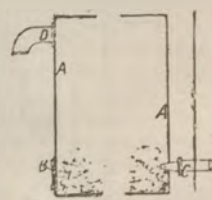


"(or rectangular) in form," and of a number of parts *a*, relatively small, and in the case of circular boxes "the said parts are bound together" by means of malleable wrought iron "bands or hoops *b*," preferably in two parts with flanges *c*, the two "parts of the hoops or bands being held together" by bolts and nuts *d*, the said bands or hoops "being placed in suitable grooves cast or formed" in flanges on the parts forming the body of the "mould: in the rectangular shaped boxes the "parts are held together" by rods or bars passing through rough lugs or eyes which are cast on the parts; and the rods have an eye "at one end for receiving" the opposite end of the respective rod or bar "with which they form right angles," the whole being fastened together by cotters and pins. Thus breakage from expansion is checked, and the box or mould can be economically fitted up.

Abridged also in *Class Manufacture of iron &c.*

4787. Sachs, J. J. Nov. 19.

Slag wool.—A method of utilizing the product of slag, known as slag wool, in the manufacture of papier-maché, roofing and similar felt, card pasteboard and paper apparatus, or tubing packing for engines, and for similar purposes. The slag



wool must first be separated from globules, sand grains, pieces of glass, and the stiffer fibres. To do this the material is mixed with water, with or without the addition of acids, such as hydrochloric or sulphuric, or alkalies such as caustic soda or potash, silicate of soda or potash, or ammonia or zinc salt, or chloride of sodium. The material is stirred with the liquid, allowed to settle, and the top layer of liquid containing the fine fibres in suspension is filtered through suitable material. The fine fibre remaining on the filter is collected and pressed, and worked up in the manner in

which paper pulp, asbestos, &c. are usually employed. Or the slag wool is placed in the closed box A, through the door B, air is blown in by C, and escaping by D, carries with it the finer fibres, which are afterwards collected. The fibre may be made up with or without the addition of binding materials such as glue, starch, alumina-resinate, gypsum, soluble silicate of soda, cements, and the like. It may also be combined with vegetable fibres, asbestos, and suitable powders such as French chalk, and the like.

Abridged also in Classes *Fabrics, Dressing &c.; Paper &c.; Pipes &c.; Steam engines.*

4844. Lake, W. R., [Braconnier, A.].
Nov. 22.

Refractory substances.—Calcined dolomite is treated with ammonium chloride solution to remove lime, a pulverulent and easily washed residue of magnesia being left. The ammonia given off during the process is conducted into calcium chloride solution (such as may have resulted from a preceding operation) together with carbon dioxide; calcium carbonate is thus precipitated and ammonium chloride regenerated. The ammonium-chloride liquors resulting when soda is obtained by the ammonia process, containing sodium bicarbonate, are treated with sufficient lime to reduce the bicarbonate to carbonate, and calcium chloride solution is added to form calcium carbonate and sodium chloride from the sodium carbonate. After settling, the liquor may be decanted or filtered off, and used in treating calcined dolomite as described.

Abridged also in Classes *Acids &c., Div. II.; Manufacture of iron &c.; Metals and alloys.*

4906. Grant, H. G., [Richter, F. A.].
Nov. 25.

Artificial stone blocks of various shapes for erecting miniature buildings from plans furnished with the blocks &c. They are composed of sand and finely-ground chalk, to which suitable colouring-matters are added, ochre for yellow, caput mortuum for red, and ultramarine and lamp black for a bluish gray, and for brighter colours to produce blocks for mosaic work, aniline colours are used. The sand, chalk, and colouring matters are mixed thoroughly with linseed oil varnish, and the mass is turned in moulds, provided with closely fitting followers. Great pressure is then applied to the followers, and the blocks thus formed are dried for about eight days in an oven.

Abridged also in Classes *Moulding &c.; Toys &c.*

5290. Mills, B. J. B., [Trenauway, A.].
Dec. 17. *Drawings to Specification.*

Cement for wood-block paving.—This is manufactured of a mixture of pulverized stone, pitch, powdered asphalt, mineral tar, powdered resin, powdered scoria, and powdered white lime.

Abridged also in Classes *India-rubber &c.; Paints &c.; Roads &c.; Wood &c.*

5350. Biggs, J. H. W. Dec. 21. *Drawings to Specification.*

Fireproof composition.—The wooden evaporating-pans employed in salt manufacture are rendered fireproof by treating them with phosphate of ammonia.

Abridged also in Classes *Acids &c., Div. II.; Air and gases, Compressing &c.; Distilling &c.; Filtering &c.; Fire, Extinction &c. of; Furnaces &c.; Lifting &c.; Steam generators.*

5355. Wedekind, H., [Bollinger, H.].
Dec. 21.

[*Letters Patent void for want of final Specification.*]

Refractory substances.—Linings of converters &c. may be moulded or formed of certain materials, similar in their chemical constituents, and known as asbestos, chrysotile, and serpentine, to which may be added binding materials affording plasticity, such as alumina or kaolin, or an aqueous solution of hydrogen silicate in the gelatinized jelly-like form. The refractory power may be varied with the proportion of asbestos or chrysotile to that of serpentine. After moulding and drying the composition is soaked or impregnated *in vacuo*, or under pressure, with chloride of magnesium or analogous alkaline chloride; it is then dried and burnt. When it contains a silicate in a fluid state a neutral compound may be obtained or, by continuing the addition of chloride of magnesium, a basic compound. The moulds employed may be coated with a solution of chloride of magnesium.

Abridged also in Classes *Manufacture of iron &c.; Metals and alloys.*

5365. Clark, A. M., [Closson, J. B. M. P.].
Dec. 21.

Refractory substances.—In manufacturing basic firebricks, hollow bricks, crucibles, tuyères, pipes, or other refractory products of magnesia or calcined dolomite or lime, there may be used an animal or vegetable gelatinous substance, such as glue, gelatine, vegetable gelatine, Japanese cement, fucus, and their congeners, and sometimes sugar and molasses as a binding-material.

Abridged also in Classes *Manufacture of iron &c.; Metals and alloys; Moulding &c.; Pipes &c.*

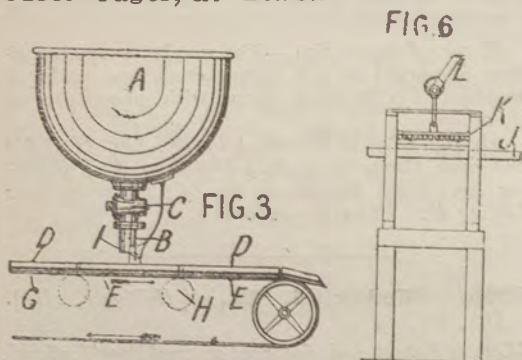
5372. Biggs, J. H. W. Dec. 22. *Drawings to Specification.*

Improvements on the invention described in the following Specifications,—No. 4324, A.D. 1876, Nos. 1788 and 2106, A.D. 1877, No. 1336, A.D. 1878, and No. 5350, A.D. 1880.

Fireproof composition.—Wood may be rendered fireproof by treating it with phosphate of ammonia or tungstate of soda.

Abridged also in Classes *Acids &c., Div. II.; Centrifugal drying &c.; Distilling &c.; Drying; Filtering &c.; Fire, Extinction &c. of; Metals and alloys; Metals, Cutting &c.; Moulding &c.; Packing &c.; Paints &c.; Wood &c.*

5486. Jager, G. Dec. 30.



Casting sugar, salt, and like substances.—The semi-fluid mass from the vacuum pan or other evaporating-apparatus is run into the heated receiver A, which is provided with a spout B and a cock C for supplying the moulds D. The mould plate D is a metal plate pierced with a number of holes the form of the required blocks; the plate rests on a second plate E, with a layer of calico, canvas, or other cloth between them. The plates E rest on a travelling belt G running on flanged pulleys and

supported by rollers H. As the mould plate comes under the spout B it is supplied with the material, which as the plate is moved forward is spread by the scraper I, any excess being scraped off. The moulds are put by to harden, the lower plates and cloths are removed, a mould plate is placed on a slide J, Fig. 6, and is pushed under a press provided with a series of punches K, exactly corresponding to the holes in the mould plate. These punches are made to descend by the handle L, and push the blocks out of the mould plate into a receptacle or on to a carrier B.

Abridged also in Class *Centrifugal drying &c.*

5509. Corke, J. H. Dec. 31.

Artificial stone.—Suitable for the manufacture of chimney pieces, trusses, capitals, arches, and any kind of plastic decoration for use in buildings. Sulphate of iron, sulphate of alumina and logwood are boiled with water, the mixture is strained through a fine sieve, the solution is mixed with Keen's or Martin's cement, and pressed or run into suitable moulds. When sufficiently hard the articles are dried in a chamber heated to about 90° Fahrenheit.

A.D. 1881.

136. Page, W. Jan. 12.

Casting slabs.—Corner paving-slabs are cast in a single mould or are built up of separate portions cast in separate moulds so shaped as to give a quadrant, sector, or other like shape so that the slab will not require cutting.

Abridged also in Class *Moulding &c.*

144. Lake, W. R., [Lamb, D. M.]. Jan. 12.

[Provisional protection only.]

Stone, preserving.—Tallow, lard, or other grease, or spermaceti or wax, is dissolved in benzene, benzol, naphtha, gasoline, or other hydrocarbon. India-rubber, gutta-percha, milkweed, or other hydrocarbon gum may or may not be added. Common salt having been put into the solution, sulphuric acid is added in such a way that it settles down on the salt and liberates gases which rise through the liquid, and precipitate all mucilaginous

matter. Or the gas may be generated in a separate vessel and led into the solution by piping. Black oxide of manganese may be mixed with the common salt and acted on by sulphuric or other acid; or other chlorides and acids may be used to generate the gas. When the solution is thoroughly bleached it is drawn off and any residual gas is removed by standing, or by mechanical agitation, or by driving a strong current of air through the liquid. The sediment is again drawn off and the liquid freed from residual acid by mechanical agitation with caustic soda or ammonia, or both, or other alkali, with or without the use of water. If the compound is to be stored as a solution it must be kept in tightly-closed vessels. But it may be obtained as a solid by evaporating off the solvent in heated shallow tanks. The compound may be applied to the articles to be treated by means of a brush or sponge, but preferably by immersing the articles in a bath of the compound. All adhering moisture is then pressed or drained out, and the articles gently dried in a warm closed room. The coating

of compound will then be fixed and is vulcanized preferably in the same room, by raising the temperature to about 180° F.

Abridged also in *Classes Cutting &c.; India-rubber &c.; Leather; Paints &c.; Waterproof &c. fabrics; Wearing-apparel, Div. I.; Wood &c.*

173. Lake, W. R., [*Lamb, D. M.*]. Jan. 13.

[*Provisional protection only.*]

Stone, preserving.—Relates to treating wood, stone, metal or other substances so as to render them waterproof and vermin-proof. A hydrocarbon gum, such as india-rubber, gutta-percha, milkweed, &c., is dissolved in naphtha, benzene, benzol, gasoline, or the like, and paraffin is then added. Common salt having been put into the solution, sulphuric acid is added in such a way that it settles down on the salt and liberates gases which rise through the liquid, and precipitate all mucilaginous matter. Or the gas may be generated in a separate vessel and led into the solution by piping. Black oxide of manganese may be mixed with the common salt and acted on by sulphuric or other acid; or other chlorides and acids may be used to generate the gas. When the solution is thoroughly bleached it is drawn off and any residual gas is removed by standing or by mechanical agitation or by driving a strong current of air through the liquid. The sediment is again drawn off and the liquid freed from residual acid by mechanical agitation with caustic soda or ammonia or both or other alkali with or without the use of water. If the compound is to be stored as a solution it must be kept in tightly-closed vessels. But it may be obtained as a solid by evaporating off the solvent in heated shallow tanks. The compound may be applied to the articles to be treated by means of a brush or sponge but preferably by immersing the articles in a bath of the compound. All adhering moisture is then pressed or drained out and the articles gently dried in a warm closed room. The coating of compound will then be fixed, and is vulcanized, preferably in the same room, by raising the temperature to about 180° F.

Abridged also in *Classes Cutting &c.; India-rubber &c.; Leather; Paints &c.; Waterproof &c. fabrics; Wearing-apparel, Div. I.; Wood &c.*

182. Hutchinson, H. Jan. 14.

Compositions for castings.—Describes various metallic and other substances which are reduced to an impalpable powder and mixed with molten sulphur to produce compounds of various colours suitable for producing works of art and other objects. The compounds are obtained as follows:—Chocolate by using burnt iron pyrites known as purple ore by the vitriol makers. The burnt ore is washed to remove soluble metallic salts, then dried at a suitable temperature to decompose any remaining hydrates and mixed in the proportion of two of sulphur to three of ore. Red of different shades by using oxide of mercury, antimony, arsenic, and red chromate of barytes. Also by calcining clay with purple ore prepared as above, or

with solutions of copperas or chloride of iron obtained as waste products from galvanizing and other works. Yellow by using the yellow chromate of barium, chromates of zinc, cadmium, and oxide of cadmium. Blue by using blue slags or blue glass in the proportion of about two of sulphur to three of slag or glass. Green by the use of oxide of chromium or any of the chrome greens, also by mixing any of the yellow compounds with any of the blue compounds. Any of the secondary or tertiary colours may be produced by a mixture of any of the aforesaid compounds to obtain the required tints. White and grey compounds are obtained by using oxy-sulphides of zinc, carbonate of zinc, diatomaceous earth, dolomite, carbonate of magnesia, milk-white glass, soapstone or steatite. Black compounds by using the black slags resulting from the smelting of antimony, lead, copper, or other ores, also by using black silicious slags from gasworks &c., basalt, olivine, obsidian, or black glass. Coloured compounds of every tint may be obtained by using coloured glass of any shade or colour. The proportion of sulphur will vary from about 20 to 75 per cent. the substances of greatest specific gravity requiring the smallest, and those of the lightest the greatest amount. The Provisional Specification states also that the various coloured compounds may be obtained as follows:—Red of different shades by the use of oxides of iron such as magnetic oxide of iron, red hæmatite, specular iron ore, spathic iron ore, clay iron ore, black band iron ore, or any red oxide of iron calcined or uncalcined. Blue by using ultramarine or blue slags containing ultramarine. White and grey by using oxide of zinc, carbonate of zinc, silicate of zinc, sulphate of barium, carbonates of lime, or any of the poly-silicates of lime and magnesia such as pumice stone, gypsum, cements, and calcined flints and aluminous shales. Black by using the red and black oxides of copper, carbonates and silicates of copper, also oxides, chlorides, phosphates, carbonates, sulphates, or silicates of lead; such as red lead, litharge, oxy-chloride of lead, or oxy-sulphate of lead. Or by using iron black, lamp black, black silicious slags containing oxide of iron, lead, antimony, or copper. Bronzy blue with a metallic lustre is obtained by acting upon metallic copper at a red heat with sulphur, grinding the product to an impalpable powder and again melting with sulphur. The same coloured compound may be obtained by reducing to powder the product known as "blue metal" consisting chiefly of oxides of copper, metallic copper and iron, and then melting with sulphur.

Moulds.—When moulds are made of any of the aforesaid compounds plumbago is mixed therewith to prevent adhesion of the object cast therein. Moulds for works of art which are slightly undercut are formed of carvers' and gilders' "compo" which, being slightly elastic when warm, can be withdrawn from the undercut objects and used again.

Methods of casting.—For casting large works in gelatine and other moulds the melting-pan is placed high above the moulds to allow the molten compound to run down an inclined plane or otherwise to the bottom of the mould, or the compound may be run in at the top of the mould and down an iron pipe suspended in the centre of the inside

of the mould. A lid may be fixed to the top of the melting-pan and a pipe passed through it reaching to the bottom: air is then forced through a second pipe on to the surface of the molten compound or mixtures and the mass thus caused to travel through pipes to any part of the works. A mechanical mixer is used to blend the sulphur and other substances and prevent the sulphur becoming overheated and firing.

Abridged also in Classes *India-rubber &c.; Pipes &c.; Steam engines.*

311. Newton, H. E., [*Batonnier, E. A.*]. Jan. 24.

Artificial stone.—Treating plaster, wood, stone, metal, canvas, and other surfaces so as to imitate marble and other stones. The surface is washed over with adhesive material, and a paste consisting of carbonate of lime and flour or other starchy substance is applied to represent veinings. Barium sulphate, kaolin, or other inert material may be substituted for the lime, and wax, dextrin, or albumen may take the place of flour. The ground colour is next laid on, the paste is removed, and the veinings are left plain on the ground. Or, coloured veinings are produced by colouring the paste. Stronger colour may be applied in lines or pats, and the surface is polished or varnished. Dyes are used in the process or metallic salts giving coloured precipitates by double decomposition are employed. In the latter case, one reacting salt may be washed on, and the other be mixed with the paste. If necessary a coat of paint or a mordant is first applied to the surface, and heat is sometimes used.

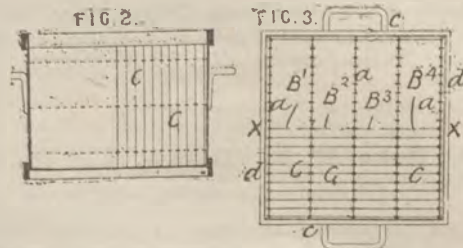
Abridged also in Classes *Ornamenting; Water-proof &c. fabrics.*

414. Lake, H. H., [*Fillon, J. B. M., and Capitani, C. L. de*]. Jan. 31.

Refractory basic compositions for lining furnaces &c. To obtain a product which will resist a temperature of 1200° C.; native or natural carbonate of magnesia is pulverized, calcined at a higher temperature than the above, and mixed in about the proportion of 70 or 80 p.c. thereof with 15 of silicate of alumina or aluminous earth and 4 or 5 of quicklime. For a product to resist the action of acids, the calcination is raised to 1500° C., and from 70 to 80 p.c. of the calcined magnesia is mixed with 10 of "uncalcined magnesia" and of quicklime, respectively. For making bricks for lining or for forming the hearth or bottom of apparatus employed in dephosphorizing iron or steel by the Bessemer, Siemens-Martin, or other process; the purest pieces of the natural carbonate of magnesia are pulverized, calcined at from 2000° to 3000° C., and mixed in the proportion of from 80 to 95 p.c. thereof with quicklime. Or the same method may be pursued as in making a composition to resist acids. The various mixtures are moistened by the addition of gluten or heavy oils and placed in moulds; and considerable pressure is applied to form articles.

Abridged also in Classes *Acids &c., Divs. I. and II.; Manufacture of iron &c.; Metals and alloys.*

508. Bauer, M., [*Tietz, H., Selwig, J., and Lange, B.*]. Feb. 7.



Casting sugar into slabs, strips, or cubes. The mould consists of a box, slightly wider at the top than at the bottom, divided into compartments by metal plates *a*, Figs. 2 and 3, and thinner cross plates. Into this, melted sugar is poured up to the level of the top edges of the partitions. When the sugar is set the box is turned over and emptied; the block of sugar thus obtained is separated into the smaller blocks *B¹, B², &c.*; these blocks include in them the cross plates, or, if preferred, it may be divided into separate slabs, or may be divided into equal parts on the line *X, X*.

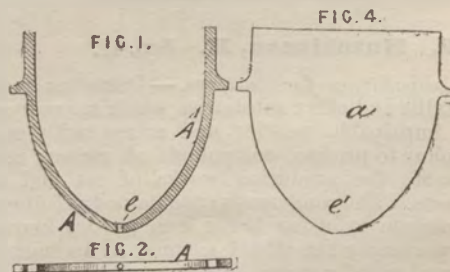
Abridged also in Classes *Centrifugal drying &c.; Sugar.*

610. Stuart, P. Feb. 12. *Drawings to Specification.*

Concretes for street pavements, floors, steps, and the like; applicable also for moulding architectural ornaments. The concrete is composed of crushed stones, brick, slag, or gravel mixed with cement. Pulverized iron ore may also be added by mixing separately with the water. The surface of the concrete is covered with small cubed granite mixed with cement, with or without pulverized iron ore; and when this has set, it may be painted over with silicate of soda or clear water and pulverized iron ore. By moulding the composition in suitable moulds and applying pressure to render the article solid, architectural ornaments may be formed.

Abridged also in Classes *Buildings &c.; Fencing &c.; Roads &c.*

613. Duncan, J., and Newlands, B. E. R. Feb. 12.



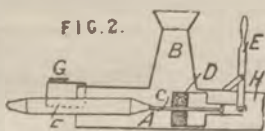
Casting loaf sugar.—The outside of each mould consists of a piece of metal *A* bent or cast to the required shape, on each side of which is placed a thin iron plate *a* which is held in position by wedges, screws, or otherwise, or one of the side plates may be cast with or attached to *A*. When

the moulds are used singly, a loose or movable frame is employed to complete the mould, but if a number are being used together they can all be placed in one frame, the whole being kept in contact by screws, wedges, &c. at each end. Each mould has a hole *e* at the bottom, or holes *e*¹ in the division plates for the escape of the green syrup. The filling is performed in the usual way, the syrup being allowed to drain through the hole. The slabs of sugar may be purified in the usual manner by means of a solution of pure sugar, aided by pressure, suction, or centrifugal force.

Abridged also in Class *Sugar*.

709. Butler, J. W., and Dale, M. Feb. 18.

Casting cement, concrete, &c. drain and like pipes. A plate of sheet metal is rolled to form a cylinder A with the joint edges abutting.



Two strips B, C are attached to the cylinder, one strip C overlapping the joint and abutting against the other strip B when the joint is closed. Clumps or slides D, connected by a rod E, work outside the strips and have oblique slots engaging with studs G on the cylinder. Within the cylinder A is placed a similarly-constructed core, the slides and strips being however on the inside. By raising the slides the cylinder A expands, and can be removed from the moulded pipe. Cement, mortar, or other material is used, and the mould may be placed in sand. The cement &c. is contained in a hopper mounted above a cylinder containing a fixed core and a piston. The piston is worked by a lever in part of the machine, thereby forming the pipe round the core and feeding the machine forwards.

Abridged also in Classes *Moulding &c.*; *Pipes &c.*

840. Cooke, B. G. D. Feb. 28.

Refractory substances for the internal parts of cupolas, furnaces, retorts, &c. Those portions, which are usually made of burnt fire-brick, are to be formed of unburnt blocks or bricks of silica or silicious rock in combination with alumina, lime or other cementing matters (including fireclays), moulded under great pressure so as to bear handling &c. The blocks, after erection, become one homogeneous mass when acted on by the fire. The cementing matters may be dispensed with, if the silicious material itself contains sufficient binding matter. Lime mixed with water may be incorporated with crushed silicious rock, and the mixture be allowed to dry till of the proper consistency for moulding.

Abridged also in Classes *Furnaces &c.*; *Gas manufacture*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*; *Stores &c.*

849. Johnson, J. H., [Smedt, E. J. de, and Twining, W. J.]. Feb. 28.

Bituminous cements and compositions for paving &c., or, either alone or in conjunction with other

substances, for insulating underground and other telegraph wires, submarine wires and cables, &c. The object of this invention is to so prepare the coal tar products preliminarily to their use, that they may not afterwards, or during use, be subject to appreciable evaporation or oxidation. The coal-tar product is heated to 300° F. and maintained at that temperature for several hours. During this time, the coal tar product is treated with an oxidizing agent such as permanganate of potash, permanganic acid or picric acid until the product is nearly oxidized. By a modification of this process, heavy oils of petroleum may be brought to the condition of an asphalt or oxygenated bitumen. The oil is heated to 250° F., treated with the oxidizing agent, and the temperature of the whole is raised to 500° F. This temperature is maintained for about an hour and the result is a homogeneous oxidized bitumen possessing great tenacity and tensile strength.

Abridged also in Classes *Electricity &c.*, *Div. II.*; *Oils &c.*

875. Faija, H. March 1.

Cements; concretes.—To accelerate the hardening of cement or cement concrete, a solution of potash, soda, or other alkali is used for mixing it. A solution of potassium or sodium silicate is used for lime or lime concrete.

Abridged also in Classes *Moulding &c.*; *Pipes &c.*

995. Walters, G., and Morgans, W. March 8.

Cement or mortar.—May be prepared from the ash or residuum from the combustion of fuel composed of coal, coke, or breeze.

Abridged also in Classes *Fuel, Manufacture of*; *Manufacture of iron &c.*; *Sewage &c.*

1155. Payne, S. J. March 16.

Refractory substances for the manufacture of fire-bricks, retorts, crucibles, furnace linings, &c. Clay, graphite, millstone grit, calcined flints, sandstone, and sands, burnt or unburnt, and ground fine if required, may be used. To one or more of the above materials, Portland cement or hydraulic lime is added; and, after intimate mixing, silicate of soda or of potash in solution is added. The materials are kneaded or pugged for thorough mixture. Suitable proportions are 7 lbs. of sand, 1 lb. of Portland cement and $\frac{1}{2}$ pint of silicate of soda (specific gravity about 1200). The compound is moulded into desired shapes and the articles are dried and hardened. They are then sometimes immersed in a weak preparation of silicate of soda or similar alkali, or in a solution of carbonate of magnesia. The final drying may be by heating in chambers to a temperature of 300 or 400 degrees. The above described compound, after kneading or pugging, may be also used for furnace linings.

Abridged also in Classes *Metals and alloys*; *Moulding &c.*

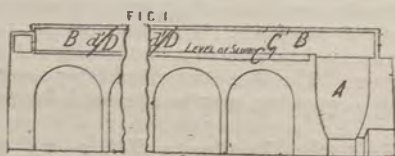
1196. Dade, D. H. March 18.

Sound-deadening compositions.—Silicate cotton is treated by being mixed in layers in a heated glutinous decoction of Irish moss and starch &c. which renders it soft, elastic, and porous in the interior, leaving a hard but elastic outer skin, which may be rendered harder by a painted or tarred casing of calico or paper. Asbestos, vegetable fibre, paper, felt, hair, &c. are treated in the same way, and for the glutinous materials may be used silicate of potash, silicate of soda, gum arabic, isinglass, &c. It is rendered fireproof and prevented from charring by the addition of a solution of "trass." It is rendered proof against fermentation, the emission of sulphuretted hydrogen, rot, mildew, and vermin by adding tannic extract obtained from tanyard refuse or by boiling in tannic solution. When partly dry the composition may be moulded into boards of flat, curved, or other forms and provided with canvas or paper backing, thin sheets of tin or zinc overlapping the boards and covering the joints are also used. Sheeting is formed with layers of the composition with loose silicate cotton, paper, felt, &c. in between. Wire or wire netting is used to keep the boards, sheets, &c. in position and tar, paint, &c. may be applied outside. The composition is applied to walls &c. which first receive a coating of the adhesive decoction. The composition and covering as above are also used for covering cylinders, boilers, &c. and are applied to stage scenery, wood, felt, lathing, walls, partitions, ceilings, doors, roofs, temporary buildings, barracks, refrigerators, cooking-stoves, &c. to resist heat, fire, damp, mildew, frost, sound, vermin, rot, putrefaction, &c.

Abridged also in Classes *Buildings &c.*; *Fire, Extinction &c. of*; *Heating*; *Paints &c.*; *Stoves &c.*

1230. Henderson, A. C., [Platonoff, J. W.]. March 21.

Compositions for casting which solidify quickly, and which may be used for the manufacture of dolls and other toys, artistic objects, figures, statuettes, &c., and articles of furniture and mouldings. The composition is made of animal glue mixed with gelatine, animal and vegetable wax, or glycerine, and zinc white, the whole being coloured with liquid or powdered colours. The composition is poured into moulds and is allowed to harden, and the several parts forming the object are cemented or glued together.

1530. Smith, J. C. J. April 7.

Cements.—A method for the speedy drying and burning of the slip or slurry used in the manufacture of cement. It specially relates to apparatus

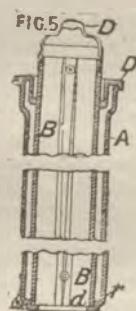
such as that described in Specification No. 1583, A.D. 1872, in which the products of combustion from the kiln are passed over the surface of the slurry in a drying-chamber. The products of combustion from the kiln A pass over the slurry C in the chamber B. A series of deflectors or screens D, preferably of sheet iron, are placed across the chamber and by their inclination deflect the hot gases on to the surface of the slip. The deflectors D rest on studs *d* projecting from stays; they are preferably made in three pieces, the two side portions being permanently fixed, and the middle one being removable. The floor of the chamber B is made to slope towards A so that the layer of slip is thicker at the hotter end.

Abridged also in Classes *Drying*; *Furnaces &c.*

1555. Tongue, J. G., [Randhahn, H.]. April 9.

Composition castings.—Coal tar, mineral tar, natural asphalt, the resin formed in the manufacture of mineral oils, and other like materials are heated, in a suitable vessel (preferably of semi-globular form with a furnace underneath), and mixed with finely-divided carbon, such as coke dust or in other convenient form. The hot material is cast into moulds for the manufacture of building ornamentation, plastic figures, pipes, &c. For pipes, the moulds consist of an outer part A, A made in two pieces, on the bottom of which is also fixed a ring *r* to support the core B, which is also made in two pieces; these do not quite close together but leave on either side a space *a, b* narrowing towards the bottom in which a wedge is inserted. The moulds, being fixed in a frame, are filled to the brim and a cover D is pressed down and fastened after which they are taken into the open air to cool.

Abridged also in Classes *Moulding &c.*; *Roads &c.*

**1623. D'Arcy, J.** April 13.

Cements; composition for casting &c.—Material for use as cement, for casting, pipe-jointing, &c. Refuse from the smelting of copper (by Henderson's process) is mixed with sulphur and it may be with bitumen. The slag is pulverized, dried, and added hot to the sulphur, which is melted by the heat, with agitation.

Abridged also in Class *Starch &c.*

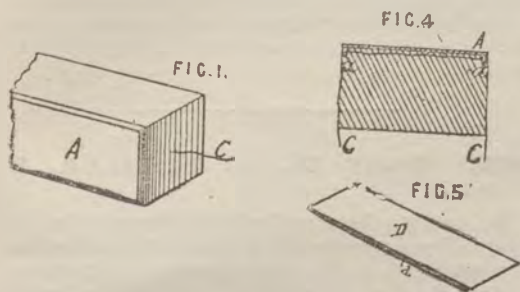
1727. Lavender, R. April 20.

[Provisional protection only.]

Cements; composition for casting.—Sulphur and rouge or oxide of iron are mixed to make a material available for casting and as a cement. The sulphur is melted and the rouge stirred in.

Abridged also in Class *Starch &c.*

1817. Gedge, W. E., [Boden, G.]. April 27.



Artificial stone suitable for building purposes, for tiling, for tops of tables and other articles of furniture, for slabs, monuments and other analogous uses. The stone is waterproofed and protected from the action of the air by a facing or veneering A of porcelain or earthenware having a surface glaze. Each block has imbedded in it a wire C or wires whereby the blocks may be bound together or to the beams in building, or they may be perforated for the insertion of wires. The shell A of glazed earthenware, having its edge dished, and with its rear face unglazed or preferably roughened and provided with perforated lugs a or projections, is placed face downwards in a suitable mould, wires c are attached to the lugs, and the mould is filled with a mixture of lime and sand, cement and sand, or cement alone, moistened with a solution of shellac, glue, borax, alum, and sal soda in water. The mixture is pressed into the mould, and when dry the stone is ready for use. In making tiles, the cement is first placed in the mould, and the shell is pressed down upon it, while the cement is still in a plastic state. In using the stones for building purposes in order to prevent access of moisture, plates D, Fig. 5, of metal, rubber, felt or other material having beaded edges d are interposed between the stones.

Abridged also in Class *Moulding &c.*

1822. Ormerod, E., Edwards, R. J., and Edwards, A. April 27.

[Provisional protection only.]

Stonework, ornamental.—Letters, inscriptions, figures, or other designs, upon surfaces of stone, metal, wood, marble, concrete, cement, &c. A design is cut in the smoothed surface, and an "alloy" composed of a metallic sulphide and sulphur is melted and run into the cut recesses of the design. The slab of material is then passed under, preferably, a rotating metal cylinder faced with emery cloth, glass paper, &c., to level the surface of the alloy with that of the slab. The slab is fed along by hand, or by india-rubber rollers.

Abridged also in Classes *Buildings &c.*; *Ornamenting.*

1927. Hill, H. May 4. *Drawings to Specification.*

Casting slabs &c. for paving, facing walls, lining chambers, &c. Stone chips from quarry waste are laid on the bottom of a mould into which a grouting of Portland or other cement is then run. When

set the slab or tile is removed from the mould. A quantity of cement, sufficient to bind the stones together, may be run into the mould first, and then a less expensive concrete, as gravel, lias lime, or an inferior cement.

Abridged also in Class *Moulding &c.*

2040. Jensen, P., [Erichsen, E. J.]. May 10

Cements; fireproof compositions; stone, preserving; stone, artificial.—Pulverized asbestos mixed with silicious solutions, gypsum, chalk, lime, clay, ground firebrick, colouring matters, &c. is applied to various purposes,—as a preservative solution for stone &c., for moulding into artificial stone, or as a composition for coating boilers externally, the asbestos being used in a fibrous condition. For this last purpose a framework of hoop iron may be built over the boiler, the composition being plastered on to the frame, so that the whole can be removed when required. The composition may also be used for securing iron rails into stone bedding, or generally for "cements or putties."

Abridged also in Classes *Buildings &c.*; *Fire, Extinction &c. of*; *Heating*; *Moulding &c.*; *Paints &c.*; *Starch &c.*; *Steam generators.*

2171. Stone, R. May 18.

Imitation marble.—Relates to the extraction of metals from ore, to burning lime, cement, bricks, &c., and to furnaces &c. employed therefor, and also for forming composition articles in imitation of marble &c.; reference being made to previous Specifications No. 2535, A.D. 1879, and No. 2070, A.D. 1880. Flint, spar, marble, or granite is dissolved or smelted, a flux being used composed of pearl-ash, nitro-borax, cryolite, alum, saltpetre or other suitable material. Colouring is given by adding oxides of cobalt, chrome, iron, or silver, zinc, platinum, gold, mercury, &c., together with suitable flux mixed with oils. A thin layer of composition when melted is run into moulds, having movable sides and weighted covers; the mould is then filled up with molten slag and the cover being placed on causes cohesion between the two substances, the first forming an enamel facing and the latter the body of the article. In some cases the powdered composition is spread into moulds and then melted slag is poured in which adheres to the composition which forms a polished facing. Sometimes the composition is laid upon the slag in the form of paste, when both are heated until they cohere. The composition can be formed into blocks, caps, pillars, slabs, cornices, chimney-pieces, bricks, tiles, pottery sets, &c.

Abridged also in Classes *Furnaces &c.*; *Grinding, crushing, &c.*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

2332. Gray, J. W. May 27.

[Provisional protection only.]

Fireproof and sound-deadening composition for buildings. One third clay and two thirds of willow dust are mixed in a pug-mill and moulded

into blocks which are then baked. The composition blocks are placed between the joists or secured to the underside of the latter and covered with plaster, composition, paper, or other material. If the joists are of wood fillets are nailed to the sides of the latter to form rebates which engage with rebate edges of the blocks. The face of the blocks may fall below the underside of the joists which are then covered by supplemental blocks or cakes. Sawdust or other material is filled in above the blocks and between the joists.

Abridged also in Classes *Buildings &c.; Fire, Extinction &c. of; Moulding &c.*

2349. Goodall, W. May 28.

Composition for castings.—Plaster of Paris, Portland or other cement, sawdust, wood pulp, glue or size and borax, or similar salt, are mixed together to the consistency of paste for pouring into moulds. Colouring matter may also be added.

Castings.—The composition described is poured into moulds around or between two or more layers of canvas, wire netting, or other suitable stiffener. When set, the casts are dried by artificial heat, soaked in glue or size, and again dried.

Abridged also in Classes *Buildings &c.; Furniture &c.*

2616. Hodson, G. June 16.

Imitation marble, granite, &c. for chimney-pieces, columns, girders, balusters, dados, and architectural ornaments in general. A plastic mixture of cement with slag, gravel, sand, broken granite or stone, or like substances, is moulded into the required form, and allowed to dry and harden. Heavy girder columns and the like are strengthened with iron cores.

Abridged also in Classes *Buildings &c.; Fencing &c.; Furniture &c.; Moulding &c.*

2629. Wright, G. A. June 16. *Drawings to Specification.*

Fireproof compositions.—Relates to a fireproof composition capable of being moulded into blocks and used for various purposes in building as a substitute for wood. Nails may be driven into the composition, and blocks of it may therefore be inserted in walls to afford means of attachment for such purposes as bell-hanging, plumbing, gas-fitting, picture-hanging, &c., fitting door-hinges direct on the walls, securing skirting boards or laths for plastering, match-boarding, wall-plates, &c. Blocks of the composition may be used instead of floor-joists; or the composition may be let into dovetailed grooves in concrete blocks employed for these and such like purposes. The composition is composed of sand, breeze, cement, lime, and loam. The breeze and sand are washed and mixed with the lime and loam, the cement which may be Portland, Keene's, Roman, &c. is then added dry. Ballast, clay, chalk, &c. may be substituted for the breeze. The drawings attached to

the Specification show various illustrations of the manner in which the blocks are to be employed.

Abridged also in Classes *Buildings &c.; Fire, Extinction &c. of; India-rubber &c.; Moulding &c.; Wood &c.*

2639. Evans, D., and Tucker, A. E. June 17.

Refractory substances for lining furnaces &c. A composition is employed consisting of ground gannister, sandstone, or like silicious material (including silicious fireclay) mixed with tar or similar hydrocarbons, preferably with the addition of a little coal dust, to attain greater durability than when gannister is used in admixture with water. The materials are employed in such proportions as to form a hard yet plastic mass. Hot tar may be mixed under edge runners or otherwise with about 10 times its weight of gannister. After a lining has been dried at about 100° C. for some 12 hours, the heat may be increased to "a black redness" and so continued while combustible vapours are evolved, air being excluded. In making the hearths of Siemens' furnaces, the mixture may be either rammed or slurried; in which latter case the proportion of tar or like binding-medium is increased so that the resulting mass will tend to spread. The invention is described with special reference to lining Bessemer converters and making converter bottoms and tuyères.

Abridged also in Classes *Furnaces &c.; Manufacture of iron &c.; Metals and alloys.*

2662. Clark, A. M., [Sorel, E. E. A.]. June 18.

[Provisional protection only.]

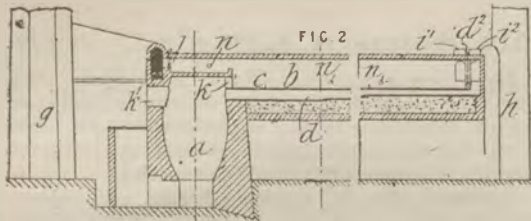
Cements, concretes, &c.—Cement is made of magnesia and sulphate of magnesia in various proportions. To this may be added powdered limestone, sand, gravel, &c. for concrete and other purposes. Instead of merely mixing the magnesia and the sulphate, the latter may be mixed with "hydrated magnesia," and the mixture calcined. Silica, alumina and iron oxide may be added. Also a solution of chloride of magnesium may be employed instead of water, in mixing the materials. The composition is suitable for making reservoirs, basins, blocks, bricks, &c.

Abridged also in Classes *Grinding or abrading &c.; Moulding &c.*

2809. Joy, W. June 27.

Drying slurry.—An improvement in the apparatus described in Specification No. 3596, A.D. 1877. The kiln is covered with a roof which forms a drying-floor, and the drying takes place in a longitudinal chamber nearly on a level with the top of the kiln. The slurry is run on to the floor *c* from tanks, preferably placed between adjoining drying-floors through openings *n*. The kiln *a* is charged in the usual way and the opening *b* is bricked up. The products of combustion pass to

the chimney *h* by the damper *i*². When combustion is so far established that the gases are thoroughly hot, the damper *i*² is closed, thus cutting off communication with the chimney *h*,



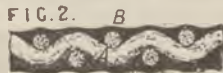
and the dampers *d*², *j* are opened; the gases then pass through the flue *d*, over the slurry in the chamber *b* and away by the chimney *g*. When the kiln is burnt out and the slurry is dry, the dampers *d*², *j* are closed and the damper *i*¹ is opened; the eyes *k*, *k*¹ are also opened, so that cool air flows through the chamber *b* to the chimney *h*. In order to assist cooling, air may be admitted by openings in the roof. The burnt charge is withdrawn from the kiln, and the dry slurry is charged into it by the opening *k*. If desired the apparatus may be so arranged that while one charge is burning another is being withdrawn. When several kilns are built side by side it is advantageous to connect the several drying-chambers and flues in connection therewith to one pair of chimneys, one being at each end of the floors. Openings which can be closed by tiles are left in the roof by which workmen can enter the chamber to clean it out.

Abridged also in Classes *Drying*; *Furnaces* &c.

2815. Clark, A. M., [Tichenor, I. T.].
June 27.

Fireproof coverings.—A fabric *A* is immersed in or impregnated with and coated on both sides with a mixture *B* of clay and pine tar or gas tar or of clay and glue or other adhesive material. The prepared canvas or material may be used for making fireproof cotton bale coverings.

Abridged also in Classes *Fire, Extinction* &c. of; *Waterproof* &c. fabrics.



2854. Brode, L. A., and Muir, R.
June 30.

[Provisional protection only.]

Artificial stone.—A mixture suitable for the manufacture of baths and similar vessels is compounded of Portland cement, fireclay, gravel, and silicate of soda mixed with water.

Abridged also in Classes *Closets* &c.; *Hollow-ware*.

2881. Elliott, A. H. July 2.

[Provisional protection only.]

Artificial stone; asphalt.—Limestone, ore, or other mineral substance is crushed, ground, screened, heated or dried in a special apparatus, mixed with the requisite amount of bitumen, and moulded to the required form.

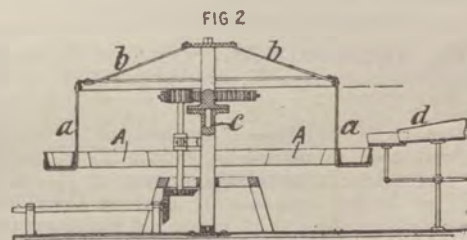
Abridged also in Classes *Drying*; *Grinding, crushing, &c.*; *Metals and alloys*; *Mixing* &c.; *Moulding* &c.

3012. Sachs, J. J. July 8.

Casting cements &c.—A compound for casting various articles &c. consists essentially of a mixture of sulphur and slate dust, to which may be added coal dust, plumbago, emery or other hard or silicious powder, and colouring matters. The castings are preferably cooled in a vacuum or partial vacuum to get rid of air bubbles &c. The compound may be used for cementing wood, stone, &c., and for casting grindstones, building or paving blocks, cistern linings, printing and embossing rollers, gas, water, and drain pipes, and picture frames. It may also be used for the production of type, for filling up printing and other rollers, for embedding railway sleepers and for other foundations, as a cement, and as a substitute for asphaltum when used in the construction of ships and footways.

Abridged also in Classes *Artists' instruments* &c.; *Buildings* &c.; *Grinding or abrading* &c.; *Hydraulic machinery* &c.; *Moulding* &c.; *Photography*; *Pipes* &c.; *Printing, Letterpress* &c.; *Printing other than letterpress* &c.; *Railways* &c.; *Roads* &c.; *Ships* &c., Div. I.; *Starch* &c.

3056. Clark, A. M., [Elbers, A. D.].
July 12.



Slag, treatment of.—The object of the invention is to enable slag to be cooled uniformly and so made available for various purposes. The slag from the blast furnace is run from a spout *d* into an annular trough *A*, mounted as shown on framing *a*, *b*, so as to be revolved on central spindle *c*. The slag first delivered into the trough is partly cooled by the time the same part of the trough has been brought round to the spout again. The new layer of slag, deposited on the top of the partly cooled layer amalgamates therewith, so that the whole mass cools and contracts uniformly. The slag thus prepared may be used for filling-in dams, jetties, &c. In this case the trough is revolved rapidly, so

that the slag is formed into "fascicular bulky masses" of irregularly shaped threads." The slag in the trough may be acted upon by blasts of steam, water or air. Granulated slag, ashes, &c. may be run in to mix with the slag.

Abridged also in Classes *Filtering &c.*; *Moulding &c.*; *Railways &c.*

3280. Clark, A. M., [*Day, B.*]. July 26.
Drawings to Specification.

Designed to provide films for printing, preparing, and finishing drawings and designs on stone or other surfaces, such as for lithographic drawings &c.

Compositions for casting.—Flexible films are formed of glycerine, dry gelatine and sufficient water to make an easy flowing liquid. The mixture is slightly heated to facilitate solution.

Moulds.—Liner stipples &c. required to be produced are engraved, photo-engraved, or otherwise produced, on a metal plate which to prevent subsequent adhesion of gelatine receives a coating of wax dissolved in ether. A jet of steam is passed over the plate and the gelatine mixture cast upon it. The completed film is then coated with wax to protect it from air, moisture, &c.

Abridged also in Classes *Printing, Letterpress &c.*; *Printing other than letterpress &c.*

3297. Armstrong, H., and London, J. A.
July 28.

Sound-deadening composition is prepared from peat fibre.

Abridged also in Classes *Buildings &c.*; *Casks &c.*; *Fabrics, Dressing &c.*; *Heating*; *India-rubber &c.*; *Paper &c.*; *Pipes &c.*; *Preparing &c. cork &c.*; *Ropes &c.*; *Ships &c., Div. I.*; *Spinning*; *Steam engines*; *Waterproof &c. fabrics.*

3303. Johnson, J. H., [*Soc. Anon. de Certaldo represented by Rey, W., and Fariguy, C. V. C. de.*].
July 28.

Stone, artificial &c.—A method of producing artificial stone or marble by indurating or hardening and colouring articles composed of plaster of Paris or having sulphate of lime as their base. The articles composed of plaster of Paris, gypsum, alabastrite, &c., either in the rough or uncut, or in the manufactured form are dehydrated by heating in a drying-stove, without direct contact with the fire. The dehydrated block or article is allowed to cool and is then immersed in a bath containing one or more of the following substances in solution:—salt of magnesia, carbonate of potash or soda, sulphate of potash or soda, sulphates of iron and copper, alum, nitric, sulphuric, acetic, or oxalic acid, ammonia, bichromate of potash, cyanide of potassium, acetates, oxalates, sulphates, nitrates, carbonates, or the equivalents of these which will not decompose sulphate of lime and are capable of imparting hardness thereto. Colour is imparted to the product either by the reaction of two or more of the above substances, or by the addition of

suitable mineral or organic colouring-matter to the bath. The finished article may be polished on iron plates with sand and water or otherwise.

3312. Haddan, H. J., [*Motte, F. J.*]. July 29.

Refractory substances.—Waste sand from glass works is moulded into slabs, flagstones, solid or hollow refractory bricks, ceramic ware, &c. So-dium silicate or the like is present in sufficient quantity to cement the particles together.

Abridged also in Classes *Metals and alloys*; *Moulding &c.*

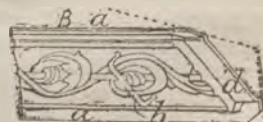
3376. Cottrell, F. W. Aug. 4.

Stone, artificial.—Relates to the manufacture of material to form artificial ivory, and applicable also as a substitute for horn, coral, malachite, vulcanite, india-rubber, gutta-percha, and for various other purposes. The object is to produce a substance both tough and elastic, and one that is soluble in alcohol alone. Fibre in the state of raw or bleached cotton rags, esparto grass, paper, or the like, is submitted to the action of the following acid solution:—Sulphuric acid of a gravity of from 1840 to 1859 is put into a receiver. Nitrous acid of a gravity of about 1420 is put into a retort in connection with the receiver or other appliance suitable for evolving and conducting the fumes so that the whole of the sulphuric acid shall be well saturated by them. Usually 25 parts of the nitrous acid are employed with 75 parts of sulphuric acid, and the prepared acid is used either cold or at a temperature not exceeding 95° F. The fibre is immersed in the acid (1 lb. of fibre to 1 gallon of prepared acid); it is immediately taken out, pressed slightly, and allowed to stand for from 20 minutes to 1 hour, by which time its conversion has taken place; it is afterwards washed in a plentiful supply of water, and then immersed in a solution of borax, or thoroughly washed in an alkaline lye: when it is dried it is fit to be treated with the solvent, which consists of alcohol either alone or combined with a hydrocarbon; the usual proportions are 1 lb. of solvent to 1 lb. of converted fibre. Compounds to match any colour may be prepared. In pliable articles there is used from 20 to 25 per cent. of an oil which will combine with the alcohol.

Abridged also in Classes *Acids &c., Div. III.*; *India-rubber &c.*; *Wearing-apparel, Div. IV.*

3507. Brewer, E. G., [*Stockstill, D. W., McGeary, T. J., and Anderson, E. W.*]. Aug. 12.

Casting plaster in position. Centres, cornices, or other ornamental surfaces are moulded in plaster immediately on the wall or other surface by a mould pressed preferably from sheet zinc or zinc composition. A mould B suitable for a cornice is provided with



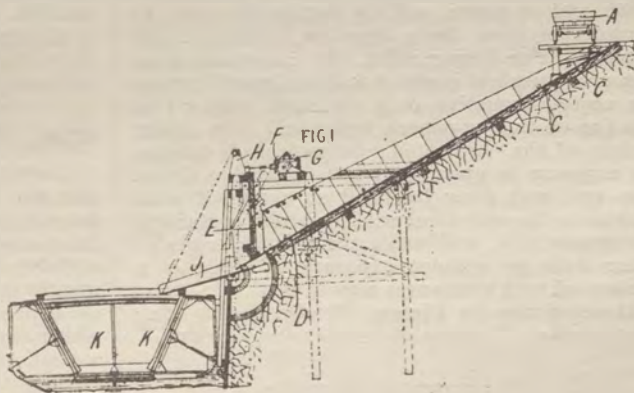
flanges *a*, for guides and handles *b*. The ends have abutting flanges *d* to form a neat joint in the plastering. The plaster is put in from the top of the mould and pressed against the surface until it has set.

Abridged also in Classes *Buildings &c.*; *Moulding &c.*

3544. Jones, E. F. Aug. 16.

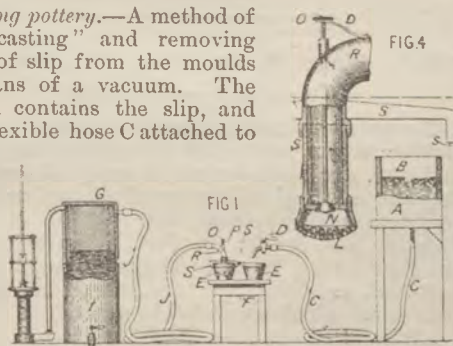
Slags, treatment of.—The slag produced in the manufacture of pig-iron is run into thin cakes of large horizontal area, so as to cool rapidly by radiation. The cakes are then removed in bogies *A* to a tipping apparatus, below which are knife-edged castings *C*, whereon the cakes fall and are broken into fragments which are received in an inclined fixed hopper *D* provided with a sluice or door *E*. This door can be raised, lowered, swung, or shut, to receive, store if needful, and deliver the broken slag to barges for being carried out to sea. To the lower end of the hopper may be attached a hinged flap *J* which forms a prolongation or shoot capable of being raised or lowered, to accommodate itself to the position of the barge according to the state of the tide.

Abridged also in Classes *Lifting &c.*; *Manufacture of iron &c.*



3593. Haddan, H. J.. [Ligowsky, G.]. Aug. 18.

Casting pottery.—A method of "slip casting" and removing excess of slip from the moulds by means of a vacuum. The tank *A* contains the slip, and has a flexible hose *C* attached to



it provided with a cock *D*. The moulds *E* are placed on the table *F*, preferably in two rows, and are filled with slip from *A* by *D*. When the slip has formed a suitable deposit, an elbow tube *R*—provided with radial arms, which rest on the top of the mould, are kept in place by the lugs *s*, and are so arranged that the lower end of *R* goes to the proper depth—is put into the slip. This tube *R* is provided at its lower end with a grating *L*, and a valve *N*, which is kept shut by the spring *P*, and which can be opened by pressing the button *O*. The other end of the tube *R* is connected by a flexible tube *J* with the airtight vessel *G* in which a vacuum is produced by a pump. The valve *N* is opened and the excess of slip is drawn over into *G*. When *G* is nearly full the slip is run off by *I* and returned to *A*. The slip may be withdrawn by a pump without the intervention of the

chamber *G*, and a vacuum may be produced by any known means. A series of suction tubes can be attached to one hose, so that the opening of a single valve may exhaust a number of moulds.

3629. Drake, C. Aug. 20.

Concrete; artificial stone.—A concrete composed of marble or granite chippings and Portland cement is mixed with water and placed promptly in the mould in such a manner as to expose the largest possible surface of marble or granite. When great hardness is required the moulded material is placed in a silicate bath and when set the interior surface may be polished by the usual methods for polishing stone or marble.

Abridged also in Class *Closets &c.*

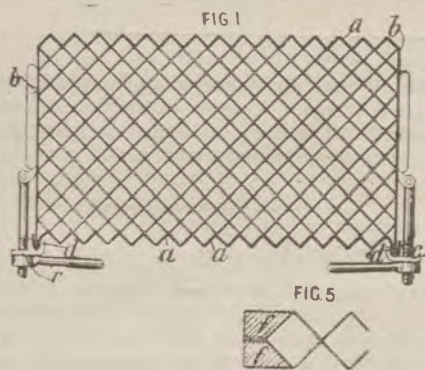
3657. Sachs, J. J. Aug. 22.

Casts from gelatine reliefs &c.—A sensitive layer is prepared, as for example, chromated gelatine, preferably supported on paper. It is varnished, as with asphalt dissolved in turpentine. This is exposed to light so as to get an image of the design upon it, either by direct super-position or by the use of lenses. The exposed sheet is soaked in water containing say, ammonia or acetic acid to swell the layer (chromated gelatine), and the varnish is gently rubbed off the parts that swell up. The varnish remaining in the sunk parts protects the fine edges in the after work. A casting is taken from this surface, using an easily fusible

substance, such as Sachs' cement (Specifications No. 3650, A.D. 1880, and No. 3012, A.D. 1881), or Spence's metal; and the operation is best done in a vacuum. Instead of merely swelling up, as above, the parts of the sensitive layer not acted on by light, they may be washed entirely away before casting. Impressions may be taken from the cast for electrotyping, or the cast may be electrotyped upon direct. One may photograph each side of, say, a house, produce from each photograph a relief cast as above, and by putting the casts, or electrotypes from them, together, obtain a model in relief. For deeper relief, the chromated gelatine or equivalent is cast in a thick layer direct on the object (negative &c.), or with only a thin film (as of tracing-paper) between. The outer surface of the chromated gelatine is made opaque, the exposure is given, and it is treated as above. Also one may draw by hand on a film of plain gelatine or its equivalent with an "ink" containing a substance that will make the gelatine insoluble either with or without exposure to light; or a mixture of such substances may be used.

Abridged also in Classes *Metals, Cutting &c.; Photography; Printing other than letterpress &c.*

3927. Duncan, J., and Newlands, B. E. Sept. 10



Casting sugar into sticks. The mould consists of vertical serrated or corrugated side pieces *a* and flat end pieces *b*; one of the plates *a* is removable and is held in place by lugs *c*, the joints being made tight by india-rubber strips *d*. The interior of the mould is filled with serrated or corrugated plates forming between them spaces into which the sugar magma is poured. The mould is open both bottom and top and is placed on a bed-plate covered with india-rubber or other cloth. When the sugar has set the mould is removed from this bed-plate and liquoring is effected, aided, if desired, by pressure or suction; or a centrifugal machine may be used, a convenient form being polygonal, each side accommodating one mould. When draining is complete the movable plate is removed and the sticks of sugar are dried as usual, or the drying may be effected by means of hot air while the sticks are in the mould. Various modifications of the apparatus may be used. The plates *b* may be dispensed with, each corrugated strip being provided with bars *f*, Fig. 5, which are placed in

contact, a slip of india-rubber or other material being put between to make a tight joint. In place of corrugated plates, flat plates may be used, the one set continuous below and with slots cut on the upper part, and the other with slots on the lower part and continuous above, so that the unslotted part of the one fits into the slots of the other, and thus forms a series of moulds. The outer plates are preferably carried a little higher than the inner divisional plates so as to facilitate filling the moulds.

Abridged also in Classes *Moulding &c.; Sugar.*

4035. Bremner, G. W. Sept. 19.

Artificial marble &c.—Syrup of biphosphate of alumina, mineral gum, or syrup obtained from bauxite, or a mixture of all, is placed in a lead-lined vessel heated by steam, and pure alumina is added to neutralize the acid, the mass being constantly agitated. Dissolved ivory, bone, whalebone, bone phosphate, horn, hair, or ligamentous tissue, either separately or admixed, are then added, also a small quantity of blood, and the mass allowed to simmer for some hours with constant agitation. The addition of alumina may be dispensed with. The adhesive substance thus obtained when mixed with cellulose, wood fibre, or paper, with or without plaster of Paris, and asbestos, and boiled may be made into slabs like marble and coloured if desired, or used for architectural ornamentation for inside work of houses.

Abridged also in Classes *Moulding &c.; Starch &c.*

4054. Pass, E. de, [Hunt, W.]. Sept. 20.

[Provisional protection only.]

Concretes.—Granite, stone, or other non-calcareous matter is crushed into granulated pieces and dust and then heated to expel all moisture. Asphalt is mixed with mineral oil, preferably the residuum of petroleum, and heated to expel moisture and render it fluid. The ingredients are then mixed together and, while at a proper heat and condition, are compressed, in moulds, into blocks which are cooled in water.

Abridged also in Class *Moulding &c.*

4101. Liebhaber, G. J. C. M. de. Sept. 23.
Drawings to Specification.

Colouring stone.—A yellow colour may be obtained by using acids containing iron, for a green colour a solution of "deutochloride" or nitrate of copper or of copper in aqua regia is applied, with a brush, or by other methods, or a paste made of copper sulphate and calcium chloride may be used. The stone thus dyed may be rendered black by treatment with solution of sodium sulphide; by using smaller quantities of sulphide a bronze tint can be obtained. To obtain a blue colour, the surface is treated with caustic soda. When the colouring is completed a coating of chloride of lime is applied.

Abridged also in Class *Washing &c.*

4297. Healey, B. D. Oct. 4.

Asphalt cauldrons.—Relates to improvements in the apparatus described in Specification No. 2733, A.D. 1876. On the cover are fixed two cast-iron boxes, with a loose flange below each and a sliding frame carrying a diaphragm of wire gauze; from each of these gauze boxes rises an iron pipe which turns downwards and opens into the fireplace over the front, so that gases delivered by it are at once burnt. The central flue of the apparatus if of large size is made of fireclay blocks joined along the crown, and the back of the flues is made of mild steel or boiler plate. For small apparatus the central flue is made of mild steel or boiler plate with an extra plate or false crown over the fire, so fixed as to allow an air space between the two plates. At the back end of the flue is put a fan-tail plate on the crown and a baffle-plate near the casing so as not to overheat the end of the casing. A large overflow spout is fixed at the back end immediately below the cover. The rings for the charging-hole cover are of cast iron with a lip on the inner edge standing upwards, and the covers are made with hinges and slightly flanged all round.

4335. Kinipple, W. R. Oct. 5. *Drawings to Specification.*

Casting concrete blocks in situ.—Bags of sand are covered with loose canvas so as to form a mould. The concrete is placed in the moulds in the plastic condition, the canvas closed over the top, and iron weights placed above it to prevent disturbance by the sea &c. when used for piers.

Abridged also in Classes *Hydraulic engineering*; *Moulding &c.*

4394. Pass, E. de, [Guillebaud, W. H.] Oct. 10.

Casts from gelatine reliefs &c.—The positive or negative is generally obtained upon glass ground on one or both sides, or an equivalent translucent material, so that light passing through it is diffused. The sensitized gelatine, either solid, liquid, or gelatinous, is exposed under the transparency, but at a distance from it of generally $\frac{1}{16}$ inch or less, so that the relief obtained by developing &c. with water has its edge bevelled or rounded. Metallic moulds are obtained from the reliefs by the ordinary methods, and are used for embossing, stamping, moulding, &c. For "moulds, dies, or matrices in relief," the transparency must be retouched before the gelatine relief is obtained to secure the relief of all proper parts. A plaster cast is taken of the gelatine relief, and from this a wax cast or a cast in equivalent material about $\frac{1}{16}$ inch thick, allowance being made for the shrinkage of the wax in cooling. This wax cast is supported in a suitable skeleton frame and moulded by the artist, and then backed with plaster. This may furnish by ordinary methods moulds or dies of metal, or serve as a pattern for casting copper, silver, &c. articles. A concave electrotype and a matrix produced from it may be used to produce photographic prints in relief. Details of the methods, which may be varied, are

described, as is also a cell for holding liquid gelatine during its exposure under a transparency.

Abridged also in Classes *Metals, Cutting &c.*; *Moulding &c.*; *Photography*; *Printing other than letterpress &c.*

4634. Clark, A. M., [Gilman, C. C.] Oct. 22.

Fireproof and sound-deadening composition.—A composition is made of kaolin and sawdust. After being mixed, it is forced by plungers through cylinders, from which it issues in the shape of long blocks. These blocks are fired to a certain extent. The composition may be used when a poor conductor of heat, electricity, and sound is required, and for fireproofing.

Abridged also in Classes *Electricity &c., Div. II.*; *Fire, Extinction &c. of*; *Heating*; *India-rubber &c.*; *Moulding &c.*; *Wood &c.*

4687. Pitt, S., [Johns, H. W.] Oct. 26.

Fireproof coverings and compositions; refractory substances.—Sheets or boards are made by separating asbestos or similar material into fine fibres, which are deposited, by a current of air, on a wire netting or other perforated surface, to form a bat of any required thickness, the fibres of which are crossed and interlaced. The bat is then damped with water or a glutinous liquid and pressed or rolled with or without heat to form a compact material. Wires or cords may be introduced through the bat during manufacture to give additional strength. The bat may be impregnated with glycerine or other non-volatile liquid to make it pliable, and oils or resinous matter may be introduced into or applied to the finished material to give it strength and stability. The bat may be polished with heated irons and dyed or coloured with pigments. Reference is made to Specification No. 3376, A.D. 1880. The material may be fastened as a veneer to wood, metal, or other substance to protect the surface from fire, or may be made into blocks for firebrick firewalls and the like.

Abridged also in Classes *Fire, Extinction &c. of*; *Heating*; *India-rubber &c.*; *Metals and alloys*; *Moulding &c.*; *Waterproof &c. fabrics*; *Wood &c.*

4731. Johnson, J. H., [Kramer, G. O., & Co.] Oct. 28.

Stone, preserving.—Consists of a waterproofing and preservative composition for application to wood, stone, iron and other metals, sailcloth, pasteboard, and the like. Fine dry sawdust is added to tar heated to about 140° C. The mixture is boiled and more tar added. It may be applied whilst hot, being spread upon the articles to be treated by brushes or otherwise; or the articles may be dipped into the composition.

Abridged also in Classes *Cutting &c.*; *India-rubber &c.*; *Paints &c.*; *Waterproof &c. fabrics*; *Wood &c.*

1840. Spence, J. B., and Ormerod, E. Nov. 4.

Concrete which will resist a high temperature and which is suitable for receiving an enamelled surface. Portland cement is intimately mixed with ground slag from iron or copper works and powdered hæmatite. Crushed bricks, burnt ballast, breeze, pottery refuse, or other materials which have been subjected to great heat, are added, and the whole is mixed with water, as in making concrete. The concrete is placed in moulds to be formed into slabs or other articles in the ordinary way, and when sufficiently set is placed under cover to harden and dry. After this it is heated to about 120 degrees for three or more days, and is enamelled in the usual way. Other materials may be used; any suitable binding material may be used in place of Portland cement; and silica, flint, &c. may be substituted for the slags, and oxides of iron for the hæmatite.

Artificial marble &c.—Articles may be moulded of various forms for architectural and other purposes, and they may be coloured in imitation of marbles &c.

Abridged also in *Class Moulding &c.*

4857. Lake, W. R., [*Basquin, P. St. A.*] Nov. 5. *Drawings to Specification.*

Cements.—A chamber or vessel and method for using during the operations of drying, bleaching, and similarly treating fibrous materials, fabrics, cements, granular materials and other substances. The materials to be treated are placed in an airtight chamber lined or coated with a substance which will resist the action of the reagents employed. The chamber may be stationary or revolving and fitted with divisional plates and stirrers. It is surrounded or partially surrounded with a second chamber, which may be filled with hot or cold liquids or gases for influencing the temperature inside the chamber which is fitted with a number of pipes for the inlet and outlet of the air, gas, vapour, or other reagent which may be hot, cold, compressed, uncompressed, or at a normal temperature or pressure. After hot gases have been used in the chamber, they are conveyed to other chambers and are there used for heating the ingoing reagent, the circulation of which is produced by pumps. When desired, the reagent after being used in the chamber or the vapours given off by the material acted upon are treated for the reclamation of the same. There is also a reservoir connected with the chamber and used for containing a compressed reagent, or a vacuum is formed in the same for reducing the pressure in the chamber. The Specification describes several modifications of the apparatus, and also details of the various processes, stating the reagent used on the chamber to effect certain changes upon materials partially prepared, and also those to be used in the preparation of the various materials before undergoing certain processes.

Abridged also in *Classes Beverages; Bleaching &c.; Brewing &c.; Drying; Fabrics, Dressing &c.; Fire-arms &c., Div. II.; Spinning.*

4927. Pass, E. de, [*Stone, R. H.*] Nov. 10.

Artificial stone.—Natural silica or a silicate such as sand, disintegrated quartz, or silicious rock is mixed either with slaked lime, or with quick lime and enough water to slake it. The mixture is then treated with sufficient water to make it plastic and allow it to be compacted by ramming into moulds. The moulded block is turned out on a suitable bed, and the surface is preferably washed over with a weak solution of silica, a dialysed solution being best. After standing some days the blocks are placed in tanks containing water preferably charged with lime or other solution of calcium. The tanks are then gradually heated by steam pipes or otherwise to about 200° F. for several days.

4994. Haddan, H. J., [*Py, P.*] Nov. 15.

[*Provisional protection only.*]

Refractory substances.—The waste products or residues of soap factories are first operated on by an hydraulic press; whereby the lye, varying between 15 and 20 per cent. of the products, is extracted and may be used again. Afterwards the products, devoid of all liquid, are moulded and dried, and become hard enough to be used as bricks &c. for building. To make flagstones for paving, cement is mixed with the residues before subjecting them to pressure. The agglomerates obtained by this process, being refractory and waterproof, are advantageously used for constructing furnaces and chimneys.

Abridged also in *Classes Acids &c., Div. II.; Metals and alloys.*

5033. O'Neill, B. Nov. 17.

Artificial stone.—Relates to the manufacture of mantel-pieces, columns, &c. in imitation of marble or other ornamental stone. Portland cement, blue-lias cement, cinder or coke dust and marble dust are mixed into a paste with water containing borax in solution and the mixture is run into moulds. When thoroughly set the surfaces are smoothed with sand paper, and covered with a succession of coats of varnish preferably in the following order, best tar varnish, Pontypool varnish, pale mixing varnish, copal varnish, extra fine polishing varnish. After each coat of varnish the casts are baked and any roughness rubbed off with pumice stone, and after the final baking the surface is well polished with rotten stone. The ground colour is preferably applied before the first coat of varnish, the veins or streaks being added between succeeding coats.

Abridged also in *Classes Buildings &c.; Moulding &c.*

5055. Davies, J. A. Nov. 18.[*Provisional protection only.*]

Slags, treatment of.—Making bricks, blocks, tiles and the like, from slag and clay. The harder portions left after projecting a jet of water on to the nearly cold slag from the blast furnace, or the harder portions of old weathered slag from the tip, are pulverized or disintegrated and mixed with pulverized clay in the dry state. The mixture is gauged with water and moulded into bricks, blocks, &c. In making inferior bricks the lighter porous portions of the slag are pulverized, mixed with pulverized refractory clays, and moulded as before.

Abridged also in Class *Moulding &c.***5155. Cobley, T. H.** Nov. 25.

Refractory substances.—The manufacture is described of mineral white substances for various purposes, including the mixing with fireclay, asbestos, or other refractory material for making fireproof goods. Hydrate of lime, freed from grit by levigation, may be continuously added to a solution of sulphate of magnesia (native sulphate or kieserite, for economy), under agitation or stirring until precipitation ceases. After settling, a paste is left on running off the liquid: or while a precipitate is forming the mixture may be passed through a filter press and the white precipitate be obtained in cakes. The white thus prepared is a mixture of precipitated sulphate of lime and hydrate of magnesia. For certain purposes, warm saturated solutions of sulphate of magnesia and chloride of calcium may be mixed and a precipitate of flaky sulphate of lime be obtained. To the residual chloride of magnesium liquor there may be added hydrate or carbonate of lime to obtain a precipitate, which may be mixed with alumina. Some chloride of aluminium may be added to the chloride of magnesium liquor.

Abridged also in Classes *Fabrics, Dressing &c.*; *Metals and alloys*; *Paints &c.*; *Starch &c.***5404. Schuman, S.** Dec. 10.

Fireproof coverings.—Non-conducting coverings for heat are saturated with incombustible materials

such as alum, sulphates, phosphates, silicates, lime, ammoniacal substances, &c.

Abridged also in Classes *Fire, Extinction &c. of*; *Heating*; *Moulding &c.*; *Sewing &c.*; *Spinning.***5495. Emery, E. V.** Dec. 15.

Casting gelatine &c.—Relates to a method of producing transparent, semi-transparent, or opaque sheets of gelatine, or other substances with words or designs thereon, applicable for screens, Christmas, New Year, birthday, visiting, and like cards, &c. The desired words or designs, are cut, embossed or otherwise formed upon metal, glass, &c. to form suitable moulds, and the gelatine &c. is melted and run upon them, and when dry is removed ready for use. The mould is preferably formed with a rim to retain sufficient gelatine &c. to produce sheets of the desired thickness, and if desired a mould may be placed both above and below the gelatine &c. to impress the design on both sides of the sheet.

Abridged also in Classes *Books*; *Furniture &c.***5508. Fisher, J. A.** Dec. 16.[*Provisional protection refused.*]

Fireproof coverings.—To prevent combustible matter taking fire it is enclosed in cases or layers of wire gauze.

Abridged also in Classes *Fire-arms &c., Div. II.*; *Fire, Extinction &c. of.***5526. Fletcher, T.** Dec. 17.[*Provisional protection only.*]

Fire-resisting composition.—Fireclay or other fire-resisting material is mixed with silicates to make a composition which may be used for altering and repairing fireplaces, as it does not require burning to acquire the density of ordinary firebrick.

Abridged also in Classes *Fire, Extinction &c. of*; *Moulding &c.*

A.D. 1882.

3. Aitken, H. Jan 2.

Stone and statuary, preserving. — Applying preservative compositions to timber castings, terracotta work, marble statuary, monuments, building stone, and the like. Consists, in one form, of immersing the work in the hot or molten substance, the temperature and length of immersion being varied to suit the desired thickness of coating or amount of absorption. The chamber containing the substance may be provided with means for creating a vacuum in it to extract air from the work, or pressure may be applied to force in the preservative substance. The work may also be first placed in a separate chamber in which a vacuum is maintained. The work may also be slowly dried and heated before being treated. In another form the solid substance is rubbed on the work and then liquefied by a jet of hot air; or the work may be first heated.

Stone, colouring. — The Provisional Specification states that colours or dyes may be fixed with hot preservative compositions, and applied with them as described above.

Abridged also in Classes *Buildings &c.*; *Electricity &c., Div. II.*; *India-rubber &c.*; *Moulding &c.*; *Paints &c.*; *Pipes &c.*; *Railways &c.*; *Steam engines*; *Wood &c.*

63. Jensen, P., [Suillot, H. S., and David, H.]. Jan. 5.

Fireproof compositions &c. — Rendering fabrics, theatrical scenery, &c. unflammable by impregnating them with a solution of salts having incombustible properties. These salts are either borates, phosphates, or tungstates, together with glucosaccharine or molasses, or they may be sucates, glucates, and melanates of potash, soda, ammonia, magnesia, and alumina. The lime salts of the above are preferred. The salts are dissolved in a hot saccharine solution to form an uncrystallizable compound, and the fabrics are steeped in it when hot or painted with it when cold.

Abridged also in Class *Fire, Extinction &c. of.*

77. Reid, H. Jan. 6.

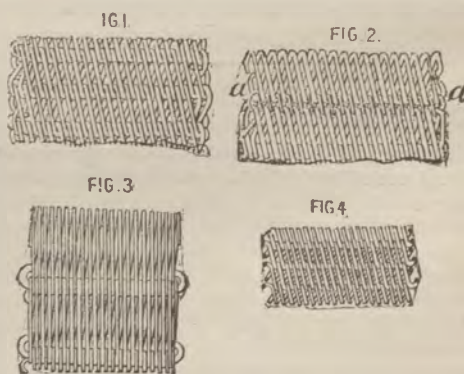
Casting cement and concretes for paving, building, and similar purposes. The machine on which the moulds are placed is made to run in a horizontal or vertical direction. The moulds are filled with concrete &c. and conveyed to the machine, which runs on wheels or rollers along a corrugated or uneven track, the vibratory motion thus obtained causing the concrete &c. to fill up the mould.

94. Culmer, J. W., [Wernickanck, E.]. Jan. 7.

[Provisional protection only.]

Casting sugar. — The moulds or shapes are in the form of rectangular boxes, so as to furnish the finished loaves in right-angled cubical masses. Each mould has top and bottom collars and covers, the bottom cover having an inclination or depression towards the centre at which is the drainage opening. On the inner side of this cap is a secondary bottom for retaining the sugar whilst in a liquid state. The mould or shape may be fitted with diaphragms or division plates whereby the loaf is divided into plates, slabs, or strips of finished sugar. The moulds are put into a closed pan which is connected with an air pump or its equivalent fitted with suitable valves for exhausting air from the pan. A hydraulic press with a table operated by a plunger in the usual way is used for forcing the loaves from the moulds. It is fitted with guides and clamps for directing and holding the moulds. A movable carriage is provided with an airtight chamber which is fitted with pipes, valves, or other appliances for the passage of steam, hot water, or other heating-medium whereby the chamber may be maintained at a temperature above that of the atmosphere. By means of a pump or otherwise the pressure in the chamber may be increased or reduced.

Abridged also in Class *Sugar.*

206. Wirth, F., [Pickhardt, G.]. Jan. 14.

Fireproof coverings consisting of wire fabrics. Cross-bars, with a hook at each end, are inserted within wire spirals the ends of which are bent upwards, or two half-round bars with their respective ends bent in opposite directions may be employed when strong link pins are required. At *a*, Fig. 2, the free ends are joined by one, two, or three spirals twisted to suit the inclination of the fabric.

Fig. 3 shows the net-work formed from single spirals, instead of double flat spirals, and in Fig. 4 is shown net-work produced from single or double cylindrical spirals by screwing out and interlinking corresponding coils. The fabric is stated to be applicable for transmission bands, mine cables, driving-bands, endless metallic cloths, coverings for money receptacles, books, safes, protection against robbery, armour, revolving windows and doors, shutters, venetian and like blinds, fireproof curtains, and as a protection and armour for ships.

Abridged also in Classes *Buildings &c.*; *Fastenings, Lock &c.*; *Fencing &c.*; *Fire, Extinction &c. of*; *Lifting &c.*; *Mechanism &c.*; *Ropes &c.*; *Shop &c. accessories.*

220. Cottrell, F. W. Jan. 16.

Stone, artificial.—A substitute for coral, malachite, &c. Fibre soaked in sulphuric acid, saturated with nitrous acid, and from which the greater part of the acid is washed away, or fibre already converted in accordance with Specification No. 3376, A.D. 1881, is mixed with a solution of barium sulphide and then with a mixture of concentrated solutions of alum, sodium carbonate, and sodium silicate. The product is then dried.

Abridged also in Classes *India-rubber &c.*; *Wearing-apparel, Div. IV.*

299. Pitt, S., [Recour, G.]. Jan. 20.

Slags, treatment of.—The oxides of iron and manganese, obtained in the following way, may be used in the manufacture of iron and steel. The slags, especially those produced in dephosphorizing iron, are treated to "a reducing melting," preferably in a tank, cupola, or blast furnace, to concentrate the iron, manganese, and phosphorus present into a phosphatic matt. The slags are assorted to ensure that the phosphate of lime therein is decomposed by a suitable proportion of silica to form a slag with 30 or 40 per cent. of silica, or silicious matters are added therefor; puddling-furnace slags may supply the requisite silica. The tank furnace should be kept very hot and the slags be charged in a finely-divided state. The phosphatic matt obtained is preferably granulated in water to facilitate further treatment. The matt is treated with hydrochloric or sulphuric acid under conditions of pressure and temperature determined by experience, a steam jet aiding therein. Hydrogen and phosphoretted hydrogen gases are evolved with the formation of a solution of chloride or sulphate of iron and manganese containing more or less of acid phosphate. From the solution of the chlorides the iron and manganese may be precipitated, either together or separately, in the state of oxide simply by adding lime in excess, or a measured quantity of carbonate of lime may be first added. Basic refinery slags, finely ground and containing an excess of lime, may replace the lime; and then the oxides of iron and manganese and the phosphoric acid in these slags become added to the precipitated oxide, and phosphate of iron. The phosphoric acid is precipitated as basic phosphate of iron with the oxide of that metal. This precipitate is calcined at a red heat with

commercial sulphate of potash, and on subsequent treatment with water an insoluble residue of oxide of iron is left, while the phosphate of potash is dissolved and utilized for manure. If the matt be treated with sulphuric acid, the solution of the sulphates of iron and manganese will only contain a small proportion of phosphorus, and may be evaporated to dryness and calcined to drive off the sulphuric acid which is recovered. Again, the granulated or pulverized matt may be decomposed by a current of superheated steam, hydrochloric acid gas, or gaseous chlorine.

Abridged also in Classes *Acids &c., Divs. I. and II.*; *Manufacture of iron &c.*

646. Lake, H. H., [Wildi, J., and Schambeck, J.]. Feb. 10.

[Provisional protection only.]

Fireproof composition.—A composition which can be applied to woodwork to render it fireproof, and which may be used in shipbuilding in place of tar, and for coating ironwork as a protection against rust. Glass, porcelain, stone, and burnt lime, all in the form of fine powder, are washed through a hair sieve and then thoroughly mixed with soluble glass (silicate of soda) to a syrupy consistency. Silicate of potash may be used in place of silicate of soda. The mixture is then used as a coating either alone or in combination with colouring-matters. The composition is applied by means of a brush.

Abridged also in Classes *Paints &c.*; *Waterproof &c. fabrics.*

835. Mountford, C. J. Feb. 21.

Fireproof coverings &c.—Consists of combinations of asbestos and other substances. For a fireproof and water-resisting paint ground asbestos is re-ground in water with aluminate of potash or soda and silicate of potash or soda, the materials being preferably mixed in a pug-mill.

Abridged also in Classes *Acids &c., Div. II.*; *Fire, Extinction &c. of*; *Paints &c.*

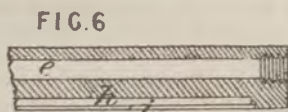
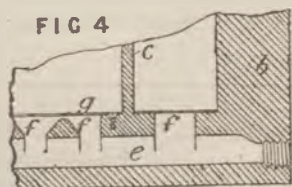
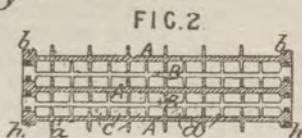
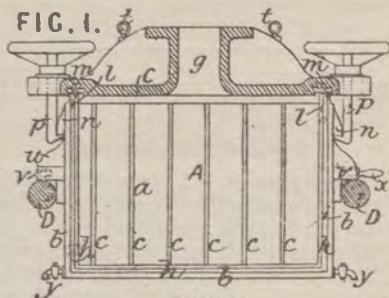
975. Nottingham, J. R., [Pelletier, A.]. Feb. 28.

Stone, artificial, suitable for paving-blocks, or for laying continuous pavements, or for blocks for building, the construction of sewers, or for other purposes for which stone is used. The stone consists of broken rock or stone or sand, an oxide of any base, but preferably of one of the heavy metals such as iron, manganese, or zinc, a chloride of the same base, and asphaltum, bitumen, or hydraulic cement as a binding-material. The stone or sand is mixed with the oxide (unless an oxide be present in the stone, when the addition is not necessary) and the chloride, the mixture is mixed with heated asphaltum, bitumen, or pitch, and the whole is thoroughly mixed. The material while hot may be laid as a continuous pavement or pressed into blocks. When cement is used as a binder heat is not required in the mixing.

Instead of adding the chloride in the mixing it may be done afterwards by treating the pavement or blocks with a solution of the chloride, or the chloride may be added and the blocks or pavement afterwards treated with a solution of the oxide, or they may be treated with a solution containing both the oxide and the chloride, or with a solution of each separately.

Abridged also in *Classes Moulding &c.; Roads &c.*

1055. Lake, H. H., [*Lebaudy frères*].
March 4.



Casting sugar.—Producing refined lump sugar in pieces or blocks without the use of saws. Rectangular bars are moulded of the section required and afterwards broken into lumps; pieces of suitable size for consumption, or slabs or loaves may be similarly produced. Metal &c. tables A, B, &c., Fig. 2, furnished with projecting rims *b* along three sides in order to joint with adjacent tables, are placed in a framework similar to that of a filter press. Each table is also furnished with ribs *c* alternating, as shown, with ribs upon adjacent tables, and so constituting the cavities *d* in which the sugar bars are formed; the ribs are rounded or tapered to avoid breakage of the sugar in removal, and the joints between the projecting rims of adjacent tables are made tight by rubber packing in a dovetail groove *h* on one face of each rim *b*, Fig. 6, which rubber is squeezed by pressure into the lateral spaces *i*, allowing the metal of adjacent tables to come in contact. A channel *e* communicates with the lower cavities by

passages *f* covered with wire gauze or perforated metal plates *g*. Each bar can be cleansed or drained in two channels; at each end of the channel is fitted a cock *y*, Fig. 1, to regulate the speed at which decolorizing agents pass. The rims *b* and joints are prolonged at *l* to the top of the central plates so as to form, with the cover C, a space connecting all the cavities, in which space an operation may be performed similar to that of removing loaves from their moulds by beating. Rubber in a dovetail groove *m* in the cover makes a joint with all the portions *l* and bolts *p* on the cover turn under projections *n* on the tables. The central tube *g* is the inlet for the prepared mass, and lateral tubes are inlets for the decolorizing and drying agents, and for steam for cleansing or draining; these inlets may be combined in one. Rings to facilitate the lifting of the cover, and air blow-off cocks are provided. Each plate is supported upon the cylindrical rods *D* by two lugs *u*, and the tables are successively separated for withdrawal of the sugar by the insertion of pins *x* through holes *v* in the lugs *u*. One end plate receives the keyed heads of the rods *D*, and the other slides upon them and is held by nuts which screw upon the rods *D*. Channels for syrup are provided under the cocks *y* and there may be a receptacle for drainings. The tables may be made in several parts, the plates, ribs, &c. may be fixed and arranged in various ways, the interior of the central plate may be hollow for the circulation of a cooling-medium, and the tables may be placed horizontally. The cleansing may be effected naturally or by exhaustion, or by the pressure of air or steam, or of a mixture of both, and decolorization may be effected by a white syrup of 36° B. running through the mass always with more or less pressure, or by other agents. Cold compressed air is passed over the mass, after drying it by heated air, in order to contract the sugar, and so facilitate its removal from the moulds.

Abridged also in *Classes Drying; Moulding &c.; Sugar.*

1306. Simmons, W. March 17.

Hearthstone.—Hassack stone and chalk are powdered and mixed with Portland cement or a similar binding-cement. The mass is moistened with water and moulded or otherwise formed into cakes, blocks, or other forms to be used as hearthstone. Pipeclay may be added to the mixture.

1458. Groth, L. A., [*Hosemann, H. R. P.*]
March 27.

Fireproof coverings &c.—Combustible materials are rendered unflammable by painting or impregnating them with a solution having incombustible properties. The solution is prepared thus: chlorides of calcium, magnesium, and aluminium are mixed first with hydrochloric acid, and then with potato starch; soapstone mixed with water is added to the solution when boiling, after which are added successively sulphate of ammonia and water, soluble glass mixed with water, and double sulphate of soda or lime. Another composition is obtained by

mixing together potato starch and chloride of calcium, and afterwards adding soluble glass to the above mixture when hot.

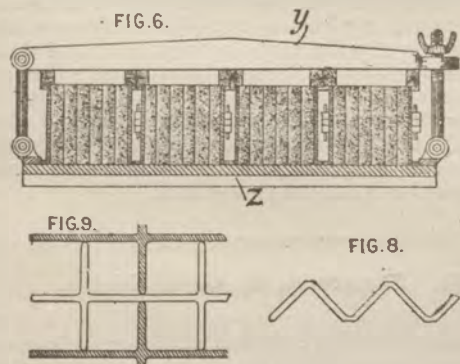
Abridged also in Classes *Fire, Extinction &c. of; India-rubber &c.; Wood &c.*

1468. Abel, C. D., [*Nagel, J.*]. March 27.

Fireproof coverings which can be used as a covering for inflammable materials such as wood-work, or employed separately for decorations, coverings, curtains, or other purposes, and for covering roofs. Amianthus or asbestos is reduced to small pieces and is mixed with oxide of zinc; the mixture either in a dry or moist state is pressed by rollers or otherwise on a net of metallic wire, or between two or more such nets. The plate is then impregnated with a solution of chloride of zinc, or chloride of iron or manganese and again rolled or pressed. If desired, the plate may be powdered with coloured sand or any coloured fireproof material. The plate is then dried and polished by rolling. If the plates are to be exposed to the weather they may be painted with waterproof paints, or impregnated with silicate of potash solution, dried, and then impregnated with skimmed milk.

Abridged also in Class *Buildings &c.*

1478. Johnson, J. H., [*Weinrich, M.*]. March 27.



Casting sugar.—Rectangular prismatic frames or moulds are used, they may be all in one piece or in two pieces held together by pins and lugs, and they are a little shorter in their widest dimensions than the depth of the centrifugal drum. The frames or moulds are placed with an open end down on a bar plate and are pressed down by a clamping-lever *y*, Fig. 6. In the moulds are now placed angular or zig-zag plates so as to divide it up into a series of prisms. A series of plates having transverse projections on each side, Fig. 9, may be used, or a series of zig-zag plates, Fig. 8, meeting at the angles. The moulds are then filled with liquid sugar and are put aside to solidify.

Abridged also in Classes *Centrifugal drying &c.; Sugar.*

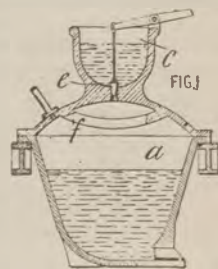
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1533. Aitken, R. March 29.

Slags, treatment of.—Extracting gases from molten glass, slags, and other materials by passing them, while molten, in streams, spray, or equivalent divided state, into or through an airtight, closed ladle or vessel *a*, wherein a vacuum or partial vacuum is maintained by connection with an air pump or exhauster. The molten metal &c. may gradually pass in a thin stream into the said vacuum vessel from a receptacle *c*, the passage between the two being fitted with a valve or plug *e*, the opening of which allows the metal to pass. Thus, not being subjected to pressure on any side, the metal will be favourably conditioned for the escape of enclosed gases; and it may strike against a projection or disperser *f* to break it up and aid the action. The gases are conveniently drawn off by the exhauster for condensation or other treatment. The treated metal may solidify in the vessel or be drawn off by a tap-hole and run into moulds, or, on removing the cover, the vessel can be employed as a ladle as usual. If requisite, nitrogen or other gas may be admitted and also exhausted, so as to reduce the proportion of oxygen in a partial vacuum to a non-explosive amount. Substances may be introduced into, or gases passed through, the partial vacuum chambers, if beneficial in improving the quality of the metal treated.

Abridged also in Classes *Glass; Manufacture of iron &c.; Metals and alloys.*



1568. Rander, F. March 31.

[*Provisional protection only.*]

Refractory substances.—Gelatinous silica is mixed with clay or other suitable material in a pug-mill or the like, and is moulded into bricks, tiles, or other articles.

Abridged also in Classes *Metals and alloys; Moulding &c.*

1620. Justice, P. M., [*Church, M. B.*]. April 4.

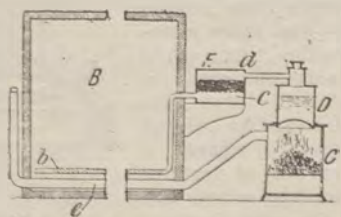
Cements.—A plaster suitable for casts on mouldings, and for coating and finishing the walls of rooms and other surfaces. Finely-pulverized calcined gypsum is mixed with glue and sulphate of zinc. The sulphate of zinc may be mixed dry or added in solution; any colouring-matter may also be added, and the sulphate of zinc may be replaced by copperas or similar mineral salts.

1836. Walker, W. April 18.

Stone, artificial.—The stone is composed of sand, cement, sulphur, and potash, and is moulded into blocks in the usual way. The moulded blocks are placed in a chamber *B*. Steam from a boiler *D* passes through a box *E* on to a perforated shelf *c*, in which is placed a layer of sulphur *d*, and

D

thence by the perforated pipe *b* to *B*. The products of combustion from the boiler furnace *C*



are preferably carried away by a pipe *e* passing through *B* near the bottom.

1959. Noad, J., and Salomon, H. April 25.

[*Letters Patent void for want of final Specification.*]

Stone, artificial.—A method of producing ornamental surfaces with designs in relief or intaglio specially suitable for wall tiles, cornices, skirting boards, mantelpieces, house decorations generally, flower boxes and pots, sign boards, advertising boards or plates, dials and scales, and building and architectural purposes generally. The materials used are silica or fine sand, clay or brick earth, china clay, ground glass, sulphur, and boracic acid; these are well mixed, heated to redness in a retort, and allowed to cool. The product is ground and sifted, colouring-matter is added if desired, the whole is thoroughly mixed and heated in a pan, and sulphur is stirred in till the mass is sufficiently fluid to be run into moulds. The moulds carry the pattern to be reproduced.

Abridged also in Class *Moulding &c.*

2028. Lake, W. R., [*May, L.*]. April 28.

[*Provisional protection only.*]

Casting sugar in cubes, prisms, or other forms, from sugar liquor. The moulds used consist essentially of strips of sheet metal suitably stamped or otherwise formed and arranged side by side. The moulds are arranged in layers in a case or carriage of suitable form; they are then filled with sugar liquor in the ordinary way, allowed to crystallize, liquored, and dried. When the pieces of sugar are of large size it is preferable to arrange a sieve between the tiers of moulds.

Abridged also in Class *Sugar.*

2097. Guelton, R. May 4.

Marble, artificial.—A method of producing artificial marble and rendering it waterproof and fireproof. The materials used are cements made of alabaster mixed with alum and colouring-matters. The marble may be produced in slabs on a smooth surface, preferably glass, or in moulded forms in moulds of cement. It is preferably made in two layers, a face coat to imitate the marble and a backing or supporting coat. The smooth surface being prepared and placed horizontally the veins are traced on it by means of fibres of silk

soaked in coloured water or cement; on these is laid the face layer of fine cement suitably coloured and mixed with water to a thin paste. To soak off excess of water a layer of dry coarse cement is sifted on the back, and when this has taken up as much water as it will, it is carefully removed and replaced by a dry layer which is in its turn removed, and the back of the layer of fine cement is carefully smoothed down. The coarse cement which has been used to absorb the moisture is mixed with some sulphate of iron, made into a paste with water, and spread as a backing on the face layer, pieces of slate or rods or strips of metal being embedded in it to give strength. After a time the article is removed from the mould and is thoroughly dried, and the surface is then smoothed with pumice or other polishing-stone; the pores on the face are stopped with suitably-coloured cement, and excess of the stopping is removed with a strip of wood or metal. When the stopping is dry the surface is again polished with a polishing-stone and finally with putty powder or other suitable substance. To imitate brêchés marbles, pieces of pasteboard cut to suitable sizes are used, the veins which separate the brêchés being traced round their edges with coloured cement. To produce bright spots pieces of alabaster are pressed through the face layer while it is still soft, or they are stuck lightly on the surface of the mould, or if many are required they are mixed with the face layer of cement. To produce crystallization on the surface, the cement for the face layer is mixed with warm water and is cast in a warm room, and it is submitted to a cold current of air during setting. To waterproof the back a mixture of brick dust and litharge with boiled oil is spread over the back with a hard brush. To waterproof the face it is polished with a mixture of spirits of wine, naphtha, turpentine, and shellac, oil being added to prevent thickening. This mixture is applied with a rag and rubbed gently. To fireproof the imitation marble a mixture of chalk, sand, "amiate" or asbestos powder, and silicate of potassium with enough water to form a stiff paste is spread on the back and heated.

2132. Stanford, E. C. C. May 6.

Cements; sound-deadening compositions.—A cement is formed of finely-divided carbon or carbonaceous material mixed with a glutinous substance, and may be applied when cold with a trowel. The carbonaceous substances mentioned are: coke, charcoal, peat, sawdust, shavings, carbonized seaweed, and residue from paper works, oil works, &c. The agglutinating-substances are distillery pot-sediment, starch gluten, refuse flour of sago, wheat, &c., dextrin, nitrogenous substances, &c., treated with caustic alkalies or alkaline earths.

Abridged also in Class *Heating.*

2157. Gray, J. M. May 8.

[*Provisional protection only.*]

Hearthstone.—Pipeclay is dried and ground to a fine powder, after which it is well washed and put into a machine with Paris white, whiting, and china

clay, and ground to a fine powder; it is then mixed with ultramarine and yellow ochre, made into blocks, and dried in the usual way.

2401. Wetter, J. May 22.

Stone, artificial.—A method of agglomerating suitable minerals for the manufacture of artificial millstones, building material, files, and other articles. A binding-material is prepared by melting resin, and adding molten bitumen and asphalt, and then sulphur; the mixture is heated to complete fusion and thoroughly mixed. The materials to be agglomerated are heated to above the melting point of the binding-material, sufficient of the latter is added, and the mass is mixed up, poured into moulds, and subjected to hydraulic pressure. After cooling, the articles are heated in an oven till all moisture is expelled, after which they are baked. A small railway with movable furnaces is used.

Abridged also in Classes *Grinding, crushing, &c.*; *Hand tools &c.*; *Moulding &c.*

2682. Aitken, H. June 8. *Drawings to Specification.*

Asphalts.—Gases from blast furnaces, gas producers, coke ovens, calcining-furnaces, and other furnaces are purified by being passed through tar, pitch, oil, bitumen, grease, or fat, whereby the hydrocarbons and sulphur are extracted, and the dust, soot, and other solid substances, including metals, are detained and held in suspension, producing a substance analogous to asphalt. The gases are then washed with acid to collect the ammonia. They may also be passed through oxide of iron to obtain the sulphur and sulphuric compounds. The apparatus used consists of a cylinder which rotates within a casing, the space between the cylinder and the casing being filled with the mixture of tar, pitch, &c., and the gases being caused to pass alternately to the inside and outside of the cylinder through perforations in the same.

Abridged also in Classes *Acids &c., Divs. I. and II.*; *Fuel, Manufacture of*; *Furnaces &c.*; *Gas manufacture*; *Heating*; *Manufacture of iron &c.*; *Metals and alloys*; *Oils &c.*; *Paints &c.*; *Steam generators.*

2772. Hitchins, R. W. June 13.

[*Provisional protection only.*]

Casting cements.—Relates to the manufacture of slabs of plaster, cement, or composition cast or moulded upon canvas, wire netting, or other suitable open fabric, and applicable for ceilings, wall coverings, and for pugging purposes. The slabs are manufactured in long lengths in a machine constructed as follows:—By one arrangement a longitudinally-oscillating mould table or bed is mounted beneath a pair of mixing-drums supplied with plaster, cement, or composition, and discharging it evenly over the mould table. The fabric to be embedded is drawn from a reel and passed through the machine so as to become coated on both sides. Instead of the oscillating mould table, it is preferred to employ an endless chain of

moulds supported on a table travelling always in one direction, and made upon an endless fabric of coarse wire cloth. The moulds may be bevelled at the edges and provided with gauges, scrapers, or rollers to obtain a uniform thickness, or to produce any required pattern on the surface. Laths of wood fed in by means of rollers may also be embedded in the slabs. A guillotine knife may be combined with the machine for cutting the slabs to the required length.

Abridged also in Class *Moulding &c.*

2957. Cross, G. J. June 21.

Fireproof compositions.—Soft wood, wooden articles, or debarked timber are placed in a chamber and the air and sap removed from the pores by exhaust-pumps. A magma of asbestos in fine powder, along with pulverized silica, or sodium silicate, or cyanite and water or other liquid is then forced in so as to impregnate and coat the wood &c. and render it non-inflammable and proof against attacks of insects and climatic injury. "Woven willow," canvas, woven textures, window curtains, bed furniture, and other textile goods may be either dipped in or brushed over and coated with the above magma or solution, which may be incorporated with the starch or size used for stiffening.

Abridged also in Classes *Fabrics, Dressing &c.*; *Fire, Extinction &c. of*; *India-rubber &c.*; *Paints &c.*; *Starch &c.*; *Wood &c.*

3049. Searle, R. June 28.

Stone, artificial, specially suitable for paving and building purposes. Portland cement is mixed in the dry state with granite or other stone, slag, metal, or other hard material of a suitable size; hot water is added and the mass is mixed and transferred to moulds. Whilst the mass is in a plastic or semi-fluid state the air is removed from it by any known mode of exhaustion, but preferably by placing the mould and its contents in an airtight chamber communicating by a pipe provided with a stop-cock with an exhausted chamber; when the stop-cock is turned on the air rushes into the exhausted chamber. When the blocks are sufficiently hard they are placed in a solution of silicate of soda, made from the natural soluble silicate called Farnham stone.

3127. Hodson, G. July 3.

[*Provisional protection only.*]

Stone, artificial.—Relates to the manufacture of artificial stone and concrete of various colours. Portland cement is mixed with red oxide of iron and yellow oxide of iron or ochre. The ingredients are mixed dry, the requisite quantity of water is added, and the mass is moulded as usual.

Concretes.—The above mixture is mixed with suitable materials, such as ragstone, gravel, pottery, slag, red hæmatite, &c. reduced to sufficiently fine fragments. To colour the face of a mass of concrete a slip is made of the coloured powder, which is put in the mould, and the concrete mass

is added in the centre of the mould. Heat may be used and the blocks after setting may be immersed in a solution of silicate of soda.

3179. Hughes, E. T., [*Wernickeusck, E.*].
July 5.

[*Provisional protection only.*]

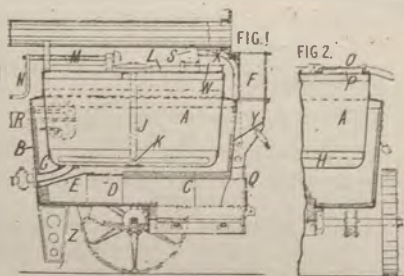
Casting sugar.—The moulds are made in the form of a hollow rectangular box, with top and bottom collars and covers, the bottom cover being formed with an inclination from all points towards the centre, where the drainage opening occurs. On the inner side of this cap a secondary bottom is placed for retaining the sugar while it is in a liquid state. The mould may be fitted with diaphragms or division plates whereby the sugar is divided into plates, slabs, or strips of finished sugar. The moulds are placed in a closed pan, in combination with an air pump for exhausting the air from the pan to clear the mass enclosed in the moulds. A hydraulic press is used for moving the loaf or lump from the mould. A movable carriage is used provided with an airtight chamber, with pipes for the passage of hot air or steam or other heating-medium, and an air pump by which the pressure of the air in the chamber may be increased or diminished.

Abridged also in *Class Sugar*.

3702. Roth, L. Aug. 3.

Cements.—Alumina, in the form of bauxite &c., silica in the form of quartz, hydrated silicic acid, infusorial earth, furnace slags, &c., and lime in the form of limestone, chalk, burnt limestone, or the like, are finely pulverized and thoroughly mixed so as to yield a mixture containing lime 58 to 63 per cent., silica 22 to 26 per cent., and alumina 6 per cent. or more. In some cases it is necessary to add a small quantity of dolomite, oxide of iron, carbonate of soda, alkaline ash, or the like. The mass is formed into slabs, dried and burnt, and the cement slag thus obtained is broken up and ground.

3783. Healey, B. D. Aug. 9.



Asphalt cauldrons.—Relates to pans, as described in Specifications No. 2733, A.D. 1876, and No. 4297, A.D. 1881, for melting pitch and producing hot bituminous compounds of tar, pitch, and other similar products. The inner pan A and the outer

casing B are in the form of truncated cones, the latter being lined with firebrick throughout except where the firebars are fixed. The fireplace C is covered with a firebrick arch, and the flue with a plate D of the same curvature; beyond this is a flat plate E which spreads the gases in each direction so that they pass round the pan to the flue F, and also protects the pipe G from being burnt away. The bottom of the pan A is riveted to the shell and carries the outlet pipe G terminating in a plug valve, and also a step for the shaft J which has one or more stirrers K fitted to it. The upper end of J runs in a bearing on the cover driven by a pair of bevel-wheels from the shaft M to which is attached the handle N. Charging-holes P are formed on the cover L, and are furnished with lids O having hinges cast on them; each hole is surrounded by a ring of trough section with the inner flange higher than the outer, and each lid has a flange which dips into the trough; opposite each charging-hole is an overflow spout. Two cast-iron boxes S are bolted to the covers, and each contains a float suspended from a small rod by which the molten matter is prevented from boiling over; between S and X is interposed a layer of wire gauze, so that, should the gas in X take fire, the flame cannot ignite the contents of the pan. The box S is also divided into two parts by a sliding gauze partition. The gas pipes X pass down the sides of F and enter the flue below the damper Y, which is so arranged that, if necessary, a portion of the flame may be turned up the flue without passing round the pan. The fireplace door Q is carried on horizontal hinges, and is provided with a stop. The pan A and covers L are held in position by 12 (or other multiple of 3) bolts pitched at equal distances, so that, when one part of the pan bottom is wearing thin, the bolts may be taken out and it may be turned through 120°. The pan bottom has three holes similarly placed, two of which are closed by blank flanges, the pipe G being attached to the other. The whole apparatus is mounted on wheels and springs, and a shaft R is attached for drawing it by horsepower. At one end is the crutch Z on which the apparatus rests; when in use this may be replaced by a roller, or, in the case of large apparatus, by a bogie.

Abridged also in *Class Roads &c.*

3891. Ulsmann, H. Aug. 15.

Refractory substances.—In making basic materials from caustic alkaline earths or their carbonates, such as lime or magnesia, the dead-burning, to remove carbonic acid, water, &c., and produce a dense mass, may be facilitated by the use of ferrous alkaline earths, natural or artificial, or by an admixture with the alkaline earths of small fragments or powder of iron in metallic, oxidized, or other state, free from silicic acid. The alkaline earths combine at high temperatures with oxide of iron, and are converted into a hard, splintery, granular, brittle, shrunk mass, which crumbles into small pieces. This facilitates reduction for the subsequent processes. Only a part should be ground fine, while another part should be left in granules of from .039 ins. to .019 ins. in size, or

larger, and with angular edges; in order to produce coarse-grain bricks &c. with the aid of binding-materials, the burnt and comminuted material is mixed with about 5 per cent. of alkaline carbonates or caustic alkalies as binding-material, and with sufficient tar or other viscous hydrocarbon for uniting the warmed mixture with pressing or stamping to form a solid mass for producing bricks, pipes, vessels, &c., or linings for metallurgical apparatus. The alkaline earths may be dead-burnt in reverberatory or shaft furnaces at as high a temperature as possible, and with the avoidance of ashy constituents containing silicic acid. If the bricks &c. are to be burnt before use, they are piled in the furnace with pieces of previously-burnt material, so that, as the tar becomes fluid, they cannot sink together. The furnaces or kilns must yield a high temperature and have a basic floor for lime bricks. Fragments of burnt material or used linings can be ground, newly formed with tar, and burnt again. If the alkaline earths be dead-burnt with the addition of chlorides, with or without fluor spar, steam should be introduced to drive off the chlorine. Small quantities of caustic alkalies or their carbonates accelerate the burning.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

3932. Astrop, W., and Ridgway, R. Aug. 17.

Fireproof composition.—A saturated aqueous solution of alum is treated with ammonia or other precipitant to throw down a gelatinous precipitate of hydrate of alumina. The precipitate is collected by filtering and washed on the filter, then dried, pulverized, and gradually mixed in a mill with an alkaline silicate such as that of soda or potash, which is by chemical decomposition converted into a basic silicate of alumina. The compound may be diluted with water to suit the article to be treated and may be used alone or mixed with colour to form a paint or varnish. In some cases it is preferable to use the alkaline silicate and hydrate of alumina separately. The compound may be used as a plaster, but ordinarily it may be applied to woodwork with a brush. Fabrics may be dipped into the liquid and then dried and ironed. Oil paintings and old theatrical scenery may be coated on the back, but the canvas for new work should be primed with the compound.

Abridged also in Classes *Fire, Extinction &c. of*; *Paints &c.*

3956. Johnson, J. H., [*Certaldo Marble Co.*]. Aug. 18.

Stone, artificial.—A method of preparing artificial marble from gypsum and colouring the same. The article required is cut out of solid gypsum and is submitted to a very gradually increasing temperature till it is sufficiently dehydrated; it is then allowed to cool, and dipped several times in a hardening solution, in which it is afterwards left to soak. To obtain great hardness the dehydrating and hardening may be repeated. The hardening-solution is a solution of alum, oxalic acid, carbonates of soda or potash, soluble compounds of

magnesia such as the sulphate, metallic salts such as sulphates of iron, copper, or zinc, and salts of potassium such as prussiate, bichromate, or cyanide, employed separately or mixed, and with or without the admixture of colouring-matters such as indigo, logwood, Brazil wood, yellow wood, or other vegetable colours, sepia, cochineal, or other animal colours, or aniline or mineral colours.

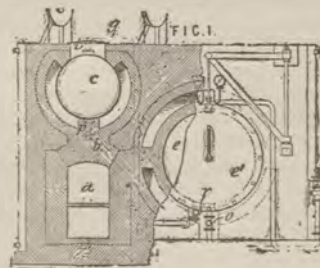
4000. Keim, A. Aug. 21. *Drawings to Specification.*

Cements.—A wall plaster or painting ground consists of caustic lime, quartz-sand, pulverized marble and fossil meal, developed by silicated hydrofluoric acid and hardened by silicate of potash.

Abridged also in Classes *Artists' instruments &c.*; *Buildings &c.*; *Moulding &c.*; *Paints &c.*

4039. Lake, W. R., [*Michalet, R., and Tescher, L.*]. Aug. 23.

Stone, preserving.—Relates to a method of impregnating stones, bricks, pipes, tiles, and other similar articles with bituminous materials such as asphalt, coal tar, pitch, ozokerit, petroleum residues, or the like.



The articles to be treated are placed on a truck which is then run into the chamber *e*, which is then closed airtight by the end cover *i* which is placed in position by a crane. The products of combustion from the fireplace *a* are made to circulate round *e* so as to heat it to above 310° F., as complete a vacuum as possible being at the same time produced in *e* by an air pump. The bituminous materials are placed in the boiler *c*, the cover *i* is fixed down, and they are melted by heat from the fire in *a*. The valve *p* in the pipe *h* is opened, the bituminous materials are run into *e*, and the valve *p* is closed. The action of the air pump is now reversed so as to produce a pressure of two or more atmospheres in *e*. After sufficient time, the valve of the pipe *g* is opened and the pressure forces the liquid bituminous matter back into *c*. The cover is removed and the truck is run out of *e*, another loaded truck being run in to take its place.

Abridged also in Class *Moulding &c.*

4569. Pitt, S., [*Francklyn, C. G.*]. Sept. 26.

Refractory substances for furnace linings and firebricks. Silica or riversand, practically free from loam, oxide of iron, or other fluxing impurities, is mixed with good fireclay, slaked or hydrated magnesian lime or magnesia, or calcined sulphate of

lime, in such proportions that the mixture contains 5 per cent. by weight of alumina, magnesian lime, magnesia, or sulphate of lime, as the case may be, enough water being added to produce a thick mortar. The mortar may be used as a lining for converters or walls and hearths of furnaces: it may be rammed in between a core or former and the walls, the core being withdrawn when the lining has set; or the compound may be moulded into bricks, which are air dried or burnt in a kiln. The compound, containing sulphate of lime or plaster of Paris, should not be used for parts of furnaces from which iron when under treatment would take up sulphur. The substances are used in a fine state of division, and refractory and durable compounds, which neither expand nor contract at high temperatures, are obtained. Ninety parts of finely-divided iron ore (iron sand, freed from impurities by magnetic separators or otherwise, or other very pure ores) are mixed with ten of slaked lime, magnesian lime, or magnesia, and enough water to form a thick mortar, which may be used for lining walls and hearths of puddling furnaces (being sometimes applied with a trowel, like plaster), or be first made into bricks. Ten parts of oxide of iron are mixed with 90 of magnesian lime and water to form a thick mortar, which is moulded into bricks to be dried and kiln-burnt for lining furnaces, converters, &c. Ten parts of fluorspar are mixed dry with 90 of hydrated lime or magnesian lime, and the mixture is very highly heated until it solidifies. The mixture may be made into blocks with water and dried before being thus heated. The solidified mixture is afterwards finely ground and mixed with more (*i.e.* from twice to five times its bulk) of the same mixture, water being added to make a thick mortar to be moulded into bricks, which are air-dried and highly burnt. When magnesian lime is used, the compound may be applied as mortar for lining the furnace. Vegetable substances, from which sugar or starch may be extracted, and water may be used as a binding-agent for silica, with or without other ingredients. One part of glucose to from 1 $\frac{1}{2}$ to 10 parts of water may be mixed with silica into a thick mortar for lining furnaces &c. or for moulding into brick. The glucose may be replaced by starch, dextrin, mucilage, gum arabic, or molasses, dissolved in water. Also corn or rice flour, oat, bean, or pea meal, wood pulp, potatoes, or like substances mixed with water to a thin paste may be substituted, or curd of milk or lactic acid without water may be used. Alumina, lime, magnesian lime, or magnesia may form part of the compounds referred to in the last paragraph; or they may contain 10 parts of oxide of iron to 90 of silica. The claims also extend to compounds containing 90 parts of oxide of iron to 10 of lime or magnesian lime; and some are mentioned as containing water without either vegetable matter or curd of milk or lactic acid. The linings or bricks may be coated with a mixture of one part of glucose to 1 $\frac{1}{2}$ of water, or with dextrin, starch, gum arabic, mucilage, or molasses dissolved in water, or corn flour, grain meal, or wood pulp mixed with water to a paste, with or without lime, magnesia, or magnesian lime. The coating, which gives a hard surface and power to better withstand concussion and heat, is preferably applied when the lining or bricks have been wholly or partially

air-dried, and then thoroughly dried or burnt in kilns.

Abridged also in Classes *Gas manufacture*; *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

4834. Paterson, T. L., and Scott, T. I. Oct. 11.

Cements.—Relates to the utilization of distilled or burnt shale blaes, especially from the manufacture of paraffin oils, in the manufacture of bricks, blocks, slabs, or tiles for building, paving, roofing, or analogous purposes without firing in a kiln, and also for making cement and for the manufacture of pottery. The ground burnt shale is mixed with Portland or other cement or lime, water is added, and the plastic mass is placed in moulds of the required shape and allowed to set; for the manufacture of pottery the articles may be fired in a kiln if necessary. The mixture may be used for cement by simply mixing it with water, when it may be laid over any surface required, being specially suitable for covering floors and roofs. The mixture may be mixed and fired, when it forms a cement suitable for some purposes. The substances must be intimately mixed.

Abridged also in Class *Moulding &c.*

5071. Lake, W. R., [*May, L.*]. Oct. 24.
Drawings to Specification.

Casting sugar in cubes or blocks and marking the same with numbers, letters, &c. The moulds consist of strips of metal suitably stamped or otherwise formed and arranged side by side. The moulds are placed in tiers in a case, carriage, or the like. The moulds are placed alternately cross-wise one on the other, or the tiers can be separated by a sieve. The sugar is filled into the moulds, allowed to crystallize, liquored, and dried in the usual manner. The moulds are then taken asunder and the sugar cubes are removed. By impressing or embossing the surfaces of the metal strips, each piece of sugar may be marked with a device.

Abridged also in Class *Sugar*.

5193. Whiteman, W. T., [*Eberts, R. J., and Lee, J. L.*]. Oct. 31.

Fireproof composition.—A non-conducting waterproof and fireproof composition is formed of finely-divided tan bark, cork, &c., the particles being rendered waterproof by a coating of asphalt and tar and a little plaster of Paris. It is mixed with Portland &c. cement, sand, or plaster of Paris in water; hair, fine wire, &c. may be added. The composition is applied in the form of cement round steam or hot-water pipes, which may be first covered with paper or hair felt. The composition may be compressed in moulds and used for lining walls &c., paving cellars, &c.

Abridged also in Classes *Heating*; *Moulding &c.*; *Waterproof &c. fabrics*.

5252. Hislop, G. R. Nov. 3. *Drawings to Specification.*

Cements.—Relates to the treatment of residual coke from the distillation of coal and dross. The coke is burnt, and the ashes are ground in a pan mill and converted into a cement or manure.

Abridged also in Classes *Acids &c., Div. II.; Furnaces &c.; Gas manufacture; Sewage &c.; Steam generators.*

5388. Parkes, A. Nov. 11.

Fireproof compositions of india-rubber, of gutta-percha, and of oils for insulating electrical conductors, waterproofing textile, felted, and other flexible materials, constructing battery cells, &c. Either of these substances, or combinations of them one with the other, are so prepared that they are incombustible. Also combinations of these are made with paraffin, gums, unoxidized castor-oil, pigments, steatite, talc, asbestos, or colouring-matters. To render the gums unflammable, they are incorporated with phosphate of zinc, phosphate of lead, or oxychlorides of lead, zinc, or magnesium. A less elastic compound may be formed by combining with the gutta-percha compound, shellac, dammar, paraffin, oils, pigments, blacklead, steatite, talc, or asbestos, anthracite, and silica. Wire coated with these compounds can be vulcanized by the hot or cold process of vulcanization. For the purposes of this invention, the oil (castor-oil, for instance) may be oxidized by means of chloride of sulphur or its vapour. The impure gutta-percha may be dissolved in benzoline or light spirit of coal oil, and the pure gutta-percha obtained by filtration and evaporation.

Abridged also in Classes *Cutting &c.; Electricity &c., Divs. I. and II.; Fire, Extinction &c. of; India-rubber &c.; Waterproof &c. fabrics.*

5441. Stuart, P. Nov. 15. *Drawings to Specification.*

Stone, artificial, for use in backing lithographic stones is formed of ground granite and sand or similar material, mixed into a paste with Portland, Roman, or other cement.

Abridged also in Class *Printing, Letterpress &c.*

5445. Wetter, J., [*Boulenger, J. B.*] Nov. 15.

Castings cements.—A metal bottomless mould, divided into compartments, is placed within an exterior bottomless mould upon a plane surface of plaster of Paris or other absorbent or non-adhesive material. Each compartment receives a different kind of earthy material, which has been previously washed through sieves and formed into paste. The inner mould is removed first, the exterior mould (which is greased or coated with a non-adhesive substance) being left until the tile separates from its walls. The tiles are afterwards pressed.

Abridged also in Class *Moulding &c*

5472. Hawksworth, S. Nov. 17.

Marble, imitation.—Marbling pavements or surface coverings, floorcloths, and other similar fabrics of the nature described in Specification No. 1968, A.D. 1874, such marbling extending through the mass of the compound. Plain-coloured compounds, having been prepared as described in the above-mentioned Specification, are fed in proper succession to a pair of rollers, one of which is driven faster than the other so that the compound adheres to it and is removed by a knife and received upon a reciprocating table. The combined layers are rolled up and twisted or otherwise treated so that the various layers become more or less intermingled to form a solid mass of imitation marble.

Abridged also in Classes *Moulding &c.; Waterproof &c. fabrics.*

5704. Allison, H. J., [*Mutt, W., and Mehrbach, M.*] Nov. 30.

[*Provisional protection only.*]

Stone, artificial.—A hot solution of white resin in boiled linseed oil is stirred into an aqueous solution of glue; glycerine and paper pulp are then added, and the whole thoroughly mixed, strained through a sieve, and thickened with French chalk, china clay, or equivalent material. Pigments may be added and a marked appearance can be produced by rolling and folding. Artificial veneer is produced by rolling the material into thin sheets, which can be applied in the ordinary way to wood, plaster walls, papier mâché, and any surface to which glue adheres. The sheets become firmly attached, get as hard as stone, and are susceptible of high polish.

Abridged also in Classes *India-rubber &c.; Ornamenting.*

5708. Jensen, P., [*Tallahofs Pappersbruks Aktiebolag.*] Nov. 30.

Statuary.—Imitation sculpture is made from pulp or millboard prepared from peat-moss or lichens by washing it, then mixing it with resin and soda and water, and working it by rollers into pulp. The material is then put on two sorting-cylinders, mixed with pipeclay and colouring-material, and made into millboard of the size required. The boards are compressed together before drying, or the pulp may be moulded or pressed, as desired, without being made into boards. The surfaces may be polished, painted, varnished, &c. Roofing material, suitable also for lining walls and roofs, is prepared from peat-moss and lichens by washing, boiling under pressure in dilute soda solution, agitating in water, treating in two sorting-cylinders, conveying to an agitating-vessel, and making into millboard.

Abridged also in Classes *Furniture &c.; India rubber &c.; Paper &c.; Wood &c.*

5772. Hitchins, R. W. Dec. 4. *Drawings to Specification.*

Cements.—A mixture of plaster of Paris or cement, hair, or vegetable fibre and a proportion of pulverized coke, is used for ceilings and pugging slabs. In case of a fire occurring, carbonic acid gas is generated between the floor and the ceiling and prevents the spread of fire.

Abridged also in Classes *Buildings &c.*; *Fire, Extinction &c. of.*

5835. Pieper, C., [Scheibler, C.]. Dec. 7.

Slags, treatment of.—Slags obtained in dephosphorizing iron by the Thomas-Gilchrist process or like basic slags, after being finely powdered and particles of iron or steel separated, may be roasted with stirring in a furnace with an oxidizing flame, whereby the caustic lime and magnesia and certain compounds thereof decompose the protophosphates of iron and manganese, combining with the phosphoric acid, while oxides of iron and manganese are set free and converted into sesquioxides, or combinations of protoxide and sesquioxide, less affected by acids than protoxides. Moreover, sulphides of lime and magnesia are decomposed, and the decomposition of the phosphates of iron and manganese is aided. Any sulphide of iron will be also decomposed. Afterwards the roasted slag is treated in wooden vessels, lead-lined iron tanks, or cemented cisterns of masonry, with just sufficient muriatic acid to dissolve all the phosphates and silicates and the remaining caustic lime and magnesia; the commercial acid of 21° Beaumé being diluted with, at least, nine times the quantity of water to prevent iron and manganese from being appreciably dissolved and gelatinous silica from separating, while nearly all the phosphoric acid will pass into solution. The action may be promoted by mechanical agitation or by introducing jets of steam or air into the mixture, heat accelerating the dissolution. The solid residue, containing the oxides of iron and manganese with a little silica, may be utilized for the manufacture of iron. Other acids may be used, but without advantage.

Abridged also in Classes *Acids &c., Div. II.*; *Manufacture of iron &c.*

5848. Butler, J. W. Dec. 7.

Stone, artificial, indurating. The materials are placed in an airtight chamber into which opens a pipe for supplying carbonic acid from a coke or charcoal fire, which may be used to heat a boiler, and at the side of which is a vessel containing sulphur, the boiler and the sulphur vessel both communicating with the passage leading from the fire to the chamber. When the fire is lighted, the fumes therefrom, together with the fumes from the sulphur vessel and steam from the boiler, enter the chamber containing the materials to be treated and effect the induration thereof.

5938. Lake, W. R., [Merrill, M., and Nolan, J. H.]. Dec. 12. *Drawings to Specification.*

Fireproof compositions for boxes, safes, and parts of buildings. Vegetable or mineral fibre &c. is mixed with clay, magnesia, lime, or talc, &c. by the aid of water and formed into sheets. These are saturated with solutions of alum, lime, silicate, and tungstate of soda, &c. This material may be used alone or with a lining of carbonizable material formed of fibre saturated with solution of lime, alum, borax, silicate of soda, tungstate of soda, &c.

Abridged also in Classes *Boxes &c.*; *Fastenings, Lock &c.*; *Fire, Extinction &c. of.*

5952. Timmis, I. A. Dec. 13.

[Provisional protection only.]

Fireproof compositions, applying. Pieces of wood or papier mâché are put in a closed cylinder with a suitable asbestos solution, and the asbestos is pressed into the wood &c. by the introduction of a ram or plunger, or by hydraulic pressure or other suitable means. The Specification states that the invention may be applied to lagging, flooring, boards, panelling for railway-carriage and other doors, felting for covering boilers, millboard paper, and book covers. The substances treated are subsequently coated on the surface with paint or like substance.

Abridged also in Classes *Books*; *Buildings &c.*; *Fire, Extinction &c. of*; *Heating*; *India-rubber &c.*; *Paper &c.*; *Railway &c. vehicles*; *Wood &c.*

6003. Emmens, S. H. Dec. 15.

[Provisional protection only.]

Fireproof coverings.—Switchboards &c. are soaked in a solution of tungstate of soda and covered with asbestos paint, paper, or millboard.

Abridged also in Classes *Electricity &c., Divs. I., II., and III.*; *Fire, Extinction &c. of.*

6169. Edwards, H., and Harries, H. Dec. 27.

Refractory substances for cements, firebricks, &c. Calcined flints, Dinas stone, millstone grit, gannister, sandstone, or sands are ground by edge-runners and moistened with lime-water or clear water, preferably hot, Portland cement being intermixed during the last few turns of the mill. Fire-cement is made by mixing the Portland cement and silica in a dry state, and is used like mortar to set the bricks or other moulded articles in furnaces, and as furnace linings and lutings, and for repairs. For bricks to resist great heat, 1 per cent. of lime and 2½ of Portland cement may be added to the silicious material.

Abridged also in Classes *Manufacture of iron &c.*; *Metals and alloys*; *Moulding &c.*

6180. Hamilton, S. H. Dec. 27. *Drawings to Specification.*

Marble, artificial, is prepared from slabs made of paper-boards which may be both water and fire proof, and the surface is marbled.

Abridged also in Classes *Buildings &c.; Furniture &c.; Paper &c.; Railway &c. vehicles; Road vehicles.*

A.D. 1883.

30. Williams, J. Jan. 2.

Refractory substances.—Relates to the manufacture of refractory bricks, tiles, blocks, pipes, tuyères, and other like articles and to a cement for the same. Ground quartz, gannister, or other rock consisting almost entirely of silica, is mixed with carbon and with a thick liquid hydrocarbon in sufficient quantity to bind the mass. The mixture is pressed into moulds and dried in a stove.

Cements.—To prepare a cement the bricks are crushed to powder, and mixed with a little fresh hydrocarbon, or the mixture before pressing may be used.

Abridged also in Classes *Moulding &c.; Pipes &c.*

152. Thompson, W. P., [*Bosse, M. M. R., and Freise, P. E.*]. Jan. 10. *Disclaimer.*

Cements &c.—A method of preparing hydraulic and other cements, mortar, artificial stone, and similar articles. The cement is made by mixing "puzzolane" with slaked lime, both materials being finely ground. By "puzzolane," is meant matters which contain silicious compounds which have been rendered soluble in alkalies by natural or artificial calcination, such as natural "puzzolanes," furnace slag, some kinds of glass, residues from the manufacture of alum, broken pottery and porcelain, and similar substances. The cement which it is required to produce is analyzed, the lime and the "puzzolanes" are then mixed in such proportions as to give a composition similar to that of the cement, and the mixture is finely ground, sifted, and mixed. Aluminous earth and soluble silicic acid may sometimes be added.

Stone, artificial, may be made from the cement in the usual way.

240. Stone, R. Jan. 15.

[*Provisional protection only.*]

Stone, artificial.—Flint, marble chippings, spar, or other hard stone or materials are mixed with cement and composition, the mixture is put into moulds with movable sides, covers are fitted, and pressure is applied by weights or screw, lever, or hydraulic pressure, beams of wood being placed along the moulds to equalize the pressure. For the production of fireproof stones, ground fireproof stone or fireclay, with or without addition of river mud, is mixed with molten slag as it runs from the furnace, and the mixture is run into moulds and pressed while in a partially soft state. Flags &c. may be rolled in by a to-and-fro rolling action, or the material may be forced through dies. The materials are left under pressure 6 to 12 hours, and if the stone is required for immediate use the material is roasted or the water used is boiled.

Abridged also in Class *Moulding &c.*

254. Frank, A. Jan. 16.

Sound-deadening compositions; refractory substances.—Relates to the manufacture of a porous silicious material, applicable to grindstones, and to building, filtering, and other purposes. On account of its small conductivity for sound it may be used for keeping out sound from telephone chambers. Finely-divided silicious earth such as infusorial earth is mixed with alkalies, alkaline earths, or magnesia, or salts of these, such as carbonates, sulphates, nitrates, phosphates, chlorides, and fluorides, and with organic materials such as sugar, starch, ground wood, blood, glue, gluten, ground bones, or organic salts of the alkalies or alkaline earths such as tartrate of potassium or sodium; water or other liquid is added and the mass is moulded into blocks of suitable form which are dried and fired at a high temperature. Borax, water-glass,

and other basic compounds of boracic and silicic acids may be used, and the blocks may be enamelled by exposing them while hot to alkaline vapours.

Abridged also in Classes *Agricultural appliances for the treatment of land &c.*; *Air and gases, Compressing &c.*; *Filtering &c.*; *Fire-arms &c.*, Div. II.; *Fire, Extinction &c. of*; *Grinding or abrading &c.*; *Heating*; *Lamps &c.*; *Medicine &c.*; *Moulding &c.*

280. Starling, J. H., and May, E. A. Jan. 17.

Cements.—Dredgings of rivers, docks, harbours,* and such like alluvial deposits have any superfluous sand or salt washed out and are then mixed with chalk. The mixture is washed in a mill, pugged, and then removed for moulding. Saline matter is removed by repeated washing of the dredgings. The proportions vary according to the character and class of article required. The above materials are pugged to a dough, boiled, dried, and finally burnt in any ordinary cement furnace.

Abridged also in Classes *Moulding &c.*; *Pipes &c.*

427. Weygang, C. Jan. 26.

Fireproof compositions for floorcloth, roofing felt, wall coverings, and other purposes. A drying-oil such as linseed oil is reduced to a thick consistency, preferably by boiling. Resin or resinous substances or waste india-rubber and gutta-percha may be added. The oily mixture is treated with an alkali such as a carbonate, oxide, or sulphide of soda or potash till it is soluble in water, and after cooling it is mixed with fibrous pulp in a beating-engine or other incorporating-apparatus. For floorcloths &c., where tensile strength is not required, waste paper or ligneous meal may be used with other pulps. It is preferred to add oxidizing-agents such as the manganese salts, bichromate of potash, or metallic oxides to the oily mixture before or after its introduction into the beating-engine or in conjunction with the precipitating-agents to be mentioned. To oxidize and precipitate at the same time chloride of lime may be used, but it is preferably to employ a metallic oxide such as of zinc or white or red oxide of iron in conjunction with a calcium sulphide or chloride, or a metallic sulphate of an oxy-acid salt, such as potash bichromate, in conjunction with calcium hydrate or sulphate. In using a sulphide, the pentasulphide of calcium is preferred and is sometimes used in conjunction with barium chloride. When powerful oxidizers like the permanganates of soda and potash are used, or if the oil is very thick, it is preferable to precipitate the mixture with a salt containing chlorine, the chloride of which has a greater affinity for the alkali used, *e.g.*, barium chloride, calcium chloride, or hydrochloric acid. Or calcium pentasulphide may be used with or without barium chloride or a metallic sulphate. To produce a hard material, hydrate or sulphate of lime may also be added. When an alkaline sulphide has been used to dissolve the oily mixture, the precipitation may be effected in the foregoing methods or with calcium sulphide, or with calcium chloride, or barium

chloride alone, or in combination and without an oxidizing-agent. A metallic sulphate with or without hydrochloric acid may also be used. For a cheap material for roofing felt &c., tar may be added to the oily mixture before it is precipitated. Sulphur may also be added. The pulp is coloured with the metallic oxides used for oxidation, or by colours added to the precipitating-agents or otherwise. Suitable patterns may be produced throughout the body of the material by preparing several colours in different beating-engines and employing different kinds of fibrous material and beating them for unequal periods, and also by adding the precipitating-agent gradually or quickly. The pulp is run off as usual on paper or millboard machines or made into sheets in moulds. It is dried on heated cylinders or preferably by exposure in a drying-room. If required to be pliant the material is not thoroughly dried and is passed between heated rollers or over heated boxes and between hot or cold rollers. Small sheets may be pressed in other ways, *e.g.*, between metal plates which are dusted with suitable material to prevent adhesion. Or the material, after being moderately pressed and heated as above, is repeatedly passed while warm between small rollers. If the material is required to be hard it is thoroughly dried and strongly pressed between heated metallic plates and after cooling is placed in a hot room for a few days. Sometimes waste solidified oils, such as old floorcloths, are treated with caustic alkali to dissolve the oil, and the solution is used as fresh oil would be. Nut oil or other oil may be used instead of linseed oil. To render the material less inflammable, a silicious substance such as clay or fine sand or a soluble silicate, and crude borax may be added.

Abridged also in Classes *Buildings &c.*; *Fire, Extinction &c. of*; *Waterproof &c. fabrics.*

625. Wise, W. L., [*Bauer, E.*]. Feb. 5.

Fireproof compositions for use as substitutes for leather, cloth, horn, tortoiseshell, &c., consist of a mixture of albuminous animal matters, such as egg albumen, blood serum, gelatin or glue (with or without vegetable gluten, dextrin, gum) with glycerine and a fat or oil. In some cases a solution of caoutchouc is used. The mode of preparation depends on the particular albuminoids used and the proportion of the various ingredients is varied according to requirements, the hardness of the material being greater in proportion as the quantity of albumen is increased. If necessary, Venice soap, carbonate of soda, or caustic soda or potash may be added to facilitate mixing. Any desired pigment may be added to the mixture or a multi-coloured material may be produced by dividing the mass, while liquid, into several portions which are separately coloured. The mixtures, in a liquid condition, are then taken from the various vessels and poured or divided over a plate, a brush or stick being used to help to produce the desired effect. If the compound is to be used for making waterproof and unflammable fabrics, it is allowed to stiffen on a flat surface and the fabric or web is pressed upon it after being first impregnated with a liquid solution of the compound.

The fabric is dried on stretching-frames and tanned and dried. To manufacture felt or felt-like cloth the prepared loose fibres are spread over and into the liquid mass, preferably by a sieve. When stiff the felt is dried, tanned, again dried, and compressed. The compound is tanned by immersion in moistened or liquid tannic substances, such as tan, bark, tannic acid, alum, &c., the process being facilitated by passing an electric current through the mass.

Abridged also in Classes *Fabrics, Dressing &c.; Fire, Extinction &c. of; India-rubber &c.; Leather; Preparing &c. cork &c.; Table articles &c.; Waterproof &c. fabrics.*

662. Wirth, F., [*Grünzweig, K., and Hartmann, P.*]. Feb. 6.

Stone, artificial.—Relates to the manufacture of artificial stones, briquettes, and other articles from cork. The cork, in small grains or shavings, is mixed with a paste made of starch or other starchy material and boiling water; the mass is well kneaded and is moulded by filling into moulds or pressing through dies. The moulded articles are at once transferred to drying-ovens and dried by the aid of heat. In order to give greater resistance to water, linseed oil or tar may be mixed with the paste. The material may in many cases be used as a substitute for cork.

Abridged also in Classes *India-rubber &c.; Preparing &c. cork &c.*

807. Schoeller, O. Feb. 14.

[*Letters Patent void for want of final Specification.*]

Compositions for casting.—Relates to a plastic composition applicable to the reproduction of works of art and for making artificial precious stones. The composition is a mixture of silica, in the form of sand glass, or aluminic silicate, magnesia, plaster of Paris, magnesium chloride, and wheat or rye flour or bran. It is preferred to add oxalic acid to the magnesia to neutralize the lime generally present, and ammonium oxalate is added to the magnesium chloride.

Abridged also in Classes *India-rubber &c.; Wearing-apparel, Div. IV.*

897. Twynam, T. Feb. 19.

Slags, treatment of.—Relates to the production of phosphoric acid and phosphates. The basic phosphatic slags of the Bessemer, Siemens', and other metallurgical processes, sometimes after oxidation by a preliminary roasting, or by blowing air into the molten mass, are treated, preferably in the cold, with strong or with dilute hydrochloric acid, according to whether the phosphorus is wanted chiefly as ferric phosphate or as calcium phosphate, the weaker acid leaving most of the iron undissolved. The hydrogen sulphide given off during digestion is collected. Any ferrous salts present in the solution are preferably oxidized by chlorine, which may be formed by adding manganese dioxide and free acid; or air may be forced in, though less advantageously.

When the digestion is completed, the liquor is run off the residue, which consists, when weak acid has been used, chiefly of iron and manganese oxides with gelatinous and undissolved silica, and may be utilized in some metallurgical operations. The cleared solution is then cautiously treated with calcium carbonate, in the cold or at a very gentle heat, just sufficient to throw down ferric phosphate, without calcium phosphate. The ferric phosphate is separated and treated with sulphuric acid in excess to obtain in solution phosphoric and sulphuric acids, and ferric sulphate, insoluble in the acids. The solution cleared of ferric phosphate is precipitated by lime, chalk, or dolomite, by aid of heat and agitation, to obtain either bibasic or tribasic calcium phosphate, according to the proportion of precipitant used. "Any magnesian left in solution" may be separately thrown down by lime; or it may be precipitated conjointly with the calcium phosphate. The mixed acids obtained on treating ferric phosphate with excess of sulphuric acid may be utilized to make superphosphate from the calcium phosphate afterwards precipitated. When not much ferrous oxide passes from the slag into solution, it is sometimes preferred to throw down all the ferric oxide as phosphate by chalk, without prior oxidation; and then to precipitate calcium phosphate from the separated liquor by chalk, with exclusion of air as far as possible, to avoid oxidation. Reference is made to Specifications No. 4452, A.D. 1878, and No. 438, A.D. 1883.

Abridged also in Classes *Acids &c., Divs. I. and II.*

941. Clark, A. M., [*Meyer, G.*]. Feb. 20.

Fireproof compositions.—Relates to a process and to products resulting therefrom for rendering unflammable and incombustible printed matter and manuscript of all descriptions, paperhangings, stage scenery, ornamental moulded objects, &c. An ink and a pulp are employed for the manufacture among other applications of a paper rendering unflammable all writings, printed matter, &c. The pulp is prepared of a composition into which enters asbestos fibre or other similar material. The raw fibre is first ground and afterwards carded, the carded material being first placed in a vat, and moistened with water, while a quantity of sodium chloride or potassium chloride is added to purify the asbestos. Mica, talc, plaster, &c. pulverized to a fine powder are also added. For the manufacture of cardboard or paper of inferior quality ochreous clay, mineral colours, or artificial ultramarine, according to the colour desired, may be substituted for the talc and plaster. The pulp thus prepared receives a first sizing of gelatine and a second fireproof composition of liquid silicate. The manufacture of the paper is conducted in the ordinary way of making laid or water mark paper either by hand or machine. The papers are afterwards ornamented by the application of the incombustible ink, which may be made of any colour. Paperhangings are also decorated with the above ink. The incombustible pulp may also be applied to the production of ornaments in relief, but particularly on ceramic and crystal ware, for preservation between

two thicknesses of glass or other material, of documents, portraits, &c., and of printed matter of an important nature such as an inscription to be embedded in the earth, the indestructible ink being used for the inscription. To obtain with this pulp a suitable covering for electric cables, melted paraffin and pulverized resin are added to prepared asbestos, and prepared as before described for second-quality paper, while the composition is applied to the wires in the same way as gutta-percha. An external sheathing of gutta-percha &c. may afterwards be applied. The covering of wires may also be made by lapping strips of second-quality paper prepared as before described. The coatings and vessels exposed to the action of metallic and other acids are manufactured of incombustible pulp by ordinary means, it being only necessary to take a sufficient quantity of the pulp and work it in exactly the same way as clays for ceramic ware. The pulp paper may also be employed for lining safes. To make indestructible inks of all colours, the mixtures are effected with colouring-matters. To make black ink, Cassel earth is mixed in varying proportions with artificial ultramarine, yellow ochre and artificial ultramarine to form green ink, and red ochre and ultramarine to form violet ink. By blending the colours before mentioned, other tints, such as chestnut brown &c., may be produced. For indestructible writing-inks, a mixture of pure clay, commercial glycerine, and liquid silicate may be used. To make copying-ink, sugar candy and raw sugar are used. For indestructible printing, autographic, and lithographic inks, a mixture of pure clay, virgin wax, glycerine, and silicate is employed, and for copper-plate printing a mixture of pure clay, silicate, turpentine, and glycerine is employed. For producing water-colours for painting on unflammable paper, colours such as those applied upon or under the glaze in the decoration of crystal or ceramic ware are employed.

Abridged also in *Classes Acids &c., Dir. I.; Buildings &c.; Electricity &c., Dir. II.; Fire, Extinction &c. of; Moulding &c.; Paper &c.; Writing-instruments &c.*

1234. Boekbinder, J. M. March 7.

[*Provisional protection only.*]

Cements.—Relates to a method of treating plaster of Paris for use in building, decorative, and other purposes. Dextrin is dissolved in water and the solution is added to the plaster in its plastic condition, and the mass is well mixed.

1363. Imray, J., [*Pick, E.*]. March 14.

Cements; stone, artificial.—Relates to a mixture which can be used as a cement, or which can be agglomerated into blocks, for bricks or artificial stone. The materials used are gypsum, coke dust, and marl or felspar, sometimes with the addition of slag. The materials are dried, if necessary, and are thoroughly pulverized and mixed. The powder is heated, preferably with agitation, to a temperature under 650° F. and after cooling is ready for use. It may, if necessary, be passed through a revolving sieve. The mixture

may be mixed with sand and used in the ordinary way as a cement or plaster, or it may be coloured to form artificial stone, or it can be moulded into bricks or tiles which may be rendered light and strong by the addition of fibrous materials such as wood shavings.

Abridged also in *Class Moulding &c.*

1390. Boulton, A. J., [*Caspari, E.*]. March 15.

[*Provisional protection only.*]

Cements.—Relates to the manufacture of a composition which can be used as a substitute for plaster of Paris, cement Tripoli, and similar materials. Plaster stone is burnt exactly as for plaster of Paris, and is mixed with burnt clay and gas coke or scoriae, the mixture is ground, and, if necessary, passed through a sieve.

1432. Blane, S. J. March 19.

Fireproof compositions &c.—Consists in treating white peat or kieselguhr so as to obtain a material suitable for the manufacture of fireproof and preservative paints, fireproof fabrics, paper, &c., and lubricants. The kieselguhr is calcined over a little charcoal, powdered, and sifted through fine semolina silk in a machine like those used for dressing flour. The kieselguhr is heated with a mixture of hydrochloric and nitric acids, and the resulting solution mixed with alum and borax. Fibrous materials are rendered fireproof by steeping them in the composition. Or a fireproof paint may be made by mixing the powdered kieselguhr with zinc oxide and sodium silicate solution.

Abridged also in *Classes Cutting &c.; Fire, Extinction &c. of; Oils &c.; Paints &c.; Paper &c.; Waterproof &c. fabrics.*

1451. Johnson, J. H., [*Smedt, E. J. de, and Lesley, R. W.*]. March 20.

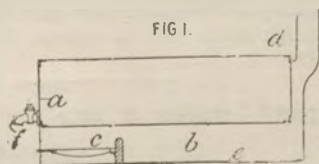
Cements.—Relates to the manufacture of Portland cement. The powdered material is mixed with a liquid combustible, preferably a hydrocarbon such as coal tar, petroleum, petroleum oil, or petroleum residues, but animal and vegetable oils may be used. Water is then added, and the materials mixed in any mixing-apparatus and moulded into blocks which can be put into the kiln at once without previous drying. If necessary, the cement and combustible may be mixed hot. Rocks deficient in lime, but otherwise suitable for the manufacture of cement, may be utilized by the addition of lime or dolomite lime, either hydrated or anhydrous, or in the form of carbonate. The cement is then prepared by any process. Portland cement may also be made by addition of lime to ordinary natural cements, moistening with water, making into bricks, re-calcining to clinker, and grinding.

1542. Stewart, J. B. March 27.

Cauldrons for melting pitch, asphalt, &c. The invention is designed to enable the heat from the furnace to pass to the end

contents of the pan, mainly some distance above the bottom, thus preventing loss of heat through sediment settling therein. To effect this the furnace *b* which is formed of metal plates and may run from end to end of the pan, rises in an arch into the interior thereof. It is riveted to the shell *a*, which is also formed of metal plates. *c* is the firegrate and bars, *d* is the chimney, and *f* a draw-off tap. The furnace may be set on a foundation or it may be carried on wheels. If the former, it is left open, but if the latter, a closing-plate is provided. In another arrangement, a return flue is provided in addition to the furnace *b*. The pan may also be provided with a cover and with pipes and tubes leading therefrom to the furnace to convey to the latter the gases evolved from the pitch &c. while heating.

Abridged also in Class *Furnaces &c.*

**1554. Abel, C. D.,** [Neveu, E. F.]. March 27.
Drawings to Specification.

Fireproof compositions.—By the action of hydrochloric acid, freed from sulphuric acid by means of chloride of barium, upon caustic lime or bicarbonate of lime, liquid chloride of calcium is formed; to this is gradually added a solution of crystallized potash alum, and afterwards a mixture of hydrochlorate of ammonia and borax in water solution. The liquid thus formed, after being decanted and mixed with water, gives off ammonia and hydrochloric acid in contact with fire, and objects treated therewith, *e.g.*, textile fabrics, wood, &c. are made unflammable.

Abridged also in Class *Fire, Extinction &c. of.*

1569. Baillif, A. March 28.

Stone, artificial.—Coating metal ornaments to represent sculptured stone and for various other purposes. Mendon white is dissolved in water, and glue made from leather cuttings and size is added to form a paste, which is diluted and heated. Strips of rolled beeswax are placed round the metal to be incrustated, and the hot composition is poured on. When the surface is cool it is burnished, and the fillets and ornamental lines are made to appear in the natural colour of the metal.

Abridged also in Class *Ornamenting.*

1602. Pieper, C., [Scheibler, C.]. March 30.

Slags, treatment of.—The invention consists of improvements on the processes described in Specification No. 5835, A.D. 1882. The phosphatic slags obtained in the manufacture of iron by the basic or like processes are powdered and roasted

at a bright red heat, and the product is lixiviated to wash out lime, the solution of which is applied later. The washed slag is then treated with hydrochloric acid diluted, but not so diluted as that recommended in the previous Specification, and more acid is used than is necessary to dissolve the phosphates only. The solution may be precipitated at once by milk of lime, but it is preferred to precipitate fractionally, weak milk of lime or magnesia or of burnt dolomite being added so as to leave a slight acid reaction. Most of the iron and manganese phosphates then separate, whilst most of the silica remains in solution. After separating the precipitate, the still acid solution is again partially precipitated by a further dose of the lime, to obtain principally "earth phosphates," and then, after clearing, the solution is completely precipitated to obtain silica, manganese oxide, and other bodies, or the separation may be carried out by two stages instead of by three stages. The iron and manganese phosphates obtained in the first stage of the process are mixed with lime or magnesia, or their carbonates, and roasted. The product is treated as in the case of the roasted slag, calcium and magnesium phosphates being obtained, besides a residue of iron oxide and manganese oxide, which may be applied in the preparation of pigments, or in the manufacture of iron.

Abridged also in Class *Acids &c., Div. II.*

1657. Wright, J. April 3.

Slags, treatment of; cements.—Relates to the utilization of converter slags. The slags are broken into lumps by hammers or other machinery, and these are pulverized by rollers, edge-runners, or other pulverizing-machinery. The metallic portion is separated by means of sieves, and is ready for re-melting and the pulverized portion is in a suitable state for being used in the manufacture of cement.

Abridged also in Class *Manufacture of iron &c.*

1658. Wright, J. April 3.

[Provisional protection only.]

Cements.—Slags are crushed and pulverized, the powder is analyzed, and lime, or limestone containing clay, is added, to bring the mixture to the right composition for the cement required.

1712. Barnes, J. April 5.

[Provisional protection only.]

Fireproof compositions.—A damp-proof and non-inflammable material for lining walls, covering floors, ships' berths, cabins, and similar purposes. A pulp, preferably of papyrus, is formed into a sheet by passing it between rollers. One surface of the material is coated with a boiling mixture of tallow, cottonseed oil, pitch, tar, resin, alum, and gum arabic. A sheet of textile fabric is applied to the coating, and the whole is consolidated by pressure between rollers.

Abridged also in Classes *Buildings &c.; Fire, Extinction &c. of; Waterproof &c. fabrics.*

1743. Pitt, G., [*Rocour, G.*]. April 6.

Slags, treatment of.—Basic phosphatic slags from iron furnaces, or other natural or artificial substances containing phosphorus but too poor for direct treatment, are fused under reducing conditions, if necessary, with matters containing iron and manganese, to obtain a "phosphoric matte" of iron and manganese phosphides. Fluxes may be added to the charge so as to give it approximately a stated composition. The "phosphoric matte" obtained may be blown in a basic converter with lime or calcined dolomite and coal, to which may be added during the blow, and from time to time, small portions of sodium sulphate or carbonate. The slag obtained may "be utilized as "natural phosphorite," or treated with sulphuric acid to obtain superphosphate. According to a second process, the "phosphoric matte" is ground with sodium or potassium sulphate, and sometimes with sulphur or pyrites, and heated, first in a reducing and then in an oxidizing flame. The cooled matt is lixiviated and the solution is concentrated to obtain sodium phosphate or potassium phosphate in crystals. The mother liquor may contain an alkaline sulphide, and may be dried up and utilized in a new operation. When sulphate of soda has been used the solution of phosphate can be precipitated by lime into the state of commercial precipitate phosphate of calcium, and the liquid concentrated by evaporation gives caustic soda. The residue remaining after lixiviating the furnace "phosphoric matte" may be roasted, and then used as purple ore to obtain pig iron.

Abridged also in Class *Acids &c., Div. II.*

1744. Stasicki, F. K. de, [*Hoff, B.*]. April 6.

Fireproof compositions.—A solution of magnesium sulphate and sulphite of ammonia, or of magnesium sulphate, magnesium sulphide, ammonium sulphate, or ammonium chloride, all free from acid, is forced into the wood &c. to be treated, which further receives a preservative coating of a mixture made of protoxide of lead, heated with a fatty oil, and then dissolved in green heavy petroleum and linseed oil, to which may be added any mineral colour.

Abridged also in Classes *Fire, Extinction &c. of; Paints &c.*

1897. Haddan, H. J., [*Leupolt, T. F.*]. April 16.

[*Provisional protection only.*]

Mortar; concrete; stone, artificial.—Coarse sand, fine sand, Portland cement, plaster of Paris, lime, salt, and soluble glass are thoroughly mixed with water to form a cement. For concrete, this mixture is mixed with broken stone. For making building stone, the mould is filled with concrete with the addition of large natural stones that have been soaked in a bath of the cement, water, and soluble glass, the whole being then well rammed. The blocks are preferably made with a projecting ridge on one end, and a corresponding

groove on the other, so that the blocks will interlock. The surface is covered with channels so as to form a trellis-shaped canalization.

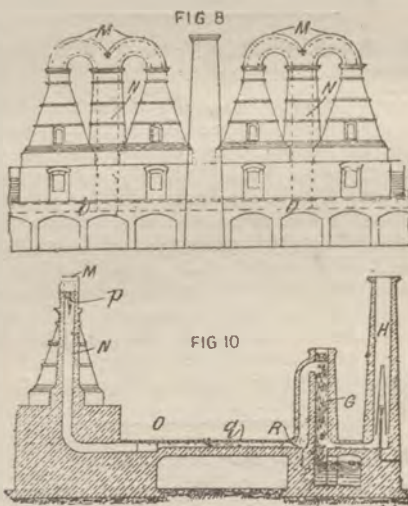
Abridged also in Classes *Mixing &c.; Moulding &c.*

1926. Clark, A. M., [*McCarroll, J.*]. April 16.

[*Provisional protection only.*]

Fireproof coverings &c.—Walls, ceilings, partitions, &c. are composed of several thicknesses of wire gauze, which, while admitting light and air, are totally impervious to flame. The wire gauze is fastened to uprights or cross-pieces of wood or iron. In the case of wood small perforated metal cubes may be nailed at convenient intervals between the gauze and the uprights or cross beams to prevent their touching. In the case of iron the cubes are dispensed with. Floors may be covered with wire gauze in movable sections, after the manner of matting, or the gauze may be laid between the joists and boards during construction.

Abridged also in Classes *Buildings &c.; Fire, Extinction &c. of.*

2063. Jones, D. April 24.

Cements.—Drying slurry. Each pair of kilns communicates by an arched flue M, Figs. 8 and 10, with a down flue N situated between them. The fumes pass from this flue to a cross flue O, from which they pass through a number of small horizontal flues to a second flue R, whence they escape to the condensing-pipe G and the chimney H. Slurry is dried on the floor q.

Abridged also in Classes *Acids &c., Div. II.; Drying; Furnaces &c.; Locomotives &c.; Steam engines; Stoves &c.*

2091. Walker, J. April 3.

Cements.—Utilizing waste material from coal-gas purifiers. The mixture of coke dust and lime, or lime alone, from gas purifiers is thoroughly agitated with water in a cistern and then allowed to settle.

The sediment and sulpho-alkaline liquid so produced may be employed for various purposes. Mortar or plaster may be formed by adding hydrate of lime and sand to the residue, mixed with spent oxide of iron from gas purifiers which has been burnt to extract the sulphur.

Abridged also in Classes *Agricultural appliances, Farmyard &c.; Agricultural appliances for the treatment of land &c.; Fabrics, Dressing &c.; Gas manufacture; India-rubber &c.; Leather; Oils &c.; Paints &c.; Sewage &c.; Starch &c.; Weaving &c.*

2199. Smith, T. May 1.

Cements &c.—Relates to a material for use as a cement and for other useful and ornamental purposes. The scrapings or sweepings of macadamized roads are mixed with water, the lighter particles being washed away and the heavier allowed to settle: the sediment is thoroughly dried and is mixed with dry powdered chalk and coke dust or analogous materials. The mixture, which must be in the condition of a very fine powder, is then stirred into melted sulphur, and the whole is poured into moulds. Thames or other sand may be used in lieu of, or in conjunction with, the road sweepings. The compositions may be coloured by the addition of ordinary colouring-matters, the coke dust being omitted when light colours are required. The composition may be used for many purposes, as for building or paving, manufacturing ornamental or other tiles, the foundations or surroundings of electric apparatus, lining baths, tanks, cisterns, &c., castings, ornamental and other articles such as busts, medallions, &c., stereotyping, filling up defective castings, printing or other rollers, cementing articles together, and fixing iron-work. When used for jointing piping a small portion of pitch or bitumen is added to the mixture; tar, pitch, asphalt, or oil may be added, if required, to make a material suitable for lining the interior of ships, covering telegraph wires, and other purposes.

Abridged also in Classes *Electricity &c., Dir. II.; Moulding &c.; Printing other than letterpress &c.; Starch &c.*

2251. Weygang, C. May 3.

Stone, artificial., is prepared from paper pulp which is sized in such manner that the size is made insoluble by the use of certain chemicals, which may also supply a mineral matter such as calcium sulphate, with subsequent pressure with or without warming.

Abridged also in Classes *Cutting &c.; Fabrics, Dressing &c.; India-rubber &c.; Leather; Paper &c.; Starch &c.; Waterproof &c. fabrics; Wood &c.*

2252. Colton, E. G., [Elbers, A. D.]. May 3.

Slag, treatment of.—The slag, preferably of the "unisilicate type," is blown into slagwool by steam or air. The fibrous material thus obtained is pressed into crucibles, retorts, muffles, or ovens, with or without the addition of such substances as favour reduction, and is heated to redness till it is

desulphurized, care being taken that the temperature is high enough to grit but not to fuse the mass. Dark-coloured particles are separated by scraping or washing, and are added to the next charge, and the finished mass is pulverized for use. If the slag contains sulphate of lime, this may be first reduced to sulphide. Alone or mixed with other pigments the material may be used as a paint.

Cements.—If the finished slag be treated with sulphuric acid, sulphate of lime and gelatinous silica are produced, forming a plastic mass which may be used for statuary and ornamental or other purposes. The pulverized, unfinished mass, on treatment with nitric acid, also yields a similar plastic material.

Stone, artificial.—The material may be used for making ornamental plastering, stucco, statuary, and artificial stone in admixture with lime.

Abridged also in Classes *Glass; Moulding &c.; Paints &c.*

2293. Haddan, H. J., [Gimenez, L., and Yrigoyen, J.]. May 5.

[Provisional protection only.]

Fireproofing woven fabrics, wood, paper, &c. A solution of iron-wood bark and sea salt is mixed with sulphate of zinc, alum, sal-ammoniac, and glue. After heating it is applied with a brush &c. to coat and impregnate the material.

Abridged also in Class *Fire, Extinction &c. of.*

2303. Overton, S. E. May 7.

Fireproof coverings are made by running pulp, consisting of wood or paper pulp, asbestos, and selenitic cement, into moulds and removing moisture by hand pressure, absorption, and evaporation in hot air. Tough porous paper or canvas is then glued or cemented all over the back. Unflammable articles are obtained by coating both sides of the moulded pulp with potassium silicate, which also renders them moisture-resisting.

Abridged also in Classes *Buildings &c.; Fire, Extinction &c. of; India-rubber &c.; Moulding &c.; Ornamenting.*

2321. Hess, B. May 8.

Stone, artificial.—An artificial stone for building and paving blocks, floor plates, table plates, wainscoting, grindstones, millstones, crucibles, acid-proof vessels, mill rollers, and as a substitute for emery. Serpentine or kindred minerals, soapstone, felspar, mica, quartz, and fireclay are mixed in various proportions according to the article to be made, ground, moistened with water, and pressed into moulds of the required form; they are then slowly dried, and finally burned at a white heat. For making crucibles the material is worked on the potter's wheel as usual.

Abridged also in Classes *Grinding or abrading &c.; Grinding, crushing, &c.; Metals, Cutting &c.; Moulding &c.*

2352. Shepherd, E. S., and Aspinwall, J. L. May 9.

Stone, artificial.—Refuse pieces of slate are broken up and separated from dust; they are then mixed with Portland or other cement and with a hardening-solution such as a solution of silicate of soda, potash, or alumina, or aluminate of potash or chloride or carbonate of magnesia; the whole is thoroughly mixed and the mass pressed into moulds.

Cements.—Slate dust, as, for example, that separated in the manufacture of the artificial stone, is dried and heated: it is then mixed with melted resin, or pitch, or asphalt, sometimes with the addition of sulphur, Russian tallow, or of other fat or coal tar. For a substitute for bottling-wax, the sulphur is omitted, and the addition of fat or coal tar makes the cement plastic. The cement may be used for coating electric cables, caulking ships, waterproof tanks, and paving, and for other purposes. The cement is an improvement on that described in Specification No. 3012, A.D. 1881.

Abridged also in Classes *Electricity &c., Div. II.; Ships &c., Div. I.; Starch &c.*

2407. Cochrane, W. May 11.

[Provisional protection only.]

Slags, treatment of.—The block of slag is cast round solid cores of metal so arranged that they can be withdrawn from the solidified block, and through the holes thus left air can be made to circulate, or the cores may be hollow and remain in the slag, the air being made to circulate through them. The block of slag is raised by a crane and let fall on a block which may be provided with holes through which the cores can fall, or the core may be left projecting and the mass allowed to fall on a flat surface; the cores will act as wedges and break up the mass. Or the core may be made as a lewis bolt so that the block may be lifted by a crane and allowed to fall, leaving the core suspended. The moulds are made tapering towards the bottom and are provided with trunnions. The mould is slung by a crane, a catch is released, and the mould turns over on its trunnions and allows the block of slag to fall. The moulds may be made so as to divide to release the slag.

2435. Pieper, C., [Scheibler, C.] May 15.

Slags, treatment of.—The processes given in Specifications No. 5835, A.D. 1882, and No. 1602, A.D. 1883, are herein modified. Instead of roasting the finely-powdered slags, the latter are roasted in lumps of about the size of a fist in an oxidizing flame, and are then treated with water or steam, whereby the caustic lime present becomes hydrated and the lumps break up into fine powder. The effect of the roasting is "to convert the protoxydes of iron and manganese into sesquioxides and combination of sesquioxides with protoxydes."

Abridged also in Class *Acids &c., Div. II.*

2481. Greening, F. May 17.

Stone, artificial.—Cellulose, acted on by sulphuric acid and nitric acid and washed with water, is treated in succession either with ammonia or ammonium carbonate, strong aluminium sulphate solution and hot water with the last two, and then alcohol. The dried product in either case is rendered plastic by adding a mixture of naphthalene, zinc chloride, and alcohol, and zinc oxide, whilst denser and less inflammable material is obtained by adding pulverized fused aluminium sulphate, flexible material by the application of oils, gums, or resins, and coloured material such as imitation malachite, coral, vulcanite, &c., by the use of dyes or pigments, or ivory or tannin black.

Abridged also in Class *India-rubber &c.*

2535. Engel, F. H. F., [Mwajahn, E.] May 21.

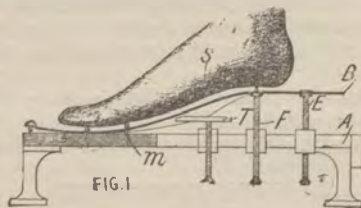
Stone, artificial.—Clay and pulverized peat are mixed, moulded into the required forms, and burned in kilns or otherwise. If a fireproof stone is required, the clay and peat is well washed to remove sandy impurities.

2562. Clark, A. M., [Gross, M.] May 22.

Drawings to Specification.

Fireproof coverings.—Superheater pipes are rubbed with plumbago inside and out, and are wound with strips of hair felt covered with a paste of plumbago and water; outside this is a layer of asbestos paper in strips, with the inner surface covered with the same plumbago paste; iron wire is then wound round the pipes, which are finally coated with a wash of powdered plumbago, fireclay, and warm water. The fasciculus of pipes is then wrapped in sheets of asbestos paper, coated inside and out with the same paste of plumbago and fireclay, and secured with wire. The bends at the ends are not in the incandescent portions of the retort, and do not require protection.

Abridged also in Classes *Fire, Extinction &c. of; Gas manufacture; Steam generators.*

2640. Stürmer, A. May 28.

Casting cements.—Apparatus for making plaster casts of the feet, to be used as patterns for casting boot-lasts of iron. A frame A supports a flexible plate B; the plate is on all sides about two centimetres larger than the largest foot, and is attached to the frame by adjusting-screws E, F, &c. By means of a screw the fore part of the plate can be

inclined upwards. The hind part of the plate is regulated by three screws E, F, which are movable longitudinally in grooves in the frame A. About midway, the plate is supported by a transverse bar T, which rests on and is regulated by a screw, and is so placed that it gives to the plate a slanting position corresponding to that of the hollow of the foot. A dividing-bar S is laid across the plate and attached by pins; the bar is hollow and a string passes through it. There are two brass knobs *m* on the fore plate of the foot; and the knobs, the projecting end of the screw F, and the bar S mark the proper position for the foot. To take a cast of the foot the position of the plate is regulated by the screws, the bar S is placed in position, and the foot is covered with an elastic stocking and pieces of leather laid on the tender parts. A layer of gypsum is spread on the plate; the foot is placed on the gypsum so as to touch the knobs and bar; the ends of the string are drawn upwards over the ankle and fastened to the stocking; the foot is then entirely surrounded with gypsum; before the gypsum is quite dry the ends of the string are loosened and drawn downwards, cutting the gypsum into two parts, the bottom part being divided by the bar S. The foot is then raised a little, whereby the whole form is loosened from the frame. The heel part is then easily removed and allows the foot to be withdrawn from the fore part by taking off the stocking. Both halves are again laid on the plate, after removing the bar S, and with the use of more gypsum they are united, forming one hollow mould from which the required cast can be easily taken. A piece of the cast is cut out to allow for the instep piece.

Abridged also in Classes *Metals, Cutting &c.; Wearing-apparel, Div. III.*

2755. Williams, H. F. June 2.

Asphalt.—A mixture is made of about 78 parts of "Val-de-travers" or other asphalt and 22 parts of Trinidad pitch. In some cases lime rock in powder can be mixed with Trinidad pitch; asphalt and the pitch may be replaced by other heavy mineral oils capable of blending with asphalt.

Abridged also in Class *Roads &c.*

2924. Leask, A. R., and Torrini, E. June 12.

[Provisional protection only.]

Stone, artificial.—Compound or material applicable as a substitute for stone, marble, &c. Bone-dust, asbestos in powder, farina, albumen, coal ash, horn cuttings, and slate in powder are mixed together in varied proportions. The horn and bone are boiled until they are sufficiently soft to be mixed with the other ingredients. The compound when thoroughly mixed is put into moulds shaped according to the articles required, and the moulds are subjected to pressure. By the addition of suitable colouring-agents, imitations of stones, marbles, tortoiseshell, ivory, coral, and other substances may be produced.

Abridged also in Classes *Electricity &c., Div. II.; Grinding or abrading &c.; India-rubber &c.; Wearing-apparel, Div. IV.*

3160. Imray, J., [Duryee, G.]. June 26.

Refractory substances.—Molasses is mixed with highly-refractory fireclay or ground soapstone, and sometimes titanite iron and bauxite combined with a small quantity of plumbago.

Abridged also in Classes *Cooling &c.; Filtering &c.; Furnaces &c.; Heating; Manufacture of iron &c.; Metals, Cutting &c.; Moulding &c.; Roads &c.; Stoves &c.*

3195. Lockwood, W. June 27.

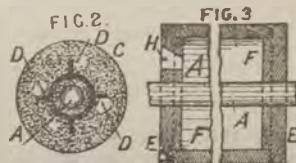
Casting cements.

—Relates to rollers for wringing and mangling machines.

The body of the roller is made of Portland cement or other plastic material that will set hard.

The axle A, Fig. 2, is preferably made of a reeled steel bar and the body C of the roller is made by moulding Portland cement in and around a metallic strengthening-core having any number of straight or curved ribs D. The roller may be cast in and to a shell of zinc or other metal or a baked earthenware pipe to form a hard jacket; or the mould shown in Fig. 3 may be used. The end pieces E have parts F which vary in length to suit rollers of different lengths; the axle A and the ribbed strengthening-core are placed in position and the liquid cement poured through the hole H; after setting, the mould is removed and the roller put to dry.

Abridged also in Classes *Fabrics, Dressing &c.; Washing &c.*



3438. Tomlinson, J. July 12.

[Provisional protection only.]

Cements.—Relates to the manufacture of plaster of Paris. The mineral is broken in a stone crusher, powdered between millstones, and passed at once to the "boiling" apparatus, whence it is passed into the sacks. The boiling apparatus consists of an oblong firebrick chamber provided with a furnace and chimney, in which is placed a tube of copper or iron which can be made to revolve, and is set at an angle. The ground stone is supplied to the upper end of this tube, which is rotated slowly, and as it travels downward it is completely "cooked." A stove or dust room is used in connection with the apparatus into what the dust is drawn by an exhaust fan. The material is cooled as it travels along and is delivered into sacks.

Abridged also in Class *Furnaces &c.*

3514. Dalgliesh, R., and Lynde, F. G. July 17.

[Provisional protection only.]

Slags, treatment of.—The slag is run into boxes in the usual manner, and as it runs small pieces of limestone are introduced into it. When the slag has set it is turned out, and either water is poured on it, or it is exposed to the weather, when it

rapidly breaks up. The method may be applied to breaking up other materials into which limestone can be introduced as described.

3528. Hutton, W. R., and Granger, A.
July 18.

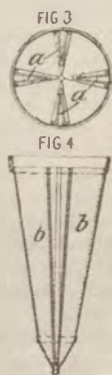
[Provisional protection only.]

Refractory substances.—Fireclay and steatite or soapstone, with or without the addition of plumbago, all in a fine powder, are mixed with water into a pasty mass, which may then be moulded into bricks, blocks, retorts, pipes, or other articles.

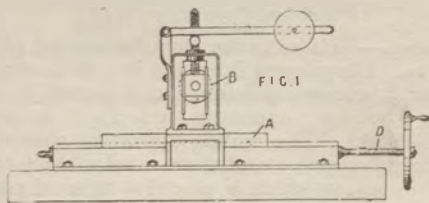
3546. Duncan, J., and Newland, B. E. R.
July 19.

Casting sugar.—The moulds are provided with internal recesses which are not filled with sugar and through which air can circulate. The moulds and recesses may be of any form. Figs. 3 and 4 represent a conical mould with wedge-shaped recesses *a*, the spaces *b* between which are filled with sugar.

Abridged also in Class Sugar.



3558. Webb, H. C. July 19.



Stone, colouring.—Improvements in the process of ornamenting wood, marble, leather, and like materials, described in Specification No. 4097, A.D. 1880. A separate steel blade is used for each of the liquid stains, dyes, or colours applied to the material. Or, instead of using blades, the spreading of the stains may be limited by printing designs on the material, either by the "set off" method with transfer papers, india-rubber, cloth, or other material, or direct from plates or rollers or a lithographic stone. Fig. 1 shows a machine for effecting these operations. The travelling bed A is preferably coated with india-rubber, on which the transfer and the slab of material are placed. By means of the screw D, the whole is moved under a roller B, the bearings of which are movable to enable the pressure to be regulated. The colours may be applied with a stencil or brush before

printing. Two or more slabs can be treated simultaneously by placing them back to back during the rolling or pressing.

Abridged also in Classes India-rubber &c.; Leather; Ornamenting; Printing other than letter-press &c.; Wood &c.

3573. Groth, L. A., [Paul, S.]. July 20
Drawings to Specification.

Stone, artificial.—A method for the manufacture of slabs, blocks, and other articles of "hydraulic mosaic marble." Pieces of marble or other stone are broken up by a steam-crusher and passed through an inclined revolving sieve, the pieces which will not pass through being returned to the crusher. A paste of concrete or Portland cement and marble dust coloured to the required tint is also prepared. A mould of suitable shape, made in three parts (bottom, top, and frame), is smeared over with turpentine, and another mould, called a designer, of thin sheet iron and forming the intended pattern, is placed in it. The spaces in the designer are then filled with the coloured pastes or concrete, it is carefully removed, and the mould is filled up with Portland cement and sand; the top is then placed on the mould and the whole is subjected to pressure, after which the mould is removed and the article is dried. The face of the slab is then smoothed and a coat of Portland cement is given to fill up the pores; the slab is again dried and polished by means of fine sand and water, and finally finished with pumice stone. The material may be used for the manufacture of baths, columns, balusters, window sills, &c.

Abridged also in Classes Buildings &c.; Fencing &c.; Moulding &c.

3614. Heinemann, J., [Rothe, H.]. July 23.

Marble, artificial.—Articles made of gypsum are heated to about 120° C., dipped in a solution of calcium chloride and afterwards in a solution of magnesium sulphate, and then re-heated and re-dipped, this process being repeated several times, the temperature of heating being increased each time till it reaches about 400° C. The articles are then treated alternately with solutions of gelatine and tannin, and dried in a drying-stove. In place of gelatine other substances such as liquid gluten, blood serum, drying-oils, &c. may be used, sometimes with the addition of solution of alum. To produce coloured marble the solution of calcium chloride is mixed with metallic chlorides, which on being treated with metallic salts yield coloured precipitates; for instance, iron chloride, which on treatment with potassium chromate yields a brown precipitate of iron chromate.

3716. Pataky, H., [Wildhagen, C.].
July 30.

Cements; fireproof compositions.—A coat of cement formed of four parts of vegetable filaments, two parts of finely-sifted ashes, and one

part of coal tar mixed together with a sufficient quantity of water, is laid over the laths or brushwood covering the rafters in such a manner as to fill the joints and form a surface level with the top of the laths. When dry, this surface is thinly covered with coal tar, after which a second coat about one centimetre thick is laid on, and over this a sifted mixture of cement and sand is strewn and levelled. The cement, which dissolves in the moist compound and extracts part of the water, protects the roof against fire. A coat of gravel is added in the case of flat roofs.

Abridged also in *Classes Buildings &c.; Fire, Extinction &c. of.*

3718. Healey, B. D. July 30.

[*Provisional protection only.*]

Asphalt cauldrons.—Improvements in the apparatus described in Specifications No. 2733, A.D. 1876, No. 4297, A.D. 1881, and No. 3783, A.D. 1882. The gauzes in the passages by which the waste gases pass to the fireplace are dispensed with, the gas boxes being fitted with solid slides instead. The firing-doors are closed before the slides are opened, and the slides are closed before the doors are opened, or the operations may be combined by a suitable arrangement of levers and rods. The back end of the casing is bolted to angle irons, so that by removing it the flues may be inspected or cleaned. The firebrick saddles over the firegrate are quarter circles, two forming a semi-arch, and are set lower than hitherto. The pan seats are of channel irons at each end, to which the casing ends are bolted, and angle-iron seats are run from end to end on each side of the pan. The long overflow spouts are dispensed with and a short one is formed near each corner at the back end of the pan, projecting inwards. The overflows pass over the lowest spout into the back end channel, which leads them to the corner, and they fall quite clear of the apparatus. The main flue is of cast steel or wrought iron, curves upward, resting on bricks at the back end, and has a joint on the main flue. The front end is tied by a strap running over the firebrick saddles to the front plate. The side angles at the top are put outside the pan and the end angles are put inside and joggled for the corner angles. On the leading axle cast steel or malleable sockets are attached for the shafts to hook into. The main springs have cast sockets which are bolted to the casing. All casings are lined with split bricks, and each apparatus is provided with a hinged chimney. The pan covers are made in halves, the ends of each sheet having a slight drip to prevent rain water from getting into the pan.

3822. Rydill, G. Aug. 4.

Stone, artificial.—Relates to the manufacture of imitation stained, ground, cut, or embossed glass, stone, wood, &c. for windows, translucent pictures, signs, advertisements, lamps, cabinetwork, chimney-pieces, or fingerplates, or for ornamenting buildings. Sheets of printed or stencilled paper or fabric are mounted on cardboard, sheet metal, wood, or asbestos cardboard, assisted or embellished with gold, silver, bronze, or other metallic alloy in leaf, liquid,

or powder. For panels or partitions both sides of the said cardboard &c. are so treated, and it is then placed between two sheets of glass which are cemented together with parchment, bladder, or asbestos cement, or other material, or by a composition of isinglass dissolved in proof spirit or acetic acid, and gum mastic, gum ammoniacum, or resin mastic dissolved in alcohol, proof spirit, and ground glass. The panels are printed to represent woods, marbles, granite, or works of art. When used for facings the front side may be of glass, talc, or muscovite or oblique mica, cemented at the edges to the cardboard &c. backing. The printed paper may be impregnated with a mixture of the cement last described, but without the ground glass, and olive or other oil or fat. Or it may be varnished on its face and coated with the said composition at the back. Asbestos or other paper or material may be coated with asbestos or other paint and printed upon with asbestos or other fireproof paints or inks and enclosed with plate, sheet, or moulded glass for facing walls or floors, or may be cemented to tiles to form panels. When glass is placed on each side of the printed sheet the two pieces may be fused together at the edges instead of being cemented.

Abridged also in *Classes Advertising &c.; Artists' instruments &c.; Cutting &c.; Furniture &c.; Glass; Hinges &c.; India-rubber &c.; Moulding &c.; Ornamenting; Paints &c.; Photography; Starch &c.*

3941. Haddan, H. J., [Hemmerling, J.]. Aug. 14.

Stone, artificial.—A process for the manufacture of coloured tiles, bricks, statues, and other stone-ware. Furnace slag is ground, metallic oxides or other mineral colours are mixed with soluble glass, and the mixture is allowed to harden and then pulverized. The powder thus obtained is mixed with the ground slag and soluble glass is then added till the mass has the consistency of a paste, which is then well kneaded by rollers, and is transferred to moulds so as to form a layer one or two centimetres high; the moulds are then filled up with a mixture of cement and slag, sand, or cement and silicious sand, and the contents are subjected to hydraulic pressure. The blocks are left in the moulds a few hours; they are then dipped in soluble glass, washed in a stream of water for about four weeks, and finally dried and impregnated with soluble glass.

Abridged also in *Class Moulding &c.*

4094. Thompson, W. Aug. 24. *Drawings to Specification.*

Concrete.—Walls for fences, buildings, and the like are formed of concrete composed of cement, gravel, and sand, and moulded into a corrugated form.

Abridged also in *Classes Agricultural appliances for the treatment of land &c.; Buildings &c.; Fire, Extinction &c. of; Hydraulic machinery &c.*

- 4096. Hughes, E. T.,** [*Wojacrek, J.*].
Aug. 24.

[*Provisional protection only.*]

Stone, preserving.—Relates to a varnish for making wood, paper, metals, natural and artificial stones, plastering, textile fabrics, &c. waterproof and acid-proof and otherwise preserving them. The varnish is made by saturating alcohol, ether, or other volatile solvent with shellac, and adding turpentine and soot. The articles to be treated are coated once or more with the varnish. To make the varnish stronger, powdered shellac is strewn upon the first layer before it is dried, and melted either by placing the object in a hot room or by passing over it a heated roller, soldering-iron, or suitable plate. Articles made of this material are not corroded by acids.

Abridged also in *Classes Cutting &c.; Paints &c.; Waterproof &c. fabrics.*

- 4223. Doulton, H.** Sept. 1.

Casting cements.

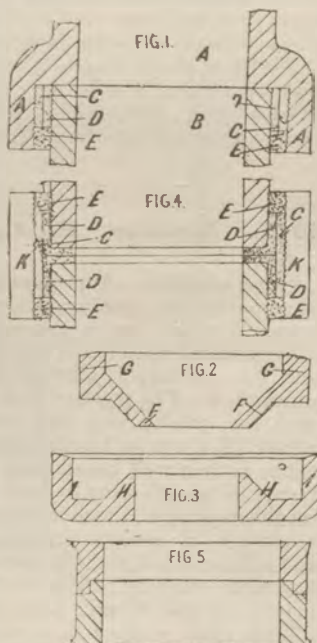
—Earthenware pipe joints are made with cylindrical rings of cement on each end so as to form a joint which will remain tight even when the ends are slightly apart. The joints may be "half-cut" for convenience of laying or removing. For forming the ring C, Fig. 1, a mould, Fig. 2, is used having a conical portion F to centre the mould truly in relation to the bore of the tube. The space left between the surface G and the inside of the socket is then filled with cement. For forming the spigot ring the mould, Fig. 3, is used, the conical portion H entering the bore of the pipe and centering itself, and cement being poured into the space between I and the outside surface of the spigot. The collar mould, Fig. 5, is used for forming the ring C on the inside of the collar K, Fig. 4, and is made in two parts to allow of removal after the cement has hardened.

Abridged also in *Class Pipes &c.*

- 4270. Dade, D. H.** Sept. 5.

[*Provisional protection only.*]

Fireproof compositions &c.—The surface to be protected is coated with one to three coats of a



paint made by mixing powdered silicate cotton with a solution of silicate of soda. The surface is next coated with a mixture of powdered mica, asbestos, sulphate of lime, barytes, and solution of silicate of soda. Pigments or colouring-matters may be added if required. The silicate cotton paint may be used alone as a protection against fire and heat and also against the rays of the sun, *e.g.*, for roofs &c. in tropical climates, and also for keeping tanks, pipes, and other liquid containers cool in summer, and protecting them from frost in winter. Also for ice and meat safes and provision trucks. For some of the above purposes a compound of the two paints may be used. Where the paint is used only to prevent radiation and is not exposed to a great heat, wood pulp, paper pulp, and powdered charcoal may be added to the above silicate cotton paint. As an outer coating for any of the above paints, size or varnish may be used, or a paint consisting of silicate cotton, mica or asbestos, barytes, colouring-matter, oil, varnish, and driers.

Abridged also in *Classes Fire, Extinction &c. of; Heating; Paints &c.*

- 4308. Bloomfield, J. C.** Sept. 7.

Cements.—Waterproof facing for walls. A mixture of about equal parts of melted gas pitch and powdered chalk with sand, ballast, or other material is poured between the face of the structure and a plate fixed at a little distance from it, so as to form a facing of impervious material. The composition is applicable for grouting walls and for other purposes.

Abridged also in *Classes Buildings &c.; Moulding &c.; Pipes &c.; Ships &c., Dir. I.; Steam engines.*

- 4379. Imray, J.,** [*Rémaury, H., and Valton, F.*]. Sept. 13.

Refractory substances for furnaces and metallurgical vessels. Chromic iron is pulverized to the condition of course sand, and is mixed, in slightly heated pans, with a certain proportion of the carbon deposit of gas retorts, and tar, pitch, or heavy oil. The compound may be applied directly as a lining by ramming it in place with heated rammers; or it may be formed into bricks by ramming it into iron moulds, and raising it to a red heat in a furnace.

Abridged also in *Classes Furnaces &c.; Manufacture of iron &c.; Metals, Cutting &c.; Moulding &c.*

- 4589. Blüthgen, V.** Sept. 26. *Drawings to Specification.*

Castings, plastic.—Coloured gelatinous liquid such as collodion or gelatin, is poured on to a surface upon which a design has been produced. The outline of the film is formed by metal foil, by helioplatic process, or by a layer of colour previously applied and cut away in parts. When the film has hardened, the picture may be varnished or protected by glass. The process is also applicable to ceramic ware &c.

Abridged also in *Class Ornamenting.*

4600. Imray, J., [*Nagel, J.*]. Sept. 27.[*Provisional protection only.*]

Fireproof coverings.—Relates to improvements on an invention described in Specification No. 1468, A.D. 1882, whereby fireproof and waterproof plates are formed by pressing a mixture of asbestos and oxide of zinc on nets of metallic wire, and treating with chloride of zinc and other substances. According to the present invention, a frame or support of metallic wire in combination with other fibrous material is employed, and is covered with a mixture of asbestos, and magnesia, gypsum, or lime. When glazed or coloured surfaces are required, powdered glass, borates, or colouring-matters may be mixed with the composition. The solution used for impregnating the plates, instead of being a solution of chloride of zinc, may consist of other metallic chlorides or sulphate of alumina. In manufacturing the plates the asbestos is torn into fibres and mixed with the other materials pulverized. The mixture is then passed through carding-apparatus, by means of which a layer of it is placed on both sides of the network. The network thus covered is passed between pressing rollers, round which pass endless webs, which, dipping into a solution of a metallic chloride or sulphate of alumina, transmit the liquid to the composition. The plates after having been pressed may be immersed in water to free them from any surplus of the solution: but this is not necessary when the plates have been treated with soap or fatty matters and sulphate of alumina to render them waterproof. The aforesaid solution may also be mixed with the asbestos and other materials before being applied to the network.

Abridged also in Classes *Fire, Extinction &c. of*; *Waterproof &c. fabrics.*

4773. Robbins, E. Oct. 8.

Cements &c..—Relates to the manufacture of cements and similar compounds applicable to building, pottery, the manufacture of fireproof and waterproof slabs, and other purposes. The materials used are asbestos, limes, lime putty, cobble rocks, cobble gypsum, limestone, carbonaceous or argillaceous sulphates of lime, Portland, Parian, Keene's, or other cement, animal and vegetable matters, soluble earths, aluminates and silicates such as those of potash or soda, sulphuric acid, chlorides or oxides of magnesium, zinc, baryta, sulphate of baryta, oils, glues, gums, blood, cow dung, salts of tartar, green copperas, &c., these being mixed in various proportions as required. The mass is coloured with pigments such as cobalt, ultramarine, picric acid, pottery colours, &c., and is fired, ground, and, if necessary, moulded into blocks. Textile fabrics such as asbestos, silk, spun threads, yarns, &c. may be treated with any of the above-named substances and formed into slabs which can be vitrified and indurated, or they may be embedded in more of the cement to give greater firmness. These blocks may be used in conjunction with concrete work for various purposes. A cement may be made by mixing the limes with a slip of Portland cement stirred well with chemicals such as sulphuric acid, salts of tartar, or green copperas. A white cement may

be made from china clay and chalk mixed with muriatic or acetic acid, mustard, starch, albumen, &c. Blocks may be made to imitate marble, or they may be made translucent, white, or coloured, or transparent like glass.

Abridged also in Class *Fire, Extinction &c. of*.

4954. Spence, W., [*Faure & Kessler*]. Oct. 17.

Stone, preserving and colouring..—A method of indurating natural and artificial stone, stucco, &c. The materials used are, for white stones fluor-hydrates and fluosilicates of ammonium, magnesium, aluminium, zinc, and lead, and for coloured stones those of iron and manganese. Earthy or metallic phosphates dissolved in acids, soluble aluminate of barium, sulphates, and the alkaline aluminates and silicates may also be used. When impermeability and a polish or enamel are required, oily or damp-excluding substances, such as wax, stearin, or paraffin, may be added to the other substances. The colourization may be produced in two stages, for instance, by treating with fluosilicates of lead or mercury and then with an iodide or chromate.

Cements..—Clay or china clay mixed with hydro-fluosilicic acid yield a paste which can be used for lutings &c., which can be moulded and turned like clay, and which can be formed into vases or other articles and hardens without baking.

5077. Wood, J., and Abbott, J. Oct. 25.[*Provisional protection not allowed.*]

Casting slag, concretes, &c..—To facilitate the loading and unloading of slag, concrete blocks, &c., a conical mould is formed with two notches at the bottom, into which projecting iron noses are inserted until the slag solidifies. To lift the trunnions, ordinary crane tackle is used in connection with a frame having catches to fit into the notches of the mould, the frame being suspended with the chains from the crane-hook. The wagon &c. being at the dump-heap the chains are attached, the noses inserted in the grooves, and the mould lifted a few inches by the trunnions and chain. The block is lifted clear of the wagon (the cone and block rising together) and swung out, the block then being let go by means of a lever. The catches can be so weighted as to fly back to their normal position as soon as they are clear of the block.

Abridged also in Class *Lifting &c.*

5489. Faure, C. A. Nov. 22.

Refractory substances for furnaces and retorts. The invention, an improvement on that described in Specification No. 6058, A.D. 1882, is for producing sodium, potassium, &c. from alkaline salts in an electric furnace of special construction, applicable to other purposes. A mixture of carbonate of soda and charcoal is subjected to preliminary heating in retorts or cylinders of compressed magnesia or lime, or of the same materials melted by pyro-electric means. The furnace is constructed of the same material.

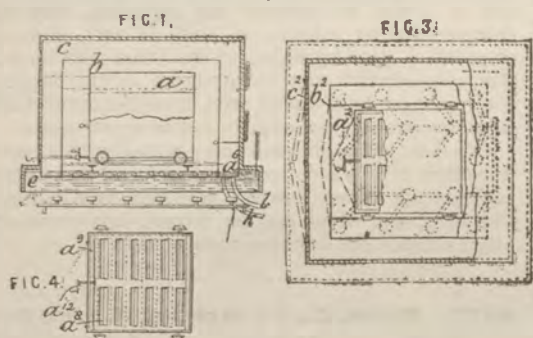
Abridged also in Classes *Electricity &c., Div. IV.:* *Metals and alloys.*

5600. Redfern, G. F., [*Stickle, J.*]. Dec. 1.
[*Provisional protection only.*]

Slags, treatment of.—Relates to the preparation of blocks for building, paving, sewers, and other purposes, as a substitute for stone, brick, terracotta, and like materials, applicable also for railway ties and other articles made of wood. Moulds of any desired form are filled with broken pieces of scoria (slag), on which is poured molten scoria. When the mass has sufficiently cooled, the block is removed from the mould and immersed in heated pitch or other liquid waterproof cement.

Abridged also in Classes *India-rubber &c.*; *Moulding &c.*; *Wood &c.*

5616. Hand-Smith, G. Dec. 3.



Stone, colouring.—Relates to improvements in the treatment of marble, wood, ivory, and other materials described in Specification No. 3640, A.D. 1877. An object to which colours or designs have been applied is heated in a closed chamber. Vapour is admitted and the temperature is raised at such a rate that the vapour may always be a certain number of degrees hotter than the object. After a time ingress of vapour is cut off, and the temperature is lowered continuously or by stages. Or the vapour may be allowed access from the first. The heating-chamber *a*, Figs. 1 and 3, is surrounded by two or more casings *b*, *c*, to the bottom of which liquid is supplied from a closed water bath *e* or through pipes *l*, *k*. Doors *a*², *b*², *c*² are provided, and the chamber is arranged to run on rails *a*⁰. As shown in Fig. 4, the bottom of *a* is formed with openings *a*⁸, which can be closed by a perforated sliding plate *a*⁹ operated by a screw *a*¹². In a modification described, the chamber *a* is fixed and is provided near the bottom with a grating, under which water from the bath can be introduced. Colouring-agents for producing various effects are enumerated.

Abridged also in Classes *India-rubber &c.*; *Ornamenting*; *Wood &c.*

5781. Justice, P. M., [*Potter, N. F.*]. Dec. 18.

Cements or compositions for covering blackboards, for using as a finish to plaster, or as a mortar. Soapstone or talc, alum, lime putty, black sand, silica, and mortar black are powdered, mixed with plaster of Paris, and made into a paste with water. Common brown mortar is applied to the laths in

the usual way and floated to an even surface. The coating is then spread over with a trowel and smoothed, and the surface is brushed with a dry brush. When required as a finish for plaster, the black sand silica and mortar black are omitted from the mixture. The talc is powdered with alum, mixed with the other ingredients and with water, and applied with a trowel; if a glossy surface is required, powdered soapstone may be applied to the finished surface. As a mortar for laying brick, stone, &c., and especially for chimneys, the proportions of the ingredients are slightly varied, and if desired, may be coloured.

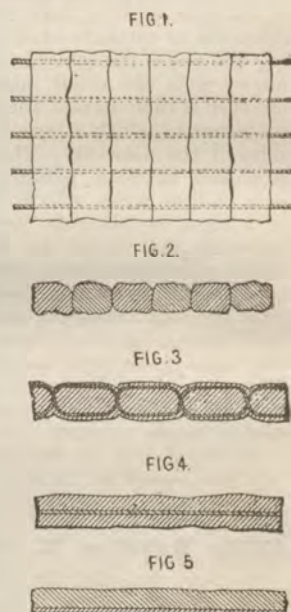
Abridged also in Class *Writing-instruments &c.*

5783. Pitt, S., [*Johns, H. W.*]. Dec. 18.

Fireproof coverings.

—Asbestos is broken and both the long and short fibres mixed with hair if desired formed with loose ropes which are woven into a fabric, Fig. 1, with asbestos or other card, Fig. 3, or with metallic wire, or threads or wire coated with asbestos, Fig. 4, or otherwise rendered fireproof, or all the kinds of thread may be used in the same fabric, a nap being raised by passing a picker over the cloth. Or the warp and weft may be similarly combined by knitting, or the loose ropes, arranged parallel, as in Fig. 2, may be sewn across, one or more machines being employed, and to give strength the fabric may be compressed. India-rubber, sizing, or silicate of soda is used for coating or impregnating either the threads or finished fabric, the latter being used alone or combined with cloth, wire fabric, sheet metal, or wood, Fig. 5, as blinds, doors, or partitions.

Abridged also in Classes *Buildings &c.*; *Fabrics, Dressing &c.*; *Fire, Extinction &c. of*; *Furniture &c.*; *Heating*; *Lace-making &c.*; *Sewing &c.*; *Spinning*; *Waterproof &c. fabrics*; *Wearing &c.*



5850. Herbert, F. Dec. 24.

Cements.—Water-carried town or other sewage is run from the main into a suitable covered settling tank or tanks, from which, after addition in some cases of a disinfectant, it is siphoned into a series of receivers lined with a non-conducting substance, and supplied with long carbon plates acting as electrodes to a suitable generator of electricity. The electrical action causes evolution of hydrogen sulphide and other gases, which are collected, purified when necessary, and utilized as fuel or

otherwise. The deposit, chiefly of road grit, in the settling-tanks, is collected and made into cement.

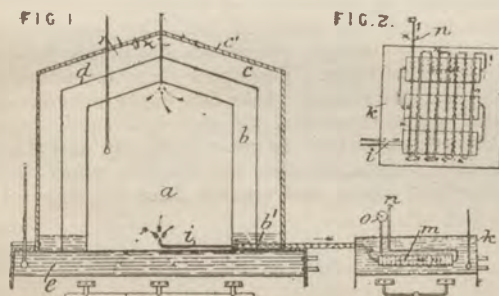
Abridged also in Classes *Acids &c.*, *Divs. I. and II.*; *Sewage &c.*

5855. Abel, C. D., [*Koch, J. A.*, and *Herre, W.*]. Dec. 24.

Fireproofing - compositions. — These consist of sulphate of iron, rock salt, or clarified lime, and common alum, either solid or in solution. The mixture is added to water in which the material to be treated has been placed, and the whole gradually heated to a certain temperature, or the water and material are first heated and the composition then added. The material is treated with this boiling liquor for a certain period, and then the whole is allowed to cool slowly. This composition is applicable to wood and textile fabrics and is intended to render atmospheric-proof as well as fireproof.

Abridged also in Classes *Fire, Extinction &c. of*; *India-rubber &c.*; *Paints &c.*; *Wood &c.*

5861. Hand-Smith, G. Dec. 26.



Stone, colouring. — Relates to improvements in the treatment of marble, wood, ivory, and other materials described in Specifications No. 3640, A.D. 1877, and No. 5616, A.D. 1883. An object to which colours have been applied is placed in a chamber *a*, and fluid, such as air, heated and charged with moisture or other vapour by passing

through a saturator *m* is forced in through a pipe *i*. The temperature is then gradually raised. Beneath the chamber is a hot-water bath *e*, and air cells *b, c* with a non-conducting covering *c'* serve to retain the heat. The liquid *b'* passes freely between the cells through holes at the bottom of the wall *d*. The saturating-vessels contain liquid into which porous diaphragms dip. They are heated by a bath *k* and may be enclosed in heat-retaining cells; or they may be arranged beneath the liquid *b'*; or simply be enclosed in the cells *b, c*. A gauge *o* is provided. The chamber *a* may be fixed or be made to run on rails, and may be enclosed in a wooden or other casing instead of the air cells. Colouring-agents for producing various effects are enumerated.

Abridged also in Classes *India-rubber &c.*; *Ornamenting*; *Wood &c.*

5974. Warner, C. B., [*Hestanz, L.*]. Dec. 31.

Marble &c., artificial, for making buttons, jewellery, combs, memorandum cards and covers, knife &c. handles, slates, brush backs, looking-glass frames, mantelpieces, clock cases, statuary, rings, tiling, ceiling and wall decorations, &c., and for household, telephonic, &c. utensils, is prepared from skim milk or pot or skimmed milk cheese, by admixture with water and salt, cooling, skimming, straining, warming, dissolving in warm caustic soda, and cooling somewhat, the temperature employed being higher and the cooling more rapid the harder the material required. At this stage or previously the material may be subjected to various treatments according to the object in view. The material may be bleached by any suitable bleaching-agent produced in the mixture itself or external to it. Or light-coloured material may be obtained by the use of barium chloride with ammonia and subsequently dilute sulphuric acid, or by the use of terra alba, barium sulphate, or lead sulphate; whilst for dark-coloured material tannin and an acid are employed. Any required colour is obtained by the use of pigments and dyes. For making imitation marble, porcelain, &c., powdered silica or porcelain is added and the mass is treated with a dilute solution of alum with glycerine and a few drops of an alcoholic solution of aniline blue. Sodium silicate may also be incorporated in the material.

Abridged also in Classes *India-rubber &c.*; *Paints &c.*

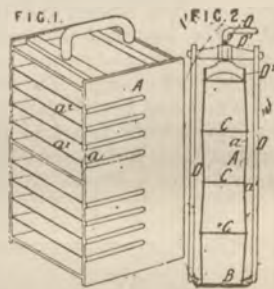
APPENDIX.

A.D. 1877.

4647. Abel, C. D., [*Langen, E.*]. Dec. 7.

Casting sugar.—Relates to the manufacture of loaf sugar. The boiled syrup is filled into rectangular moulds open at two sides, which are placed one above another on a tray B, Fig. 2, with a perforated plate C between each two, the joints being made watertight by suitable packing. The moulds are fixed in position by tie-rods D and a bridge piece D' with a screw which presses on a separate rim D² on the top mould. The syrup is poured into the top mould and passes into the others through perforated plates C. Fig. 1 is a perspective view of a single mould. It consists of frames A, tapered from one open side *a* to the other *a'*, so that the solid sugar can easily be discharged. The mould is divided by removable partitions *a*² into any desired number of separate compartments, so that slabs of sugar of any size can be obtained. When the sugar has solidified, the moulds are separated, and with the plates C are placed in the centrifugal machine and the "green syrup" thus removed. The moulds are then placed on a "liquoring" table, which is preferably of the kind described in a Provisional Specification filed by the inventor on April 23, A.D. 1878. After liquoring, the moulds are again subjected to centrifugal action, after which the division plates *a*² are withdrawn and the moulds placed on the drying-table. The drying-table consists of two chambers separated by a perforated plate. The upper chamber contains steam heating-pipes and has apertures over which the moulds are placed. Into the lower chamber a current of air is forced. The apertures in the perforated plate separating the drying-chambers are angular incisions, the corners being turned up to cause the currents of air to enter obliquely, and thus to be distributed evenly over the surface of the heating-pipes before entering the moulds, where the air passes through the spaces left by the removal of the division plates and quickly dries the slabs of sugar.

Abridged also in Classes *Drying; Sugar.*



A.D. 1878.

266. Nawrocki, G. W. von, [*Gercke, G.*]. Jan. 21.

[*Provisional protection only.*]

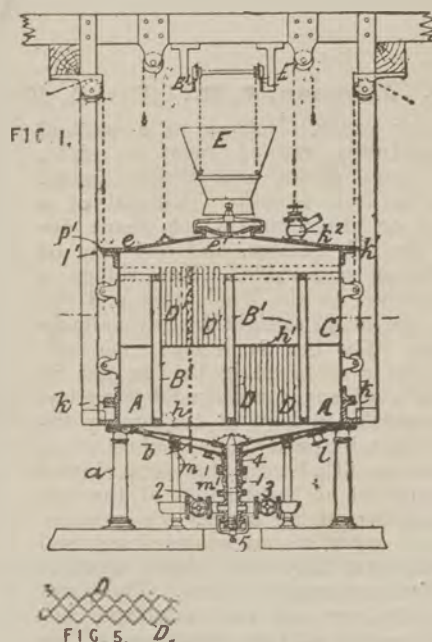
Stone, artificial.—Peat is utilized as a building material by the following process:—"The upper layers of peat moors are dried, exposed to great pressure, and in some cases rendered non-hygroscopic by being impregnated or otherwise treated with tar, asphalt, oils, lacquers, water-glass, fat, tallow, sulphur, india rubber, resin, wax, wood, cement, or other suitable substance, and then used as a substitute for wood, stone, clay, earth, &c. in roofing, panelling, flooring, and other building purposes. It is capable of being sawn, planed, turned, embossed, and polished, and it may be moulded into such articles as trays and cups. To increase the strength or "cohesion," bast, oakum, tow, and rope waste, pieces of wood or metal, felt, cement, long peat fibres, reeds, heather, or other suitable objects may be placed between two or more such layers of peat, and be joined therewith by a suitable cement.

Abridged also in Classes *Buildings &c.; Furniture &c.; India-rubber &c.; Moulding &c.; Preparing &c. cork &c.; Table articles &c.; Wood &c.*

449. Johnson, J. H., [Seyferth, A.]. Feb. 4.

Casting sugar.—Relates to washing raw or partly-refined sugar in a specially-constructed apparatus, also serving to mould it, with concentrated alcohol, which is afterwards removed by absolute alcohol or ether, the alcohol &c. being recovered. Fig. 1 is a sectional elevation of the apparatus employed. A is a rectangular vessel with double bottom forming a steam space *b* which communicates with a narrow vertical chamber extending across A and communicating with similar chambers B' at right angles to it. A hood C fits over A and is provided with a manhole cover *e* and manhole *e'*. Either C or its cover can be raised or lowered. Above the double bottom *b* is arranged a perforated false bottom *h*, upon which is placed a series of plates *i* of a zig-zag shape, as shown in horizontal section in Fig. 5, thus dividing the whole space into prismatic moulds D corresponding to the size of the sticks of sugar to be made. The hood C is bolted to A at *h*, an india-rubber ring ensuring a tight joint. Two series of moulds are arranged one above the other, with another perforated false bottom *m* between, and when they have been charged and allowed to set, a plug 4 is partially withdrawn from a cock 1 to allow the "green syrup" to escape through the cock 2 to a tank. The cover *e* is then secured to C and the manhole cover closed, making the whole apparatus airtight. Alcohol of, say, 95 per cent., saturated with sugar, is introduced through a valve *k*². As soon as the discharge from the cock 2 contains alcohol it is closed and the cock 3 opened, and the mixture of green syrup and alcohol led to the distilling-vessels. When the fluid passing through 3 becomes colourless the supply of 95 per cent. alcohol is stopped for about two hours, and absolute alcohol is led in and washes the 95 per cent. alcohol off the sugar crystals. The apparatus is then allowed to drain and steam is led through a valve *l* into the space *b*. The alcohol evaporates and is conducted away. When the distillation is complete the apparatus is opened and the dry sugar removed. Instead of consisting of one extended depression the bottom of the moulding-apparatus may have a number of depressions in it, and the apparatus may be made movable by mounting it on wheels.

Abridged also in Class *Sugar*.



A.D. 1879.

748. Wise, W. L., [Schuhmacher, J., and Stade, G.]. Feb. 24.

[Provisional protection only.]

Stonework, ornamental.—Photographic pictures are photographed on chalked paper prepared with gelatine solution and coated with collodion as usual; their surfaces are afterwards coloured, preferably with oil colours. The coloured picture is then covered with French re-touch varnish or other adhesive substance, and is caused to adhere to canvas, or to an article to be ornamented, such as a tray, or to a metal, wood, stone, glass, or other surface. By then removing the chalked paper with the gelatine solution by washing with warm water, the coloured picture will be left on the canvas or other surface and may be covered with copal varnish.

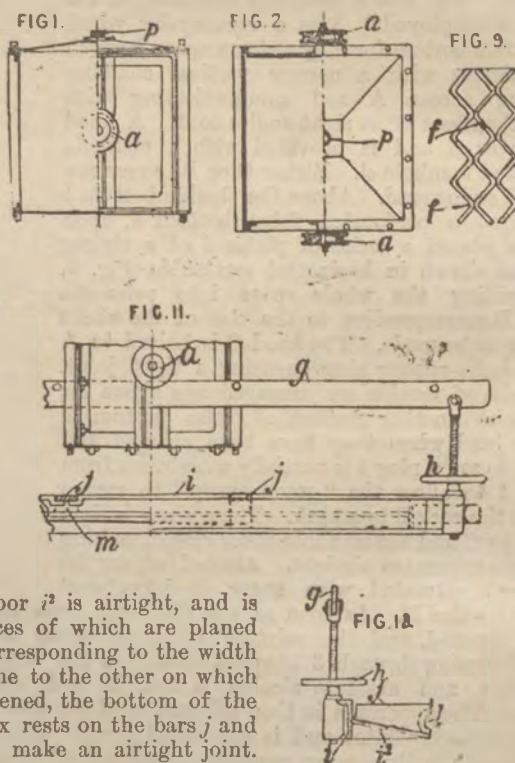
Abridged also in Classes *Ornamenting*; *Photography*; *Printing other than letterpress &c.*; *Table articles &c.*

A.D. 1881

5616. Johnson, J. H., [Weinrich, M.]. Dec. 22.

Casting sugar.—Relates to a method for producing refined sugar in slabs, plates, bars, sticks, and similar forms. Boxes of iron or other material of a cubical or other convenient shape are used, the lid, bottom, and one side of each being removable. Two rollers *a* are attached to the fixed sides and the boxes are made airtight by any suitable packing. The box is divided into cells or spaces corresponding to the size of the slabs of sugar required by vertical plates which are kept at the proper distance apart by projections fixed on them, or by being fitted into transverse slotted bars, one set at the bottom of the box and another in the cover. To produce sticks of sugar, zig-zag plates *f* are used of such form that when placed together they form rectangular spaces. The boxes being filled are run on trucks and conveyed to the claying-apparatus. This consists of rails *g* upon which the boxes can be run, which can be raised or lowered by the wheels and screws *h*. The floor *i*² is airtight, and is crossed by transverse bars *j*, the upper surfaces of which are planed true, and which are placed at distances apart corresponding to the width of the boxes, with cross-pieces passing from one to the other on which the sugar can rest. When the sugar has hardened, the bottom of the box is removed, the rails are lowered till the box rests on the bars *j* and the sides *i*, suitable packing being interposed to make an airtight joint. The suction pipe *l* of a pump opens through *i*² into the chamber below the sugar, the pump is set in action, and the green syrup is removed. The liquoring is performed under pressure. The cover of the box is secured airtight, and is connected by *p* with a reservoir of clarifying-liquid. When the mass is deprived of its syrup, the suction pipe of the pump is disconnected from the chamber underneath the boxes and connected with the orifices in the covers; hot air is then admitted and being drawn through the sugar rapidly dries it. When the sugar is dry the cover and detachable side of the box are removed and the plates are taken out.

Abridged also in Classes *Drying; Sugar.*



A.D. 1883.

254. Frank, A. Jan. 16.

[Addition to abridgment on page 57.]

Fireproof compositions.—The masses produced, as described on page 57, are fireproof, and may be applied to a large number of purposes, such as furnace building, and for fireproof vaults, and partitions in dwelling-houses, factories, and ships, &c.

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