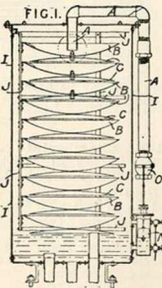


the casing overlap, and are fastened together by means of double clips C and slits.

4281. Jordan, F. E. Feb. 27.

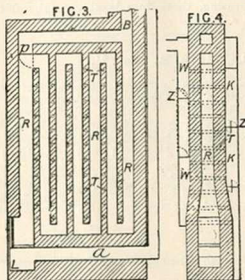
Heating water.—An apparatus for heating and purifying water by live or exhaust steam, hot air, or other gases is shown in Fig. 1. A series of domes and saucers B is arranged for the reception of the water, to be heated and purified, delivered from the pipe A. Saucers only may be employed. The series of water vessels is mounted in the cage J suspended from the top of the shell I, or from a special support, with levelling screws or a universal joint, in such a manner that the domes and saucers may be levelled by hand or automatically. The heating-medium enters the apparatus near the bottom and leaves near the top, and may be made to pass spirally by the interposition of baffle-plates. Impurities are deposited on the domes and saucers. Blow-off and overflow pipes are provided. A float N and valve O regulate the water level when the apparatus works at atmospheric pressure. According to the Provisional Specification, the water may be drawn off for use in a steam boiler, and the system of domes and saucers, or saucers only, may be used in steam boilers to purify the feedwater.



4418. Dymond, G. C., [Lönnbeck, F. W.]. Feb. 28.

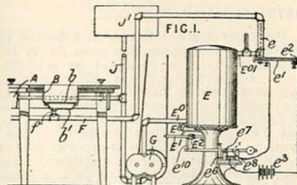
Heating buildings.—Fresh air from outside is admitted through a warming-apparatus to the various rooms, and the vitiated air is withdrawn to the fireplace of the apparatus. One form of apparatus is shown in Fig. 3. The combustion products pass to the chimney B either directly or by the flues R depending on the damper p. Tubes T passing through holes in the flue partitions connect the cold-air chamber K, Fig. 4, with the hot-air chamber W. Suitable dampers z between the chambers are provided. The foul air is brought from various parts by the conduit a to the foul-air chamber L, so as to feed the fire with the foul air. The air tubes T may be vertical, and the fireplace may be arranged on the top of the apparatus. The flues R may also be arranged horizontally, and may be straight or spiral. The warm air is taken to orifices in the floors of the rooms, and the

vitiated air is taken from the ceilings. The ceilings and floors may be hollow and have suitable perforations, or perforated conductors used as skirting boards, and perforated friezes, may be used for



purposes of ventilation. In modified forms of apparatus, the foul air is divided into two parts in the main conduit, one part being discharged into the ashpit and the other in front of the ashpit; the two air chambers are connected to form one chamber; and the apparatus may be heated by an ordinary kitchen range.

4887. Werner, J. March 6.



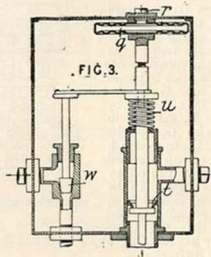
Heating liquids; thermostats.—Relates to apparatus for heating and maintaining melted chocolate or cocoa mixture in a fluid condition. Fig. 1 shows the application of the invention to apparatus for coating confections with chocolate &c. The operating-table A is provided with a number of dipping-tanks B, each of which consists of a receptacle b having a steam, water, air, &c. jacket b'. A suitable heater E serves to heat the fluid which circulates through the jackets b'. Fig. 1 shows a water-heater adapted to be heated by gas. The water enters by the pipe E', and after being heated passes through the outlet pipe E'' to the circulating-pipe F, which is connected by pipes f

with the jackets b^1 . The water may be forced through the heater by a pump G, or by gravitation from a tank J¹. A return main H delivers the water after circulation through the jackets to the feed-pipe J. The gas is supplied through a pipe E¹, having a cock E² which is controlled by a thermostat. The pipe E¹⁰ is supplied with a burner which acts as an igniting device for the main burner. The thermostat which is placed in the outlet pipe E¹⁰ consists of a metal bar e , connected to an arm e^1 adapted to contact with the point e^2 , which forms part of an electric circuit, the current being obtained from a battery e^3 . An electromagnet e^4 and an armature e^5 are arranged in the circuit. The armature e^5 is connected to a pivoted lever e^6 , which is coupled by a link e^7 to the gas cock E². Normally the arm e^1 is out of contact with the point e^2 . When the temperature of the water rises too high, the expansion of the rod e causes the arm e^1 to complete the circuit. The armature e^5 and the lever e^6 are drawn down by the magnet e^4 , thereby turning off the cock E² and shutting off the gas supply. By means of this apparatus the chocolate &c. mixture may be maintained at a constant temperature.

4903. Pirrie, W., and Pirrie, N. March 6.

Thermostats.—An arrangement for regulating the supply of liquid and of heat in a liquid-sterilizing apparatus is shown in Fig. 3, and consists of a flexible chamber g , which is connected by a pipe r to a tube s immersed in the liquid being sterilized so that the pressure of the vapour of liquid contained in the tube s may, when the temperature rises sufficiently, inflate the chamber g , thus opening a liquid supply valve t against the action of a spring u and partially closing a gas

regulating-valve w . A fall in temperature reverses this operation. According to the Provisional Specification, the thermostatic regulator may consist of a vessel immersed in the heated liquid and



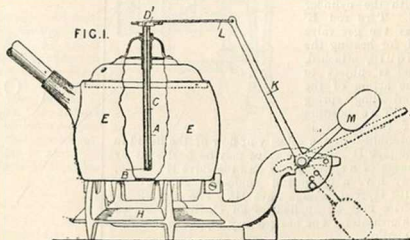
filled with an expansible fluid, the vessel being in communication with a receiver so that, when a portion of the liquid has been expelled by excessive heat, the vessel rises and actuates the regulating-valves.

4949. Mackintosh, I. B., and Mackintosh, L. A. March 7. *Drawings to Specification.*

Thermostats.—Thermostatic capsules for use in incubators are strengthened by affixing wires to their exterior surfaces.

5089. Griffiths, E. H., and Whetham, W. C. D. March 8.

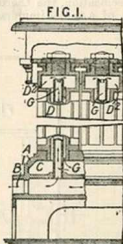
Thermostats.—Relates to a device in which a fusible alloy is employed to cut off gas, or sound an alarm or the like, at a given temperature. In Fig. 1, the device is shown applied to a saucepan for boiling milk. The rod C is, at normal temperatures, rigidly connected to the surrounding tube A by a fusible alloy B. This tube is mounted on the lid of the saucepan E, and dips into the milk to be boiled. When the required temperature is reached, the alloy melts, and the rod C is rotated by a counterweight M on the gas tap H, thus shutting the gas from the heater. The bell-crank lever K, on which the weight M is fixed, is connected to the rod C by a rod L, which hooks on one of the rays of a star-wheel D¹. When the alloy resolidifies, the gas tap can be readily reset.



5107. Sugg, W. T. March 8.

Heating buildings &c.

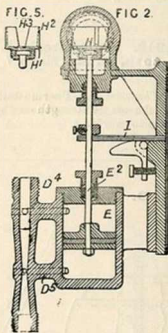
—A steam radiator is in part shown in Fig. 1. The tubes D have rays or wings, and are screwed into the casing A. The tubes G are free at the upper end. Steam entering by the inlet B' passes by the tube G to the chamber D', and then by the tube D, external to the tube G, to the chamber C, from which chamber condensed water may be run off by a suitable outlet. In the Provisional Specification the arrangement described is such that the inner tubes are fixed at their upper ends and the upper ends are perforated.



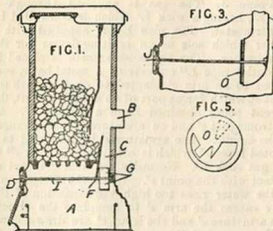
5236. Richmond, E. W. T., and Adam, M. A. March 9.

Heating liquids.

—A controlling-device for regulating the supply of heat to water and other liquid heaters is shown applied to a gas-heater valve in Fig. 2. The contracted pipe D through which the liquid from the heater flows is connected by the two pipes D' and D'' with the cylinder E. The rod E' has the gas valve H, for heating the liquid, attached, and is subject to the action of the controlling spring I. The position of the piston is determined by the velocity of flow of the liquid in the pipe D. The gas valve may be held shut by means of a spiral spring, and the valve H', Fig. 5, may have a cylindrical guide-ring H² provided with tapered passage ways H³. The controlling-device may be applied to an electrically-heated water-heater. The heaters may supply their water to baths.

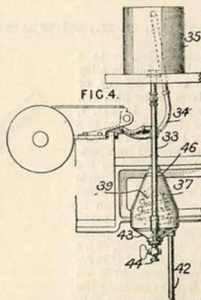


5450. Soc. Anon. des Usines du Pied-Selle. Dec. 23, A.D. 1898, [date applied for under Soc. 103 of Patents &c. Act, A.D. 1883].



Heating-apparatus.—Relates to heating-apparatus in general, but especially to continuous-burning and slow-combustion stoves. A stove is shown in Fig. 1. The ashpit A is in direct communication with the smoke-pipe B by the passage C. The valves D and G regulate the admission of air and the draught, and are connected together by the rod I, so that, when the air-admission aperture is open to its maximum, the draught-retarding orifice F is closed, and vice versa. Another valve arrangement, which permits of a suitable opening of the draught-retarding orifice corresponding to each intermediate position of the damper J, is shown in Fig. 3. The openings of the valve O are as shown in Fig. 5.

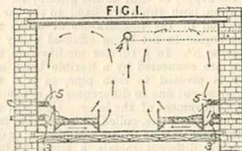
5523. Brookes, A. G., [Knowlton, M. D., and Beach, F. H.]. March 14.



Heating liquids.—In apparatus for applying glue &c. to strips or sheets of paper or other

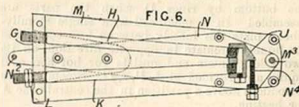
material, hot water is circulated through a chamber beneath the glue receptacle. The apparatus employed for heating the water for this purpose is shown in Fig. 4. Pipes 33, 34 from the chamber beneath the glue receptacle are connected with the heating-coil 39 and the cistern 35 respectively. The coil 39 is contained in a casing 37, which may be supplied with steam, which enters through the pipe 42 and passes out through the cock 44. To adapt the apparatus for use with a gas burner, the burner is connected with the base 43 of the casing in place of the cock 44, while the plug 46, which closes the top aperture, is removed.

fresh air, are placed within the structure, near the base, the air passing through the perforations, which are preferably on the underside of the pipes. The air is preferably heated, while in the



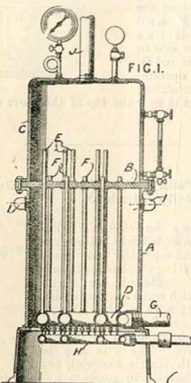
perforated tubes, by means of the ordinary heating-pipes 3, which run parallel therewith underneath, and against these the air impinges on escaping through the perforations, being thus further heated. In modifications, sets of inlet pipes are arranged above and below the heating-pipes, the air being admitted into one or more of them by a cock. By this arrangement the air which enters through the upper pipes is more highly heated than that which enters through the lower. When applied to a railway carriage, the air is first heated by being passed through pipes which may enclose or be enclosed by steam pipes under the seats, before issuing through perforated pipes at the top.

5775. Clarkson, T., and Clarkson & Capel Steam Car Syndicate. March 16.



Thermostats.—Relates to steam generators heated by an oil or vapour burner which is automatically controlled to regulate the supply of heat. Fig. 6 shows one form of automatic regulator for the burner, consisting of two tubes H and K, of brass and iron respectively, or of other suitable metals of varying expansibility. The tube H is fixed in a rigid bar G, and carries a hollow block J. The tube K is secured in the block J, and passes freely through the bar G, beyond which it carries locked nuts L as shown. Steam passes through the tubes, which expand unequally. At the normal temperature the nuts L are brought against the bar G, but any further expansion due to increase of temperature will result in the depression of the block J, owing to the greater expansion of the tube H. This acts

5532. Kane, W. March 14.



Heating water.—Relates to hot-water and low-pressure steam boilers for use with heating-apparatus. Fig. 1 shows a steam boiler. An upper water or steam chamber C is connected with a double annular water chamber D by tubes E, F, the former projecting farther into the upper chamber than the latter. The tube-plate B is readily detachable from the chamber C and from the casing A. J and G are flow and return pipes. The boiler may be heated by any ordinary means, or by a gas burner H corresponding in shape to the water chamber D. The products of combustion escape at I, I.

5566. Hinterberger, A. March 14.

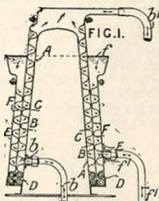
Heating air.—In ventilating hospitals &c., perforated pipes 1, which are in communication with

on a set-screw N^4 , adjustably carried by a lever N , formed of two plates pivoted at M^3 in the frame M which carries the bar G . The movement of the outer end N^2 is caused to control the supply of fuel to the burner, or otherwise to regulate the supply of heat to the generators. In a modification, both tubes are fixed to the bar G , the regulation of the temperature at which the apparatus begins to act being effected solely by the set-screw N^4 . In a further modification, the two pipes are connected by a flexible bend, and the lever is pivoted to each pipe, so that the relative movement due to differences of expansion produces a movement of the lever. Bars enclosed or surrounded by pipes, coiled or otherwise, may replace the pipes H and K , and, in place of using two tubes of different metals, a single U-tube may be combined with a tie-rod of different metal.

5824. **Bryan, L. A.** March 17.

Heating liquids.

—Relates to cooling-apparatus for milk and other liquid, in which the heat abstracted is utilized for heating new milk passing to pasteurizing, sterilizing, or other heating-apparatus. Spiral partitions B, F , fixed to the outer and inner cones A, E , lie against the loose central cone C , and a liquid-tight joint is made at the bottom by rings D when the parts are assembled. In a modification, a single spirally-ribbed plate lies loosely between two cones, and the liquids circulate in opposite directions on its two sides. Inlets and outlets for hot and cool liquids are provided at b, b', f, f' . Steam may be introduced above a partition in the central cone A for heating.



5923. **Philipson, W. H.** March 18.

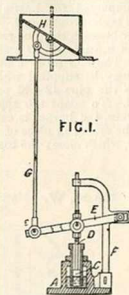
Drawings to Specification.

Heating air.—Wood is treated in kilns so as to obtain charcoal, tar, acetic acid in the form of calcium acetate, and waste gases which are employed for heating the air required in the kiln. Air enters a column through a tube at the bottom, and, passing up vertical tubes therein, is heated by a surrounding flame caused by igniting the waste gases after separating out the tar, acetic acid, &c

5984A. **Cope, J. T.** March 20.

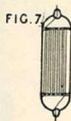
Thermostats.

—Relates to means for regulating temperature in stoves and for other purposes. The piston C is operated by the expansion of the mercury or mercury and air or gas contained in the metallic vessel A . The piston stem D is connected to the lever E mounted on the frame F and attached at one end to the zinc or other metal rod G , which rod operates the air-regulating valve H fixed near the top of the stove or hot-air chamber.



6028. **Feeny, V. I.** [*Allgemeine Electricitäts-Gesellschaft*]. March 20.

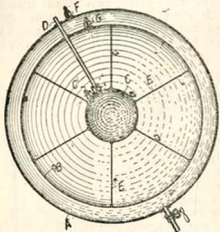
Heating by electricity.—Resistances intended to be heated electrically, and especially those made of metal having a high temperature-resistance coefficient, are constructed with small heat capacities, by winding wire on thin rods or tubes, or on flat or other open frames, or by coiling it helically in a thin tube. The wire may be coated with plastic material, and dried or heated, to produce a thin insulating-coating of varnish or enamel. Resistances made of oxidizable metal are enclosed in vessels which are exhausted or contain indifferent gases, as shown.



6039. **Dymond, G. C.**, [*Brady, J. F.*]. March 20.

Non-conducting coverings.—Liquefied air and other gases are stored for consumption by placing the liquid in the innermost of several concentric spheres made of a strong non-conductor of heat such as woven or knitted fabric, with or without a metal skeleton. The sphere C is stayed from the vessel B by ropes E ; it has a pipe D of non-conducting material leading to the outer air, and a spring valve C' which allows the gasefied liquid to escape into the vessel B . The sphere B is

similarly supported from the sphere A, and they have relief valves G, F.



6060. Borchers, W. March 20. *Drawings to Specification.*

Methods of heating.—Relates to a method of, and apparatus for, obtaining high temperatures for smelting metals and other like purposes. Heat is produced by the combustion of solid fuel alternately in one of two chambers, or in one of two groups of chambers, while the fuel in the other chamber or group of chambers is heated by the escaping gases. The combustion is only carried so far as to produce carbonic oxide, so as to enable temperatures to be obtained higher than those at which carbonic dioxide and water are dissociated. Oxygen, or air charged with oxygen, may be used to support combustion, and it may be heated and compressed before use.

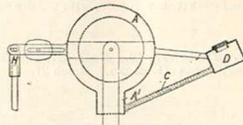
6067. Vignon-Danto, J. M. J. E. March 20. *Drawings to Specification.*

Heating air; heating by electricity.—In an electric drying-apparatus for fabrics, air is heated by passing it through tubes consisting of a mixture of carbon and clay and heated by electric currents.

6521. Knüttel, F., and Berliner Actiengesellschaft für Eisengiesserei und Maschinenfabrikation. March 25.

Heating air.—Relates to malt drums of the construction described in Specification No. 508, A.D. 1899, and consists of a slowly-revolving drum *a*, which is provided with a perforated central tube *b* closed at one end, and a number of perforated peripheral tubes *g*, which are closed at the ends opposite to the closed end of the tube *b*. Air for drying and curing the malt is admitted through the tubes *g*, passes through the malt, and finally escapes through the tube *b*. The air is moistened by mixing it with steam, and is heated while in the tubes *g* by a heating-agent contained in tubes *f*,

6293. Drummond, D. March 23.

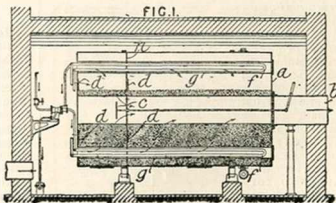
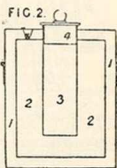


Thermostats.—An apparatus for automatically regulating the heating or ventilation of buildings, or railway carriages, is shown in the Figure. The annular vessel A is filled with expansible liquid and the chamber A' with mercury, so that a rise in temperature causes the mercury to be forced up the tube C into the box D, and the lever H, which is connected to the ventilator or heat-controlling valve, to be raised.

6414. Joly, C. March 24.

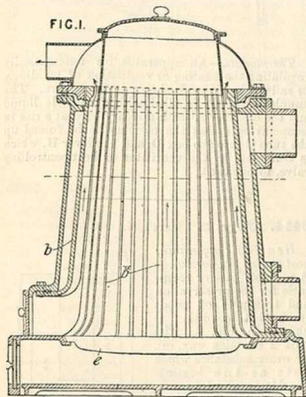
Heating apparatus; heat-storing apparatus.—

A portable case or receptacle for the preservation and transport of goods in a hot condition is shown in Fig. 2. The part 2 contains wax, oil, or other substance which acts as the heating-medium, and is surrounded by slagwool or other non conducting material in the casing 1. The goods to be kept hot are placed in the compartment 3, which has an insulating-cover 4. The non-conducting bottom is removable so that the apparatus may be heated. The heating-medium may be placed centrally, and the goods surround it. For liquids, such as tea, coffee, &c., the containing-vessel is provided with a draw-off cock.



which extend the length of the tubes *g* and are mounted so that they revolve with the drum.

6549. Fletcher, T., Neil, J., and Fletcher, Russell, & Co. March 27.

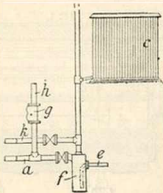


Heating water.—Relates to upright boilers, as used for heating conservatories and other buildings, of a cylindrical or conical form having outer and inner shells so constructed as to leave a water space between the two shells, the fire being placed inside the inner shell. Fig. 1 shows the boiler in vertical section. A series of vertical ribs *b*^x are cast in one piece with the internal shell *b*, and project inwardly over the grid *e* which supports the fuel.

6714. Codd, T. J. March 28.

Heating buildings; heating liquids.

—Relates to the heating of buildings, or water or other fluids contained in reservoirs, by means of exhaust steam. From the main exhaust connection *a* the steam is carried through an ordinary valve and separator before travelling to the radiator *c*. In the



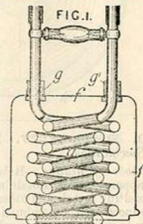
atmospheric pipe *h* there is a balanced non-return valve *g*, which allows the steam to escape when the pressure rises above that of the atmosphere, and which closes when the pressure falls. A condensed-steam pipe *e* and siphon *f* and a branch connection *k* for live steam may be provided.

6779. Staege, A., and Tornow, C. March 29.

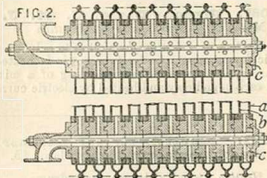
Heating water.—

Relates to apparatus for heating water by an ordinary kitchen range or cooking-stove for baths or other purposes. The water feed and flow pipes are connected to the coil *a* with upstanding ends joined by a handle. The coil slides through muffs arranged in the top of the hood *f* which rests on the range or stove.

The lowest turn of the coil rests upon the burning fuel. In another arrangement, for use with a deep firebox, the hood *f* is dispensed with, and the guiding-muffs *g*, *g*¹ are secured in a metal plate.



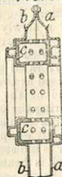
6826. Fouché, F. March 29.



Heating liquids; heating gases;

heating buildings &c.—Relates to apparatus for effecting exchange of heat between fluids, and more especially to the elements or parts of such apparatus. These elements consist of chambers or narrow passages formed by the junction of pairs of metal plates, and are connected together by one or more series of hollow cores which form continuous channels with branches leading into each element. The apparatus may, according to the

FIG. 10



Provisional Specification, be used for heating liquids or air for heating buildings and structures. One form of apparatus is shown in Fig. 2. The plates *a* and *b* are joined together, and have cores *c* interspersed between them. The several parts are connected by rods and bolts. The metal plates may be corrugated. In a modified apparatus, one series of cores *c* only is employed, the inner channel being divided by a partition. This partition may be omitted, and the inlet and outlet may be common. The passage from one element to the next may be closed by a partition alternately above and below. Instead of solid cores, hollow perforated parts *c*, as shown in Fig. 10, may be employed.

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

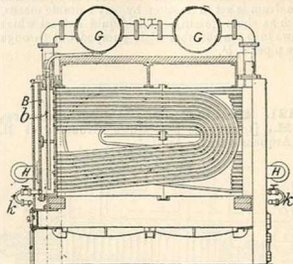
Non-conducting coverings and compositions.—Relates to the manufacture of non-inflammable material, which is also a non-conductor of heat. The refuse of coco-nut husk is combined with fibrous materials such as paper pulp, wood pulp, rag pulp, or asbestos fibre, and mica &c. and magnesium silicate or carbonate,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

7033. **McPhail, H.** April 1.

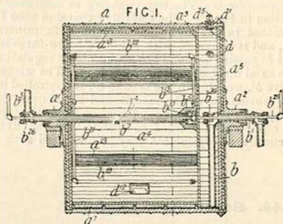
Heating water.—U-shaped tubes are arranged, as shown, in connection with vertical headers *B* to form one or more elements, which, when several are employed, are preferably arranged side by side in a casing, with the tubes pointing in opposite directions, and heated by one or several furnaces. The Figure shows, in sectional elevation, a steam generator so constructed, but the invention may be applied to apparatus for heating water.

(For Figure see next column.)

7033.



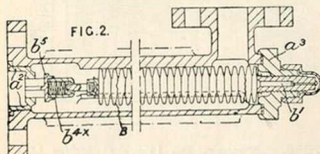
7066. **Young, D., [Vaughn Machine Co.]**
April 4.



Heating liquids.—Relates to leaching-apparatus especially adapted for leaching tan bark. For this purpose, the tan bark is enclosed in a rotating drum, and subjected to the action of heat and water &c., which results in the extraction of the tannin. The leaching-chamber *a*¹ is provided with a number of liquor outlets *a*², which discharge into the chamber *a*³ through holes in the partition wall *a*². The chamber *a*¹ is provided with a liquid inlet, consisting of a pipe *b*¹ with perforations *b*², which is supported by a frame *b*³ attached to the wall *a*². The chamber is heated by steam which enters through a pipe *b*⁴ coupled to a fitting *b*⁵. Branch circulating pipes *b*⁶, *b*⁷, *b*⁸, *b*⁹, *b*¹⁰, &c. pass from the fitting *b*⁵ and through the chamber, and the steam is finally exhausted through a pipe *b*¹¹. The steam pipes passing through stuffing-boxes *b*¹², *b*¹³ are free to turn therein so that the heating-apparatus may revolve with the drum. Safety-valves *d*, each controlled by a spring *d*¹, are connected to the chamber *a*³, and are adapted to be operated by an actuating-device such as a bar *d*² during the revolution of the drum. In operation, the chamber is charged with tan bark, and

water or leaching-liquor is admitted. Steam is then circulated through the heating-pipes, and the drum is set in motion by any suitable means, such as chain gearing. The liquid extract which flows into the chamber *a*³ is pumped out through the pipes *b*, *b*¹.

7121. Grouvelle, J., and Arquembourg, H., [trading as Soc. Jules Grouvelle et H. Arquembourg]. April 4.

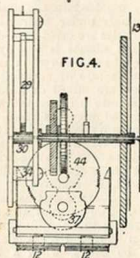
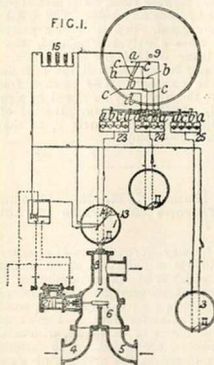


Steam traps.—The trap is shown in longitudinal section in Fig. 2. The metallic expansion tube B, enclosed in the casing, is charged with mineral oil, and is provided with a hollow screw-threaded rod *b*¹ passing through the cover *a*³ for regulating the axial displacement of the tube *b*. The winged valve *b*⁵, working in the seating *a*⁴, is controlled by the movements of the tube B, and closes upon the escape of the water of condensation from the pipe or other steam-charged receptacle. When fixed vertically, the spring *b*^{6x} may be dispensed with.

7144. Schultz, H. April 5.

Thermostats; heating liquids; heating gases.—Relates to electric apparatus for automatically regulating the condition of gases and liquids in respect to heat, pressure, vacuum, density, or humidity, either to maintain the state at a pre-determined degree, or to increase or reduce it. Fig. 1 is a schematic diagram of three heat-regulating devices controlling by clockwork, and Fig. 4 shows a part of the regulator mechanism. The temperature in the chamber 7 is kept constant by the operation of the slide valve 6 which controls the admission of the cold and hot fluid by way of the ports 4 and 5, the valve being operated by the hydraulic piston 21 which is worked by the relay and battery 15, the movements being due initially to the metal thermometer 8. The hand 13 of the regulator 1 is controlled by the clock 9, 10, and the hand 14 by the thermometer through the medium of the segment 29 and pinion 30, and the electromagnets 12 excited through contacts *a*, *b*, *c*, *d*. By turning the curved disc 37, one of two clicks 34 actuated by electromagnets is made to engage with the ratchet-wheel 44 through the intermediary of which the movement of the contact-hand 13 is being controlled. When the hands

13 and 14 meet, the slide-valve mechanism is set in motion. Contact-rails 23, 24, and 25 are provided to impart the desired motion to the hands 13, so that the regulator 3 may have eight times the

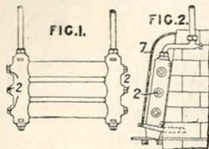


speed of the regulator 1. By omitting the time piece 9 and contact-rails, the apparatus may be used as a thermostat. When employed in connection with a malt-drying installation, the apparatus may be used uniformly and gradually to raise the temperature to a given maximum temperature. The apparatus may also, in conjunction with a pressure gauge, be employed for regulating the supply of fuel in coal-dust furnaces.

7217. Smith, B. G. April 6.

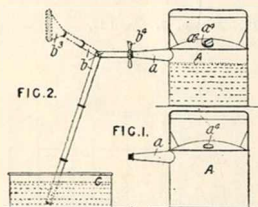
Heating water, boilers for. The hot-water boiler for domestic use shown in Fig. 1 consists of a series

of tubes parallel to one another and connected by tubes at an angle, each tube having an independent screw or plug inlet 2 by which its interior may be



cleaned. The boiler is shown in position in a grate in Fig. 2, and is protected from ashes or dirt by a perforated shield 7.

7240. Ansell, W. G. April 6.

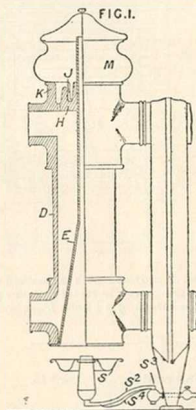


Heating water.—A kettle A is provided with an elongated spout *b*, by which the steam may be discharged into the water in a pail, bath, or other container C, to heat the same. The elongation *b* is connected to the kettle spout *a* by a screw union *b'*, and may be turned up and fitted with a sprayer *b''* so as to make the kettle serve as a bronchitis kettle. The spout *a* is connected to the steam space, and the top *a'* is provided with a screw-stoppered filling-aperture *a'*.

7347. Denyer, E. A. April 7.

Heating water; heating buildings.—A water-heater, which may be a self-contained radiator or may be applied to other sectional radiators, is shown in Fig. 1. The annular space between the outer casing D and the tapered tube E forms the

water chamber. The water reservoir M is in communication with the channels J and K in the plug H, and with the water jacket or chamber. The water is supplied by siphon action. The combustion products, after passing to the water reservoir,

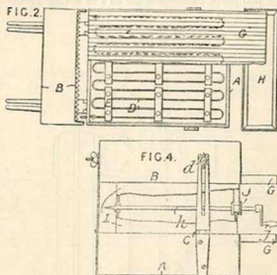


escape to the atmosphere, or they may escape directly. The burner is provided with the annular cup S, and is carried by the pivoted arm S², and the gas valve S¹ has a slender lever S³ which is pushed over to the arm S² to turn off the gas. To ignite the gas, the burner is withdrawn from beneath the tube or chamber E. According to the Provisional Specification, tubes may be placed across the heat space to connect opposite parts of the water space.

7415. Cary, J. B., and Delevy, M. C. V. April 8.

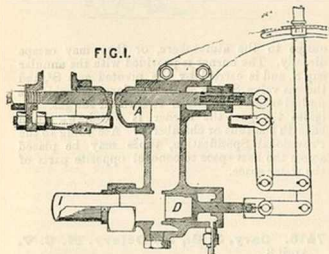
Heating by electricity.—A cooking-apparatus consists of two metal boxes A, B, Fig. 4, connected by slotted hinges C, screws, and clamping-nuts *d*, so that they may be held in contact, or one at some distance above the other, as shown in Fig. 4. Each box is closed by a sliding corrugated enamelled iron plate G, which extends forward to convey drippings to a separate receptacle H, shown in plan in Fig. 2; the enclosed space contains iron heating-wires D clamped between insulating strips E, or incandescent lamps. With the boxes in contact, a steak may be cooked between the corrugated

plates. When the boxes are separated, a rectangular shield I, Fig. 4, may be placed between the corrugated plates, to form an oven; the shield



carries a spit *h*, provided with a toothed wheel *J* engaging a spring pawl, to retain it in any position to which it is turned by a handle *j*.

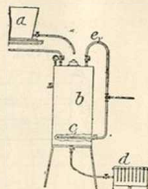
7952. Langridge, J. April 15.



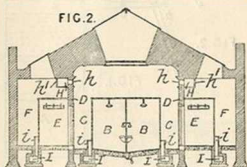
Thermostats.—The apparatus shown in Fig. 1 is for regulating automatically the flow of fluids. The expansion of the rod *A* causes the piston valve *D* to be moved through the medium of the lever arrangement *C*, so cutting off the passage to the discharge pipe *I*.

7985. Olivier, A. Oct. 29, A.D. 1898, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1893].

Digesters.—A glucose solution of the strength required by brewers and others is obtained by the saccharification of starch or other amylaceous substance in a digester *b*, which is fitted with a steam pipe *c*. The amylaceous substance, mixed with water, is run from a trough *a* into the digester, previously charged with water and sulphuric acid. The saccharification is conducted in the usual way, and after its completion the steam is shut off, the acid is neutralized by any convenient means, and the glucose solution is forced through a filter-press *d* by means of steam introduced into the digester from a pipe *e*.



7992. Kane, J. April 17.



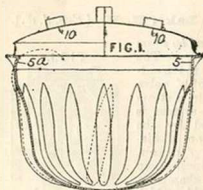
Heating buildings.—Fig. 2 shows a transverse section of a public bath, to which warm and fresh air is supplied through vertical shafts at the end of the building communicating with horizontal shafts *H* on the walls *D* fitted with lateral openings *h* and *h'*. Air is exhausted through short vertical shafts *i* leading to the main shafts *I*.

7995. Wicks, J. T. April 17.

Hot-water bottles.—Hot-water bottles and like hollow-ware articles of india-rubber are moulded without seams, fins, or taped joints in a vulcanizing-mould of the shape required, under the action of heat sufficient to vaporize water which is contained in the article. Instead of water being vaporized, steam may be blown into the article.

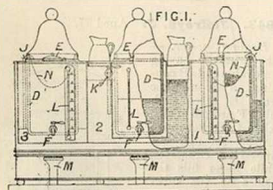
Handles and funnels may be attached as desired. According to the Provisional Specification, the mould may be of aluminium, or may be lined with aluminium or other white metal.

8129. Gardner, S. April 18.



Boiling-pans.—Relates to laundry and cooking coppers, boiling-pans, and other metallic hollow-ware or vessels for heating water or other liquids. The bottoms, sides, or both parts of the vessels are corrugated to aid in the heating or in the prevention of boiling over, or in stirring. The bodies and other parts may be made by casting, or of sheet metal by stamping, drawing, or spinning. In the boiling-pans, Fig. 1, the corrugations may be vertical or inclined. The form of the mouths 5, 5 are shown different in the two halves of the Figure. Grids 10 are provided for the escape of steam.

8322. Druce, E. April 20.

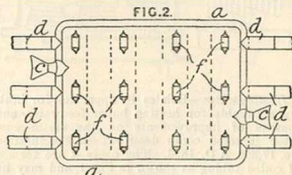


Heating water.—Relates to apparatus for making coffee, boiling water, &c. Fig. 1 shows a front elevation, partly in section. The water is forced by steam pressure up the pipes J; it may be drawn off through the cock K.

8353. Davies, A. April 21.

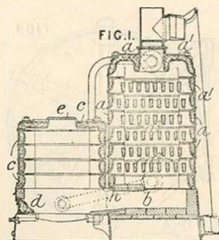
Hot-water bottles and similar heating-apparatus.—Relates to means for applying external heat to the bodies of horses &c. A hot-water vessel *a*,

with filling or emptying stoppered funnels *c*, is secured by straps *d* to the animal. The straps may be secured direct to the vessel, or may be passed



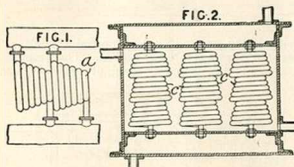
through loops *f* on one side of the vessel. The vessel *a* is provided with internal strengthening-ribs.

8368. Keith, J. April 21.



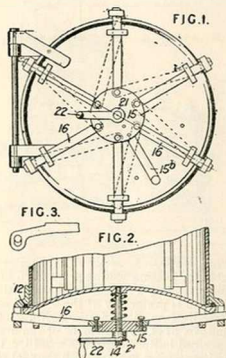
Heating water.—A sectional hot-water boiler applicable for heating buildings is shown in Fig. 1. According to the Provisional Specification, the main portion is preferably of the vertical sectional type described in Specifications No. 2709, A.D. 1879, and No. 5744, A.D. 1885, or of the horizontal type described in Specification No. 3013, A.D. 1887. The auxiliary water-heater *c* with the fuel chamber *d* and firing-door *e* is fitted alongside the main boiler *a*, and is in sections, or may be tapered and in a single piece. The fire-gases pass into the combustion chamber *b* by the flue *h*. The sections *a'* have cross-tubes *a''*.

8414. Makin, E. April 22.



Heating water.—Relates to apparatus for heating applicable for heating boiler feedwater, and consists of improvements on the steam-generator jacketed cones described in Specification No. 17,358, A.D. 1896. The cones *a* are formed of coiled tubing as shown in Fig. 1, and may be jacketed by suitable cast metal. Several such cones may be formed out of one length of pipe, and these multiple cones *c* may be connected at the bottom to a common water supply and at the top to a steam pipe or chest.

8443. Shaw, T. April 22.



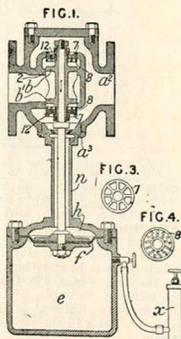
Digesters.—Doors for apparatus under pressure, such as "steam boxes or retorts for cooking canned "fish and the like," are pressed against a rubber-packed seating 12 by a series of bolt levers 16 connected to a disc 15. The disc is mounted on a central stud 14 secured to the door, and by turning it the bolt levers are shot or withdrawn. The bolt levers being shot, the door is pressed to its

seat by turning the nut 21 by means of the handle 22. The handle 15^b is provided for turning the disc. The hinges are formed with elongated holes as shown in Fig. 3, to allow the door to be pressed to its seat.

8677. Lake, H. H., [Este, J. d.]. April 25.

Heating by steam circulation.—

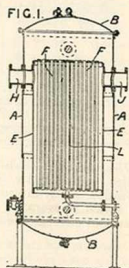
The pressure in the outlet *a*² of a valve for use in a steam heating-system is regulated by the action on a diaphragm *f* of air, driven by a pump *x* into a chamber *e*, and fluid which passes through openings *a*³ and a tube *n* to a chamber *h*. The diaphragm is connected to the valve spindle, which carries two valves *b*, *b*¹, having seats 2, 3, and two mufflers each consisting of perforated sections 7, 8, between which is situated muffling material 12 of wire gauze &c.



8843. Jeffreys, J. April 27.

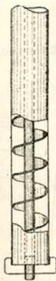
Heating water.—

The drum *A* having removable ends *B* contains a concentric drum *E* fitted with tubes *F* around which exhaust or other steam flowing through the pipes *H*, *J* circulates, while water fills the insides of the tubes and the space between the drums *A*, *E*, which are secured to each other by the junctions of the pipes *J*, *H* and by angle lugs and bolts fitted in slotted holes to allow for expansion. Diaphragm plates *L* are used for circulation and to remove grease from exhaust steam.

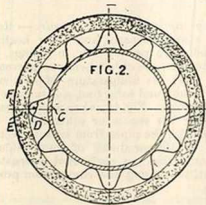


9379. Green, G. May 4.

Heating liquids; heating gases.—The tubes of feedwater-heaters and other apparatus for heating liquids and gases by means of steam or water are provided with a loosely-fitting metallic worm or screw to cause the steam or water to revolve and thus bring it into the form of a thin annular stream in contact with the walls of the tube. The worm or screw may be mounted and secured as shown, or in any other convenient way.



9397. Chapman, W. H. May 4.



Non-conducting coverings.—Relates to non-conducting coverings for boilers, pipes, or other surfaces, in which air spaces are provided by coiling round the surface C the metal or other strip D, and by placing upon this strip insulating-material E of asbestos, slagwool, silicate cotton, hair felt, or magnesia provided with the outside covering F of durable substance.

9426. Lake, H. H., [Bianchini, G.]. May 4.
Drawings to Specification.

Heating water.—In a process for treating grain, the grain is moistened by water, warmed by being passed through pipes immersed in a hot-water bath.

9474. Humberstone, W. May 5.

Heating water.—A boiler, such as is used in kitchen ranges for heating water for baths &c., is shown in sectional plan in Fig. 2 and in sectional elevation in Fig. 3. The front of the boiler is made with two corrugations b, the openings to which are covered by plates d. The plates are secured by a cross-bar e, and are perforated at d', so as to cause the water to circulate. In a modification, the corrugations are arranged underneath the boiler, and one of the perforations in each plate is fitted with a short vertical tube to assist the circulation.

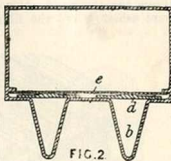


FIG. 2

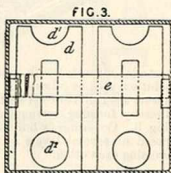


FIG. 3.

9710. Bussey, J., and Duckering, S. May 9.

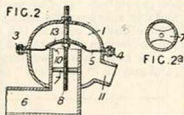


FIG. 29

Thermostats.—Relates to a thermostat for incubators and other apparatus required to be kept at a constant temperature. The passage of gas from the inlet 6 to the outlet 11 to the burners is controlled by a valve 13, to which and between the flanges 3, 4 of the casing is secured a rubber diaphragm 5. The valve is actuated by a spindle 8 screwed thereto and sliding in holes in the guide 7 and the cover 1. A V-groove 10 serves as a bypass when the valve is closed. The spindle may be operated by means of an ether expansion box, expanding metal bars, a float on mercury, or other apparatus inside the incubator &c.

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

Non-conducting coverings and compositions.—Relates to flexible sheets for lining or wrapping pipes, flues, boilers, bulkheads in ships, for wall and other

coverings, and for fireproofing buildings or insulating heated surfaces. The sheets are in three layers, the inner and outer layers being of nearly pure asbestos, and the filling or core of fibrous

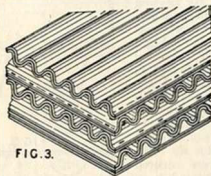


FIG. 3.

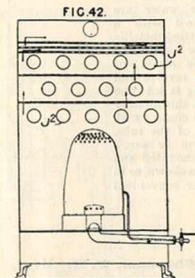
material saturated with incombustible hardening-solution, such as silicate of soda. The composite sheets are run between heated corrugating-rollers, thereby forming corrugated sheets as shown in Fig. 3. Coverings or building-blocks may be composed of several layers of sheets which are laid crossing each other.

9935. Joly, G., and Millar, C. C. H.
May 11. *Drawings to Specification.*

Heat storing apparatus; heating water; foot-warmers; heating-apparatus.—Relates to the storage, preservation, and transport of heat, or latent heat, for heating, cooking, and other purposes, including steam generation for the production of power. A suitable substance melted and enclosed in a transportable case is used as the heat-giver. Non-conducting coverings are employed to prevent loss of heat. The heat-storing vessels are renewed as required, and may be "preserved" in insulated

compartments. For the storing of heat in foot-warmers, which are insulated, melted zinc may be used.

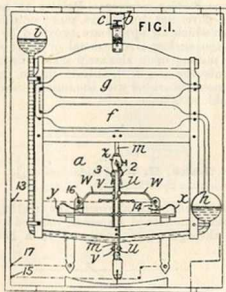
9982. Driessche, L. V. May 11.



Heating apparatus; heating air.—Relates to burners, stoves, furnaces, and other heating-apparatus, and more particularly to casings, bells, or arches therefor, the object being to prevent loss of heat, to raise the temperature of combustion of gaseous, liquid, and solid fuel, and in some cases to consume smoke. Fig. 42 shows an arrangement for warming air for rooms or other spaces. The air passes through the pipes from back to front, and is warmed by the products of combustion. The casings or arches are perforated alternately back and front, so causing the combustion products to circulate.

10,150. Golby, F. W., [Morgenstern, L.]
May 13.

Thermostats.—The pendulum thermostat shown in Fig. 1 is adapted to close an electric circuit to open or close valves, shutters, or the like for regulating the heat of rooms &c., and the electrical contacts are so arranged that the electric current required for controlling is momentary. A mercury and air thermometer is suspended from the bracket *b* by screws *c* in the box *a*. The bulbs *g, f* are filled with compressed air, and the bulbs *h, i* in part with mercury. The pendulum arrangement is central when the temperature is normal. The rod *m* with weighted extremity carries the sleeve *z*, which carries two bent arms 2, 3, adapted to trip the vertical swinging levers *u, v* when the frame swings to one side. The levers *u, v* have arms *w* which make contact with the springs *x, y*. Leads are connected to the contacts 14 and 16 from the terminals 13, 15, and 17 as indicated and to two electromagnets, which by attracting their armatures

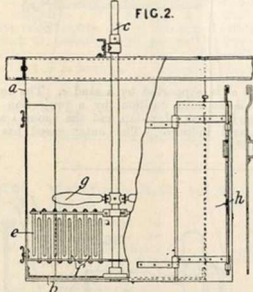


control the dampers, valves, &c. According to the Provisional Specification, for high temperatures as in malting, in conservatories, &c., the pendulum may be suitably loaded on one side or the air in the thermometer rarefied.

10,181. Bestwick, G. May 15.

Non-conducting coverings.—A covering for preventing radiation from boilers, steam pipes, and the like is made by steeping corozo nut in chloride of lime and then grinding it to a powder. Cotton seed, cork, and either flue dust or carbon are then added, and the mixture is made into a paste with a liquid obtained from the star fish or jelly fish. The paste is passed through rolls and pressed into a band suitable for covering purposes.

10,195. Müller, A. May 15.

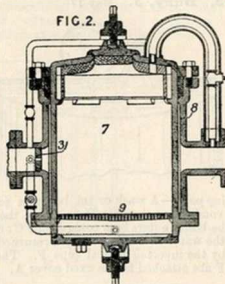


Boiling-pans.—Relates to the extraction of hops in the process of brewing, and consists in the use of the apparatus shown in Fig. 2, which is immersed in the wort in the wort copper. It consists of a cylindrical vessel *a*, in which the hops are placed and which is provided with a sieve bottom *b* and a revolving shaft *c* carrying rakes *f* or the like *e*, which revolve between fixed rakes *f*. Helical blades *g* are also fixed on the shaft *c*. At the end of the operation, a number of doors *h* are opened, and the contents of the vessel are mixed with those of the wort copper. In a modification, the vessel rests on the bottom of the wort copper, the sieve bottom *b* is dispensed with, and the casing *a* is perforated to allow access of the wort to the interior of the vessel.

10,312. Mills, C. K., [Edison, T. A.] May 16.

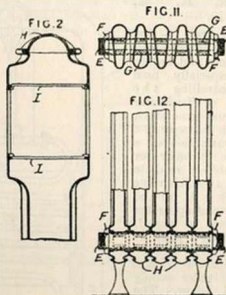
Heating air.—Relates to the heating of compressed air by deflecting a portion of it into contact with a source of burning material and causing it to re-unite with the air from which it was deflected. The air, except the deflected portion, may be heated

by surrounding the combustion chamber 7 with a jacket 8. The fuel is burnt on the grid 9, and the part of the air to be heated directly is admitted through a retarding-device such as a valve or perforated disc 31, so as to cause the air to flow



through the by-pass. The heating-chamber is shown in the Specification in combination with a compressor, a storage tank, a rock drill, and an air engine.

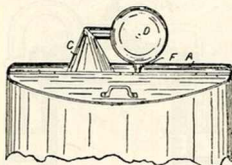
10,330. Crittall, R. May 16.



Heating buildings &c.—Relates to radiators for heating or cooling rooms and the like by water, steam, or cooled brine. The sections of the radiator are made from metal tubes by stamping or pressing by suitable dies, and are connected together by suitable devices, preferably as shown in Figs. 11 and 12. The perforated tube E with screw-threaded ends passes through the bosses of the sections, and is provided with tightening-nuts F. The tube E communicates with the sections by

hoies G. The sections may be closed with stamped metal caps H, connected by turning or beading the ends, as shown in Fig. 2, and may have abutment pieces I introduced to prevent collapse.

10,373. Duffy, J. May 17.

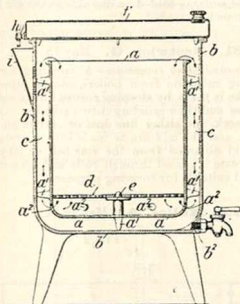


Boiling-pan.—A wash or set boiler is provided with a condensing-chamber D, to which the steam from the boiler enters by a conical pipe C and from which the water of condensation is returned to the boiler by the inverted conical pipe F. The pipes C and F are attached to the fixed cover A.

10,570. Brown, J. May 19.

Boiling-pan.—A boiler for washing has two vessels *a* and *b* with a space *c* between, and a

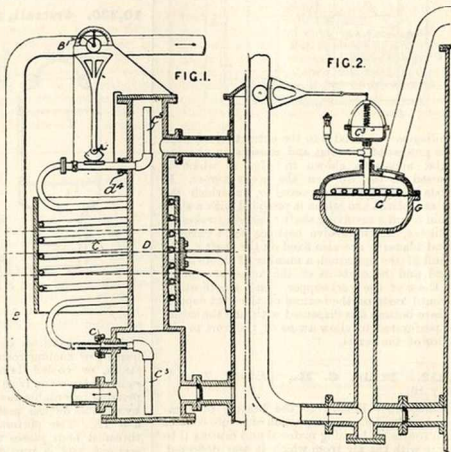
hollow lid *f*, which serves as a hot-water cistern, arranged as shown. The inner and outer vessels communicate by openings *a'*, and the perforated



bottom *d* is supported by a stud *e*. The inner vessel is kept in position by a projection *a'*. The tap *h* acts as a feed-tap, and the spout *i* as a water-level indicator. The outer vessel has an outlet *b'*.

10,606. Shattuck, A. R.
May 19.

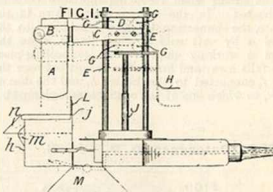
Thermostats. — Relates to thermostatic regulators and indicators, especially used for controlling the supply of feedwater to steam generators, in which the expansion and contraction of a metallic tubular or solid body is made to control a suitable valve or cock. A tubular coil form of apparatus is shown in Fig. 1. The stand pipe D communicates with the steam space above and the feedwater supply pipe B below. The tubular coil C has its lower end rigidly secured to the pipe D, while its upper end is free to move through the stuffing-box *d'* and so communicate its motion through the means shown to the valve stem B'. Vertical tubes *e*, *e'* are



connected to the ends of the tube C within the stand-pipe. Change of water level in the steam generator and in the tube C causes the coil to expand or contract and so operate the feedwater valve. In Fig. 2, a tubular spiral modification is shown. The spiral C contains fluid, is placed in a chamber G communicating with the steam space and feedwater, and transmits its movements to a flexible diaphragm C'. In other modifications described in the Specification, the body C is solid, and is coiled or zig-zag shaped within a closed chamber communicating with the feedwater and the steam. The device may control a valve for the admission of steam to a pump, and means for controlling a forced draught or a damper or the flow of combustible to an oil or gasoline burner, and may actuate a signal or alarm, visible or audible, so acting as a water-level indicator.

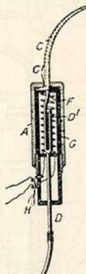
10,736. Hughes, F. May 23.

Heating-apparatus.—Relates to improvements in the apparatus described in Specification No. 29,938, A.D. 1897, for liquefying and applying adhesive materials, and therein stated to be applicable for use in sealing bottles &c. with wax, for applying the adhesive material of medical and other plasters, or for melting shellac, gutta-percha, &c. for electric insulation. The wax &c. A is held in a spring clip B at one end of the arm C attached to a block D, provided with grooved pulleys G to facilitate its movement up and down the pillars E. The block D is lowered by depressing the finger-plate H, and is raised by a spiral spring contained in the pillar J. The receiver n is held in place by a headed pin L, which passes through an open-ended slot in the back j of the scoop h containing the heater or bolt m. A hollow foot M is provided. In other respects the apparatus is stated to remain as described in the earlier Specification.



10,794. Waterman, E. R., and Morison, R. R. May 23.

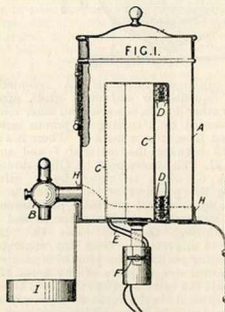
Heating air; heating by electricity.—Relates to an electric air-heater for dental work and other purposes. The central air-conducting pipe D and coil D' are surrounded by an electric heater F, the parts being enclosed in a chamber A with insulating-lining G. The nozzle C has a base-piece C' fitting within the chamber A. Air is forced through by a hand-compression bulb or by other suitable means, and the degree to which the air is heated is controlled by means of the hand-pressed contact device H. The warm air current is intended to dry teeth or cavities therein, and may also be used for making sensitive teeth absorb medicine.



10,795. Waterman, E. R., and Morison, R. R. May 23.

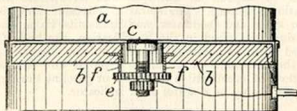
Heating liquids.—Relates to apparatus for heating liquids by electricity or other means. A double-walled C-shaped chamber C for receiving the heater is centrally secured within the liquid

containing vessel A having a draw-off cock B at one side. The interior portion of the chamber C is in open communication with the outer vessel A. The heating-coil is inserted from below, and is



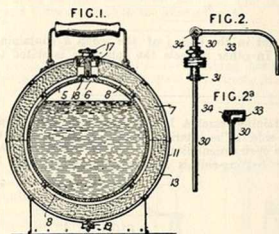
made as shown at D and insulated from contact with the chamber walls. Wires E connect the coil with suitable terminals and switch F. A bracket with a receiver H into which the vessel may be set, and a hanger I for a cup, may be provided.

10,839. Schindler, F. W. May 24.



Heating by electricity.—Cut-out device for breaking the circuit when a cooking-appliance becomes overheated. In the arrangement shown in the Figure, the connecting-device *c* is soldered to the vessel *a* by soft solder, which melts when the vessel is working empty. The connecting-piece then falls away and breaks the circuit between the ring *f*, connected to the heater *b*, and the disc or nut *e*, to which one of the conductors is clamped.

10,883. Ostergren, O. P. May 24.



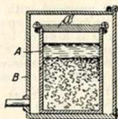
Non-conducting coverings.—A receptacle for storing liquefied air and other gases, applicable also for other liquids, comprises an inner receptacle 5 surrounded by a coating of porous material 7 separated from it by a space 8. There is a similar space 13 between the material 7 and an outer casing 11. The receptacle is filled through an aperture 6, which is closed by a valve 18, allowing the products of evaporation to escape into the space 8, and gradually pass through the porous material 7 into the space 13 and finally escape through the safety-valve 19. If it is desired to liberate gas from the apparatus for refrigerating purposes, the plug 16 is unscrewed so as to uncover one or more of the holes 17 in it, and to lift the valve 18, when the gas in the space 8 and the space above the liquid consequently escapes. The liquid may be drawn off by inserting a siphon 30, with a disc 31 to close the aperture 6 so that the pressure of the gas may expel the liquid. The spout 33 controls the valve 34. A vacuum space may be substituted for or used in conjunction with the porous material. The outer casing may be silvered or polished to reflect heat rays.

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

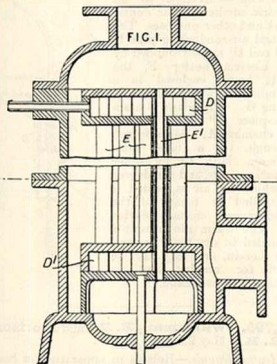
Non-conducting coverings and compositions.—Relates to mortars suitable for building purposes and applicable also as non-conducting compositions. The composition consists of lime waste, vat or soap waste, and sand, ashes, or other silicious matter, ground together in a mortar mill. The materials may be dried or roasted before grinding, so that the composition may be stored in bags like cement. When employed as a boiler or pipe covering, the composition may be mixed with fibrous material, such as hemp waste, crude asbestos, coco-nut fibre, esparto grass, or paper-works refuse, and clay may be added to render the composition plastic and adhesive.

11,159. Boulton, A. J., [Marks, A. H.]. May 29.

Digesters.—A vessel A, closed by a cover *a* and used for devulcanizing india-rubber, is enclosed in an outer casing B, to which steam is supplied at a pressure of 125 pounds per square inch, to heat the inner vessel.



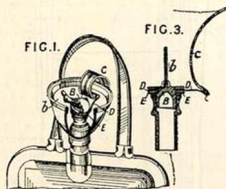
11,212. Kitchen, J., and Kitchen, E. E. May 30.



Heating liquids.—Relates to water or other heaters, and is applicable to feedwater-heaters,

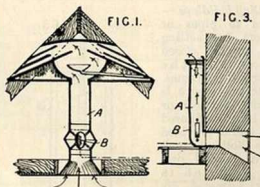
condensers, evaporators, and the like. In the steam heater shown in Fig. 1, the outer tubes E are connected to the inner walls of the chests D, D', and surround the inner and smaller tubes E'. The liquid to be heated flows around and through the tubes. The apparatus may be arranged vertically or horizontally.

11,277. O'Brien, A. G. May 30.



Hot-water bottles.—Relates to screw stoppers for rubber bottles. The stopper is connected by a tab C of rubber or other material to the lip or other part of the bottle, as shown in Fig. 1, so that the stopper cannot be misplaced. The tab C is attached to the stopper B, Fig. 3, by means of the washer D, which is loose around the stopper and lies upon the washer E fixed to the stopper. The hinged wing δ is fitted to the top for purposes of screwing up, and may be folded down out of the way.

11,312. Mackay, R. May 31.

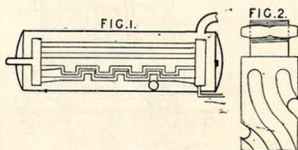


Heating air; heating by electricity.—An electric heater B is used for heating air for the ventilation of buildings or ships. Fig. 1 shows the heater arranged in an outlet pipe A for removing vitiated air. Fig. 3 shows a heater arranged in an inlet pipe A to raise the temperature of the incoming fresh air.

11,425. Bremer, H. June 1. *Drawings to Specification.*

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

11,612. Cope, J. T. June 5.



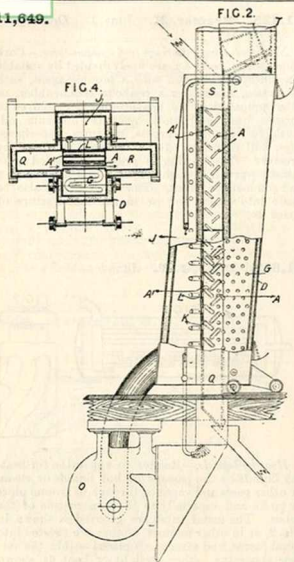
Heating liquids.—Relates to apparatus for heating liquids by the passage of hot liquids or steam or other gases and vapours, through or around pipes or tanks, and especially to the construction of the tubes. The metal tubes are grooved as shown in Fig. 2, or in other manner, or they are twisted into spiral forms, and afterwards placed within the surface apparatus, either straight or bent as shown above or below in Fig. 1. Tubes of square, rectangular, triangular, or other section may be so treated and employed. The ends of the tubes are attached to the plates by brazing, by packing, or by nuts and collars.

11,649. Boulton, A. J., [Correll, F.]. June 5.

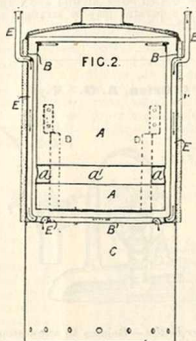
Heating-apparatus.—Relates to apparatus for heating granular, powdery, semi-fluid, or fluid material. The material passes between obliquely-arranged surfaces A, A', and is there subjected to a current of air, gas, steam, &c. passing from the chamber D to the chamber J, through openings L controlled by dampers K, whence it is drawn by a fan O and driven to a chamber Q, from which it may pass through the shelves A, A' to a chamber R communicating through a chamber S with a passage T. A series of heating-tubes G may be used. In a modification, one series of surfaces A is replaced by a perforated surface. The apparatus may be provided with feeding and discharging cylinders.

(For Figures see next page.)

11,649.

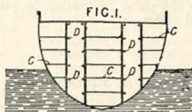


steaming articles of food and for heating water, milk, &c. comprises three parts:—An inner vessel A for the article to be steamed, an outer vessel B for the water and steam, and a chamber C for the



heating-appliance. The vessel B is covered with felt or the like to retain the heat. Pipes or flues E are formed in the vessel for the passage of hot gases or the products of combustion. Steam is admitted into the vessel A through openings a, which may be covered with U-shaped cross-pieces a'. The vessel A rests on a false bottom or supports D. In a modified arrangement, the pipes E are replaced by an annular recess.

11,659. **Dick, C. I.** June 5.



Thermostats.—The air space around crates containing fruit and vegetables for transit and placed on shelves C in a ship, is kept at a temperature of 60°–70° F. by passing steam from a boiler, or expanding ammonia, respectively, into pipes D, arranged as shown, and connected to cross-pipes provided with pipes and stop cocks to enable them to be connected with either the heating or cooling arrangements.

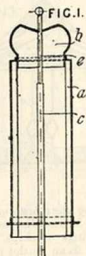
11,684. **Robinson, J.** June 5.

Heating liquids.—Apparatus for cooking or

11,838. **Todtenhagen, A., and Lemké, H.** June 7.

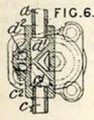
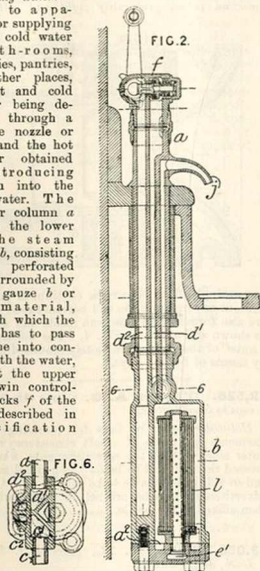
Heating buildings.—

Relates to pipes or radiators for setting upon stoves, closed fireplaces, and the like for heating rooms. The heating-pipe a is of corrugated iron or similarly figured metal, and is provided with a hollow cap b and a vertical partition c, which is readily adjusted by means of the extension e. The position of the partition c determines the quantity of the heated gases passing through the heating-pipe and the amount allowed to pass to the chimney direct.



12,163. Brophy, M. M. June 10.

Heating water.—Relates to apparatus for supplying hot or cold water in bath-rooms, lavatories, pantries, and other places, the hot and cold water being delivered through a single nozzle or spout and the hot water obtained by introducing steam into the cold water. The stem or column *a* has at the lower end the steam heater *b*, consisting of a perforated pipe surrounded by wire gauze *b* or other material, through which the steam has to pass to come into contact with the water, and at the upper end twin controlling-cocks *f* of the kind described in Specification

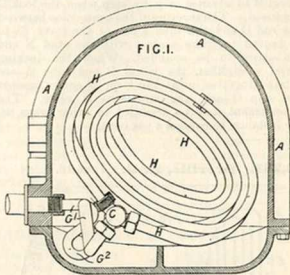


No. 12,162, A.D. 1899, [Abridgment Class Valves &c.], operated by cams. Suitable passages *c*, *c'* and *d*, *d'* formed in the column, and shown in section in Fig. 6, convey the steam and water introduced by the pipes *c* and *d* to the top of the column, and thence to the heater *b* by the ports *e* and *a* from which the water, either hot or cold, flows upwards to the discharge spout *j*.

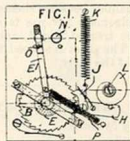
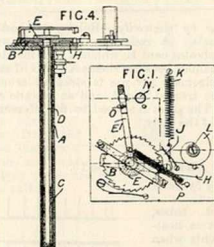
12,184. Alley, S. E., and Mathieson, D. June 12.

Heating liquids.—A number of flat coils of piping *H* are connected to a divided chamber or pipe *C*, which is mounted in end bearings in a casing *A*, so that the coils can be turned in and out of the casing when the door is removed. The two divisions of the chamber *C* may be connected, as shown, by flexible pipes *G*¹, *G*² with the supply and discharge branches, or the supply and discharge

of the steam or other heating medium may take place through the end bearings of the chamber *C*.



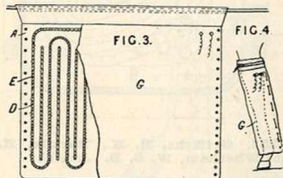
12,252. Griffiths, E. H., Darwin, H., and Whetham, W. C. D. June 12.



Thermostats and other apparatus for automatically regulating temperature.—Relates to mechanism for indicating a temperature limit and enabling a control to be kept of the temperature, in which a spring or other force is held inactive by an alloy, metal, or other substance until the temperature of fusion has been reached, when an alarm is sounded and the supply of heat cut off or reduced until an automatic resetting mechanism is brought into operation. The mechanism may be arranged upon the end of the tube, shown in Fig. 4, which contains the alloy and is capable of insertion through a saucen lid or of being otherwise arranged. An arrangement whereby an electrical contact is made and a signal given is shown in plan in Fig. 1. The ratchet-wheel *B* is attached to the tube *A*, and the disc *E* to the rod *D* which dips into the fusible substance or lock *C*. The lever *H* pivoted on the hub of the wheel *B* carries the pawl *J*, and is controlled by the spring *K*, which is stronger than the spring *P* which pulls on the lever *E* of the

disc E. The cam L, which is rotated by clock-work, causes the lever H to oscillate, and the wheel B to advance step by step when the lock C has fused. The severing of the connection between the rod D and the tube A causes the lever E' to be moved to make contact with the stud N and the alarm to be sounded. When the locking metal resolidifies, the wheel B and tube A are rotated together until the lever E' comes against the stop O and the apparatus is reset. The arrangement may be arranged in other ways, as, for instance, to control a gas cock.

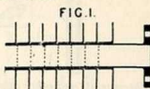
12,283. Greville, A. E. June 13.



Heating by electricity.—Relates to heat baths for animals. A resistance wire D is wrapped around asbestos cord E, which is then inserted in a zig-zag manner between sheets A and G of asbestos. The arrangement for use is strapped around the limb to be treated, Fig. 4, and an electric current passed. The sheet is shaped to fit different limbs or parts of the body.

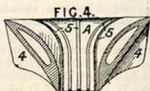
12,340. Rau, R. June 13.

Heating by steam circulation.—Ribbed tubes, which act as heating-elements when using high-pressure steam, comprise a copper or wrought-iron tube, over which flanged plates of copper or iron, as shown in Fig. 1, are forced and soldered to the tube or tinned together with the tube.

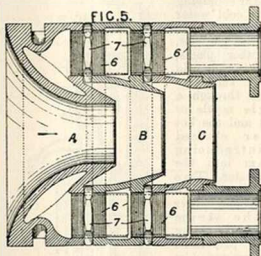


12,450. Makin, E. June 15.

Heating water.—Relates to apparatus of the kind described in Specification No. 19,016, A.D. 1896, consisting of a series of hollow-walled cones for use in the flues of steam generators, and water-heaters for heating buildings &c., or separately, for generating and superheating steam and



heating water. The cones A, B, C, Fig. 5, are now formed in one piece with the water-circulation passages, and are connected together by means of insert-on tubes, preferably right and left hand



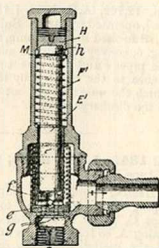
screw nipples 6, so as to form continuous passages without any separate top and bottom tubes. They are also formed with gills both inside and outside, as shown at 4 and 5 in Fig. 4. The collars 7 or "nuts" of the nipples are loosely mounted thereon by means of feather keys.

12,526. O'Brien, A. G. June 15. *Drawings to Specification.*

Hot-water bottles or bags for receiving advertisements are made of a soft consistency on the outer side, so that the advertisements, when impressed thereon, will be below the general surface, and so will be less liable to be rubbed off. Or the advertisement may be printed on fabric, which is then affixed to the bottle.

13,085. Lake, H. H., [Serrell, J. A., and Leith, M.]. June 23.

Thermostats.—Relates to thermostatic valves. An expanding piece E', which when expanded closes the passages e, f, adapted to put the inlet and outlet in communication through passages g, is held against an adjustable screw plug H by a spring F' engaging a shoulder h with or without a washer M. The invention is shown applied to a thermostatic valve of the kind described in Specification No. 9829, A.D. 1897.

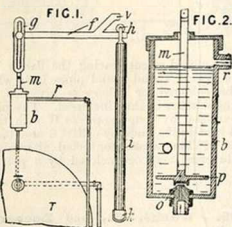


13,566. British Thomson-Houston Co.,
[Haskins, C. D.]. June 30. Drawings to
Specification.

Thermostats.—A tube, containing a few drops of highly-volatile liquid, such as chloroform &c., is curved and suitably supported. Upon attaining a critical temperature, the liquid volatilizes and the tube is straightened. This movement, in the case of an electric cut-out, serves to release a contact-arm, or to close a circuit through a magnetic cut-out. In a modified arrangement, electrical connection is made with the thermostat by means of a sliding connection, so that the effective length of the heating-tube may be varied.

The Figures applied to a water tank. A metal rod *i*, Fig. 1, having a large coefficient of expansion, is secured to a wall at one end *k*, and at the other end is provided with a roller *h* which presses on one arm of a lever *f*. The lever works on a pivot *e*, and its longer arm is adjustably attached to a slotted plate *g*. The plate is connected, by means of a rod *m* with a plate *p*, Fig. 2, which works inside the cylinder *b* and normally closes the nozzle *o* of the feed-pipe. An overflow pipe *r*, Fig. 1, connects the cylinder to the water tank *T*, to which various water pipes are connected. When the temperature falls, the metal rod contracts and causes the feed-pipe nozzle to be uncovered, so that water rises in the cylinder and slowly overflows into the tank and pipes.

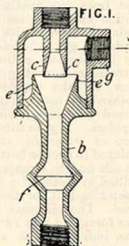
13,641. Schratzenstaller, J. July 1.



Thermostats.—A device for automatically preventing the freezing of water in pipes is shown in

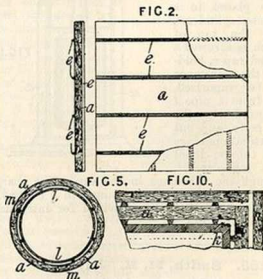
13,701. Phillips, R. E. July 3.

Heating water.—An injector or apparatus for heating water for lavatory basins, baths, and other purposes by steam is shown in Fig. 1. The steam inlet is formed with the nozzle *c*, and projects into the cone-shaped end *e* of the tubular portion *b*, which constitutes the hot-water outlet. The double cone *f* in the outlet portion *b* facilitates the mixing of the water from the inlet *g* and the steam. The steam and cold water supply pipes are, as usual, furnished with automatic valves.



13,989. Lamprecht, C. July 6.

Non-conducting coverings.—A non-conducting covering for boilers, steam tubes, ships' walls, and the like consists of a felt plate *a*, Fig. 2, covered on both sides with a layer of asbestos and having ribs *e* arranged on one or both sides. The ribs may be parallel or at right angles, or reticulated. Plugs or bearers may be used instead of the ribs. As applied to a steam pipe *l*, Fig. 5, suitably-shaped plates *a* are applied all round the pipe, and are secured by a metal cover *m*. A double felt cover may be used to cover the wall *k*, Fig. 10, of a boiler. The boiler is covered with a felt plate *a* ribbed on both sides, and outside this is placed a second felt plate *n*.



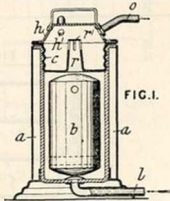
- 14,033. **Dunn, R. H., and Bromhead, S. S.** July 7.



Solar heat, utilizing.—Relates to a thermopile or "heliopile" for utilizing solar rays and other energy in order to generate a thermo-electric current, which may be transmitted directly for use or stored by accumulators. A rectangular pile is shown in Fig. 1. The couples *a* are insulated from one another by a material or composition such as glass or gutta-percha or other substance combined with "phosphuret of nitrogen," or nitrogen gas in a solution of phosphorus, or it may be asbestos or the like forming an opaque or transparent roofing for buildings and a container for the couples. Focussing-glasses are employed to concentrate the solar rays on the exposed junctions, which may be coated with lampblack. A glass tube *g*, through which liquefied gases, or water or steam, may be passed, is employed to cool or heat the unexposed junctions. The pile may be arranged so that it may be moved or tilted by means of a plate with holes to receive a fastening-bolt, or the apparatus may be on a swivel. The pile may be of oblong, circular, or other form, and may vary in size from one-eighth of an inch square to a surface twenty acres in extent.

- 14,134. **Fiedler, R.** July 8.

Heating-apparatus.—In apparatus for vaporizing substances, a hot body *b* is placed in a jacketed cylinder *a*, into the top of which is screwed a dish *c*, holding the substance to be vaporized. Air from a pipe *l* is forced over the hot body, and out by lateral openings in a tube *r*, closed by a top plate *r'*, through the substance in the cap. The charged air escapes through an opening *o* in a cover *h*, in which a hole *h'* is also provided for introducing material into the cap.

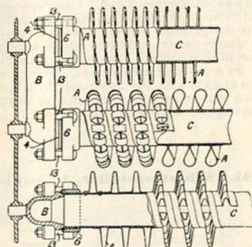


- 14,155. **Smith, M. H.** July 8.

Heating buildings &c.; heating liquids.—Relates

to apparatus for cooling water or other liquids, especially applicable for use on motor cars and also applicable for heating water or for warming. A flanged V or U-shaped strip or an L-shaped

FIG. 1.



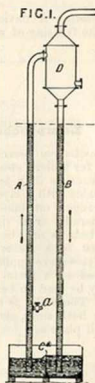
strip *A* is nicked or cut leaving the flange intact, and the strip is wound round pipes *C*, to which it may be soldered or otherwise attached. The radiating surface is thus increased. The pipes *C* are connected by coupling-pieces *B* with tapered faces *4* held in the ends by collars *6* and bolts *13*. A nest of the tubes, connected alternately at opposite ends, may be enclosed by a perforated casing.

- 14,199. **Waché, A., and Locoge, E.** July 10.

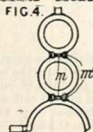
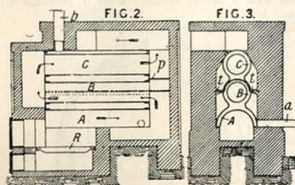
Heating liquids.

—Relates to a method and apparatus for effecting the flow or circulation of liquids in order to heat them. In the apparatus shown in Fig. 1, the liquid is circulated in the tubes *A* and *B* by opening the cock *a* to the atmosphere and introducing air, the vessel *D* being connected to a vacuum pump. The ascending tube *A* may be surrounded by a steam jacket for heating the liquid. The single tubes may be replaced by a nest of tubes, each tube *A* having an air cock.

FIG. 1.



14,222. Paul, C. O. July 10.



Heating water.—A hot-water boiler for use in hot-houses and for other purposes is composed of two or more double-walled cylinders B, C, Figs. 2 and 3, connected together and to a double walled semi-cylinder A, as shown.

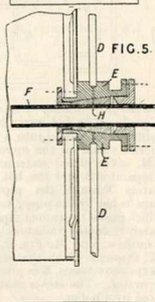
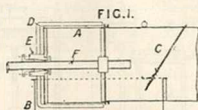
The water-circulating pipes are connected to the boiler by means of the pipes *a, b*. By means of baffles *t* and an arch *p*, the gases from the furnace R are made to thread their way through the boiler as shown by the arrows. In a modification, the sections of the boiler are connected together by means of rings *m*¹, Fig. 4, and the water spaces communicate through apertures *m*. When the sections of the boiler are made of cast iron, the connecting-rings are replaced by cast-on flanges. Two or more of the boilers may be heated by one furnace, and connected by branched pipes to the water-circulating pipes.

14,282. Millington, W. J. July 11.

Heating air.—The apparatus employed in connection with ventilation is shown in elevation in Fig. 1, Fig. 5 illustrating a detail on a larger scale. A rotating cylindrical framework A, covered with gauze, is surrounded by a series of L-shaped tubes D. These, rotating with the boss E to which they are secured, receive hot or cold water from an orifice in the central supply pipe F. The air used for ventilation, or for heating or cooling, is forced through the water-sprinkled gauze and passed through a metallic screen C, and thence delivered to its destination and exhausted therefrom through suitable ducts. The bath B is provided to catch the waste water. In Fig. 5, the L-shaped tubes are shown at D, and the orifice in the central pipe F at H.

(For Figures see next column.)

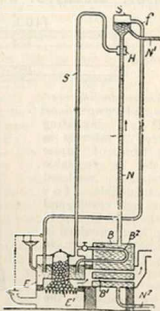
14,282.



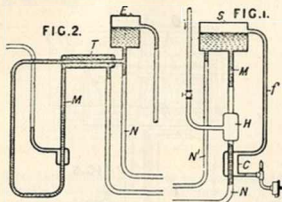
14,473. Reck, A. B. July 13.

Heating buildings; heating water.

—Hot-water apparatus for heating buildings is fitted with an auxiliary appliance for increasing the circulation. The hot-water boiler B is heated by flues B¹ from the furnace E¹ and steam pipes B² from the steam boiler E, or by the steam pipes alone. The outward flow pipe N leads to a steam separator S, and the pipe N¹ leads the hot water to ordinary radiators, from which it returns by the pipe N². The pipe *s* leads steam to the heater H, between which and the pipe N there may be a perforated partition. The heater causes steam to be generated in the upper part of the pipe N, and so increases the circulation of the hot water. The steam is condensed in the separator, and returns to the steam boiler through the pipe *f*.

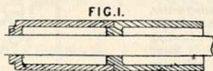


14,474. **Reck, A. B.** July 13.



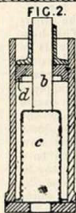
Heating buildings; heating water.—Increased circulation is produced in hot-water heating-apparatus by causing steam passed into a chamber H, Fig. 1, to generate steam in the upper part of the outflow pipe M. The mixed water and steam rise to the steam separator S, and the hot water passes to the radiators through the pipe N'. The separated steam is led by the pipe f to a condenser T, through which passes the return pipe N, bringing the cooled water from the radiators. In a modification, the outflow pipe M, Fig. 2, passes into a condenser T, through which the return pipe N passes. An expansion vessel E is provided instead of a steam separator. The steam heating-chamber may be replaced by a boiler.

15,387. **McLay, J.** July 27.



Non-conducting coverings and compositions.

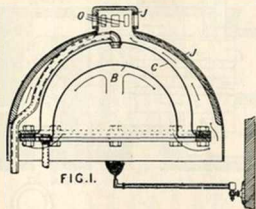
Heat insulating covers of asbestos in the form of papier mâché or vegetable substances rendered incombustible for pipes and vessels, and of the form shown in Fig. 1, are moulded in the mould shown in Fig. 2, in which there are a mandrel b and loose sleeve or core c, by means of the piston d actuated by a screw or other means.



15,458. **Robinson, H. M., and Elliott, A. E.** July 27.

Heating liquids.—Relates to boilers for heating water or other liquid, applicable to the heating of

buildings, in which a luminous gas flame is used as a heating-agent. The boiler has a domed bottom B and a similarly-shaped upper part C, in combination with a non-conducting hood J, jacketed by

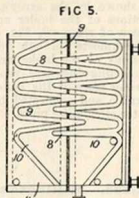


insulating-material or a pneumatic casing, and arranged over the boiler so as to leave a passage for the products of combustion. At the top of the hood an exit orifice is provided, and by means of a perforated cup the openings of the discharge orifices O may be varied. Used as a boiler in a water-heating system, the radiator pipes are taken to the top and bottom of the boiler. Gills or corrugations may be provided on the surface of the boiler.

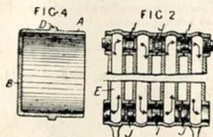
15,524. **Dubuisson, A.** July 28.

Heating liquids.

—Relates to a process and arrangement of apparatus for sterilizing butter, or butter substitutes. The butter is first heated to about 60° C., and separated from the water and casein mixed with it. The purified butter is then passed into a second apparatus, and heated to 100°–110° C. until it is sterilized. The butter is then passed into a third apparatus, in which it is maintained at about the melting point. The butter is then churned with about 20 per cent. of sterilized water, after which it passes to a pump so constructed as to facilitate the cooling of the butter, which is finally expressed from a die or mouthpiece in the form of a roll. The heating-apparatus is formed in two parts, fitted together as shown in Fig. 5, to facilitate cleaning. Each part is formed with a partition 8, shaped so as to form a zig-zag passage 9, a settling-chamber 10, and a steam jacket 11. The three heating-chambers are superposed, and are connected together by suitable passages. The chambers are fitted with steam supply and exit pipes, gauges, and other necessary fittings.



15,660. Lang, J. W. July 31.



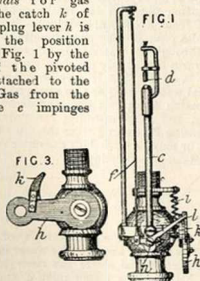
Heating buildings.—A nipple for coupling together the adjacent sections of radiators consists of a short tube A, Fig. 4, closed at one end with a perforated diaphragm B, and fitted with an external ridge D. The nipples J, Fig. 2, are placed at the alternate junctions of the radiator E, the remaining junctions being fitted with ordinary nipples I. The perforated diaphragms allow of the escape of air or water. In a modification, the nipple is formed with external right and left hand screw threads, and is screwed into the sections.

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

Non-conducting coverings and compositions.—Relates to compositions applicable as non-conducting coverings for pipes, boilers, ice-boxes, &c. Calcined magnesite is mixed with water, and aerated with carbonic acid gas under pressure. The mass is dried at about 160° F., and shaped under pressure. Fibrous material, such as asbestos, paper pulp, sawdust, vegetable fibre, &c., is preferably incorporated with the magnesite during the process of manufacture.

15,760. Zacher, F. Aug. 1.

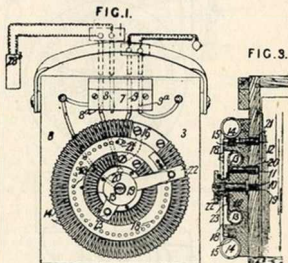
Thermostats for gas lamps. The catch *k* of the valve-plug lever *h* is held in the position shown in Fig. 1 by the hook *l* of the pivoted lever *n* attached to the wire *f*. Gas from the pilot pipe *c* impinges



against the ignition pellet *d* and lights the pilot and

main burners, the former of which heats the wire *f*, causing it to release the catch *k* and allow the spring *i* to draw the lever *h* into the position shown in Fig. 3, so that the full supply of gas is admitted to the main burner, while the supply to the pilot burner is cut off. The wire *f* now contracts and brings the lever *n* into position for re-engaging the lever *h* when it is set for lighting.

16,091. Richardson, J., and Ramsbottom, H. Aug. 5.



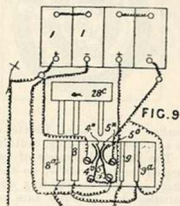
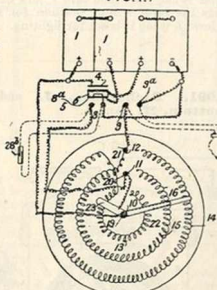
Heating by electricity.—Relates to electrical apparatus adapted for lighting, cauterizing, or heating, &c. The battery 1 consists of two or more cells connected to terminals 7, so that they may be arranged in series for lighting and in parallel for cauterizing &c. On the face of the box 3 is removably fitted the base 16 of the rheostat. This consists of three coils 13, 14, 15, over which may move the contact-arms 22 and 23. The inner and outer coils are connected in series and are used for regulating the lighting, and the coil 15, which is fitted with contact-studs 18, is for regulating the heating. The base 16 is detachable from the box, and is fitted with contact pins or plugs 19, 20, 21, adapted to fit in sockets 10, 11, 12 connected to the terminal board 7. Fig. 4 is a diagram showing the connections, and Fig. 6 shows the construction of a switch for automatically connecting the batteries in series or parallel when the plugs are inserted. The contact-plate 6 is normally in contact with the contact 5, and the cells in series for lighting the lamp when the contacts are in the sockets 9 and 9^a. When the plugs of the cauterizing-appliance are in the sockets 8, 8^a, the plate 6 is rocked by the pins striking a projection 6^a, causing it to make contact with the contact 4, putting the cells in series. In a modified arrangement, the terminal or switchboard 7 is also placed on the base 16 and connected to the battery by pin-and-socket connections. Fig. 9 shows another arrangement of switch for altering the

connections of the battery. The plug 28^c carries an insulating-pin, which separates contacts 4^o, 5^o, forcing them against contacts 4^o, 5^o.

FIG. 6.



FIG. 4.



16,140. Feeny, V. I., [Allgemeine Electricitäts Gesellschaft]. Aug. 8.

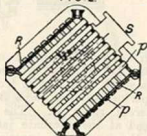
Heating by electricity.—A metallic oxide, such as an oxide of iron, copper, chromium, uranium, manganese, nickel, cobalt, titanium, zinc, tungsten, or molybdenum, or a mixture of these, to which magnesia or porcelain may be added, is powdered and made plastic with water or gum, and formed into rods or tubes. These are heated to incandescence, so that they contract considerably, after

which they conduct electrically at ordinary temperatures, and are mounted between platinum, nickel, or other infusible metallic connections. They may be used as heating-bodies.

16,381. Witkowitch, W. Aug. 11.

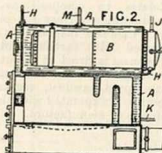
Heating liquids and gases.—A surface apparatus for heating or cooling liquids or gases is shown in cross-section in Fig. 2. The receiver R is fitted with open-ended tubes p, the alternate rows of which cross one another as shown, so that, when the apparatus is immersed in the fluid which is to be heated or cooled, circulation is promoted. The receiver is fitted with pipes S for the admission and exit of steam, water, or other heating or cooling medium.

FIG. 2.



16,405. Wilson, H. H. Aug. 12.

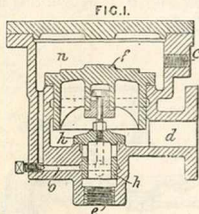
Heating water.—Relates to boilers for supplying hot water for domestic supply and for heating purposes, there being a single fire. The water supply for domestic purposes enters the cylindrical casing or domestic boiler B, Fig. 2, by the pipe H, leaves by the pipe J, and returns by the pipe I. The water for heating purposes enters the casing A by the pipe K from a cistern, and leaves by the pipe M. The inlet pipe H may pass directly to the heater B, or through the water space of the heater A, so as to warm the supply prior to its entry into the heater B, or the pipe H may be connected up to a special water casing or to a series of pipes. The outer casing A is rectangular and arched, and feed, stoking, and ashes openings are provided. The inner casing B is slung from the top of the outer casing, or may be flush with the outer casing at the end instead of projecting.



16,608. Massey, T. H., and Ashworth, L. Aug. 16.

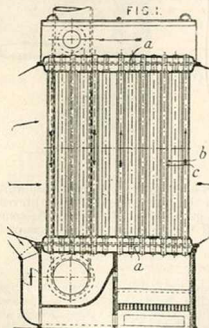
Steam traps.—A steam trap for drawing off condensed water from steam vessels, or, when the steam inlet c is dispensed with, for regulating the supply of water or keeping the water in boilers or tanks at a fixed level, or of allowing tanks to be emptied after the water has risen to a certain height is shown in Fig. 1. The lift valve f is arranged between the steam inlet c and the water inlet d, and the valve h controls the water outlet e. The valve f is raised by the water pressure and retained on its seating partly by its weight and the steam pressure. The passage o provides for the

draining of the space *n* and for releasing the steam pressure. In a modified form of trap, the steam inlet is central and concentric with the large valve *f*,



and has a small valve connected with and controlled by the large valve *f*. The valve *h* may be dispensed with, and the water outlet placed at the side of the casing.

16,957. Bergström, C. J. O. Aug. 21.



Heating gases; heating liquids.—Relates to apparatus for heating air, other gases, or liquids, or for generating steam, wherein pairs of concentric tubes are arranged so that there are three passages for the giving, transmitting, and receiving media respectively. In the arrangement shown in

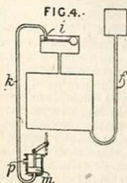
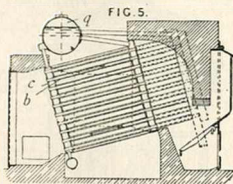


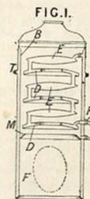
Fig. 1, the outer tubes *b* are fixed to the plates *a* and surround the inner tubes *c*. For heating air for rooms &c., the air is sucked or blown through on the outside of the tubes by a fan, while the combustion gases pass up the inner tubes, and water fills



the annular space between the tubes. The hot gases may be made to pass on the outside. When used for heating, water is supplied by the pipes *f*, Fig. 4, to the lower part of the water space, and the float valve *i* is provided, to allow steam when formed to pass to the pipe *k*, where it may operate the piston *m* and the fue or air damper before passing to the atmosphere by the port *p*. In the apparatus for heating air and generating steam shown in Fig. 5, the inclined double tubes *b*, *c* are prolonged into the fireplace at the outer sections or sides, the fire gases pass through the inner tubes, water is contained in the space between the tubes, steam collects in the drum *g*, and the air to be heated is driven by a fan, worked by the steam or other means, through on the outside of the tubes.

17,232. Prost, A. Aug. 25.

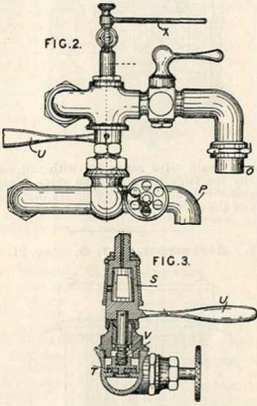
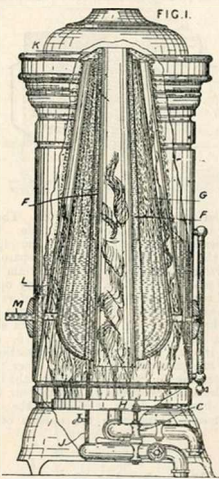
Heating water.—A water-heater for baths has a furnace or fireplace *F* suitable for burning wood or coal. The supply pipe *R* admits water to the hollow vessels *D*, *E*, whence it passes to the double-walled boiler *B*, which has a discharge pipe *T*. The products of combustion which condense on the inner wall of the boiler are caught in the trough *M*. The boiler stands on a base fitted with firebars.



17,409. Haddan, R., [Ready, M., McCormick, F. J., and Dayton Supply Co.]. Aug. 28.

Heating water.—A boiler for heating water for baths and other domestic purposes is supplied with

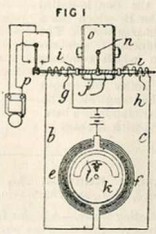
cold water through the pipe J, Fig. 1. The water circulates through the vessels F, G, L, which are connected by a distributing-cap K, and the heated water is withdrawn through the pipe M. A gas burner H heats the vessels internally and externally. A controlling-cock *c* for the gas and water supply is shown in detail in Figs. 2 and 3. The gas and water supply pipes O, P are controlled by the



hollow plug valve S and the lift valve T. The handle U is a part of the plug valve, and also works the lift valve by means of the screw V. A bye-pass is provided in the water supply-pipe to prevent the boiler from running dry if the water valve is closed while the gas is burning. A pipe X, connected with the gas valve, serves as an igniter. When the handle U is turned, the igniter is moved into proximity with the burner.

17,504. Goddin, E. A. Aug. 29.

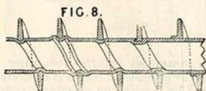
Thermostats. — Relates to apparatus for recording the deflections of compass needles and other moving bodies such as pointers, and for the utilization of such movements for controlling and operating various forms of mechanism and apparatus. The apparatus is stated to be applicable for thermometers for controlling and regulating ventilators



and fire-sprinklers. Fig. 1 shows the apparatus in its simplest form, in which a compass card *k* is arranged to allow light to pass through a slot *l* on to one or both of two selenium cells *e, f*. These cells are in two parallel circuits *b, c*, including two solenoids *g, h*, having a common floating core *i* provided with balance springs *j*. The core *i* carries a registering-point *n* resting on a moving drum *o*, and a control for the alarm circuit *p*, and may be directly connected to the valve of a servomotor. The motion of the compass card *k* alters the electric balance, and operates the solenoid core *i*. The core *i* may be arranged to close one or more electric contacts at each end, these contacts including varying battery power for operating a second pair of solenoids with a floating core. Instead of two selenium cells, a number of such cells may be arranged round a dial, the pointer &c. allowing some one or more of such cells to be brought into

use. To obtain increased motion of the floating core, several such coils and cores may be arranged in series, so that the core of one coil carries the next solenoid coil, the corresponding elements of each pair of coils &c. being rigidly connected together. Balancing-springs are also employed between the cores and coils. The selenium cells are mounted so as to be normally screened from the light, but light reaches the cells either by reflection or by the direct passage through the opening in a screen attached to the indicating-device. The cells are preferably mounted with adjustment for allowing the zero of the recording-point n to be in the centre of the strip. Any other electric sensitive material may be employed in place of the selenium.

17,584. Commichau, R. Aug. 30.



Heating-apparatus; heating buildings; heating water.—Relates to hollow bodies or pipes, for use in heating or other apparatus, which are provided

with spiral metal ribs of broad, elliptical, corrugated, ornamented, or other shape. The ribs or spirals may be secured to the pipes by grooves formed or turned in the pipes, or by expanding the pipes, or by shrinking the ribs on to the pipes, as shown in Fig. 8, or by soldering. Internal spiral ribs may be combined with the external radiating ribs. The ribs may be fitted to zig-zig or spirally-coiled pipes, and to heating coils and stoves.

17,718. Overman, A. H., and Bullard, J. H. Sept. 1. *Drawings to Specification.*

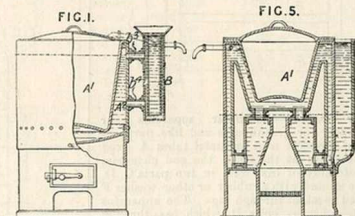
Heating liquids.—The liquid fuel for heating the steam generator of a motor road vehicle is heated by passing it through a coiled tube enclosed in a casing through which the engine exhaust is delivered.

17,811. Stead, G. E., and Stead, J. F. Sept. 4.

Non-conducting coverings.—Hair felt is enveloped in asbestos or other cloth, and the whole is covered on one side by a strip of cotton or canvas rendered non-inflammable, or rot- or vermin-proof, and afterwards sewn or riveted. For covering boilers or large surfaces, the sheets have eyelets or hooks for lacing together.

17,834. Parish, E. W., Eady, J. W., and Carryer, A. P. Sept. 4.

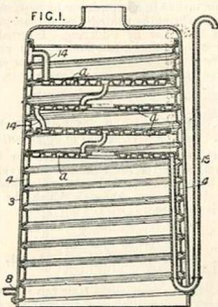
Heating water; boiling-pans.—Relates to low-pressure steam apparatus for cooking, drying, evaporating and similar purposes, from which a supply of hot water can be obtained at any time. In the cooking and hot-water supply apparatus shown in Fig. 1, the cooking pan A^1 with concave bottom is surrounded by the water space A^2 , which communicates with the hot-water supply apparatus B by the pipes b^2 and b^1 . The supply portion comprises two compartments disposed concentrically. In a modified arrangement, for supplying hot water and heating rooms, the hot-water supply part is of U-shape, and the closed limb communicates with the water-heater, which is cylindrical, with a central flue from the burner. The hot-water supply portion of the apparatus may surround the water space of the cooking-apparatus, and a water chamber may be provided between the furnace and the water space of the cooker, as shown in Fig. 5. The parts of the apparatus need not be in close proximity.



17,849. Pattison, T. Feb. 24, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1883].

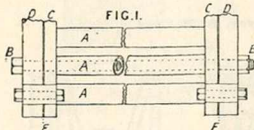
Heating water.—A water-heater of the geyser type, used for baths, saloons, &c., has a spirally-corrugated casing 4 covered with an external casing 3, so as to form a spiral water passage, to which is connected a supply pipe 8. A gas or oil burner is placed inside the casings, and heats the circulating water, which rises to the top of the water passage and then passes, by means of pipes 14, through sections a . Each section is made of a plain disc and a spirally-corrugated disc secured together so as to form a spiral water passage. The heated water is discharged from the lowest

section through the pipe 19. In a modification, the water circulates upwards through the sections,



which are made dish-shaped to assist the circulation.

17,983. Harrison, A. Sept. 6.

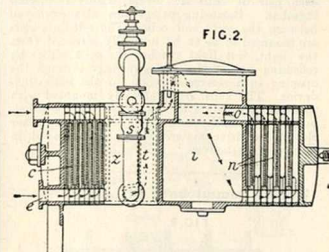


Heating water.—Tubular apparatus for heating water for greenhouses and like purposes consists of wrought iron or metal tubes A fixed into water-ways at the ends, the end chambers being preferably of cast iron, in two parts C, D, which are jointed with a rubber or other washer F and bolted together through lugs. The apparatus is held together by bolts B, which pass through the water tubes.

18,129. Hirt, L. Sept. 7.

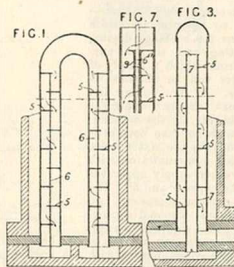
Heating water for purification purposes. The apparatus is in three portions, for heating, precipitating or settling, and filtering, arranged in series after the manner of a filter-press. The water enters at *e*, and passes between the steam-heated plates *c* to the chamber *z*, from which it is drawn by a steam jet *s*, which further heats it, and forces it by a passage *t* into the precipitating-chamber *l*, where reagents are added, and finally through the filter-plates *n* to the outlet *o*. The steam jet may be dispensed with, but is useful for

causing an active circulation to prevent incrustation. In modifications, the heating plates *e* are dispensed with, or a pump is used to force the water from the steam jet into the chamber *l*, or,



lastly, the steam jet returns the water to the bottom of the chamber *z*, which is separated from the passage *t* by a partition reaching nearly to the bottom. The apparatus is suitable, among other purposes, for feeding steam boilers.

18,306. Watson, H. B., Watson, J. S., and Billetop, T. C. Sept. 11.

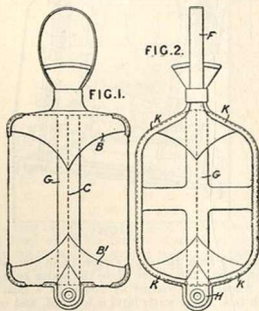


Heating liquids; heating buildings.—Relates to tubes and like heat-transmitting surfaces, such as are used in feedwater-heaters, radiators, evaporators, condensers, liquid-heaters, boilers, and the like, which are fitted with internal baffles 5 arranged on a rod 6, Fig. 1, a tube 7, Fig. 3, or loosely on a rod 6, Fig. 7, with distance-pieces 9. The baffle-plates and their attached bar or tube are readily removed for cleaning, and the apparatus for heating &c. may be V-shaped or its equivalent, or may be modified for the various purposes to which it is applicable.

18,328. **Goldschmidt, H.** Sept. 11. *Drawings to Specification.*

Heating by chemical action.—In welding together two pieces of metal, the surfaces are held in close contact and heated to a welding temperature by applying to them in a state of reaction a mixture of aluminium and oxide of iron, which then consists of pure iron and alumina in a molten condition. Or magnesium or carbides of magnesium or aluminium may be used in conjunction with metal compounds, preferably oxygenous compounds.

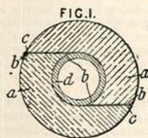
18,412. **Alden, A. H.** Sept. 12.



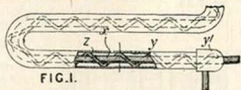
Hot-water bags.—India-rubber receptacles designed to be used as water bags, reservoirs for fountain-syringes, and the like are shown in the Figures. As shown in Fig. 1, a sheet of rubber is folded over until the edges *C* meet. A reinforcing-strip *G* is then fastened round, and the ends are closed by sheets of rubber *B, B'*. Oval bags are made similarly, and may have reinforcing-strips *K*, Fig. 2, placed round the sides. The handle *F* and tag *H* may be made by prolonging the strip *G*.

18,419. **Höge, F. C.** Sept. 12.

Non-conducting coverings.—Steam and other pipes *d* are covered with two similar sections *a*, made of any non-conducting material. The contiguous surfaces *b, c* are tangential to the pipe, so as to allow the covering to be tightly fitted round the pipe.



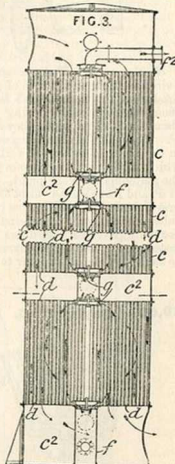
18,560A. **Allen, F.** Sept. 14.



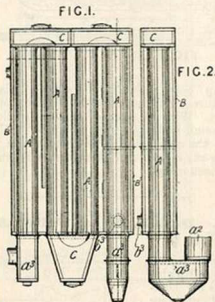
Heating gases; heating liquids.—Relates to temperature-equalizing coils for heating purposes generally. Wire of square or other section *z* is wound round a straight pipe *x*, which is then inserted in the outer pipe *y*, and the whole is bent into a zig-zag or coil and furnished with end caps and connections *y'*.

18,580. **Duff, E. J., and United Alkali Co.** Sept. 14.

Heating air; heating water.—Relates to means for cooling, and utilizing the heat of, producer gas. The hot gas, after the tar and ammonia have been separated in the usual manner, enters the top of a column *C*. This column consists of a number of superposed compartments, the larger ones *c* containing a large number of open vertical pipes *d*, down which the gas passes, the various streams of gas mixing again in each shorter compartment *c'*. Water enters the bottom compartment *c'* by a tube *f*, and passes upwards. In each compartment *c* the upward stream is deflected by a plate *g*, and passes between the tubes *d*. The water is passed through the compartments *c'* by tubes *f*, and so arrives at the outlet *f'* at the top. The cooled gas passes away for use, while the hot water flows to a column, down which it passes, meeting an upward stream of air. The hot air and water vapour given off from this column pass to the generator for use in obtaining gas.

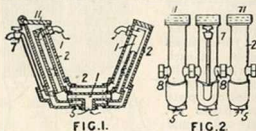


18,582. Duff, E. J., and United Alkali Co. Sept. 14.



Heating gases.—The air and water vapour, required in the manufacture of gas by means of gas-producers, are superheated before use by passing them through an opening into a rectangular chamber B, from which they escape by an opening b^2 . Through the chamber pass any number (four, in the example shown) of vertical pipes A, through which the hot producer gases pass on their way to the ammonia recovery plant. The hot gases enter at a^1 , and leave at the outlet shown on the left. The first and last tubes end in dust boxes a^2 , and the other tubes are connected by external dust boxes C. These boxes are provided with doors for removing the collected dust. Baffles are arranged in the chamber to cause the air and vapour to take a zig-zag course.

18,616. Sayer, R. C. Sept. 15.



Heating water.—Water-heating apparatus, shown in section in Fig. 1 and in side elevation in Fig. 2, has smoke-tubes 1 surrounded by water tubes 2. The water tubes are connected together by hollow trunnions 8, and are fitted with a cover 11 and tap 7. The apparatus is connected to a source of heat by openings 5. In a modification adapted for generating steam, the water tube 14, Fig. 4, is connected by tubes 2 to a water tube 15. The tubes 2 have inner smoke-tubes 1, which have bell mouths 5, at one end, opening into the heating-chamber 50,

and exits 49 at the other end. The feedwater is automatically supplied by means of a solenoid 35, which works the valves 21, 22, so as to admit water

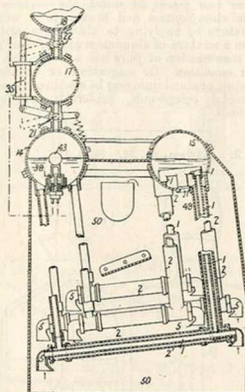


FIG. 4.

alternately from the supply pipe 18 to the vessel 17, and from the vessel 17 to the water tube 14. The solenoid is worked by means of a float 43, which falls as the water level is lowered, and completes an electric circuit through the mercury cups 38 and solenoid.

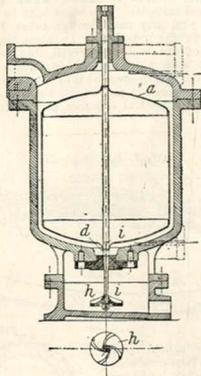
18,785. Sulley, J., Cole, T., and Cole, W. L. Sept. 18. *Drawings to Specification.*

Heating by steam circulation.—Tables on which chocolate or the like paste is worked are made of steel or polished metal, and are heated by steam pipes placed below.

18,832. Stumpf, J. Sept. 18.

Steam traps.—Relates to apparatus with a float-operated valve for removing water from steam, air, and gases. The valve is constructed to give a variable amount of opening, so as to allow a continuous discharge, and it is kept in rotation during the discharge. In the arrangement shown, the discharge of water is controlled by the valve d which is secured to the float a . The spindle below the valve completely closes the discharge orifice for a certain distance, below which it is formed with grooves or cut-away portions constructed to afford an increasing discharge opening as the valve rises

under the action of the float. The rotation of the valve is produced by a small turbine wheel *h* acted on by the escaping water. The interior of the float is drained by a passage *i*. The rotation of the



valve may be produced by vanes on the top of the float acted on by the current of steam, air, or gas, or by the action of inflowing water, or otherwise, and the valve may be arranged to rotate independently of the float.

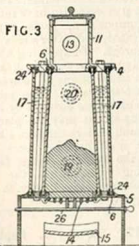
18,851. Mazey, J. T. Sept. 19.

FIG. 8.



Heating water; heating buildings &c. — Relates to slow combustion coke or other stoves or water boilers, and to pipes for use in connection with water-heating apparatus. The hot-water pipes are concave in form, as shown in Fig. 8, and when used may have the channel uppermost and water contained in it, or may be used for economizers or other purposes. The stove shown in Fig. 3 is applicable for heating

FIG. 3.



greenhouses and similar purposes, and consists of two oval tapered shells of different diameters joined to top and bottom plates grooved to receive their edges and bolted together by bolts 17 passing through the water space between the shells. The cylindrical hopper 11 is provided on the top plate 4, and may be provided with the smoke pipe 13. Washers 6 of asbestos or suitable material and red lead or the like 24 are employed to secure water-tight joints. The firegrate 14 may be divided, and may hook on to the bottom plate 5, so that, on withdrawing the rod 26, the halves may turn down; or the grate may be in one piece, hinged at one end, and held at the other by bar buttons. Water is admitted to the stove by the orifice 19, and the exit is by the upper pipe 20. Access to the firegrate and ash ashtray 15 is had by a sliding door or other suitable means.

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

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

18,973. Dawson & Co., R., and Kershaw, H. B. Sept. 20.

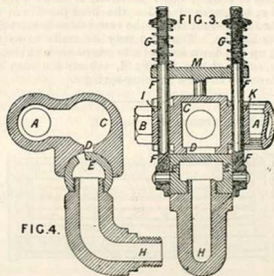


FIG. 4.

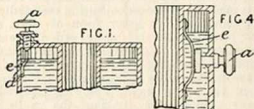
Steam traps, valves for. Relates to valves for steam traps of the type in which the outlet of the valve moves about a centre to open and close the steam port, and is held to its seating by and pivoted to bolts or rods controlled by springs. The valve is shown in longitudinal and transverse section respectively in Figs. 3 and 4, and has a straight inlet tube or barrel *A* which is closed at

one end by the screw plug B. The chamber C opens into the inlet tube A, and has the outlet port D below. The discharge valve E with its cylindrical seating is held in position by two bolts F and springs G, and the port D is opened and closed by the rise and fall of the discharge nozzle H. The bolts or rods F pass through the guides K at the sides of the chamber C, and a cross-pin M is placed over the rods F to receive the springs G.

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

Heating air.—In an apparatus for drying bricks, earthenware, cement slurry, &c. before burning, and for drying salt, whitening, &c., by means of a current of hot air, the air is heated by passing it through the burnt bricks &c. in the kiln or by means of a steam heater.

19,353. Timar, I. Sept. 26.

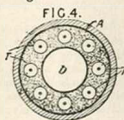


Heat-storing apparatus.—Devices for starting the crystallization in thermophors are shown in Figs. 1 and 4. The thermophor or double-walled vessel *e*, Fig. 1, which contains a concentrated solution of acetate of soda or other material, is fitted with a stud *a*, by means of which the bent pin *d* can be rubbed against the side of the vessel so as to start the crystallization. The stud may be made so as to slide up and down and actuate one or more rubbing-discs, or, as shown in Fig. 4, the stud *a* may be arranged to rotate a rubbing-spring *e*.

19,354. Timar, I. Sept. 26.

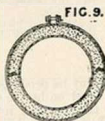


Heating by electricity; heat-storing apparatus.—Thermophors with electric heating-arrangements and used for heating provisions, electrically-driven carriages, tramway vehicles, &c., are shown in



Figs. 4 and 5. A double-walled vessel A, shown in section in Fig. 5, contains the acetate of soda &c. and has a non-conducting covering *d*. The central chamber *b* contains wires *a* through which an electric current is passed, which melts the crystallized material. The wires may be variously arranged and may pass through tubes T, Fig. 4, inserted in the vessel A. To start the crystallization of the melted material, the vessel may be fitted with a pointed screw, which is withdrawn from and re-inserted into the material. As adapted for heating provisions, the vessel is provided with a central chamber and is fitted with a lid.

19,404. Duff, J. A. Sept. 27.

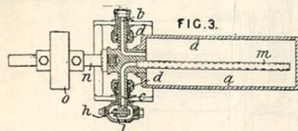
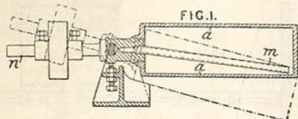


Non-conducting coverings for boilers, pipes, and the like are made in sections, and secured upon the surface to be covered so that any section may be removed without materially disturbing the other sections. Each section is composed of the shallow curved pan *a*, Fig. 4, made with angle-irons and the bottom plate *g*. Wires or the like *h* are stretched across the pan to aid in retaining the composition, which is poured in a plastic state into the pan. The sides of the pan may also have retaining-lips. In drying the composition, it is perforated, grooved, or corrugated, and afterwards lacquered to render it waterproof. In applying the covering to a boiler, retaining-bars *i*, *i'*, Fig. 3, are provided with short bars *p* and sections *o* between, and studs *j*, nuts *k*, and set-screws *m*. The joints at the butt straps are in each case covered by independent sections *o*. Binding-straps may be placed round the boiler. For small boilers the bars *i* need not be fixed to the boiler, and distance-pieces may be employed to keep the bars or hoops from the boiler. For covering steam pipes, the pans are flanged to interlock as shown in Fig. 9.

19,611. Snow, C. Sept. 29.

Steam traps.—A bottle-shaped trap with trunnions, having steam inlet and water outlet and operated by the weight of condensed water, is shown in Figs. 1 and 3. The steam inlet *b* is connected with the steam pipe by the stuffing-box *d*, and the water outlet *c* is similarly connected and

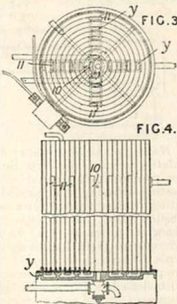
dips into the chamber leading to the outlet pipe. The end of the water-outlet trunnion is formed with an arm *h* which enters a staple or loop in the spindle of the outlet valve *j*, or the arrangement of



staple and arm may be reversed. The pipe *m* is inclined downwards, and the weight of the trap is counterbalanced by the weight *o* on the arm *n*. When condensed water collects in the chamber *a*, the trap is brought into an inclined position, and so discharges the water.

19,621. Harris, A. Sept. 29.

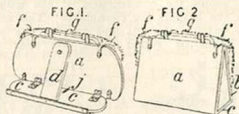
Heating water.—Relates to water-purifying apparatus, comprising a heat-interchanger in which outgoing hot water is made to impart its heat to incoming cold water. The heat-interchanger consists of a series of concentric vertical cylinders with overflow passages 10, 11 and connecting-passages *y* in the base. The cold water passes inwards and the hot water outwards through alternate chambers.



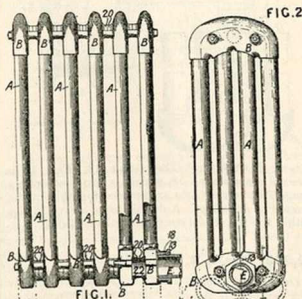
19,651. Hill, W. Sept. 30.

Hot-water bottles.—A flat bottle *g* with cover *f* is hung by clips &c. on the upright *b* of a folding

support used to support bed-clothes and prevent pressure on the feet.



19,813. Wilmot, F. A. Oct. 3.

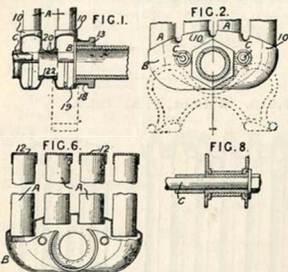


Heating buildings &c.—A wrought-metal radiator for use in hot-water or steam heating-apparatus is shown in front elevation and end view in Figs. 1 and 2 respectively. Wrought-metal pipes *A* are fitted into headers *B*, which are made of sheet metal drawn and pressed into shape. Several such sections are connected by flanged sleeves 22, fitted with inner sleeves 20, and bolted together. The pipes may be fitted into the headers in various ways, and the top header may be dispensed with.

19,814. Wilmot, F. A. Oct. 3.

Heating buildings &c.—Radiators for heating by steam or water are made entirely of wrought metal, and have the pipes fixed in headers cupped and drawn from wrought metal. The edges of the header blank are closed in and secured on the outer face of the header, and openings with collars to which the pipes are attached are formed in the inner face. Figs. 1 and 2 show the way in which the pipes *A* are fixed in the lower headers *B*, and the method of joining the various parts together. Fig. 6 shows another method of fixing the pipes into the header; upper headers are also dispensed with, and their place taken by caps 12. The pipes are preferably of sheet metal, the edges being

secured as described in Specification No. 6824, A. D. 1897, [Abridgment Class Metals, Cutting &c.]. Fig. 8 shows the construction of the passages through the headers for tie-rods C. The collars 10 may extend upwards and receive the pipes within them or round them, or they may



extend downwards. The sleeve 13, Fig. 1, is secured to a sleeve 18, which is provided with a flange 19, and the parts are secured together by the process of sweating. A double taper sleeve 22 lies within the sleeves 20 connecting the sections.

19,882. Hall, E. W. Oct. 3.

Hot-water bags.

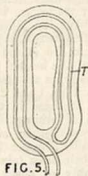
—A flexible bag A, which, when plugged, serves as a hot-water bag, is provided with a handle a and a suspending-loop b, and the neck is adapted to receive a nozzle c for connections to form a fountain syringe or enema.



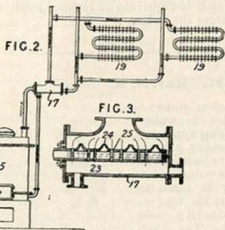
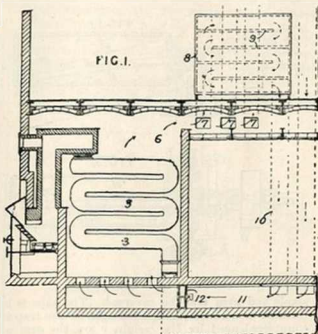
19,994. Ross, M. L., and "Perfect" Automatic Hot Appliance Co. Oct. 5.

Hot-water bags.

—Hot or cold water is circulated through tubes T in pads to be applied to various parts of the body, e.g., in a foot pad, Fig. 5.



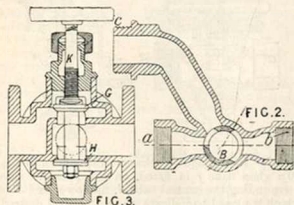
20,027. Haddan, R., [Schuppmann Fabrik für Central Heizungs & Lüftungsanlagen, C. A.] Oct. 5.



Heating by air circulation; heating by steam circulation; heating buildings &c.—Relates to means for circulating hot air or steam for purposes of heating, cooking, and drying. A hot-air circulating arrangement is shown in Fig. 1. The combustion gases pass into the coiled tube 3 in the chamber 6, where the air, circulating in the channels or pipes 7, heating-bodies 8, and return pipes 10 and 11, is warmed. The heating-bodies are preferably of stoneware or zinc or iron sheets, with deflectors 9. A ventilator 12 or equivalent apparatus in the return channel 11 circulates the heated air through the closed channel system. In the hot-air and steam installation shown in Fig. 2, the steam from the generator 15 passes into the chamber 17, Fig. 3, and issuing from the nozzles 24 draws the cold air through the channels 25. The air and steam circulate through heating-bodies 19, and the condensed steam in the chamber 23

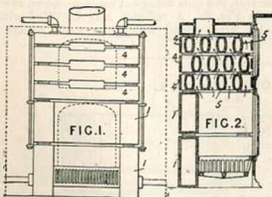
returns to the generator. Several chambers 17 may be used, and the mixture of steam and air may be superheated.

20,428. Brooke, R. G. Oct. 11.



Heating buildings &c.—Relates to valve fittings for use in connection with the circulation pipes and radiators or the like of a heating system, for enabling the flow of the heating-fluid to be diverted and controlled, so that a number of the radiators or the like may be cut out without interfering with the circulation. At the junction of the inlet, outlet, and radiator branch pipes *a, b, and c*, Fig. 2, is placed the tapered plug valve *B* provided with an adjusting-handle. In a modified arrangement, the mushroom valves *G, H*, Fig. 3, are arranged to control the junction of the three pipes, and are provided with the screwed spindle *K* and an adjusting hand-wheel or lever. In another arrangement, with four pipes forming a junction, a suitable plug cock is employed to control the flow.

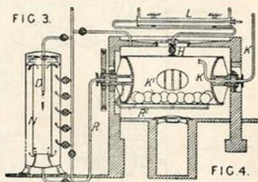
20,473. Alltson, C. A., [Hubbard, A.]
Oct. 12.



Heating water, boilers for. A sectional hot-water or fireplace heater, which may supply water or steam to radiators for heating buildings, is shown in Figs. 1 and 2. The lower hollow sections 1 form the combustion chamber round an ordinary fireplace, and one or more hollow sections 4 with cross-tubes 5 are arranged above the grate.

The top section is provided with an aperture for the smoke pipe and one or more connections for flow pipes. All the sections communicate, and the lower one is supplied with the water. A fire-board is arranged in front of the heater, and doors for cleaning purposes are also provided.

20,575. Podewils, A. von. Oct. 13.



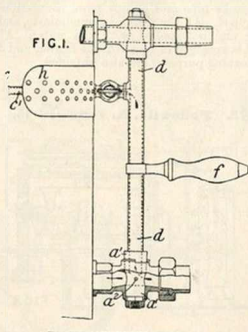
Digesters.—Animal carcasses are placed in hermetically-closed cylinders, which are either double-walled, or closely surrounded by brickwork as shown in Fig. 4. For the sterilization and treatment of the substance, a liquid heated to over 100° C. is forced into the cylinder through pipes *R, R'* from a vessel heated either by fire direct, or, as shown in Fig. 3, by steam, introduced laterally, and also through a nozzle *D* ending inside an open inner cylinder *N*, so that the liquid circulates upwards in the interspace of the cylinders, and down the inner cylinder. The digesting-cylinder is rotated, and the liquid, which may be circulated to and from the heating-vessel, is introduced from below to wash the carcasses. Separated fat may be floated through a cock *H*, but usually the fat is heated with the whole mass to over 100° C., and the outlet pipe behind the cock *H* is led through a Liebig condenser &c. *L* to prevent emulsion of the fat. The fat may be passed back to the heating-vessel, and the liquid there forms a solution of regulated concentration.

20,604. Richmond, E. W. T. Oct. 14.

Heating water.—Relates to means for turning on simultaneously the gas and water in a gas heater, and for igniting the gas. The gas and water taps are of the plug type, and are connected by the hollow stem *d*, which also carries the pilot burner *c*. A tap is provided to cut off the gas supply to the pilot burner. The small hole *a'* in the stem plug *a* of the gas valve allows the gas to pass to the pilot burner when the handle *f* is turned at right-angles to the position shown and the main burner is cut off. The perforated curved plate *b*, attached to the pilot pipe *c'*, is used to cover the gap in the heater casing.

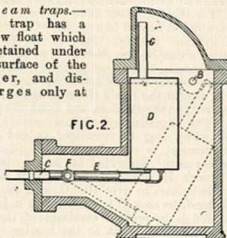
(For Figure see next page.)

20,604.



20,638. Slack, J. E. Oct. 14.

Steam traps.—The trap has a hollow float which is retained under the surface of the water, and discharges only at

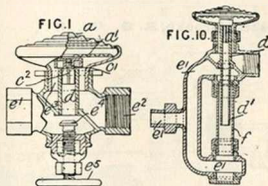


long intervals. The hollow float *D* is connected to the discharge pipe *C* by means of the tube *E* and swivel cock *F*. The inlet to the hollow float is provided with the pipe *G*, so that the water only enters to be discharged when the trap is full. Steam enters by the pipe *B*. The float *D* sinks into the position shown in dotted lines, when full of water, opens the valve *F*, and discharges the water of condensation.

20,932. Lamplough, F. Oct. 19.

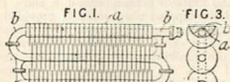
Steam traps.—Relates to traps of the kind described in Specification No. 4662, A.D. 1895, in which an expansible liquid is used to regulate the discharge. The alcohol chamber has a circularly-corrugated convex cap *a* and a flexible diaphragm or bottom *a'*, which operates the disconnected valve *c'*. The valve is provided with wings *c*, which keep the valve in position in the valve case.

The central tube *d* communicates with the inlet *e'*, and the annular space *e''* with the outlet *e''*. A valve *e'*, worked from a hand-wheel *e''*, is provided, so that the passage through the trap may be



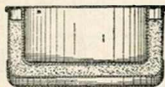
closed. In the sight discharge trap shown in Fig. 10 a glass tube *f* is fitted, on the pressure side, surrounding the central tube *d*, the lower end *d''* of which is placed to indicate the water level desired. The inlet passages *e'* communicate with both ends of the glass tube.

21,017. Thompson, W. P., [Piepmeyer, W., and Karst, A.]. Oct. 20.



Heating buildings &c.—A radiator or other form of heating-apparatus for heating buildings &c. is fitted with a water trough for moistening the air as shown in Figs. 1 and 3. The water trough *a* is fitted round the gilled top pipe *b* of the heating-apparatus, the gills being cut away as shown in side view in Fig. 3. A radiator may be fitted with a suitable pipe, round which the water trough is placed.

21,019. Timar, I. Oct. 20.



Heat-storing apparatus; heating by molecular combination.—A heat-conserving or secondary heat-generating apparatus is shown in the Figure. Between the outer and inner vessels is a filling of acetate of soda, or hydrate of barium, and between the two bottoms of the vessel there is a lining

of fossil meal, ashes, or other non-conducting material. By this means the saline mass is prevented from being heated too quickly, when the vessel is placed on a hot plate or fire.

21,134. Frank, M. Oct. 23.

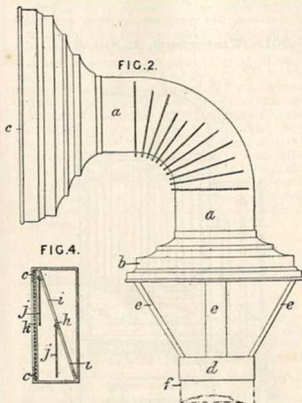
Non-conducting coverings and compositions.—Raw silk is treated with vapour of hydrochloric acid to destroy all vegetable matters. The silk is then washed, prepared by breaking cards, and formed into hanks *b*, which are twisted together into the desired form for covering purposes.



21,417. Beutier, L., and Vernier, C. Oct. 26.

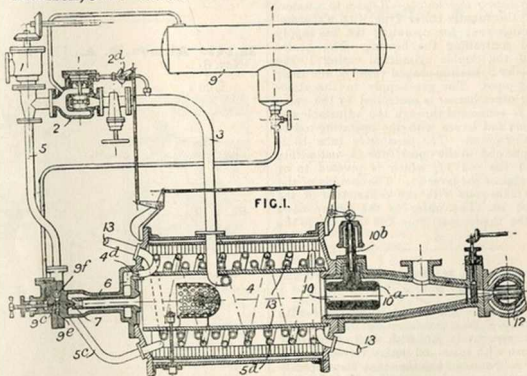
Heating water.—To create a draught for gas fires, and especially for geysers used for heating bath water, the vertical outlet pipe *f* for the products of combustion from the geyser fits within a collar *d* carried by ribs from the lower end *b* of a curved pipe *a* leading to the outlet. This lower end *b* acts as a suction lantern, allowing air and products of combustion to pass to the outlet. The outlet *c* is protected by metallic gauze *k*, and is divided by an inclined plate *h* having openings *i* protected by freely-swinging plates *j*, which prevent down-draught in the pipe *a*. The suction

lantern may be fitted near to, or at some distance from, the geyser, while the outlet or valve-box *c*



may be bell-shaped, as in Fig. 2, or box-shaped as in Fig. 4.

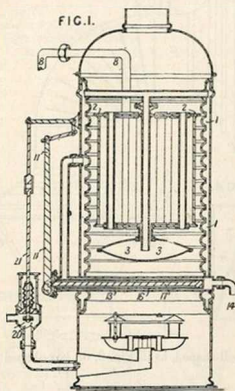
21,607. Nicolson, J. T. Oct. 30.



Thermostats for liquid-fuel heating-apparatus. Air, which passes through the reducing-valve 2 and pipe 3 for heating in the chamber 4 prior to passing to a hot-air engine, is also controlled by

the thermostat 10, comprising an annular chamber 10^a filled with a fusible alloy and a weighted plunger 10^b, which adjusts the cock 2^d by means of the links shown.

21,801. Winterflood, J. Oct. 31.

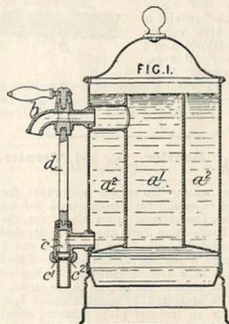


Heating water; thermostats.—Relates to a water-heater of the tubular-boiler type with a thermostatic arrangement for operating the gas supply valve and controlling the heating. The heater consists of the double cylindrical casing 1, the tubular boiler 2, the disc-shaped vessel 3, and their connecting-pipes. The gas supply to the atmospheric or other burner is controlled by the valve 20, which is connected through the adjustable rod 17 and arms and levers with the operating-rod 17 of the thermostat. The expandible tube 16 is fixed at one end to the outer tube 13, and within it is fixed the rod 17, which is pivoted to or impinges against the lever 11. The opening of the gas valve takes place with the contraction of the inner tube 16. The water to the heater flows through the thermostat from the inlet 14 to the outlet 8.

22,116. Parish, E. W., Eady, J. W., and Carryer, A. P. Nov. 4.

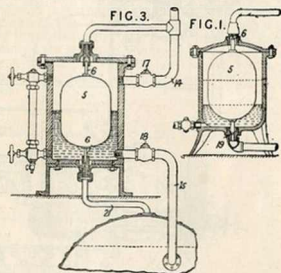
Heating liquids.—The heater is provided with compartments a^2 , a^1 , communicating with the inlet and outlet respectively, and with each other at the top, and also with inlet and outlet valves c and b , which are so connected together that they operate simultaneously to enable the hot liquid withdrawn to be replaced by an equal quantity of cold liquid. The valves may be connected by the rod d , which

has squared ends, and engages loosely with the plugs, so that the valves may be adjusted to their seats independently, or other means may be



employed. The cock c may have a chamber c^1 to receive one or more perforated rings, so that the cold liquid introduced may be regulated.

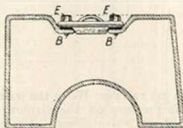
22,142. Allison, C. A., [Eureka Iron Co.] Nov. 6.



Steam traps.—Relates to traps for collecting and discharging the water of condensation from heating and other steam apparatus. The trap, Fig. 1, is

provided with the float 5 and the spindles 6, the lower spindle forming the discharge valve 19. The float may rotate with the condensed water, so causing the valve to grind and remain tight. In the trap shown in Fig. 3, which discharges against pressure, both spindles G form valves, and the delivery and discharge pipes are arranged as shown. When the float 5 rises, the upper valve is closed, steam is admitted from the boiler by the pipe 21, and the condensed water, on the establishment of pressure equilibrium, falls into the boiler. Check valves 17 and 18 are provided in the pipes 14 and 15.

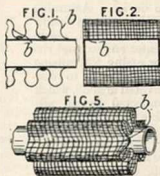
22,173. Peake, C. B. Nov. 6.



Heating water, boilers for. The manhole is sunk, so that the heads of the pins E which fasten the lid are on a level with the surface of the boiler. The underside of the lid forms a rabbet B for holding the packing in place, and the bottom is in line with the inside of the sunk part of the boiler plate.

22,176. Blake, F. C. Nov. 6.

Heating gases; heating liquids; heating buildings &c.—Relates to surface apparatus, or pipes with metallic gauze, soldered, riveted, or otherwise secured to the surface, for heating gases, vapours, or liquids, or for radiators. On flat pipes, as shown in Figs. 1 and 2, the copper or other metallic gauze *b* is undulated transversely, while with cylindrical pipes the undulations are longitudinal, as shown in Fig. 5. According to the Provisional Specification, the gauze, when cylindrical pipes are employed, forms a diaphragm for a battery of the pipes.



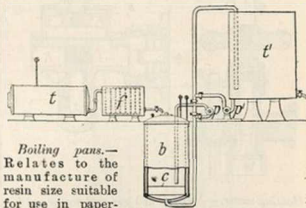
22,271. Vogt, A. Nov. 7.

Heating by electricity.—Resistances capable of sustaining high temperatures are moulded from mixtures of very finely powdered metals and refractory non-conductors with water or other liquid, and may be pressed in moulds to produce uniform results; they are dried, and then heated in hydrogen, at first to a temperature only sufficient to reduce the oxide on the metal particles completely. This having been done, the temperature is raised to the welding-temperature of the metal, so that the non-conducting constituent frits, still in the hydrogen atmosphere, carbon being carefully excluded. The materials used may be nickel, cobalt, or wolfram, with kaolin, talc, alumina, quartz, or other oxides or rare earths. These resistances are applicable for heating branding-dies, and for other purposes.

22,438. Miller, W. M. Nov. 10.

Boiling-pans.—Relates to boiling-appliances such as those used for boiling saccharine or other liquors, and consists in the use of heated oils for conveying heat to the substances to be treated, the hot oil being supplied to a jacketed space surrounding the apparatus containing the substances to be treated, or caused to circulate through a coil immersed in the substances. By this means the process may be carried out at a regulated temperature.

22,547. Arledter, F., and Huth, G. Nov. 11.

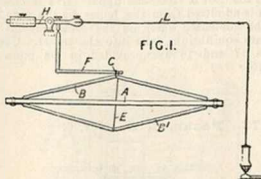


Boiling pans.—Relates to the manufacture of resin size suitable for use in paper-making. The resin is melted in a boiler *t* heated by steam coils or a steam jacket, and is forced through a steam-jacketed filter *f* into a steam-jacketed boiler *b*. This boiler has a false bottom *c*, from below which the contents may be pumped by centrifugal pumps *p*, *p'* back into the boiler or into the tank *t'*. The pump *p'* circulates the contents of the tank *t'*. Alkali and water are introduced into the boiler *b*, and, when the alkali has dissolved, the resin is run in and the mixture is boiled under pressure, while the pump *p* circulates it. The mixture or size is

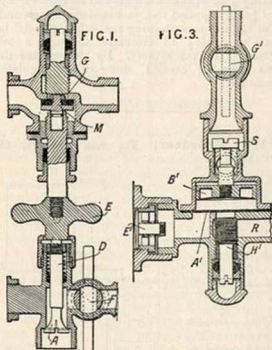
then blown into the tank ρ , and concentrated carbolic acid is added and thoroughly mixed with the size. The size is then ready for use without further dilution.

22,559. Mann, J. Nov. 11.

Thermostats. A temperature regulator for raising or lowering the damper of the heating-lamp of an incubator or other apparatus is shown in Fig. 1. The rod A is of mica, asbestos, slate, or other material and the rods B, B' are of iron. The sheet-metal piece C connects one pair of the metal rods with the lever F, and a wire E connects the other pair. The movements of the lever F are communicated to the damper cord through the lever mechanism H, so raising or lowering the damper. By arranging the outer end of a rod in place of the cord L to move over a graduated scale, the apparatus may be employed for thermometric purposes.



22,606. Doulton, H. L. Nov. 13.

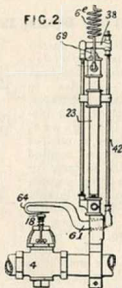


Heating water.—A combined gas and water valve for water-heaters is shown in Fig. 1. In order to prevent the gas supply from continuing after the water has been cut off, the handle E of the water-supply valve M has a downward extension, which presses on the projecting spindle D of the self-closing gas supply valve A, so that both valves open and close simultaneously. Auxiliary controlling-valves F and G may be placed in the gas and water passages respectively. In a modification, the water supply pipe R, Fig 3, is fitted with a diaphragm A'. The diaphragm closes a chamber within which works a piston B' connected to the

spindle of the gas valve S. When the water supply is cut off, the pressure on the diaphragm is removed, and the gas valve closes. Auxiliary control valves G', H' may be used, and a check valve E' prevents the backward escape of steam from the heater.

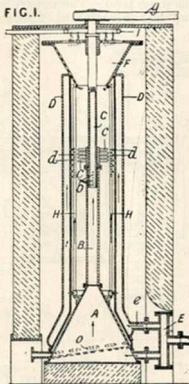
22,607. Chappell, F. M. April 15, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1883].

Thermostats &c.—In water tube and other boilers, the water level is adjusted by a thermostatic device. Assuming that the water is below the normal level, steam will enter and expand the hollow casing 23, causing the knife edge 63 to raise the pivoted arm 38, which is connected by an adjustable rod 42 to the pivoted lever 61, the outer bent end 64 of which depresses the spindle of the valve 4, and allows water to flow to the boiler until the mouth of the stand-pipe is covered, when the steam in the condensing-coil 6 is liquefied, and the thermostat contracts and closes the valve. When steam is again admitted to the thermostat, the water therein is forced through a valve into a waste pipe. A free supply of water to the boiler may be obtained by depressing the cap 18 of the valve 4 and locking it by a pivoted hook lever.



23,787. **Totte, A.** Nov. 15.

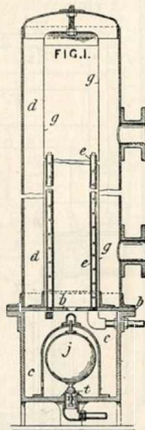
Digesters.—Organic substances, such as leather or felt parings, bones, wool waste, and the like, are digested and concentrated or dried by means of the apparatus shown in vertical section in Fig. 1. A conical steam receiver or generator A, is surmounted by a pipe B, having apertures *b* and receiving a steam pipe C, which is rotated by means of a belt *g*. Blades *c*, or other stirring-appliances, are mounted upon the pipe C, and are preferably formed with steam outlets. A steam-jacketed casing D, provided with apertures *d*, surrounds the pipe B, C, and steam pipes H may be arranged within the casing in order to increase the heating-surface. When a steam receiver A is used, it is supplied with steam by means of a pipe E, whence a branch pipe *e* communicates with the casing D. The materials to be treated are fed through a hopper F into the digesting-chamber, and the digested and partially-dried product is discharged continuously through passages *o* formed in the lower part of the digesting-chamber. During



the digesting and agitating operations, the charge is sprinkled with dilute acid by means of a perforated pipe I.

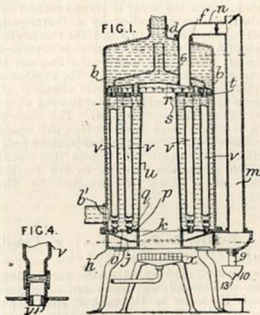
23,068. **Richardson, J.** Nov. 20.

Heating water; steam traps.—In the apparatus shown in Fig. 1 for heating water by steam for the purpose of heating buildings, there are two chambers *c* and *d* separated by the plate *b*, the lower chamber having a trap for discharging the water of condensation accumulating from the perforated steam pipes *e*, and the upper chamber containing the water for circulation, which flows round the cylinder *g* and is heated by the steam within it. The steam trap consists of the ball *j* and valve *t*, the ball being connected to the valve by a lever or by a lever and screw combined. A relief valve is fitted to the steam cylinder, and a snifting-valve may also be connected to it.



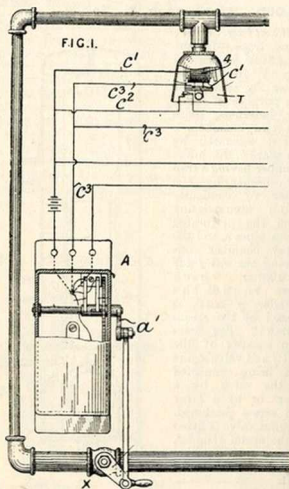
23,113. **Shaw, T. P.** Nov. 20.

Heating water.—A water-heater for domestic use is shown in Fig. 1. Water enters by the pipe *b* and leaves by the central opening *d*. The lower end of the drum *b* is provided with a diaphragm *j* and a casing *h* of annular dish form. The opening through the diaphragm *j* is eccentric with respect to the wall *k*. A flat diaphragm *o* is also provided, and a tapered tube *u* connects the openings *p* and *s*. The openings *q* and *t* are connected by elliptical tubes *v*. The elliptical tubes are secured as shown in Fig. 4, and have nipples *r* at the ends. The conical hood *6* is set upon the head *r*. A movable gas burner *x* is preferably employed, and the combustion products pass to the chimney by the tube *n* or by the tubes *v* and *m*, according to the position of the dampers. The branch pipe *w* has a stuffing-box connection *f* to allow for expansion. A water trap for the casing *h* consists of a block 10 with central tubular extension 9 and passages to enable the water to drip from the point 13. For a water-heating



system for buildings, the conical hood 6 is not required.

23,157. Butcher, J. Nov. 21.

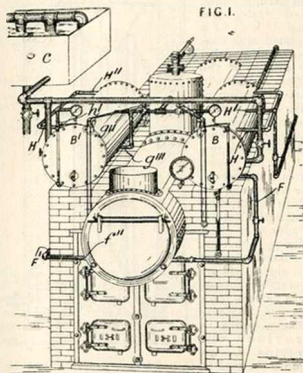


Thermostats.—Relates to a system of automatic sprinklers in which the water is turned on and off by an electromotor controlled by a thermostat. In the arrangement shown in Fig. 1, the thermostat T consists of a flexible chamber, which is expanded when the air inside is heated by the fire, and is placed under the sprinkler nozzle. The expansion of the thermostat closes an electric circuit c', c^3 , which starts the electromotor A, and thereby closes the valve X on the service pipe. The electromagnet 4 is at the same time excited, and opens the sprinkler valve. When the temperature falls, the thermostat contracts and closes the circuit c', c^3 , which closes the valve X by the further revolution of a crank a^1 actuated by the electromotor.

23,171. Boulton, A. J., [Bainter, C. F., Possell, G. W., and Persons, C. M.] Nov. 21.

Heating water.—Relates to means for heating, purifying, and supplying feedwater. Exhaust steam boils the water in the tank C, from which the closed cylinders B, B' are supplied alternately.

These cylinders are supplied with boiler steam by pipes g^{11}, g^{111} , which enter them above and below the water level. The impurities are precipitated, and may be removed through blow-out pipes.

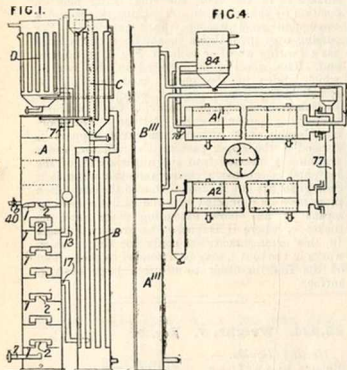


Scum pipes H, H', H'', leading into common pipes h^1 , are fitted near the water level of the cylinders B, B', from which the feedwater flows automatically through the pipes F or F' and check valves f^{11} to the boiler.

23,404. Naef, P. April 26, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1883].

Heating liquids.—Relates generally to the treatment of liquids with gases in order to heat or otherwise treat them. The treatment is effected in a columnar vessel A, Fig. 1. The liquid to be treated is subjected to a preliminary heating in the tubular chambers C, D, and is then heated in D by the hot gases from the vessel A, and in C by the heating-agent which has been used in the tubular heater B. Further heating is effected by gas or vapour admitted at 7, and the vapours evolved are drawn off at 13 and passed through the tubular apparatus B, in which they are heated by a suitable agent, such as hot furnace gases, and re-enter the vessel A through the pipe 17. The central pipe 2 of the plate 1 is made longer than usual at this point, so as to form a liquid seal where the vapours are drawn from the vessel A. A modified apparatus is described, in which the heater B is divided horizontally into three parts, but the tubes run continuously through all the parts. They serve in turn to receive and heat the vapours from the vessel A and return them to it,

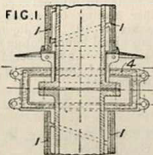
the vapours being taken from and returned to the vessel A at successively higher points. Fig. 4 shows an apparatus for the treatment of semi-liquids, or liquids, such as sewage, which contain



solids. It consists of two revolving cylinders A^1 , A^2 , provided with perforated partitions and baffle-plates and with scoops on the interior of the walls to agitate the liquid. The liquid flows from the vessel 84, which is a heating appliance, into the cylinder A^1 , and then through the pipe 77 into the cylinder A^2 . The vessels A^1 , B^1 serve for heating the gas with which the liquid is treated, the gas being first heated in the vessel A^1 , and then, after it has passed through the cylinder A^2 , it is further heated in the vessel B^1 , before it enters the cylinder A^1 .

23,459. Kessel, J. Nov. 24.

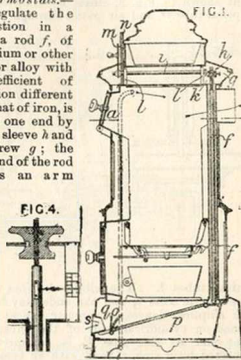
Non-conducting coverings.—An insulating covering for steam pipes is shown in Fig. 1. The material is cylindrical in shape, and is provided upon its lower face with spiral ribs or projections 1, so forming an air jacket. The connecting-joints are insulated by the cap or box 4, formed in two parts and provided with connecting-lugs, one of the parts, if desired, being fitted with a small discharge pipe.



23,468. Suchier, R. O. E. Nov. 24.

Thermostats.—

To regulate the combustion in a stove, a rod f , of aluminium or other metal or alloy with a coefficient of expansion different from that of iron, is held at one end by a brass sleeve h and set screw g ; the other end of the rod actuates an arm

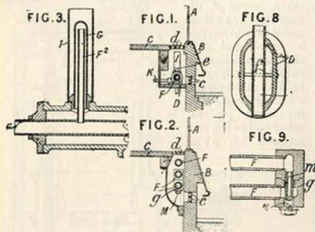


of a lever p , and causes a flap q to regulate an air-hole s . A curved back-plate o prevents the flap q from falling on the lever p . The limiting position of the rod f is adjusted by a pin k , which engages a horizontal groove in the rod. This pin is eccentrically placed on a rod i mounted to rotate on bearings l , and provided with an index-finger m and dial n . In another method of adjustment, shown in Fig. 4, the upper end of the rod f is screw-threaded, and engages in a nut, which is rotated to vary the position of an index-finger.

23,474. Statter, J. G., and Vapour Preventer (Limited). Nov. 24.

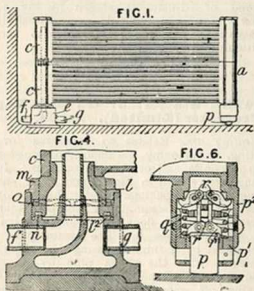
Heating air.—Relates to apparatus for preventing, or removing, the deposit of moisture on shop windows and other cold surfaces. In the arrangement shown in Figs. 1 and 3, air enters a casing through openings c under the window sill B, is heated by a steam pipe F, and passes through apertures d in the floor C, in close proximity to the window panes A. The steam pipe F is surrounded by a tubular casing D, which communicates with the steam pipe by means of siphon tubes F^2 , G, and is fitted with a tube K for carrying off water of condensation. Tubes I, surrounding the dome-shaped siphon tubes G, are perforated at e to allow air to pass into the spaces between the tubes. Lengths of the tubes D, F may be connected in line by right and left handed screw couplings. In a modification shown in Figs. 2 and 3, parallel tubes F are connected by hollow blocks G and screwed bolts M to form a steam

coil. The bolts are made with central or external longitudinal steam passages *m*. In the arrangement shown in Fig. 8, steam is admitted to an elliptical tube *D*, and air passes through the open



vertical tubes *I*. The elliptical tubes may be stayed by tie bolts *f*, and the ends may be made with elliptical flanges, or circular flanges may be formed on cylindrical ends of the tubes. The outer end of the pipe *F* is contracted, and connected by a siphon bend with an escape pipe for carrying off water of condensation. The pipe *K* may be formed with a siphon bend, and may lead to a steam trap. The apparatus may be enclosed in a casing of wood or metal coated with asbestos paper &c.

23,576. Brophy, M. M. Nov. 25.

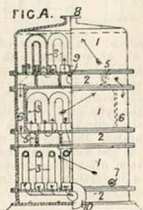


Heating buildings, radiators for. Relates to radiators for warming buildings, and consists in providing the radiators with hinged leaves or sections. The leaf *a* is pivoted upon the hollow foot *e*, Fig. 4, to which the flow and return pipes *f*, *g* are attached. The hot water is delivered

near to the top of the radiator. The connection between the foot and the socket *c* is effected through the medium of the flanged connector ring *l*, which is capable of rotation upon the bearing surface *l'* in the foot, the ring being held in position by the gland *m*. A packing-ring *n* and a corrugated steel washer *o* are provided. For passing over inequalities in the floor the radiator has a bearing wheel or roller *p*, Fig. 6, at the free end. The wheel *p* is mounted in the box *p'*, which slides in the outer fixed box *p''*. A spiral spring *q* and pivoted levers *r* connected by links to a bridge-piece provide for a uniform supporting power in any position. For floors considerably out of level, the pivot support is formed at the upper part of the radiator, and a trunnion is inserted into the upper socket of the leaf, and is capable of being removed when it is desired to lift the leaf. One of the circulation pipes may be connected with the radiator head by means of an elbow extending down into the socket *c*, where it is packed to prevent leakage. In this arrangement, the connector ring *l*, which works in the foot *e*, may be extended to the bottom of the foot in order to afford a large bearing-surface.

23,694. Wright, J. Nov. 28.

Heating liquids. — Relates to surface heaters, or condensers, of the kind described in Specification No. 1991, A.D. 1892, in which pairs of chambers 1, 2 are grouped together, the heating or cooling agent passing through one set, and the liquid treated through the other. The object is to do away with the exterior bent connecting-pipes which have been found to impair the efficiency. The chambers 2 through which, with their U-pipes 3, the heating-agent flows are, according to the present invention, connected by internal conduits 6, the steam, gas, or other heating or cooling fluid entering at 9 and leaving at 10. The liquid treated, for instance ammoniacal liquor, enters the chambers 1 at 7, and passing through the openings or passages 5 emerges at 8. The functions of the chambers may be interchanged.



23,734. Bouillet, J. Nov. 28. Drawings to Specification.

Heating by electricity.—An arc lamp of special construction, having horizontal carbons supported above motor mechanism, is applicable for heating, being placed in a casing, the top of which is a corrugated metal plate to support utensils to be

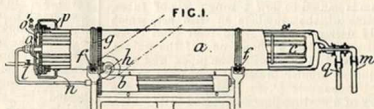
heated, over the arc. The plate is supported by a refractory ring. Several lamps may be used in one apparatus.

23,765. Gobbe, E. Nov. 28. *Drawings to Specification.*

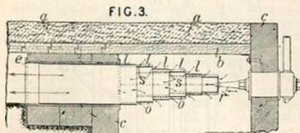
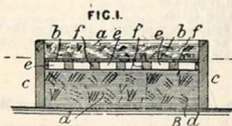
Heating gases.—Air and gas, which are drawn into a chamber by the condensation of hot products of combustion and expelled by an explosion, are heated by the operation, which is suitable for supplying air to blast and cupola furnaces, gas-producers, &c.

23,828. Johnson, J. Y., [*Cie. Générale pour la Conservation des Liquides*]. Nov. 29.

Heating liquids.—In apparatus for sterilizing beer, wine, milk, and other liquids, a cylinder *a* containing the liquid is heated by allowing steam to pass from a pipe *m* into the lower portion of the jacket, and thence through a pipe *n* to a chamber *o* connected by pipes *c* with a chamber *o'*, from which the steam passes through a pipe *p* to the upper portion of the jacket, escaping through a pipe *q*.



23,835. Stichelen, A. J. M. van der. Nov. 29.

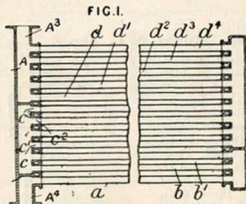


Heating garden frames.—The frame *c* is partially filled with soil *d*. A number of channels *e* are formed by bricks *f* and porous tiles *b*. The soil *a*, in which the plants are set, is placed upon the tiles *b*. The channels *e* are placed in communication with each other at each end of the frame, and a current of warm moist air is caused to circulate through them by means of a jet of steam issuing from the nozzle *r*, shown on a larger scale in Fig. 3. A series of adjustable annular openings *s, s*, through which air is drawn by the steam jet, which thus causes the air to circulate through the channels *e*.

24,141. Flannery, Sir J. F., and Boyd, W. Dec. 4. *Drawings to Specification.*

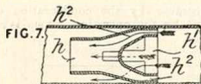
Heating liquids.—Relates to means for facilitating the separation of water from liquid fuel, more especially in cases where the liquid fuel is stored in the ballast tanks of ships with, or alternately with, water, as described in Specification No. 15,791, A.D. 1898, [*Abridgment Class Furnaces &c.*]. The separation is expedited by the application of heat to the oil in the settling-tanks by means of coils of pipe through which steam, hot water, or other heating-agent is passed, by utilizing the heat radiated or conducted from the boilers, or otherwise. The method of adapting the invention to the various arrangements of tanks &c. described in the prior above-mentioned Specification is illustrated in the Specification.

24,212. Szamatolski, H. Dec. 5.



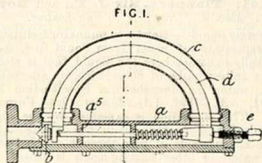
Heating liquids.—A steam superheater is shown, but the apparatus is applicable for heating other

fluids. Steam entering the chamber A at A^3 flows through the heated tubes d, d', d'', d''', d^4 to the chamber A^1 , and thence through sets of decreasing numbers of tubes c, c', c'', c''', c^4 , and a, a', a'', a''', a^4 , and



escapes at A^4 at high velocity. In a modification, the steam is caused to flow through sets of tubes, irrespective of the numbers in each set, which gradually decrease, however, in their total cross-sectional areas. Fig. 7 shows one of the guides, which are fitted at intervals in the pipes, and comprise annular tubular pieces h^1 connected to the pipe h by channels h^2 , so that steam near the periphery of a heating pipe is deflected to its centre, and *vice versa*, as indicated by the arrows.

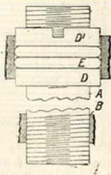
24,219. Whitaker, C. H., and Whiting, A. C. Dec. 5.



Steam traps.—The trap is shown in Fig. 1. The inlet valve b is controlled by the oval Bourdon tube d , which is filled with liquid. The partition a^1 of the casing a causes the steam and water to pass by the semicircular path. The casing c is of thin metal. An adjusting-screw e is provided at the outlet end of the casing.

24,288. Moffat, A. C. Dec. 6.

Heating water.—Relates to pipe joints for heaters of the type described in Specifications No. 4202, A. D. 1875, [Abridgment Class Pipes &c.], No. 9880, A. D. 1889, [Abridgment Class Pipes &c.], and No. 9721, A. D. 1897, [Abridgment Class Steam generators]. One end of

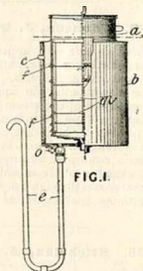


the tube A is screwed into the plate B, and the other screwed end has washers D, D^1 , between which the india-rubber or asbestos rings E are compressed. Handholes are provided in the covers for allowing adjustment of the washers D^1 .

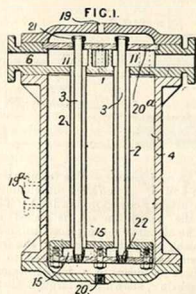
24,304. Edwards, E., [Nielsen, L. C., and Petersen, P. V. F.]. Dec. 6.

Heating liquids.

—A heating or pasteurizing apparatus for milk, cream, and other liquids is shown in Fig. 1. The reservoir a , through which the fluid to be treated flows, is heated by steam which enters the casing b by the pipe c . Drip rings f are provided in the steam chamber. Horizontal plates m with holes near the axis are fixed on the stirrer, and serve to remove or prevent the formation of foam. A vent cock o is fixed on the waste pipe e , or in the bottom of the steam chamber, so that air carried by the steam may escape.



24,313. Holden, H., and Brooke, E. G. Dec. 6.



Heating liquids.—Relates to tubular apparatus for heating liquids or for condensing steam. Pairs of concentrically-arranged tubes are connected to separate tube-plates, between which chambers or passages are formed. In the apparatus shown in

Fig. 1, the lower tube-plates are free from the casing &c.; there are three chambers 11 above, and two chambers 15 below, so that the fluid entering by the inlet 6 passes down the annular space between the tubes 2, 3, up and down similar tube passages in the middle chamber 11, and finally up and out by the outlet shown. The heating fluid or steam may enter by the port 19, and pass away by the outlet 20, after being allowed to pass down the inner tubes 3 and round the outer tubes 2 within the casing 4. Or steam may be admitted by the inlet 19^a, and a draining-tube 20^a employed. The working of the apparatus may be reversed, and the groups of tubes and the number of the upper and lower chambers varied. The outer tubes are expanded into their plates, and the inner tubes are made fluid-tight by soft-metal plugs 21, and are provided at their lower ends with tapered ferrules 22, which have square or other holes and are screwed home by a key. In a modified form of apparatus, the arrangement described above is inverted, the tubes and tube-plates being supported from below instead of above, and there are two upper chambers and one lower chamber.

24,389. Dervilles, J. Dec. 7. *Drawings to Specification.*

Thermostats for incubators. A damper over the lamp chimney is operated by suitable means from an arm on a coiled metal tube forming a thermostat.

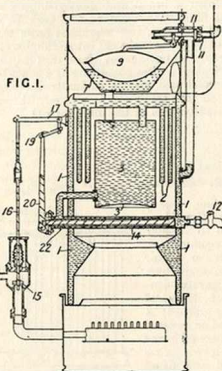
24,482. Radice, C. A. Dec. 9.

Non-conducting coverings and compositions.—Relates to the manufacture of articles used as a protection against the sun's rays, such as hats, spine-pads, tents, umbrellas, carriage hoods, and roofs, and consists in utilizing in their manufacture either aluminium or substances which are impervious to the Röntgen rays, such as tin, copper, zinc, bone, and alloys. These substances are used in one or more layers, in combination with the materials hitherto used in the manufacture of these articles, or may be incorporated with the materials, or be applied as a coating to them.

24,511. Winterflood, J. Dec. 9.

Heating water; thermostats.—Relates to a water-heating apparatus or boiler for domestic and other purposes, which consists of the combination of a water-heater, a ball valve for controlling the water supply, and a thermostatic regulating-device for controlling the gas supply to the atmospheric or other burner. The water-supply valve 11 is controlled by the float 9, which rests in the water in the chamber 7. The heater consists of the outer casing 1, the inner casings 2 and the central

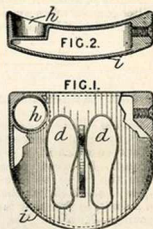
chamber or boiler 3, which is in communication with the chamber 7 and with the outlet 12. The thermostat 14, which controls the gas-supply valve 15, is fixed through the outer casing of the heater



under the boiler, and the operating-rod 22 is hinged to the lever 20, which by the levers 19 and 17 operates the valve-rod 16.

25,050. Lippert, J. Dec. 18.

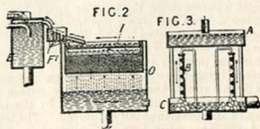
Hot-water bottles.
 —A hot-water bottle with a felt covering *i*, depressions *d* for the feet, and a depression *h* for the reception of a drinking vessel is shown in Figs. 1 and 2. It is of circular shape on the underside, and has one side concave.



25,085. Schantz, A. Dec. 18.

Heating water.—Relates to the purification of water for boilers and other uses. The water is

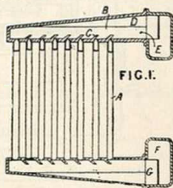
discharged through the bottom of the receiving-tank A in a shower over sets of heated pipes B, under which piles of boulders are placed in an open tank C. The boulders are heated by the water, and cause a first deposit of impurities. The water in the tank C is agitated by steam jets, and then flows down a broad and gently-sloping settling-channel, filled with boulders, to a tank E, where it is heated by steam, and whence it flows through a series of settling-tanks F into troughs I. From the perforated bottoms of these troughs the water flows through a filter consisting of a sheet of fabric on a gravel bed, and it is finally discharged in a spray, so as to become aerated, through the perforated bottom of the filter tank O.



25,172. Grandage, H. Dec. 19.

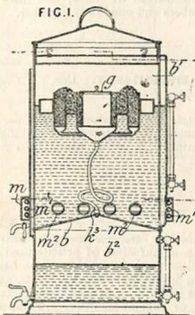
Heating gases ; heating liquids.—Relates to tubular fuel-economizers, hot air or water heaters, or the like.

The apparatus consists of rows of heating-tubes A ferruled or pressed into pairs of boxes B, which are tapered and fitted with guide-plates C, and have tapering inlet and exit passages E and F, and also inclined guide-plates G, as shown in Fig. 1. The tapering backs of the boxes B are strengthened by longitudinal ribs D.



chamber b^1 . Air heated by a steam pipe m^1 circulates through the pipes m^2 , and, as the oil is heated only by these pipes, risk of overheating is avoided.

FIG. 1.

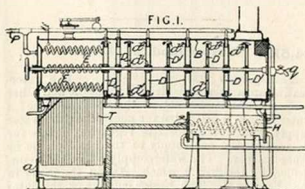


25,291. McArthur, D. A. Dec. 20.

Heating liquids.—A device for heating oil &c. in a filter consists of an annular box m with openings on its outer side, and pipes m^2 traversing the

25,293. Anderson, D. Dec. 20.

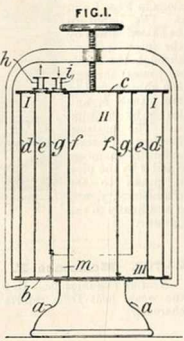
Heating water.—A boiler for heating water consists of a barrel B connected by tubes T to drums a , between which is the grate. In the barrel B are plates D, D^1 having parts d^1, d^2 cut away so as to cause the water to take a zig-zag course. The plates D are fixed, but the plates D^1 are mounted on a shaft, so that they can be rotated to bring the openings d^2, d^1 in line, and allow of the easy removal of deposit. The plates D form chambers which may be heated by steam from the pipe P, to heat the water further. The first chamber is supplied by coils E as shown. The water, sterilized, and softened by the heat and reagents, if necessary, is drawn off hot at g , it also passes through a coil H, where it is cooled, preferably by the boiler



feedwater. A vertical form of boiler is also described.

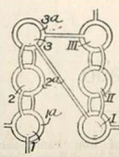
25,328. Bühler, E. von. Dec. 21.

Heating liquids.
—Vessels for sterilizing liquids such as milk are constructed so that the parts may be readily separated and cleaned. In the heat-exchanger or regenerator shown in Fig. 1, cylinders *f, g, e, d* are compressed between plates *b* and *c* by suitable means, such as a clamp formed with hooks to engage the plate *b* and a screw by which pressure is applied to the plate *c*. The short cylinder *g* is provided with feet *m* to engage the plate *b*. The plate *b* is formed with a pedestal *a*. The liquid to be sterilized enters the chamber III at *i*, and leaves at *h*, becoming heated by contact with the walls of chambers I and II through which the hot sterilized liquid flows.



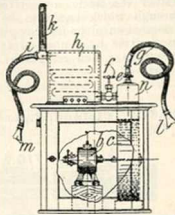
25,329. Bühler, E. von. Dec. 21.

Heating liquids.—Relates to apparatus for continuously sterilizing and pasteurizing milk and other liquids. The milk &c. is passed through chambers 1, 2, 3, enclosed in outer chambers 1^a, 2^a, 3^a through which the sterilized milk is passed in a reverse direction. The incoming milk becomes heated in its passage, and is led through chambers I, II, III, which are heated by steam chambers as shown. As the milk is heated before entering the chamber I, there is no tendency for the milk to adhere to the walls. On leaving the chamber III, the sterilized milk is passed through the chambers 1^a, 2^a, 3^a, and gives up its heat to the milk in the chambers 1, 2, 3. Several of these arrangements can be connected together.



25,432. Thiergärtner, W. E. Dec. 22.

Heating air.—A hot and cold air douche comprises a centrifugal fan *c* for producing a current of air driven by an electric motor *b*, an air collector *n*, a heating-box *h* in which the air is heated by electricity, and air-distributing pipes, cocks, and nozzles *i, f, m* and *g, e, l*. There is a thermometer *k* in the hot-air pipe.

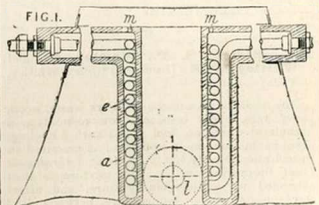


25,586. Giordan, F. Dec. 27.

Heating liquids.
—An apparatus for thawing oils in oil tanks is shown in section in Fig. 2. Between the outer and inner cylinders 1 and 2 water is contained, and is heated by the burner 3, which is fed with gas or other combustible by the pipe 5. Air-supply tubes 3, 4 are provided, and a cross bar 10 is secured in the interior of the cylinder 2. The horizontal pipe is engaged by slots in the cylinder 2.



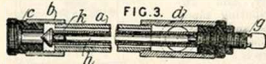
25,567. Wipperrn, H. F. W. C. Dec. 27.



Heating liquids.—Relates to feedwater and other heaters in which heating is effected by hot gases

and steam, the steam being finally superheated. A heater applied to a marine boiler and arranged in the smoke-box is shown in Fig. 1. The double-walled receptacle *a* receives the coiled tube *e* through which liquid to be heated flows. The fire-gases envelope the receptacle *a*, and the steam is admitted by a nozzle *l* to the interior of the receptacle *a*, and escapes by openings *m* in the cover.

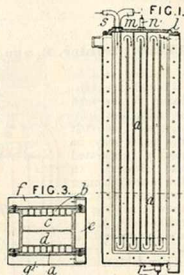
25,612. Cleland, J., and Stewart, J. C.
Dec. 28.



Steam traps.—A trap, for draining steam pipes of water and air, is chiefly constructed of tubing. To the ends of the outer casing *a* are screwed the coupling *b* and the tee-piece *d*. The trap is joined to the steam pipe by the thimble *c*, which forms the valve seat for the valve *h* carried by the inner tube *h*. The set-screw *g* provides for the adjustment of the valve. The action of the trap is determined by the contraction and expansion of the inner tube *h*.

25,637. Sellar, H. Dec. 29.

Heating liquids.
—A heating-apparatus for liquids is shown in vertical and horizontal sections in Figs. 1 and 3. The liquid to be heated enters by the pipe *s*, flows through the canals *a*, passes through the short pipe *l* to the canals *b*, and leaves by the pipe *m*. The heating-medium or steam enters the chambers *c* and *d* by the pipe *n*, passes to the chambers *e*, *f*, and *g*, and finally to the outlet *r*.



25,707. McNamee, F. Dec. 30.

Heating buildings &c.—Hot-houses are heated by the waste heat from retorts used in making peat charcoal.

A.D. 1900.

112. Ridley, S. F., Whitley, G., and Whitley, W. R., [trading as Ridley, Whitley, & Co.]. Jan. 2.

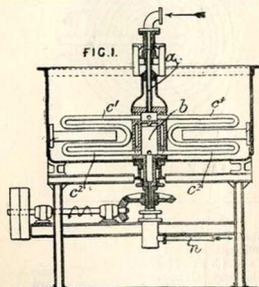
Non-conducting compositions.—Cork waste, wood, paper, rags, mealy cobs, &c. are reduced to a granulated condition, and mixed with a binding-agent containing casein and lime, as described in Specification No. 19,459, A.D. 1892, [Abridgment Class Stopping &c.]. The mixture is then subjected to considerable pressure, and afterwards heated to a temperature between 100° and 200° C., to harden the casein. The composition may be employed for the manufacture

of non conductors of heat, the proportions of the different ingredients, and the pressure and temperature suitable to its manufacture, being stated in the Specification.

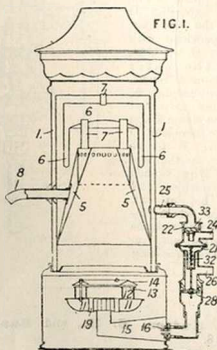
221. Schaefer, J. Jan. 3.

Heating liquids.—Relates to steam heating or boiling apparatus in which steam is passed through pipes which are rotated between fixed arresting-devices. In the arrangement shown in Fig. 1, the steam enters by the pipe *a*, passes through the coils *c*, *c'*, which are rotated, and to the discharge

pipe n . In a modified arrangement, the steam passes into the central chamber b , and then passes through the coils and to the discharge pipe.



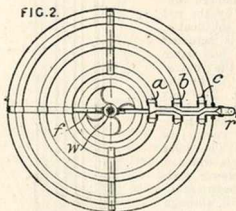
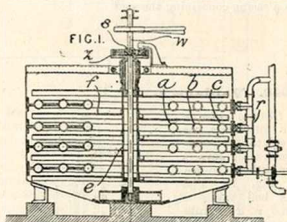
602. Winterlood, J. Jan. 10.



Heating water.—Relates to gas water-heaters or geysers, to automatic valve attachments, and to atmospheric gas burners therefor. The body of the heater consists of the double casing 1, the deflector or hood 6, and the conical-screen-shaped vessel 5, the water inlet being at 25 and the outlet at 8. Tubular stays 7 connect the water compartments. The burner consists of the bowl-shaped reservoir 11, the ring-shaped gas chamber 12, covered at the top by gauze 13, the fixed deflecting-shade 14, and the funnel-shaped elbow 15 with the plug 16. Air is drawn in round the

plug 16 and through the air tubes 19, and the caseous mixture is ignited by a pilot light and burns round the edges of the deflecting-shade. The automatic valve attachment consists of the gravity lift valve 33 in the water-supply chamber 22, the flexible diaphragm 21 to which is attached the spring-pressed gas valve spindle 32, and the gas-control valve 28. As the water enters by the inlet 24, the diaphragm 21 and gas valve 28 are lowered, so that gas passes from the inlet 26 to the burner.

828. Ullrich, G. Jan. 13.



Heating liquids.—Relates to apparatus for heating brewers' mash and similar materials. It consists, as shown in vertical section in Fig. 1 and in cross section in Fig. 2, of horizontal concentric pipes a , b , c , arranged in tiers between which move freely horizontal blades f , for agitating the mixture and extending to the walls of the mash tun. The blades are mounted on a sleeve e , which is driven from a central shaft s by gearing s , z . In a depression at the bottom of the tun is a centrifugal wheel, mounted on an end of the shaft s , and serving to agitate and mix the mash. The heating-fluid is supplied first to the innermost pipe a of the lowest layer, and successively to the pipes b and c of the same layer, and from the last it flows into a pipe r through which it is conveyed into the tier next above, and so on.

1026. **Lawton, A. W.** Jan. 16.

Heating gases; heating liquids.—Water or other fluid is heated by passage through a pipe surrounded by helically-wound resistant wires embedded in layers of vitreous enamel, asbestos paper, or other refractory insulator. The pipe *b* may be coiled spirally or otherwise, and supplied with fluid through a valve *v*, which can be rotated by a handle carrying a switch arm over fixed contacts to connect one or more of the heating-wires in circuit, in parallel. The contacts may be carried on a casing containing the coil.

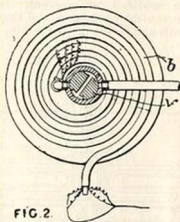


FIG. 2.

1049. **Vallant, J.** Jan. 17.

Heating water.—An automatic gas regulator for water-heaters, or geysers for baths, is shown in Fig. 1. The gas bell valves *c* and *r* dip into mercury or other seals, and are connected by the rod *b* with the float *a*, which is actuated by the hot water from the heater flowing in by the inlet *g*. The gas enters by the inlet *n*, and the valve *r* always remains sealed. The inlet pipe *g* is widened at the lower part, and has perforations *h*, through which the hot water passes into the receptacle *d* containing the float. After overflowing, the water leaves by the outlet *k*. The vessel *d* also has a small outlet *f* at the bottom.

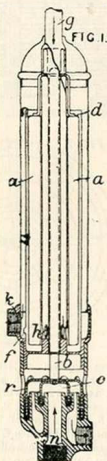
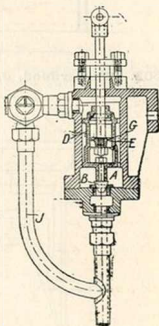


FIG. 1.

1105. **Borrowman, W. C.** Jan. 17.

Steam traps.—Relates to steam traps in which there is a cylinder connected to the discharge valve within the trap chamber, and within the cylinder there is a reciprocating piston which is locked with the cylinder when the water of

condensation collects in sufficient quantity, so that the cylinder and valve are raised and the water discharged. The piston *E* is reciprocated from a suitable working part. The valve extension *D* forms the cylinder, and is provided with the port *G* so that, when the water accumulates sufficiently in the chamber *A*, the water may get above the piston *E* and cause the extension *D* and valve *B* to be raised in the up-stroke. The branch pipe *J* enables the trap to be cut out. A plunger which displaces the water on the down-stroke may replace the reciprocating piston.

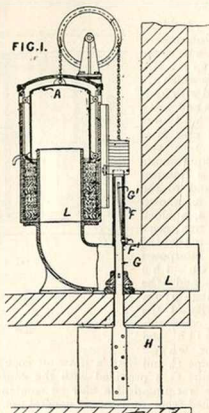


1111. **Hudson, E. H., and Raan, J.** Jan. 18.

Thermostats.—Relates to means for automatically controlling dampers by changes of air pressure. The damper *H* on a spindle *G* is opened and closed with the rise and fall of a balanced bell *A*, which hangs in a water seal upon a pipe *L* opening into the chimney. The connection between the bell and the damper is as follows:—The counterweight of the bell, being constrained to move vertically, has attached to it a sleeve *F*, which bears a pin *F'* engaging a spiral groove *G'* in the damper spindle *G*.

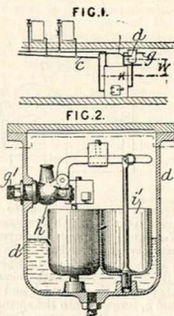
(For Figure see next page.)

1111.

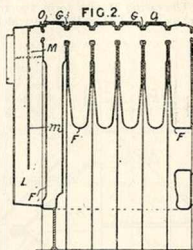


1285. Eggert, O. Jan. 20.

Heating buildings &c.—Relates to means for maintaining a certain pressure difference on the two sides of the regulating valves in connection with the heating-bodies in low pressure steam heating plants. The general arrangement is shown in Fig. 1, and the regulating float valves in Fig. 2. The vessel *d* communicates with the boiler *K*, with the reflux conduit *c*, with the atmosphere by the pipe *g*, and with the compressed-air conduit *g'*. The compressed-air admission is controlled by the valves *h'* and *h*. A similar pair of valves in the vessel *d* governs the exhaust *g*. A uniform difference of pressure corresponding to a column of water *w* is maintained.



1385. Hoffman, H. M. Jan. 22.

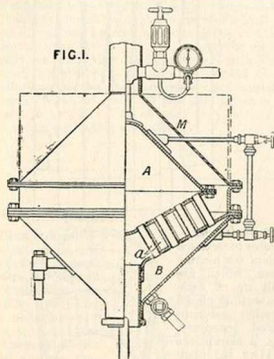


Heating water.—Relates to sectional boilers for heating water, which are built up of cast-iron sections placed together and connected interiorly. Fig. 2 shows the boiler in longitudinal central section, and Fig. 4 one of the intermediate sections. Each intermediate section consists of the hollow legs A connected at the top by the crescent-shaped crown B, and below the crown by the hollow arch C, which has openings E through which the products of combustion pass towards the front of the boiler. The hollow curved and corrugated plates F form downward extensions of the arches. The sections are united by nozzles G on the crown and legs, and are tied together by bolts passing through these nozzles. The front section differs from the intermediate sections in that the arch C, except the lower part, is omitted and the corrugations are on the inner surface only, and the plate is continued down to the grate bars. The rear section has the plate F corrugated on both sides, and is secured to the smoke-box L, which has a central partition *m* with an adjustable draught-damper M. Water entry and exit nozzles P and O are provided.

1405. Austin, H. Jan. 23.

Heating liquids.—Relates to boilers for raising steam and heating liquids. An upper water chamber A and a lower one B have their opposing faces conical or dished, to form a flue space traversed by water tubes *a*. The upper part of

the upper chamber is also coned or domed, and is enclosed in a casing M so as to form an upper flue space. The casing M may form the inner wall of a tank, shown in dotted lines, in which feedwater

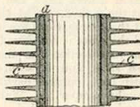


is heated; or, according to the Provisional Specification, a third water chamber occupying this position may be connected to the chamber A by tubes traversing the upper flue. The boiler shown is adapted to be heated by liquid fuel, but a modification is illustrated in the Specification with a conical firebox for burning solid fuel. A spherical boiler constructed on the same principle is also illustrated in the Specification. The parts are bolted together so as to be readily separable.

1474. Schiele, J., and Boisselot, J. B. Jan. 23.

Heating buildings &c.

—Iron and steel articles, such as radiators, are prepared for receiving a coating or covering of aluminium by immersing them in a bath composed of essence of turpentine and copaiva balsam. The aluminium may then be cast on, or the article may be dipped into molten aluminium. The Figure shows the application for producing aluminium ribs *c* on the iron cylinders *a* or valve boxes of explosion motors for radiating the heat.



1492. Dymond, G. C., [Clarke, C.]. Jan. 23.

Heating buildings &c.; footwarmers.

—Relates to steam or hot water radiators which are provided with footwarmers and rests. The hollow metallic case B is divided into two foot compartments *d*, and is clamped to the pipe *a*, as shown in Fig. 4, a block *m* of non-conducting material being interposed between the warmer and the supporting-pipe. The cavity of the warmer communicates with the steam or water supply pipe C, and with a draw-off cock *h*. The supply pipe C is provided with the control valve G. The warming-device may be combined with, or detached from, radiators in general use.

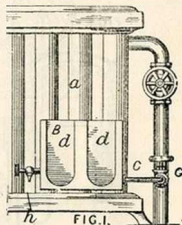


FIG. 1.

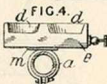


FIG. 4.

1563. Brooke, R. G. Jan. 24.

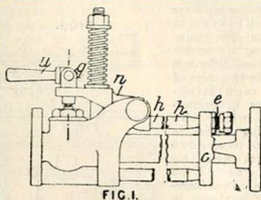
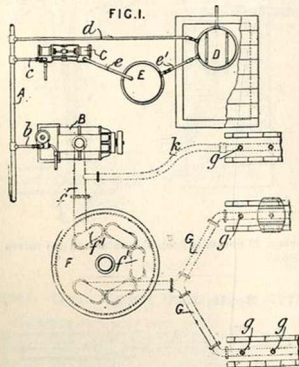


FIG. 1.

Steam traps.—Relates to fittings for use on steam traps in which the expansion or contraction of a tube or tubes is employed to operate a valve lever thrust rod or bar. The trap shown in Fig. 1 is like that described in Specification No. 13,062, A.D. 1898, fitted with means for adjusting in length the thrust rod *h* and with the shouldered stud *g*, screwed into the spring-pressed lever *n*, and adapted to thrust upon the valve stem or plug, with the pivoted handle *u* for turning the stud. The thrust rod fits within a recess in the pin *e*, which is screwed into the crosshead *c*, or it may be fitted into the lever *n*. The rod *h* may also be made adjustable by providing either end with a screwed part and a nut portion, or by constructing

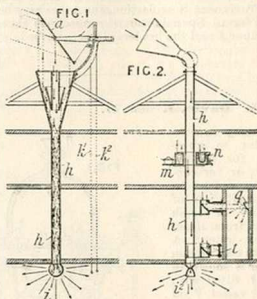
it in two parts which are connected by a right and left handed screwed sleeve.

1701. Russell, H. S. Jan. 26.



Heating air; heating liquids; heating by steam circulation.—In lining casks or similar vessels with paraffin, wax, &c., the cask is first treated with sterilized heated air to open the pores of the wood, and then with the lining-composition, after which cold air is injected to cool and set the lining or coating. The air for heating and cooling the casks passes from a steam blower B through a pipe *f* to the heating-chamber F to be heated, and to the branch pipe *k* for finally cooling the casks. In the chamber F, which is suitably lined to serve as a furnace, the air passes through enlarged pipes *f'*, and thence through the pipes F to the casks through nozzles *g*. Within the tank D containing the coating-composition is secured to the lid the pump cylinder of the direct-acting air, steam, or other pump, for withdrawing the composition from the tank and forcing it through pipes and nozzles to the casks, the composition being cleared out of the tubes and the lining partially or wholly cooled by compressed air, which is conveyed through a pipe *e'* from the air reservoir E, which is in communication with the air-compressor C by means of a pipe *e*. The motor cylinder is secured to the outside of the lid of the tank. The steam pipe A has branches *b*, *c*, *d*, leading to the steam blower B, the air-compressor C, and the tank D respectively.

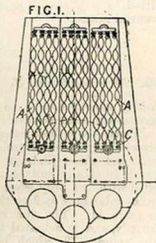
1822. Hanneborg, O. B. H. Jan. 29.



Heating-apparatus; heating water; heating buildings &c.; solar heat, utilizing.—Relates to means for the collection and conveyance of heat from the sun or other source to the cellar, basement, or other dark rooms in buildings, mines, ships, or the like. In the apparatus shown in Fig. 1, the rays are reflected by the mirror *a*, which is controlled by the cords *k*¹, *k*² and passes by reflection down the tube *h* to the bulb *i*. In the arrangement shown in Fig. 2, the rays are collected by a cone, which may have a collecting-lens and mirror, and are transmitted to the distributor *r*, or to the radiator *t* for warming a room, to the plate *m* for warming food or the like, or to the water-heater *n*, by the insertion of the various small lengths of tube in the places provided in the conducting-tube *h*.

1918. Borrowman, W. C., Edmiston, J. B., and Wallace, W. C. Jan. 30.

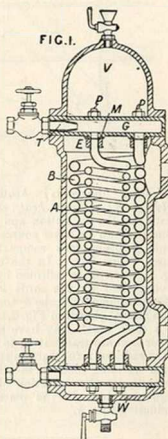
Heating water.—Tubes of waved or serpentine form are employed in the construction of superheaters and apparatus for heating and evaporating feedwater and the like. Fig. 1 shows a superheater in a steam-boiler uptake. The tubes are preferably arranged to cross one another, as shown at A, being connected alternately to opposite sides of



transverse pipes or headers C. Free expansion and contraction are thus allowed. According to the Provisional Specification, the tubes may be of spiral form. Special forms of connections between the tubes A and the headers C are described.

1943. **Davie, J.** Jan. 31.

Heating water.—Relates to apparatus for heating water, or for condensing steam as in the production of potable or fresh water from steam or salt-water. A vertical steam heater is shown in Fig. 1, fitted with an air vessel V on top and a mud drum W at the bottom. Coils A, B are mounted in the casing with bores in the ratio of the area of their heating surfaces. These coils are jointed to the ends of the apparatus by means of flanges E having spigots M fitting between inner and outer rings. Stud P provide for the tightening of the joints. When combined high and low pressure steam

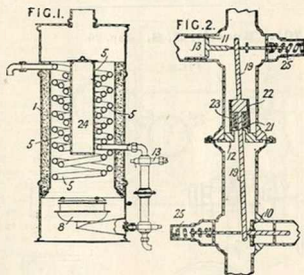


is used for heating, the high-pressure steam is admitted to the upper chamber G by a central inducing-nozzle T, and the low-pressure steam is admitted by a Y-shaped opening branching from the central nozzle.

1958. **Winterhood, J.** Jan. 31.

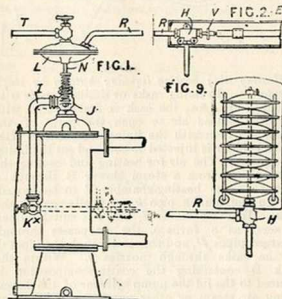
Heating water.—Relates to water-heaters or gas geyzers, and to automatic valve attachments therefor. Within the cylindrical casing 1 packed with non-conducting material are arranged the helical coils 5 and the cylindrical chamber 24. The burner 8 is of any suitable construction, and is supplied with gas only when the water is flowing in by the inlet 13, Fig. 2, to the heater through the water valve 11. The disc valve 10 controls the gas supply, and is actuated through the medium of the spindle 19, which is pivoted about the diaphragm 12 between the water and gas chambers

from the water supply valve spindle. The piece of rubber tubing 22 surrounding the projection 21 on the diaphragm encloses the coiled spring 23.



Springs 25 normally keep the water and gas valves closed.

2177. **Royle, J. J.** Feb. 3.

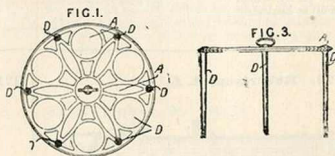


Heating buildings &c.; thermostats.—Relates to devices for regulating or controlling the action of a heating-apparatus, as for instance controlling the steam or hot-water supply of rooms heated by steam or hot-water pipes. By expansion, changes of temperature, operate a valve which controls the flow of a fluid under pressure, e.g., town's water, acting upon a diaphragm, piston, or the like, which in turn operates the valve controlling the supply of hot fluid. The thermostatic apparatus may be used for working the dampers of boilers, or for ventilators, or for controlling the temperature of water in a swimming bath. Fig. 1 shows the application to steam heating-apparatus fitted with

an expansible metal thermostat at the side as described in Specification No. 19,416, A.D. 1893. The thermostatic bar E, shown in part in Fig. 2, is arranged in a corridor say, and when the temperature becomes too great closes the valve 4 through which water or fluid under pressure from the pipes T and R trickles normally to waste. The small adjustable collar V provides means for altering the length of the valve spindle. Within the casing J is a double beat equilibrium valve, and within the chamber L is a diaphragm valve connected to the spindle N of the double-beat valve. Instead of the double-beat valve and the valve K^x in the steam pipe I, the diaphragm valve may operate directly upon the valve K^x. The thermostat may be of the form shown in Fig. 9, where alternate metal segmental bars are threaded on to guide-bars, and are mounted above the valve H. When applied to a fire-heated hot-water circulation system, the valve casing J is fitted to the flow pipe.

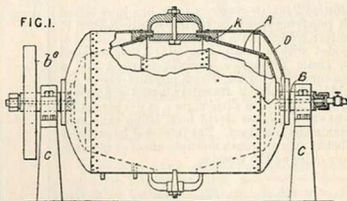
2316. Price, P. Feb. 6.

Boiling-pans.—A perforated baffle-plate or grid A is supported on legs D, or is suspended from the cover. The appliance may be used when boiling wort, extracts clothes, vegetables, &c.



2341. Boulton, A. J., [Marks, A. H.]. Feb. 6.

Digesters; heating by steam circulation.—Ground rubber waste, to be devulcanized, is mixed with a chemical solution and heated to a high temperature for several hours in a closed barrel A, built up in a cylindrical casing D, on flanges of horizontal shafts B, which are supported in fixed bearings C, and rotated by a pulley b^c. Manholes are formed through strengthening-plates K placed between the barrel and casing. The shafts are provided with openings to pass steam through the space between the barrel and casing, inlet and outlet pipes being jointed to them.

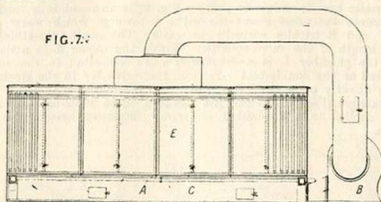


2409. Kent, H. A. Feb. 7.

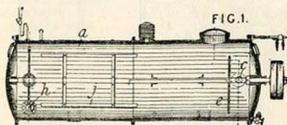
Heating by electricity.—Electric conductors, to take the place of platinum as electrodes for electrolysis or primary or secondary batteries, or as resistances, or as heat generators, are formed of ground or sanded glass or unglazed porcelain plates, sheets, tubes, rods, or vessels of any shape. A thin coating of platinum or gold is first formed on them, by either (1), painting or flowing platinum solution or liquid gold thereon, and heating to a red heat to reduce to the metallic state, or (2), pouring a tin-chloride solution thereon, washing, and afterwards applying a gold or platinum solution in caustic soda together with a few drops of glycerine, and keeping the article warm until the film has deposited. After cooling, a solution of platinum chloride is applied, and the article is heated to render the coating metallic. These two processes may be reversed, or one may be omitted. The article is next used as a negative electrode in an electrolytic bath consisting of a hot solution of sodium or ammonium phosphate and platinum chloride, by which an electrolytic deposit of platinum is obtained.

2465. Davidson, S. C. Feb. 7.

Heating air.—An apparatus for drying fabrics or the like has a fan B which forces air through a channel C, having a perforated top, and into the drying-chamber E. The channel is fitted with steam pipes A, by which the air is heated.



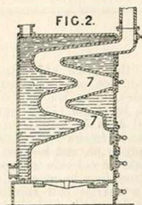
2572. Robertson, R. A. Feb. 9.



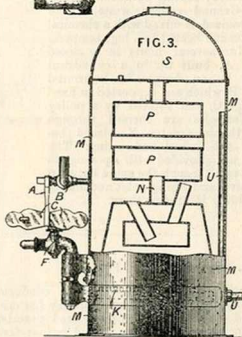
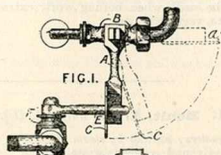
Heating liquids.—Sugar-cane or like juice mixed with purifying-agents is heated to about 250° F. by direct contact with steam in a closed vessel a, provided with a rotating agitator j, and supplied with steam through a silencing-nozzle h and a valve controlled by the steam pressure above the liquid. The juice is forced in near the nozzle h, and, after passing a diaphragm e, is discharged by a float valve at c, the liquid level being thus kept approximately constant. The juice may be partially heated by vapour from a multiple-effect evaporator, before entering the vessel a.

2655. Binns, E., Speight, W., and Binns & Speight (Limited). Feb. 10.

Heating water. boilers for. Wedge-shaped waterspaces are arranged to form a tortuous flue 7. The boiler is preferably of the welded type, and rectangular in cross-section.



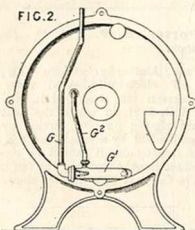
2714. Fenlon, H. T. Feb. 10.



Heating water.—To prevent the gas supply of a geyser or similar water-heater from being turned on, or the water supply cut off, one independently of the other, the handle A, Fig. 1, of the water tap B is fitted with a perforated plate C, which engages with and secures the handle E of the gas tap F in the closed position, as shown. When the handle of the water tap is turned into the position indicated in dotted lines a, the tap is open, and the gas supply can be turned on; in this position

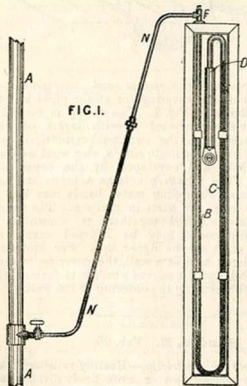
the water-tap handle cannot be closed more than is indicated by the dotted lines *c*. As adapted to a geyser, the gas tap is connected to the burners *K*, Fig. 3, and the water tap to the boiler *M*. The combustion products circulate through the vessels *N*, *P*, *S* to the chimney, and the water is drawn off through a pipe *U*.

2821. **Tullis, D. K.** Feb. 13.



Heating water in washing-machines. The heating-appliance, Fig. 2, consists of a tubular iron U-piece *G*¹ fixed to the end of the machine below the water level, supplied with steam by the pipe *G*, and provided with a pipe *G*² connected to the air space above the water in the machine.

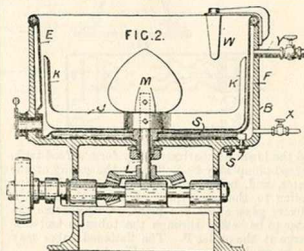
3177. **Mackintosh, C.** Feb. 17.



Heating water.—A safety-valve of the kind

described in Specification No. 24,622, A.D. 1895, and adapted for kitchen boilers, water-heaters, &c., is shown in Fig. 1. The flow pipe *A* or other source of pressure is connected by a pipe *N* to a T-piece *F*, to one limb of which a U-tube *B* is connected. The free end *C* of the U-tube is curved, and dips into a receiver *D*. A quantity of mercury proportional to the pressure to be resisted is placed in the U-tube, and the closed limb and connecting-tubes are filled with spirits of wine. A rise of pressure in the flow pipe drives the mercury into the receiver, and the escaping steam may actuate a whistle or other alarm. The entrance of the mercury into the receiver may complete an electric circuit by which the alarm is given. An air cushion may be formed between the flow pipe and the U-tube by suitably arranging the connecting pipe.

3263. **Walter, W.** Feb. 19.

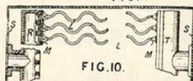
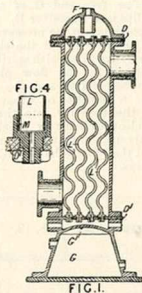


Heating by steam circulation.—Relates to apparatus for mixing, heating, and cooling chocolate and other materials. The pan *E* fits in a casing *F*, a space *F* being left between the two and charged with water by the pipe *X*. This water is heated for the purpose of heating the chocolate &c. by means of a steam coil *S*. When it is required to cool the contents of the pan, the steam is turned off and the water turned on; the overflow escapes at *Y*. A frame *W*, carried by a bracket, serves to hold a thermometer and to assist in the mixing operation.

3286. **Griffiths, E., and Killip, J.** Feb. 19.

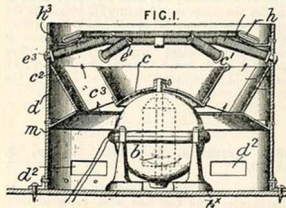
Heating gases; heating liquids.—Relates to tubular heaters and the like with tubes of rectangular section with rounded ends and bent or corrugated lengthways. In the heater shown in Fig. 1, the rectangular tubes *L* are fixed to plates *D*, *D*¹ by nozzle-shaped castings *M*, Fig. 4, secured

by nuts. When the liquid to be heated is passed through the tubes and exhaust steam is used to heat the tubes, the nozzle opening is narrowed as shown. The hollow base or tank G is in two parts



and the lower compartment may form a feed-tank. A feed-pump may be bolted to the casing of the heater, and, being provided with a suction pipe leading to the lower part of the tank G and a delivery pipe above the plate G¹, may force the water to be heated through the tubes L and discharge at the outlet F. The flattened tubes may also be employed as shown in Fig. 10.

3315. Brookes, A. G., [Boston Electric Heating and Power Co.]. Feb. 20.



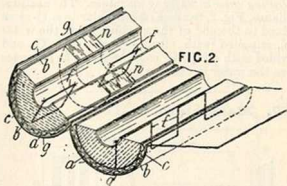
Heating by electricity; heating air; heating buildings &c.—Air is passed through a casing *d* by a fan *a*, by which it is thrown into contact with

heating-wires coiled on a porcelain ring *h* and tubes *e*¹. The fan is carried by the vertical shaft of an electric motor enclosed in a case *b*, and consists of a disc *c* carrying a cone *c*¹, flat radial blades, and an outer cone *c*². The casing *d* has inlet openings *d*¹, a deflecting-plate *m*, and supports *e*², *h*² within its open top to carry the insulators *e*¹, *h*. The apparatus is applicable for heating cars, steamships, workshops, or dwellings.

3371. Porter, E. F. Feb. 20. *Drawings to Specification.*

Heating air; heating by electricity.—An apparatus consisting of electrically-heated wires and an electrically-driven fan, described in Specification No. 5595, A.D. 1891, in which the heated wires may be laid zig-zag on pins carried by the fan blades, is controlled by a special switch, arranged so that the heating-circuit cannot be closed without also connecting the motor of the fan in parallel circuit. The fan may be connected alone.

3443. Herdman, G. A. Feb. 21.



Non-conducting coverings and compositions.—A non-conducting covering for steam pipes and the like is shown in Fig. 2. The casing is formed of corrugated strawboard *a* with layers of thin strawboard *b*, *c*, the two semi-cylindrical parts being filled with silicate cotton, slag wool, asbestos, or cowhair, and enveloped by the cover *g* of canvas. The canvas *g* acts as a hinge and as a fixing-flap. Encircling metal bands may also be used to keep the parts in position. The various layers are stitched together as shown at *f*. Distance-pieces *n* may be inserted within the fibrous mass at the upper side. For protecting pipes placed against a wall, the covering is semi-cylindrical, and the canvas wrapper is formed with flanges for securing the covering to the wall.

3731. Sander, E. Feb. 26.

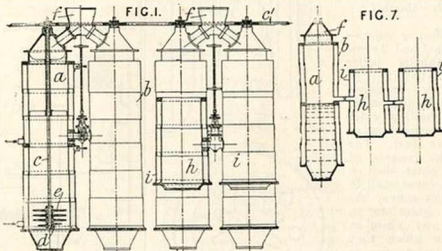
Heating by electricity.—Heating-resistances are made by mixing two or more finely divided substances selected from both of two classes, in equal or other proportions, and fusing the mixture in an

electric or other furnace. The substances of one class are calcium, strontium, barium, beryllium, magnesium, zinc, cadmium, mercury, aluminium, scandium, yttrium, ytterbium, erbium, samarium, thorium, zirconium, lanthanum, cerium, didymium, terbium, gadolinium, or their oxides. Those of the other class are iron, cobalt, nickel, chromium,

molybdenum, wolfram, uranium, ruthenium, osmium, rhodium, iridium, palladium, platinum, or their salts, oxides, or sulphur compounds. When the metals are used, they are oxidized in the furnace. The products may be powdered, mixed with resin, syrup, or other binding material, pressed to shape, and heated in absence of air.

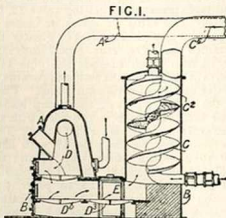
3918. Woodcock, W. H., and Harper, W. A. Feb. 28.

Boiling-pans.—Relates to a method of and apparatus for extracting sodium nitrate from raw material, such as "caliche," or from the refuse known as "ripio." The powdered material is led by a hopper *f* to a boiler *a* previously charged with water, having a heating-jacket *b*, which may be divided into two sections, through each of which steam or hot water from a separate boiler may be passed. A stirring-device *c*, operated by a shaft *c'*, is provided to each boiler. It has ordinary stirring-



arms *e*, and a device, such as a screw blade *d*, or a screw-thread cut on the agitator shaft, for raising the stirring-arms above the residue as it collects at the bottom. When the material is exhausted, the residue is allowed to deposit, and solution is run into one or more crystallizing-tanks *h*, having jackets *i* through which cold water passes. Before passing to the crystallizing-tanks, the whole charge may be passed through a filter-press, in which the temperature is maintained at or near the boiling point of the solution. The heated water obtained may be run into the boilers. The residue in the boilers is discharged through a bottom door operated by a screw or by hydraulic means. The liquid from the crystallizing-tanks may be run back to the boilers while the crystals are emptied out.

3947. Crane, R. March 1.



Heating water.—Relates to boilers for heating buildings and to hot-water supply boilers arranged in proximity and capable of being heated by a common furnace. The water-supply boiler *A* of known type is mounted upon a suitable frame *B*, and is in combination with the supplementary or

water-heating boiler *C*, which has hollow spiral vanes *C'* to the water conduit. The water supply boiler has upper and lower firegrates *D, D'*, the lower being for use with the common firegrate *D''* when both boilers are in use. The boiler flues have suitable dampers *A''* and *C'*. When the hot-water supply boiler only is working, the folding doors *E*, which form the sides of the passage between the boilers, are closed together, forming the ashpit back for the supply boiler.

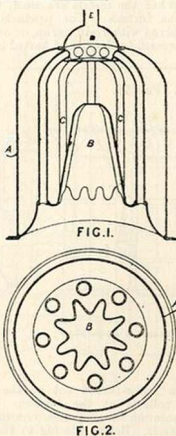
3975. Bloxam, A. G., [Panzl, R., and Troetscher, A.]. March 1.

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

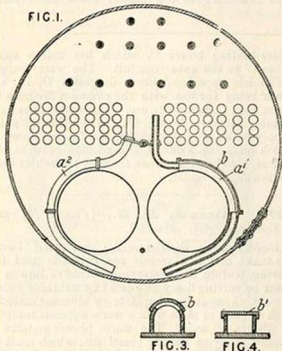
themselves, a metal skeleton, to which the material is applied, being used.

4385. Price, H. A., and Turner, H. C. March 7.

Heating water.—Figs. 1 and 2 show a tubular boiler constructed of copper or other metal, and suited for heating water by means of gas or other fuel. The boiler consists of an outer shell A and inner shell B. Tubes convey the hot gases to an upper chamber, from which they escape by a flue or chimney.



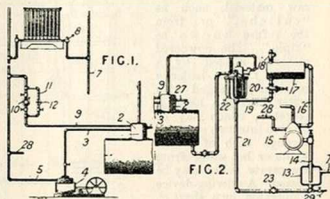
4391. Barnes, S. E. March 7.



Heating water.—Relates to means for promoting water circulation in boilers. The invention is

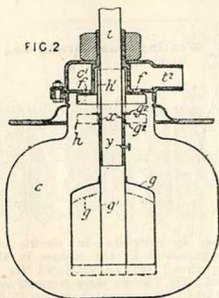
shown as applied to a marine boiler, but is stated to be applicable to others. Tubes curving round the flues induce a flow of water from the bottom of the boiler. Ordinary pipes connected by flanges may be used, as shown at a^2 , or one length may be open at the side next the flue, as shown at a^1 and in Figs. 3 and 4. The outer side of the tube is open, and is covered by a plate b , b^1 to allow cleaning.

4531. Ball, C. A. March 9.



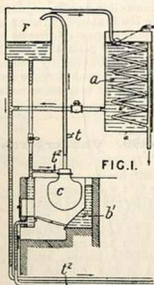
Heating buildings &c.—Relates to steam heating systems which are adapted to operate either as low-pressure or exhaust, or as pressure or live-steam systems, the change being automatic and governed by the boiler pressure, and in which the relief of the entrained air is automatic, and the condensed water is returned automatically to the boiler under either condition of supply. The supply side of the system is shown in Fig. 1, and the return side in Fig. 2. The steam drum 2 is connected by the pipe 3 with a power fixture or engine 4, the exhaust pipe 5 of which constitutes the supply pipe for the radiators, and is connected by the pipe 9, which has a suitable reducing-valve 10, and, in the bye-pass 11, the suitable pressure-regulating valve 12, to the supply pipe. The valve 12 opens or closes automatically under any pressure less or greater than a predetermined one. The return pipe 7 leads into the chamber 13, into which extends the pipe 14 connected with a suitable exhausting-apparatus, such as the water end 15 of a vacuum pump. The pipe 16 from the delivery port of the pump leads into the closed tank 17, which is provided with a suitable outwardly-opening air relief check 18, and which is connected by the pipe 19 with shut-off valve 20 to a return steam trap 22 and to the under side of the chamber 13. The pipe 21 is provided with a check valve 23 to prevent water from passing to the chamber 13, and a drain cock 29 to remove all water when desired. The steam supply for the pump 15 is through the pipe 27, while the pump exhaust is connected through the pipe 28 to the supply pipe 5. The system is converted from an exhaust into a live system by the opening of the valve 12 into the bye-pass 11. A static valve 8, which at all times affords the necessary relief, is employed.

4608. Rouquand, L. J. M. March 10



Heating buildings &c.; heating water.

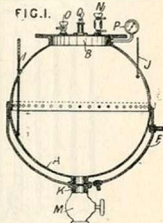
Relates to hot-water heating systems for rooms, hot-houses, orangeries, drying chambers, and the like. The general arrangement of the heater and pipes is shown in Fig. 1, and the boiler which circulates the water intermittently is shown in Fig. 2. The boiler is mounted in a suitable fire, which is provided with double walls b^1 , in which the feedwater may circulate, and is connected with the hot-water reservoir r ,



the steam-condensing tank a , and the various pipes as shown. The return pipe t^2 communicates with the compartment c^1 , which is separated from the boiler chamber c by openings f , and the discharge pipe t opening towards the centre of the boiler serves as a guide for the pipe g^1 attached to the bell float g . Above this float is another float h attached to the pipe h^1 and limited in its descent by the shoulder g^2 of the tube g^1 . Openings x in the pipe t , and a notch in the pipe g^1 in which the screw y engages, are provided. When the boiler is full of water, the float h closes the openings f , and the openings x are uncovered. As steam is produced, the float g rises and closes the openings x , and finally the hot water is discharged by the pipe t , and the steam passing over is condensed in the tank a and returned. Hot water is thus intermittently discharged into the reservoir. The radiators used are fitted with taps to regulate the water supply.

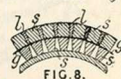
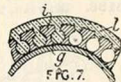
4847. Fowler, G. C., Fowler, M. A., and Fowler, E. J., [trading as Welcome & Co.], March 14.

Digesters.—Relates to the production of a solid portable fuel by incorporating alcohols, ketones, volatile liquid hydrocarbons, and other similar liquids with solid substances. Caustic soda is mixed with a heated mass of carnauba wax and stearine, and the mixture is run into a digester, which may contain methylated spirit and caustic soda. A digester for use in heating the mixture consists of a globular vessel A , provided with a steam jacket F , and a discharge pipe M , fitted with a valve, and strainer K . The vessel is closed by a lid B , carrying inlet pipes O, N , respectively fitted with one and two cocks. A safety-valve Q , a pressure gauge P , and thermometers I, J are fitted to the digester. After the digesting process, the heated mass is partially cooled and drawn into boxes or moulds.



4918. Rheinhold, S. March 15.

Non-conducting coverings.—Relates to non-conducting coverings for steam boilers, pipes, and the like, in which non-conducting material is spread upon a foundation of asbestos, cardboard, webbing, or the like, and furrowed in one or more directions. A sheet g with furrows i on one side is shown applied to a pipe in Fig. 7, and a two-sided sheet $s s$ is shown in Fig. 8. The exterior gaps l are filled with non-conducting material, and the outside is rendered smooth.



5026. Clare, F. March 16.

Heating buildings &c.—A four-loop radiator is shown in Fig. 1, and one loop is shown in section in Fig. 2. The end loops are supported on legs a^1 ; each loop consists of two or more members a with open tubes B , for heating ascending air, screwed in at the top and held by thimbles E at the bottom. The loops communicate with each