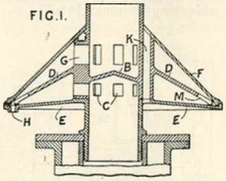
other heating-appliance and to radiate heat, a condensing chamber is provided around the flue, into which the smoke &c. is admitted by openings C below a cross partition B, and from which, after passing around a flange D, they again pass to the flue by openings G. The flange D and plates E, F forming the condenser incline downwards, thus allowing the condensed vapours to gravitate towards a drain H at the periphery. An annular space may be left around the flange D, or it may be provided with peripheral apertures M. Vertical air passages K may be formed through the condenser adjacent to the flue.

FIG. 1.



3958. Glogner, R. Feb. 21.

FIG. 1.

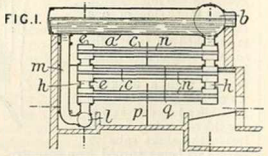
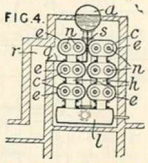


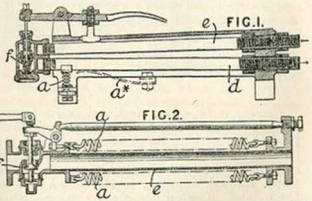
FIG. 4.



Heating water.—Relates to boilers of the kind comprising superposed water-tubes containing fire-tubes and opening into end water-chambers. The chambers *l* are arranged separately one above the other, and are only connected by short intermediate tubes *h*, which are so disposed that they are exposed to entire contact with the furnace gases. Each element may consist of two or more water-tubes *e* containing fire-tubes *n* and opening in single end headers *e*. In the boilers shown, the front headers of rows of such superposed elements open into an upper longitudinal drum *a* formed with a short transverse portion *b*. The lower ends of the back headers open into a transverse drum *l*, which is connected to the upper drum by a downcomer *m*. The flue space is divided by an horizontal baffle *q*, which is cut away at its back end to allow the gases to pass upwards and to return to the front of the boiler along one side of a vertical longitudinal baffle *s*. They pass around the baffle *s*, and escape through the flue *r* at the back of the boiler. Cross plates *p* are placed below and above the baffle-plate *q* to compel the gases to take a longer course through the flues.

3975. Geipel, W. Feb. 21.

Steam-traps.—In a steam-trap of the type in which a tube *e*, Fig. 2, or tubes *d*, *e*, Fig. 1, in contracting open a valve *f*, as described in Specifications No. 14,950, A.D. 1900, and No. 21,063, A.D. 1905, one or more springs *a*, *a** are used to assist contraction of the tube, so that there is no tendency to permanent elongation. A diaphragm or similar elastic device, as described in Specification No. 21,783, A.D. 1897, may be used instead of the spring, being acted on by fluid under pressure.



4007. Hislop, G. R. Feb. 22. [*Cognate Applications Nos. 4008 and 4009, A.D. 1908, dated Feb. 22.*]

FIG. 1.

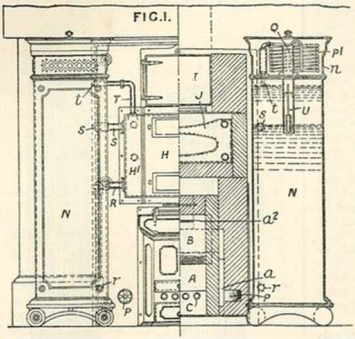
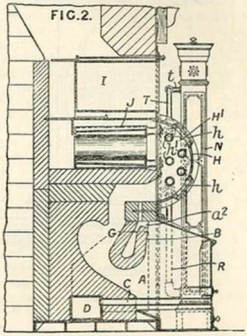


FIG. 2.

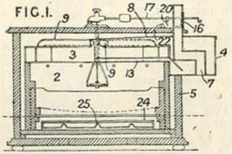


Heating buildings &c.—In a heating system comprising radiators heated by hot water from a boiler set in a domestic fire-place, the radiators N are connected to the water heater H^1, *h* by circulation pipes R, *s*, S, *s*, Figs. 1 and 2, and by a steam-escape pipe T, *t*. The steam in the upper parts of the radiators is condensed in coils P^1 in water vessels *n* at the upper ends of the radiators N, The radiators are filled with water by means of a pipe Q fitted with a floating indicator U.

4022. Stockdale, C. Feb. 22.

Thermostats.—To prevent excessive expansion of the ordinary capsule used in an incubator, stops 16 are provided, between which the end of the lever 17 works. In order that the lamp flame regulated by the capsule may be left at its ordinary height when the egg chamber is open, a latch 20, pivoted to the lever 17, engages one of the notches on a device 22 secured to the top of the incubator.

FIG. 1.

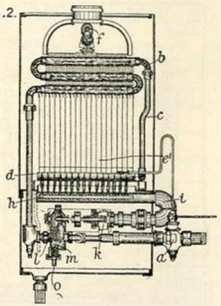


4103. Vaillant, J., and **Remscheider Centralheizungs-und Badeapparate-Bauanstalt J. Vaillant.** Feb. 24.

Heating liquids.—Liquid is heated by passing through coils of ribbed tube *b* situated between hollow walls e^1, through which the liquid flows either before or after passing through the ribbed tube and which enclose the burners *h*. In the heater shown, water enters by an inlet *a*, flows through a chamber *m*, in which a diaphragm *l* operating a gas-control valve is situated, and passes up into the ribbed tube *b* where it is heated by the burners *h*; thence it flows by a divided pipe *c* and two horizontal headers *d* into two rows of inclined tubes e^1, which form a wall on either side of the burners. Horizontal headers connect the top ends of the tubes e^1, and through these headers the water passes to an outlet pipe *f*. The gas supply is controlled by the movements of the diaphragm *l*, which divides the chamber *m* into two compartments connected by a small opening, caused by

the difference in pressure existing in the chamber *m* on opposite sides of the diaphragm when water is flowing through the heater, the diaphragm

FIG.2.

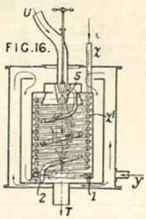


being connected to a valve in the gas supply pipe *i*. The size of the opening may be varied by a screw *o*.

4129. Le Rond, L. J. J. B. Feb. 28, 1907, [*date applied for under Patents Act, 1901*].

Heating air; heating water.—In apparatus for producing a mixture of combustion products and steam, dry compressed air enters at *y*, passes through casings, and up the coil 2, whence a portion supports combustion of fuel entering by the pipe U, the remainder passing around the burner. Water is heated in the coil z^1.

FIG.16.



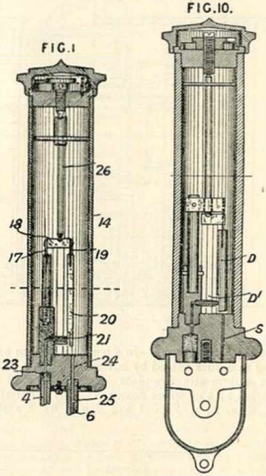
Specification No. 1849, A.D. 1908, [*Abridgment Class* Air and gas engines], is referred to.

4261. Marks, E. C. R., [*National Regulator Co.*]. Feb. 25.

Heating buildings &c.; thermostats.—In apparatus for controlling the temperature in buildings, in which a fluid-pressure motor 7, Fig. 9, regulates dampers 8, 9 admitting hot and cold air to a room, the supply of fluid is controlled by a thermostat 2 in such a way that the movement of the motor is

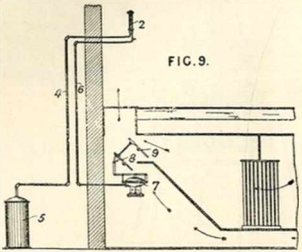
FIG.10.

FIG.1



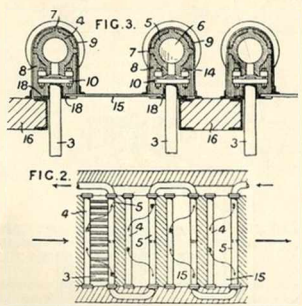
retarded or accelerated. One form of thermostat, shown in Fig. 1, consists of an india-rubber or other tube 14, the expansion of which actuates a rod 26, supported by a spring 17 and a cross-rod 18, and controls the tension of a spring 19, to which is attached a valve 20 controlling the end of a pipe 4, leading through a filter 23 to a supply tank 5. The pressure of the fluid in the supply pipe 4 is balanced by the back pressure in the thermostat and by the tension of the spring. A rise of temperature diminishes the tension of the spring, and allows the fluid to open the valve and pass to the motor, thereby closing the damper of the hot-air chamber. At the same time, the back pressure in the thermostat is increased and assists the spring 19 in closing the valve. An outlet pipe 6 leading to the motor has a small hole 25 opening to the atmosphere, through which the fluid escapes from the motor when the valve is closed. In this way a vibrating action is set up, and the movement of the motor is retarded. Similarly, by reversing the connexions, the movement of the motor may be accelerated. In a modified form of thermostat, the spring 19 is replaced by a coiled spring forming part of the rod 26. In a modified

system, the two pipes 4, 6 are replaced by a single pipe, a restriction being formed in the pipe leading from the tank, and the outlet pipe 5 of the thermostat, Fig. 10, opens to the atmosphere. In



the thermostat used in this modification, the tension of the spring increases when the temperature increases, so that the valve D closes the opening D[1].

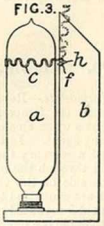
4270. Schulz, M. R. Feb. 25.



Heating liquids.—A surface apparatus comprises a series of groups of heating tubes arranged in the path of the heating fluid. Each group is formed of two main tubes 4, 5, shown in plan in Fig. 2, connected by U-shaped heating-tubes 3, shown only at the left-hand, several of which extend from each of the compartments into which partitions divide one main tube, through the heating fluid, to the other main tube. The partitions are arranged so that the liquid in each group of tubes passes two or more times backwards and forwards. Figs. 2 and 3 show the apparatus as a feed-water heater or steam superheater arranged in the flue of a steam generator, where it also acts as a spark-arrester. The heating-tubes 3 are connected by flanges 10, Fig. 3, which are held against corresponding slotted flanges on the main tubes by bolts 14. The number of compartments in the main tubes may be made variable by having loose partitioning pieces spaced apart by short tubes surrounding rods passing through the main tubes. The main tubes are provided with ribs 7 on which covers 9 rest, thus forming dead air spaces as non-conducting coverings. Flanges 8, formed on the ends of the main tubes 4, 5, rest on cross-bars 16 and thus support the groups, the flues being closed by angle-bars 18 supporting plates 15 between the main tubes. A modification is described, in which the water, after passing from the main tube 5 to the main tube 4 through heating-tubes 3, is returned to the next compartment in the main tube 5 by a single large connecting-tube. The heating-tubes can be cleaned by a brush introduced through doors at the front of the groups. Cross walls form troughs at the bottom of the flue into which the ashes fall and whence they may be removed through doors.

4444. Dowsing, H. J. Feb. 27.

Heating by electricity.—The free ends of electric radiator lamps *a* are supported by encircling bands *c* having loops or eyes *f* engaging other loops, eyes, or pins *h* on the angular sides of the reflector *b* so that the bands *c* may be turned into a vertical position to disengage the lamps. The loops or eyes *h* on the reflector *b* may be stamped out of the metal, or may be formed by passing a wire through holes in the angular sides of the reflector and bending each end of the wire into a loop; or a single long pin may be passed through holes in all the angular sides of the reflector and through the eyes in the bands *c* supporting several lamps in a row.

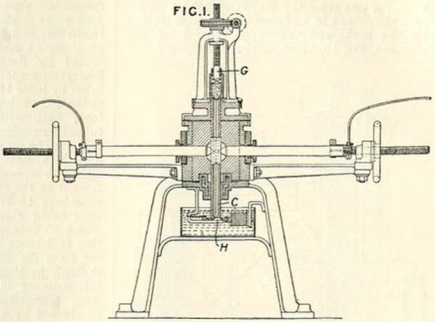


4461. Michaud, G., and **Delasson, E.** June 10, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Heating by electricity.—Filaments for lighting and heating, not requiring protection from air, are made from certain oxides, and have conductive cores of sugar carbon, metals such as

vanadium, tantalum, or osmium, or oxides of such metals. Silica, alumina, lime, magnesia, or a mixture of these substances is mixed with rare oxides, such as thoria and ceria, and with black soap to form a paste; traces of chromium oxide may be added. The paste is squirted by means of a piston G, Fig. 1, through a die, which may have a serrated edge. To form the core, the conductive material is made into a similar paste, and concentric dies, cylinders, and pistons are used. The filament traverses a vertical tube C of refractory material, such as carborundum, or thoria, or other rare earth, heated by arcs one on each side of it. At the constricted lower end of the tube, the filament is cut into lengths by a knife H operated by an electro-magnet.

FIG. 1.



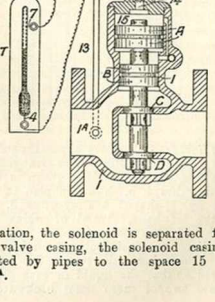
4621. Friedheim, E. March 4, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Heating air; heating water.—The tubes of heat interchangers of the kind known as honeycomb radiators are made electrolytically in three or more sections, each section being short enough to allow of dispensing with an internal anode. The sections are placed end to end and soldered together, the whole being placed in a frame or envelope.

4678. Baldwin, A. March 2.

Thermostats.—Relates to means for maintaining constant the temperature of liquids in vats or air in rooms when steam or other fluid is used as the heating-agent. In the vat or room to be heated is placed a mercury thermometer T having a wire 4 sealed through the bulb, and another wire 7 sealed in the side of the thermometer tube. These two wires are connected to a battery (not shown) and a solenoid 5 mounted on top of the valve 1. Within the solenoid is a loosely fitting metal plunger 10 provided with a valve 11. The casing 9 is connected by a pipe 13 to the inlet 1^A of the valve. When the liquid in the vat is to be heated, the steam or other heating-fluid is admitted at 1^A into the valve whereby the piston B is raised, thus opening the valves C, D, and allowing passage of the steam. If the temperature of the liquid rises too high, the mercury in the thermometer expands and completes the electric circuit. This causes the plunger 10 to be drawn up into the coil, and steam now passes up the tube 13 and through the opening 14 into the space 15 above the piston A. The piston A is thereby depressed and causes the valves C, D to close. As the temperature falls, the circuit is broken by the contracting mercury, the valve 11 closes, and the valves C, D again open by the pressure of the steam beneath the piston B. In a modification, the solenoid is separated from the main valve casing, the solenoid casing being connected by pipes to the space 15 and the inlet 1^A.

FIG. 1.

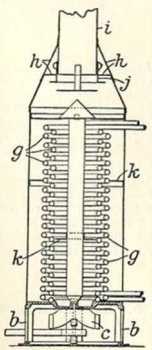


4847. Waelde, C. April 10, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Non-conducting compositions.—A composition consisting of finely-divided leather waste, with or without cork waste and the like, and a binding-agent consisting of a mixture of magnesium chloride, magnesite, glue water, and pitch or their equivalents, is used for making flooring, plates for floors, and for heat, electric, and sound insulation.

4943. Mower, C. H., and **Sturtevant Engineering Co.** March 4.

Heating air; heating buildings.—In apparatus for heating and circulating air in a workshop or the like, a centrifugal fan draws air downwards from the upper part, optionally mixed with fresh air, over a heating-coil, and discharges it horizontally over a wide area near the floor. In the construction shown, air from the room, drawn into the heater through openings *h*, may be mixed with fresh air entering by a pipe *i*, the amount of fresh air being determined by the position of an adjustable sleeve *j*. Baffles *k* regulate the path of the air over heating-coils *g* to a fan *c*, which discharges it horizontally through openings *b* at the bottom.

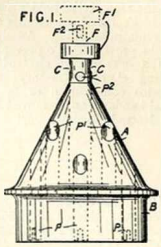


4947. Noodt, V. A. April 16, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Non-conducting coverings and compositions.—A heat-insulating material is produced by combining shavings or chips of charcoal by means of a liquid binding-material and pressure. The shavings &c. are placed in a bath of liquid pitch, resin, or asphalt, and stirred. The mass is then compressed in a mould, whereupon the shavings &c. are broken down to splinter form and a large quantity of air remains in the resulting body. The outer faces can be polished.

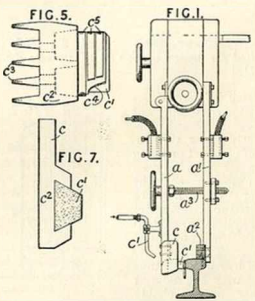
4997. Taylor, J. March 5.

Boiling-pans.—A device for promoting the circulation of the contents of kettles, pans, &c. comprises a cone A with a hollow collar B at the base. Pipes P, P¹ from the bottom and top of the hollow space beneath the cone lead respectively through and from apertures in the base of the cone to the surface. A pipe P² from the base to the apex of the cone is perforated at C, and may contain a movable pipe F surmounted by a float F¹ and perforated at F².



5017. Harrison, G., [*Electric Railway Improvement Co.*]. March 5.

Heating by electricity.—An electrode for electric welding, soldering, or brazing, particularly for use in bonding rails, comprises a block of carbon or the like which is embedded in its cast-iron holder during casting, so as to ensure a good electrical contact and prevent heating of the holder. The apparatus may be mounted on a truck and consists of two arms *a*, *a*¹, adjustable by a screw *a*³, the arm *a* of which carries the electrode *c*¹ and the arm *a*¹, a foot *a*³ resting on the rail. One form of holder is shown in Fig. 7, the holder *c* being adjustably secured by bolts &c. to the arm *a*, and the block is embedded in the mould in the process



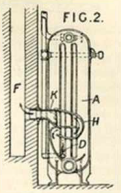
of casting. To facilitate the cooling of the holder, the terminal portion c^2 of the holder is thickened, and the rear of the holder and also the face above the block may have flanges c^3, Fig. 5, to increase the radiating-surface. An air blast C^1, Fig. 1, may also be provided. To prevent the rapid oxidation of the sides of the electrode, it is enclosed in a coating c^4 of refractory material, such as an asbestos composition or fireclay &c., secured by metal bands c^5, and removed in annular sections as the electrode becomes worn away.

5112. Thüringer Blechindustrie-Werke. March 25, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*]. *Void.* [*Published under Patents &c. Act, 1907.*]

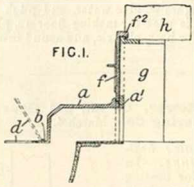
Non-conducting coverings.—The seat of a chair, bench, &c. is coated with cement, varnish, paint, or other suitable adhesive that can be dried in the air or by artificial heat, and whilst the adhesive is moist or tacky, a layer of woollen dust is blown upon it. The seat may be made of sheet metal or wood, and the layer of woollen dust which is secured to it saves clothing from wear, and serves as a heat insulator.

5128. Sulzer, Geb. April 27, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Heating buildings &c.—A radiator containing hot water can be heated independently by gas, the products of combustion being led through flues between the elements of the radiator; or it may be connected to a hot-water supply system to enable it to be used without direct heating. The flues are formed by ribs which may be cast with the radiator elements or detachably secured between them. If the radiator is heated independently, the flow-pipe is stopped, preferably by closing a regulating-valve; expansion then takes place into the pipes of the central installation. In the construction shown, gas burners D are arranged between the radiator elements A, the products of combustion from each burner passing between ribs H forming a flue, to a common outlet K discharging into a chimney F. The Specification in the original form, as open to inspection under Section 91 (3) (a), comprises also the use of the radiator apart from a central installation; the radiator then must not be filled completely or must have an open pipe projecting above it. This subject-matter does not appear in the Complete Specification as accepted.

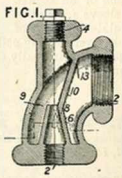


5257. Beck, J. A., and **Richardson, A.** March 9.



Boiling-pans.—Relates to a steam escape for a copper or boiler for washing clothes, of the type in which a hood placed over the copper conducts the steam to the flue. The present device consists of a combination with the hood of a frame which fits into the flue wall and is provided with a removable door for providing access to the flue for cleaning purposes. The hook a is fixed to a plate b to which is hinged the copper lid d. Within an opening in the flue wall h is disposed the frame g in the front of which is a door f, which hooks over the top of the frame and fits into a recess a^1 in the hood. The apparatus may be made of metal or other suitable substance.

5430. Tillinghast, W. E. March 10.



Steam-traps.—A trap for discharging air and condensation water from steam heated radiators, heating coils or main risers to an exhaust pump, has no movable part, and is divided by an upright partition 10 into an inlet chamber 8 connected at 2 to the heating-apparatus, and a vacuum chamber 9, connected through a cane 6 to the pump. The partition extends on each side of the cone 6 nearly to the bottom of the trap, so that the ports thus formed are sealed by the condensed water to prevent escape of steam. Air is discharged through a small hole 13 in the partition, any steam passing through being condensed in the trap. Condensation water overflows into the cone 6. An opening 4 is provided at the top of the trap for cleaning purposes.

5662. Scaramuzza, G. March 25, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

FIG. 3.

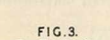
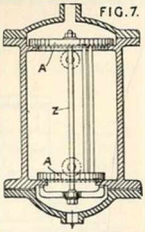


FIG. 7.

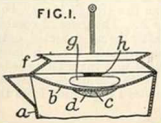


Heating gases; heating liquids.—Surface apparatus for the transfer of heat between fluids at different pressures, applicable for the evaporators and condensers of cooling-machines, is made up of tubular elements for conveying the low-pressure fluid, each formed by flattening and rolling a thin tube to the section shown in Fig. 3, the corrugations being straight. The ends of the tubular elements are secured in metal plates A, Fig. 7, which form the top and bottom of a chamber containing them; preferably end plates of a bronze alloy are cast round the ends of the tubular elements, and the whole is rendered fluid-tight by soldering or galvanic deposition. The end plates A may be secured by a tie-rod Z, or they may have conical edges, so that they can be removed with the tubular elements. The Specification, in the original form, as open to inspection under Section 91 (3) (a) comprised also the formation of the cells from plates with semi-circular or angular corrugations, the corrugations being opposed or nesting together, or by electro-deposition upon easily fusible patterns. This subject-matter does not appear in the Complete Specification as accepted.

5820. Kregelius, P. March 16. *No Patent granted* (*Sealing fee not paid*).

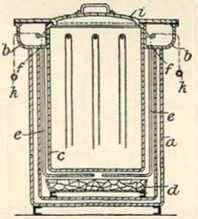
Heating liquids.—In a milk pail having a strainer *d* in the lid, a removable container *g* with lid is provided for containing hot water &c.

FIG. 1.



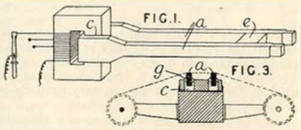
5824. Partos, A. March 16.

Heating by chemical action.—An apparatus for warming bathing-towels, shirts, &c. consists of a receptacle *c*, in which the towels are hung, provided with a water tank *b* forming a flange which rests on a double casing *a*, two bent pipes *e* from the tank *b* being arranged so as to sprinkle water on unslaked lime placed in a tray *d* beneath the receptacle. Each pipe is closed by a valve *f*



operated by a string *k*. The whole is covered by a lid. The space between the two casings may be filled with a non-conductor.

5856. Gin, G. H. March 16.

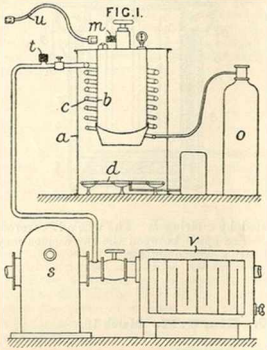


Heating by electricity.—Thick metal bars *a*, Figs. 1 and 3, forming the secondary circuit or circuits of a single or polyphase static transformer are heated to incandescence by the passage of the current, and serve for singeing fabrics which are caused to slide in contact with them. The temperature of the bars is regulated by varying the number of primary coils, and the length of the bars heated is regulated by means of a movable contact-block *e*. The bars extend into gutters formed in masonry *c*, and are supported against the walls of the gutters by projections *g*. The bars are maintained in a taut condition by tension springs. The Specification, in the original form, as open to inspection under Section 91 (3) (a), also states that pairs of rollers may be heated by current received from "rubbers." This subject-matter does not appear in the Complete Specification as accepted.

6120. Baudry, A., and **Bordigoni, V.** March 19.

Heating gases.—Apparatus for supplying vapour or fumes for disinfecting &c. comprises a boiler *b*

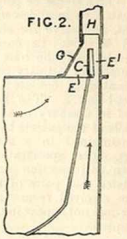
mounted in a casing *a* and surrounded by a serpentine pipe *c* of gradually increasing diameter, a sulphurous anhydride container *o*, a burner *d*, and a fan *s*. Vapour generated in the boiler may



be passed direct into a room through a pipe connected to the junction *m*, or may be forced into a room by the fan *s*, in which case the junctions *m*, *t* are connected by the tube *u*. Sulphurous acid gas, heated in the serpentine pipe *c*, may similarly be supplied by the fan.

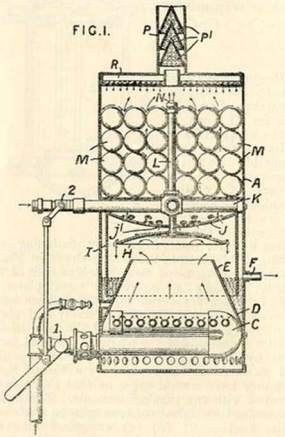
6125. Dean, W. H. March 19.

Boiling pans.—A combined outlet is provided for the steam arising from a wash-boiler and for the fumes from the stove by which it is heated. A portion of the flange of the boiler under a vent pipe H is cut away and a metal plate C provided. The hood G is thus divided into two separate passages E, E¹.



6132. Shipley, A. E. March 19.

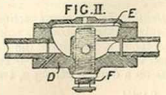
Heating water.—Water is heated by being exposed in thin films on non-absorbent balls and plates to direct contact with heated gases rising from a gas burner C. Water passes through a valve 2, which is simultaneously operated with a gas valve 1, and flows to a spraying-pipe L, from the nozzle N of which it is directed towards a flue pipe P in the form of fine spray, thus inducing a



draught. Baffles P¹ may be fitted in the flue to prevent the spray from rising too high. The water trickles down the walls of the flue into a distributing-chamber R, whence it flows through small perforations on to glazed porcelain balls or stones M. It is then directed by a collecting plate J, with fine perforations j^1 at the centre, on to a baffle-plate H directly over the burner C. From the plate H the water falls into a trough D situated between the outer casing A of the heater and a conical shell E surrounding the burner. From this trough it may be withdrawn through a pipe F. The gases of combustion from the burner C, after being deflected outwards by the plate H, pass upwards through large perforations in the plate J into the interstices between the balls, contact with the outer casing A being prevented by a cylinder I depending from the plate J.

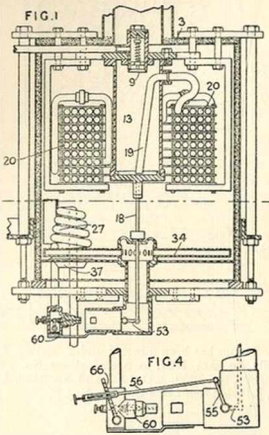
6203. Davis, H. N. March 20. *No Patent granted (Sealing fee not paid).*

Thermostats.—The supply of gas to a burner heating a boiler, radiator, cooking oven, or other article is regulated by a



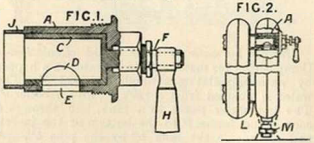
diaphragm E controlled by the thermal expansion of air or gas contained in a closed tube, which is connected with the upper part of the casing D. The diaphragm E operates directly against the open end of the gas outlet tube F, which is screwed for adjustment.

6416. Turnbull, H. A., and **Goding, A.** March 23.



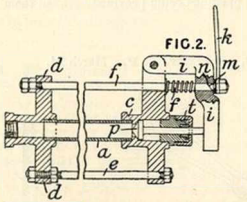
Thermostats.—In a steam generator intended particularly for use on motor-cars, water is vaporized in a vertical cylinder 13 which is heated by burners 34. The cylinder is connected by a rod 18 and levers 53, 55 to a rod 56, controlling the fuel-valve 60, which is thus arranged to open and close upon the contraction and expansion of the cylinder. The rod 56 is connected to the valve-lever 66 through a sliding-block carrying an adjustable pin which engages in pin-holes in the lever.

6481. Ritchie, J. *Sept. 21.*



Heating buildings &c.—To regulate the quantity of hot water passing through radiators, they are provided with rotary cylindrical valves A arranged as shown. The lower connecting nipple L between the first and second sections of the radiator is closed so that the water entering at M passes through the valve A. The inner end of the valve casing is reduced, and engages in the top connecting-nipple between the first and second sections of the radiator.

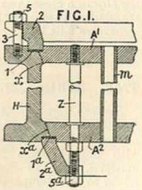
6491. Cleland, J., and **Stewart, J. C.** March 24. [*Patent of Addition to No. 13,077, A.D. 1906.*]



Steam traps.—In a steam trap of the type described in Specification No. 13,077, A.D. 1906, the expansion tube *a* has at one end a coupling *d* for connexion to a steam-pipe, and at the other end a similar coupling which carries the valve seat *c* and the fulcrum of a lever *i*, the two couplings being connected by a non-expansible rod *e*, so that when the tube expands the fulcrum moves, and an adjustable non-expansible rod *f* causes the lever *i* to close the valve *p*. This valve can be seen through a lateral discharge opening, and its spindle passes through a stuffing-box *t* separated from the valve. A hand-lever *k* has a projection *m*, which, when the lever is turned through 90 degrees, rests in a groove *n* in the lever *i* and releases the valve, allowing the trap to blow through.

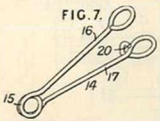
6534. Scaramuzza, G. May 24, 1907, [*date applied for under Section 91 of Patents &c. Act 1907*].

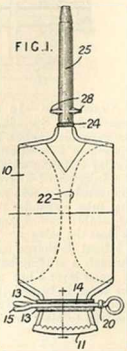
Heating gases; heating liquids.—In surface apparatus for the transfer of heat between fluids under different pressures, comprising hollow bodies *m* inserted in perforated end plates A^1, A^2 in one or more chambers H, special means are adopted for securing the end plates to the chambers, and for connecting several chambers in series. The hollow bodies *m* convey the low-pressure fluid, and may consist of straight or spiral



tubes, or of the elements described in Specification No. 5662, A.D. 1908. The end plates A^1, A^2 have similarly-directed conical edges fitting seatings x, x^a, and are rigidly connected by tie-rods Z. Annular recesses in the end plates and the chamber contain packing 1, 1^a, and receive clamping-rings 2, 2^a. These rings are pressed on to the packing by nuts 5, 5^a, screwed respectively on bolts 3 secured to the chamber, and on the tie-rods Z. When two chambers are connected end to end, the upper clamping-ring 2 is of rectangular section, and enters annular recesses in both chambers, which have flanges drawn together by nuts and bolts. Two chambers may be arranged side by side, inlet and outlet openings being provided between them.

6542. Leyner, C. P. March 24.

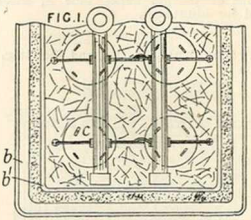




Hot-water bags and the like.—A combined surgical syringe and hot-water bag comprises a flexible receptacle 10, having edges 22 adapted to fold inwards, as indicated by dotted lines, and provided with an outlet 24, to which a syringe nozzle or a stopper may be attached, and with a filling aperture 11, normally held closed by a clip 14. The clip consists of wire bent to form a spring 15 and having arms 16, 17, one of which is provided with a hook 20 to engage the other arm and hold the clip in a closed position. The arms of the clip are adapted to engage the flexible receptacle between transverse ribs 13.

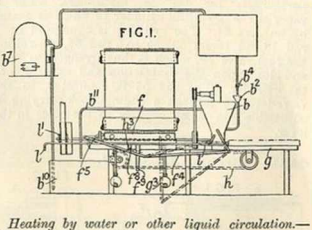
6744. Müller, N. March 26.

Heating liquids.—An apparatus for heating or cooling liquids comprises a battery of vessels c, with beaded walls c^1, enclosed in a receptacle provided with double walls b, b^1, with non-conducting material, such as sawdust or paper pulp. The liquid to be attemperated is supplied to the vessels by a main pipe d and branch pipes d^1, and the vessels are arranged so as to be completely surrounded by the attemperating-medium. Beer or the like is cooled by ice f. The vessels are provided with detachable lids and may be grouped in various ways.



[Reference has been directed under Section 7 of Patents &c. Act, 1907, to Specifications No. 7436, A.D. 1895, No. 8259, A.D. 1905, and No. 2450, A.D. 1906, [*Abridgment Class* Cooling &c.].]

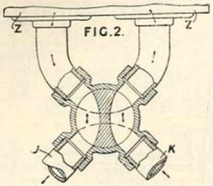
7122. Moreland, P. March 31.



Heating by water or other liquid circulation.—Composition for match splints is heated in a hopper by water circulating through a jacket b. The water is pumped from a tank b^{10}, into a boiler b^7. The hot water passes to a tank, and through a cock b^4 and funnel b^5 to the bottom of the jacket, and returns to the tank b^{10} by the pipe b^{11}. A system of jointed pipes f^4 leads from the jacket b to a passage in a travelling slab f; a cock f^5 at the

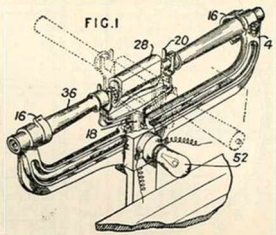
other end is opened and closed automatically during the motion of the slab.

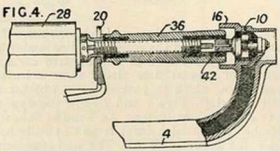
7410. Vivian, A. W. H. April 3.



Heating buildings &c.—Radiators, arranged in series, are connected to the main pipes conveying the heating-fluid, through valves of the kind shown in Fig. 2, so that each radiator can be cut out at will without interfering with the others. In the position shown, fluid enters at J, passes through the radiator Z, and issues at K. If the plug is turned into the position shown by dotted lines, the radiator is cut out without interfering with the flow of fluid in the system.

7507. Oertly, J., and **Dudley, C. F.** April 6, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].





Heating by electricity.—A treeing or other iron 28 is heated electrically when placed on a support 4 so that contacts on the handles 36 of the iron engage with spring plunger contacts in the support, and close the circuit through a resistance in the iron; means, such as a lamp 52, may be provided to indicate when the circuit is closed. In the arrangement shown, the iron 28 rests in two forked pieces 20 carried on a vertical stem 18, which can be turned through a right-angle, the movement being limited by the engagement of lugs on the stem with a stop on the support 4. Each handle 36 of the iron is provided with a fixed insulated contact 42, Fig. 4, to engage with a spring plunger 10 arranged inside a split sleeve at the end of one arm 4 of the support, the contact being protected by a shield 16. When the iron is not in position to be heated, the lamp 52 has its circuit opened by a central spring contact entering a recess in the vertical stem 18.

7613. Brougham, F. J., [*Preyss, W. von*]. April 6.

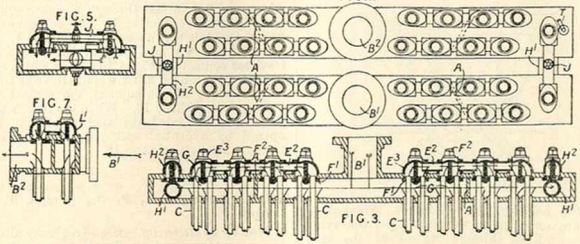
Heating by electricity.—High-frequency alternating currents are used to effect heating in the production of organic or other preparations, either by passing the current between electrodes applied to the substance to be treated, or inductively, or by capacity effect; the current may be sent by several paths through a place to be specially warmed, so that a greater effect is obtained there. Any organ in a living body may thus be warmed, and undesired reactions, such as oxidation by the oxygen in the air in the case of lecithins or cholesterins, or coagulating or splitting processes, in the case of a solution containing protein, can be avoided. By confining the heat to different layers of a liquid, solution of precipitates can be effected, or fractional precipitations can be made. The method of heating can also be used to cause fractional coagulation of sensitive albuminoid bodies, for rendering catalytic bodies, such as enzymes, more effective, in preparing or purifying toxins or antitoxins, and in the production of serums.

7635. Marchant, J. A. April 7.

Heating liquids.—Relates to apparatus of the Field-tube type for heating liquids, and consists in surmounting the inner tubes by hollow caps connected together into groups by short tubes, in order to provide easy access for repairs. Fig. 1 shows a plan, and Fig. 3 a sectional elevation, of the apparatus having two steel headers provided with an inlet B^1 and outlet B^2 respectively. Each header is divided into compartments by partitions A. The Field-tubes C are welded or screwed into the headers. Holes in the top of the headers allow the Field-tubes to be inserted, and are covered by hollow caps E^2 connected together by short tubes E^2 and held in place by the bolt-plates F^1 and nuts F^2. The inner tubes G are secured to the bolt-plates F^1. The headers are connected together by tubes H^1, H^2, in which are valves J, as shown in Fig. 5. These valves may be operated from the front of the boiler. A mercury bath T on the outlet header is provided, and a tube charged with mercury is carried therefrom to the

front of the boiler to enable the temperature to be noted. Fig. 7 shows a form of the apparatus having only one header provided with a longitudinal partition on opposite sides of which are the inlet B^1 and outlet B^2. The caps L^1 are connected in groups of two, as shown, one on each side of the partition. The apparatus may be placed in the downtake of a Lancashire boiler.

FIG. 1.



7864. New Hygienic Stove Co., and Greenwood, E. P. April 9.

FIG. 3.

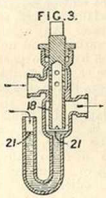
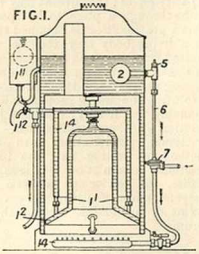
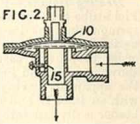


FIG. 1.



Heating water; thermostats.—Relates to thermostatic means for regulating the gas supply to the burner of a boiler, the thermostat being of the kind comprising a diaphragm or liquid-seal valve, which is opened and closed by the varying pressure of air or other fluid in a closed vessel in the boiler. The air &c. in the vessel 2 communicates with the gas valve 7 through a tube 6 containing a loaded valve 5, and acts, at a certain temperature, to depress a diaphragm 10, Fig. 2, or to seal the end of a tube 18, Fig. 3, by mercury 21, thus cutting off the gas supply to the burner 14. The diaphragm valve is provided with a by-pass aperture 15. The boiler is of the type described in Specification No. 6240, A.D. 1902, [*Abridgment Class* Stoves &c.]. The cylindrical water chambers 1^1, 1^4 are connected to each other and to the outer chamber 1^2 by screw unions, thus allowing the boiler to be readily assembled or taken to pieces. The supply cistern 1^{11} containing a ball-valve communicates with the boiler through a U-shaped pipe 1^{13}.

FIG. 2.



7879. Winder, J. April 9.

FIG. 1.

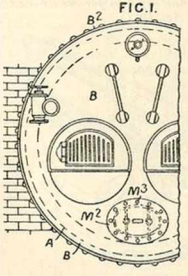
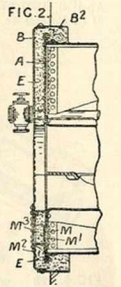


FIG. 2.

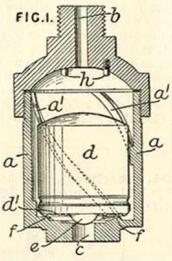


Non-conducting coverings and compositions.—The fronts of boilers and the ends of engine and other cylinders are provided with a protective covering consisting of a metal plate placed so as to leave a narrow space, which is packed with asbestos or similar material. Figs. 1 and 2 show the application to a Lancashire boiler. An annular flange B^2 is attached to the false front B and extends back beyond the front plate A. The non-conducting material E is packed between the plates A, B and may be joined to the longitudinal covering of the boiler. Openings are made in the plate B for the flues, mud-doors, and other fittings. The covering

for the mud-door M preferably consists of two plates M^1, M^2 with the space between them packed with asbestos. The plate M^2 is secured to the cover B by bolts M^3.

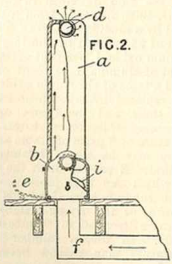
7939. Still, W. M., and **Adamson, A. G.** April 9.

Steam traps.—A steam trap has a valve operated by a float carrying a thermostatic device. In the form illustrated, a float *d*, containing an expansible fluid and fitted with a flexible base d^1 carrying a valve *e*, is enclosed in a casing *a*, which is provided with an inlet *b* from a drain-pipe, and an outlet *c*. The float, when cold, rests on projections *f*, and the valve *e* is off its seat at the bottom of the casing. When steam enters the casing, the float expands and the valve *e* is pressed downwards, the pressure of the steam holding the valve on its seat. When the float becomes covered with water, the distensible bottom *d* contracts, the valve is lifted from its seat, and the float rises to the surface of the water. If steam is shut off, the float rises and allows water to escape. Helical or vertical ribs a^1 are formed on the casing to guide the float, and studs *h* are provided to prevent it from obstructing the inlet. The valve instead of forming part of the diaphragm d^1, may be formed of a metal ball loosely held in the metal of the diaphragm.



8004. Haden, W. N., Haden, C. I., and **Watts, C. J.** April 10.

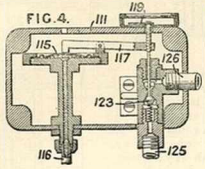
Heating buildings &c.; heating air.—A gas-heated radiator consists of one or more hollow sections *a* above non atmospheric burners enclosed in a base *b*. The radiator is placed over an inlet *f* admitting air from the outside of the building, and the air, which enters the base *b* only through this inlet, is heated by the burners and by the sections *a*, and issues into the room &c. containing the radiator through perforated plugs *d* at the upper ends of the sections. The base *b* is fitted with a door *e* which gives access to the burners. The door *e* may be loosely fitted, or may be perforated, to allow some of the fresh air to pass outside and to be heated by the outer surfaces of the sections *a*. The burners are preferably fitted on a gas-supply chamber *i* of the kind described in Specification No. 27,665, A.D. 1907.



8017. Branco, H., and **Gumpert, G.** April 10.

Non-conducting coverings and compositions.—An insulating material is formed from peat by treating the moist or dry fibres so as to open them out without injury, and entangle or felt them together, and then subjecting the mass to hot dry steam, without charring or distilling the peat, and moulding it under high pressure. Prior to the moulding process, the mass may be treated to render it fire-proof, and proof against insects and fungoid growths, and the steaming may be carried out with superheated steam so as to sterilize the product. The moulded product, which may be in the form of plates, blocks, strips, spheres, or ropes, may be subsequently treated by stamping, moulding, colouring, or covering with varnish &c., and can be used for building purposes and as "an "insulator against moisture, electricity, heat, and "sound."

8084. Boult, A. J., [*Goldman & Co., E.*]. April 11.

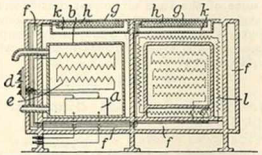


Thermostats.—In apparatus for pasteurizing bottled beer &c. and comprising a number of tanks, from each of which the water is circulated through a jet pump, a thermostat is used which comprises a closed tube 116 containing alcohol &c., which by expansion under a diaphragm 115 in a casing 111 depresses a ball-valve 123, so that air under pressure operates through pipes 125, 126 upon a flexible diaphragm to depress the steam-valve of the jet-pump. Adjustment is effected by means of a pointer 119 screwing into the lever 117.

8093. Marks, E. C. R., [*Roberts, J.*]. April 11.

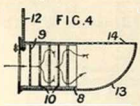
Heating by electricity; heating water; non-conducting coverings.—The heat loss in a step-down transformer is utilized by placing it in a water

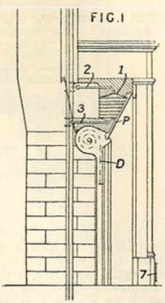
chamber in an electric stove. Specification No. 22,314, A.D. 1905, is referred to. Hot-plates *g*, heated by coils *h* connected to the transformer *a*, are protected by vacuum chambers *k*, and the



sides and back of the stove are surrounded by vacuum chambers *f*. The heating-coils *e*, *l* for the water chamber *b* and oven, the coils *h*, and the secondary of the transformer are connected to a switchboard *d*. A cover may be provided to enclose utensils on the top of the stove; it may be hinged to the stove, and may have vacuum heat-insulation and heating-coils. According to the Provisional Specification, the transformer may be used in lighting-circuits.

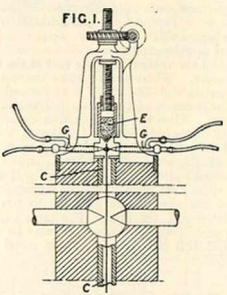
8100. Aubert, G. April 16, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].





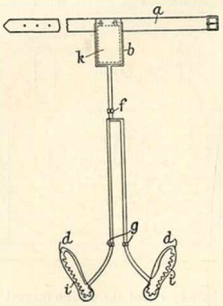
Heating buildings &c.; heating air.—Air is heated by steam and supplied to a room by a heater of the honeycomb type, one face of which is flush with the face of a wall or fire-place in which it is situated, air being led to the heater from the room or from the outside by a passage containing purifying and supply-regulating means. Fig. 1 shows a heater 1 located behind an inclined panel P above a fire-place, but it may also be arranged against the side walls or the front uprights of the fire-place. Steam and condensed-water pipes 2, 3 connect the heater to corresponding mains, the joints preferably being within the jambs of the fire-place. The face of the heater which is flush with the wall has a grating or perforated plate through which the hot air passes, and the slabs forming the fire-place front are removable for access to the heater. Fig. 4 shows an air filter which may be arranged at the inlet 7, Fig. 1; this consists of a half-cylinder 8, containing a filtering-screen 9 and baffles 10, or wadding, and placed inside a case 13 having a supply-regulating damper 12 and a filtering-screen 14. When air is obtained from outside, a vertical filter is used, having a sliding damper. The air passage may be of plaster, brick, or iron, and the steam or condensed-water pipes may be located within it to increase the air circulation, or a fan may be used. When the heater is arranged above the fire-place, as shown in Fig. 1, the shutter D is made to roll up The Specification in the original form, as open to inspection under Section 91 (3) (a), comprises also an arrangement of the honeycomb heater below the mantelpiece and not flush with the wall; this subject-matter does not appear in the Complete Specification as accepted.

8104. Michaud, G., and **Delasson, E.** April 11. [*Patent of Addition to No. 4461, A.D. 1908.*]



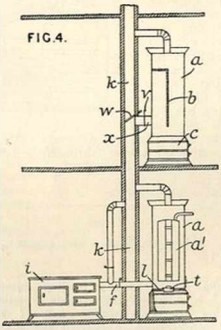
Heating by electricity.—Incandescence-filaments of the kind described in Specification No. 4461, A.D. 1908, are made from a modified composition and by a modified process. The material may consist of 92 per cent of thorium oxide, 2 per cent of cerium oxide, 1 per cent of beryllium oxide, 4 per cent of alumina, 1 per cent of aluminium silicate, and a trace of chromium oxide. The alumina may be replaced by silica, magnesia, lime, or mixtures of these, and the thoria or beryllia by ceria, zirconia, erbia, or mixtures. As agglutenant, a mixture of 9 parts of arabin and 1 part of ammonia soap may be used. Filaments squirted from a cylinder E pass through the convergent flames of oxy-hydrogen blow-pipes G before entering the carborundum tube C of the electric arc furnace shown, or the drying-chamber of the horizontal furnace described in Specification No. 22,036, A.D. 1907. In use, a number of parallel electric filaments may extend between two conductive blocks.

8148. Krüger, O. April 13.



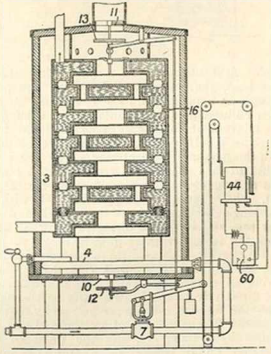
Heating by electricity.—For warming persons' feet, a resistance wire *i*, placed between layers of asbestos forming a sole *d*, is heated by current from an accumulator *k* carried in a bag *b* on a strap *a* fastened round the body. Switches and plug connexions *f*, *g* are provided.

8262. Zügel, A., and **Bassler, P.** April 14.



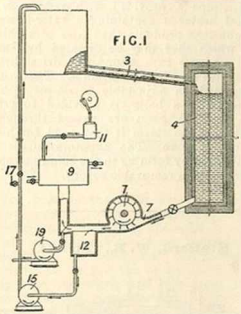
Heating buildings; heating water.—Relates to apparatus in which hot combustion products are passed through radiators or "stoves" for warming rooms, which radiators may also contain water-heaters. In the arrangement shown in Fig. 4, the combustion products from a kitchen range *i* pass through a pipe *f*, provided with a damper, to a cylindrical heater *a* containing a water-heater a^1. The combustion products then pass to a chimney *k*, from which they may be directed by dampers *v*, *w* and a pipe *x* to a second cylindrical heater *a* provided with a vertical partition *b*. The heaters *a* are supported on adjustable telescopic stands *c*. In cases where a boiler is provided for steam-heating, the hot gases are passed through the radiators, and the steam is then used for heating water for baths &c. The radiators can be independently fired by forming in the stand *c* a separate chamber having a removable cover *t*.

8267. Stafford, W. K. April 14.



Heating-apparatus; heating water; thermostats.—Valves are provided in the air inlet and outlet ports of heating-apparatus in which liquid or gaseous fuel is used, and are arranged to work in unison with the fuel-control valve, so that when the fuel supply is shut off, both valves are closed, thus preventing the cooling effect of air circulating through the passages in the apparatus. The Figure shows the invention applied to a water-heater in connexion with hot-water pipes. A heating-chamber 3 in which the water-heater 16 is situated is provided with an air inlet 10 and outlet 11. Valves 12, 13 closing these openings are connected by link-work with a valve 7, which controls the supply of gas to a burner 4 within the chamber 3. A thermostat 60 may operate the valve 7, by making or breaking a circuit for an electric motor 44.

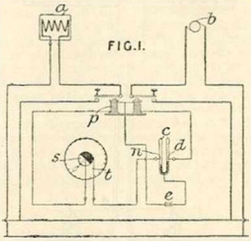
8318. Haddan, R., [*Sun Power Co.*]. April 14.



Solar heat, utilizing.—In a system for utilizing solar heat, the water heated by the sun passes through an expanding nozzle 7 so that it boils under reduced pressure maintained by a pump 11. The mixture of steam and spray produced drives a turbine T. If sea-water or other salt solution is used, this becomes concentrated. The water may be heated in a sheet-metal vessel, or in a tank 3, such as is described in Specification No. 28,130, A.D. 1907, having a floor covered with an absorbing-substance, such as tar, a single or double glass top, and baffles to direct the flow of water. From the tank, the water flows through an insulated reservoir 4 encased in a non-conductor of heat, and through the nozzle 7 to the turbine T driving an electric generator; or the water may pass directly from the heating-tank to the nozzle From the turbine, the vapour and spray pass to a condenser 9, the condensation water being discharged by a pump 19, and the water or concentrated liquid passes to a trap 12 and is returned by means of a pump 15 to the inlet chamber of the heating-tank, or to the reservoir 4. Concentrated liquid may be withdrawn through a cock 17.

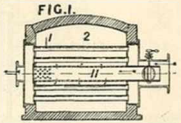
8412. Kosch, K. T., Kosch, A., and **Kosch, O.** April 15.

Heating buildings; heating by electricity; thermostats.—A clock switch *s* is placed in a thermostatically-controlled electric circuit, which operates heating-apparatus *a* or a fan *b*, so that the circuit for the heating-apparatus can only be completed during certain hours of the day. The apparatus is shown as used with an electric heater *a*. A drum *s* driven by the clock is covered with metal strips in places that correspond to the desired hours for working, and a spring *t* pressing against the drum makes contact with these strips. Connexions from the drum and spring lead to the low-temperature contact *n* of a thermometer *c*, a



galvanic battery *e*, and the electro-magnet *p* of a relay, controlling the supply of current to the heater *a*. Another relay circuit, completed by the rise of the mercury to a high-temperature contact *d*, brings the ventilating-fan *b* into action; a clock switch may be situated in this circuit also. Where heating by gas, steam, or air is employed, the electro-magnet *p* in the relay circuit is replaced by a solenoid, the core of which operates a valve.

8424. Bouhon, J. R. April 15.



Heating air.—In apparatus for heating or cooling, disinfecting, and moistening air, the air is heated by being passed through tubes 1 in the chamber 2, which can be heated by steam or furnace gases. Air can be blown against the tubes 1 through the perforated tube 11 to clean or dry them.

8471. Veritys, Ltd., and **Smith, H. S.** April 16.

Heating by electricity; heating liquids.—An electric heater has several separate circuits formed by coiled resistance wires, each of which is divided into sections, to prevent the convolutions from closing into touch and from being displaced, by bridges or partitions *e* crossing spiral grooves in an insulating-base, in which the coils are placed. As shown in Fig. 1, two coils c^2, d^2 are placed in

grooves *c*, *d* in the base *a*, and are divided into sections by bridges *e* provided with slits in which the wire fits tightly. A heater of this type may

FIG. 1.

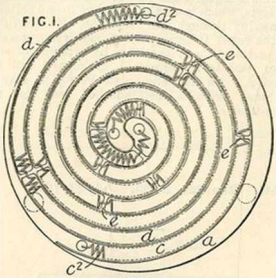
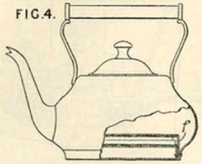


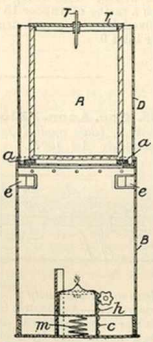
FIG. 4.



be fitted in a deep recess *f* in a vessel such as a kettle, as shown in Fig. 4, or adjacent to the lid.

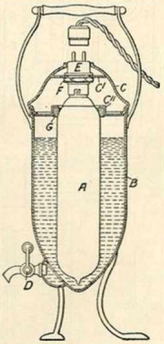
8500. Hunter, A. C., and **Bosanquet, N. B. T.** April 16.

Heating liquids.—Apparatus for warming milk or other liquids, of the type consisting of an upper chamber containing a vessel for the liquid to be treated and a lower chamber for a night-light or the like, is arranged to keep the liquid at an approximately constant temperature for a considerable time. The apparatus is especially intended for milk treated with lactic acid bacteria. The two chambers B, D are made of tin &c., the lower chamber B being preferably covered with felt &c. The chamber B is provided with adjustable ventilating apertures *e*. The liquid is placed in a jar A standing on asbestos supports *a* in the chamber D, which has openings in its bottom for the passage of hot air. The height of the night-light holder *c* can be adjusted by means of a rack *h* and a pinion. The night-light is pressed against the top of the holder, which consists of a hinged cap, by a spring *m*. The jar A is provided with a thermometer T in its cover *r*.



8679. Pownall, J. B. April 21.

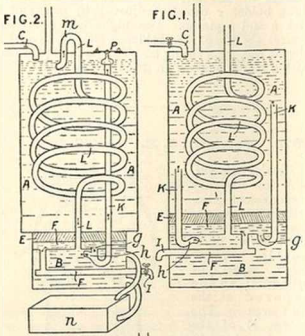
Heating liquids.—A low-efficiency incandescent electric lamp is supported in a fluid-tight cover, in a kettle, urn, or other vessel of cylindrical shape tapered at the bottom. The holder E of the lamp A is fixed to a disk C^1 in a casing C by a nut F, and an asbestos washer G forms a water-tight joint between the lamp and a lower ring C^{11}. The vessel is shaped so that there is only a narrow space between the bottom of the lamp and the vessel. A tap D is provided. The lamp has a ground or obscured glass surface. According to the Provisional Specification, the lamp may be enclosed in a pocket in the vessel.



8843. Pike, J. G. April 23. [*Cognate Application No. 12,621, A.D. 1908, dated June 12.*]

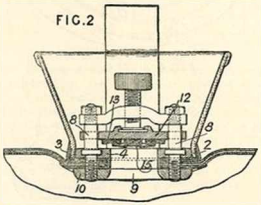
Heating water.—In water-heaters for baths &c., comprising upper and lower vessels A, B separated by a non conducting partition E, the water to be heated fills the vessel A and certain water-jacketed compartments in the vessel B. The heat from a gas burner, Fig. 3, a kitchen boiler *n*, Fig. 9, or any other heating-device is imparted primarily to the jacketing-water, which transfers it to the water for use. In each of the three forms shown, the water to be heated enters the vessel A by way of a pipe C, flows to water-jacketed

compartments F through a down-take K having a U-shaped lower end g, and is delivered through a pipe I leading from the vessel B. The jacketing-water is boiled, and the steam generated passes



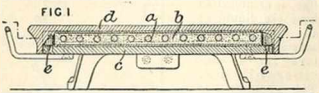
through a rising pipe and coil L or its equivalent in the vessel A, thereby giving up its heat. The coil L may lead to the atmosphere, Fig. 1, or into the vessel A, Figs. 2 and 3, by way of a siphon end m. As water in the vessel B undergoes very little change by way of addition of fresh water, little or no deposit of fur takes place therein. Loss by evaporation or leakage is made up from the vessel A by way of a down-take K with a curved lower end h. In the form shown in Fig. 1, the down-takes K are separate; in that shown in Fig. 2, a single down-take is provided with two outlets g, h; while in the form shown in Fig. 3, the one down-take forms a jacket to the other. In Fig. 3, the water-jacketed compartments F are shown arranged to provide a zigzag path for the heated combustion products, which leads to a chamber u and chimney T passing through the vessel A. The walls F^1 of the vessel B form part of the water-jacketed compartments, and they may be covered by outer water jackets w connected by pipes t with the vessel A. An inspection plate P, Fig. 2, may be combined with a bell-mouthed trap for the down-take K.

8846. Brooks, J. B. *July 31, 1907.*



Hot-water bottles.—The lower edge 2 of a mouthpiece is held between the inclined edges of a tray-shaped base part 3 and a flanged washer 4 placed in it, the whole being clamped to the bottle and to an inner plate 10 by screws 8, which form part of a valve fitting. This fitting has a lift-plate 12, to which a facing of rubber 13 is secured by a washer 15, fixed by rivets and arranged to fit into the water inlet 9.

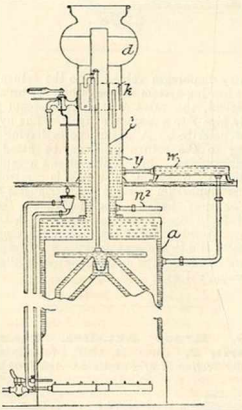
8996. Soc. Anon. l'Electricité Moderne. April 6, [*date applied for under Section 91 of Patents &c. Act, 1907*].



Heating by electricity; heat-storing apparatus; foot-warmers.—An electric heater for foot-warmers, plate-warmers, box-irons, &c. has resistance wires or bars surrounded by a mass of a metallic salt, such as barium sulphate, which is a bad conductor

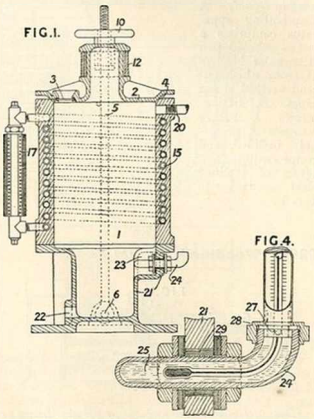
of heat and gives up its heat slowly. The resistance may be a nickel coil *a* placed in barium sulphate *b* in a metal case, formed of two parts *c*, *d* held together by screws *e*. The wire may be embedded in a moulded mass of the salt, or the latter may be made with grooves in which the wire is placed.

9048. Jackson, H. April 25. [*Patent of Addition to No. 16,804, A.D. 1907.*]



Heating water.—A water-heater *a*, of the type shown in Specification No. 16,804, A.D. 1907, is placed under a counter, and is provided with a hollow standard *y*, which extends upwards through the counter and encloses an annular water expansion chamber *k* and a flue pipe *l*. The top of the standard leads into an ornamental chamber *d*, which is divided into upper and lower compartments. The lower of these compartments serves as a condenser for steam rising from the water, while the upper one serves as an outlet for the flue *l*. A hot-water plate *w* may be connected to the heater by flow and return pipes. The heater is supplied with water by a pipe n^2 in communication with a cistern and ball-valve.

9090. Simpson, J. F., and **Brown, A. W.** April 27.

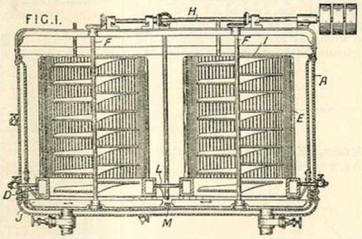


Heating by electricity; heating by steam.—An apparatus for drying and re-inforcing the insulation of armatures, coils, electro-magnets, transformers, and other electrical apparatus, with lacquer or varnish, consists of a chamber 1 which is heated by a coiled steam pipe 15 embedded in the wall casing, as shown in Fig. 1. The cover 2, provided with glasses 3 for ascertaining the level of the contained fluid, has a coned seat 4 which is held down by a cross-bar 12, and rods 5 pivoted at the base 6, so that the cover can adjust itself on the seat. The cover is capable of rotating in the cross-bar 12 so that the seating may be ground-in, and wheels 10 allow the cover to be raised and lowered. The coils are extended outside the casing, and on the exposed parts wires 17 are wound and well lagged so that steam may be raised by passing a current through the wires. An outlet 20 is provided for exhausting the chamber or putting its contents under pressure, and an opening 22 serves for introducing the insulating-fluid. The chamber may be heated by means of a coil of wire, through which a current may be passed. A pocket 23 is provided in the base chamber 21 to take a mercury-cup or oil-cup 24, shown in detail in Fig. 4, and the bulb 25 of a thermometer is secured in this cup. A nut 28 holds the thermometer in place, and slots and projections 27 prevent the thermometer from being twisted and broken in the cup. Some non-conductor of heat is introduced at 29 between the cup and the base chamber.

9096. Pritchard, A. H. April 27.

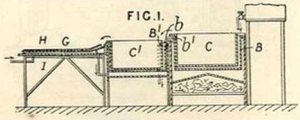
Boiling-pans; heating liquids.—A soap-boiling apparatus comprises a steam-jacketed pan A, annular headers D, from which extend vertical steam pipes E, lifting-screws I, rotary scrapers J, preferably inclined, and reciprocating agitators of inclined slats secured to bars L.

FIG.1.



9264. Woodland, W. *Oct. 29.*

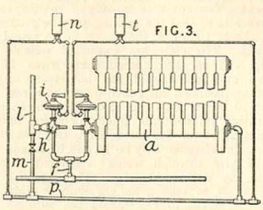
FIG.1.



Heating liquids.—In apparatus for sterilizing or scalding milk, the milk is passed through heating and cooling members consisting of rectangular vessels C, C¹, depending in tanks B, B¹ so as to leave passages at the sides and back, from which the milk is discharged by recesses b^1 leading to spouts *b*. The milk finally passes through passages H in one or more inclined troughs G having passages I for cooling-water.

9400. Nesbit, D. M. *Nov. 1, 1907.*

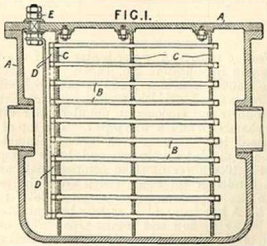
FIG.3.



Heating buildings.—A steam heating-system for greenhouses, cotton-mills, and other buildings has valves regulating the escape of steam to the air, controlled automatically by a device operated by the varying humidity of the air. As shown in Fig. 3, the hygrostat *n* controls the connexion of an ordinary diaphragm valve *i*, *h* to the return pipe *p* of the heating-system, so that when the humidity is insufficient, the valve *h* discharges steam from a supply pipe *f* to a discharge pipe *l*. The hygrostat is not described. A drain-pipe *m* having a trap leading to the return pipe may be fitted to the discharge pipe *l*. Fig. 3 also shows a radiator *a*, the supply of steam to which is controlled by another diaphragm valve and a thermostat *t*. The radiator may have a thermostat of the type described in Specification No. 27,687, A.D. 1904, arranged inside. In a modified arrangement, the hygrostat and thermostat do not act independently, but are in series in a single pipe controlling both diaphragm valves.

9449. Krupp Akt.-Ges. Germaniawerft, F. June 24, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

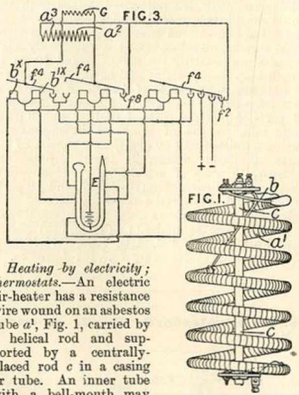
FIG.1.



Heating by electricity.—In an apparatus for heating air, nickel tubes B form the resistance through which current passes. These are supported in perforated plates C and are arranged inside a casing A like a condenser, so that the medium to

be heated passes inside and outside the tubes. The tubes are connected in series by sheet-metal strips D, and the ends of the conductor are brought to two terminals E on the casing. The heated air may be supplied to the combustion chamber of an internal-combustion engine.

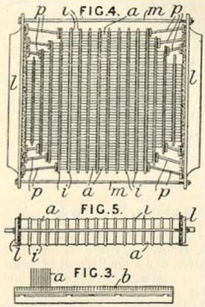
9481. Rorke, T. J., and **Rorke, E.** May 1.



Heating by electricity; thermostats.—An electric air-heater has a resistance wire wound on an asbestos tube a^1, Fig. 1, carried by a helical rod and supported by a centrally-placed rod c in a casing or tube. An inner tube with a bell-mouth may convey additional air to the upper part of the coil. The wire is divided into two sections, which can be put in circuit separately, or in series, or in parallel, by a thermostat; a supplementary field winding G of a fan motor is also put in or out of circuit by the thermostat. The wire is first wound on a mandrel of smaller diameter than the asbestos tube, so that when the mandrel is removed the convolutions will be of the same diameter as the tube. The asbestos tube is slipped on a spiral or other shaped rod b, which may have a coating of insulating-material. The sections a^2, a^3, Fig. 3, of the wire and the field winding G of the fan motor are connected to mercury cups f^8, f^7 and three rocking switches f^4 each operated by two electromagnets b^x, b^{1x}, connected with a maximum—and minimum—thermometer E having a number of contacts or with three separate thermometers. A clock switch may also be used.

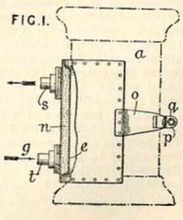
9560. Soc. J. Grouvelle, H. Arquembourg, et Cie. May 2, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Heating buildings &c.—In the manufacture of radiators of the type described in Specification No. 5599, A.D. 1902, filling-plates a are assembled in combs b, and the flat tubes i are placed between them, the whole being clamped in a frame. The radiator thus assembled is then lifted by the frame out of the combs and is dipped into solder. The



combs b consist of bars with saw-cuts in them, flanges being provided on the bars to leave spaces for the tubes. The frame consists of T-bars l and bolts m, toggle-clamps p being provided to tighten projecting portions. Asbestos is inserted between the parts which the solder is not required to unite.

9583. Robinson, A. S. F. May 2.



Heating water.—A hot-water boiler is adapted to be clamped against the outer face of a wall of a closed stove, such for example as a "Torquoise" stove a, in a readily removable manner. The boiler comprises two plates between which a narrow water space n extends, suitable flow and return fittings s, t being provided. The whole is held by bands o and a nut and bolt q passing through lugs p.

9745. Cartin, J. May 5. *Drawings to Specification.*

Non-conducting coverings.—A boiler lagging consists of a layer of fire-brick covered with asbestos.

9758. Barbé, P. A., Garelli, F., and **Paoli, G. de.** May 5.

Digesters.—A digester used for saponifying fats with ammonia comprises a helical stirrer 3, a steam-coil 5, a steam injector 4, and the usual fittings. Specifications No. 4733, A.D. 1882, and No. 12,210, A.D. 1907, are referred to.

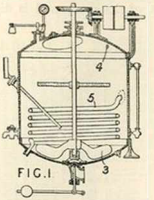


FIG. 1.

9762. Ruzicka, C. May 5.

Heating by electricity, resistances for. An oxide, carbonate, chloride, nitrate, or nitrite of copper, iron, or silver, and a similar salt of iridium, nickel, palladium, or platinum, or a combination, such as a double salt of these metals, are mixed with compounds of silicic or boric acid melting below 1500° C., such as calcium feldspar or silicon borate, and with minerals or stones melting above 1500° C., such as bauxite or aluminium oxide. The materials are moulded under strong pressure with a temporary binding-agent, such as gum arabic or dextrin, and baked in a reducing-atmosphere or with a reducing-substance at a sufficiently high temperature to reduce the metallic constituents and vitrify the mass. The metallic salts or oxides may be dissolved in a suitable solvent, such as water. A resistance rod 10 cm. long, 1 sq. cm. in section, and having a resistance of 300 ohms, may consist of 20 parts of iron oxide, 33 parts of nickel oxide, 26 parts of calcium feldspar, and 18 parts of bauxite, worked together with gum-arabic solution and treated as described above. A rod of the same dimensions, but having a resistance of 2 ohms, may consist of 20 parts of iron nitrite and 38 parts of nickel nitrite, dissolved in a small quantity of water and mixed with 26 parts of calcium feldspar, 18 parts of bauxite, and a binding-agent, such as powdered dextrin, and treated as above described. The portions of the resistance body to which contacts are to be attached may have metal fused or electrically or chemically deposited thereon. The invention is applicable for resistances for use in electrical heating and cooking apparatus.

9763. Ruzicka, C. May 5.

Heating by electricity.—A resistance applicable for use in electric heating and cooking apparatus is formed of a mixture of: (1) carbon or metallic carbides, such as silicon carbide; (2) minerals or stones forming second-class conductors and melting below 1500° C., such as potassium feldspar or calcium borate; (3) minerals or stones forming non-conductors or second-class conductors and melting above 1500° C., such as quartz, marble, or calcium oxide; (4) solid or liquid substances, that leave a carbonaceous residue when heated in a vacuum or reducing-atmosphere or with a reducing-substance, such as asphalt, wood-tar, coal-tar, tar-pitch, or resin, a solvent such as amyl alcohol or turpentine oil being added if the substance is a solid; and (5) metallic compounds having acid or neutral properties and acting as fluxes and permanent binding-agents, such as boric acid. The solid constituents are pulverized, mixed with the liquid constituents, moulded under strong pressure, and baked in a vacuum or reducing-atmosphere, or with a reducing-substance at a sufficiently high temperature to vitrify the mass. A rod 10 cm. in length 1 sq. cm. in section and having a resistance of 400 ohms, may consist of 4 parts of carbonized petroleum residue, 34 parts of potassium feldspar, 22 parts of quartz, 4 parts of coal-tar, and 6 parts boric acid. A rod of the same dimensions and having a resistance of 60 ohms, may consist of 60 parts of silicon carbide, 24 parts of potassium feldspar, 12 parts of marble, 3 parts of tar pitch, dissolved in 12 parts of amyl alcohol, and 10 parts of boric acid. The resistance body may be provided with contact-pieces formed of a mixture of substances classified under (1), (4), and (5) above. Specification No. 16,422, A.D. 1904, [*Abridgment Class* Electricity, Measuring &c.], is referred to.

9923. Stralendorff, F. H. A. von. May 7.

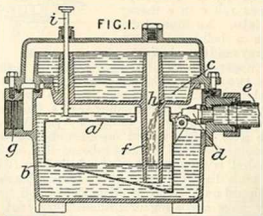


FIG. 1.

Steam traps.—A trap in which the drainage valve *d* is periodically opened by leakage of water into an open-topped float *a*, contained in a casing *b* normally filled with water, is provided with a reservoir *c*, in which a sufficient quantity of water remains on the discharge of the trap, to sink the float. The water in the reservoir *c* flows back into the float through a small aperture *h*, which opens into a pipe *f* extending from the bottom of the float to the top of the reservoir. When full, the float sinks and opens the valve *d*, condensed water and steam then passing into the casing *b* from the drainage pipe *e*, and the water in the float being forced up the pipe *f* into the reservoir *c* and

thence escaping through an outlet pipe *g*. A hand-rod *i* is provided to depress the float. A non-return air-inlet valve is fitted on the reservoir *c* to prevent all the water from being siphoned out. The size of the aperture *h* may be made adjustable to regulate the period of the trap.

9987. Tennett, C., and **Bairstow, J.** May 8.

Steam traps.—A discharge pipe F is bent near its end and carries a casing G divided by a web H. A valve closing an aperture in this web is carried by a stem A, which slides through a stuffing-box in the casing and is screwed into a yoke (not shown), supported by a rod D and a bracket E on the straight portion of the pipe F. The expansion and contraction of the pipe F relatively to the rod D effect the closing and opening of the valve. A hand-wheel C on the stem A enables the trap to be blown through.

FIG.1.

10,210. Gibbs, C. A. May 11, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Heating water.—In a combined air and water heating furnace, the furnace gases pass through tortuous flues arranged in chequer brick-work for heating the air, and the water tank or boiler is supported in the brick-work and connected to an inclined hollow casing which is placed above the fire and formed with openings for the passage of the gases. Air enters the chequer brick-work through openings near the bottom and leaves by service pipes 7. From the grate 9, the gases pass through the openings in the water chamber 26 to a dampered flue 10, whence they pass down a flue 13 to horizontal flues 14, 15, 17, 18, 19, and then to the outlet flue 20. The horizontal flues 14, 17, 19, which may be made in sections, are provided with removable caps 21 for cleaning purposes, and the flues 13, 15, 18, 20 are fitted with sliding joints. Cold water from the main passes through a pipe 23 to the tank 22, which is connected by service and return pipes to radiators or a hot-water service system. Flow and return pipes also connect the tank with the inclined hollow baffle 26. This baffle is formed with flue passages 31, and the front portion 30 is shaped as shown to allow of access to the fire and to prevent

FIG.6.

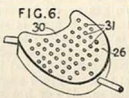


FIG.2.

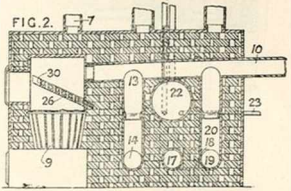
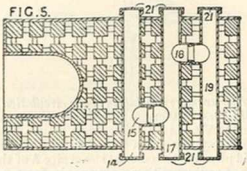


FIG.5.

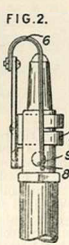


emission of flames &c. when the door is opened, by providing a large opening for gases to escape to the main flue.

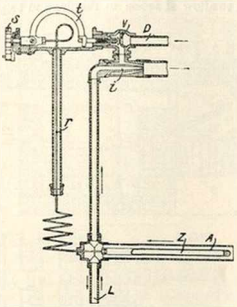
10,295. Kelley, W. V. D. June 3, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Thermostats.—The flame of a gas burner is periodically varied by a thermostat operating the gas cock, and a magnetic or other retarding-device prevents the gas cock from being operated too rapidly. In the form shown, the free end 8 of the curved thermostat 6, preferably consisting of iron and brass strips, engages with pins 9 eccentrically arranged on the gas cock, and also vibrates between the poles of a permanent magnet 10. The free end 8 is made of or carries magnetic material, and the cock is held by a spring.

FIG.2.

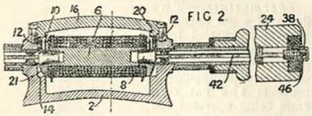


10,518. Drach, J. May 14.



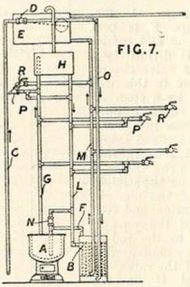
Thermostats; heating by steam circulation; heating buildings.—A thermostatic regulator, for controlling a valve V admitting live steam from a pipe D to a heating-system, has a tube Z filled with expansible fluid placed in the exhaust steam pipe A of the system out of contact with an air supply from a pipe L; the tube Z is connected by a tube *r* to a separate pressure tube *t* operating the valve V to admit live steam to an injector *i*. The fixed end of the pressure tube *t* is provided with means for adjustment *s*. Condensed water escapes down the pipe L.

10,521. Boult, A. J., [*Miller Treeing Machine Co., O. A.*]. May 14.



Heating by electricity.—A treeing-iron for use in finishing boots and shoes has a heating-resistance which can be removed from the iron, and replaced in case of a break, without disturbing the connexions. The hollow body 2 of the iron has a removable lid 16 forming a part of the ironing-surface, and contains a resistance, wound on a spool 6 and connected at each end to a projection 10 extending laterally from a contact-plug 8. The iron has two removable hollow handles 24 with internal insulated conducting rods 42, which engage with the contact-plugs 8, and are connected by springs 46 with contacts 38 adapted to engage with contacts on a stand as described in Specification No. 7507, A.D. 1908. The resistance spool rests on curved ledges 14 in the iron, and is held in position by lugs 20 on the lid which rest on flanges 12 on the spool. As the resistance is put in position, bevelled surfaces 21 force back the conductor rods so that they engage with the contact-plugs 8.

10,526. Stevens, F. J. Warden-Cooper, E. E., and **Lawrence Patent Water Softener and Sterilizer Co.** May 14.

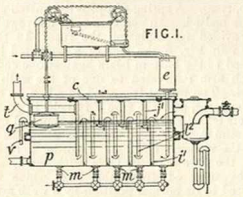


Heating water and other liquids.—Relates to means for softening and purifying water in conjunction with an ordinary hot-water circulation system, and for obtaining supplies of hot and cold purified water for use in factories &c. A suitably-shaped vessel with a jointed door or cover is connected to the hot-water storage tank in the usual manner and takes the place of the ordinary hot-water boiler. An auxiliary source of heat, such as movable gas or oil burners, may be used if the main source of heat is stopped. The purifying-vessel is provided with easily-removable baffles or trays for catching the sediment, and may have its heating-surface increased by gills, corrugations, or internal tubes. Fig. 7 shows the arrangement for obtaining supplies of hot and cold purified water, in which the purifying-vessel is heated by a separate furnace. Water from the main C flows through the valve D, which is controlled by a float in the cold-water storage tank E, into the pipe O which leads to the interchanger B. The water is heated by the hot water surrounding the tubes in B, and then passes to the purifier A by the pipe F. The softened hot water rises through the pipe G to the storage tank H, and then passes down the pipe L to the interchanger B, where it is cooled, and finally passes to the cold purified storage tank E by a pipe M. A branch connexion and check valve are provided at N to allow the water to circulate to and from the tank H when no water is being drawn. Cold and hot water are drawn off by the taps R, P respectively.

10,531. Soc. C. & G. Pulinx. June 8, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

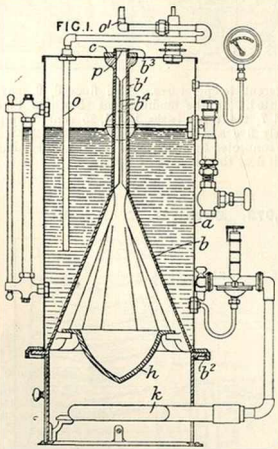
Heating water.—In a water-purifying heater of the type in which the water is in contact with steam travelling in the same direction in a precipitation tank *c*, which is divided into compartments by partitions i^1, the water entering each compartment under baffles j^1 for the steam, is deflected by a plate l^2 to the bottom of the compartment, where impurities settle out and whence they are removed through sediment pipes *m*. To assist in precipitating impurities, carbonate of soda or a similar reagent, may be mixed with the water in a funnel *e* before it enters the heater. To avoid incrustation of the bottom of the funnel pipe it is led to the bottom of the first compartment. A reservoir *p* fitted with an overflow pipe *v* is situated at the end of the heater, and in this reservoir a float *q*, for regulating the supply of water and reagent, may be fitted. An escape pipe *t* for exhaust vapours from the water is provided in the last compartment.

FIG. 1.



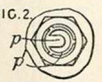
10,592. Revy, J. W. May 15.

FIG. 1.



Heating water.—Relates to water-heating apparatus, also applicable to the generation of low-pressure steam, of the type consisting of a vertical cylindrical shell through which passes a corrugated conical flue. The conical flue *b* has at its lower edge a flange b^3, to which is bolted the cylindrical shell *a*, and is continued upwards as a cylindrical flue b^1 provided with heating-webs b^4 and at its upper end with a screw b^2 and a nut *c* by which the shell *a* is secured to the flue b^1. A removable inverted conical baffle *h* directs the products of combustion from the gas-burner *k* against the walls of the flue *b*. A joint o^1 of the draw-off pipe *o* is above the flue b^1, and, to prevent it from being injured by the hot gases, a plate *p* is provided fitted with a tongue p^1, Fig. 2, to deflect the gases from the joint.

FIG. 2.



10,680. British Prometheus Co., Cooper, G., and **Sharp, F. C.** May 16.

FIG. 1.

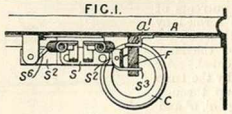
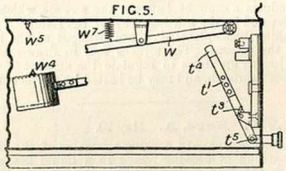


FIG. 5.

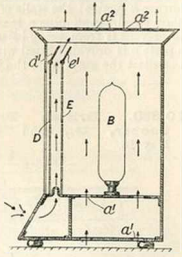


Heating by electricity; heating liquids.—A cut-out for electrically-heated vessels &c., in which a switch arm is held in the closed position by a detachable fusible plug against the action of a spring, is constructed as shown. A switch arm S^2, Fig. 1, is pivoted to the bottom A of a heating-vessel, and has a contact-piece S engaging with

contacts insulated from the bottom of the vessel. An **I**-shaped fuse F fits in a forked extension S^3 of the switch arm, and also in a bracket a^1 fixed to the bottom. A spring S^6 opens the switch when the fuse is melted. An aperture with a screwed cap C is provided for replacing the fuse. In the form shown in Fig. 5, the end of a weighted lever W pivoted to the bottom bears against one end t^4 of a switch arm t^1 pivoted to one of the walls of the vessel. The weight is carried in a box on one end of the lever, and the fuse F is held in position in holders w^2, w^4. The arm may be replaced by means of a stud t^2, which also indicates when the cut-out is in the working position. In order to replace the fuse, the screwed cap C is withdrawn, and the weight removed from the box, which is then restored to its normal position by a weak spring w^7. According to the Provisional Specification, the contacts may be arranged for two heating-circuits; the fuse-holders may be of dovetailed form, and the holder on the bottom of the vessel may be open at the top.

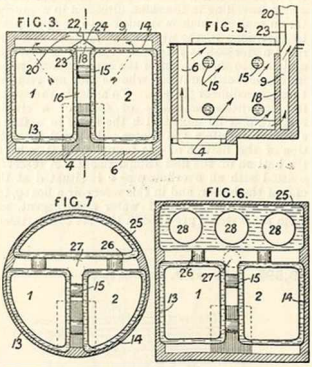
10,760. British Prometheus Co., Cooper, G., and **Sharp, F. C.** May 18.

Heating by electricity.—A radiator has one or two screens D, E formed of a number of small bodies such as beads suspended on wires, fine chains, or threads, placed in front of an incandescent lamp B, so that currents of air are formed by convection, and the glare of the lamp is prevented. Air heated by the lamp passes up through openings a^1, a^2 and produces a draught between the screens, which is increased by the heating effect of the latter. Two sloping baffle-plates d^1, e^1 are arranged at the top of the screens. The screens may be drawn back or looped up so as to regulate the amount of air passed through, and may be heated by convection.



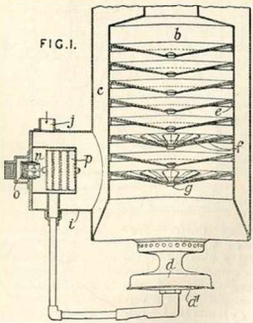
10,939. Hage, A. May 20.

Boiling-pans.—In cooking-apparatus of the kind consisting of cooking-vessels in a liquid heating-bath, the bath consists of several chambers, each containing a cooking-vessel, connected by short pipes. Fig. 3 shows a plan of a cooking-apparatus consisting of two vessels 1, 2, each in its bath or jacket 13, 14, heated by front and rear flues 6, 9, and a flue 16 between the baths 13, 14 which are connected by short tubes 15. The combustion products from the fire 4 pass under and between the baths 13, 14 and round a partition 18 near the chimney 20. The outlet to the chimney is divided by partitions 22, 23, 24, shown also in Fig. 5, and dampers are fitted so as to heat the baths to



different temperatures. The flues 6, 9 may be omitted. In the modifications shown in Figs. 6 and 7, the three baths 13, 14, 25 contain respectively five and three cooking-vessels 1, 2, 28, and are connected by short pipes 15, 26. The chimney 27 is near the junction of the flues.

11,072. Ewart, G. H. May 21.



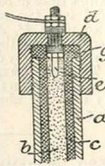
Heating water; thermostats.—An annular water casing *c* is provided with a series of metallic baffles

in a flue or passage *b* over a burner *d*, so that the water is heated by conduction of heat through the baffles. Each baffle *f* consists of a number of triangular metal blades extending towards the centre of the flue from a ring *e* attached to the casing; the blades incline downward to the centre, and are angular in cross-section to avoid the retention of condensed moisture. The openings at the centre of the baffles are filled with buttons *g*. The gas supply to the burner *d* is controlled by a thermostat in an extension *i* of the casing *c*, carrying the water inlet *j*; an expansible chamber *p* on expansion closes the end of the gas inlet tube *n*, which is held in place by a spring *o*. The bunsen burner *d* is provided with a gauze diaphragm at d^3 and is formed with a constricted neck as shown; the outlet holes for gas are lateral, thus preventing any deposit falling from the flue, from entering the burner.

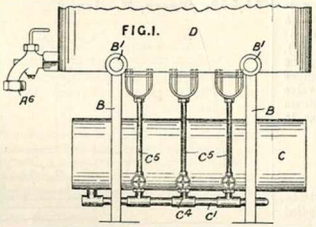
11,128. Hankin, M. May 27, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

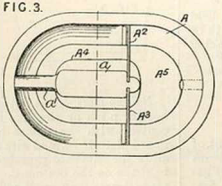
Heating by electricity.—Relates to electric heating-apparatus of the kind described in Specification No. 24,517, A.D. 1902, in which the current passes through a granular core surrounded by insulating-material, and consists in replacing this insulating-material by a material similar to the core material but having a greater specific resistance. Terminal rods *e* enter the core *b* at each end and are carried by, but insulated from, metal caps *d* screwed over the ends of the tube *a* and containing a layer *g* of material of similar composition to the envelope *c*. A mixture of powdered cast iron or other metal with fireclay, plumbago, asbestos, or the like may be made into a paste with water and packed closely into the tube, the proportion of conducting-material being reduced for the outer layer or envelope *c*. The Specification in the original form, as open to inspection under Section 91 (3) (*a*), comprises also a composition of 100 parts by weights of refractory earth, 100 parts of cast iron, and 10 parts of plumbago for the core, and for the envelope 100 parts of refractory earth, 25 parts of cast iron, 10 parts of plumbago, and 1 part of asbestos, which after being packed in the metal case is heated gradually to a high temperature and is converted into a compact mass. This subject-matter does not appear in the Complete Specification as accepted.

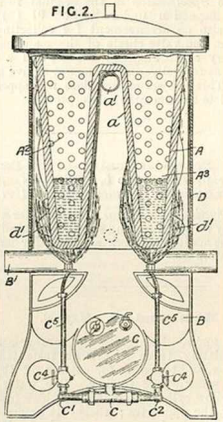
FIG. 2.



11,557. Allan, J., and **Richmond, J.** *Nov. 30.*







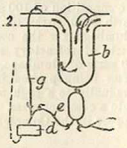
Boiling-pans.—Bitumen, pitch, marine glue, grease, &c. are melted in an elongated vessel A having a cone *a* elongated horizontally, through which pass the hot gases from an oil stove to a chimney a^1. The vessel A is supported on two standards B carrying the fuel tank C, from which

the oil is forced by air pressure through pipes c, c^1, c^3, and valves c^4 to two rows of vertical pipes c^2 with burners. A casing D surrounds the vessel A, with a space d^1 between them. The vessel A is divided into two compartments A^4, A^5 by perforated plates A^2, A^3, through which the melted material passes to the tap A^6. The stove is preferably surrounded by doors hinged to the standards B. The apparatus may be transported by hand if bars are inserted in the sockets B^1 of the standards B, or axles for wheels may be inserted in these sockets.

11,589. Nouailhetas, P. May 31, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*]. *No Patent granted (Sealing fee not paid).*

Steam traps.—Water collectors b in steam mains are connected by pipes e to constantly-working auxiliary engines d, such as pumps or capstan and windlass engines, which can be worked by the pressure of either steam or water, or both. The pipe e is of small diameter, such as 10 to 15 mm. Dry steam is delivered by the main to the principal engines. Live steam may be supplied to the auxiliary engine by a pipe g. The system is described as applied to the engines on board a ship. The Specification in the original form, as open to inspection under Section 91 (3) (a), describes also an arrangement for collecting the water from the valve-chests of the main engines for delivery to an auxiliary engine, and a valve arrangement for delivering either wet or live steam at will. This subject-matter does not appear in the Complete Specification as accepted.

FIG.2.



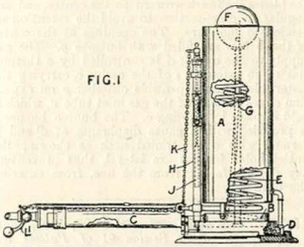
11,611. Saint-Germain, J., and **Saint-Germain, H.** June 5, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Non-conducting compositions.—Kapock fibres held together by an agglutinating substance and with or without the addition of cork are used for making heat-insulators &c.

11,755. Hammond, F. May 30.

Heating water.—Relates to the arrangement of water-circulating tubes &c. in an instantaneous water-heater, and to means for cutting off the gas when the water ceases to flow. The water first enters a hollow cylindrical casing A, which forms a jacket for the apparatus; thence it passes to a chamber D in the base, up a central pipe E to a chamber F, which it leaves by a pipe G which passes straight down to the bottom of the apparatus and thence up and down in coils finally opening into the outlet pipe H. A bunsen burner C

FIG.1



opens into a flame-box B at the bottom of the casing A. In the outlet pipe H is placed a float J connected by a chain K with the gas cock L^1; when water ceases to flow through the pipe H the float J falls, allowing the weighted handle of the cock L^1 to close the cock.

11,953. Tyers, F. June 2.

FIG.1.

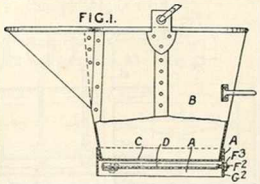


FIG.3.

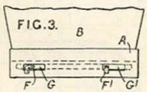
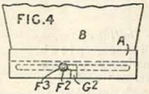


FIG.4

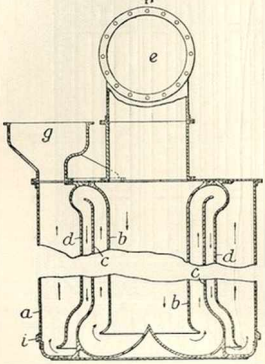


Boiling-pans.—The bottom C of a bucket B for heating pitch or the like is protected from direct contact with the flames by a fixed or removable guard-plate D formed with small perforations which allow the flames to pass through but not far enough to strike on the bottom C. The bottom rim A is made deeper than usual and in the example shown is formed with three slots G, G^1, G^2 to receive three radial studs F, F^1, F^2 on the plate D. The ends of the studs F, F^1 are turned to engage the outer side

of the rim A. One slot G^3 is of the bayonet-joint type, and the stud F^2 which fits therein is fixed by a nut F^3 screwed up to the rim A.

12,004. Swift, H., and **Walker, W.** June 3.

FIG. 2.



Heating air.—In apparatus for heating buildings, railway coaches, ships, &c., by air heated by the waste gases of boiler flues and wherein air is circulated through concentric tubes, the outermost of which is in contact with the waste gases, the tubes *b*, *c*, *d* are arranged and constructed as shown, communicating with one another within an outer shell *a* placed in the smoke-box or flue and having inlet and outlet pipes *e*, *g* for the circulation of air from the atmosphere. A scraper *i* is provided to remove soot &c. from the exterior.

12,078. Gray, W. June 3.

Digesters.—The cover 7 of a digester is clamped in position by a spider 11, provided with pivoted hooks 13 which engage with the bevelled underside of a rim 2, Fig. 9, on the body of the digester; a pressure screw 15 passes through the spider, and bears against the centre of a pressure-distributing plate 8 on the cover. The cover and the distributing-plate, which is removable, are formed as cones. A packing-ring is placed between the inclined edge of the cover and the flat upper surface of the rim; pressure within the digester thus tends to wedge the packing more tightly in the joint. The cover is provided with a pressure indicator, consisting of a cylinder containing a spring-pressed piston with a graduated rod, and also with a safety-valve 16, consisting of a ball of metal, drilled to a short distance

FIG. 9.

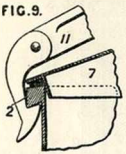
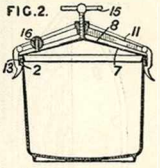


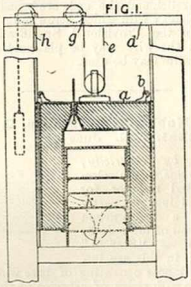
FIG. 2.



above its centre, resting on a steam-escape pipe. Several such balls may be provided for different pressures.

12,191. Abbott, J. A. June 5.

FIG. 1.

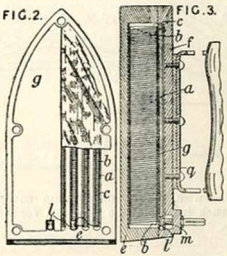


Heating by electricity; non-conducting coverings.—In an electrically-heated oven of the type described in Specification No. 9372, A.D. 1895, in which a counterbalanced cover *a* can be raised above trays *k*, the cover is made with double walls, the space being hermetically sealed with cork-dust, to prevent loss of heat. In the construction shown, the cover is supported from a cross-bar *d* by a cord *e* passing over pulleys *g*, *h*. The opening at the bottom is closed by doors *l* when the cover is raised.

12,275. Eastman, W., and **Warne, A.** June 5.

Heating by electricity; heating water; bed-warmers.—Heating-resistances *a*, wound on strips of asbestos or like material, are placed in slots *c* in a metal base *e*, from which they are insulated by mica.

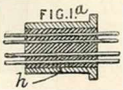
The invention is shown as applied to a flat-iron, but may be applied to other apparatus, such as radiators, water-heaters, and warming tables and pans. The iron is covered by a plate *f* over a layer



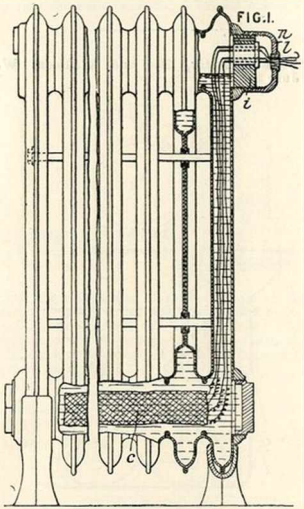
of asbestos *g*, and a handle is separated from the cover by asbestos fibre *g*. The coils may be in series or parallel, and the ends are brought out to terminal plates *l* with which screw plugs *m* make contact. In the Provisional Specification, it is stated that the wire may be platinoid and that strips of uralite may be used.

12,352. Nobbs, C. G., Nobbs, C. G., and **Rosenthal, J. E.** June 6.

Heating by electricity; heating liquids.—An electrically-heated radiator for heating buildings is partly filled with a hydrocarbon lubricating-oil of low specific heat, such as "Sternol" engine oil; in this are immersed resistances consisting of bare wires woven into a fabric with strips of asbestos or the like; a special terminal plug may be provided, and preferably is situated above the liquid, wires being led to it from the heating-element through an end section of the radiator. The heating-element *c* may be folded, or coiled, and inserted through a screwed boss into a lower header. The terminal plug, Fig. 1[a], consists of a flanged metal sleeve *h* in which terminal rods, which may be of non-circular section, are spaced by insulating-material, such as "ambroin," impervious and inert to oil. This is poured into the sleeve when hot and compressed between dies while cooling. The sleeve may be of brass and tinned so that it can be sweated or soldered into a plug *i*, Fig. 1; the flange may be countersunk in the plug and sealed by soldering. Wires from intermediate points of the heating-element *c*, as well as wires from the ends, may be attached to corresponding terminal rods of the plug, so that the connexions may be varied by a switch, or polyphase current used.



Supply wires *l* attached to the terminal rods pass through an insulated hole in a cap *n*. The radiator



is filled up to the bottom of the upper header with oil, which expands sufficiently on heating to ensure circulation.

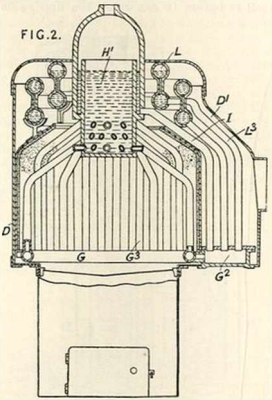
12,570. Rogers, A. B. C. June 11.

Non-conducting coverings and compositions.—Powdered mica is used for heat insulation.

12,589. Norris, W., and **Williams, M. H.** June 11.

Heating water.—Relates to boilers of the kind in which a water ring G around the furnace grate is connected by water tubes G^2 to a central water chamber H^1 at the top of the fire-box. The upper part of the chamber H^1 is enlarged so as to form an internal annular water space as shown. This space is connected by a tube I to a bottom header G^3 in communication with the ring G. The central chamber is surrounded by one or more water rings L, which are connected to the bottom header by tubes L^3 and also to the upper part of the central chamber. The furnace gases pass upwards around

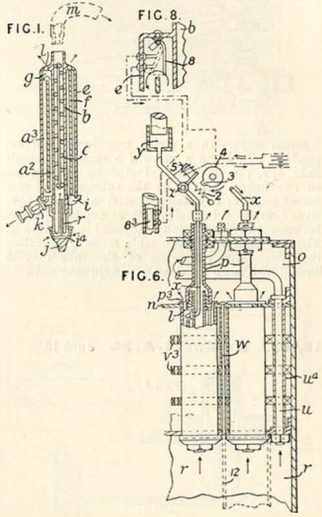
the rings L and are drawn downwards amongst the connecting-tubes L^3, which are placed in the flue D^1



formed between the fire-box and an outer casing D. The return water from a heating system enters the boiler through a pipe upon one of the rings L.

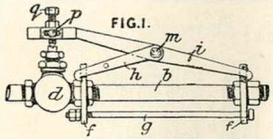
12,596. Sayer, R. C. June 12.

Heating water. — An annular water-heater *e*, Fig. 1, has its internal flue pipe *b* fitted with a spiral baffle *c*, the ends of which are held by a central rod. Circulation in the water-heater is promoted by a metal cylinder *f* dividing the water-space into two parts a^2, a^3 connected by passages *g* at the top and bottom. A cap *i*, supporting a liquid-fuel trough *r* supplied with air through a pipe i^4, is screwed to the central tube and thus closes the bottom of the heater. Water is admitted through openings *l* and withdrawn through a cock *k*. Fig. 1 shows the heater fitted with a handle *m* and a ferrule *j* for use as a walking-stick. A number of such water-heaters may be fitted in a casing to form a steam generator, Fig. 6, heated by a furnace *r*. Each heater is screwed into the lower plate *n* of a steam chamber *o*, the upper and lower plates of which are connected by tubes *p* fitted over the openings for the tops of the heaters and provided with flanges p^3. Perforations in these flanges normally coincide with perforations in the plate *n* and steam openings *l* in the heating-elements. Any tube *p* may be turned through a small angle to close the holes, and thus any heater may be removed without affecting the working of the remainder by turning the tube *p*, detaching the corresponding water inlet pipe, unscrewing the heater, and withdrawing it through a tube 12 which may be inserted through the furnace. The upper and lower plates of the casing holding the



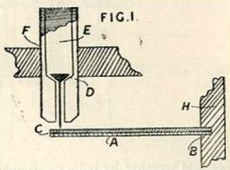
heaters are held together by bolts *w*. Supporting-pieces v^2 pass around the heaters to neutralize any tendency to burst. The products of combustion from the furnace pass either through the inner tubes of the heaters or through tubes *u* passing through the casing and traversing the steam chamber *o*. These tubes are fitted with distance pieces u^4. Water under pressure is supplied from a cylinder *y* through a pipe *x* and cock *z* to the outer water passage a^3 of each heater. The supply is regulated by a valve 8, Fig. 8, actuated by the circulation of the water through the upper opening *g* between the two water chambers of the heater, or by a float 8^3, or by both together, the movement of the valve completing an electric circuit through an electro-magnet 5 which holds the cock *z* closed against the tension of a spring 2. When the circuit is broken by the water falling sufficiently to stop further circulation or to lower the float from its contacts, the cock *z* is opened by the spring 2. A cam 3, on a constantly rotating drum 4, closes it at regular intervals and so brings it into position for the electro-magnets 5 to act upon it as soon as the water level rises again. The feed-pipe from the water reservoir is connected to the water inlet pipe by a union.

12,616. Lord, J S., and **Barlow, P.** June 12.



Steam traps.—In a steam trap having an expanding tube *b* and a valve *d* operated by toggle links *h*, *i*, the links are pivoted by knife edges on two flanges *f* fixed to the tube, and are connected together by a slot and stud *m*. The longer lever *i* carries at its end a nut arranged to swivel between two horizontally adjustable centres *p*. The nut carries an adjustable screw *q* operating the valve. The expansion of the tube may be limited by a rod *g* provided with adjusting-nuts.

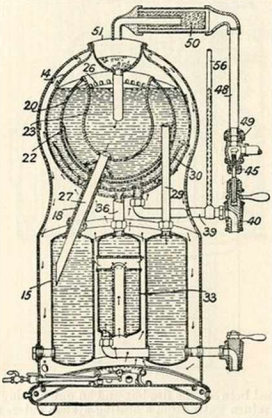
12,705. Woodward, A. M. June 13.



Thermostats.—A compound strip A of metals of different expansibilities such as copper and steel, brazed or riveted together, is used for regulating the supply of gas to a vulcanizing-mould. One end B is securely fixed in the mass H of the mould and the other end bears against the spindle of a valve D in the gas-supply pipe. The strip A is heated by conduction from the end B, and the end C rises or falls with varying temperature allowing more or less gas to pass through the pipe E. Regulation for a given temperature is made by adjusting a set-screw pressing against the strip A near to the end B, or by raising or lowering the valve seat F.

12,896. Allman, D. W. June 16.

Heating water.—Water is heated in a cylindrical chamber 33, surrounded by an annular water chamber 15, and situated over an oil or gas burner or an electric heater. Connected to these two chambers are three concentric shells 14, 20, 23. In the outer shell 14 a baffle-plate 30 is placed directly over a pipe 36 communicating with the chamber 33; water rising from this chamber is thus caused to flow over a large portion of the lower surface of the shell 14 before it can reach the upper side of

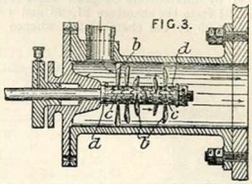


the baffle and escape through a delivery pipe 39. Pipes 29, 18, with openings at different levels, connect the space within the intermediate shell 20 with the annular water chamber 15, thus maintaining a circulation; an air jacket 22 is fitted at the bottom of this shell to insulate the cooler water from the hot water in the outer shell. The innermost shell 23 is a water reservoir, supplied through a loose funnel 51; a pipe 27 connects it with the annular water chamber 15. Perforations 26 in the innermost shell afford an outlet for steam generated in the intermediate one. A plug cock 40 in the delivery pipe 39 is coupled with a screw valve 45 in the cold-water supply pipe, by a squared spindle loosely fitting in the plug cock. Both valves can thus be opened simultaneously; the supply valve 45 may be opened alone, by turning the delivery cock past the open position until it is closed again. A filter 50 is arranged in the water-supply pipe 48, which is mounted in a swivel joint 49 on the valve 45, and a water gauge 56 on the delivery pipe. A draw-off cock for emptying the heater is also fitted at the bottom of the annular chamber 15. The waterheater is enclosed in a casing and is shown as heated by a gas burner, supplied with air through openings from a chamber underneath. The supply of air is regulated by closing inlets in the sides of the chamber by means of a ring. The heated gases pass upwards through the annular chamber 15, strike against the outer shell 14, and descend close to the outer casing, which is provided near the bottom with an opening.

12,952. Haden, W. N., and **Haden, C. I.,** [*trading as* Haden & Sons, G. N.], and **Watts, C. J.** June 17.

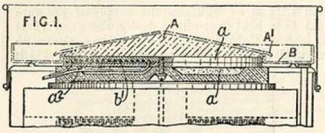
Heating buildings; heating by water circulation.—The circulation of water in boilers, pipes, and radiators is accelerated by the use of a series of propellers mounted upon a common shaft so that their tips lie upon a helix. The propellers are formed of blades *b* mounted upon bosses *c*, and are arranged in echelon. The bosses have toothed or corrugated edges to allow the propellers to be equally spread round the shaft and to permit the pitch to be adjusted. The propellers are secured to the shaft by means of collars *d*, which are pinned or otherwise fixed to the shaft, and have corrugated edges similar to those on the bosses *c*.

FIG.3.



13,107. Berry, A. F. June 19.

FIG.1.



Heating by electricity.—In an electric heating-apparatus in which a hot-plate *a* is heated by currents induced in it by an enclosed winding forming part of a secondary circuit of a transformer, as described in Specification No. 25,411, A.D. 1906, a cover-plate a^2 is heated so that it expands equally with the hot-plate, by means of an interposed sheet b^1 of non-magnetic material, such as copper or gun-metal, in which currents are induced. The bottom of a vessel to be heated by the plate consists of a block of copper or other non-magnetic material, in which currents are induced when the hot-plate is magnetically saturated. A griller for use on the hot-plate consists of a block A of nickel-plated copper, iron, or conductive alloy, having inclined ribbed surfaces and depending edges A^1, as shown, the block being surrounded by a pan B for drainings. According to the Provisional Specification, the interposed plate b^1 may be dispensed with, and the winding embedded equally in each plate a, a^2.

13,311. Varvell, G. June 23.

Heating water.—When the ordinary alarum mechanism of a clock comes into action, an oil stove *b*, Fig. 1, is set free and is drawn on guides *a* by a spring to position under a vessel of water *e*, being ignited by a match *k* as it passes a striking plate *m*. A lever detent *h*, Figs. 2 and 3, pulled by a spring is kept in engagement with a notch in the base-plate of the stove by a bolt *i* until the alarum goes off, whereupon the winding-piece *j* draws the bolt.

FIG.3.

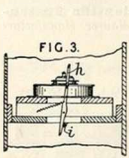


FIG.2.

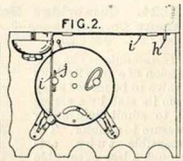
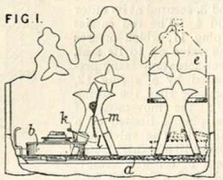


FIG 1.

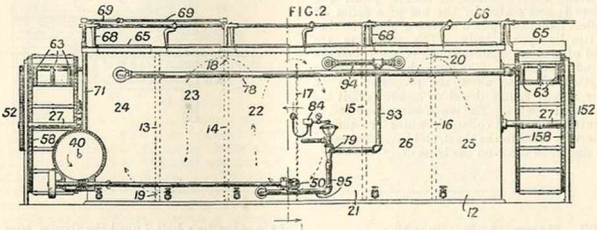


13,462. Boult, A. J., [*Goldman & Co., E.*]. June 24.

Heating water.—In apparatus for pasteurizing bottled beer &c., in which the bottles &c. are passed through a series of heating and cooling chambers, the required temperatures are maintained by thermostats acting on jet pumps controlling the circulation. A tank 12 is divided by partitions 13, 14, 15, 16 into a receiving chamber 24, attemperating-chambers 23, 26, a central pasteurizing-chamber, and a delivery chamber 25. Ports 18, 19, 20 are disposed as shown, and the partitions are formed with insulating air-spaces. The pasteurizing-chamber is divided into compartments 21, 22, which communicate over the top of the partition 17 and through bottom ports therein

which are fitted with shielded agitators on a shaft 50. Steam-jet pumps 79 placed on either side and regulated by thermostats 84 draw water through pipes 93, 94 from the chambers 21, 26 and return it by pipes 95 to the chamber 22, whence part returns to the chamber 21 and the rest flows through the chambers 23, 24, a pipe 78, and the chambers 25, 26. The jet-pumps and thermostats are preferably those described in Specifications No. 20,112, A.D. 1907, and No. 8084, A.D. 1908.

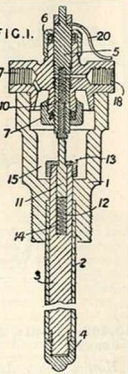
FIG. 2.



13,524. Cambridge Scientific Instrument Co., [*Hohmann & Maurer Manufacturing Co.*]. June 25.

Thermostats.—The expansion of a tube 2 allows a valve to be moved away from its seat by a spring 10, to admit fluid under pressure to a motor. The expansible tube acts through a less expansible rod 3, secured at its outer end 4. The rod carries a plug 11, which presses the valve on to its seat, over-actuation being prevented by a spring 12, stronger than the spring 10; the movement of the plug is limited by a cap 13. The valve and spring 10 are carried in a stem 5, screwed removably and adjustably into a casing 1, the adjustment being shown by a pointer 20. The pressure fluid passes from an inlet 17, through a chamber 15 and through the clearance between the valve spindle and the stem, to an outlet 18. Stuffing-boxes 6, 7 are provided at each end of the stem 5.

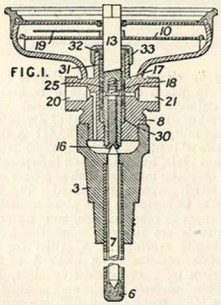
FIG. 1.



13,526. Cambridge Scientific Instrument Co., [*Hohmann & Maurer Manufacturing Co.*]. June 25.

Thermostats.—In a thermostat of the type in which an expansion rod 7 operates a valve 16 mounted inside an adjustable and removable stem 13, and so regulates the supply of pressure fluid to a heat-controlling device, the stem 13 is made fluid-tight by means of a loose sleeve 25 provided at each end with packing 30, 31 which

FIG. 1.



can be compressed by a gland 32, and a screw cap 33. When the valve is open, fluid passes from an inlet 20 through clearance between the valve spindle and the stem 13, and through a lateral opening in the stem to a space between the stem and the sleeve 25, from which it passes through openings in the sleeve to the outlet 21. The valve is kept open and resting on the expansion rod 7 by a light spring 17, its movement being limited by a pin 18, engaging with a slot in the valve spindle. The stem 13 is screwed into a casing 8, and the adjustment of the valve is shown by a pointer 19 moving over a dial 10. The expansion rod 7 is encased in a tube 6, which is fixed in a casing 3.

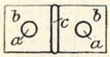
13,734. Cornaro, G. June 27, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Heating by electricity.—Heating-resistances of the kind described in Specification No. 22,090, A.D. 1903. [*Abridgment Class* Electric lamps &c.], and containing finely divided metals or metallic salts or both, are now brought to the desired conductivity by repeated alternate baking and compressing, the resistance varying oppositely to the pressure. Resistances for stoves, radiators, cooking-appliances, and the like may thus be made. To obtain constancy of resistance, oxides or salts may be added which have a negative resistance-temperature coefficient.

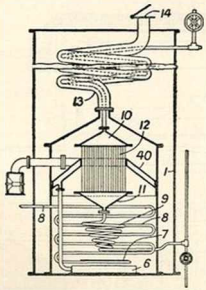
13,776. Grouvelle, J., and **Arquembourg, H.** June 29. [*Patent of Addition to No. 10,143, A.D. 1902.*]

Heating liquids.—In the heaters or coolers described in the parent patent, the plates that are interposed between the gills *b* of the tubes *a* are replaced by tubular partitions *c*, through which circulates the same fluid that flows through the tubes *a* or a different fluid.

FIG.1



13,988. James, G. July 1.

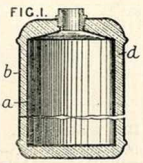


Heating water.—A boiler consists of upper and lower conical chambers 10, 11 connected by straight tubes 12. Water is fed to the top chamber through a helical coil enclosed by a large helical pipe 13, through which the hot gases from the burner pass upwards to the escape outlet 14. The air supply to the burner 7 is heated in a chamber 40 surrounding the boiler, and the gas supply is heated in a coil 8 which terminates in a flat coil 7 having bottom perforations forming the burner.

14,001. Valentini, A. J., and **Boujour, J. M.,** [*trading as* Soc. Valentini & Boujour]. July 6, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*]. *Void.* [*Published under Patents &c. Act, 1907.*]

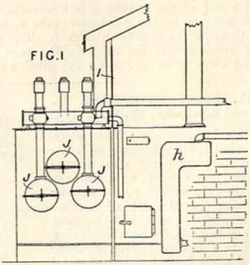
Hot-water bottles; non-conducting coverings. — Hot water containers for use in heating the human body, are constructed with double walls *a*, *b* between which is placed non-conductive material *d*, preferably several layers of corrugated cardboard.

FIG.1.



14,034. Johnson, J. C. July 2.

FIG.1

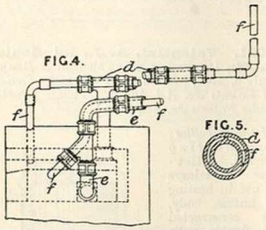


Heating water.—A portable gas-making apparatus comprises a metallic retort chamber containing one or more retorts J and fitted with a damper I so that the waste gases can be passed over a water-heater *h*. The gas-making apparatus may be used separately or in conjunction with the water-heater and is applicable for use as a stove or range.

14,098. Bushby, F. W., and **Roberts, W. R.** July 3.

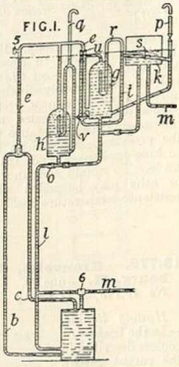
Heating buildings.—A pair of flue pipes *f* is carried through a part or the whole of the length of the water-holding pipes of a heating system, one

of such flues passing through the flow pipe *d* and the other through the return pipe *e*.



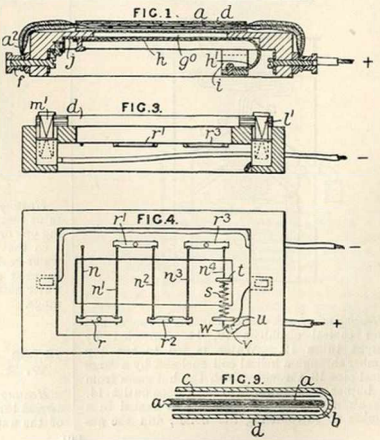
14,112. Walton, H. July 3.

Heating buildings &c.—In an apparatus for accelerating the flow of hot water through a system, steam, either generated in a closed circuit *c*, *b*, or drawn from a separate source, traverses a pipe *e* and lowers the water level in two "displacing-" vessels" *g*, *h* arranged at different levels. Water is forced out of the higher vessel *g* into the main return pipe *l*. The out-flow continues until the lower end of the U-tube *r* is uncovered, thus admitting steam to the condenser tube *s*, which passes through the expansion tank *k*. The pressure of steam causes the water in the tube *t* to close the valve *u* by action on the diaphragm *v*, and the vacuum caused by the condensation draws fresh water from the tank *k*. Meanwhile the steam pressure has emptied the lower vessel *h* into the circulating-pipe *l* through the non-return valve *o*. On the fall of the valve *u*, the vessel *h* is refilled from the higher vessel *g* and the operations are repeated. Relief pipes *p*, *q* and air valves 5 are provided. The radiators &c. are connected to the pipes *m*. A three-way valve 6 may cause the water all to pass through the boiler, part through the boiler and part into the circulating-pipe, or all through the circulating-system. In a modification, the valve *u* is dispensed with, the upper vessel *g* deriving its steam from a U-tube in the chamber *h*, which is the first in this case to be discharged. The rise of water in the vessel *h* effects the same purpose as the valve *u*.



14,121. Hay, J., Couper, H. R., and **Lindsay, W. H.** July 3.

Heating by electricity; thermostats.—An electrically-heated portable vulcanizer, particularly suitable for repairing tyres, consists of a heating-coil *a*, Fig. 9, wound round one or more flat or curved sheets of mica or other insulator *b* and laid between mica or like sheets *c*, the whole being encased in a flat or curved metallic sheath *d* made from a flattened metal tube or from a metal strip wrapped round it and mounted in a recessed block. Figs. 1 and 3 are vertical sections of two forms of vulcanizer and Fig. 4 is an underside view of the form shown in Fig. 3. The heating-coil *a* is preferably used in conjunction with a thermostatic make-and-break, which may consist (1) of a compound metallic strip *h*, Fig. 1, bent at one end h^1 and connected through the saddle-piece *i* to one terminal while the other end is normally in contact with a plate *j* which is connected to one end of the resistance coil *a* through the binding-screw *f* and terminal a^2, or (2) of a number of rods n, n^1, Fig. 4, connected

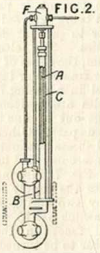


in turn to pivoted bars r, r^2. The rod n^4 passes through a fixed plate t and carries on it a plate u and an insulated contact-piece w, which normally contacts with a similar contact-piece v. When the bars become heated by radiation through the opening g^5 from the metallic sheath d, they expand and break contact which is normally insured by a tension spring s. To prevent sparking on breaking, the strips i, j, Fig. 1, may be connected by a high resistance. The ends of the heating-coil shown in Figs. 3 and 4 are connected to the male members l^5, m^1 of knife switches so that various coils may be inserted.

14,162. Garbe, H. July 3.

Thermostats.—In a feedwater regulator and water gauge combined in one fitting B, the extending body A of the thermostatic device opens a valve F whereby steam under pressure, which normally maintains the feed water valve closed, escapes into the atmosphere, the feed valve then opening and supplying water to the boiler. A tube C surrounding the expanding rod A is filled with water or steam according to the level of water in the boiler.

FIG.2.



14,302. Marsh, J. July 6.

Heating by steam circulation. — In steam cooking and like apparatus, a lid or cover without a fitting rim, formed, for example, of sheet tin wired as shown in Fig. 1 and adapted to cover any one of a number of vessels having level tops such as saucepans, cups, basins, &c., is provided with a nozzle a adapted to fit the spout of a kettle or a nozzle b adapted to engage the end of a steam-supply pipe. In order to steam articles in several vessels simultaneously, a distributing-device having any suitable number of branches may be used, as illustrated in Fig. 3.

FIG.1.

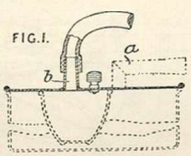
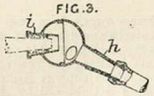


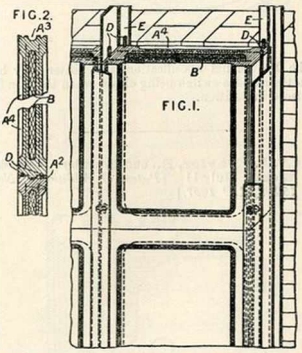
FIG.3.



The connecting-tube may have a handle and may be rigid or flexible, and if of india-rubber may have a helix of wire inside or outside. The end thimbles may be similar to the parts h, i, Fig. 3. Flexible metal tubing may be used with rubber tapered-metal, or screw connexions for the ends The nozzle a, Fig. 1, serves also to remove the lid when the kettle to which it is connected is lifted.

14,528. Henry, J. July 8.

FIG.2.



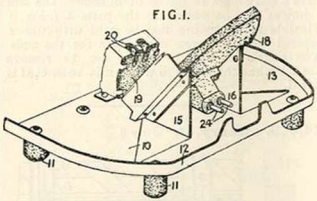
Non-conducting coverings. — A heat-insulating casing for boilers, furnaces, superheaters, &c. is formed of reinforced concrete, fireclay, slag, or other slabs, having cores B of non-conducting material. The slabs may be formed with internal air spaces in place of, or in addition to, the non-conducting cores, and they may be formed with recesses A^4, as shown. The slabs are held in position by projections and grooves A^2, A^3 formed in their edges. Packing-material D is provided at the edges to ensure air-tight jointing. In some cases, the joints may be stiffened by metal framework E.

14,537. British Thomson-Houston Co., [*General Electric Co.*]. July 8.

Heating by electricity.—A stand for a flat-iron or other device containing an electric heater is made with an inclined portion arranged so that when the iron is placed thereon the circuit is closed automatically by the engagement of contacts on the iron and stand. The inclined portion 18 may be of soapstone, or porcelain, supported by angle-pieces 15, 16 on a metal base 10, which has insulating supports 11, and a rim 12; two fixed clips 20, which receive studs on the iron, are

arranged in a block 19 of insulating material, and connected with terminal pins 24. According to

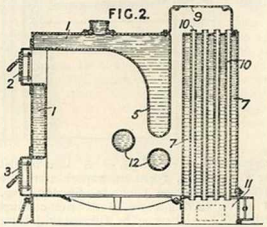
FIG.1.



the Provisional Specification, the heater may be in the stand, a switch being closed when the iron is placed in position.

14,728. Naylor, S., and **Lumby, Son, & Wood.** July 11. [*Patent of Addition to No. 15,892, A.D. 1907.*]

FIG.2.



Heating water.—In the type of boiler described in Specification No. 15,392, A.D. 1907, in which there are front and back water spaces, a pendent water space, cross water-tubes, and a water-containing bridge, the bridge and the back water space are combined to form one back water space which is traversed by vertical smoke tubes, access to which is obtained by means of a detachable cover. The boiler, which is preferably rectangular, has upper and lower fire-doors 2, 3, a front water space 1, pendent water space 5 and, if desired, cross water-tubes 12. The back water space 7 forms a bridge and is traversed by vertical smoke tubes 10, over which is mounted a detachable cover 9 to provide access to the tubes. The hot gases pass down through the tubes 10 to the smoke-box 11. The boiler may have an outer casing of brick-work, in which case additional flues may be formed at the back and sides between the casing and the shell.

14,817. Fuller, G., and **Fuller, L.** July 13.

FIG.7.

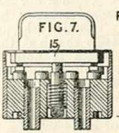
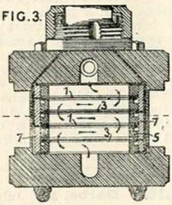


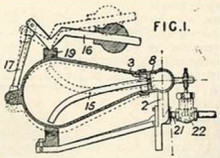
FIG.3.



Heating water.—Water is heated by passing between electrodes 1, 3, Fig. 3, between which an electric current is passed, the direction of the current being reversed each time the heater is used in order to prevent deposit from settling on the electrodes. The electrodes are thin sheets of platinum, the edges of which are secured between rings or frames 5 or in slotted plates of insulating-material in a casing 7. In the form shown, the electrodes are horizontal, and are provided with openings out of line to cause the water to take a circuitous path. Otherwise the electrodes may be vertical sheets without openings. Alternate electrodes are connected to fixed studs of a reversing-switch, Fig. 7, intermediate fixed studs are connected to the supply conductors, and connexion is made by two spring-pressed contact-bars carried by the switch bar 15, which is also spring-pressed. Vertical faces on the contact-bars permit the switch bar to be turned in only one direction.

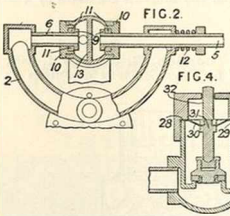
14,842. Littlefield, F. A. July 13.

FIG.1.



Steam traps.—In a trap of the type in which a counterbalanced receiver is filled with condensed water and then tilted to open a discharge valve, the joints between the receiver and inlet and outlet pipes which support it are arranged so that the packing is tightened by steam pressure and by a spring, so that wear is automatically taken up. The discharge valve has a diaphragm to check the movement of the receiver, and a counterbalanced lever and supporting-link are arranged so that the movement tending to lower and discharge the receiver increases rapidly with a small movement

of the latter. The trap may be used for discharging liquid from steam or compressed air. The receiver 3, Fig. 1, has a head 8 divided into two parts by a partition 13, Fig. 2, one part connecting the



inlet pipe 5 to the receiver, and the other connecting a discharge pipe 15 in the receiver with an outlet pipe 6. A hollow support 2 is U-shaped as shown, and carries a pipe 21 connected with a discharge valve 22 so that water passes from the outlet pipe 6, through one arm of the support to the valve. The inner ends of the inlet and outlet pipes have flanges which are forced by steam pressure and by a spring 12, against packing 11. The discharge valve 22 has a diaphragm 30, Fig. 4, secured at its outer edge between the upper edge 29 of the casing, and a shoulder 28 on a screwed cap, and is clamped at the middle between the upper and lower sections 31, 32 of a valve stem, thereby preventing leakage. The elasticity of the diaphragm checks the movement of the receiver in its extreme positions. A counterbalanced lever 16 has a V-shaped bend 19 forming the fulcrum, and its shorter arm is connected by a link 17 with the receiver.

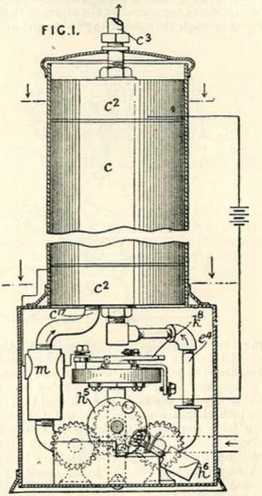
15,100. Kathe, J. July 16.

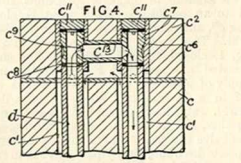
Non-conducting compositions.—Artificial stone, mortar, plaster, and the like are rendered waterproof and non-conducting towards heat, electricity, and sound by adding a watery emulsion of argilliferous and bituminous substances; in place of these fats, oils, tallow, or soaps may be employed. The bituminous substance may be mixed with fats, oils, rubber, resin, sulphur, chalk, cork, sawdust, mica, metallic oxides, flints, slag, or tufaceous stones.

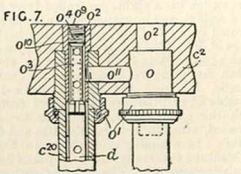
15,338. Deller, W. July 20. *Drawings to Specification.*

Non-conducting coverings.—A vacuum chamber surrounds a steam-boiler or steam-pipe to intercept the radiation and heat therefrom. A valve and vacuum gauge are provided to regulate and indicate the state of the vacuum.

15,376. Rains, E. I. July 20.



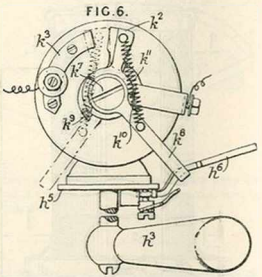




Heating water.—In an electric water-heater of the type described in Specification No. 23,801, A.D. 1907, carbon or other conducting-tubes *d*, heated by the passage of current, are placed in

chambers c^1 in a porcelain or other insulating body c, Figs. 1 and 4, or in insulating-tubes c^{50}, Fig. 7, and are connected at the ends, so that water passing through the conducting-tubes and chambers

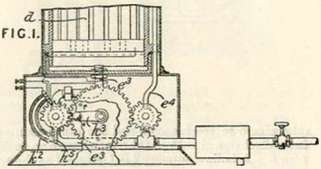
FIG.6.



come into contact with both sides of the conducting-tubes; a switch is controlled by the handle regulating the supply of water to the heater and to a by-pass. The conducting-tubes d, Fig. 4, project beyond the body at each end into caps c^2, in which they are secured by water-tight joints. Each joint consists of a sleeve c^6, into which is screwed a bushing c^7 provided with ports c^9 admitting water to a screwed sleeve c^{13} connected with an adjacent tube, the tubes being connected alternately at the top and bottom in this way, so that water circulates inside and outside the tubes in the same or in opposite directions, and is then led to an outlet c^3. Each joint is closed by a plug c^{11}, and lead washers c^5 make the joint water-tight. The heater has an automatic switch m, Fig. 1, closed by the water, and a snap-switch operated by a handle h^3, Fig. 6, which controls the supply of water to the heater through a pipe c^{17}, and to a by-pass e^4. When the handle is first turned, water flows through the heater and by-pass together, and as the movement continues the by-pass valve is closed. If the handle is moved in the opposite direction, the by-pass valve alone is opened. The switch has a spring-controlled lever h^6, carried by a hub h^5, and engaging with a rocking arm k^8, pivoted on a spindle k^7 and moving between two stops k^9, k^{10}. The arm is connected by a spring k^{11} with a contact-arm k^2 also pivoted on the spindle. When the spring has passed over the centre of the spindle, it closes the contact against a fixed member k^3, and the lever is released from contact with the rocking arm, and when the handle is reversed, it again engages the arm and opens the switch. In a modification shown in Fig. 7, each carbon tube is arranged inside a porcelain or other insulating-tube c^{50}. The joint at each end of the tubes has a sleeve o, which is moulded in an end block c^2 and is arranged to receive a stuffing-box o^1. A second sleeve o^2 is screwed into the lower sleeve o, and has slots for centring the carbon tube in the outer tube, the slots also forming passages for water. A bushing o^3 has an enlarged upper end o^4, which is screwed into the upper sleeve o^2, so that the bushing makes electric contact with the end of the tube. The bushing is closed by a screwed plug o^5, and the tubes are connected by a screwed pipe o^{11}.

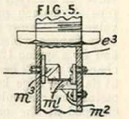
15,377. Condon, E. J. Nov. 1, 1906, [*date applied for under Section 91 of Patents &c. Act, 1907*].

FIG.1.



Heating water.—An electric water-heater of the type described in Specification No. 23,801, A.D. 1907, in which water passes through and around carbon tubes d fixed between headers, has an automatic circuit-closer, Fig. 5, operated by the flow of water, in series with a hand-operated switch, Fig. 1, arranged so that the electric circuit is not closed unless water is flowing through the heater. The circuit-closer, Fig. 5, consists of a movable contact m^1, normally resting against an insulated stop m^2, but engaging with a contact m^3 when water flows up a supply pipe e^3. A handle h^3, Fig. 1, regulating the supply of water to the heater or to a by-pass e^4, also operates a switch h^5 through toothed wheels, the switch having two blades which engage with two pairs of curved contacts h^3.

FIG.5.



15,497. Richardson, E. H. July 21.

Thermostats; heating by electricity.—Relates to a thermally-operated fusible device for thermostats &c. Figs. 1, 2, and 3 show the application of the device to the electric heating-apparatus of a laundry iron in order to cut off the current when the temperature becomes too high. A pair of heating-units 3 are provided, each comprising a cord 4 wound with resistance wire 5, the two coils of wire being tied together at the front end and connected to binding-posts 6 at the rear. A receptacle 21, projecting rearwards from

FIG.5.

FIG.4.

a wedge-shaped head 22, contains a fusible material 25, such as lead, and is closed at the rear end by a plug 24, through which passes a shaft 26 shouldered at 26^a and carrying a pair of blades 27, Figs. 1 and 5.

FIG. 1.

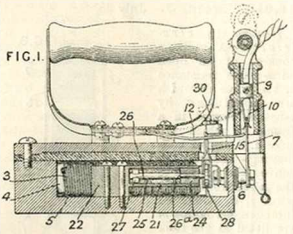


FIG. 2.

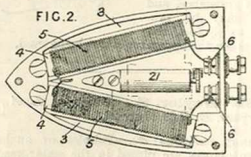
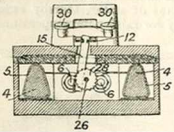


FIG. 3.

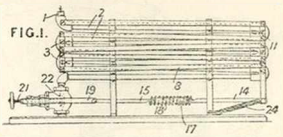


On the rear end of the shaft 26 is fixed a ratchet-wheel 28, normally engaged by a pawl 15, Figs. 1, 3, and 4, provided with notches 19 engaging a slot in a flat spring 12. When the lead 25 melts or softens, the spring 12 rotates the shaft 26 through the medium of the pawl 15 and ratchet-wheel 28, the pawl being thus released from the ratchet; a switch plug 9 is thus forced upwards, thereby withdrawing clips 10 from terminal-blades 7 connected to the binding posts 6, and thus breaking the circuit. When the lead has hardened, the device can be reset by depressing push-buttons 30 mounted on the spring 12.

15,690. Duffy, F. July 27, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Steam-traps are formed by a number of inclined pipes 2, connected at their adjacent ends by U-shaped elbows 3, provided with bosses on which are pivoted levers 11 joined together in series by links 8, so as to magnify the expansion of the pipes and close a valve 22. One end of the first link is fixed to an inlet pipe and the last link is in

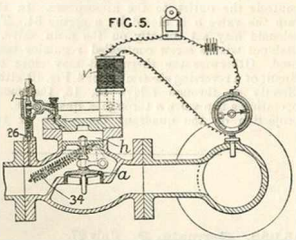
FIG. 1.



two parts 14, 15, the adjacent ends of which are connected by a spring 18 and slide inside a sleeve 17, thus preventing excessive pressure on the valve. The valve is adjustably connected by a screw 21 and yoke 19 to the link 15. A spring 24 tends to open the valve.

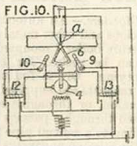
15,788. Paterson, W. July 24.

FIG. 5.



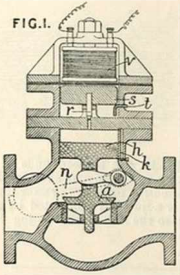
Thermostats.—A thermostat, for controlling the temperature of superheated steam by supplying saturated steam to it through a by-pass valve, closes the circuit of a solenoid, which actuates the valve either directly or through a pilot valve; the thermostat may close the circuit of a reversing electric motor, which actuates a flap valve and reverses when the temperature falls to a certain minimum. In the form shown in Fig. 1, a solenoid *v* lifts a block of iron *s* carrying a pilot valve *r*, which allows steam to escape from one side of a piston *h* to the atmosphere through an outlet *t*, the piston being then raised by pressure of steam to open a valve *a*. When the pilot valve is closed, steam leaking past the piston through a

FIG. 10.



port *k* balances the piston, and the valve is closed by a weighted lever *n*. In order to reduce the loss of steam, the arrangement shown in Fig. 5 may be used, in which the solenoid operates two

FIG. 1.

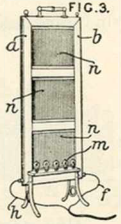


valves 26, 27, one controlling the supply of steam to the upper side of the piston, while the other 27 controls the outlet to the atmosphere. In this case the valve *a* is closed by a spring 34. The solenoid may act directly on the main valve, a dash-pot with a screw controlled regulator being used. Otherwise the thermostat may close the circuit of a reversing electric motor 4, Fig. 10, either directly or through relays 12, 13, the motor operating a flap valve *a* through a quadrant 6. A projection on the quadrant opens one of two switches 9, 10 when the valve is fully open. A brake may be applied to the motor.

15,816. Held, J. July 25.

Heating by electricity.—A radiator consists of an open wire-gauze resistance *n*, the wires of which are insulated by asbestos, carried in a frame of which the sides *a*, *b* are of conducting material to convey the current to the gauze from supply wires *f*, *h*. Coloured incandescent lamps *m* are fitted at the back of the resistance, and doors may be provided to protect the gauze when the apparatus is not being used.

FIG. 3.

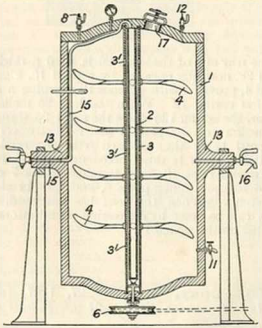


15,881. Naylor, S., [*Ricordeau, L. A.*, and *Liegard, E. H.*]. July 27.

Heating buildings &c.—Pebbles or analogous hard substances are placed in the water space of hot-water radiators or in hot-water pipes to reduce the amount of water, thereby reducing the time necessary for raising its temperature.

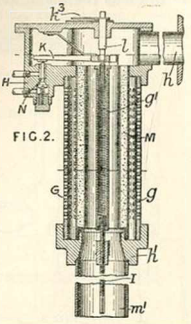
15,956. Germain, P. July 27.

Digesters.—An autoclave for use in extracting precious and other metals from ores consists of a pressure-boiler 1 mounted on trunnions 13 so that it can be rocked for convenience in filling and emptying. Ore is fed through a manhole 17, and the reagents are supplied through a pipe 16 in one trunnion, or through a separate pipe 8. Steam is passed through a passage 15 in the other trunnion leading to a central pipe 2, and the hollow shaft 3 of the stirring-apparatus, which is mounted about the pipe 2, is provided with holes 3^1 so that the materials may come in contact with the steam-pipe 2. The shaft 3 is rotated by a pulley 6, and carries stirring-arms 4. A draw-off tap 11, and a pipe 12 for leading off gas are fitted.



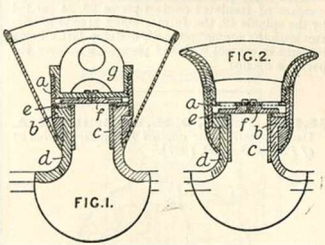
16,279 Lake, W. E., [*Buffalo Forge Co.*]. July 31.

Thermostats.—A definite relation between the temperatures of two media is maintained by a regulating device mechanically operated by the difference in thermal expansion of two tubes g, g^1, one within the other, the outer tube being exposed to one medium, and the inner tube to the other medium, which flows through an intervening non-conductive tube M from an inlet h to an outlet m^1. The outer tube g is screwed into a support H, and carries at its free end a coupling h^1, to which the inner tube g^1 is secured adjustably by a screw I, screwing into both the coupling and the inner tube. The connexion I may have a different coefficient of expansion from that of the inner tube. The tube g^1 can be turned for adjustment on the screw by a shaft l with a squared end provided with a pointer l^3. A lever K rests on knife-edges on the tube g^1 and casing H, and operates a valve N, which may regulate a supply of compressed air to a motor for moving dampers in two air passages leading from the interior and exterior of a building to a fan and humidifier. In this application of the apparatus, the outer tube g is exposed in the building, while air from the humidifier is passed through the tube M. In a modification, the inner tube g^1 is covered with absorbent material, the upper part of which extends from a water reservoir; the intervening tube is left open at the lower end, within the outer tube, so that air can be drawn through perforations in the outer tube and then over the inner wet tube.



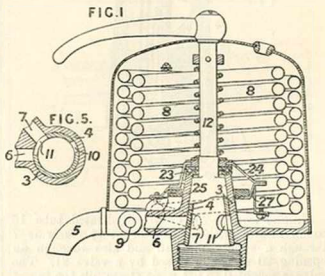
16,424. Cross, A. H. Aug. 4.

Hot-water bags and the like.—Relates to the necks, stoppers, and valves of hot-water bottles, beds, pillows, and like receptacles for liquids. As shown in Fig. 1, the neck d is provided with a flange b and is sprung into a collar a and clamped by means of a split cylinder c, which is roughened on the surface in contact with the neck d to prevent slipping. A valve plate f is loosely attached to the base of a stopper g, so that, when the valve touches its seat, it is tightened without rotation and consequent grinding of its seat. The valve seat consists of a rubber washer e attached to the flange b by rubber solution. In the modification shown in Fig. 2, the stopper is hollow forming a funnel and its base is provided with holes for the passage of liquid. The parts of the valve may be made of brass, aluminium, vulcanite, &c., and the exposed parts are covered with rubber.



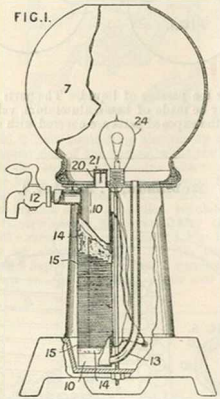
16,451. Robinson, F. A. Aug. 4.

Heating water.—Relates to apparatus, whereby water can be drawn off hot or cold or at any intermediate temperature, of the kind wherein a two-way valve controls two passages, one being unheated through which cold water can be drawn off, and the other passage being electrically heated so that, when the valve is operated to draw off hot or warm water, the water passes wholly or in part through the said heated passage on its way from the supply to the outlet, the electric circuit heating the aforesaid passage being completed by the operation of the valve so that only when heated water is required is the current switched on. The improvement comprises a particular construction of apparatus based on these principles. The hollow plug 4 of the



valve has two ports 10, 11, and the casing 3 has two passages 6, 7, the latter leading through the coil 8, around which the electrical resistance is wound, to the passage 9 and outlet 5. The switch consists of insulated contact-pieces 23, 24 carried by the spindle 12, the former being always in contact with the contact-piece 25, and the latter being brought in contact with the piece 27 whenever the port 7 is opened.

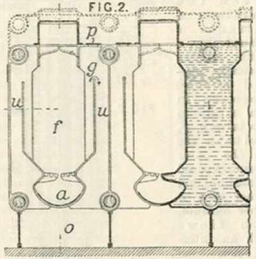
16,496. Fiddes, O. H., and **Seifke, H. A.** Dec. 18, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

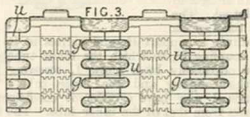


Heating water.—An electrically-heated tube 10 communicates with a glass or other reservoir 7 through a supply pipe 13 and also through an opening 20 normally closed by a valve 21. The valve is weighted to lift when steam fills the top of the tube. The tube is fitted with a delivery tap 12. On the tube is openly coiled a high-resistance heating-coil 15, insulated by mica 14. A coloured or plain lamp 24, connected in parallel with the coil 15, is fitted in the reservoir to indicate when the heater is in operation.

16,613. Tornack, M. Sept. 21, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

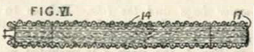
Heating water.—A sectional boiler consists of a number of rows of sections *g*, which are so formed and arranged that each two adjacent rows enclose a combustion chamber *f*, and rows of sections and furnace spaces succeed one another alternatively along the length of the boiler. Each section *g* is provided with ribs which, when the sections are





assembled in the usual way, form the sides of the flue passages *u* between the water spaces in the sections. The combustion products may enter the flues *u* from both sides of the combustion chamber, or, as shown in the middle sections of the boiler, Fig. 2, they may enter the flues from one side only of the combustion chamber. The products pass downwards through the flues *u* and enter large exhaust flues *o*, which open into a common uptake. Apertures which are closed by covers *p* are provided at the top of the boiler to afford access to the flues. In a modification, the ash chambers *a* are arranged in the flues *o* instead of being placed above them, as shown.

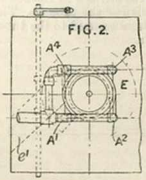
16,796. Mattison, R van S. Aug. 10.

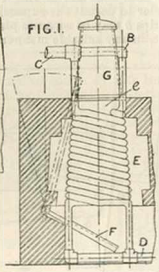


Non-conducting coverings.—A mattress or non-conducting covering for locomotives is formed of outer layers 14 of asbestos textile fabric and inner layers 17 of asbestos fibre felt, which consists of fibrous asbestos cemented together sufficiently to keep the layers in shape while at the same time

enclosing a considerable amount of air in the interstices. The textile fabric may have metallic wire interwoven with the asbestos thread. The edges of the fabric are sewn together to enclose the layers of fibre, and the whole is further solidified by quilting. Metallic bands or asbestos tapes hold the mattress in position upon the boiler.

16,856. Mycock, W. Aug. 11.

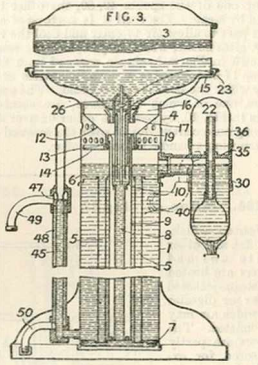


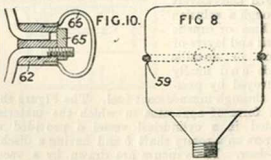


Heating water.—Relates to the type of hot-water boilers in which tubular spiral coils are built into the interior of a furnace, and consists in winding two or more coils together to give a greater pitch, thus accelerating the circulation. The coils are connected to headers. Figs. 1 and 2 show four tubes A^1, A^2, A^3, A^4 wound together and connected to bottom and top headers B provided with an inlet D and outlet C respectively. The boiler is built into a furnace having a flue E surrounding the coil. A passage *e* connects the chamber within the coil with the flue E, and the products of combustion pass away through a flue e^1. A vertical partition may be placed at one side of the flue E to cause the gases to pass completely round the outer surface of the coil. The furnace is provided with a fuel reservoir G and a swivelling grate F. The tubes may be arranged to form the bars of the grate.

17,052. Forbes, J. S. Aug. 13.

Heating liquids.—The Figures show a compact modification of the apparatus described in Specification No. 26,342, A.D. 1898, whereby in the heating and sterilizing of milk, water, and other liquids, the initial supply of cold liquid is insulated from the heat exchange, and the cold liquid container may be readily removed; other modifications are made. A casing 1 mounted on a base supports a shell 4, from the bottom plate 6 of which depend tubes 5 entering a common chamber 7 at the bottom of the casing. A central tube 8 conducts cold liquid from a receptacle 3 at the top of the casing to the chamber 7, from which it rises through the tubes 5 to the shell 4. The tube 8 is surrounded by a sleeve 9, which is soldered to the chamber 7



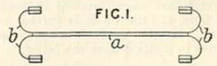


and at its upper end passes through the tube plate 6, being connected by a short sleeve 10 to the tube 8. Within the shell 4, a funnel-shaped member 12 supports the receptacle 3 and has a tubular part 13, encircling the sleeve 10 and carrying a plate 14 which forms a cover to the shell 4; the receptacle 3 rests on a seat 15 on the member 12. The liquid is fed through a valved outlet 16 carried by a screwed cap 17 fitted over the end of the receptacle and carrying an outlet tube 19, having a sleeve with an aperture 22 allowing air to escape at the upper end. The outlet has a valve 23 on a stem the lower end of which is normally pressed upwards by the top of the tube 8, while when the vessel 3 is raised a spring 26 presses the valve on its seat. The liquid passing down to the bottom of the apparatus and rising again to the shell 4 is led into a heater 30 divided by an horizontal partition 35, through which passes a vertical tube 36 flared at the bottom. On being heated in the vessel 30, it

rises through the tube 36 and passes by a tube 40 to the casing, wherein it surrounds and heats the tubes 5. The liquid escapes by a pipe 45 which is surrounded by a sleeve 48 and is perforated at the part 47 to provide an outlet and also at the top to prevent siphoning; after filling the sleeve, it passes out by one of the spouts 49, 50, the other being closed by a cap. The shell 4 is perforated at its upper part to allow air to enter and cool the vessel 3. A glass bottle, which may replace the vessel 3, is shown in Fig. 8, having a screwed neck fitting the cap 17 and a groove in which lie wires or rods 59 by which the bottle may be lifted. The ends of a wire, one of which is screwed, are secured as shown in Fig. 10, by passing a collar 62 over them, screwing an eccentric nut 65 over the screwed end, and screwing a handle 66 on the collar.

17,223. Gin, G. H. Aug. 15. [*Patent of Addition to No. 4550, A.D. 1907.*]

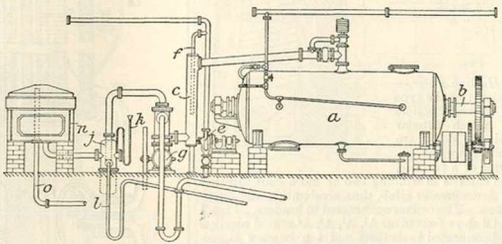
FIG.1.



Heating by electricity.—In the electrically heated tubes or channels described in Specification No. 4550, A.D. 1907, for gassing yarns, the straightness of the tubes &c. *a* is maintained by splitting one or both ends and curving the strips *b* so formed in order to permit the expansion of the tube &c. The strips *b* may be separate pieces secured to the tubes &c. in any suitable manner.

17,284. Milne, J. Aug. 17.

Digesters.—Fish, fish offal, and other waste animal matters are heated in a steam-jacketed drier or digester into which air may be admitted. The vapours are partly condensed, for example by a water spray, and are passed successively through a solution of lime or caustic alkali and layers of lime or metallic oxide and finally destroyed by passing through incandescent fuel. The Figure shows one form of apparatus in which the material is heated in a cylindrical vessel *a* provided with stirrers on a rotary shaft *b* and having a discharging-door. The vapours are drawn by a vacuum pump *g* through a pipe into a chamber *c*, where they meet water sprayed through a pipe *f* by means of a centrifugal pump *e*. The pump *g* discharges the impure water into a sewer and forces the gases through a pipe into a vessel *j* containing lime-water or other alkaline liquid which is renewed through a siphon *k*, the spent liquor escaping through a pipe *l* to the sewer. The gases pass to a purifier *n*, in which lime, metallic oxide, or like purifying-agent is spread on trays, and finally escape through a pipe *o* to a furnace.



17,340. Phillips, W. A., and **Bacon, F. R.** Aug. 18.

Heating by electricity.—A refractory non-conductor is impregnated with a metal or metallic compound so that the degree of saturation diminishes from the outside towards the centre, the material so formed being applicable for electric heaters &c. Fire-clay is mixed with a binder such as Portland cement or other calcium compound, to which porcelain clay, alumina, silica, and compounds of calcium, aluminium, magnesium and carbon may be added, and is baked to vitrification with or without an internal metal network or sheet for strength. The non-conductor thus formed is treated with molten volatilized or powdered metal or metallic compounds, such as a mixture of lead and iron sulphides, to which copper or tin may be added separately or together. The conducting-material may be iron, lead, copper, tin, zinc, &c., either pure or as alloys or as oxides, sulphides, phosphides, tellurides, solenides, arsenides, &c., and it may be applied by immersing the refractory non-conductor in the liquid and heating until the metal or compound is absorbed by the non-conductor or the non-conductor may be surrounded by metallic powder and heated. The outer portion only of the non-conductor may be impregnated with the metallic conductor, leaving a non conducting core.

17,687. Pheysey, R. G. Aug. 22, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*]. *No Patent granted (Seating fee not paid).*

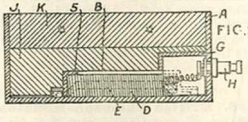
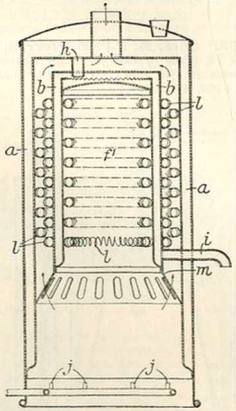


FIG. 1.

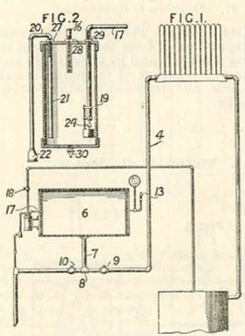
Heating by electricity.—In an electrically-heated apparatus, such as a smoothing-iron or stove, the heating-coils D are held with the ends of their cores E in contact with an outer thin metal casing A by a sheet-metal housing B, which, with a shield G for the connexions and terminals H, fits into recesses in a block J of heat-insulating material, such as asbestos, held in position by a lid K which, in the case of an iron, is made heavy. As shown, the housing B consists of two parts connected at one end by an integral cross-piece 5, and at the other end by the shield G, the ends of each part being formed to receive the bent over ends of the cores E.

17,697. Barralet, T. E. Aug. 22.



Heating water.—In geysers of the kind in which the heating passages or flues contain heat-conductors in the form of spirals or coils of wire, these are arranged so as to touch only one wall of each passage or flue. The walls are preferably grooved to receive the coils. The geyser consists of an outer water-space *a* which communicates through a passage *h* with an inner water-space *b* provided with an outlet *i*. The gases from the burners *j* pass up between the water-spaces *a* and *b* and also into the inner space *f* [1]. The gas passages contain heat-conductors *l* of coiled-metal strip so arranged that each coil touches only one wall of the passage. The axes of the coils may be arranged in the direction of the flow of the gases. A perforated plate *m* which may be replaced by separate strips is arranged to conduct fluid of condensation from the heated surfaces to the inner wall of the outer water-space to protect the flame. The geyser may be rectangular or of any other form.

17,743. Tillinghast, W. E. Aug. 24.



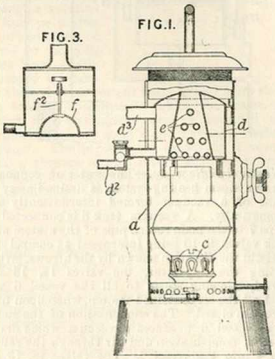
Heating buildings &c.—The water of condensation in a steam heating-system is drained away by means of a vacuum formed intermittently and automatically. A vacuum tank 6 is connected by a pipe 7 to the main return pipe of the system at 8, check valves 9, 10 being interposed to compel discharge in the direction shown by the arrows. When starting the apparatus, the valves 18, 13 are opened, allowing steam to fill the vessel 6 and expel all the air contained therein, whereupon both valves are closed. The condensation of the steam in the vessel 6 produces a vacuum which draws water of condensation and air through the return pipe 1 into the vessel 6. The valves 18, 13 are then re-opened and the action repeated until the system is freed from air. After this the vacuum is created automatically and intermittently by means of the device shown in Fig. 2, which communicate with the vessel 6 by means of the pipe 17. On admitting steam to the chamber 19 the thermostatic valve 22 at the end of the longer leg

of the siphon 20 is closed. Water of condensation collects in the chamber 19 until it raises the float valve 24 and cuts off the supply of steam to the tank 6 through the pipe 17. Water continues to rise in the chamber 19 until the siphon is started. By this time, the valve 22 has opened again owing to cooling, so that the water in the chamber 19 is siphoned off and the valve 24 falls and allows steam to pass to the vessel 6, where it is condensed and creates a vacuum. The cycle of operations is then repeated. The nuts 27, 28, 29 serve to adjust the pipes 21, 16, 17 and thus determine the intermittency. In low-pressure systems, the thermostatic valve 21 is connected to the return pipe of the system. The system may be quickened at any time by opening the pet-cock 30 to drain the chamber 19 and allow steam to pass into the vessel 6.

17,978. Crossley, W. J., and **Rigby, T.** Aug. 27. *Drawings to Specification.*

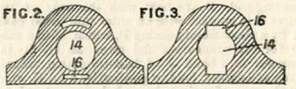
Heating liquids.— The alkali liquor used for absorbing acetic acid from the gas evolved in producer-gas plants is heated by means of the said gas, previous to the passage of the latter through the first washer, and immediately after leaving the superheater.

18,383. Haigh, T. C. Sept. 2.



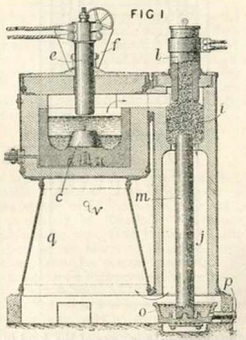
Heating water.—In order to prevent freezing in the water-jackets of engines, particularly those used for motor road vehicles, a heater, which may be portable and detachable or may form part of the ordinary circulating system, is arranged to circulate hot water through the jackets and the radiator. The heater, shown in Fig. 1, consists of a burner c, for oil or gas, and a water chamber d with an inlet pipe d^2 and an outlet d^3, the whole being enclosed in a casing a. Water-tubes e may be provided in the path of the hot gases. In an alternative form of heaters shown in Fig. 3, circulation is promoted by a cup f situated immediately over the lamp and adapted to rise and force a small piston on its stem f^2 into the pipe d^3.

18,458. British Thomson-Houston Co., [*General Electric Co.*]. Sept. 2. *No Patent granted.* (*Sealing fee not paid*).



Heating by electricity.—In order to distribute heat equally over a heating-surface and to prevent conduction of heat to parts not required to be heated, parts of the metallic body of a heater are made of lower conductivity than the remainder; Figs. 2 and 3 represent sections of flat-irons provided with spaces 16 for the purpose. In Fig. 2, the metallic body surrounds and is in good thermal contact with a heating-unit placed in a space 14.

18,653. Côte, E. F., and **Pierron, P. R.** Feb. 12, [*date applied for under Section 91 of Patents &c. Act, 1907*]. [*Patent of Addition to No. 5100, A.D. 1907.*]



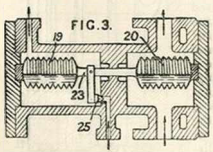
Heating by electricity. — An electrically-heated condenser j for obtaining molten zinc, as described

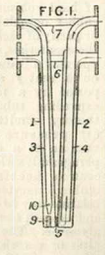
in Specification No. 5100, A.D. 1907, is provided with an electrically-heated basin *o*, in which the condensed zinc is collected and maintained molten to refine it. The condenser may be heated by a resistance rod *m*, which is of increased resistance towards the bottom, or by a refractory tube with carbon blocks at the ends packed with powdered carbon, or by a pile of carbon discs. At its lower end the rod *m* rests in the collecting-basin *o*, with which contact is made by the zinc, sufficient heat being generated to keep the zinc molten. The Specification in the original form, as open to inspection under Section 91 (3) (*a*), comprises also a condenser either (1) consisting of two concentric cylinders separated by pounded carbon forming a heating resistance, or (2) having a resistive lining of graphite and clay, or (3) of ovoid form heated by an arc in the middle. This subject-matter does not appear in the Complete Specification as accepted.

18,730. Parvillée, A. Sept. 9, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*]. *Drawings to Specification.*

Non-conducting compositions.—To prevent the casings of pottery ovens and kilns from being disjointed or deformed by expansion or contraction and to render them sufficiently air-tight to prevent the passage of cold air, the outer walls are formed of armoured concrete, and a non-conducting and slightly compressible material is interposed between the walls and the refractory lining of the kiln. This material consists of a mixture of iron dross or clinkers with sandy clay and is compressed within the spaces between the lining and the outer wall.

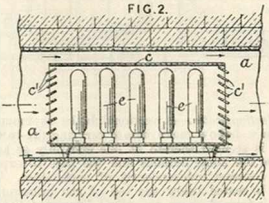
18,734. Pollard, F. Feb. 11, [*date applied for under Section 91 of Patents &c. Act, 1907*].





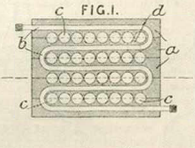
Thermostats.—The supply of liquefied gas to a refrigerator in a refrigerating machine is controlled thermostatically to meet the varying conditions obtained in working. The control is obtained by utilizing the differential expansion of two devices, one of which is situated in the gas at its entrance into and the other at its outlet from the refrigerator. Two forms are shown. In that shown in Fig. 1, two expansible tubes 1, 2 are held together by rigid pieces 5, 6, 7. Liquefied gas before entering the refrigerator flows through an inner tube 3 and the tube 1, and after leaving through an inner tube 4 and the tube 2. The difference in temperature of the two outer tubes causes alteration in their position, while the inner ones, being free at the ends, preserve their original positions. A pad 9 attached to the outer tube 1 then permits sufficient liquefied gas to flow through the refrigerator. A by-pass 10 is made in the tube 3 to permit the operation to start. In the form shown in Fig. 3, the gas passes elastic capsules 19, 20 containing expansive or volatile substances; a bar 23 carrying a valve 25, connects the capsules. The thermostatic devices may otherwise be expansible rods with levers or other magnifying-appliances.

18,735. Lyon, T. G. Sept. 7.



Heating air; heating by electricity.—Heating-devices *e* situated in ventilating-shafts *a* are provided with casings *c* of non-metallic, non-inflammable material which are so supported that air passages exist all round the casings. Louvers *c'*, made of similar material to the casing, may be fitted at the ends of the casing to prevent radiation of heat. The heating-devices *e* may be electric lamps.

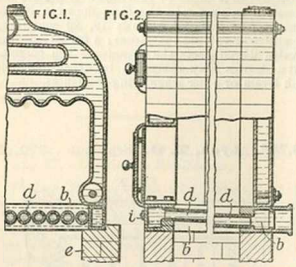
18,773. Friedenthal, H. Sept. 7.



Heating-apparatus.—In surface-apparatus of the type in which a block of metal is cast around a sinuous pipe, the holes between the convolutions are drilled closely together so that the metal which

remains forms ribs on the pipe. A block of metal *a* is cast round the sinuous pipe *b* which conveys the liquid, gas, or vapour to be treated or cooled, and holes *c* for the passage of the heating or cooling medium are drilled so as to leave ribs *d*.

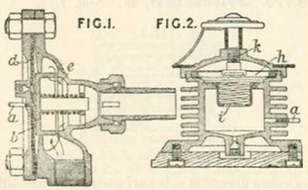
18,828. Cotton, S. A. Sept. 8.



Heating water.—A sectional boiler is mounted upon a hollow metal base *b* carrying fire-bars *d*, and is secured thereto at one end only so as to allow the boiler sections and the base to expand and contract independently of each other. The base is seated below the top of the brickwork *e*, and is formed so as to extend downwards around the fire-bars. The base may consist of two parts connected by hollow fire-bars, the two parts supporting the front and rear sections of the boiler. A removable plate *i* is provided at the front of the base to afford access to the fire-bars.

[Reference has been directed under Section 7 of Patents &c. Act, 1907, to Specifications No. 493, A.D. 1865, and No. 161, A.D. 1880.]

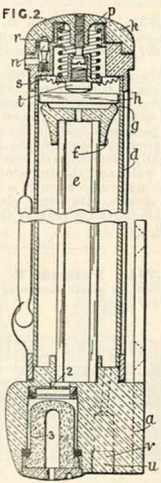
18,945. Segesváry, E. Sept. 9.



Thermostats.—An expansible liquid such as ether is contained in a closed chamber, Fig. 2, exposed to the temperature to be regulated. On expansion of the ether, a small quantity is forced through a pipe *a* into an expansible capsule *d*, Fig. 1, heated by the steam or other heating-medium employed, where it vaporizes and presses out a diaphragm *b*, thus closing a valve *e* controlling the supply of the heating-medium. A piston may replace the diaphragm *b*. The expansible and volatilizable fluids may be different, a diaphragm separating them; the liquid forced into the chamber *d* must have a boiling-point lower than the temperature of the heating-medium. The chamber, Fig. 2, containing the expansive liquid, has one side formed by a diaphragm *h*, which is adjusted for any temperature by a screw *k* and spring *i*.

18,969. Taylor, W., Atkinson, R. E., and **Nesbit, D. M.** Sept. 9.

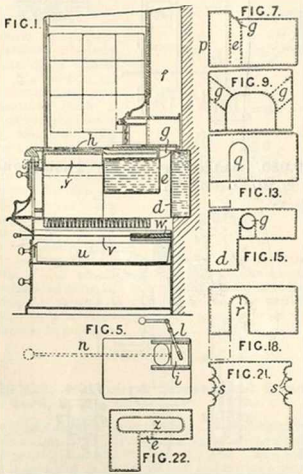
Thermostats.—The expansion member in apparatus for controlling temperature or humidity is made comparatively rigid, and may be affected by both temperature and moisture, or by moisture only. When affected by temperature it preferably has a dull black surface. In the particular construction of apparatus described, for controlling the condition of the air in ships, trains, or rooms, an expansion tube *d* is made of hard vulcanized rubber or gelatine or partly of each of these materials, and operates a valve *h* on a seat *f* supported by a non-expanding tube *e*, thereby admitting air pressure or vacuum to a diaphragm valve which controls heating,



cooling, moistening, or drying apparatus. The gelatine may be treated with bichromate of potash and exposed to light, and may also contain salts or glycerine. The non-expanding tube *e* may be of glass or porcelain; the valve seat *f* has a sharp edge *g* on which dust cannot collect. A glass valve disk *h* is normally kept in contact with the seat *f* by a screw stud *t* at the middle of a diaphragm *s* and a spring *r*; the downward movement of the stud *t* is limited by a screw *p* in a cap *k*, which can

be turned to set the valve for any degree of temperature or humidity, and is locked by a spring bolt *n*. A base *a* supporting the two tubes has two ports, one connecting the interior of the inner tube *e* with a diaphragm chamber of a regulating-valve of the type described in Specifications Nos. 27,687 and 27,777, A.D. 1904, and No. 9400, A.D. 1908, the other port connecting the space between the tubes *e*, *d* with a vacuum pump. Air can pass into the tube *e* through a filter 3 and a small vertical hole 2 with a sharp edge. When the valve *h* is closed, air leaks into the tube *e* and the diaphragm chamber of the regulating-valve, which opens and admits steam to radiators, or controls the supply of steam for moistening air. When the valve *h* is opened, the vacuum pump draws air from the diaphragm chamber faster than it is supplied through the small hole, the regulating-valve being thus closed.

18,979. Parker, J. Sept. 10.

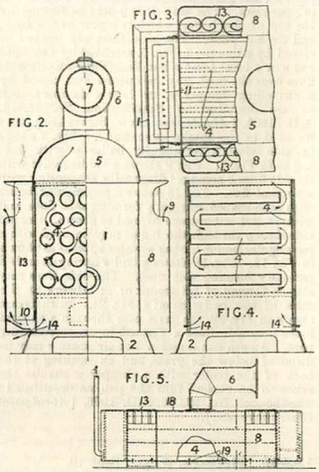


Heating water.—Flues controlled by dampers are formed in connexion with the boilers of cooking-ranges and domestic fire-places so that the gases may pass through ducts in the boiler before passing to the oven but when they are passed direct to the oven the boiler is still adequately heated. Fig. 1 shows a saddle or like shaped boiler, with the grate continued under the boiler so that the fire burns within its arch. A water space *d* is formed at the back, and there are also provided a vertical duct *e* and side flues *g* which lead the gases over and around the oven or ovens and beneath the top plate *h*; the gases may be utilized for other heating purposes. The side flues *g* may be formed by the top of the boiler, which is higher at the back, and the hot plate. The side flues are opened or closed by a damper *i*, Fig. 5, actuated by a straight rod *n* or a lever *l* and a handle. The ordinary side flues over the oven may be opened and closed by a swivelling damper *y*, or louver dampers such as are described in Specification No. 28,713, A.D. 1903, [*Abridgment Class* Stoves &c.], may be used in the uptake oven flue *f*. Fig. 7 shows in side view a rectangular boiler *p* with flues *e*, *g* as in Fig. 1. Fig. 9 shows a saddle boiler with its side flues *g* arranged diagonally, dispensing with a vertical flue. Fig. 13 shows a rectangular boiler with arch-shaped recesses *q* forming side flues and with an end water space formed as shown. Curved side flues *g* through the boiler may be used with a rectangular boiler having a water space *d* as shown in Fig. 15. Fig. 18 shows a boiler having an arched passage *r* forming side flues. The side flues may also be formed of brickwork or metalwork at the sides of the boiler as at *s*, Fig. 21. In the form shown in Fig. 22, the gases pass through a vertical flue *e* into side flues *z* formed in an overhanging part. An ash-pan *u* and a hot-air space *v* may be disposed below the grate, and an opening at the back of the boiler with a damper *w* enables the ashes to be pushed into the pan as described in Specification No. 24,006, A.D. 1906, [*Abridgment Class* Stoves &c.].

18,986. Sellars, J. C. Sept. 10.

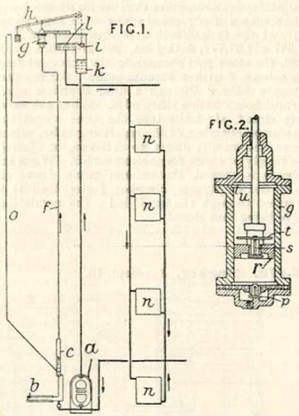
Heating air.—Air-heating apparatus of the type consisting of a casing traversed by flame tubes or the like is fitted with air 'inductors' as described in Specification No. 10,004, A.D. 1905. Fig. 2 shows an apparatus consisting of tubes 4 traversing an air space formed by a casing 1. Air enters the casing through the apertures 14, to which it is conducted by the air inductors 13. The inductors, which are shown in sectional plan in Fig. 3, are placed in side casings 8 with open upper ends 9, and deflectors 10 conduct the air to the apertures 14 leading into the body of the apparatus. The apparatus is heated by a burner 11, and stands on a base 2. The heated air is collected by a removable hood 5, to which is connected a swivel elbow 6 containing a damper 7. In a modification, large flattened tubes 4, Fig. 4, are fitted, the air circulating as shown. In another modification, the tubes 4 are set in a cylindrical casing 18, Fig. 5, at the ends of which the casings 8 containing the inductors are placed. Air enters through the casings 8, and also through apertures 19 in the lower part of the casing 18 and between the casings 8. A cement or cement paint consisting of silicate of soda, or of a mixture of silicate of soda and ground flint, with or without Portland cement, is used for making the joints between the tubes and the tube-plates and for coating the surfaces of the apparatus. According to the Provisional Specification, the apparatus is useful for heating offices,

dwellings, ships, horticultural and like structures, and for dry-air baths.

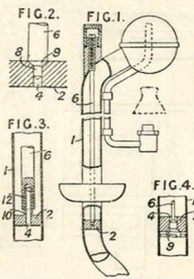


19,023. Segesváry, E. Sept. 10.

Heating buildings &c.—The water in a hot-water heating-system is kept circulating at a high speed by means of a pump which comes into operation automatically when the pressure in the generator supplying it is equal to the pressure due to the head of water in the system. A pipe *f* supplies steam to a cylinder *g*, the piston-rod of which is connected to a lever *h*, which has a bucket *i* at the other end. As water is raised from a vessel *k* by the bucket, a projection on the edge of the feed-vessel *l* engages with the bucket and causes the water to be tipped into the vessel *l*, whence it flows to the hot-water boiler *a* and heating-coil *b* by way of radiators *n*. Steam generated in the coil *b* passes into the space *c*, which is connected to the hot-water system by the safety pipe *o*. The exhaust from the pump passes to the expansion vessel *k* where it condenses. The steam pump is shown in Fig. 2. Steam passes through the valve *p* into the cylinder *g* and raises the piston *r*. Before the end of the stroke, the spring *t* of the exhaust valve *s* engages with a projection *u* and is opened by the further movement of the piston. The sudden rush of steam closes the inlet valve. By the downward movement of the piston the two valves are brought in contact, first closing the exhaust valve, and then opening the inlet valve by the continued downward movement of the piston.



19,050. Ahlsell, F. L., and **Thompson, L. O. T.** Sept. 10.



Thermostats.—Thermostatic valves for vapour burners for illuminating or heating are constructed that relative movements between the valves and their seats during preheating do not occasion the opening of the valves until the vaporizers attain a temperature high enough for thorough vaporization of the fuel. The valve rod 6 is screwed or otherwise adjustably secured at its upper end within the vaporizing-tube 1 and, as shown in

Fig. 2, its lower end may be made conical as at 9 with a diminished cylindrical extension 8 fitting tightly within a countersunk hole 4 in the valve seat 2, which forms a partition across the tube. The end of the valve rod 6 may be equal to or larger than the upper part of the rod in diameter and may have the conical portion 9 below the seat 2, when the materials for the rod and tube having been suitably selected with regard to their coefficients of expansion, the relative motion is oppositely directed as shown in Fig. 4. In the form shown in Fig. 3, the valve rod is tubular at its lower end and fits tightly over a tube 10 and may have perforations 12. In all forms the amount of initial relative movement between the valve and seat necessary for the opening of the valve may be adjusted by screwing the valve rod 6 or otherwise.

19,119. Laycock, W. E. Sept. 11.

Steam-traps.—In a steam-trap applicable for use on steam heating-apparatus for railway carriages, a capsule c^1 is placed in an horizontal casing c provided with a hinged dished cover h, which is closed by a fly-nut i^1 and bolt i and has a number of perforations j for the escape of water. The capsule c^1 arranged at the bottom of a downtake pipe b leading from a drain-pipe a, and rests on ribs g^1 and an adjustable stud k on the hinged perforated cover h. A vulcanized fibre or other ring f is secured to the bottom of the vertical pipe by a screwed cap e. A spring g holds the capsule in position.

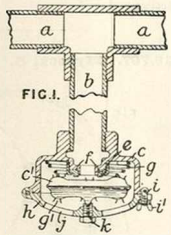


FIG.1.

19,226. Holden & Brooke, and **Shepherd, J. P.** Sept. 12.

Steam-traps.—Water enters a float-actuated steam-trap by a tube m which extends into a tube d passing centrally through the float. The tube d is extended at its lower end, and carries a valve g closing the outlet of the trap. Openings are provided in the sides of this extension to permit the water to flow into the casing a. A weighted lever p may be provided to counterbalance the float, the inner end of the lever being bifurcated and carrying knife-edges engaging a plate on the end of the tube d. Guides s, t prevent displacement of the lever. Small openings to permit the escape of air are provided in the tube m.

(*For Figure see next column.*)

19,226.

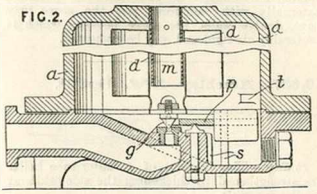


FIG.2.

19,333. Bastian, C. O. Sept. 15.

Heating by electricity.—A heating-resistance, consisting of a thin rod, wire or ribbon closely wound into a helix or zigzag &c., is removably enclosed in or supported by a narrow thin tube or rod A of quartz, or of a substance possessing similar properties, and is run at a high temperature. The weight of the containing-tube A should not exceed 0·15 grammes per watt and is preferably less than 0·025 grammes per watt, while the total weight of the resistance wire and tube should not exceed 0·225 grammes per watt and is preferably less than 0·05 grammes per watt. The tube A should not exceed $\frac{1}{8}$ inch in bore; it may be open or closed at the ends, and may be exhausted. The resistance may be of silver, nickel, iron, tantalum, gold, tungsten, copper, thorium, silicon, or carbon, or of carbides, compounds, mixtures, or alloys of these; or it may be of silver-plated wire. The ends of the tube A are provided with nickel or other metallic terminals C, clamped over a sleeve D of asbestos &c. and having a comparatively large radiating-surface, and these may be adapted to fit into spring clips E. The terminals may be of blade form fitting corresponding clips. The resistance unit may be bent to a circular, horseshoe, or other shape, and the resistance wire may be wound outside the tube or on a quartz disk. Several resistance units may be arranged preferably horizontally, in a stove and may be connected in series or in parallel. According to the Provisional Specification, the temperature may be regulated by switching the heater or heaters in or out of circuit at intervals, either by hand, or automatically by a time switch, thermostat, &c.; one or more of the tubes or rods on or in which the resistances are located may be arranged within a larger tube and fixed by radial wire supports &c.; the resistance may be steadied or anchored in the tube; the tube containing the resistance may be sealed and exhausted or filled with hydrogen or other gas or with mercury vapour; the leading-in conductors may be of copper ribbon, as described in Specification No. 22,911, A.D. 1906, [*Abridgment Class* Electric lamps &c.], when an air-tight seal is

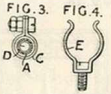


FIG.3. FIG.4.

required; the tube may be of kaolin, fireclay, Jena combustion glass, &c., and may be provided externally with radiators; and the stove may have double walls, the space between which is preferably air-tight and may be evacuated.

19,637. Hinchley, J. W. Sept. 18.

FIG.5.

Boilers.—The headers of a water-tube boiler are strengthened by thickening the side walls at regular intervals.

19,665. Bell, G. G., and **Pletts, J. St. V.** Sept. 18.

FIG.1.

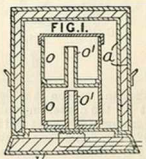


FIG.4.

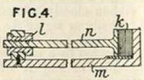
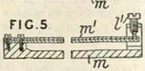
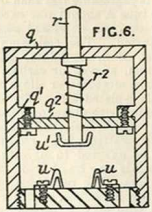


FIG.5



Heating by electricity; thermostats.—An oven comprises a fixed base and hollow counterpoised cover, both heat-insulating, an electric heater enclosed in the base, a thermostat, and a switch actuated by the edge of the cover so that the heater is only in circuit when the oven is closed. The walls may be of badly-conducting material sheathed internally and externally with metal *a*, Fig. 1; or they may form a vacuum jacket, the internal and external surfaces being polished or silvered. The heater is of the resistance, hysteresis, or induced-current type, or of any combination of these. The thermostat is enclosed, with the heater, in the sheathing of the base *b*, and is either a variable resistance or a cut-out. The variable resistance consists of carbon plates *k*, Fig. 4, granulated carbon, or the like, compressed between the bent end of a plate *m* and a disk on the end of a rod *n*, which has a smaller coefficient of heat expansion than the plate, and screws through an insulator *l* secured to the plate. This resistance is connected in series with the heater. The thermal cut-out comprises a bi-metallic strip m^1, Fig. 5, secured at

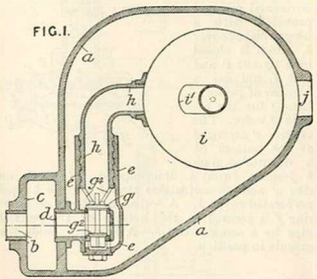
FIG.6.



one end to a base *m* and carrying at the other end a contact which normally rests against a screw l^1. The heater may be in two sections, one of low resistance for rapidly heating up the oven, and the other of high resistance for maintaining the required temperature. The two sections may be in parallel, with the cut-out in the low-resistance branch, or in series, with the cut-out as a short-circuit across the high-resistance section. The switch for opening the circuit when the cover is raised is shown in Fig. 6. A box *q* on the base of the oven has internal projections q^1, to which is attached a plate q^2; a rod *r* sliding through this plate and the top of the box carries a bridging-contact u^1. A spring r^2 bearing against a collar on the rod holds the contact u^1 away from contacts *u* except when the projecting end of the rod *r* is depressed by the lower edge of the cover. Cords and counterweights for two ovens may be contained within a hollow cross-bar and pillars. Cooking-vessels *o* may be placed one above another, the steam spaces being interconnected by pipes o^1. According to the Provisional Specification, the invention is applicable to ovens heated by chemical action.

19,707. Mycock, S. Sept. 19.

FIG.1.

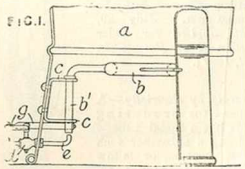


Steam-traps.—A trap, wherein the fall of a float caused by entrance into it of water standing in a tank opens the drainage valve by means of a quick-threaded screw or a cam, is fitted with a double-beat drainage valve, the two parts of which are of different diameters. A full-way passage is thus procured through the valve and the trap. Fig. 1 shows one construction in plan. The ball *i*, which has a small water inlet at the bottom, and a large outlet pipe i^1 floats in water in an open tank *a*, provided with an inlet *b* and an outlet *j*. The inlet *b* is closed by a double-beat valve, the two parts of which g^1, g^2 are of different diameters, and which is held on its seat by bars g^4 extending from the end of a pipe *h*, which supports the ball *i* and leads into it. The pipe *h* is provided with a steep screw-thread which screws into a similar

thread on the interior of the valve casing *e*. When the ball sinks through water entering from the tank, the valve is opened, and water of condensation flows through the inlet *b*, a sediment chamber *c*, gauze *d*, the valve, the ball, and the outlet f^1 into the tank. When steam enters, the ball rises and closes the valve.

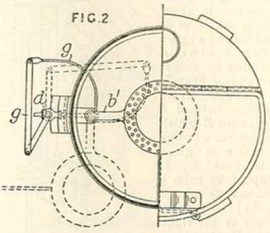
19,754. Mudd, J. *March 22, 1909.*

FIG.1.



Boiling-pans.—The gas burner *b* of a boiler such as is fitted in wash-houses, lavatories, &c. is drawn from beneath the boiler for the purpose of igniting the gas or reducing the flame. The gas-inlet end b^1 of the burner is pivoted in the bracket *c* and gas from the supply jet *e* is delivered into its open

FIG.2



end; a gas-tight joint for the swivelling burner is thus unnecessary. The burner is connected by rods *g* with the gas tap *d*.

20,356. Brennan, W. J. April 9, [*date applied for under Section 91 of Patents &c. Act, 1907*].

FIG.2

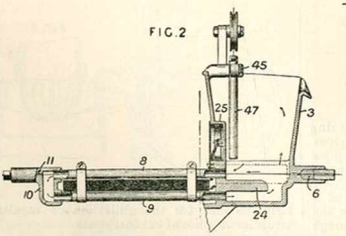
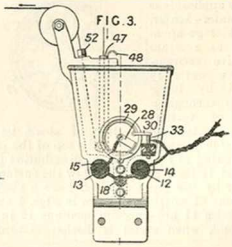


FIG.3.



Heating by electricity; thermostats.—A wax-pot for a boot-sole sewing-machine is heated by three electric heating-coils 12, 18. Two are placed in recesses 13 in the base of the wax-pot and the remaining one is placed between the pipes 8, 9. They are connected in series, and in order to keep the temperature of the wax constant a thermostat switch is inserted in the circuit. The thermostat comprises a curved plate 29 integral with a fixed arm 28, a contact plate 30 on the free end of the plate 29, and an insulated adjustable contact pin 33. When the temperature rises beyond that required, the plate 29, in expanding, lifts the contact plate 30 from the pin 33, and the electric circuit is broken. When the temperature has been sufficiently reduced, the contact is renewed. The thermostat is placed in a recess 25 in the walls of the wax-pot.

20,370. Kestner, P. Sept. 30, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Steam-traps.—In apparatus in which a liquid is alternately admitted to and discharged from a closed chamber by steam, an interior float Y is connected to an exterior balance I by a wire Z which passes over a pulley R; this is fitted with pins K, L adapted to raise a hammer Q which, in falling alternately to the right and left, operates a three way cock. The Specification in the original form, as open to inspection under Section 91 (3) (*a*), comprises also a modification in which this three-way cock may drain a steam-pipe; this subject-matter does not appear in the Complete Specification as accepted.

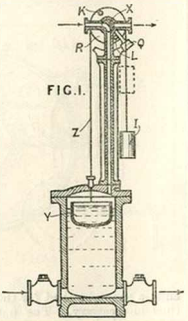


FIG. 1.

20,496. Kunstwerkzeuge Ges. Schule Reimann. July 29, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Heating by electricity.—A pen used for producing designs has a metal tube *a* containing a substance such as wax, stearine, or tallow which is melted by a resistance, not shown.

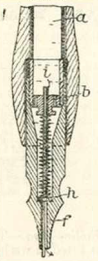


FIG. 1.

20,711. Morison, D. B. *May 5.*

Heating water.—In apparatus applicable as a feedwater-heater, thermal storage apparatus, or as a steam regenerative accumulator, the water is circulated by being drawn up through a plurality of vertical pipes by the inductive action of steam issuing from suitable jets arranged at the top of the pipes. Steam entering at *f* passes to the distribution pipes 2, 3, 4 and is then led just below the surface of the water by the pipes 5, which have a star-like arrangement of nozzles as shown in Figs. 4 and 5. These nozzles 11 are opposite openings 12 in the pipes 9, and, when steam is discharged through them, an upward current of water is induced which serves to equalize the temperature in the containing vessel. The apparatus is more particularly designed for the utilization of regular or irregular supplies of exhaust steam.

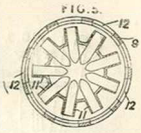


FIG. 3.

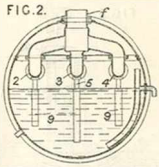


FIG. 2.

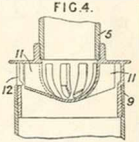


FIG. 4.

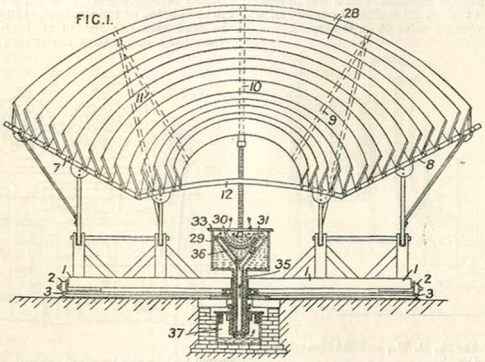
20,902. Williams, W. G. Oct. 3.

Solar heat, utilizing.—Curved lengths 28 of mirrors of parabolic cross-section are mounted upon a frame comprising bars 7, 8, 9, 10, 11, 12 rigidly connected together and to an underframe 1, which is adapted to run upon the wheels 2 around a circular track 3 to allow for the apparent movement of the sun. The mirrors are preferably arranged concentrically or one behind the other and with their reflecting-surface underneath so as to focus the sun's rays upon the hearth. The hearth, when used for extracting precious metals from their ores, comprises a tank 29 for holding water and a crucible 30 supported in an iron or other basin 31 lined with magnesia. A cover 33 with an aperture for the rays is provided. Pipes 36, 35, all water-jacketed, form the conduits along which the metallic vapours &c. are withdrawn to be finally condensed in a chamber 37 provided with suitable baffles. An exhaust fan provides the necessary current of air through the condenser. The apparatus may be used in the manufacture of calcium carbide and certain nitrates, and in the distillation of oils.

(*For Figure see next page.*)

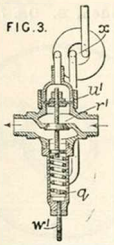
20,902.

FIG. 1.



20,921. Nobel, E., and **Bessonoff, S.** Oct. 3.

FIG. 3.



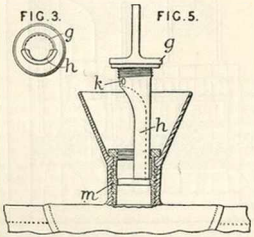
Thermostats &c.—A thermostatic apparatus for regulating the admission of cold feed liquid to a heater comprises a spiral tube x containing ethyl or methyl alcohol, the expansion of which consequent on a rise of temperature depresses a rubber diaphragm u^1 and thus opens a lift valve r^1 on the liquid supply pipe. The temperature at which the valve opens is regulated by adjusting the compression of a spring q by means of a screw spindle w^1.

20,923. Roberts, F. Oct. 5.

Hot-water bottles.—Stoppers for hot-water bottles are formed with an extension arranged to guide the liquid into the bottle and to serve as an air outlet. The extension h of the stopper g is of the semi-tubular shape shown in Fig. 3, the concave side serving to guide the liquid into the bottle. The extension is hollow and is provided with an air outlet hole k. The lower end of the extension

FIG. 3.

FIG. 5.

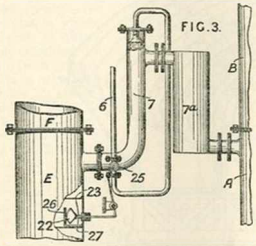


is expanded to engage with a ridge m in the bottle-neck, so that the stopper is held in the raised position while the bottle is being filled.

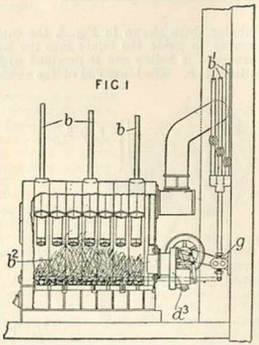
21,068. Slavicek, V. Oct. 6.

Thermostats &c.—In a distilling-apparatus, the flow of the liquid through a pipe 6 is regulated by a thermostatic device placed in the rectifying-column E, F, and comprising a capsule 22 containing a suitable liquid and abutting on a bracket 26,

so that the expansion consequent on a rise of temperature pushes the rod 23 against the action of a spring 27 and opens a valve 25 on the pipe 6.



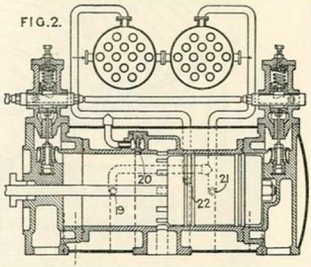
21,123. Bassett, C. T., and **Richardson, J A. V.** Oct. 7.



Heating by water circulation ; heating buildings.—Water is caused to circulate in a system of pipes b, b^1 by a pump or the like g, actuated by a hot-air engine d^3 driven by the heat or hot gases from a water-heating or other furnace b^2. The furnace is used to heat the water to be circulated when the apparatus forms part of a hot-water heating installation.

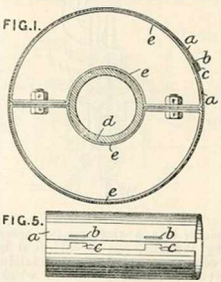
21,174. Stumpf, J. *April 15.*

Heating by steam circulation.—In a terminal exhaust steam-engine, steam withdrawn from the cylinder through check valves 19, 20, 21, 22 before the completion of the stroke is utilized for heating the feed-water, or for other heating purposes. When used for heating feed-water, the water is



heated first by the terminal exhaust, then by steam from the valves 20, 22, and finally by steam from the valves 19, 21.

21,176. Bowden, E. Oct. 7.

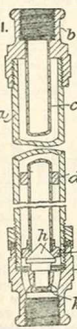


Non-conducting coverings.—A sheet-metal casing a for holding a non-conducting covering upon a pipe is provided with tongues c along one edge, which pass through slots b in the other edge and are bent over as shown to secure the edges together. The casing is supported concentrically upon the pipe by means of distance-pieces e made of bent metal strips bolted together. Each distance-piece e is bent to the form of half an annular disk, the inner and outer radii of which are equal to the radii of the pipe d and casing a respectively. The free ends of the distance-piece e may overlap as

shown, or the strip may be shorter so as only partly to embrace the pipe *d*. The lagging around the flanges of the pipe is kept in place by means of two semi-cylindrical boxes having interfitting eyes through which pins pass. The ends of the boxes have semicircular notches which fit around the pipe.

21,275. Plummer, W. E., Kermode, W. M., and **Plummer, C. St. C.** Oct. 8.

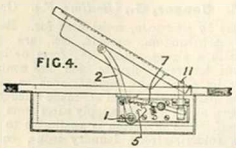
FIG.1.



Steam-traps.—A brass expansion tube *c*, fixed at one end in a casting *b*, carries a valve seating *e* and collars *d*, which make sliding fit with and prevent access of steam to an outer iron tube *a*. A conical valve *h* is mounted in a bridge-piece in a casting *f*, and is held by a nut *k* but is free to rotate under the action of the escaping fluid. According to the Provisional Specification, the outer tube may be replaced by a suitable rigid structure.

21,458. Jardine, H. H. Oct. 10.

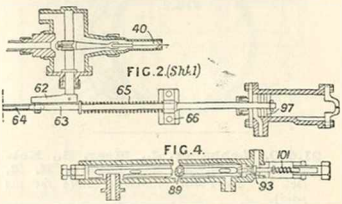
FIG.4.



Foot-warmers.—A foot-warmer, or a foot-rest carrying a foot-warmer, is hinged so as to turn down flush with the floor of a vehicle and is operated by one or more arms 2 mounted on a shaft 1, which is rotated by springs thereon when a lever catch 7 is released by the pressure of the foot on a push-pin 11. The foot-rest &c. is held in the inclined or folded-down positions by the catch 7, which engages the teeth of a quadrant 5 on the shaft 1.

21,476. Duggan, C. R. *April 18.*

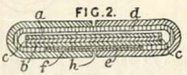
Thermostats.—If the temperature of the steam in a flash boiler rises normally, a hollow perforated tube 89 placed in its path to the engine expands, and by lifting a valve 93 permits steam to press down a piston 97, thus shutting off the gas by a needle valve 40. If the pressure rises unduly, the



spring 101 governing the valve 93 yields and the same operations occur. The heel block 66 is movable and hand-controlled, so that, by moving it against the spring 65, the automatic action of the spring 97 can be cut out, and the fuel supply increased, or by moving it with the spring, the fire can be cut off. Specification No. 8648, A.D. 1908, [*Abridgment Class* Stoves &c.], is referred to.

21,493. Cooper, G., [*Boelling, F.*]. Oct. 10.

FIG.2.

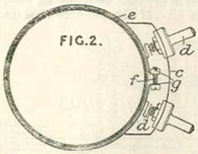


Heating by electricity.—A resistance for heating and cooking apparatus consists of a layer of metal *e* painted on a strip of mica *a*, or of wire wound on mica or asbestos; the resistance is covered by a sheet of mica *b*, and both are almost enclosed by a plate *d*. Between the two edges of the plate *d* is placed a plate *e* covered with a layer of asbestos *h*. The whole is enclosed in two U-shaped metal plates *f*, applied with high pressure so as to clamp the resistance firmly. The ends of the resistance project to make electric connexions, and the cover-plates may be extended and provided with holes for attachment purposes.

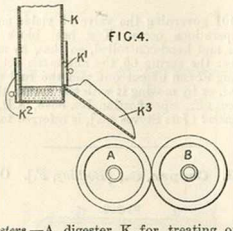
21,494. Cooper, G., [*Boelling, F.*]. Oct. 10.

Heating by electricity.—A resistance is held directly around the lower part of a cooking-vessel by a metal band *e*, which covers the resistance and is drawn tight by bolts *f*. A box *c*, soldered to the vessel, carries terminals *d* which press against springs connected with the resistance. If the vessel becomes overheated, the solder melts and the circuit is opened. The resistance may consist of metallic layers on mica plates, or of round or

flat wire. The wire may be wound directly on the vessel, without an intervening plate.



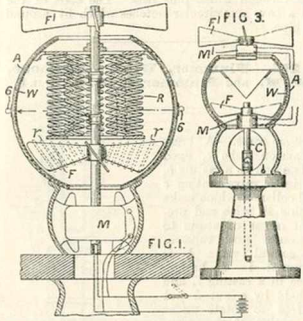
21,630. Lehbauer, J., Mear, S., Hollinshead, E. W., and **Moody, H. E.** Oct. 13. *No Patent granted (Sealing fee not paid).*



Digesters.—A digester K for treating offal in the production of manure is provided with a discharge aperture K^1 which does not reach quite to the bottom, so that a space is left into which stones, pieces of iron, &c. will sink. Pipes with delivery nozzles all pointing towards a second door K^2 admit steam or other pressure fluid at intervals to force out the residue.

21,645. Kyle, A. I. D. April 14, [*date applied for under Section 91 of Patents &c. Act, 1907*].

Heating air.—Air is forced through a heater contained in a casing by one fan, and is withdrawn and dispersed by another fan, which may or may not be mounted upon the same shaft. In one form the heater consists of resistance coils R mounted within a casing A, which may have a non-



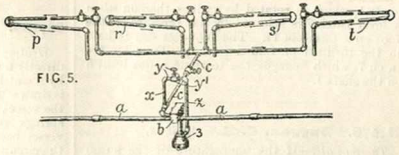
conducting lining W. The fan F, arranged below the heater, forces the air through the heater and the upper fan F^1 disperses the heated air. Heating-coils *r* may be wound upon the blades of the fans. The fans may be driven by the same motor M or by separate motors M, M^1 as shown in Fig. 3. In this case the heater is in the form of an inverted cone which is heated by a Bunsen burner C. The casing A may be of an ornamental character, and may carry electric lights 6.

21,756. Cooper, G., [*Boelling, F.*]. Oct. 14.

Heating by electricity, resistances for. Bars of carbon, carborundum, carbide, &c., are placed together in a zigzag, spiral, &c., form or in the shapes of letters or figures, and are connected together by a resistant cement, such as silicon. The end bars of the chain are made thicker than the others, to prevent the supply wires from being melted off. The invention is applicable to cigar-lighters, soldering-irons, laundry irons, cooking-vessels, and other heating-apparatus.

22,096. Gold, E. H. Oct. 19.

Heating by steam circulation.—The radiators of a heating-system are divided into several sections, the steam supply to any section being continuous and independent of the working of the other sections. Thermostatic means actuated by the exhaust from a loop, which may be a radiator, control the steam supply from the train-pipe and reduce its pressure before admission to the radiators. In the arrangement shown in Fig. 5, steam from the train-pipe *a* passes to the controlling-

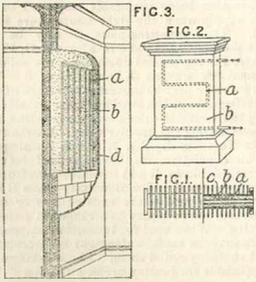


device *b*. A pipe *c* leads steam from the low-pressure chamber of the controlling-device *b* to the radiators *p*, *r*, *s*, *t*, which are open to the atmosphere. Steam from the loop *x*, *y*, *z* passes through the restricted opening in the valve y^1 to the thermostat chamber 3 and so causes the thermostat to operate. In a modification, a regulable spring-loaded valve is placed in the controlling-loop so that, in starting the system, steam first blows through until the pressure in the radiators reaches that for which the valve was set. The valve then opens and steam is admitted to the thermostat. In a further modification, the exhaust from a radiator causes the operation of the thermostat.

22,118. Lang, A. Oct. 21, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

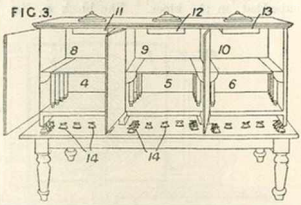
Heating gases and liquids.—Relates to heating by exothermic reaction in a closed space as described in Specification No. 4580, A.D. 1904. A mixture of iron filings and sulphur, made into a cake or briquette, is brought to combustion temperature at one point and placed in a tube or receptacle which is then closed and placed in the gaseous or liquid material to be heated. The combustion propagates itself throughout the cake or briquette.

22,222. Jachimowitz, W. Oct. 20.

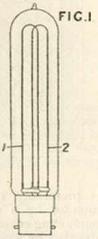


Heating buildings.—Radiators are formed by embedding steam or hot-water pipes in a heat-retaining concrete of cement and sand, or cement, lime, and rubble. As shown in Fig. 1, a ribbed or smooth covering *c* may be provided for the concrete *b* around the pipe *a*. Modifications are illustrated in Figs. 2 and 3, of which Fig. 3 shows a wall radiator in which the steam pipe *a* is covered by bricks *d* bedded in the concrete *b*. The radiators may be faced externally with tiles, terra-cotta, or papier mâché.

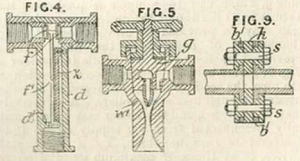
22,551. Coiseur, F. March 27, [*date applied for under Section 91 of Patents &c. Act, 1907*].



Heating by electricity; heating water.—An incandescent lamp for heating or cooking purposes has U-shaped metallized carbon filaments 1, 2 mounted in series in a tubular bulb, the filaments being of such dimensions as to be brought to a red heat only. The filaments are made by depositing on carbon, a metal which is a bad conductor. In Fig. 3 a range is shown in which these lamps are used. It consists of three ovens 4, 5, 6 above which are plate-warming chambers 8, 9, 10, and the cover of the range carries three heaters 11, 12, 13, the circuits of the lamps being controlled by switches 14. The lamps may also be used in food-warmers, heaters for curling-tongs, and radiators, nickelled reflectors being used if required. In an arrangement for heating a kettle, a number of lamps are placed inside a metal basin the bottom of which is perforated for the circulation of air. The Specification in the original form, as open to inspection under Section 91 (3) (*a*), comprises the use of filaments having a coating of german silver; this subject matter does not appear in the Complete Specification as accepted.

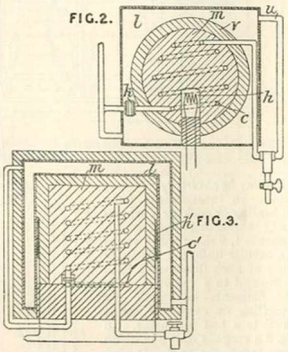


22,598. Bell, G. G., and **Pletts, J. St. V.** Oct. 24.



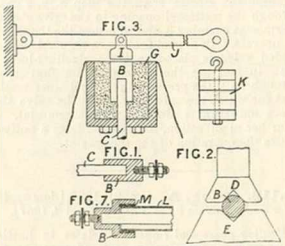
Heating water; thermostats; heat storing apparatus.—A block of iron or other substance

capable of storing heat is heated electrically, and the heat is given up when required to water, which may be passed through a coil of pipe embedded in the block. The block *m*, Fig. 2,



is preferably of spherical shape, and is surrounded by a vacuum chamber or by a non-conducting covering *v*, any heat which escapes being absorbed by water in an outer tank *l*. The block is heated by a resistance h_1, or may form the secondary of a primary winding h^1, Fig. 3, in which case it is made cylindrical in shape. The water pipe may be corrugated, and in the arrangement shown in Fig. 3 the lowest convolution c^1 is removable. The number of convolutions in use may be varied by means of a tubular plug having a number of holes admitting water to separate convolutions. The hot water or steam produced may be mixed with cold water by means of an injector which draws cold water from a separate tank, or by means of a thermostat controlling the supply through pipes *u* in which a rod f^1, Fig. 4, carrying two valves *f* is pivoted to a projection d^1 on an outlet pipe *d* and is connected with a rod *z* which expands less than the outlet pipe. The mixing may also be effected by means of a cock which has a tapered plug *g*, Fig. 5, carrying a nipple w^1 projecting into a constricted portion of the outlet pipe. A steam trap may be provided to prevent loss of steam. Conduction of heat along the water pipe is prevented by means of an insulating-washer *k*, Fig. 9, placed between flanges b^1 on two sections of the pipe, the sections being held together by bolts *s* passing through insulating-collars. A safety-valve may be provided, and the heater may be automatically disconnected from the supply circuit if the temperature rises too high, by a thermostatic switch, or at times of maximum demand on the circuit, for instance by means of an electro-magnetic switch acting when the voltage falls a predetermined amount.

22,627. Cooper, G., and Sharp, F. C. Oct. 24.

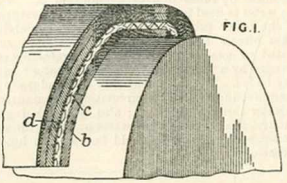


Heating by electricity.—Metal connecting-pieces are compressed while in a plastic state around the ends of a rod of refractory resistance material, such as silundum, the preparation of which is described in Specification No. 6693, A.D. 1905, [*Abridgment Class* Acids, alkalies, &c.], and allowed to cool under pressure. The connecting-pieces B may be of wrought iron compressed around the end of the rod *c* by jaws D, E, Fig. 2, pressed together by screw, cam, hydraulic, or other means. The metal piece B may be heated in a fire or by a blowpipe, or electrically by connecting the jaws D, E to the terminals of a welding-transformer, a time-limit circuit-breaker being preferably employed to cut off the supply when the right temperature is attained. The connecting-piece B may be cast around the end of the rod *c* in a mould G, Fig. 3, a plunger I being pressed down upon the solidifying metal by weights K on a lever J. The resistance rod *c* may be protected by a tube of fire-clay having enlarged ends which form moulds for casting the terminal pieces, and a protection may be placed outside the fire-clay tube. Alternatively a protecting-tube L, Fig. 7, having openings to allow air circulation, may be supported between the terminal blocks B and insulated therefrom by mica or asbestos M. The connecting-pieces B may be arranged to receive the ends of two or more rods, so that the rods may be arranged in series or in parallel. When used for immersion heaters, the contacts may be made water-tight by arranging a suitable housing round them. The resistances are also applicable for heating ovens, grills, &c.

22,628. Dawson, E. W. Oct. 24.

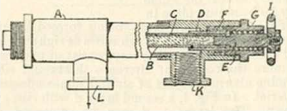
Non-conducting coverings and compositions.—A heat-insulator for boilers &c. comprises a layer *b* of a composition consisting of asbestic No. 1, 30 parts, soot 30 parts, sawdust 5 parts, hair 1 part, rye flour 20 parts, blue clay 2 parts, and water together with a second layer consisting of soot 50 parts, sawdust 10 parts, ground cork 10 parts, hair 1 part, rye flour 20 parts, and water. A third layer

may be applied containing a mixture of soot 40 parts, rye flour 20 parts, sawdust 15 parts, hair 1 part, and a suitable proportion of water. Between the first and second coats a layer of "expanded



metal" or "trussed fabric" *c* may be placed, forming a continuous air gap, a sheet of asbestos paper *d* being superposed before the application of the second layer of composition.

22,677. Horne, A. D. Oct. 26. [*Patent of Addition to No. 11,312, A.D. 1907.*]

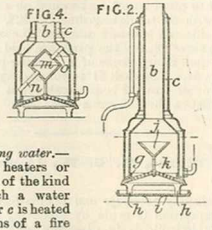


Steam traps.—In a steam trap described in Specification No. 11,312, A.D. 1907, a drainage valve is carried by one end of a tube B containing an expansible material C, a piston in this end being held stationary by a spring in the casing A, which also carries the valve seat, the other end of the tube being closed and unattached but subject to the steam pressure in the casing. According to the present invention, the free end of the tube is now provided with an enlargement D, which extends through a stuffing-box F to the exterior of the casing. The unbalanced steam pressure on the expansible material in the tube is thus avoided. The end of the tube is also provided with a hand-wheel I for operating the valve. A spring G, bearing against the enlargement D, assists in forcing the valve off its seat when the expansible material contracts.

22,860. Lyman, J. G. Oct. 27. *Drawings to Specification.*

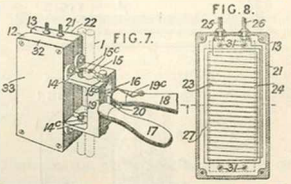
Non-conducting coverings and compositions.—The outer glass wall of a vacuum-jacketed vessel is coated externally with oxalic acid or with paraffin, or with both, in which case the paraffin is exterior to the oxalic acid. Wool or other non-conducting material may be arranged between the bottle and the outer casing.

22,963. Ewart, G. H. Oct. 28.

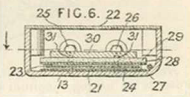


Heating water.—Water-heaters or geysers, of the kind in which a water chamber *c* is heated by means of a fire in a grate provided with a central flue *b*, are provided above the grate with a deflector, preferably in the form of an inverted cone *j*, having a support *k* which is bolted to the grate. The deflector may take the form of a doubly-conical vessel *m* connected by tubes *n*, *o* with the water chamber *c*, so as to form part of the water-circulating system. The deflector causes the combustion products to communicate more heat to the walls of the flue and thus to the water. The grate is formed with feet *h* and rests on a tray *i*; it has an annular flange *g* for retaining the water chamber in position.

23,194. Mills, F. A. Aug. 26, [*date applied for under Section 91 of Patents &c. Act, 1907*].



Heating by electricity.—Pressing-irons heated by electricity comprise irons 12, 13, Fig. 7, having attached to them brackets 14, 15 and handles 17, 18.



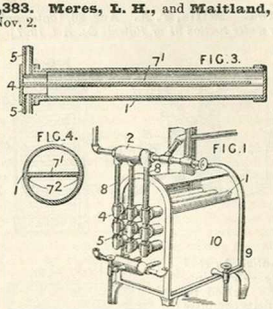
The brackets are cut away at 14c, 15c to receive a standard 1, and are pivoted together at 16. A spring 19 engaging the pivot and the brackets forces the irons together. The lugs 15a on the brackets 15 through which the pivot passes have open slots enabling the irons to be separated by causing one end 19c of the spring to engage in a

hook 20 on the other end of the spring so enabling the irons to be used by themselves. The heated iron 13 comprises a high-resistance coil 23, Fig. 8, connected to plugs 25, 26, and wound on a sheet of mica 24 with an insulating-sheet 27, 28, Fig. 6, on either side. A sheet of asbestos 29 covers the insulating-sheet 28, and the parts are held against the inner shell 21 by means of a backing-plate 30 and screws 31. The shell 21 is covered by a plate 22. The other iron 12 is preferably not heated, and comprises a shell 32 and a cover 33.

23,264. Marks, E. C. R., [*Schaar, A.*]. Oct. 31.

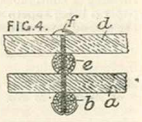
Non-conducting coverings and compositions.—An elastic composition is made by dissolving one or more suitable colloids in glycerine, and adding salicylic acid, tannin, hexamethylenetetramine, and "lysoform" (a mixture of about equal parts of soap solution and formaldehyde), to the solution. As an example, 1 part by weight of a colloid such as tjan-tjan (Japan glue) is dissolved in from 2–6 parts of glycerine, and to this solution are added from 2–3 per cent of salicylic acid and from 1-2 per cent of tannin. This mixture, preferably just before charging into the tyre, is heated to 70-80° C., and from 2–12 per cent of lysoform, and from $\frac{1}{4}$–$\frac{1}{2}$ per cent of hexamethylenetetramine are added.

23,383. Meres, L. H., and **Maitland, J.** Nov. 2.



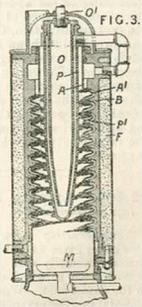
Heating water; heating air.—Relates to hot-water tubes having longitudinal partitions within them, and consists in extending the partitions into the T-pieces which connect a series of such tubes, and also in supporting the partition upon ledges in the tubes. As shown in Figs. 3 and 4, a tube 1 is provided internally with ledges 7^2 upon which rests a partition 7^1 extending into a T-piece 4. A number of these tubes are assembled, as shown in Fig. 1, to form a water-heater, the T-pieces being connected together by means of nipples 5 or by any other suitable means. The T-pieces of each vertical row of tubes are also preferably held together by rods passing through eyes in flanges provided on the T-pieces. The top tubes communicate by tubes 8 with a manifold 2. When the water is used for heating purposes, it is returned to the lower tubes and a continuous circulation takes place. The tubes are enclosed in a coal-heated or gas-heated receptacle 9, preferably surrounded by a jacket 10 from which hot-air pipes may be led. The apparatus may be employed in a steam heating-system by circulating steam instead of water through the tubes; also by circulating air amongst the tubes and hot water or steam through the tubes, the apparatus could be used as a hot-air furnace.

23,464. United Asbestos Co., and **Fisher, J. A.** Nov. 3.



Non-conducting coverings.—A series of ribs *b* of flexible heat-insulating and non-inflammable material is attached to a flexible sheet or mat of non-conductor *a* by means of clips *f* so that the whole may be bent into place in its final position, air spaces being formed by the ribs. The ribs may be in two series at right-angles, and the complete covering may consist of one, two, or more thicknesses of alternate sheets and ribs, forming alternate layers of air and non-conducting material. In Fig. 4, a second layer *d* with ribs *e* is shown. The layers *a*, *d* may be composed of fibrous asbestos held between two or more layers of wire netting, the ribs being attached by wire.

23,482. Lovekin, L. D. Nov. 3.



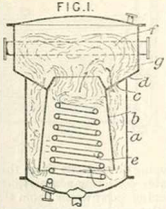
Heating liquids.—The liquid to be heated is passed through the annulus between two concentric spirally corrugated tubes, one of which A is adapted to screw into the other B, the heating-fluid flowing through the inner tube. The outer may be a casting and may be surrounded by a casing F. When used for heating water by gas, the burner M is at the lower end of the inner member. To increase the heating-surface and to act as a baffle, a hollow plug P is placed at the upper end, and this is connected with the annular space, so as further to heat the water.

It is provided externally with a rib P¹ of the same pitch as the rib A¹. Within it is located another member O, which is open at its lower end and at its upper end is connected to the water inlet O'.

23,698. Boult, A. J., [*Fischer, E.*]. Nov. 5.

Boiling pans.—In an apparatus for boiling resin soap the froth overflow *g*, mounted on the casing *a*, supports a preferably conical insertion *b* within which is a steam coil *e* or other heating device. The sloping sides *d* have perforations *c*. When the soap mass boils, the froth is condensed by cold pipes *f* for example, and flows back through the openings *c* and the space between the casing and the insertion. The casing may be corrugated.

FIG.1.



23,939. Tattersall, W. Nov. 9.

FIG.6.

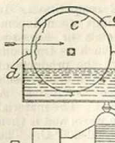
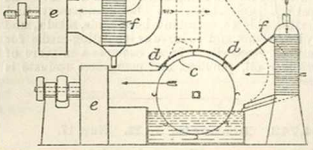


FIG.1.

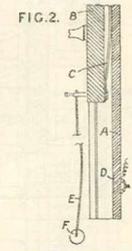


Heating gases or liquids.—In apparatus for heating gases or liquids, the gas to be treated is passed through a battery of heating-pipes or the like before, or after, its passage between rotating disks which are moistened with the heating-liquid from the battery of pipes. In one arrangement, Fig. 1, air to be heated is drawn by a fan *e* through a battery *f* of pipes around which hot fluid circulates and afterwards between disks *c* mounted on a shaft driven from the fan shaft. The hot fluid from the battery *f* flows into the tank into which the disks dip. The disks may consist of plain, corrugated, or perforated sheet metal, or of woven wirework &c., and may carry troughs *d* to lift and distribute the liquid. The battery *f* may be placed at the side or above the disks, and the direction of the flow of the air may be reversed. In another arrangement, the fan is placed at the other end of the apparatus so that the battery is between the disks and the fan. The shaft *f* carrying the disks may be arranged so that the gas passes through instead of between the disks. Fig. 6 shows another form of apparatus in which the liquid from the tank containing the disks *c* flows past a valve *n* to the space between the tubes *f*. The fan *e* may be dispensed with, and a current of air induced by the expansion of air heated by the battery of tubes.

24,038. Abbott, J. A. Nov. 10.

Heating liquids.—In an apparatus for electrically heating liquids, the act of lowering a resistance F into the liquid causes the current to be switched on. In the fork shown, the resistance F is supported by wires E, by a tube containing an insulated conductor, or by concentric tubes from a hard wood or other block B vertically slidable in a guide A. The movable block B carries metal strips C connected to the resistance F and making contact, in their lowered position, with plates D connected to the source of supply. The resistance F may be of bare wire or strip, or it may be encased in metal, porcelain, &c; or it may be enamelled. The invention is applicable for heating small quantities of liquid in cups &c. Specification No. 13,850, A.D. 1896, [*Abridgment Class* Printing, Letterpress &c.], is referred to.

FIG.2.

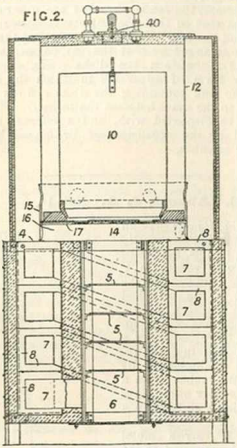


24,046. Ellis, H. S., and **Allsopp, C. E.** *May 8, 1909.*

Heating air; heating by electricity.—Wool and other fibrous substances are dried in a hot-air apparatus preparatory to weighing by means of a balance combined therewith. As shown, the apparatus is divided by a partition 4 into a lower air-heating and an upper drying compartment. Air enters and passes through a spiral channel 7 surrounded by a channel 8, through which the used air escapes. From the passage 7, the air passes into a channel 6, wherein it is heated by electric devices 5, and whence it flows into the drying-compartment. The air rises into the space 14 and may be caused to pass through the material in the cylinder 10, out through registering apertures in the cylinder 12 and sleeve 15, and into the

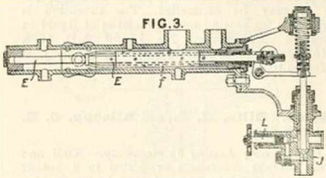
passage 8. The air may be caused to pass through apertures in the ring 16 and the lower part of the sleeve and to the channel 8.

FIG.2.



24,389. Rutherford, E. J. Y., and **Ross, C. A.** Nov. 13.

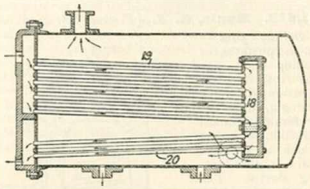
FIG.3.



Thermostats for controlling water and fuel supply to steam generators. A metal tube *f* is fixed at one end and attached at the other to an inextensible sliding rod E, which it surrounds.

24,487. Dargue Griffiths & Co., and **Griffiths, E.** Nov. 14.

Heating liquids.—In calorifiers, condensers, &c. of the type in which steam is admitted at the upper part of one end of the apparatus and passes through tubes returning to an outlet at the lower part of the same end of the apparatus, the tubes 19, 20 are arranged in two stacks, the tubes 19



sloping downwards from the inlet to a condensed-water collecting-compartment 18, and the tubes 20 sloping downwards from this compartment to the outlet. The condensed-water compartment 18 is supported by the tubes only, so as to allow for expansion.

24,597. Winkler, K. Nov. 18, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

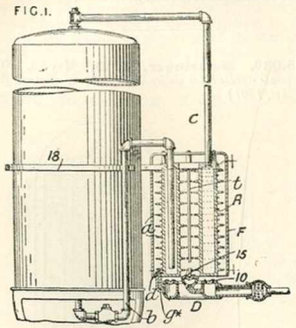
Non-conducting coverings and compositions.—In producing non-conducting coatings upon incombustible materials, such as metals or asbestos, difficultly oxidizable animal fats, such as train oils and liquid waxes, are mixed with the products of distillation of colophony and heated in open vessels to 250° C. until the mixture becomes viscous. A siccative or drying oil may be added. The material is coated with the mixture while warm and is then heated by an oxidizing flame to 500–600° C. The coatings are stated to be transparent and flexible, able to withstand heat, acids, alkalis, and hydrocarbons, and to serve as insulating-media for heat and electricity. In an example a mixture of cod-liver oil, pinoline, and manganese resinate is used.

24,743. Beauvais, J. B. Nov. 17.

Heating water.—Water is heated in an annular cylindrical vessel A connected by pipes *b*, *c* to an ordinary hot-water cistern and heated by gas jets on the inner and outer surfaces, as well as at the bottom. The vessel A is provided with projections *a* to increase the heating-surface formed integrally with it or screwed on. The gas burner D is formed with a double ring of jets 10 directed against the bottom of the vessel A, a central cluster of jets 15 to heat the inner surface of the cylinder, and a series of separate jets g^* to heat the outer surface. Some of the jets g^5 are attached to lugs *d* on the vessel A, thus serving to support the burner D. A rod *t* passing up the

middle of the vessel A directs the flame from the central jets 15 against the sides of the vessel. The

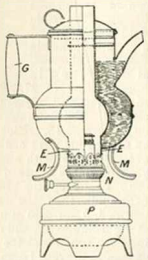
FIG. 1.



vessel A is surrounded by a casing F and supported by a strap 18 passing around the cistern.

24,768. Llewellyn, W. L. Nov. 18.

Heating water.—A kettle of the shape shown is traversed vertically and centrally by a metal flue in the form of an ordinary bulbed lamp chimney, the projecting end E being adapted to fit into the gallery N of the lamp P. Feet M are provided to support the kettle when detached from the lamp. A handle G is also provided preferably of non conducting material.

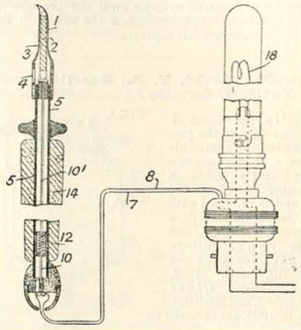


24,815. Berville, P. Nov. 18.

Heating by electricity.—An electric instrument for pyrography or surgical purposes has a hollow point 1, inside which is a heating-appliance consisting of a wire conductor 3 embedded in refractory material 2. The circuit is completed through a lamp 18, conductors 8, rods 10, 10^1, a conductor 3, a point 1, a metal tube 5, and a conductor 7. The contact between the conductor 3 and the point 1 is maintained by a spiral spring 12. Holes 4 are provided to cool the end of the material 2, and a cork sleeve 14 is attached.

(*For Figure see next column.*)

24,815.



24,821. Stevens, F. J. Warden-, Cooper, E. E., and **Lawrence Patent Water Softener and Sterilizer Co.** Nov. 18.

[*Patent of Addition to No. 10,526, A.D. 1908.*]

FIG. 2.

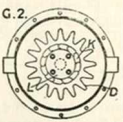
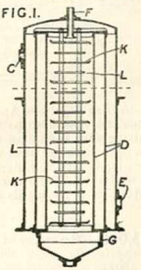


FIG. 1.



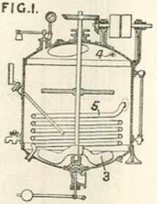
Heating water.—The deposition of scale is prevented in the boiler and pipes of a hot-water circulating-system by causing water from the boiler to heat the water drawn off for use in its passage through a tank placed in the usual circulating-cylinder. Hot water from the boiler enters at C and after heating the inner corrugated cylinder D passes back to the boiler through the opening E. The unsoftened water enters at G and while passing up between the baffles K, L is heated and deposits its sediment and is drawn off at F. The preferred forms of baffles, which are easily removable, are shown in Fig. 2. The large plates have central orifices and finned edges and alternate with small unperforated plates, thus compelling the water to take a circuitous course through the cylinder which is open at the top. The exit pipe F extends some distance down into the inner cylinder and forms a trap in which the gases from the heated water collect. Any reduction in the water-level in the outer cylinder allows the gas

seal to expand and water to overflow from the inner to the outer cylinder until the pressure of the seal is restored, whereupon the waters in the two cylinders are left separate.

24,836. Barbé, P. A., Garelli, F, and **Paoli, G. de.** *May 5.*

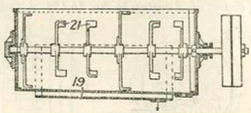
Digesters.—A digester used in the production of ammonia soaps from ammonia and fatty acids is heated by a steam coil 5 and is provided with a helical stirrer 3, a steam injector 4, and the usual fittings. Specifications No. 12,210, A.D. 1907, [*Abridgment Class* Oils &c.], and No. 9758, A.D. 1908, are referred to.

FIG.1.



24,838. Barbé, P. A., Garelli, F., and **Paoli, G. de.** *May 5.*

FIG.1.

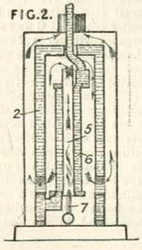


Heating liquids.—An apparatus for producing soda and potash soaps from ammonium soaps by mixing with sodium or potassium salts consists of an open tank provided with a steam-jacket 19 and a winged stirring-device 21. The process is described in Specification No. 12,210, A.D. 1907, [*Abridgment Class* Oils &c.].

25,028. Ramassot, M. Nov. 21, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

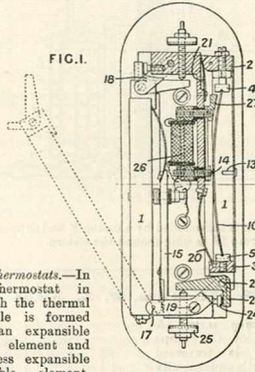
Heating water.—In boilers of the type in which concentric tubes 5 providing annular water spaces 6 are heated within a water-holding casing 2, the tubes consist of similar elements, the water flowing from the bottom upwards and each being heated by a separate Bunsen burner 7. The apparatus can be made in varying sizes by altering the number of these elements to suit requirements. The water spaces 6 may be partly obstructed by balls or bullets, and the boiler may also be adapted for steam generation.

FIG.2.



25,036. Geissinger, H. G. May 29, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

FIG.1.

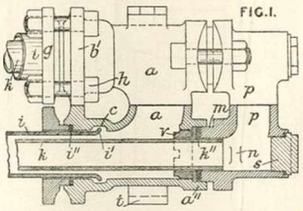


Thermostats.—In a thermostat in which the thermal couple is formed by an expansible rigid element and a less expansible flexible element, as described in Specification No. 27,608, A.D. 1907, the means for supporting and adjusting the thermal couples are claimed. Fig. 1 shows two thermostats mounted on one frame 15. Each thermal couple consists of an expansible rigid channel-shaped bar 1, provided at its ends 2, 3 with screws 4, 5, between V-shaped grooves in the heads of which is sprung a flexible strip 10 of spring steel or other material less expansible than the bar 1. The heads of the screws 4, 5 are also provided with square grooves at right-angles to, and deeper than the V-grooves, in which tongues at the ends of the flexible strip 10 engage to prevent lateral displacement. The screw 4 is adjustable for varying the curvature of the strip 10, and a pin 13 prevents reverse curvature. The flexible strip 10 is adapted to close a circuit through an insulated contact-screw 14 carried by the frame 15. The screw 14 is preferably of iron, and may form one pole-piece of an electro-magnet 26 in the regulating-circuit, and by its attraction on the strip 10, may prevent the circuit from being broken until a definite change of temperature has taken place. The other pole-piece 27 is of considerable area, so as to exert only a small attraction on the strip 10. The bar 1 is pivoted at its upper end 2 to an arm 18, pivoted to the frame 15 by a screw 19. To the lower end 3 of the bar 1 is loosely pivoted a bell-crank lever 22, the shorter arm of which abuts against a screw 24, while the longer arm is adjustable by a calibrated screw 25

for adjusting the temperature at which the device operates. Springs 20, 21 prevent vibration of the bar 1 and lost motion at the pivots 17, 23. The strip 10 may be concave to the contact-pin 14, so that contact is made on expansion of the thermal couple.

25,232. Rathmell, B. Nov. 24.

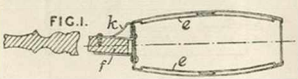
FIG.1.



Heating liquids.—Relates to means for attaching the pipes of double-pipe apparatus, such as are used for liquid-heaters, heat interchangers generally, to return bends, headers, &c. The outer pipes *i* are attached to inner bends *a*, and the inner pipes *k* to outer bends *p*. The pipes *i* are secured and made tight by rings i^{11} and glands *g* secured to flanges b^1 on the bends *a* by bolts *h*. The ends i^1 of the pipes *i* are swelled or beaded over so as to project into recesses *c* in the bends *a*, thus preventing the pipes from being withdrawn while allowing for expansion. Neck bushings *v*, through which the pipes *k* pass, are screwed into the outer ends of the bends *a*, so as to give access to the pipes *i* for cleaning &c. The pipes *k* are secured and made tight by rings k^{11} and spigots *m* on the bends *p*, which are bolted to flanges a^{11} on the bends *a*. Projections *n* are formed in the bends *p* so as to prevent the pipes *k* from being withdrawn while allowing for expansion. Screw plugs *s* give access to the pipes *k*. Projections *t* are formed on or attached to the bends *a*, whereby several sets of pipes may be connected together to form a coil. Modifications in the details of the joints and a form in which the bends *a* are replaced by a continuous header are also described.

25,338. Pinchbeck, H. Nov. 25.

FIG.1.



Bed-warmers.—Consists of a circular pan for hot water, of flattened section, and with internal channelled ribs *e* crossing each other, and a filling-orifice. A handle-socket *f*, with a strengthening-stay *k*, is provided and secured through three thicknesses of metal.

25,485. Hearn, R. K. Nov. 26.

FIG.2.

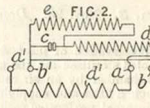
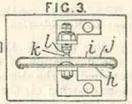


FIG.3.

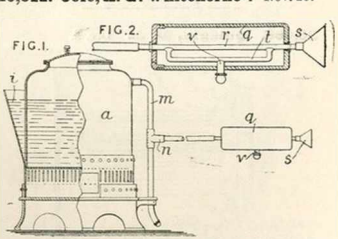


Heating by electricity; thermostats; foot-warmers.—A thermal cut-out *c* for a heating-coil *d* is connected to a shunt coil or resistance *e* to prevent arcing at the contacts. The arrangement may be applied to heating flat-irons, vulcanizers, foot-warmers, ovens, incubators, and conservatories. The wiring shown in Fig. 2 is arranged with terminals *a*, *b* for pressures of from 80 to 110 volts, and terminals a^1, b^1 for pressures of from 200 to 240 volts; for the higher pressure a coil d^1 is put in circuit. The cut-out may be placed in a separate chamber and actuated by a proportion of the current passing through the main apparatus. The thermal cut-out consists of a bimetallic strip *h*, Fig. 3, fixed at the middle and carrying a curved strip of tempered steel *j* having a platinum or other contact *k* engaging with a fixed, adjustable contact *l*. According to the Provisional Specification, the heater may have plugs for connexion to electric-lamp fittings or wall sockets, and the shunt coil may be replaced by a condenser provided with a resistance arranged as a leak.

25,512. Cole, A. G. Whitehorne. Nov. 26.

FIG.1.

FIG.2.



Steam traps.—Apparatus for use in treating the skin with steam comprises a boiler *a* fitted with a funnel *i* serving as a filling-device and as a water gauge, and with a steam outlet pipe *m* continued

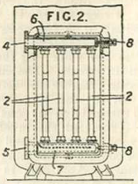
below the branch n so as to serve as a steam trap. The branch n is connected to a terminal distributor q, Fig. 2, comprising a non-conducting casing through which the steam-pipe r passes to a funnel s. The pipe r is fitted with a pipe t forming a loop serving to collect condensed water and fitted with a draw-off device v.

25,683. Macmeikan, J. Nov. 28. *Drawings to Specification.*

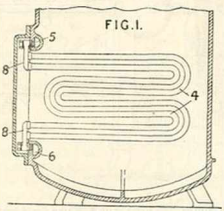
Heating air.—In the preservation of meat &c. by the circulation of cooled sterilized air, the air is supplied to the storage chamber by an air-compressor drawing air through a filter and supplying it to a heater having an internal perforated casing which sprays steam into the air, and a spring-loaded outlet valve.

26,085. Quiggin, D. A. Dec. 3.

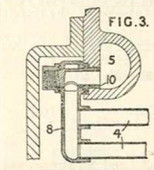
Heating water.—Relates to apparatus for heating and evaporating water by means of steam, of the type consisting of a series of zigzag pipes which are arranged in parallel and are detachably connected to detachable headers arranged above and below a door through which the pipes can be withdrawn. The pipes 2 are connected to the headers 6, 7 by joints such as are described in Specification No. 5992, A.D. 1890, [*Abridgment Class* Pipes &c.], and the headers are machined so as to fit into inlet and outlet sockets 4, 5, against which they are held by screws 8.

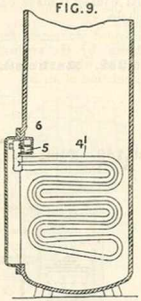


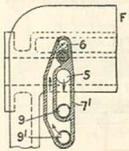
26,086. Quiggin, D. A. Dec. 3.



Heating water.—In evaporaters, feed-water-heaters, &c., of the type in which the heating-surfaces consist of zigzag steam-pipes arranged in front of a door large enough for the removal of the pipes, each coil either consists of two pipes in parallel, or of a single pipe returning on itself,

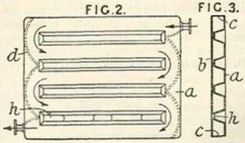






appropriate junction-pieces being provided for attaching the pipes to the steam inlets and outlets. Fig. 1 shows an apparatus of the first kind, in which the heating-pipes 4 are attached to the inlet 5 and the outlet 6 by junction-pieces such as that shown in Fig. 3. The pipes 4 are connected to a piece 8 which is connected to the inlet 5 by a hollow stud 10, the joint between the piece 8 and the stud 10 being formed as described in Specification No. 5992, A.D. 1890, [*Abridgment Class* Pipes &c.]. Forms of junction piece attached to the casing by bolts instead of a hollow stud are also described. Fig. 9 shows an apparatus of the second kind, the inlet and outlet channels 5, 6 being arranged side by side and the pipes 4^1 being attached to them by the junction-piece shown in Fig. 14; this consists of a member 7^1 containing two passages which communicate with the inlet 5 and the opening 9 and with the outlet 6 and the opening 9^1, respectively.

26,140. Schewczik, S. A. Dec. 3.



Heating-apparatus.—Hollow metal plates, through which heating and cooling fluids are passed, are formed of two sheets of metal of which one at

least is grooved or corrugated, the two sheets being connected at their edges by a metal frame, and touching along the bottom of the grooves so as to divide the plate into passages for the fluid. In the form shown, the two plates *a*, *b* are connected by the frame *c* and guide-strips *d* are provided to cause the fluid to take the path shown by the arrows. Perforations *h* may be formed where the plates touch to allow of the circulation of air &c.

26,156. Fleischer, J., and **Eickemeyer, P.** Dec. 3.

FIG.4.

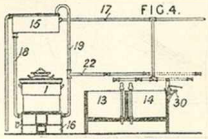
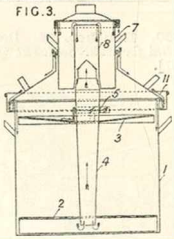


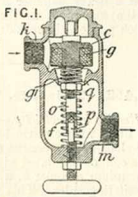
FIG.3.



Boiling-pans.—Apparatus for cleansing clothes by means of steam and boiling water comprises a container 1 having a downwardly-tapering circulating-pipe 4 extending below the perforated false bottom 2. The clothes are prevented from rising by a perforated disk 3, which is adjustably secured to the pipe 4 by means of a clamping-ring 5. The trough 11 collects overflowing water and conducts it back to the container. In order to remove the dirty water, a vessel 7 having a central open-ended pipe 8 is placed upon, and receives the water from, the circulating-pipe 4. Fig. 4 shows a convenient installation consisting of the container 1, rinsing-vessels 13, 14, and a wringer 30. A hot-water tank 15 is connected by pipes 18, 19 with a coil in the fire-box 16, and supplies hot water to the vessels 13, 14 through a pipe 22. Cold water is supplied to the tank 15 and the rinsing-receptacles through a pipe 17.

26,294. Dietsche, W. June 17, [*date applied for under Section 91 of Patents &c. Act, 1907*].

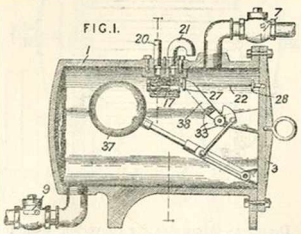
FIG.1.



Steam-traps.—A cock for automatically discharging condensation water from an apparatus connected to the inlet *k*, consists of a valve *c* having an expansible filling *g* of graphite &c. The valve is carried by a spindle *o* and is normally kept open by a spring *f*. A spring g^1 presses against the graphite *g*. When steam is first admitted to the heating-apparatus &c., condensation takes place, and the water escapes through the valve opening to the outlet *m*. As the steam pressure increases, the valve *c* is thrust towards its seat but is arrested before it completely closes, by the pipe *p*. The narrow orifice left allows the remaining condensed water to be blown through by the steam. As the temperature of the valve rises, the graphite *g* expands, and nearly closes the valve opening, the final closure being effected by the expansion of the valve casing, which causes the pin *p* to move downwards and allow the steam to completely close the valve. The sloping sides *q* of the valve seat direct hot water passing through the valve on to the spindle and so prevent cooling of the same.

26,295. Harrison, G., [*Clark Manufacturing Co.*]. Dec. 4.

FIG.1.



Steam-traps.—A trap for discharging liquid from an exhaust pipe or the like consists of a casing 1, into which the liquid drains past a valve 7, and which is alternately put into communication with the atmosphere at 21 and with an exhaust pipe 20 leading to a condenser, by the movement of a float 37; the variations of pressure thus brought about in the casing permit the entrance or exit of

water past check valves 7, 9. The float 37 is pivoted to a removable end 3 of the casing, and is linked to a rocker 33, provided with tappets to turn a heavy hammer 38. The hammer is loose on the same pivot as the rocker 33, and has arms which pass on either side of a horizontally-sliding rod 22 connected to a valve, such as a piston valve 17, controlling the communication of the casing with the exhaust pipe 20 and the open pipe 21. The rod 22 carries adjustable abutments 27, 28 against which the hammer 38 strikes.

26,452. Twiss, G. V. Dec. 7.

Heating by electricity.—Boot trees and stretchers are fitted with electric heating-devices. The heating-element may consist of a cartridge *d* composed of a coil of insulated wire *f*, Fig. 3, wound on an aluminium cylinder *h*, which may be provided with ventilating-holes. This cartridge is sprung into depending arms e^1, Fig. 1, of a carrier *e* riveted to the boot tree. The ends of the coil *f* are connected by flexes *i* and contact-pins i^1 to a terminal plug *j*, which can be connected to a lamp socket. In a modified form, the resistance may be placed on a sheet of mica held by clamps punched out of a bridge-piece, which is secured to the bottom part of the tree.

FIG. 3.

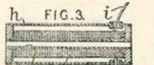
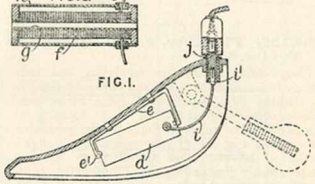
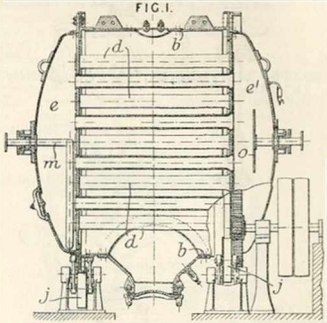


FIG. 1.



26,619. Compagnie Industrielle des Alcools de l'Ardèche. June 9, [*date applied for under Section 91 of Patents &c. Act, 1907*].

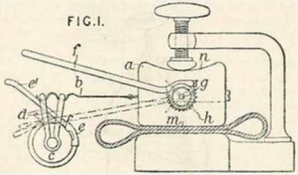
FIG. 1.



Digesters.—Apparatus for converting wood into fermentable sugar and other products by acid, especially sulphurous acid, comprises a rotary drum *b* heated by tubes *d* communicating with steam &c. chambers *e*, e^1. Steam is supplied through a rose *o*, and water of condensation is discharged through a collector *m*. The drum is supported upon balanced rollers *j*.

26,680. Bouchet, M. Dec. 10, 1907, [*date applied for under Section 91 of Patents &c. Act, 1907*].

FIG. 1.



Thermostats; heating by electricity.—An apparatus for vulcanizing india-rubber at a required temperature for a definite period of time consists of a receptacle *a* containing an alloy fusing at the desired temperature; the receptacle is heated by a lamp or electricity until the alloy is all fused, when the heating is stopped automatically. The temperature remains constant during the fusion of the alloy and its subsequent solidification. In the form illustrated, heat is conducted along a plate *b* from a spirit lamp *c* hung by hooks *d* from the other end of the plate; when all the alloy has been melted, a lever *f*, which is connected to a shaft *g* having blades *h* immersed in the alloy, is released and engages with an arm e^1 which moves a shutter *e* to extinguish the lamp. The receptacle may have flat and curved surfaces *m*, *n*, for different articles; when used for vulcanizing tyre covers it is held by a strap. The receptacle may contain a divided mould for vulcanizing wires or tubes, and may carry a mould for T-shaped parts or for parts forming a cross.