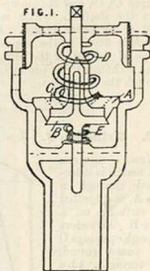


secured to a gas or oil stove H by the ledges H'. D<sup>1</sup> is the inlet pipe, and D<sup>2</sup> is the outlet pipe.

953. Sumner, D. Jan. 18.

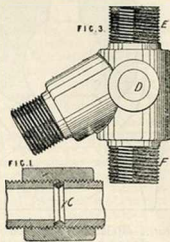
*Heating water,* safety and vacuum relief valves for boilers for. The valve A is perforated at C and carries a seat for another valve B. The two valves open in opposite directions and are loaded by springs D, E. When acting as a safety-valve the two valves move upwards together, the valve B forming part of the valve A. The other valve B acts as a vacuum valve and opens downwards.



1024. Evans, J. Jan. 19. *Drawings to Specification.*

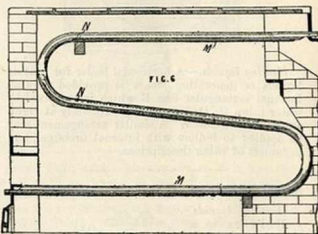
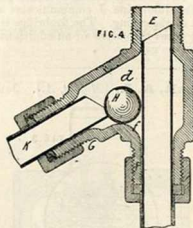
*Heating buildings.*—Air, heated in a stove or fireplace in a lower room, is carried up into a hollow skirting round the walls of a room or rooms above and supplied as required through valves.

1102. Hansen, H. L., Keyworth, J. R. H., Keyworth, H. J., and Walker, W. Jan. 20.



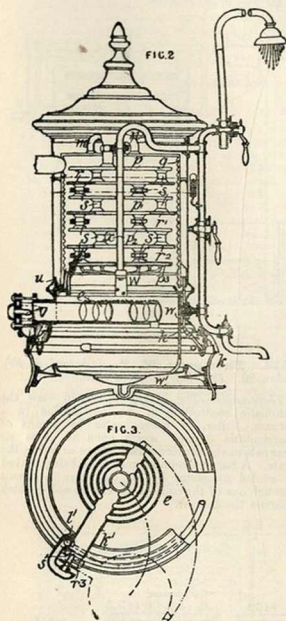
*Heating buildings; heating water.*—Relates to high pressure hot-water heating-apparatus. A

ring C, Fig. 1, of lozenge or similar section is placed between the ends of the tubes so that its edges cut into the pipes to make a tight joint. The ring may be of steel or other metal. A special valve for filling the mains is shown in Figs. 3 and 4. The branches D and E are connected to the flow and return pipes, respectively. To fill the pipes, the pipe from the pump is inserted into



the branch F, and a discharge pipe K into the branch G. As the water flows through the branch E, the air flows through the branch D into the chamber *d* and escapes through the pipe K. When the mains are full, the pipe K is withdrawn and a cap screwed on to the branch G. This cap has a projecting spring which bears against the ball H so that, when the pipe from the pump is withdrawn, the ball is thrown over on to the seating *f* and closes the branch F. A cap may then be screwed on, if desired. The boiler consists of a number of S-tubes M, Fig. 6, the lower limbs of which form the firebars; they are shaped, as shown, at the ends to prevent air or gas bubbles from lodging at their points. Bars or tubes N are placed between the upper and middle limbs to direct the furnace gases.

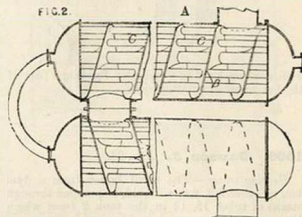
1210. Zeitschel, B. Jan. 21.



*Heating water.*—Fig. 2 shows the apparatus applied to heating water for a bath, either by gas or oil; the burner *e* shown is for gas. The products of combustion are led up inside a double-walled cylinder *g* (having the inner surface corrugated) round a series of hollow discs and rings *p, p<sup>1</sup>, p<sup>2</sup>, p<sup>3</sup>, r, r<sup>1</sup>, r<sup>2</sup>* which are connected by posts *s, z* as shown, one of the posts in each tier being hollow and affording communication between the discs and rings. Water passes by the cock *k* to the pipe *h*, and thence up the walls of the cylinder *g* and by pipes *m, n* to the discs and rings, through which it is led by the most circuitous path possible to twisted and interlacing pipes *W*, and thence through the pipe *x* to the delivery pipes. These are so arranged and furnished with cocks that a head or hand douche, or simply an ordinary supply, may be obtained. Water of condensation

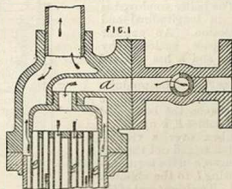
is drained off by the gutter *u* and pipes *u<sup>1</sup>, u<sup>2</sup>*. The burner *e*, Fig. 3, can be swung out from under the heater on a hollow pivot *l<sup>1</sup>*, the gas nozzle *o* working through a central hole in a disc *r<sup>3</sup>* carried by an arm *s<sup>1</sup>*; this disc is thus moved over the end of the mixing-tube *l<sup>3</sup>*, while the burner is being lighted, and limits the supply of air so as to prevent back-lighting. The cock *k*, Fig. 2, is furnished with an indicator to show what temperature the water will acquire according to how much the cock is turned on, and this cock is so connected to the water-supply cock by a slotted link that the turning on of the gas necessitates the turning on of the water, danger of explosion being thus obviated.

1385. Robinson, E. Jan. 23.



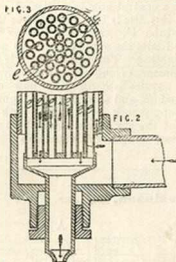
*Heating air for drying tea, grain, sugar, &c.* The air is heated by being caused to traverse in a spiral fashion one or more annular chambers *A* containing archimedean screw surfaces *B* and traversed by tubes *C* heated by steam, furnace gases, or other suitable means.

1448. Schaffstädt, H. Jan. 25.



*Heating buildings &c.; heating water.*—An arrangement such as is described in Specification No. 8380, A.D. 1889, for heating water for shower baths, is employed to heat the water, and to cause

circulation in a hot-water heating-system. Steam is supplied by a pipe *a* to the heating-tubes *e*, *e*,

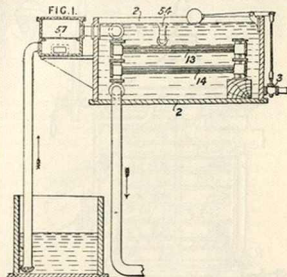


which are enclosed in a cylinder forming a part of the hot-water circulating system.

**1506. Dawson, J.** Jan. 26.

*Heating water.*—The spent liquor from a dyvat, or other hot waste liquid, is pumped through stacks of tubes 13, 14 in the tank 2 from which the vat or other vessel is supplied. The spent liquor, before entering the tubes, passes through a perforated strainer 57. Cold water is supplied to the tank 2 by a ball valve 3, and the hot water is drawn off through a pipe 54. A three-cylinder

circulating-pump is shown, but any other pump or an injector might be used.

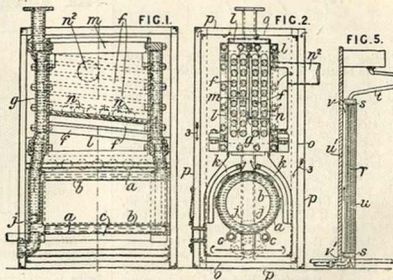


**1512. Thompson, W. P.,** [Chatard, F. E.].  
Jan. 26. *Drawings to Specification.*

*Thermostats.*—The invention has in view the automatic controlling of the combustion in a furnace, boiler, or other heater by means of thermostatic devices which open or close air channels to the furnace either above or below the grate. A bar of dissimilar metals on being heated or cooled completes by its curvature a circuit through one of the coils of an electromotor which actuates the damper.

**1541. Brophy, M. M.** Jan. 26.

*Heating water* for heating buildings, railway vehicles, &c. The boiler employed is shown in longitudinal and cross-section. An annular water space enclosed by shells *a* and *b* has vertical water chambers connected by tubes *f*, *f*. The products from the gas burners *c*, *c* pass between the boiler and curved baffles *k*, *k* up among the tubes, over a vertical partition *m*, and out through openings *n*, *n* in the surrounding casing *l*, to the chimney flue *n*<sup>2</sup>. The lower end of the water chamber *g* passes down into the end of the boiler and has openings *j*. This arrangement promotes an independent circulation

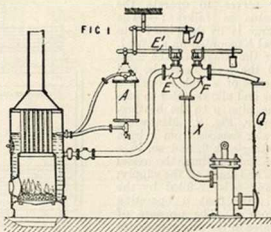


in the boiler. The air supply for the burners is heated by passing between the outer casings  $o$ ,  $p$ , as shown by the arrows 3, 3.

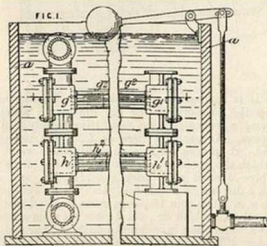
*Heating buildings.*—To promote circulation in a water-heating system when the pipes are below the level of the boiler, the arrangement shown in Fig. 5 is adopted. The flow pipe  $t$  is connected to a header  $s$  having a number of parallel tubes  $r$  enclosed by a casing  $u$  fixed to the wall  $w$  in which are openings  $v$ ,  $v'$ . Air passing through these openings and over the pipes  $r$  cools them slightly and so promotes the circulation.

1570. **Wise, W. L.**, [Dreuz, L.]. Jan. 26.

*Heating liquids.*—Relates to automatic apparatus for feeding water and other liquids to boilers and other vessels. Fig. 1 shows the arrangement as applied to a steam generator. The absence or presence of water in the suspended chamber A determines the course of the supply, whether to the boiler or to a waste tank Q. When the water level in the boiler has been sufficiently reduced to allow the entry of steam to the vessel A, which forms a variable weight for the valve lever E', the feed passing up the pipe X overcomes the weighted valve E and enters the boiler. As the level rises steam is cut off from the suspended vessel. On a vacuum arising in the latter, through the condensation of steam therein, water passes into it and subjects the valve E to a greater load than that on the valve F. By reason of this the feed, which is under pressure, overcomes the valve F and passes to waste. The vessel A, when empty, is counterbalanced by the lever and weight D. In a modification, the rise and fall of the vacuum vessel opens or closes the valves of injectors which supply the boiler.



1662. **Dawson, J.** Jan. 28.

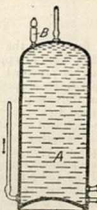


*Heating water.*—Relates to surface apparatus for heating by exhaust steam water for use in tubular systems for heating buildings. The steam is passed in a sinuous path through a series of tubecusters  $g^2$ ,  $h^2$  immersed in the automatically-filling water tank  $a$ . The tubes  $g^1$ ,  $h^1$  connect the end

boxes  $g$ ,  $g^1$ ,  $h$ , and  $h^1$ , into and through which the steam passes.

1742. **Hudson, J. J.**, and **Chapman, A. L.** Jan. 28.

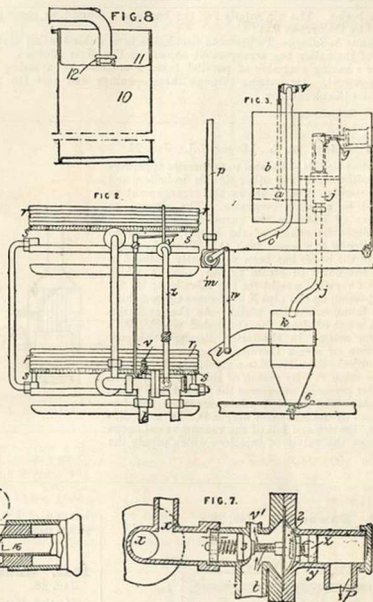
*Heating water.*—Near the top of a kitchen or domestic boiler, or preferably of the cylinder A, connected by circulating-pipes therewith, is placed a spring valve and whistle B. The normal pressure of the hot water is insufficient to open the valve, but, should a stoppage occur in the pipes so that the level of the water falls below the valve, steam is generated which opens the valve and blows the whistle.



1860. **Clark, A. M.**, [Soc. des Fontaines Distributrices d' Eau Chaude]. Jan. 30.

*Heating water; footwarmers.*—Relates to a coin-

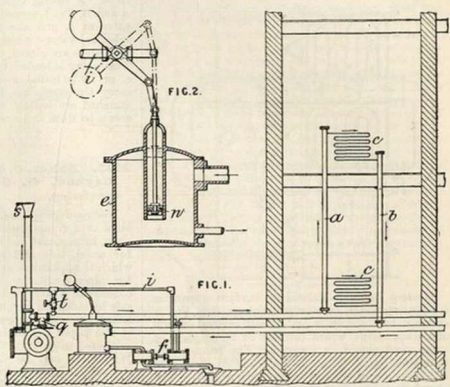
freed system by which a definite quantity of water is heated by gas, and delivered for foot-warmers &c. It is enclosed in a kiosk with double walls packed with a non-conductor of heat, and advertisements &c. are placed outside. After inserting a coin and operating a push-piece, the rod *g* tilts a siphon *e*, Fig. 3, and causes the discharge of the water in a tank *b* provided with a float *a*. This water serves to operate the apparatus as follows:—The discharge is by the pipe *j* into a vessel *k* mounted on a lever *l*. Under the weight of the filled vessel the lever descends, and by means of a link *n* opens a cock *m* and allows water to pass up the pipe *p* to the heating-coils *r, r*, Fig. 2. Meanwhile the water escapes from *k* by a regulating-cock *6*, and so, in a predetermined time, the vessel *k* rises and shuts off the supply; the tank *b* is re-filled by the pipe *c*, the float *a* operating the cock *q*. The pressure of the water in the pipe *p* operates a special valve which allows the



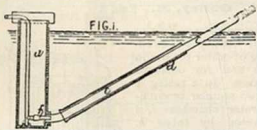
gas to flow from the pipe *t* to the burners *s, s*, where it is ignited by pilot jets *v, v*. A somewhat simplified form of apparatus may be employed. To keep the pressure of the gas uniform a special regulator is provided having a dome-shaped piece carrying a truncated cone, and fitting loosely into a correspondingly-shaped casing through which the gas passes. As pressure rises or falls, the passage between the casing and the regulator is reduced or enlarged. A spindle for receiving adjustable weights is attached to the regulator. Fig. 7 shows the valve by which the gas is supplied to the heating-burners, and its means of actuation. The water to pass into the pipe *z* must push back the piston *y*, and so operate the spring valve *3* by the spindle *1* passing through a diaphragm *2*. A bye-pass *v'* is always open to supply the pilot jets, the main gas supply being through *x, x*. The coin *15* passes down a shoot, which may be a sinuous channel with side apertures for the removal of rubbish &c., till it rests between a push *16* and the rod *g* for operating the siphon. It thus forms a connection between the push and the rod *g*, and communicates the requisite movement to the latter till thrust out by the spring piston *19*. The push is returned by the spring *20* acting on the piston *25*. To ensure correct action and return of the rod *g*, the piston *25* and rod *g* are connected by a pin *23* and slot *24*. The foot-warmer *10*, Fig. 8, is preferably made with a recessed upper part *11*, as shown, with a screw nozzle *12* through which it is filled and over which a stopper forming a handle may be screwed.

1873. Brophy, M. M. Jan. 30.

*Heating buildings; steam traps.*—Exhaust steam is conveyed through a pipe *a* to the heating-coils *c*, from which a discharge pipe *b* leads it to a trap or chamber *e* shown in section in Fig. 2. The air is exhausted from the pipes, and the water from the chamber *e*, by a steam pump *f*, which is automatically started, when the vacuum is lost, by the movement of the piston *n* which controls a valve on the steam pipe *i*. A grease separator *g* may be placed in the pipe *a*, which has a discharge pipe and valve *s* to allow the surplus steam to escape. If the exhaust is insufficient to heat the buildings, live steam may be supplied through a cock *t*.



1909. Livesey, G. T. Feb. 1.

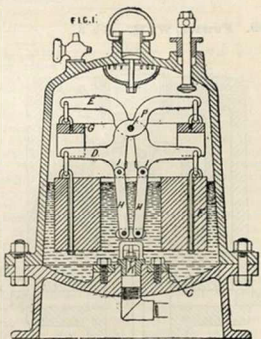


*Heating water.*—Relates to apparatus for preventing the freezing of water in the cups or lutes of gas holders, and for other similar purposes. A Bunsen or other gas burner *f* is arranged in a vessel *a* inserted in the cup or lute. The products of combustion ascend through a tube *c* surrounded by a jacket or casing *d* through which the water circulates. A number of these contrivances may be placed round the gas holder.

1972. Fowler, W. H. Feb. 2.

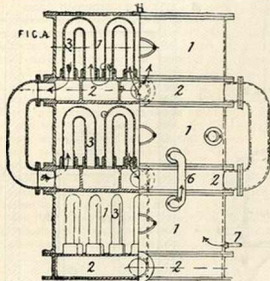
*Steam traps.*—A bracket, the bottom of which is shown at *C*, carries a pin *P* on which a pair of levers *D, E* are journaled. These carry an annular float *F*, and an annular balance weight *G*, and have projecting lugs *I* to which are jointed links *H*, also jointed to the discharge valve *K*. Thus, when the casing contains no water, the valve is held on its seat by the toggle action *I, H*, but when water

accumulates it is lifted by the weight *G* which overbalances the immersed float *F*. A balanced valve may be used, and a hollow float may take the place of the tile *F*, in which case the balance



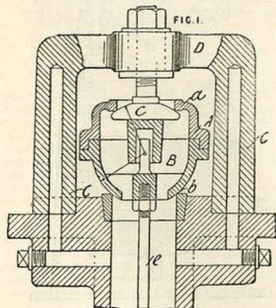
weight *G* is not required. The valve may be lifted from the exterior by rotating a spindle carrying a cam which moves one of the levers.

1991. Wright, J. Feb. 2.



*Heating liquids.*—Relates to surface apparatus for heating water, ammoniacal liquors, &c. Fig. A shows a half elevation and a half vertical section of the apparatus, which consists of three pairs of superposed chambers 1 and 2. The former contains the liquid to be heated, and through the latter the steam or heating-gases are passed. The chambers 2 are divided by diaphragms, the spaces between being connected by U tubes 3. The cold water is supplied by a pipe 7 and passes from chamber to chamber by tubes 6, and the hot gases follow the path indicated by the arrows. The apparatus may be of any shape in plan, and any number of sets of chambers may be used.

1999. Fowler, W. H. Feb. 2.



*Steam traps.*—Relates to a double-seated equilibrium valve, applicable as a safety-valve for

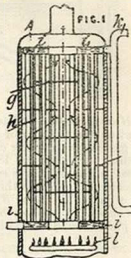
boilers, and also as a discharge valve for steam traps. A casing, which may consist of two parts A and B, Fig. 1, secured together, forms a spherical valve at *b*, and also has a seating *a* for another spherical valve *c* which is fixed in position. When the valves are closed, both spheres are concentric. The casing is loaded by a weight attached to a rod *e*, or by external weights. The pillars C which carry the cross-bar D to which the valve *c* is attached are hollow, so that the steam may have access to them and ensure equal expansion.

2033. Baker, C. F., Randall, J. H., and Mayhew, G. S. Feb. 2. *Drawings to Specification.*

*Non-conducting coverings and compositions.*—Relates to a composition material, forming boards, slabs, linings, and the like, to serve as a substitute for wood, lath and plaster, and other materials, which is applicable as a non-conducting covering for pipes &c., among other uses. The material consists of a body of wooden strips or slats placed side by side, and covered on both sides with paper-board, the slats being cemented to each other, and to the paper, by adhesive material, and the whole subjected to great pressure to form a rigid board. Wire cloth may be placed between the paper and the wooden body. The cement is of such a nature as to harden thoroughly, and may consist of a solvent, glue, and whiting and plaster of Paris or clay.

2062. Galley, M. Feb. 3.

*Heating water.*—Relates to the heating and circulating of water for use in baths and for domestic purposes. In a casing A are two annular or circular water chambers *i*, *i* connected by tubes *h*. Gas, as shown, or the products of combustion of wood, coal, or liquid fuel, may be used as a source of heat. Diaphragms *g* are arranged as shown to deflect the hot gases, or spiral or other baffles may be employed for a similar purpose. Water enters the lower chamber and passes away from the upper by a pipe *k*.



2537. Knoch, H. R. Feb. 9.

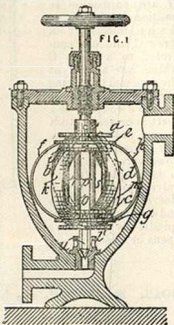
*Non-conducting coverings.*—To paper pulp is added cork, nutshells, cellulose, bark, chaff, or other light fibrous material, in the proportion of 50 parts of pulp to 12 of the cork or other material. 2 or 3 parts of gum tragacanth may be

added to give cohesion, and from 2 to 5 parts of a soda or other saline solution to render the material fireproof. This material may be moulded into plates, sheets, &c.

**2630. Arendt, G.** Feb. 10.

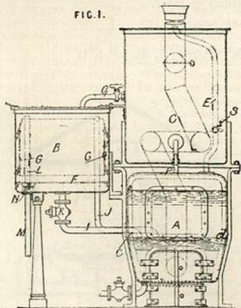
*Steam traps.*—

The valve is opened and closed by the contraction and expansion of a number of pairs of metal tubes the opposite ends of which are connected by metal strips. The valve *u* is attached to a metal plate *l* connected to a similar plate *i* by a pair of bent metal strips *k, m*. This plate *i* has a pair of downwardly extending tubes *o, p* connected to another similar plate *g*, which again is connected, by bent metal strips *f, h*, to a plate *e*, which carries a pair of pendent tubes *r, s* united by a plate *c* at the bottom. This latter plate is connected, by strips *b, d*, to a plate *a* which is adjustable vertically by a screw and hand-wheel.



**2760. Herscher, C.** Feb. 12.

FIG. 1.



*Heating liquids.*—Relates to sterilizing or disinfecting apparatus particularly applicable for

sterilizing expectorated matter and disinfecting spittoons, bedclothes, linen used in dressings, surgical instruments, &c. The contaminated articles are placed in a chamber B, wherein they are treated with a boiling caustic lye or any suitable antiseptic liquid, or pure water. The vessel B is connected to a boiler A, containing the water or antiseptic liquid and heated by the furnace shown, by tubes I and J, the first passing from the bottom of the vessel B to a point a little above the level *c d* in the boiler A, while the second passes from the top of the vessel B to a point a little below the level *c d*. By these means the boiling liquid is caused to circulate. The vessel B has a perforated false bottom F, an internal basket G for collecting the scum, and an overflow pipe L, M, the lower part of which may be used as a discharge pipe by opening the valve N. The boiler is fitted with a steam-escape pipe E, having a tap S. A water reservoir C, connected to the vessel B by a pipe O and heated by the furnace flue P, supplies water for cleansing the articles after disinfection.

**2997. Matthews, W., Yates, J., and Yates, W.** Feb. 16.

*Heating buildings.*—Radiators

are built up of vertical or horizontal pipes of other than circular section, provided with longitudinal gills or ribs. When vertical pipes are employed they may have horizontal flanged openings at top and bottom, by which they are coupled together, and each may be cast with a section of a plinth or pedestal on which it stands.



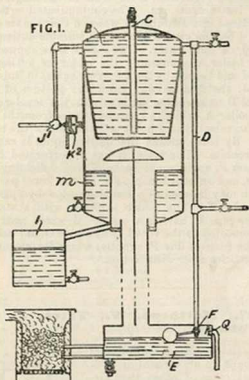
FIG. 3

**3009. Oldroyd, E.** Feb. 16. *Drawings to Specification.*

*Heating buildings.*—Relates to means for warming and ventilating hospitals and other buildings. In, say, a public building, a conduit or culvert is constructed all round the basement parallel to the outer walls. This is supplied with fresh air by short shafts in each wall having gratings at the ground level. From this culvert the air passes up through numerous gratings into a heating-chamber, also passing round the building, and from this chamber vertical shafts, in the walls or otherwise, carry the heated air to the various floors. Similar pipes or shafts remove cold or vitiated air and convey it to a sub-basement chamber, from which it may be re-admitted to the heating-chamber, so that the same air is continually circulated. Or it may be led from the cold-air chamber to a shaft in which an artificial draught is created by a fan driven by a gas or other motor, steam pipes, a heating-boiler flue, or gas jets. In summer the arrangement can be used solely for ventilating purposes, by throwing out the heating-apparatus. Hot-water or steam pipes to heat the air traverse the heating-chamber described above.



3013. **Hunting, N.** Feb. 16.



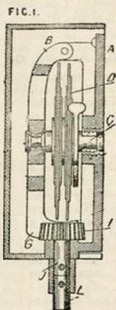
*Heating water.*—Relates to apparatus for distilling and heating water for domestic or other purposes. A hot-water tank E is heated by a domestic fire or other means in the ordinary way, and the vapour generated is absorbed by a current of air. This air is cooled by coming into contact with a tank B having a constant supply of water through the pipe C. The cooled air deposits its moisture on the sides and bottom of the tank B, and the collected moisture runs down into the annular reservoir m and thence into the tank L. The tank B serves as a reservoir of hot-water for the house. The cooled air sinks again into the tank E, and is again heated and charged with water vapour. An automatic device is provided for running off water from the tank B, when it becomes too hot, by causing the increased pressure of the air, due to the increased temperature, to act on a diaphragm K<sup>2</sup> connected to a valve J<sup>1</sup>. A modified arrangement of apparatus and automatic device is also described.

3035. **Lake, H. H.,** [Consolidated Car Heating Co.]. Feb. 16.

*Thermostats.*—Relates to a liquid compound for use in the thermic cells of thermostats. The compound is made up of two or more liquids having their boiling points at "progressively higher degrees" below or near the temperature at which it is desired to act. The liquid is used in such proportion to the capacity of the cell as to allow of its entire vaporization at normal temperatures.

3036. **Lake, H. H.,** [Consolidated Car Heating Co.]. Feb. 16.

*Thermostats.*—Relates to transmitting-mechanism for actuating a valve or damper. The sensitive cells D are adjustable in position in the casing A by means of a screw C, and are connected to a lever B which has a rack at the free end G gearing with a pinion I on a spindle J coupled to a shaft L or geared to it in any other manner. For operating a screw-down valve, the shaft L is coupled to the valve spindle by a sleeve which allows endwise motion of the spindle as the valve opens or closes.

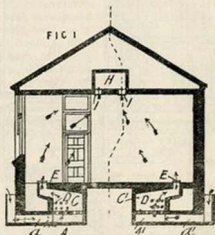


3043. **Byrom, W. A.,** [Bère, A.]. Feb. 16.

*Heating water.*—Boiler tubes and other tubes used in heating and condensing apparatus are constructed with internal longitudinal ribs. Fig. 1 shows one arrangement, where two ribs are employed. In no case are there more than four projections provided.



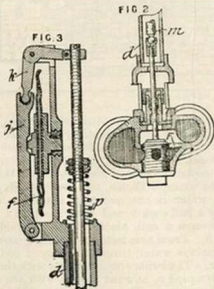
3060. **Oldroyd, E.** Feb. 17.



*Heating air; heating buildings.*—Relates to warming, ventilating, and disinfecting the foul air

from hospital wards, public halls, workshops, and churches. As applied to a hospital, air enters longitudinal culverts A, A' under the floor by grated openings a, a', and passes into upper chambers C, C' in which it is heated by steam or hot-water pipes D, D before passing into the ward through grated openings E, E, placed preferably under the beds. The foul air passes away by openings I, I in the ceiling, preferably between the beds, into a passage H, which leads it to an exhausting and disinfecting furnace placed in the base of an upcast shaft.

**3132. Lake, H. H.,** [*Consolidated Car Heating Co.*]. Feb. 17.



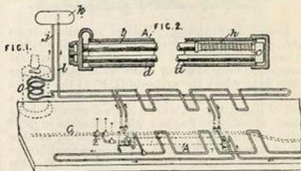
*Thermostats.*—Relates to thermostatic arrangements for use in a system for heating railway vehicles by steam. The valve casing has two branches separated by a diaphragm F, into which, through an opening on the bottom, is screwed a hollow perforated plug, the upper end of which forms the valve seating. The casing is rigidly connected to the casing or framing of the thermostat by a tube d. The sensitive cell f is screwed to the casing so as to be adjustable, and bears against a pivoted lever j, jointed to a bell crank k which operates a spindle m, ball-jointed to the valve spindle. The upper end of the spindle m is screwed through a nut carried by the forked end of the lever k to allow of adjustment. The valve is normally held open by a spring p.

**3257. Mirrlees, W. J., and Liversedge, A. J.** Feb. 19. *Drawings to Specification.*

*Heating liquids.*—The vapours arising from the concentration of liquors are utilized to effect other operations upon the same or other liquids, e.g., the vapours arising from the concentration of waste or other liquids from soap and candle works, paper

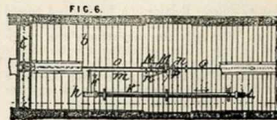
works, distilleries, sugar works, wool scouring, the manufacture of meat extracts, &c. are utilized for heating or otherwise treating other liquids or substances, such as for boiling meat to obtain meat extract, heating materials for the manufacture of candles, &c.

**3426. Lake, H. H.,** [*Consolidated Car Heating Co.*]. Feb. 22.



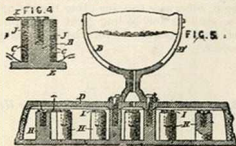
*Heating water for warming railway vehicles.* A perspective view of the apparatus as applied to the floor of a car is shown. The circulating-pipes are connected to a main heater A placed beneath the floor and connected by the steam pipe E to the main steam pipe C from the locomotive. A second heater is formed by the stove O which causes the water to ascend the pipe j into the mixer k and then return through the pipe l to the main heater A. The heater A consists of a casing through which steam pipes b pass and return by the bends c through the pipes d, the heating-water circulating round the outside of the pipes. The expansion and contraction of the pipes is provided for by the corrugated part h.

**3473. Eastman, W. E.** Feb. 23.



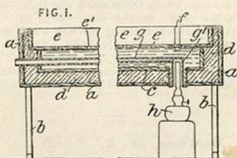
*Thermostats.*—Relates to means for regulating the temperature in railway refrigerator cars or the like. A brass tube K is fixed at the end h and connected by springs to an iron rod L enclosed in it. The rod is pivoted to a lever k, the motion of which reciprocates a rod m and through it the rods o, which are connected to valves C in the cold-air supply pipe. The connection n between the rods n and o is adjustable by a nut P; a pointer N moving over a dial M indicates the temperature to which the apparatus is set.

3496. Mitchell, W. Feb. 23.



*Heating by electricity.*—Relates to tailor's irons and other smoothing-devices heated by electricity. A metal base-plate E is fitted with pillars H covered in by asbestos or other walls, and by a top plate D to which the supports B, B' of the wooden handle are screwed. Upon each pillar is wound a coil of naked wire C, which is then covered by a sheet of asbestos J upon which another coil of wire is wound, and so on, until a sufficient number of coils has been provided. The wire then passes into the next pillar of the series, and the two ends are brought through the hole in the top and through the guide-passage shown in the handle supports B, B' for connection with the source of electricity. The pillars are joined at the top by bridge-pieces I which keep the coils in position.

3586. Greig, O. Feb. 24.



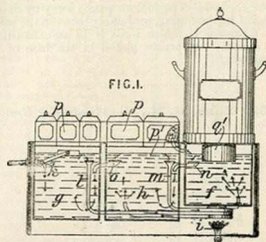
*Heating water.*—Relates to a forcing-bed heated by hot water, and applicable also for incubating purposes. The apparatus consists of a case a supported on legs b and containing a water tank c surrounded by coco-nut fibre d or other suitable non-conductor. A tray e is placed over the tank c for holding the pots or seed pans, or the eggs for incubation. The bottom of the tray e is perforated at e', and a tube f is supplied for ascertaining the depth of water in the tank or for siphoning it out. The tank is heated by a lamp h or equivalent source of heat. The lamp is placed beneath a funnel g' surrounded by a water jacket. An expanding or trumpet-shaped heating-flue g is attached to the funnel g', and passes through the water tank to the outside of the case a.

4224. Leydecker, H. March 3. Drawings to Specification.

*Heating air.*—Air for use in a drying-chamber is

heated by pipes through which is passed heated air which has been used for drying in another drying-chamber.

4361. Down, J. March 5.



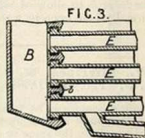
*Heating liquids.*—A longitudinal section of the apparatus, which is particularly applicable for heating water and other liquids for restaurants and public-houses, is shown. A double casing, containing some non-conductor of heat, encloses a boiler f, and, in the example shown, two water tanks g and h. Cold water is automatically supplied to the former by a ball cock k, and from it a pipe l leads water through a coil, placed under the boiler, to the tank h. From this latter a similarly-arranged pipe m conveys water, through a second coil, into the boiler. The boiler communicates with the tank h through a pipe n, and the tank h with the other g through a pipe o. The water in the coils and in the boiler is heated by a gas burner i and a continuous circulation is maintained, the water in the tank h being intermediate in temperature between the boiler and the other tank. Cooking or food-warming vessels p, p' are placed over the tanks g and h, and may be supplied with steam from the boiler by a pipe p'. A coffee or like urn placed over the boiler has a well q' dipping into it. Hot water may be drawn off from the boiler through a cock.

4929. Starmer, E. R. March 12.

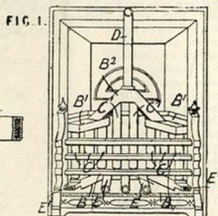
*Heating air;*

*heating water.*—

On the bottom of an ordinary fire-place is placed a shallow box B, Fig. 1, connected to a pair of upper boxes B', B' by pipes C. A breeches pipe B', connected to these upper boxes and also to the lower

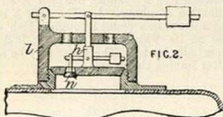


one by pipes C', C', communicates with a pipe D which conveys the heated air to the apartments to be warmed. Air enters the lower box by openings E' and also through pipes E. These latter may be



rectangular and connected to the box B as shown in Figs. 3 and 4. Each has a tapered flange C on each side, and is slipped behind under ribs *b* on the box. This air-heater may be modified in form, and may be placed in the chimney, in which case it consists of two hollow rings connected by vertical tubes. It may be swung into a recess to allow the chimney to be swept. A similar arrangement to the above may be used to heat water.

5222. Würfler, F. March 16.

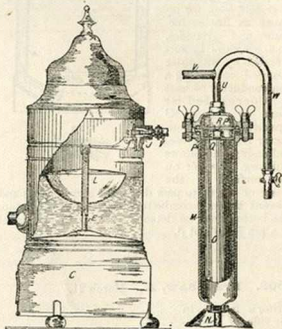


*Hot-water bottles, relief valves for.* Relates to combined maximum and minimum pressure valves. Fig. 2 shows a form specially suited for steam boilers. The large lift valve under the perforated dome *l*, which opens when the pressure exceeds the power of the weight on the external lever, contains a small poppet valve *n* with counter-weighted beam fulcrumed in the stem *h* of the lift valve. This latter valve opens downwards when the internal pressure falls below that of the atmosphere. Instead of weights springs may be used, especially when the valves are applied to warming bottles.

5232. Caddell, W. E. March 16.

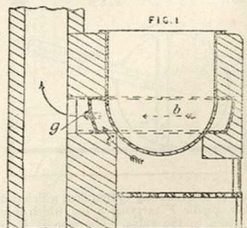
*Heating water.*—Relates to a combined hot-water urn and filter, applicable for tea rooms &c. The urn, which stands on a base C, is supplied by a

ball cock J the float L of which slides on a spindle E within the urn. Filtered water is supplied to the cock by a pipe Y which is connected to a filter M supplied by a pipe N. The filtering-medium



consists preferably of a block O of kieselguhr attached by a short tube P and a nut to a plate Q which is clamped between the cover R and the casing of the filter. The outlet tube U has a branch W from which drinking-water may be drawn off.

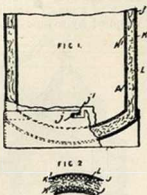
5371. Atkinson, J. March 18.



*Boiling pans.*—A cast-iron flue *b* is built into the brickwork, having an opening *c* in the lower flange for the entry of the furnace gases. Separated from this opening by a mid-feather is a branch *g* leading to the chimney. The flue may be cast on the boiler or may be separate.

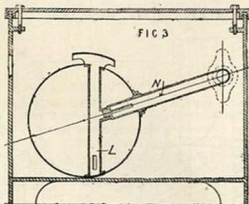
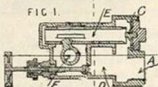
5450. **Hoglen, G. W.** March 19.

*Non-conducting coverings.*—To prevent the freezing of liquids in vessels, such for instance as fire extinguishers and grenades, the vessel is surrounded by an outer casing J containing a non-conductor of heat L. Corrugated tar board or paper K<sup>1</sup> separates the non-conductor from the vessel and casing and allows moisture or water on the surface of the vessel or casing to pass down the corrugations and prevent the non-conductor from becoming damp. The bottom may be detachably fixed to the vessel by a pin j and slot j<sup>1</sup>.



5509. **Bradshaw, A.** March 21.

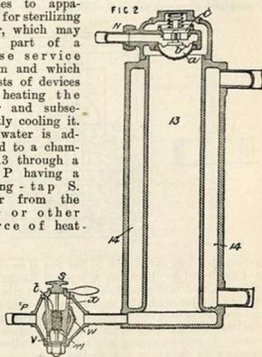
*Steam traps.*—In one side of the receiver is a casting D with a steam and water connection A. In this casting is a hollow valve E which can be pressed against, or withdrawn from, a



woodite or other seating C, by a float which rotates a hollow spindle F carrying a lug which engages with a slot in the valve. The spindle F communicates with a hollow arm N carrying the float. When the valve is in the position shown in Fig. 1, water of condensation flows from the inlet A through the valve, spindle, and arm to the float, from which it finally flows into the receiver. Steam passing through the valve discharges the water from the float through the pipe L, and the float rises and shuts the valve and so prevents the waste of steam.

5589. **West, S. L.** March 22.

*Heating water.*—Relates to apparatus for sterilizing water, which may form part of a house service system and which consists of devices for heating the water and subsequently cooling it. The water is admitted to a chamber 13 through a pipe P having a filtering tap S. Water from the boiler or other source of heat.



circulates in the annular chamber 14 and boils the water inside, which flows away through the pipe N controlled by a valve which only opens when the water has reached boiling point. The valve in question c is actuated by mercury or other substance enclosed in a chamber a which is covered in by a flexible diaphragm b. The pipe N is connected to a worm in a vessel through which water may pass on its way to the pipe P, and thus become partially heated. The water may be cooled by ice after leaving the worm.

5619. **Fisher, J. A.** March 22.

*Non-conducting coverings.*—Long bags of cotton or other material are filled with cork or other non-conducting material, and are secured between two sheets of asbestos cloth, or canvas, to form bagging for covering boilers &c.

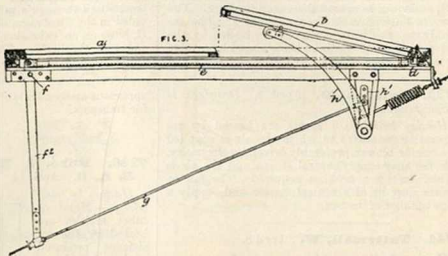
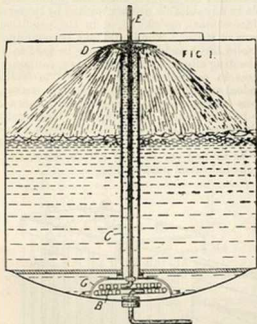
5757. **Birnbaum, T.** March 24.

*Hot-water bottles.*—The body is composed of steam-vulcanized india-rubber, and is covered with an india-rubber-coated fabric, preferably melton, felt, or flannel, which has on one side a dry-heat-vulcanizing dough. The two are caused to adhere by some means, and are then vulcanized together by dry heat. The cloth flanges are then bound or braided.

**5980. Anderson, J.** Feb. 17.

*Thermostats.*—Relates to means for automatically controlling the opening and closing of ventilators of greenhouses, vineries, or like buildings, in order to regulate the temperature.

A bar *e* of zinc or other suitable metal is fixed at one end *d* and is connected at the other end with a lever *f*<sup>2</sup> centered at *f*. A rod *g* connects the lever *f*<sup>2</sup> with the lever *h* of the ventilator *b*, shown as fitted in the window *a* of a greenhouse. As the rod *e* varies in length, according to the temperature, the ventilator *b* is more or less opened. The ventilator is preferably secured to the lever *h*, to hold it in position against wind pressure. In some cases the rod *g* may be connected with a weighted or spring lever as shown, and the invention may be otherwise modified.

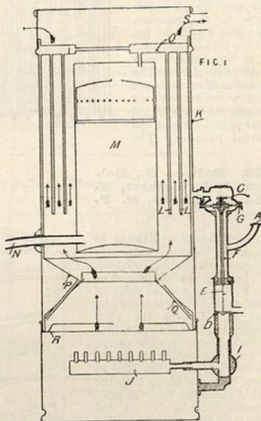

**6291. Brennand, J.** April 1.


*Heating liquids; boiling-pans.*—Relates to kiers and similar vessels for heating liquids. A steam coil *B* is employed to heat the water. It is contained in a cage or perforated casing *G*, and is supplied by a pipe *E* surrounded by a circulating-pipe *C*. Open vessels have a baffle-plate *D* to deflect the water.

**6455. Winterlood, J.** April 4.

*Heating water.*—Water is admitted through a valve *C* to a hollow casing *K*, and passes through tubes *O* to a boiler *M* and outlet *N*. The casing *K*

is provided with an internal projecting part *P*, and the tubes *O* carry inner hollow cylinders *L, L*, the products of combustion from the burners *J* passing



between these parts to the outlet *S*. Condensed products of combustion collect on the part *P* and pass through tubes *Q* to a gutter *R*, provided with

an outlet. The boiler M contains a perforated bell, as shown, to spread the entering water. The burners J are movable about a joint I. The gas supply to the water-heater is controlled by the water supply. The gas inlet being closed by a valve D, except when this is lifted by a rod E and

india-rubber diaphragm G, below which the water is admitted through a tube A. An opening is provided in the diaphragm G, and covered by a valve C, loose on an extension of the rod E, to admit water to the heater. The rod E is packed by a surrounding flexible tube F.

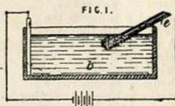
**6733. Rylands, D.** April 8. *Drawings to Specification.*

*Heating buildings.*—Houses are heated by regenerative gas stoves to which the air is supplied by a fan or blower, preferably driven by electricity. The fan may supply several stoves, and the air is turned on by a cock as required. The fan or blower may be at a central station and supply a large number of houses.

apparatus easily admits of being reduced to sections for transport.

**7226. Hoho, C. H. A., and Lagrange, E. A. C.** April 14.

*Heating by electricity.*—Metal or other articles are heated by the resistance produced at the point of contact of the body or electrode *e* with a conducting or suitable liquid *b* forming part of the circuit. With a high electromotive force a gaseous envelope forms round the body *e* to be heated, increasing the resistance at this point. The contact between the solid and liquid may be made in any suitable manner, such as by immersion, surface contact, sprinkling, or in the condition of vapour or steam. The liquid may be contained in the solid body, and insulators may be used to limit the heating effect. The liquid may contain substances in solution, suspension, &c. to facilitate chemical and physical action, and moist, soaked, or porous bodies, such as sponges, sand, stones, &c., may be used instead of the liquid. The articles or bodies to be heated may be contained in a casing or mould forming the electrode *e*. The method may be applied for heating metals, glass, &c. for various industrial purposes.



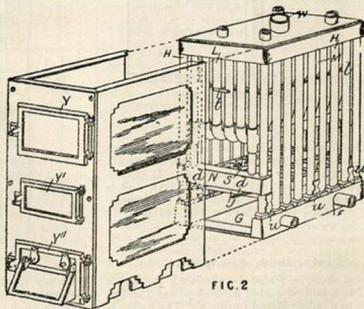
**6744. Tattersall, W.** April 8.

*Heating liquids and gases,* surface apparatus for. Parallel plates have their vertical edges flanged and joined together at D by riveting &c., the horizontal edges being flanged in the opposite direction and joined together at C, thus forming alternate series of passages with openings at right-angles to one another. The plates may be so cut that the corners are filled up, or the corners may be otherwise closed. The heating-medium is passed through one set of passages, and the liquid or gas passed through the adjacent passages. The



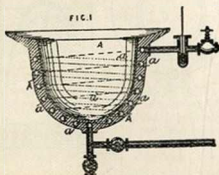
**7359. Bolton, G., Bolton, J. R., Foskett, W. A., and Bishop, N. P.** April 19.

*Heating water.*—Relates to boilers for heating water for hot-water circulating systems for heating buildings. The base F, forming three sides of a rectangle, is connected by pipes H, H with the top chamber in the centre of which is an opening *w* for the escape of the combustion products. The front pipes L are bent as shown, and pass along over the grate J and down into the base. A water chamber N at the grate level is in communication with both upper and lower water chambers. Closed tubes M hang down from the top chamber. The casing consists



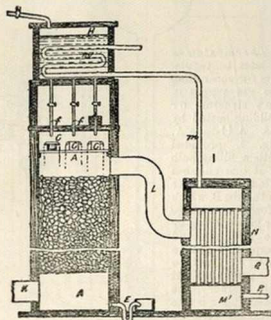
of outer and inner iron plates with asbestos between, and has flue, fire, and asphit doors Y, Y', and Y'' respectively.

**7388. Frederking, T.** April 19.



*Boiling-pans.*—Vessels for cooking and evaporating are constructed of a series of metallic heating-pipes *a* embedded in a good heat-conducting material *A*, such as a metal or metallic alloy. The pipes may be arranged between double walls and the space filled up with molten metal, or metal may be cast around the pipes in a mould. The vessel is heated by passing a heated fluid through the pipes *a*.

**7393. Hurter, F.** April 19.



*Heating gases.*—Relates to means for drying cooling, or heating chlorine to be used in the manufacture of bleaching-powder, so that it may be dry and of a uniform temperature at all times of the year. The invention is not restricted to particular apparatus, but the apparatus shown is suitable. Chlorine is introduced through a tube *K*

to a tower *A* packed with coke or the like, down which trickles cooled sulphuric acid. The latter is charged into a receptacle *H*, and is allowed to pass as desired down tubes *f* on to distributors *C*. The dried and partially cooled gas passes through *L* to a vessel *N* where it is further cooled by refrigerated brine forced into the lower compartment *M'* by the tube *P* and up through the column. The dried and cooled gas escapes through *Q* to the bleaching-powder chambers, and the cooling-liquid passes away through *m*, first cooling the acid in the cistern *H*. If it is desired to raise the temperature of the chlorine gas, warm water or other liquid is passed through the tube *P*, the vessel *N*, and the tube *m*. All the internal parts of the vessels and their connections are coated with lead, or formed of earthenware or the like.

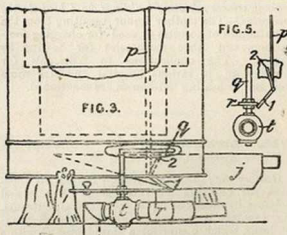
**7450. Laing, J.** April 20.

*Heating liquids.*—Relates to a boiler in the form of an upright cross in section. The two horizontal wings, under which the fire is placed, forms the boiling-chamber, the top part serves as the liquid, vapour, or steam outlet, and the lower tail-piece receives the precipitated matters, which may be removed by a run-off cock fitted at the bottom of the tail-piece.

**7473. Aston, C. H.** April 20. *Drawings to Specification.*

*Heating air; heating water.*—Molten slag is caused to flow through a tube which is enclosed in another tube or chamber in which air or water is heated. The slag is disintegrated by steam jets while passing through the tube.

**7602. Bailey, T.** April 22.



*Heating liquids.*—In geysers for heating water and the like, a cylindrical heater *c*, Fig. 1,



provided [with cross-tubes *a*, is fed from the cistern *l* above by means of the pipe *b*; a pipe *g* connected to *w* allows the steam to escape. A casing *k* surrounding the heater *w* allows the products of combustion to escape by means of the tube shown, after passing round the cistern *l*. The cocks *x, y* are for drawing-off water from the boiler. The burner, Figs. 3 and 5, is of the ordinary type provided with a pilot burner *q* the lower part of which forms the plug of the gas cock *l*. By turning the small burner *q* over the large one *j* by means of the lever *r*, gas is admitted to the burner *j* and is lighted by the pilot burner *q*. At the same time the bell-crank lever *1* pivoted at 2 moves the rod *p* attached to a shutter, which latter uncloses an opening for the waste gases to escape away into the chimney.

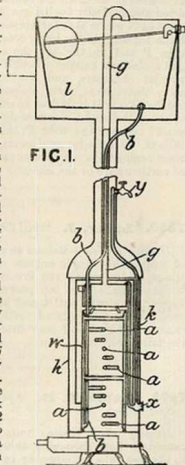
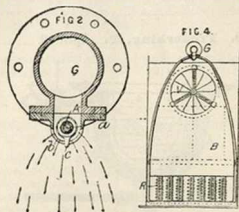


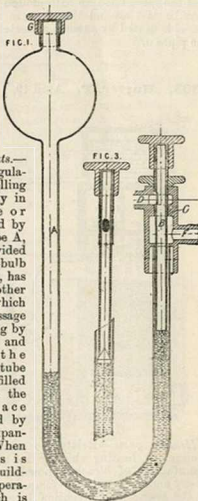
FIG. 1.

the slits to clear them of solid deposits. The spray-producer *G* is mounted at the top of a chamber *B*, Fig. 4, through which air is forced by



a fan *V*; or the spray may pass over coils *R* containing a heating or a cooling fluid or steam or vapour to be condensed.

8298. Phillips, W. May 3.



*Thermostats*.—Relates to regulators for controlling the gas supply in any structure or building heated by gas. A U-tube *A*, Fig. 1, provided with a filling-bulb *G* at one end, has fitted to its other end a tube *B*, which affords a passage for gas entering by the inlet *D*, and escaping by the outlet *F*. The tube *A* is partially filled with mercury, the remaining space being occupied by a thermally-expansive fluid. When the apparatus is placed in the building the temperature of which is required to regulate, the mercury covers or uncovers the end of

7614. Heslop, G. April 22.

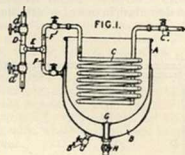
*Footwarmers; heating buildings &c.; heat-storing apparatus*.—The mother liquor resulting from the manufacture of acetates is used for charging footwarmers and other receptacles for heating by liquids. The applications to footstools for churches &c., to various hospital and sick room uses, and to heating hot-houses are mentioned.

7713. Lightfoot, T. B., [Gesellschaft für Ländes Eismaschinen]. April 23.

*Heating air; heating liquids*.—Relates to apparatus for effecting the interchange of heat and moisture by means of liquid spray and air currents. Fig. 2 shows a transverse section through the spray-producer, which comprises a liquid pipe *G* with a semicircular extension *a* provided at intervals with narrow slits *b* for the passage of the liquid; tongues *c* on a shaft *A* are worked to and fro in

the tube B, according to the volume of the heated fluid contained in the tube A, thereby controlling the supply of gas to the burners which flows through the pipes D, B, and F. Further to control the gas supply, the orifice in the side of the tube B can be constricted by rotating the tube B in its casing; a conical valve, Fig. 3, floating on the enclosed fluid, may be used for closing the tube B.

the heating operation is finished the steam is shut off and cold water is admitted to the coil by the



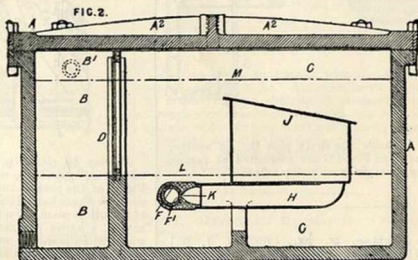
stop-cock *d* in order to cool the contents of the pan A. The mass is then withdrawn through the outlet pipe G and tap H. In a modification, the pan is mounted upon trunnions, so that it can be tipped over to discharge its contents. High-pressure steam is preferably used.

**8688. Filshill, J. May 7.**

*Boiling-pans.*—Relates to apparatus for making jam, marmalade, &c. The steam-jacketed pan A has placed inside it a coil C, through which steam can be passed from the pipe D. The fruit and other ingredients having been placed in the pan A, steam is admitted through the stop-cock *d* into the pipes E, F, and the coil C, finally passing away through the stop-cock C'. At the same time steam is admitted into the jacket B through the pipe F, and escapes by the stop-cock B'. When

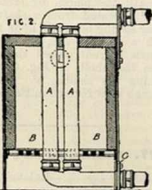
**8690. Wyllie, J. May 7.**

*Steam traps.*—The steam is led into the compartment B of the steam trap A by the inlet pipe B', for the purpose of depositing any sediment, before passing through the wire-gauze partition D, to the steam trap proper C. The steam condenses in the chamber C, and water accumulates in quantity sufficient to float the open-topped gauze-covered pan J, pivoted on the outlet pipe F, until further motion is rendered impossible, by the cover A<sup>2</sup> or other stop. The water then enters the pan J and causes it to sink to the bottom, whereupon the opening K of the tube H comes over the opening F' in the outlet pipe F, allowing the condensed water an outlet through the pipe F. When the water level has fallen to the line L, the gauze covered pan J with its attached pipe H is again floated and then closes the outlet pipe until the higher level M is reached.



**8790. Fowell, B. May 10.**

*Heating water.*—Relates to an improved form of hot-water boiler and furnace for heating buildings and structures. Two or more vertical tubes A, situated in the furnace B, are connected at the top and bottom by the flanges

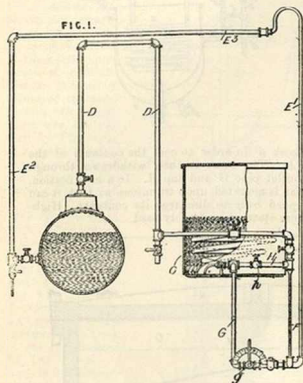


extremities C to the hot-water pipes. Tie-rods passing through the tubes A and terminating at the elbows keep the several members together.

**8853. Burnham, W. May 10.**

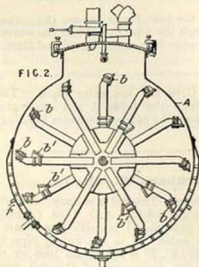
*Heating water.*—The "steam hoop" described in Specification No. 18,435, A.D. 1888, (*Abridgment Class Steam generators*), is applied to steam coils used to heat water. D is the supply pipe to the coil C, and E<sup>1</sup>, E<sup>2</sup> is the steam loop or return pipe. G is the drain pipe of the coil, provided with a valve *g* by which the apparatus is regulated.

F is a pipe supplying steam direct to the return pipe. It is connected to the lower end of the coil by a pipe H with a valve *h*. Slight modifications are shown and described, in one of which the steam



pipe F is inside the drain pipe G. In another form, the pipes F and G are connected at various points by short pipes with stop valves.

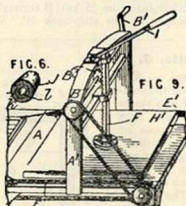
3952. Justice, P. M., [Billings, A. W.].  
May 11.



Boiling-pans.—A vessel A for use in brewing is

provided with a lid so that it can be used as a mashing-vessel or as a boiling-copper. It is jacketed, as shown, at *f*, and is of the shape shown in cross-section in Fig. 2, having a curved top and narrow opening to prevent boiling over. The lid J is made in three sections, the central one fixed and provided with openings communicating with the vapour pipe and inlet pipe for the material, while the side sections are removable and suitable means are provided for clamping them to the vessel. The vessel is provided with two sets of rotary agitators *b*<sup>1</sup>, *b*<sup>2</sup>, and with pipes for the admission of steam and water to both the vessel A and jacket *f*.

9300. Mitchell, W. May 17.

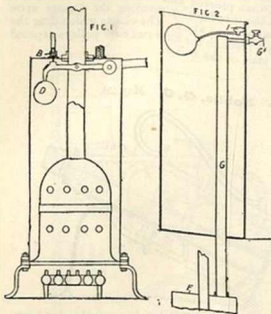


Heating by electricity.—Consists of an electrically-heated stereotype-matrix press. The platen H<sup>1</sup>, Fig. 9, of the press is hollow, and is provided with studs which project vertically from the inner surface of its bottom plate. Conical or other shells J, Fig. 6, having a series of insulating-partitions *k* upon which wire *l* is wound successively, are supported by the studs. The platen H<sup>1</sup>, Fig. 9, is secured to a rack F, which is operated by means of a pinion B<sup>2</sup>, mounted on a shaft B provided with a handle B<sup>1</sup>; additional pressure may be obtained, when required, by means of a lever I pivoted to the frame A<sup>1</sup>. The chase with its type is placed on a travelling carriage running on rails up to the table A of the press, and the chase is pulled into position beneath the platen by means of endless chains E, E<sup>1</sup> operated from a shaft B. The moistened paper having been laid upon the type, and covered with a blanket &c., the platen, heated by the electric current passed through the wire wound upon the shells J, Fig. 6, is brought down by turning the handle B<sup>1</sup>. The moisture escapes through slots formed in the bed of the press.

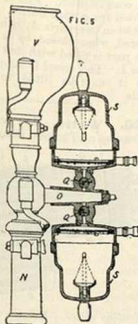
9377. Childs, J., and Jones, C. J. May 17.

Heating liquids.—Relates to apparatus used in the making of infusions and maintaining a supply

of hot water or liquid, and consists, firstly, in an improvement on the gas-heated steam boiler described in Specification No. 13,952, A.D. 1884.



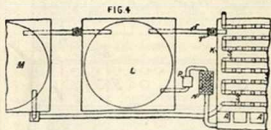
As shown in Fig. 1, the water in the boiler is kept at a uniform level by controlling the supply valve B by means of a float consisting of a partially counterbalanced ball D of stone, glazed porcelain, or like impervious material. Secondly, the invention comprises a modification of the apparatus described in Specification No. 4834, A.D. 1885, in which vessels containing liquids &c. are heated by steam jackets. The vessel containing the liquid, Fig. 2, is heated by a steam pipe G rising from a boiler F, such as is shown in Fig. 1, and provided at its upper end with a tap G<sup>1</sup> for allowing the escape of air. When used for maintaining a constant supply of hot water, the apparatus is provided with a ball cock I. Urns may be heated in this or a similar manner. Thirdly, the invention consists in improvements on the infusion-making apparatus described in Specifications No. 14,578, A.D. 1888, and No. 14,405, A.D. 1890. The infusion vessels S, Fig. 5, are mounted so as to turn upon a joint pin O fixed to a standard N and provided with two passages, one connected with a hot-water and the other with a steam



supply. By means of a multiple-way cock Q, hot water is first admitted to the vessel below its perforated false bottom, on which the material to be infused rests, during which operation air escapes through a pipe leading from the top. The cock is then closed and the vessel rocked on the pin O. After a sufficient time the cock is turned so as to admit steam to the top of the vessel for forcing the infusion out into a receiver, which is kept heated in the manner shown in Fig. 2. The apparatus is provided with an urn or vessel V for containing milk, which may be kept heated in the same manner.

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9378. Lidgerwood, W. van V. May 17.

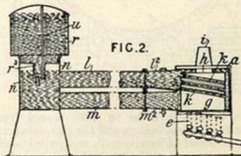


Heating air in connection with the drying of cereals, spices, fish, &c. Atmospheric air is drawn by a fan P into a chamber K containing pipes through which the moist air which has been used escapes, and is thereby dried and heated; it passes thence through the drying-chambers A, and then through a heating-apparatus N<sup>1</sup> and into the drying-chamber L.

9416. Herscher, C. May 18. Drawings to Specification.

Non-conducting coverings.—Relates to apparatus for disinfecting articles by steam. The disinfecting-chamber is cased with a covering of wood having sheets of cork or other insulating-material inside.

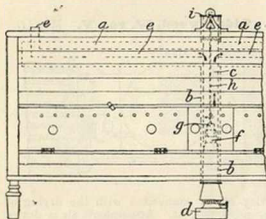
9449. Williams, W. H. P. [trading as W H. Parker]. May 18.



Heating buildings; heating water.—As applied to heating buildings, the apparatus consists of a

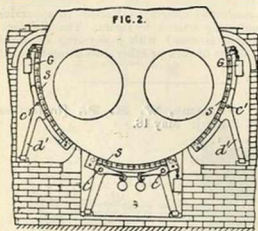
water-jacketed tubular boiler *a* provided with inclined oval or circular tubes *k* extending across the inner firebox *g*. The boiler is heated by Bunsen gas burners *e*, the products of combustion escaping through the flue *h* and the chimney *i*. The hot water from the boiler circulates through the upper set of tubes *l*, returning back to the boiler through the expansion chamber *n* and the lower set of tubes *m*, *m*<sup>2</sup>. Instead of gas burners *e*, oil lamps may be used. The method can be applied for heating water for baths or for domestic purposes.

9560. Mann, S. May 19.



*Thermostats for incubators.* The temperature is regulated by a damper *i* on the top of the flue *c* operated by a rod *h* attached to an inverted glass *g* with ether dipping into mercury in a receptacle *f*.

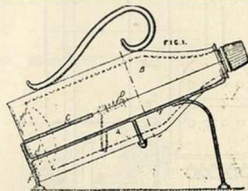
9585. Ormston, T., and Rushworth, L. May 20.



*Heating water.*—In order to remove soot from the outside of steam boilers and the like, scraping-blocks *s*, mounted on carriages *d'*, are pulled along the flues in contact with the boiler plates. The blocks, of prismatic form, are threaded and secured to frames in such a way as to be pressed against the

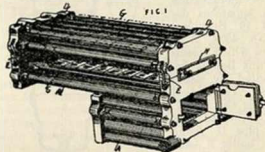
plates by weights *G*, and yet to yield to protuberances on the boiler surfaces. This freedom of movement is effected in the lower flues by mounting one end of each of the chains of scraping-blocks upon pivoted and counterbalanced levers *c*, and in the side flues by pivoting the frames upon their supports as at *c*<sup>1</sup>. The chains which drag the carriages through the flues run over pulleys exposed at the ends of the boiler.

9937. Nobile, G. C. May 26.



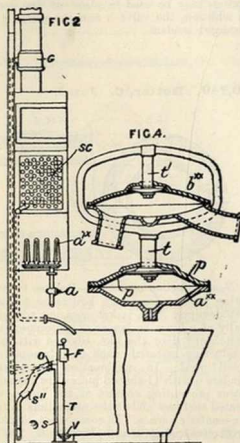
*Heating liquids.*—Relates to apparatus for keeping wine or other liquids at a suitable temperature for consumption. Fig. 1 shows the apparatus adapted for a wine bottle. The jacketed vessel is formed in two parts *A*, *B* hinged together at *C* and secured, when closed, by a pin *D*. The jacket of each part is filled with hot water through the plug holes *I*. The vessel is supported on a cradle *F* so that it may be tilted to pour wine from the bottle.

9940. White, L., and Baker, W. Y., [trading as Thames Bank Iron Co.] May 26.



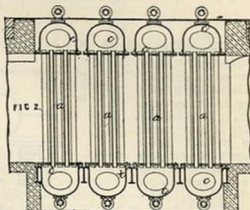
*Heating water.*—Relates to means for increasing the heating-surface in hot-water tubular boilers of the type described in Specification No. 9090, A. D. 1888. Additional layers of tubes *T*, mounted in end water-way castings, can be detachably attached by bolts *E* to the top layer of boiler tubes, so that there is a free water-way throughout. Baffle-plates *G* are placed between the pipes, with open spaces at each end, to cause the heating-gases to pursue a zig-zag course. The sides of the fire-box are composed of hot-water circulating-pipes *A* communicating with the main piping. A door *H* is provided in the front end casting *D* to permit access to the pipes.

10,118. Chaboche, E. M. May 27.



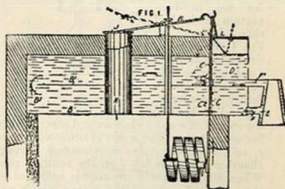
*Heating water for baths.* The gas water-heater SC, Fig. 2, is mounted on a wall above the bath, which turns on a pivot at *c* and may be turned up to enclose the heater &c. when not required. The flue pipe *G* is made with a telescopic section to allow the end of the bath to fit against the wall. The heater consists of a tubular boiler with side baffle-plates to direct the water through the tubes. A drying-chamber for linen &c. is mounted above the heater. The gas burners consist of a series of perforated cones *d*<sup>x</sup> mounted over apertures in a horizontal gas-supply pipe. The gas cock *a* is fitted with a bye-pass so arranged that, when the latter is closed, it automatically locks the main tap. In the water-supply pipe to the boiler a time-screw is fitted to regulate the quantity of water supplied. The gas and water cocks are coupled. In order automatically to cut off the gas supply in the event of the water supply failing, the water main communicates with a chamber *a*<sup>o</sup>, Fig. 4, in which a flexible diaphragm *p* is mounted. This diaphragm carries a rod *t* connected to a second rod *t*, to the lower end of which a diaphragm is attached in a chamber *b*<sup>o</sup>, through which the gas passes. When, as shown, the water is passing through the chamber, the diaphragms are raised and the gas has a free course. Should, however, the water fail, the diaphragms fall and the gas is automatically cut off.

10,169. Muirhead, J. A. May 28.



*Heating water for brewing &c. by waste gases from steam-generator or other furnaces.* The heater consists of a nest or nests of tubes *a*, a connecting boxes *c*, *c* of D section. Water is supplied to the lower boxes by perforated internal pipes and is withdrawn, after heating, from the upper ones, all the connections being arranged to allow for expansion and contraction. Each nest has on each side a vertical bar sliding in guides in the brickwork setting, or in a metal framework, so that it can be easily withdrawn for repairs &c. The pipes are shown as arranged vertically, but they may be horizontal if preferred.

10,449. Ball, E. A., and Kneebone, A. R. June 1.

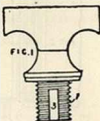


*Thermostats for incubators.* Relates to the construction of an incubator in which the egg drawer is heated by a hot-water tank placed above it. The tank B is divided into two compartments by a vertical partition C having holes *C*<sup>1</sup> and *C*<sup>2</sup> for the circulation of the water through the two compartments. The temperature is controlled by cutting off communication between the two compartments of the tank B by a slide having holes which register with or close the openings *C*<sup>1</sup>, *C*<sup>2</sup> in the partition C. The slide is operated by a lever H actuated by any suitable thermostat in the egg drawer. The lever H also actuates a damper J on an air tube K leading from the egg drawer, and a flap L covering the

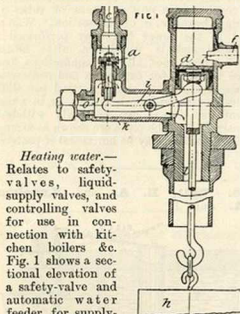
compartment D so as to let any steam that may be generated in the said compartment escape.

10,549. **Milward, G. N.** June 3.

*Heating buildings; heating by water circulation.*—For venting hot-water pipes &c., a threaded vent plug is used having an inclined groove 3, so that, by slightly unscrewing the plug, the venting is effected.



10,553. **Fisher, F. W.** June 2.

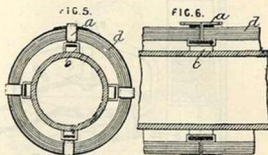


*Heating water.*—

Relates to safety-valves, liquid-supply valves, and controlling valves for use in connection with kitchen boilers &c. Fig. 1 shows a sectional elevation of a safety-valve and automatic water feeder for supplying and controlling the supply of water to houses and other buildings or for other uses. The water is admitted by the pipe *c*, and, when the valve *a* is opened, through the chamber *k* and outlet *l* to the tank or reservoir. When the pressure in the tank is sufficient to raise the weighted piston *d*, the lever *i* which prevents the supply valve *a* from closing is released. The head of water then shuts the valve and cuts off the supply. When the pressure within the chamber *k* is lowered, as, for instance, by drawing off water along the pipe *o*, the piston *d* descends and the supply valve is correspondingly opened. Undue pressure within the chamber *k* is relieved by the piston *d* rising and leaving behind the lever *i* and opening the exhaust aperture *f*. When the arrangement is employed in connection with the hot-water cylinder of a house supply, the steam from the surface of the riser is conveyed to the underside of the piston *d* through suitable pipes. It is found that cold water may be withdrawn through the discharge pipe *o* direct

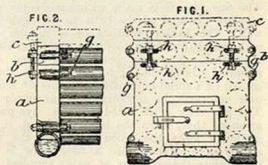
from the main *c* without greatly affecting the hot water within the cylinder. The arrangement of details may be modified; thus, for instance, springs may be used in place of the weight *h*; in addition, the valve *a* and the piston *d* may be arranged tandem.

10,749. **Bötter, C.** June 7.



*Non-conducting coverings.*—Relates to heat-insulating jackets for steam boilers or hot-water or hot-air pipes. The jacket or casing consists essentially of a layer or layers of superposed sheets of pasteboard *d* or the like, covered with some non-conducting material, such as infusorial earth or fossil meal. In combination therewith metal binders *a* with U-shaped pieces are employed, the latter preventing contact of the jacket with the heated surfaces and at the same time forming an air-insulating space. In some cases, outside metal protective casings are employed.

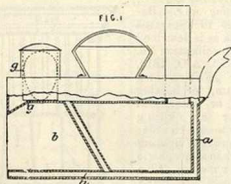
10,759. **Watts, C. J.** June 7.



*Heating water.*—The heating-surface of horizontal tubular hot-water boilers is increased by adding extra layers of circulating tubes connected by hollow waterway castings at their ends. The layer of pipes *b* is connected to hollow end castings by the bolts *g*, and to the boiler *a* by the bolts *h*. The socket joints between the hollow end castings *a* and *b* are made water-tight by rubber washers &c. Any number of layers, such as *c*, may be thus added to the boiler *a*. The Provisional Specification states that plates are interposed between the

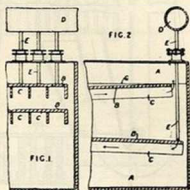
pipes, to cause the heating-gases to travel horizontally between the pipes before escaping to the layer of pipes above.

10,833. Hughes, J., and Ring, J. June 8.



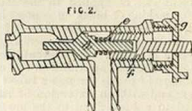
*Heating liquids.*—A portable apparatus for heating water &c. consists of a water chamber *a* surrounding a heating-chamber *b* in which is placed a lamp; or wood or other combustible may be burned in the chamber. The stopper *g* of the filling-aperture may be used as an egg boiler.

10,836. Ross, R. G., Hilliard, J. B., and Paterson, W. June 8.



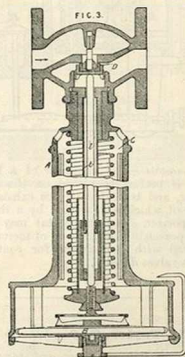
*Heating liquids.*—Relates to apparatus for treating liquids with gases, applicable for heating or boiling liquids by means of hot air. The gas &c. is brought by pipes *D* and passes down pipes *E* to beneath the lower ends of one or more inclined frames or planes *B*, provided with guiding-channels *C*, the frames being immersed in the liquid, which reaches to the level *G*. The gas passes away from the higher end of the inclined planes, and escapes through an opening in the top of the casing *A*.

10,843. Anderson, J. W. June 8.



*Heating water.*—Relates to a combined tap and safety-valve for kitchen boilers. A conical valve *d* is pressed against its seat by the screw plug *f* acting through the spring *e*, the stem of the valve *d* fitting into a corresponding recess in the plug *f*. Any pressure above that fixed by the compression of the spring *e* forces the valve away from its seat and relieves the pressure. The plug *f* has a squared end to enable it to be screwed up or down; by removing a cap *g* the tap can be cleaned.

10,852. Porges, C. A. June 8.

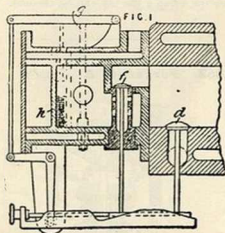


*Thermostats.*—The apparatus consists of a capsule *B* with flexible sides, containing an easily-vaporizable liquid such as chloride of ethyl. An adjustable weight or spring *C* bears upon the flat side of the capsule to regulate the boiling point of the contained liquid. The capsule being placed in any locality, the contained liquid acquires the temperature of the surrounding medium, and its expansion, by moving the rod *l*, may be used to actuate a valve *D* for controlling the supply of steam, hot



air, or water to heating-apparatus, or to regulate the gas supply to heating-stoves. Further, this movement can be applied to the actuation of a lever for making or breaking contact in an electric circuit, whereby the temperature of the locality may be indicated, or a motor operating louvres &c. may be set in action. To prevent the passage of fluid to the thermal apparatus in the casing *A*, the actuating-rod *l* passes through a tube *t* provided at its lower end with an extension of rubber tubing attached to a bush fixed to the lower end of the rod *l*. This device acts as a stuffing-box, and easily allows the vertical adjustment of the rod *l*. In a modification, a diaphragm valve is used.

**11,141. Weyman, J. E., Hitchcock, G., and Drake, J. A.** June 14.



*Thermostats.*—The vaporizer of a hydrocarbon engine is preferably placed on the end of the cylinder, and is heated by the exhaust gases, the passage of which is controlled by a thermostat in the vaporizer. The thermostat may comprise a rod of porcelain *f* or a vessel of mercury *h*, and is connected with mechanism for controlling the exhaust valves *d* and *f*.

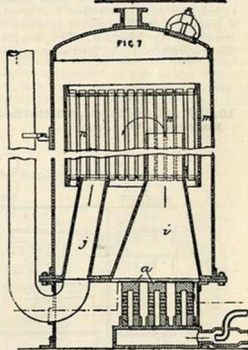
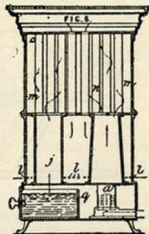
**11,226. Taylor, G. C.** June 15.

*Non-conducting coverings and compositions.*—A fireproof and heat-insulating cement or composition for boilers, flues, &c. and for setting bricks in or relining furnaces consists of a mixture of clean sharp sand, free from oxide of iron and chloride of sodium, asbestos fibres, and silicate of sodium, and water. The composition is applied in the form of a paste, but hardens when heated. It can be rendered soft again by treatment with hot water. The Provisional Specification states that slagwool fibres may be used in place of asbestos. The cement may be used in combination

with the flue covers described in Specification No. 6594, A.D. 1892.

**11,512. Lishman, T.** June 20.

*Heating water; heating air.*—Relates to apparatus such as is described in Specification No. 11,753, A.D. 1819, for generating steam, for heating air or water, and for cooking purposes. In order to prevent lighting back in atmospheric burners, the burners are made in the form of



perforated chambers *a*, Fig. 7, of asbestos or other refractory material. The burners in use become incandescent. An arrangement of such burners may be placed within the furnace of a steam generator or below the water-heater, Fig. 7. This water-heater is traversed by the flues *i* and *j*, the internal heating-chamber *m* being filled with water-tubes *n*. Fig. 5 shows one form of air-heater in which a perforated burner *a* of refractory material is employed. The air to be heated enters the casing *m* through apertures *l* and passes through the tubes *n*, around which the combustion

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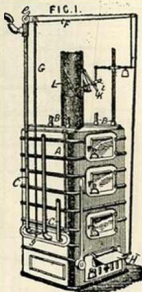
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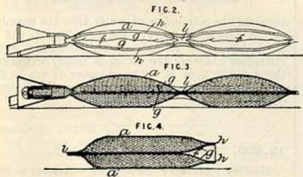
products pass, to the flue *j* and the gas-purifying trough *q*. In a modification of air-heater, the tubes *n* are arranged horizontally.

11,595. **Thompson, W. P.**, [Smith, L. F.].  
June 21.

*Heating water; thermostats.*—Dampers for heating-water boiler furnaces are automatically controlled by thermostatic apparatus. In the Figure, *A* is a boiler, and *B, B* the outflow and *C, c, c* the return pipes of the heating-system. *F* is a lever pivoted on a rod *G* and jointed, at one end, to a lug *e* on the tube *C* and, at the other, connected by rods or chains to the dampers *H, K*, and *L*. Thus the contraction and expansion of the tube *C*, as the temperature of the return water varies, opens or closes the said dampers. As shown, the expansion and contraction of the pipe *C* is employed to operate the dampers, but a rod in the said pipe may be used instead.



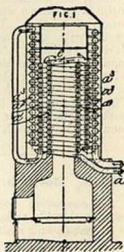
11,642. **Perman, C.** June 21.



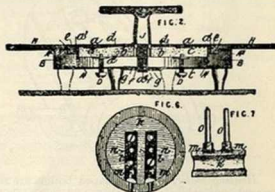
*Hot-water bottles; bed-warmers.*—India-rubber footwarmers for use in beds are provided with pockets *f, f* for the reception of the feet, such pockets being formed by india-rubber sheets *g, g* secured to the outer envelope *a, a* at the edges *h, h, i*. At about the middle *l* the sheets *a, g* are secured together, the connection extending about two-thirds across the bag. A single pocket for both feet may be used, in which case the sheets *a* and *g* are not secured together at *l*.

11,721. **Schmidt, W.** June 23.

*Heating air.*—Fig. 1 shows an arrangement for superheating wet steam and for superheating moist air for steam and air engines. The wet steam or air is admitted by the opening *a* to the first of a series of coils placed above the furnace, the steam ascending in the same direction as the furnace gases. From this first coil *a'* the steam or air enters the second coil *a''*, and, after traversing the latter, passes through the third coil *a'''*. The furnace gases leaving the central flue *e* descend between the first and second coils before passing over and between the elements of the third coil. In a modification, the superheater is arranged immediately above a vertical boiler the furnace of which opens to the superheater. In a third variety, the coils of the superheater are arranged like watch-springs.



12,087. **Schindler-Jenny, F. W.** June 29.



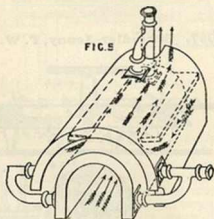
*Heating by electricity; heating water.*—Relates to electric cooking and heating apparatus of the kind described in Specification No. 16,767, A.D. 1891. The non-conducting refractory heating-body *b*, Fig. 2, in which are the grooves *c* for the heating-wires, is provided with a thin mica cover *d*, and is mounted for levelling purposes on screws *D*, fit *d* with discs *d'*, and passing through cross-bars *C* of the frame. The cover-plate *a* is provided with a flange *a'* which passes over one of the flanges *A'* of the frame to prevent access of liquids to the heater *b*. The annular space *B* between the flanges *A', A'* may be fitted with a tap for drawing off overflowing liquid. Or a washer *e* of asbestos may be interposed between the plates *a* and *H* to check the passage of

liquids into the chamber B. The plate *a* is clamped down by a pin *a*<sup>1</sup> projecting downwards from it, and provided with lugs *f* which gear with inclined surfaces *g* when the plate *a* is turned by means of a key *J*. The heater is electrically connected with the mains by means of a contact-device consisting of two metal strips *l*, Fig. 6, mounted in an insulating-body *k*, and provided with screws *m* for the main wires and with holes or tubes *n*. Into these are inserted the pins *o*, Fig. 7, projecting from metal strips provided with screws *m* for the connecting-wires, and mounted in an insulating-block *k*.

**12,174. Terp, O.** June 30.

*Non-conducting compositions.*—A mixture of calcium chloride and magnesium chloride solution is prepared, and hydrochloric acid and a saturated solution of chlorine is added thereto, the whole being constantly stirred. This solution is then mixed with "bitter earth" (a native oxide of magnesia) and emery to form a non-conducting composition for safes. This material is fireproof and resists steel drills &c.

**12,209. Fisher, R. P.** July 1

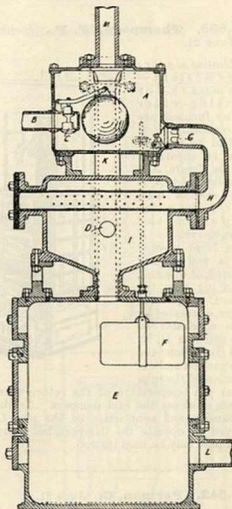


*Heating water.*—Saddle-shaped boilers are superposed one above the other and connected by pipes so that the hot gases from the furnace, after heating the innermost boiler, can circulate in the spaces between the others. Fig. 5 shows two boilers connected together in this way.

**12,273. Martin, J. W.** July 2.

*Heating water.*—Water is admitted into the chamber A by the pipe B and then passes through the valve G to the perforated pipe H in the chamber I, where it meets with live or exhaust steam entering by the pipe or pipes D. The heated water afterwards falls into the chamber E, and can be drawn off as desired by the

pipe L. The position of the valve G is determined automatically by the float F, which opens or shuts it according to the water level in the chamber E. A ball-actuated valve C serves to

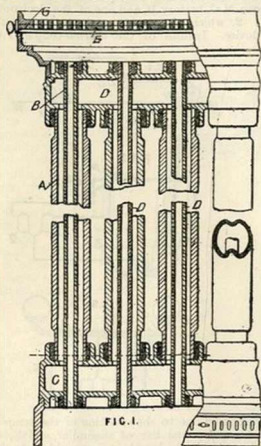


regulate the admission of water into the chamber A. A pipe K connects the chambers E and A to enable steam to enter for heating the water contained therein: the steam is finally exhausted through the pipe M. The chamber E can be dispensed with without altering the essential features of the invention.

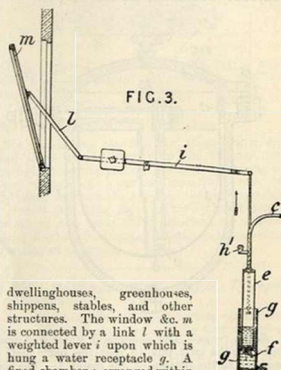
**12,406. Spencer, W. F.** July 5.

*Heating buildings; heating air.*—Relates to hot-water radiators and ventilating-apparatus. Air is allowed to pass through the tubes D by the gratings G, E. The air tubes D are surrounded by pipes A, communicating with upper and lower water casings B and C respectively. A constant circulation of hot water is kept up through the outer pipes A, thereby heating the air which is allowed to pass through the ventilating-tubes. The openings in the gratings break up the continuity of flow of the air when passing through the grids, and thus cause it to give up its heat

to the surrounding metal in an evenly distributed manner. All the pipe joints are caulked.



shutters for the ventilation of public buildings,



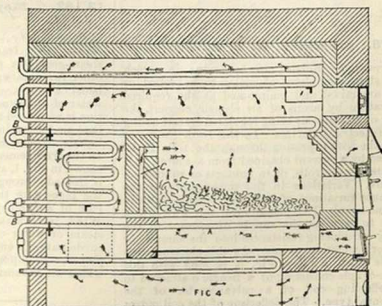
dwellinghouses, greenhouses, shippens, stables, and other structures. The window & c. *m* is connected by a link *l* with a weighted lever *i* upon which is hung a water receptacle *g*. A fixed chamber *e*, arranged within the latter, is provided with a valve *f*, and communicates by a pipe *c* with a reservoir of atmospheric or compressed air or other gas. Water is supplied through an inlet pipe *h'*. The expansion or contraction of the air in the reservoir, due to changes of temperature in the space to be ventilated, effects a passage of the water from one of the vessels *e*, *g* to the other, the change of weight of the vessel *g* causing the lever *i* to open or close the window & c. according to the amount of ventilation required.

**12,539. Poole, H. A.** July 7.

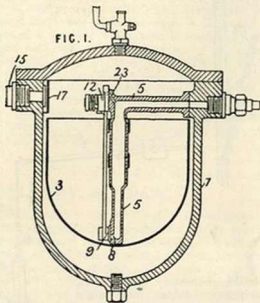
*Thermostats.* — Relates to apparatus for automatically opening and closing windows, doors, or

**12,613. Gibbs, R. R.** July 8.

*Heating water.* — Water-tube circulating boilers for heating buildings & c. are constructed with all their joints *B, B* outside the setting. Shafts *C* are formed in the walls through which air for secondary combustion is supplied. When the fire is first lighted a damper is opened to allow the products to escape directly into the chimney, but is closed when the fire is well alight.



12,699. Morison, D. E. July 11.

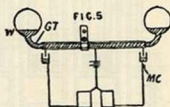
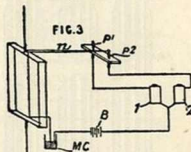
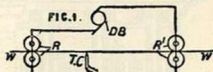


*Steam traps.*—The condensed water and steam enter by the inlet pipe 15, past the baffle-plate 17, and fall to the bottom of the casing 1. The accumulated water buoys up the float 3 until the quantity of water becomes so great that it flows over the edge, causing the float 3 to sink to the bottom of the vessel. The float, by this downward movement, operates a lever 12 in such a manner as to raise the valve 9 and uncover the port 8, through which port and the tube 5 the water is then discharged. When the float 3 is emptied it rises, causing the port 8 to become shut. A port or passage 23 in the lever 12 opening into the hollow tube 5 can be arranged for permitting the discharge of air from the trap at any predetermined part of the upward or downward stroke of the float. A gauge glass indicates the water level in the trap.

12,776. Crompton, R. E. B. July 12.

*Thermostats.*—Relates to apparatus in which wires, strips, or plates of metal to be rolled or drawn are raised and maintained at the required temperature by means of an electric current, the supply of the current being regulated by self acting thermo-electrical devices. In the form shown in Fig. 1, the wire  $w$  passing through the rolls  $R, R'$  is heated by a current obtained from a source D.B connected to the rolls, or to contacts or rubbers on the wire. Variations in the temperature of the wire cause variations of the electromotive force in a thermo-couple T.C. placed near the wire, which is used to regulate the supply of current to the wire by introducing resistances into the circuit, or by other regulating means. As this electromotive force is small, a relay, Fig. 3, is used with this thermo-couple consisting of a needle  $n$  attached to the deflecting-coil of a galvanometer of the D'Arsonval type. The deflection of the coil moves

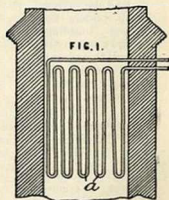
the needle  $n$  into contact with one of the stops  $P^1, P^2$  completing the circuit through the mercury cup M.C. battery B, and one of the electromagnets 1, 2, which are used to actuate the regulating device. Instead of the thermo-couple T.C, the



deflection due to the variation of the temperature of a compound bar of dissimilar metals, or the alteration in the length of a straight strip parallel to the wire  $w$  or of a spiral wire surrounding the wire  $w$ , may be used to actuate the regulating devices. The rise and fall of mercury in a thermometer, or the pressure of a volume of air on mercury in a balanced tube G.T, Fig. 5, may be employed.

13,162. Meyer, A., and Gehrke, H. July 19.

*Heating air.*—Waste gases from steam-generator or other furnaces, exhaust steam, or water of condensation is employed to heat air for heating liquids, drying, &c. In the arrangement shown in Fig. 1, air is forced through the pipes  $a$  in the base of a chimney. When exhaust steam or water of condensation is employed, the piping  $a$  is situated in a tank into which the exhaust steam &c. is passed.



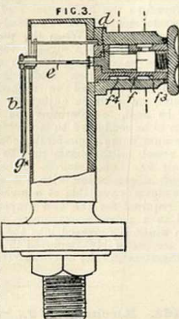
**13,192. Magee, E. A.** July 19. *Drawings to Specification.*

*Heating water.*—A water jacket is fitted round the lower part of a special water-tube steam boiler; the water of the jacket is thus heated for various purposes.

**13,363. Gardner, L.** July 21.

*Thermostats.*—

Relates to apparatus for regulating the pressure of steam in a boiler by controlling the gas flame by which the water is heated. The spindle *e* of an ordinary pressure gauge, which indicates the steam pressure on a dial by a hand *b*, is connected to the plug *d* of a tap which turns within a rotatable shell *f*, the position of which is indicated by a hand *g* on the dial. The shell is recessed as shown on the outside at *f*<sup>3</sup> and *f*<sup>4</sup>, and the gas enters the tap by one recess, and passes through the plug to the other one and thence to the burner. By turning the shell the tap can thus be arranged to check the gas supply at any required steam pressure.



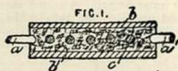
**13,402. Biernath, E.** July 22.

*Non-conducting compositions.*—Relates to a heat-insulating and waterproof material applicable for use in silos, for the protection and preservation of stored root crops, for lining damp walls, for covering damp floors, and for other like purposes. Infusorial earth is mixed with a fibrous material (such as woollen waste and calf's hair) to give flexibility and tenacity, and with water or other liquid to make a paste or dough, a colloid solution being added, if desired. The paste is then formed into sheets or plates which are compressed, dried, and painted or coated with melted asphalt upon which may be sprinkled sand, gravel, or stone chippings. Asphaltum oil may be mixed with the molten asphalt. Other substances than infusorial earth and asphalt may be employed.

**13,473. Binswanger, G.** July 23.

*Heating by electricity.*—A paste or cement consisting of silicate of soda, potash, alumina, lime, clay, asbestos, or other insulating or refractory substances surrounds electric conductors of high

resistance. The heat given up by the conductors to this cement is utilized for heating and



cooking purposes. Fig. 1 shows a coil *a* surrounded by the cement *c* for heating the hot plates *b*, *b*<sup>1</sup>.

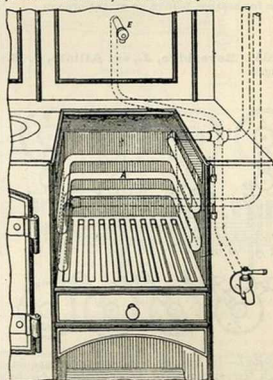
**13,510. Oertgen, A.** July 25.

*Non-conducting coverings for steam pipes &c.* Reed stems, placed parallel to one another, are attached to a waterproof linen cover by wiring or other means. A layer of kieselguhr may be interposed between the pipe and the reed covering to protect the latter from injury by overheating. Instead of the reeds being attached to a linen fabric, they may be attached directly to one another by wiring or otherwise.

**13,687. Bollinger, F. C.** July 27. *Drawings to Specification.*

*Boiling-pans.*—Sheet-metal boiling-pans and other vessels are manufactured by first stamping or drawing the sheet metal to form vessels having a single wall, and then drawing or pressing the metal in the opposite direction to form vessels with double walls.

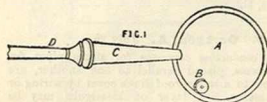
**13,700. Bushell, W. H.** July 27.



*Heating water.*—Relates to water heating and

circulating apparatus for domestic and other use. The Figure shows a perspective view of a kitchener fitted with the water-heater. A coiled water-tube boiler A is used placed round three sides of the fire-chamber. The safety-valve E is placed over the fire, so that escaping water extinguishes it.

13,805. Williams, W. July 29.

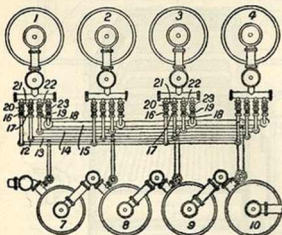


*Bed-warmers.*—The bed-warmer A is of flat, cylindrical, or other form, made in halves, soldered or otherwise joined together. It is provided with a handle C and extension D, and is filled with water through an aperture B.

14,013. Murrie, J. Aug. 3. Drawings to Specification.

*Heating by steam circulation; heating water.*—Relates to the utilization of steam for motive power, heating, and other purposes, and consists in arrangements of compound engines in conjunction with high-pressure and low-pressure boilers, a portion of the steam from the latter being withdrawn for heating, boiling, or other purposes.

14,105. Beveridge, J., and Allott, J. B. Aug. 4.



*Digesters.*—In treating wood, esparto grass, &c. at high temperatures for paper-making &c. by means of steam under pressure, the steam blown off from the digesters when the process of

digestion is complete is passed through a multiple-effect evaporating-apparatus, and used for concentrating soda lye &c. The Figure shows four evaporating-vessels 7, 8, 9, 10, connected with each other and with digesters 1, 2, 3, 4. The digesters can be put in connection, through cocks 16, 17, 18, 19, with pipes 12, 13, 14, 15, which are connected, as shown, with the inlet pipes of the evaporating-vessels. At the first stage of blowing-off, when the steam is at its highest pressure, it is conveyed to the first vessel 7 of the series, and the waste steam from this vessel passes into the next, and so on. When the pressure falls to a sufficient extent in a digester, the steam from it may then be conducted to the second or third vessels of the series. Reducing valves 20, 21, 22, 23 are provided in connection with each digester, or a single adjustable reducing-valve may be used, to determine the pressure of the steam to be conducted to each vessel of the series. A vacuum pump is preferably connected with the last vessel, or the steam may be discharged into the air &c. Other sources of heat may be employed in connection with the evaporators, and when steam is available at a higher pressure than that required for the first evaporator, it may be used in a separate evaporator, the waste steam from which is conveyed into the vessel 7. Save-alls are preferably employed in connection with the digesters and the last evaporating-vessel.

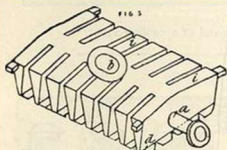
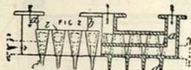
14,162. Kirchmann, J., and Schwinghammer, K. Aug. 5. Drawings to Specification.

*Non-conducting compositions.*—Relates to laggings, casings, and walls built around boilers or furnaces in general. The invention consists in particular conformations and compositions, and in utilizing the chambers in the lagging for passages for supplying air to the furnaces. The lagging and furnace casings are built up of a double wall of iron trellis work covered with a suitable plaster. When the wall is not exposed to the direct heat of the furnace gases, the plaster may be composed of clay, sand, powdered spar, or cryolite, with a suitable binding material such as water-glass, borax, cement, or gypsum, with or without cinder or ashes. For such wallings as are immediately exposed to the fire, there is used a composition of cement, cinders, graphite, and asbestos, with firebrick, if desired.

14,334. Wadsworth, J. Aug. 9.

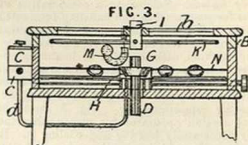
*Heating liquids or gases; heating buildings.*—Consists of improvements on the apparatus described in Specification No. 9896, A. D. 1887. Fig. 2 shows a section, and Fig. 5 an isometric projection, of the apparatus as arranged for heating water. The water entering by a passage a traverses the lower compartment of the structure, which, as shown, is composed of lateral wedge-shaped arms i opening into a common central passage, before traversing the upper

compartment to the outlet *b*. The base-plate of the boiler or heater is provided with depending



ribs *d*. The boiler may be used as a radiator for heating buildings.

14,431. **Moule, C. W.** Aug. 10.



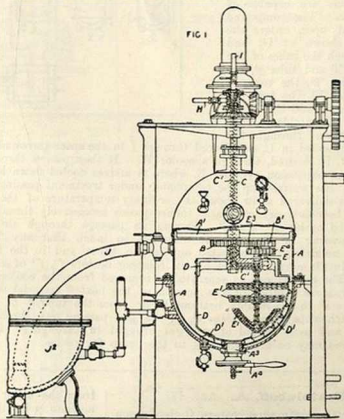
*Thermostats for incubators.* An incubator heated by hot air is provided with a hot-air chamber *I* placed immediately over the heating-cylinder *D*. A number of air tubes *K* project from the chamber *I*, and also communicate with the exterior of the incubator through holes in the lid *B*, not shown in Fig. 3. A hinged lid is fitted in the top of the chamber *I*, and this lid is raised by a system of levers operated by a thermostat *M* when the temperature rises too high. Any thermostat may be employed. The Specification describes one in the form of a bent tube containing mercury and ether, which on expansion raises a plunger.

14,651. **Bolanachi, A. J. M.** Aug. 13.

*Heating liquids; boiling-pans.*

—Relates to apparatus for heating, boiling, and mixing milk or other liquids &c. The apparatus may be either a vacuum or an open pan, provided with stirring and scraping mechanism, and arrangements for heating as desired. Fig. 1 shows a jacketed vacuum pan *A*, having within it a frame *A'*, carrying a rotating stirring-frame *D*. The latter has scrapers *D'* and arms *E'*, which are rotated by means of gearing *E<sup>2</sup>*, *E<sup>4</sup>*, *B<sup>1</sup>*, and the fixed wheel *B*. The shaft *C* to which the frame *D* is attached is driven by hand power by the gearing shown. It has two channels passing down its length, which are continued through the framing *D* and stirrers *E'*, so that any heating-agent may be circulated through them, entering at *I* and leaving at *H*. Any heating-agent can also be passed through the jacket of the pan. By these arrangements the material in the pan may be heated or cooled as often as desired, while it is subjected or not to the action of the stirrers. The pan is in connection with a suitable vacuum apparatus.

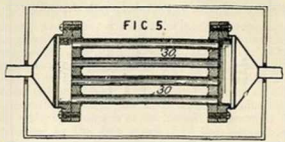
The material is charged into the pan from the jacketed vessel *J<sup>1</sup>* through the pipe *J*, and the discharge may be through an outlet *A<sup>3</sup>* and hand valve *A<sup>4</sup>*. In the open pan form, the arrangements for heating and mixing are somewhat similar; but, in addition, arrangements are made for raising the frame carrying the stirrers out of the vessel, and also for rotating the stirrers in a direction opposite to that in which the frame is rotated.





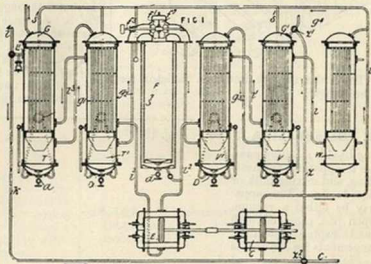
14,786. Kersenbrock, J. H. Aug. 16.

*Heating liquids.*—Relates to a combination of apparatus for pasteurizing and bottling fermented malt liquors. The apparatus comprises apparatus for indicating the level of liquid in, and for drawing liquid off from, casks or kegs to heating-apparatus whence it passes to cooling-apparatus and then to bottling-apparatus. The liquor is forced from the casks &c. into pipes leading to the heating &c. apparatus by compressed air. Fig. 5 shows in horizontal section apparatus for pasteurizing the liquid by successively heating and cooling it. It consists of a series of tubes 30 through which the liquid is passed and is successively exposed to the action of steam and of a cooling-agent.



14,851. Windhausen, F. Aug. 17.

*Heating air; heating liquids.*—Relates to means for eliminating from gaseous or liquid mixtures one or more of their constituents, particularly applicable for concentrating liquids containing alcohol by freezing out a part of the water in the same, and for gases containing hydrocarbon and paraffin for condensing and separating out such parts as are capable of condensation. The compound to be acted upon enters the apparatus shown at G, and passes through the tubes of the first cooler T and tube  $g^1$ , the second cooler T', the tube  $g^2$ , the re-heater V<sup>1</sup>, the tube  $g^3$ , the re-heater V, and the outlet G<sup>1</sup> and  $g^4$ . A suitable gaseous body is drawn through the tube c, compressed in C, and forced through l to the space surrounding the tubes in the re-heater V, passing first, if desired, through a cooler W. It then passes through P, the re-heater V<sup>1</sup>, and the tube P, to an expansion cylinder E, where it arrives cooled down by passing through the re-heaters, in which it has warmed up the compound under treatment passing in the other direction, so that the latter is delivered at or about the ordinary temperature of the air. The gas expanding in the cylinder E becomes very cold, and thence passes successively through the tube P, cooler T<sup>1</sup>, tube P, cooler T, and outlet L<sup>1</sup> and P. During its passage through the coolers it cools down the gas or liquid passing in the opposite direction so much that any bodies therein capable of being liquefied or solidified are separated out in the tubes and in the bottom of the coolers, while any carried on in the current is met by the rotating beaters  $f^1, f^2$  of a shaft  $f^3$ , and fall into the catch vessel F. The constituent so separated is removed from the coolers and catching-vessel through the tube a, and, if in a solid form, a portion of the heated material may be taken from the tube l by branch pipes  $s^1$  to the double bottoms D, or from the tube P through the double walls  $s^2$ . By means of the branch tube z and valves  $z^1, z^2$ , the gas passing out through G<sup>1</sup> may be led down to the compressor and used instead of any gas brought in through c; and by means of the tube k the gas once used may be brought back to the pump for re-use.



14,890. Bratoluboff, A. Aug. 17.

*Thermostats for steam superheaters.* Coils of steam piping a are embedded in sand or other bad conductor of heat which is placed in arched chambers I, II. The heated gases enter the chambers in a direction contrary to that in which the steam passes through the coils. For adjusting at will the ultimate temperature of the steam, steam direct

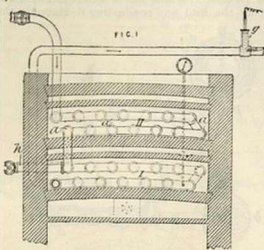
from the boiler may be admitted at some intermediate point in the superheater, such as by the pipe h. Pyrometers and thermometers may be provided. Moreover, a thermometer g may be provided with an automatic alarm or with means whereby it may operate to admit steam to the intermediate point in the superheater.

(For Drawing see next page.)

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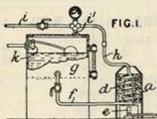
ABRIDGMENT CLASS HEATING.

14,890.



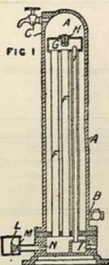
14,910. **Rose, G.** Aug. 18.

*Heating buildings.*—Relates to apparatus for producing jets of steam which may be used in ventilating houses, rooms, &c., and which may be combined with steam heating-apparatus. A coiled-pipe or annular steam generator *a*, packed with asbestos *d*, is heated by a burner *e*, and is supplied with water from a tank *g* by means of a pipe *f*, a float or ball valve being provided at *k*. The steam passes by a pipe *h*, *i* to a small blower or nozzle, a pipe *i'* supplying some of the steam to the tank to balance the back pressure in the generator.



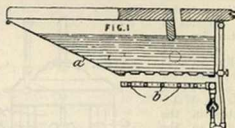
15,124. **Richmond, G. H.** Aug. 23.

*Heating liquids.*—The liquid to be heated enters the casing *A* by means of the tap *B*, and comes into contact with steam pipes *F*. The heated liquid escapes by the tap *C*, and the steam, which enters by the inlet pipe *I*, passes away through the outlet pipe *N* into the atmosphere. A conical valve *M* upon the fixed brass rod *L* regulates the outlet orifice by means of the bending of the brass rod due to expansion. A relief valve *H* is fitted upon the chamber *G* to allow the liquid operated



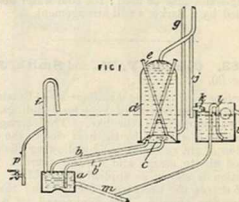
upon to escape from the casing *A* into the tubes *F* when the pressure in the casing rises above the safe limit.

15,193. **Strangman, J. P.** Aug. 23.



*Heating water for use in wet-spinning frames.* The troughs *a* containing water are made of aluminium, copper, nickel, or other suitable metal, and the liquid therein is heated by means of gas jets *b*. If the usual wooden troughs are employed, the liquid may be heated in a separate receptacle or in a coiled pipe from which the trough is supplied.

15,201. **Walker, J.** Aug. 24.

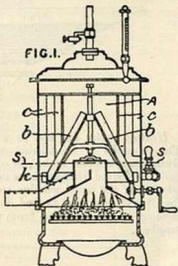


*Heating water.*—Hot water from the kitchen boiler *a* circulates through the closed chamber *c* of the cylinder *d* by means of the flow and return pipes *b*, *b'*, thereby heating the water contained in the cylinder *d*. The cylinder *d* is supplied with water by the pipe *j* from the store cistern above; the boiler *a* receives water from the cistern *i*, which is itself supplied from the cylinder *d* by the pipe *k* and ball-float valve *l*. A stand-pipe *f* is fitted to the boiler *a* for withdrawing hot water by means of the pipe *p*; a siphon *l* is fitted to the supply pipe *m* to prevent water from entering the boiler when the latter is empty. Vent pipes *e* prevent the pressure in the chamber *c* from rising above that of the atmosphere. With these arrangements the pressure in any part cannot rise much above that of the atmosphere, or, if the boiler *a* becomes empty and is heated to redness, no water can pass into it because of the siphon tube *l* on its supply pipe. The arrangement also minimizes the dangers which arise when the pipes

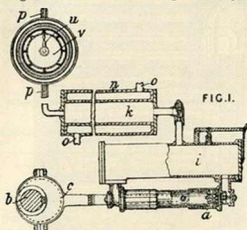
become stopped up with ice. In a modification, the boiler *a* is dispensed with and the chamber *c* is heated direct.

**15,511. Biermann, M.** Aug. 29.

*Heating water for baths.* Relates to apparatus for supplying water of gradually-decreasing temperature for shower baths, douches, &c. Water is heated in the vessel *A* to the highest temperature required, and cold water is run in at *S*, impinging on a wheel *k* which it causes to rotate. The wheel is attached to a cone with ribs *b*, which mix the hot and cold water together as it rotates. Several mixing-cones may be used; the cold water may be supplied by a Barker's mill arrangement.



to the receiver *k*, which has a water jacket *u* for receiving the heat and conducting it through the

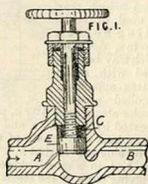


pipes *o* to the compartment. The pipe *p* leads to an escape valve, the pressure on which is regulated by the finger *u* and shown on the dial *r*.

**15,624. Gibbs, R. R.** Aug. 31.

*Heating buildings; heating by water circulation.*

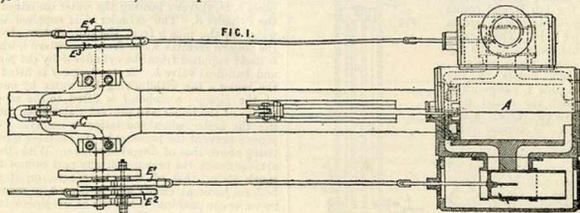
Relates to valves specially applicable to hot-water heating-apparatus. Fig. 1 shows a three-way valve constructed according to the invention. The port *C* is preferably square, and is at right-angles to the other passages *A*, *B*. In the position shown, the passages *A* and *C* communicate, but when the valve *E* is raised it acts as a piston valve, closing the passage *C* and opening communication between *A* and *B*.



**15,583. Cannon, F. W., and Smith, J. L.** Aug. 30.

*Heating air; heating buildings &c.*—Relates to the warming or cooling of vehicles, buildings, vessels, workshops, and the like. The carriage or apartment is warmed by the heat due to the compression of air, and is cooled by allowing the compressed air to escape and expand therein. The invention is shown as applied to a vehicle. The axle *b* drives the eccentric *c* for working the air-compressing pump *a*. The compressed air is first received into the reservoir *i*, from which it passes

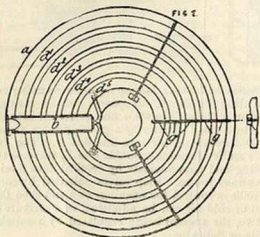
**15,768. Donaldson, W.** Sept. 2.



*Heating gases.*—Relates to a system and apparatus for refrigerating and heating air or gas, the air, when cooled, being used for refrigerating purposes, and, when heated, for warming and ventilating

purposes. The air or gas, at atmospheric pressure, is expanded in a cylinder, and is then either passed through a refrigerating-chamber for cooling purposes or heated by the atmosphere or by waste gases from the prime motor, after which it is compressed to atmospheric pressure in a similar cylinder at the opposite side of the crank shaft C, and is used for heating, or heating and ventilating purposes. The crank shaft C is driven by any suitable motor, and the amount of expansion and compression is regulated by adjustable eccentrics E', E', E', E'. The air entering the cylinder A may be first cooled by the expanded air passing from the cylinder or from the refrigerating-chamber. The latter consists of a long cylinder, through which the cold air or gas passes in a continuous stream from one end to the other, and into which the water or moist material to be refrigerated is passed from the end nearest the air or gas outlet.

15,773. Chapman, A., and Vickess, S.  
Sept. 2.

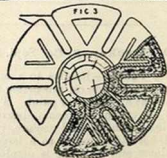
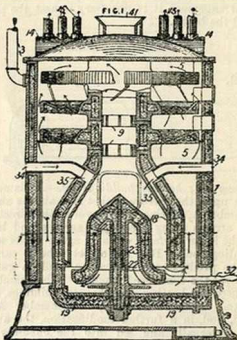


*Heating by steam circulation; heating liquids.*—Relates to steam coils for heating vacuum pans and other apparatus. Fig. 2 shows a plan view of the interior of a vacuum pan *a*. A number of coils are used in each pan, and each coil consists of a number of separate pipes *d*<sup>1</sup>, *d*<sup>2</sup>, *d*<sup>3</sup>, *d*<sup>4</sup>, connected at their extremities to the same distributing-box or steam chest *b*, there being a separate chest for each coil. The pipes *d*<sup>1</sup> &c. are made in two parts united together at *g* so as to facilitate transport.

15,777. Laird, W. H. Sept. 2.

*Heating water.*—Relates to a boiler formed with an annular casing 1, Fig. 1, into which water is returned by the circulating-pipe 3. The water then passes to the bottom casing 19 and to the vertical water grate 23. After traversing this grate, as shown by the arrows, it returns to the casing 19, and then ascends the circular fire-pot casing 18 and enters the wheel-shaped water sections 5, whence it rises to the chamber 14 for distribution by the pipes 15. The wheel-shaped sections, one of which is shown in Fig. 3, are arranged with suitable partitions for effecting a complete circulation through them. Screwed thimbles 9, Fig. 1, secure the sections to each other. The grate 23 is supported on the central

hollow spindle 22 in order to allow of its oscillation by the water-draining handle 32. Air for secondary combustion is admitted by radial tubes 34 which open into a chamber 35 communicating with the vertical corrugations of the sides of the fire-pot.

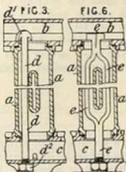


The fuel is inserted at the hopper 41, combustion taking place downwards through the fire-pot and upwards between its walls and the casing 1. Ovens may be inserted in the furnace, if desired.

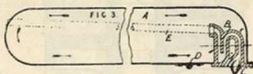
15,819. Wagstaff, J. G. Sept. 3.

*Heating buildings.*

—Relates to means for connecting the twin pipes of heat-radiators to the end socket pipes. A long bolt *d*, Fig. 3, passing through one side of the twin pipe *a*, is used for holding the socket pipes *b*, *c* and the twin pipe *a* together by means of its double hooked head *d'* at one end and the nut *d''* at the other end. In a modification, Fig. 6, the bolt *e* is of twin form so that part of the bolt may extend through each limb of the twin pipe. With this latter arrangement it is necessary to cast the pipe *a* round the bolt *e*.



15,882. Honeyman, J. Sept. 5.



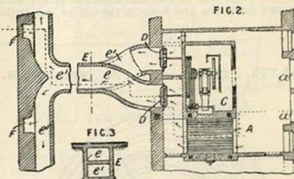
*Heating air; heating buildings &c.*—A flame *C* playing upon the fireclay pocket *B* heats the air in the chamber *A*, causing it to travel in the direction of the arrows along the upper surface and back along the lower surface, when it again meets with the heating-pocket *B*. An outlet tube *E* carries away the products of combustion, while a gutter *D* removes the condensed vapours. The chambers *A* are used for heating greenhouses, buildings, and the like. In another form, the chamber *A* is divided, and, in a further modification, the air is heated externally and led into the chamber by pipes.

15,899. Decker, J. C. Sept. 5.

*Heating liquids.*—Relates to a method for producing a composition oil possessing the qualities of linseed oil as a vehicle for paint. The composition consists of crude petroleum, beeswax, powdered resin, zinc sulphate, lead acetate, rubber, and linseed oil. A still, similar to a large steam boiler, with a dome and manhole is employed. The still is provided with two sets of coiled tubing inside, one set being perforated for admission of steam. The crude petroleum is first placed in the still and blown by direct steam for six or eight hours till the lighter impurities have passed out to a suitable condenser. The lead acetate and zinc sulphate are then added to the petroleum. The contents of the still are heated by sending steam through the coil of closed tubing, till the solution has boiled for an

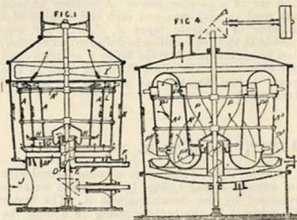
hour. The beeswax, resin, and rubber are then added and the ingredients boiled together for about seven hours. The mixture is then allowed to cool and the linseed oil added.

16,448. Bartlett, J. Sept. 14.



*Heating buildings; heating air.*—In warming and ventilating buildings, air passes into a heating-chamber *A* through inlets *a* and is forced into the flue *e* by a fan *D* driven by a gas engine; a second fan *D* forces cold air into the flue *e'*. The two flues *e* and *e'*, forming a double flue *E*, traverse the building and communicate by vertical flues *F* with the various rooms. Flap valves actuated by cords and pulleys control the openings of *e* and *e'* so that warm or cold air can be admitted, or a mixture of the two, the amount being regulated by a suitable handle or indicator.

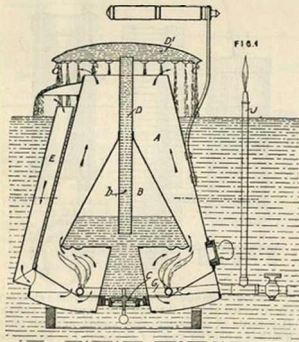
16,726. Theisen, E. Sept. 19.



*Heating liquids; heating gases.*—Relates to the production of intimate frictional action between liquids and gases or vapours by causing the liquid to pass in thin films over rapidly-revolving cylindrical or conical surfaces, while at the same time the gases or vapours are caused by centrifugal action to impinge upon the said films of liquids and to travel in intimate contact with the same, either at a different speed in the same direction or in the contrary direction, whereby

the particles of liquid and gas are subject either to a rapid interchange of temperature for effecting the evaporation or concentration of the former or the heating or cooling of the one or the other, or they are caused to be intimately mixed together; or, again, when a mixture of liquid and gas is so treated while subject to a greater or less exhaust, the gas may be separated from the liquid, or the gas may be made to act chemically upon the liquid. Fig. 1 shows one form of apparatus. The liquid enters the cylinder E by the pipe F, and is elevated by the worm D to the cup G, from which it is thrown against the concentric drums A, A, A by branch pipes H, H; it ascends over the inner walls of the drums and collects in the channels A', from which it is thrown by pipes L, L into the casing K, whence it may be returned by pipes M to the cylinder E for re-treatment. The air or gas enters the apparatus at J and is drawn through in the manner indicated by the fan I. In a modification, the drums have their larger diameter at the bottom instead of at the top, and may be fed at top or bottom, in the latter case a central feeding-cone being employed. Fig. 4 shows an arrangement in which a drum A<sup>2</sup>, having its larger diameter at the bottom, is placed between two drums A<sup>1</sup>, A<sup>2</sup> having their larger diameter at the top, and in which the liquid and gas make a continuous circuit through the apparatus, gas being propelled by means of blades P, P'. A horizontal machine is described and shown for cooling large quantities of liquid, such as the water employed for the condensation of steam in surface condensers.

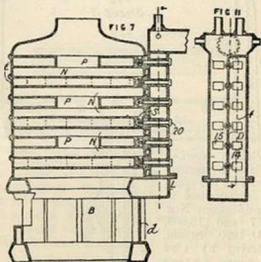
16,731. Sugg, D. W. Sept. 19.



Heating water for baths. The apparatus, which is designed to float in the water, is made of a conical boiler B communicating with the bath by a

valve C and surrounded by a casing A, in the bottom of which a ring burner G is fixed. Air is admitted by a pipe E. The boiler outlet D leads into a vessel D', the underside of which is fitted with distributing-apertures c. The action is as follows:—When immersed, water enters by C and fills the boiler until the hole b in the tube D is covered. The steam generated forces the water up the tube D and vessel D' to the apertures c. The valve C then opens and the operation is repeated. A jet J serves as a test for carbonic-acid gas. In place of gas, an oil lamp may be employed.

16,872. Allison, H. J., [King, J. C.].  
Sept. 21.

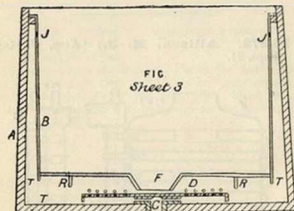


Heating water.—Relates to hot-water circulating heaters for warming buildings and the like. The fireplace consists of upper and lower hollow rings L connected by double tubes which in turn are joined by bridge-pieces d. The grate bars are made to swivel and so upset the ashes into the ash-pit. The boiler consists of a number of hollow sections E, each alternate one having a central hole P and the others several holes arranged in a circle, the object being to spread the flame and products as much as possible in the spaces N. Each section has two apertures coinciding with similar holes 14 and 15 in the water post, Fig. 11. This casting is divided into two compartments by a diaphragm D, and its base rests on the fire-pot or stove and communicates with the water therein; the top opens to the water pipes of the building. The water issuing from the space round the stove B rises in F and flows by means of the holes 14 through the sections E, which have diaphragms to make the path circuitous, and thence back to the holes 15 and so to the hot-water pipes. The water post is bolted to the furnace by bolts 20 fitting into recesses S in the casting.

16,885. **Boult, A. J.**, [Passadore, F.].  
Sept. 21. *Drawings to Specification.*

*Heating liquids in coin-freed apparatus.* The apparatus is for the sale of aerated liquids, or of liquids which may be heated by a gas burner beneath either the storage or an intermediate vessel.

16,907. **Mackie, S. J.** Sept. 21.

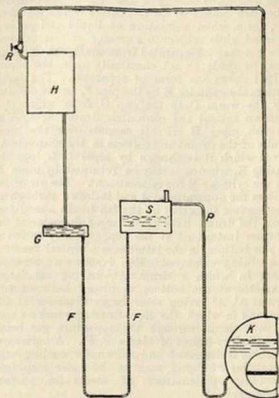


*Boiling - pans.*—Relates to improvements on the apparatus described in Specifications Nos. 5917 and 13,903, A.D. 1890. Steam, entering by the inlet pipe S, passes upwards by the neck C, through the perforated and flanged disc D, where it comes into contact with the water between the internal and external casings A and B of the tub or boiling-pan, causing the water to boil and circulate throughout the tub. The internal casing B is provided with holes J, a central funnel F, and projecting flanges R and T, for increasing the efficiency of the boiling-pan; a waste pipe Z is provided for getting rid of the dirty water. Compressed hot air or other gas may be used in place of steam.

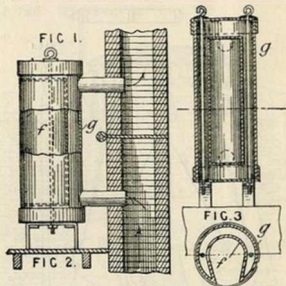
16,956. **Lindemann, O.** Sept. 22.

*Heating buildings.*—The radiator H, which is supplied with steam by the boiler K, has below it a vessel G, containing water, and connected, by a siphon pipe F, with a second vessel S at the same level. From this latter vessel any surplus water returns to the boiler through the pipe P. The radiator H being filled with air, steam is turned on by opening the cock R. The steam expels the air, which again expels the water from the chamber G into S until the surface of the vessel H exposed to steam is sufficient to condense the amount

supplied. As the steam is separated from the water in S by a column of air, undue condensation is avoided.



17,023. **Roe, M.** Sept. 23.



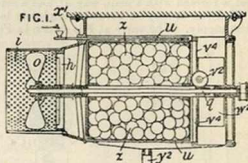
*Heating buildings.*—The hot gases from a chimney are diverted at will through the apparatus shown. It consists of an outer close-ended cylinder g, in which is a shorter vessel f of trough-like horizontal section. The chimney gases are admitted to the space between the outer and inner vessels, while the air in the room is heated by contact with the hot surfaces.

1892]

ABRIDGMENT CLASS HEATING.

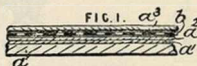
17,086. Schmid, A. Sept. 24.

*Heating air.*—Air from rooms &c. is drawn by a fan *o* through openings *w*<sup>2</sup> and a wire network casing *u* containing a number of perforated absorbent balls *z*. The casing is rotated slowly by worm and toothed gearing *q*, *v*<sup>2</sup>, *v*<sup>1</sup>, and water is supplied to the balls from a perforated tube *x*<sup>1</sup>. The escaping water passes to the tube *v*<sup>3</sup>, either directly or from the catch ring *h*, or through the perforated casing *i* from the fan *o*. The water may be cooled, heated, or disinfected in order to cool, heat, or disinfect the air.



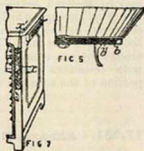
17,091. Crompton, R. E. B., and Dowsing, H. J. Sept. 24.

*Heating by electricity; heating liquids.*—Relates to means for insulating and supporting electric wires intended to act as resistances and applicable as radiators of heat for cooking, warming, and other purposes, reference being made to the heating of water and other liquids. The metal plate or base *a*, of any form, is coated with a layer of powdered enamel or glass which fuses sufficiently to run into a continuous surface *a*<sup>1</sup> between the temperatures of 1300° and 1600° F., and the coefficient of expansion of which is as nearly as possible the same as that of the metal plate. This supporting-layer is covered with a second or attaching layer *a*<sup>2</sup> of an enamel fusing more easily than the first. Into this layer the wire coils *b*, through which the current is to pass, is pressed; and a third or covering layer *a*<sup>3</sup> of enamel, similar to the second layer, is then applied. If necessary, the different enamels may each be applied in the form of a paste instead of as powders. The enamel for the lower layer may be formed of 52 parts of felspar, 34 of borax, and 14 of china clay; and for the more fusible upper layers containing and covering the wires, of 30 parts of quartz, 20 of borax, 34 of stannic oxide, 9 of sodium carbonate, and 7 of potassium nitrate. Special constructions are given for obtaining the enamels in the form of a paste, when required. Modifications in some of the ingredients are described for special purposes.



17,092. Crompton, R. E. B., and Dowsing, H. J. Sept. 24.

*Heating by electricity; heating liquids.*—Relates to apparatus in which conducting-wires are embedded in enamel for the purpose of obtaining heat on passing a current of electricity, and refers to the method of embedding the wires described in



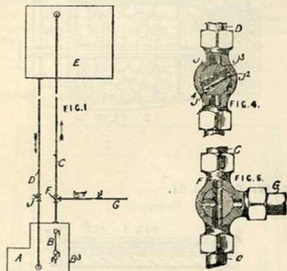
Specification No. 17,091, A.D. 1892. To vary the amount of heat as required, two or more circuits arranged in parallel may be employed for each apparatus, a suitable switch being employed; or the heating-surface may have separate enamelled parts with an independent resistance in each. In using such heating-arrangements with kettles, pans, and the like, the metal plate *b*, Fig. 5, with layers of enamel in which the wires *b*<sup>1</sup> are embedded, is made separately, and is connected to the vessel by means of a solder fusible below the temperature of the most fusible layer of the enamel. In the case of electric stoves and the like, the walls *x*, Fig. 7, are made double, and are packed with a non-conducting material *x*<sup>1</sup> of silicate or slagwool or asbestos waste.

17,139. Baker, J. A., Baker, W. K., and Baker, G. S. Sept. 26.

*Heating water.*—Fig. 1 shows an arrangement for supplying hot water or steam for the manufacture of Vienna bread or for other purposes. *A* is the boiler, *E* the tank, and *D*, *C* the circulating pipes. At *J* is a valve for regulating the supply of water, and at *F* is a second valve which serves to connect the boiler with the tank or with the pipe *G*. The valve *J* is shown in Fig. 4. The

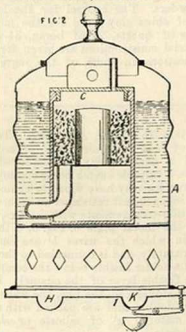


barrel is formed with a main way J<sup>3</sup>, and a smaller way J<sup>4</sup>, or it may be turned completely to cut off the supply. The valve at F is shown in Fig. 5.



The boiler is fitted with a water gauge B and a cock B' for lowering the level of the water when the boiler is required as a steam generator.

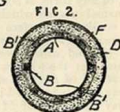
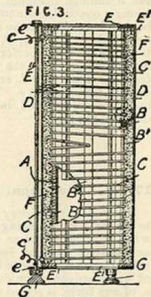
17.289. Lancaster, W. H. Sept. 28.



*Heating water.*—Relates to shaving-appliances. Water is contained in the outer vessel A and soap in the inner vessel C, or the soap vessel may be heated by a coil &c. of hot-water pipes. The water is heated by a gas jet under the bottom plate. The soap and water are drawn off through cocks into the cups H, I, where lather is made. A valve K empties the cup I.

17.304. Ahern, T. Sept. 28.

*Heating by electricity.*—Relates to appliances for obtaining and utilizing the heating effect of a current passing through a coil of wire of low conducting material. A coil of wire C of low conductivity is wound round a metallic tube A; strips of asbestos B and mica B' insulate the coil, which terminates in the leads c and c'. The annular space F between A and an outer tube D is packed with powdered fireclay, whiting, or other non-conducting material. Asbestos rings E' cover the ends, being held in place by covers E, provided with lugs e, through which pass holding-bolts E<sup>11</sup>, and insulator

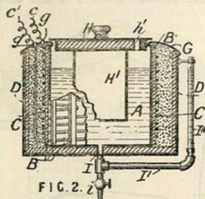


feet G serve to lift the appliance from the floor to allow the access of air to the inner tube A. Instead of a metallic tube A one of non-combustible non-metallic material may be used, and a tube closed at the bottom may be put inside A to condense and accelerate the air current; a similar casing tube may enclose the outer tube D. The heating-surfaces of the tubes A and D may be increased by corrugations, and additional air tubes may be inserted between them. The heat from the wire through which the current is flowing is conveyed by the packing to the tubes which heat the surrounding air. The heat capacity can be altered by constructing external circuits provided with resistance coils and a switch, whereby a portion of the coils can be cut out at will.

17.321. Ahern, T. Sept. 28.

*Heating water.*—Relates to means for heating water by utilizing the heating effect of an electric current passing through a coil of wire of non-conducting material. An open metallic vessel A, having strips of insulating material B wound round it, has wound upon it a coil of wire C of high resistance. This vessel A is placed in a container D. The space between the bottoms of the vessels A and D is packed with asbestos and the annular space with whiting, fireclay, or other refractory material; the top is closed in by a ring cover G provided with insulators g, g through which the

leads  $c, c'$  pass. The cover  $H$ , which is packed in a similar manner, is provided with a filling-hole  $h'$  and has a water-tight vessel  $H''$  attached to it to

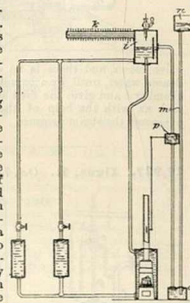


reduce the water space.  $I$  is the draw-off pipe connected by a branch  $I'$  to a gauge glass  $I''$  for indicating the level of the water.

**17,363. Lindemann, O.** Sept. 29.

*Heating buildings; thermostats.*

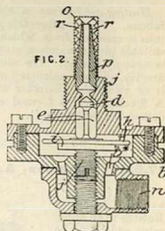
—Relates to means for preventing the stoppage of circulation in a water-heating system due to steam collecting in the higher portions, and to the automatic regulation of the furnace draught. At the highest point of the system is placed a vessel  $i$  which may have an extension  $k$  presenting a large surface to promote the condensation of any steam rising from the water in the said vessel. It contains a quantity of air and is connected to the expansion cistern  $n$  by a siphon pipe  $m$ , which may have an additional condensing-vessel at its lowest part, as shown. Steam collecting in the vessel  $i$  depresses the water level to the mouth of the pipe  $m$ , and, if of sufficient pressure, forces the water in the said pipe into the cistern  $n$ . Should steam enter the vessel  $o$  it is further condensed, and if any remains uncondensed it escapes through the cistern  $n$  and gives an alarm. As the water level in the chamber  $i$  never falls below the outlet of the pipe  $m$ , the circulation is not affected. In the vessel  $i$  or in a chamber  $k$  in the pipe  $m$  is a float which, when the water level is depressed by excessive steam pressure, sinks, and shuts a damper controlling the furnace draught.



**17,395. Hearson, C. E.** Sept. 29.

*Steam traps.*

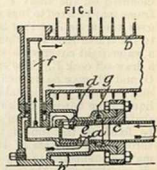
The trap is screwed on to the apparatus from which the water of condensation is to be allowed to escape by means of the screw thread  $j$ . The condensation water, after passing the strainer  $o$ , enters the bore of the plug  $p$ , passes the conical valve  $d$  and capsule chamber  $r$ , and finally leaves the apparatus by the orifices  $b'$  and exhaust outlet  $n$ . The position of the conical valve  $d$  is controlled by an expansible capsule  $h$  containing a mixture of alcohol and water. This capsule is adjustably supported upon the screw  $i, j$  carried in the lower casing  $b$ . The sides  $e$  of the conical valve  $d$  are squared to allow the condensation water to pass downwards to the exhaust outlet. The contents of the capsule  $h$  are adjusted so that, if the temperature rises above a fixed limit, the expansion of the liquid contained therein presses the valve  $d$  against its seat, thus throwing the trap out of action.



**17,420. Thompson, W. P., [Kaeferle, F.]** Sept. 29.

*Heating buildings; heating by steam circulation; steam traps.*

The object is to enable the steam and condensed water to pass one another without interfering with one another, and thus to prevent noise. The steam from the pipe  $c$  enters a plug  $a$  which can be turned so as to close the openings  $d$  and  $e$  by a screw  $g$ . The casing  $b$  of the cock forms part of the pedestal of the heating-apparatus. The steam passes in the direction of the arrows to the interior of a chamber  $D$ , into which it is conducted by a pipe  $f$  when high-pressure steam is used. The condensed water falls to the bottom of the casing  $b$ , and passes through the opening  $e$  in the cock back to the boiler through the pipe  $c$ . The steam is then enabled to pass into the apparatus over the water.



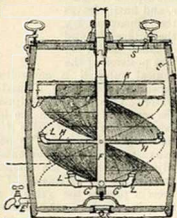
**17,558. Anderson, E. K., and Batey, J.** Oct. 3.

*Heating air for use in cleaning carpets or other fabrics.* The air after being compressed is forced into a receiver, from which it is conducted by a suitable pipe through a stove or furnace where it is strongly heated. The stove is lined inside with fireclay, and is constructed with an air pipe through it of twice the diameter of the conducting-pipe. A fireclay arch is formed above the air pipe to deflect the heat upon it.

**17,631. Robinson, A.** Oct. 4.

*Heating air; heating liquids.*—

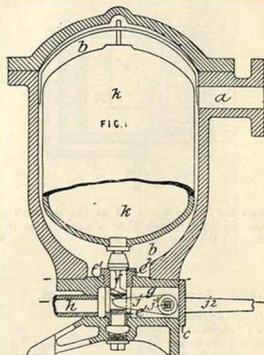
Relates to an apparatus which may be used for churning milk or cream for the production of butter, or for heating liquids. The Figure shows the apparatus in section. A central tubular rotary shaft *F* is mounted within a cylindrical or other shaped vessel, and is driven by gearing mounted on the lid of the vessel. The shaft *F* is fitted with three sets of arms *G*, *H*, and *J*, the two former being tubular. A series of metal bars are arranged spirally between the arms *G*, *H*, and *J* as shown. A vertical frame *K* composed of vertical bars is mounted on the shaft *F* above the arms *J*, or a frame may be fixed to lugs on the sides of the churn over the arms *J*, either instead of or in addition to the frame *K*. The churn may be provided with a water-tight cover with sight-holes *S*, *S*, and with a draw-off cock *E*. The ends of the tubular arms *G* and *H* may be turned up as shown at *L*, and may be fitted with suitable valves to prevent the liquid from flowing backwards into the arms and shaft *F*. A small blower or other contrivance may be fixed on the top of the shaft *F* to force air through the contents of the churn, or the shaft *F* may be connected to any arrangement for forcing air or other gases through the liquid under treatment. A hot plug or the like may be placed in the shaft *F*, or other contrivances may be used to heat the air forced through the liquid and thus heat the liquid itself.



**17,861. Oxley, T.** Oct. 7.

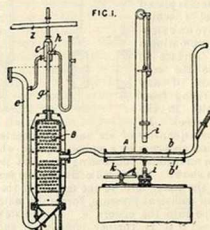
*Steam traps.*—The chamber *b*, which communicates by the passage *a* with the pipe &c. to be drained, carries a hollow float *k* attached to the valve *f* which has seats working on the faces *e'* and *e*'. A lever *j*, pivoted at *j'* and carrying a weight on the end *j''*, is in contact with the valve *f* at *f'*.

When there is no steam pressure within the chamber *b*, the weight keeps the valve open and allows the escape of condensed water through the pipe *h*. With steam pressure above a certain amount the



valve closes, and there is no escape for the condensed water, until by accumulation it rises in the chamber *b* and gives the float *k* a tendency to lift, such as, with the help of the weight on *j''*, will overcome the steam pressure.

**17,927. Ilges, R.** Oct. 7.

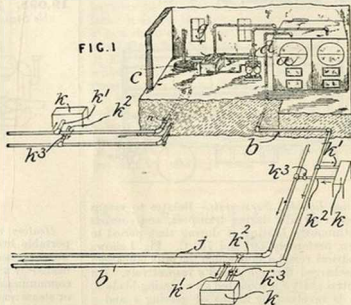


*Thermostats.*—In the separation of fusel oil from the "singlings" or liquid proceeding from the rectifier of distilling-apparatus, advantage is taken of the lighter specific gravity of fusel oil in the liquid when the percentage of alcohol is kept at somewhat more than 17 per cent. In order to

maintain the liquid at the temperature most suitable for retaining the above percentage of alcohol, the supply tube *b*, Fig. 1, passes through a temperature regulator *A* consisting of mercury and alcohol contained in a tube *b'* and which liquids, by their contraction or expansion, lower or raise a float in the tube *i*, which in turn operates the valve *k* which regulates the supply of water to the cooler *B*, or the float may operate the valve controlling the supply of steam to the distilling apparatus.

**18,146. Lake, H. H.,** [Reed, R. D., (trustee of Reed, J. R.), and E. N. Gates Heating Co.]. Oct. 11.

*Heating buildings; heating water.*—The water is heated in a boiler *a* and passes, by a pipe *b*, to the buildings to be heated. It passes into the radiators *k*, *k'* by pipes *k<sup>1</sup>*, *k<sup>2</sup>*, and away through pipes *k<sup>3</sup>*, *k<sup>4</sup>* to a main discharge pipe *j*. By controlling the flow through each radiator, by means of a cock *k<sup>5</sup>*, the temperature is regulated. The pipes *b* and *j* lead to a cistern *c*, open to the atmosphere, from which the water is forced back into the boiler by a steam pump *d*. This pump keeps the boiler full and maintains the circulation through the system. Provision may be made for drawing off water for various domestic purposes. The water in the cistern *c*, or in an intermediate tank *g*, is heated by a coil through which the exhaust steam from the pump passes.

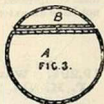


**18,258. Viggers, A. M.** Oct. 12.

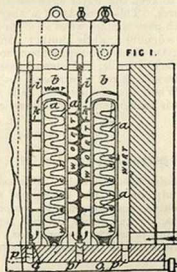
*Non-conducting coverings.*—Blue clay and torn woollen ends are mixed in certain proportions and made into plastic composition by the aid of water. If torn woollen ends are not obtainable, silk or cotton waste is used instead. The composition so made is used for non-conducting compositions. The articles produced may have a final protective coat of cement, wire netting, or plaster of Paris.

**18,370. Harris, A. T.** Oct. 13.

*Heating liquids.*—Beer and other beverages and liquids are clarified by heating them while in casks and like vessels by means of an atmospheric gas burner in a tube inserted through the bung-hole into the liquid. Fig. 3 is a horizontal cross-section of two tubes, in the bottom of one of which *A* an atmospheric gas burner is fixed, while the other tube *B* serves for air supply, and also for the passage of the gas pipe to the burner.

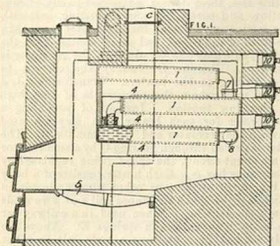


**18,814. Hughes-Hallett, C. F.** Oct. 20.



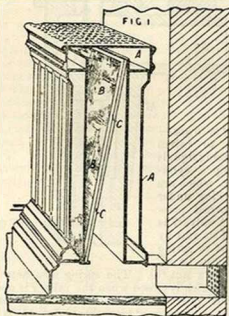
*Heating liquids.*—Relates to surface apparatus for heating wort &c. A series of vertical parallel sections, formed of horizontally, vertically, or otherwise corrugated plates *a*, are arranged in a

19,899. Milton, G., and Jones, W. J.  
Nov. 4.



*Heating water for heating buildings.* A number of cast-iron water receptacles 1 are connected by pipes 7, 8 to form the boiler. The receptacles have ribs 4 cast upon them to form channels by which the products of combustion from the firegrate 5 pass on their way to the chimney c, and thereby heat the water contained in the receptacles 1. Any one section may be replaced without interfering with the others. Orifices 10 are provided for cleaning out the flues.

20,108. Somers, R. M. Nov. 8.



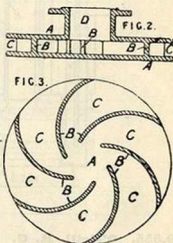
*Heating buildings; heating air.*—Radiators A are provided with an air-filtering medium or screen B, of canvas, wire mesh work, &c., stretched upon a frame C. The screen may be in the form of a hanging bag and may be otherwise modified.

20,154. Dufour, J., [Veuve Ancelin].  
Nov. 8.

*Footwarmers.*—Consists in the application of hydrated baryta for charging footwarmers, the heat being maintained from the latent heat of fusion of the salt.

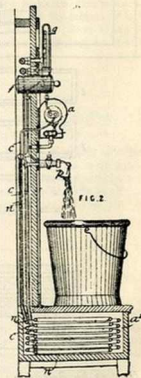
20,319. Burdekin, G. Nov. 10.

*Heating liquids.*  
—Relates to apparatus for subjecting liquids or matters in suspension to the action of air or other gases or vapours, and applicable for introducing steam into liquids to be heated for other purposes. A distributing-chamber A is provided with a flanged opening D for attaching any pipe bringing the air, gas, or vapour, and with a number of straight or curved partitions B forming openings C from which the gas &c. escapes into the liquid with a more or less tangential motion.



20,568. Grove, D. Nov 14.

*Heating water.*—Relates to a device for heating water with a view to sterilizing it. The water enters by a pipe c and passes through a coil contained in a box a', and thence to a gas heating-device a. After this it enters a receiver f fitted with a thermometer g. Thence it passes downwards through a pipe n, through the coil again, and, finally, to the tap p. The pipes c and n are concentric, so that the hot water cools the water entering the apparatus. The box a' may be packed with ice if necessary. The water may be drawn off hot if required. Gas cocks for water-heating apparatus are arranged so that the gas and water plugs



are parallel, and the axis of the former has a dice with a hole in it which, when the gas is turned on, registers with the spindle of the water tap, which can then be opened.

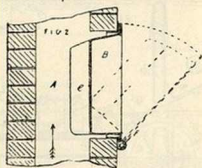
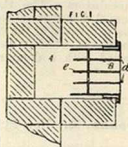
**20,660. Weyman, J. E., and Ellis, G. W. H.**  
Nov. 15. *Drawings to Specification.*

*Heating buildings.*—The heat taken up by the cooling-water in the cylinder jackets of gas and oil engines is utilized for heating workshops and other buildings or ships; the water may be subsequently sent to a cooling-coil before it is returned to the jacket.

**20,847. Knight, J. H.** Nov. 17.

*Heating buildings.*—The waste heat of the chimney gases is used for heating rooms. Figs. 1 and 2 show a sectional plan and elevation respectively of the contrivance. A casting B pivoted at F to the wall of the room carries on one side grills or grids *e* projecting into the chimney, and on the other sides grids *d* which may project slightly into the room. The waste gases passing

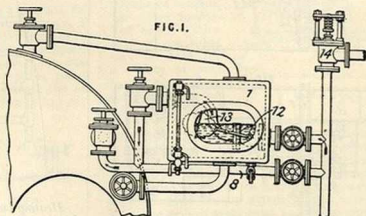
up the flue A heat the grids *e*, and this heat is communicated by conduction to the grids *d*. The



air of the room circulating round the grids *d* is heated, and thus warms the room.

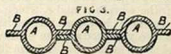
**20,941. Browne, F., and Crawford, D.** Nov. 18.

*Heating water.*—Relates to means for supplying the feed and maintaining a constant water level in boilers. The supply is controlled by the variation of the water level in a chamber 1, through the ball cock 13 which regulates the feed-passage 12, the chamber 1 being in free communication with the boiler. When the ball cock has closed the feed-passage, the water is returned through the relief valve 14. By means of the by-pass 8 the feed regulator may be cut out of circuit.



**21,066. White, L., and Baker, W. Y.,** [trading as Thames Bank Iron Co.] Nov. 19.

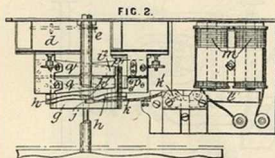
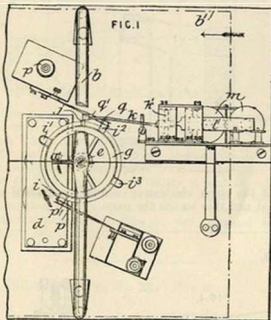
*Heating water.*—Relates to improvements on the invention described in Specification No. 9940, A.D. 1892, whereby the horizontal tubes A, Fig. 3, of hot-water boilers for heating purposes have overlapping side flanges B for the greater part of their length, compelling the products of combustion to travel in a zig-zag direction, first underneath one set of tubes, next above them, and so on. Fig. 4 shows a modified form of flange. The details may be further modified.



**21,113. Roberts, J. H., and Roberts, J. F. A.** Nov. 21. *Drawings to Specification.*

*Thermostats for incubators.* The thermostat consists of a closed funnel-shaped vessel containing a volatile liquid. The expansion of the vapour of the liquid causes the cover, which is flexible, to move a lever connected with a damper in the egg drawer.

**21,309. Westbrooke, E.** Nov. 23.



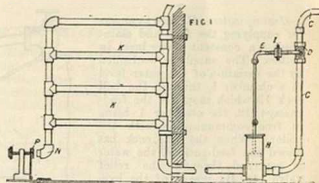
*Thermostats.*—An air-controlling valve *a*, working in the casing *b*, is pivoted upon a shaft *b* rotated by means of the wheels *d* and *e*, which latter are connected to suitable clockwork mechanism. Upon the shaft *b* is also mounted a drum *g*, provided with a groove or chase so arranged as to form four sweeps or curves *h*, connected by lateral grooves *h*<sup>1</sup> arranged 90° apart. A trigger *k* pivoted at *k*<sup>1</sup> carries at one end a pin *j*, which slides in the drum groove, the other toothed end gearing with a sector on the pivoted armature *l* of the electromagnet *m*. Four contacts *i*, *i*<sup>1</sup>, *i*<sup>2</sup>, *i*<sup>3</sup> with opposite pairs in electrical connection are arranged on the drum, and contacting-springs *p*, *p*<sup>1</sup>, *g*, *q*<sup>1</sup> form a circuit through the apparatus, the external circuit including a

battery and maximum and minimum thermometer. When the higher temperature limit is reached, the mercury in the thermometer completes the circuit and energizes the electromagnet, causing the pin *j* of the trigger *k* to slip along its lateral groove and allow the drum *g* and valve *a* to turn through 90°. This movement breaks the circuit, so that the trigger catches the drum and keeps the valve *a* in the closed position until the lower temperature limit is reached, when the action is repeated. The apparatus may be used for actuating the disc ventilators of windows and the like.

**21,514. Romano, R., and Reull, E.** June 18, [date claimed under Sec. 103 of Patents &c. Act, A.D. 1883].

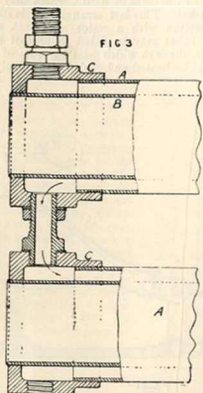
*Non-conducting coverings.*—Relates to a composition applicable for use as a non-conducting covering for boilers, steam pipes, ice houses, &c. Cork dust is kneaded with albuminoid substances or blood, mixed with common or hydraulic lime and moulded to the required form. Cement or gypsum and gelatine, mixed with bichromate of potash, may be added, or may replace some of the other constituents.

**21,713. Macer, M.** Nov. 28.



*Heating buildings; steam traps.*—Relates to steam heating-apparatus for greenhouses and other buildings. Steam from a boiler passes down the pipe *C* past the cock *D* into the cylinder *H*, which latter contains a piston connected to the cock *D* by a threaded lever *E* carrying an adjustable weight *I*. As soon as the pressure of steam is sufficient to lift the piston it cuts the steam off, and as soon as the pressure falls the piston descends and allows steam to enter. The steam thus admitted circulates through the coils *K* furnished with an outlet *N* normally covered by a spring pad *P*. The condensation water collects at *N* and cools the pipes, causing them to contract and allow the water to escape.

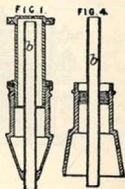
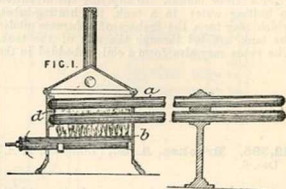
22,028. Sharrow, W. Dec. 1.



*Heating air.*—Relates to tubular apparatus for heating air by steam. The concentric pipes A, B are secured into sockets C, the inner ones being open at both ends. The sockets are connected by solid and hollow plugs alternately, so that steam supplied to one pipe of the series passes through them all and, in so doing, heats the air in the pipes B, and also that surrounding the pipes A, A.

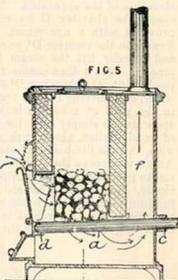
22,076. Cockburn, J. Dec. 2.

*Hot water bags and the like, filling-nozzles for.* Two vertical sections of a filling-nozzle are shown, the sections being at right-angles to one another. A central tube *b* is provided for the escape of the air.

22,272. Perkins, L. P., and Buck, W. E.  
Dec. 5. Amended.

*Heating - apparatus.*—Relates to apparatus for the diffusion or transference of heat, in which close-ended tubes, partly filled with water, spirit, or other liquid, are employed, and consists in a "novel combination" of such tubes with "lamps, stoves, "furnaces, hearths, "or other sources "of heat." The heat of the tubes may be used for a variety of purposes, among which are mentioned the heating of green-

houses, rooms, vehicles, drying-closets, and the like, the warming of currents or volumes of air or water or other liquid contained in pipes, tanks, or columns, such as water cranes (to prevent freezing), and the warming or melting of inflammable substances. It may also be applied to prevent condensation on shop windows &c. by arranging the tubes near the lower sash so as to warm an upward current of air. The arrangement of the tubes, and of the heating lamp or stove, is suitably modified to suit the various applications of the invention. Fig. 1 shows the manner of supplying the tubes *a, a* in connection with a gas stove, which is so constructed as to facilitate their introduction and removal. A similar arrangement with vertical tubes is illustrated in the Provisional Specification. Fig. 5 shows a stove burning solid fuel, the tubes serving as firebars. The tubes may form closed loops, in which, however, no circulation, except that produced by evaporation and condensation, takes place, as the tubes are only partly filled with liquid. A straight tube may be fitted with an internal longitudinal partition, or an inner tube, to produce the same effect.



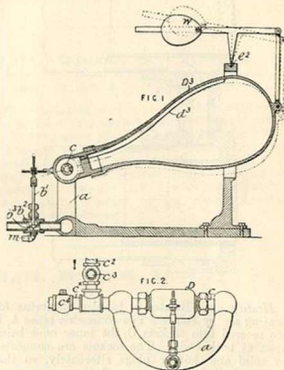


Arrangements are illustrated in which the heating-tubes project into air passages, the flow of air through which is maintained by natural draught, or by a fan or blower. In applying the invention to heating water in a tank, the heating-tubes, which may form the firebricks of a furnace under the tank, are led through the side of the tank. The tubes may also form a coil embedded in the

walls of a "warming or melting pan," and the part of the tube exposed to the heating-medium may be in the form of a coil, which may serve as a fire-basket. This last arrangement is illustrated in connection with a water crane. A series of straight tubes may be fitted to project into two chambers, through which pass currents of fluid or vapour to be heated and cooled respectively.

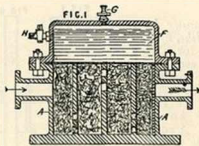
**22,395. Brookes, A. G.,** [Littlefield, F. A.].  
Dec. 6.

*Steam traps.*—Fig. 2 shows an end view with the receiver broken away, and Fig. 1 a sectional side elevation of the apparatus. Water of condensation enters the chamber D by means of the pipe *c*, and thence flows into the receiver D<sup>2</sup>, causing the latter to fall and thereby lift the steam inlet valve *b* in the pipe *b*<sup>1</sup>. Steam then enters the arm *a* and pipe *d*<sup>2</sup>, passing into the chamber D<sup>3</sup> above the level of the water, and driving it past the non-return valve *c*<sup>1</sup> in the pipe *c*<sup>2</sup> into the boiler again. When the apparatus is simply used for getting rid of water of condensation, the branch *e* may be dispensed with, and the discharge effected through the arm *c*. An air valve *m* on the stem *b*<sup>1</sup> of the valve *b*<sup>1</sup> permits air to pass into the apparatus when the valve *b*<sup>1</sup> is closed. The balance weight *w* is supported on a fulcrum *e*<sup>2</sup> much below the arm *e* to increase the leverage when the weight *w* is falling, and thus ensure a quick shut-off of the valve *b*<sup>1</sup>.



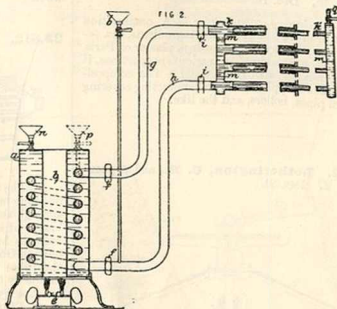
**22,481. Farini, G. A.** Dec. 7.

*Heating water.*—Relates to means for purifying feedwater of steam and other boilers. Oil and fatty matter are separated, and the effect of any mineral substances in solution is neutralized. Water entering the purifying-chamber A passes circuitously over a mass of divided iron or iron borings combined or not with sponge or other absorbent material, such as oyster-shells. This absorbent material may be combined with any chemical reagent for neutralizing or precipitating deleterious matter. On the other hand, solid reagents may be introduced to effect the same purpose. The upper portion F of the chamber is divided off by a perforated diaphragm. The oil and fatty matter rise to the surface of the water and are drawn off through the cock H. Entrapped air is released by the cock G.

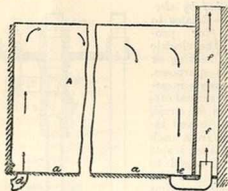


**23,030. Busch, E.** Dec. 14.

*Heating-apparatus.*—Relates to apparatus for use in shop windows and the like, more especially with the object of thawing, or preventing the freezing of moisture on the windows. In the form shown in Fig. 2, which may be somewhat modified, the oil lamp *e* heats the water in an annular boiler or receptacle *a* which communicates its heat to water in the coil *b*, and thence to the system of pipes *g, h, k, k'*, the latter being telescopic, if desired. Partitions *m, m, m* ensure circulation. The filling-tunnels *n* and *o*, or *p*, are provided with cocks, and a cock *q* is employed as an air vent while filling. Unions *f, f, i, i* are placed in the pipes *g, h* to allow of the pipes *k, k'* being turned down from the window when not required. Hot air or steam may take the place of water.



**23,066. Langfeld, J., and Sharples, R. B.** Dec. 15.

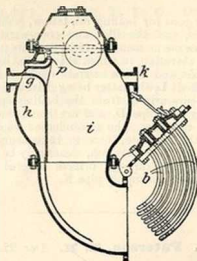


*Heating buildings &c.*—For heating and ventilating churches, chapels, schools, hospitals, and the like, hot air is admitted by a pipe *d* near the floor level *a* which rises and displaces the colder and impure air in the apartment *A*, driving it through an exit *e* placed near the level of the floor and away by the uptake *f*. The hot air passing away through the exit *e* draws all the heavy vapours and gases with it without creating a draught.

**23,200. Mudd, T.** Dec. 16.

*Heating liquids.*—The boiler-feed make-up evaporator described in Specification No. 19,222,

A.D. 1891, is adapted for use as a heater for feed-water and other liquids, arrangements being at the same time provided for removing air and impurities, such as floating grease. The water or other liquid

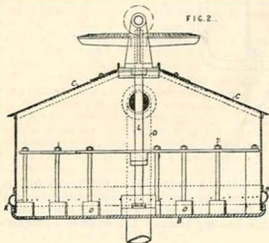


to be heated enters the chamber *i* by the passage *g, h* and passes over the heating-coils *b*, which, when in position, are enclosed by the chamber *i*. The heated water &c. escapes by the aperture *k*, while oil and the like is discharged through the float-actuated valve *p*.

**23,250. Christie, B. J., Kelly, H., Frazer, J., McMillen, S., and Rundell, F.** Dec. 16.

*Non conducting compositions.*—A composition of some or all of the following ingredients, viz.:—cotton-dust, fireclay, alum, sawdust, plaster of Paris, and flax-seed, combined in various proportions, is made by mixing with rusty water. The composition so made is applied as a non-conducting covering to steam pipes, boilers, and the like.

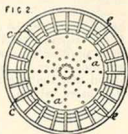
**23,542. Lotherington, C. B., and Spencer, I.** Dec. 21.



*Boiling-pans* for boiling oil, tallow, grease, soap, fish livers, and the like, and concentrating the residue for use as manure. Fig. 2 shows the pan in sectional elevation, in which B is the flat bottom, C sloping lids, and O the stirrers connected to the vertical shaft L, the latter being driven by gearing. The vapours arising from the boiling operations escape by the pipe D, and are condensed by an injection of water; the uncondensed vapours are led into the firegrate, there to be consumed. To assist the boiling operation, steam may be injected into the pan through orifices covered by the half-round steam supply pipe K.

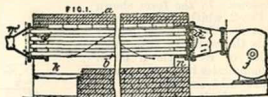
**23,611. Paterson, E. H.** Dec. 22.

*Boiling pans* for clothes &c. The articles to be treated are put into a wooden basket which is placed bodily in a boiler or copper, thus keeping the articles from touching the sides. The basket, shown in plan in Fig. 2, has a



perforated wooden bottom *a*, and sides formed of sloping ribs *c* connected together by rings of hard wood.

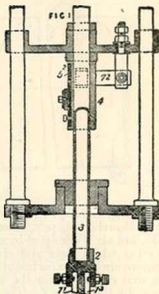
**23,612. Ross, R. C.** Dec. 22.



*Heating air* for use in connection with stenter finishing machines for woven fabrics. Air is forced through the series of tubes *b* in the furnace *a* by means of a blower *j*, and in its passage the air becomes heated by means of the products of combustion from the firegrate *k*, which circulate around the tubes in the opposite direction, and finally escape by the outlet *n*. The heated air is led away for use by the outlet pipe *m*<sup>1</sup>. The pipes *b* are secured firmly at the cooler end of the furnace *d*, but can expand or contract freely in the tube-plate *g*<sup>1</sup> at the hot or delivery end.

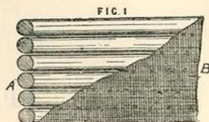
**23,774. Niewerth, R.** Dec. 24.

*Heating by electricity.*—Relates to means for producing the electric arc for heating or lighting purposes, and consists in arranging several carbons in a circle, parallel to and insulated from each other, the whole being arranged to rotate and the different carbons connected to a positive and a negative terminal alternately, at least two of the carbons being intermittently without current. These objects are effected by mounting the carbons 1<sup>1</sup>, 1<sup>2</sup>, &c. in a socket 2 carried by a hollow spindle 3 caused to revolve by means of any suitable motor. Each of the carbons is connected by a wire passing through the spindle with the corresponding segment 5<sup>1</sup> &c. of a sleeve commutator 4, current being supplied to these segments through springs 7<sup>1</sup> carrying contact-blocks. If six carbons and six commutator segments are used, four contact-springs are provided.



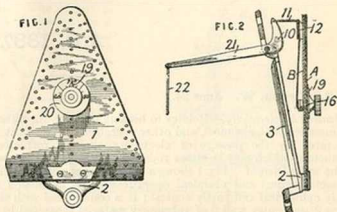
- 23,782. Clarkson, G. J.,** [Mannheimer Gummi Gutta Percha und Asbest Fabrik].  
Dec. 24.

*Non-conducting coverings.*—Lagging for steam boilers is made up of strips or bands A of insufusorial earth of any convenient cross-section and covered with asbestos B. The separate bands are bound together by asbestos thread, hemp, or the like, to form sheet lagging.



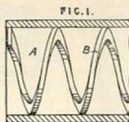
- 23,895. Howard, C. de Z.** Dec. 27.

*Thermostats.*—A triangular plate 1 constructed of two sheets of material A and B, Fig. 2, of different expansibilities joined together, is fixed by its lower edge to the base 2 of a vertical standard 3, and a cord 11 passes from a button 16 over the guide 12 to the short arm 10 of a bell-crank lever 21, the longer arm of which actuates the damper of the heating-furnace by the rod 22. The cord 11 is attached to an eccentric wrist pin on the button 16, which can be turned round by hand to regulate the damper. The bending of the plate due to expansion by the heat of the apartment moves the damper, which is of ordinary construction. The button 16 is provided with an index 19 and graduated scale 20.



- 23,993. Howell, S. E.** Dec. 29.

*Heating water.*—One or more metal coils B, of any desired pitch or twist, are secured by welding, brazing, or otherwise, within the tubes A of boilers and the like.



- 24,071. Schiff, E. L. C.** Dec. 30.

*Heating liquids.*—The boiling or evaporation of liquids is facilitated by the passage of an electric current of low tension. The invention may be applied in the production of carbonic-acid gas by the treatment of potash leys in the manner described in Specifications Nos. 9171, 9646, and 10,158, A.D. 1891, or to the boiling or evaporation of other liquids such as sulphuric acid, saccharine liquids, and brine.

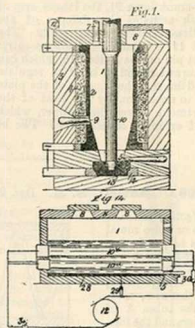
## APPENDIX.

The first of the following abridgments should be added to those appearing in the volume for A.D. 1884-88.

### A.D. 1887.

**9017. Cross, W.** June 24.

*Heating by electricity.*—Relates to heating ores &c. for effecting metallurgical, chemical, and other operations. The heat is generated by the passage of electricity through refractory conductors, which may be either rods passed through a chamber or the walls thereof. Fig. 1 shows a form of apparatus suitable for metallurgical and chemical operations. The chamber 1 is partly cylindrical and partly conical; it is constructed with the lining 2, and outer wall 3 of refractory material separated by a layer 4 of carbon or other non-conductor of heat. The lining 2 may be entirely of conducting-material, such as carbon, or only partly of conducting-material. A tap-hole 5 is provided for removing metal or other fused substance, and a second 9 for removing slag. A pipe 7 for the escape of gases is provided, and also a charging-hopper 8. A rod 10 of refractory conducting-material is the resistance or heating rod; it is electrically connected at its upper end with one pole of a source of electricity, the lower end being secured to a conducting-block 13 fitting in a metal bed 14 connected with the other pole. The conducting-lining may also be heated by a current, which may be obtained from a separate source. In modified forms, several rods may be employed, which may be arranged either horizontally or vertically, and may be tubular or of any desired cross-section. In further modifications, the rods are made to revolve in relation to the chamber and so agitate the contents. In others, the chamber is mounted on rollers and arranged to rotate, suitable connections and gearing being employed. Fig. 14 shows a chamber in which the substance may be first fused and afterwards electrolysed. The chamber 1 is provided with heating-rods 10<sup>a</sup>, a positive electrode 10<sup>b</sup>, and a negative 28, a suitable switch being provided at 29. The source of electricity is indicated at 12, a resistance coil at 30, and an am-meter at 31. The apparatus may be arranged to be heated externally by gaseous or other fuel.



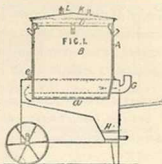
A.D. 1889.

**6529. Sumerling, H.** April 16.

*Heating liquids.*—Relates to an urn or vessel for heating or keeping beverages or other liquids hot. The vessel is preferably constructed with a water jacket A heated by a burner B, and has a container E of porcelain or other material. The bottom of the container E is sloped and a tap F provided for drawing off the liquid. F<sup>2</sup> is a removable screw plug for facilitating the cleaning of the tap. A tap is provided for emptying the external jacket. A ribbed cover I is provided, the edges of which dip into the channel H in which the condensed vapours collect, so that they do not find their way back into the vessel E. J is a siphon tube for emptying the channel H, and C<sup>1</sup> is a lid closing the opening C for filling the external jacket.

**16,110. Rose, H. J. F.** Oct. 12.

*Boiling-pans.*—Relates to a domestic clothes washer, applicable also as a generator for supplying steam. The boiler is formed with a deeply-corrugated bottom a and with an internal similarly-shaped lining or casing B. The lower portion of the internal casing is perforated in order that for water-circulation purposes free passages may be formed between the interior and the narrow exterior spaces of the casing. The removable annular ring D is also provided for deflecting ascending water currents. To facilitate emptying, the hinge e is provided in the portable arrangement, around which hinge the boiler may be turned. In place of the corrugated bottom close-ended water-tubes depending into the stove and enclosing open-ended tubes secured to the inner casing may be provided. When used for steam generation purposes the boiler is enclosed by suitably-jointing the cover K to the shell, the safety-valve L being also provided. The boiler A may be heated by placing it on an ordinary stove or upon the portable arrangement shown in the Figure. In this case the gases from the fireplace H pass to the chimney G through flues formed by the upper enclosed portions of the corrugated boiler bottom.

**17,277. Burbridge, J.** Oct. 31.

*Hot-water bottles.*—The india-rubber washer C<sup>1</sup> of screw-plug bottle stoppers B is made in one piece with a cap C having a downwardly-extending guard C<sup>2</sup>. In the case of hot-water bottles, the stopper may have a screw stem to engage with a socket in the metal nozzle A to prevent complete withdrawal.





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By DARLING & SON, LTD., 1-3, GREAT ST. THOMAS APOSTLE, E.C.  
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 21. CASES AND BARRELS.  
 22. CEMENTS AND LIKE COMPOSITIONS.  
 23. CENTRIFUGAL DRYING, SEPARATING, AND MIXING MACHINES AND APPARATUS.  
 24. CHAINS, CHAIN CABLES, SHACKLES, AND SWIVELS.  
 25. CHIMNEYS AND FLUES, [including Ventilating-shaft top].  
 26. CLOSETS, URINALS, BATHS, LAVATORIES, AND LIKE SANITARY APPLIANCES.  
 27. COIN-FERRED APPARATUS AND THE LIKE.  
 28. COOKING AND KITCHEN APPLIANCES, BREAD-MAKING, AND CONFECTIONERY.  
 29. COOLING AND ICE-MAKING, [including Refrigerators and Ice-storing].  
 30. CUTLERY.  
 31. CUTTING, PUNCHING, AND PERFORATING PAPER, LEATHER, AND FABRICS, [including the general treatment of paper after its manufacture].  
 32. DISTILLING, CONCENTRATING, EVAPORATING, AND CONDENSING LIQUIDS, [excepting Steam-engine condensers].  
 33. DRAINS AND SEWERS.  
 34. DRYING.  
 35. DYNAMO-ELECTRIC GENERATORS AND MOTORS, [including Frictional and influence machines, magnets, and the like].  
 36. ELECTRICITY, CONDUCTING AND INSULATING.  
 37. ELECTRICITY, MEASURING AND TESTING.  
 38. ELECTRICITY, REGULATING AND DISTRIBUTING.  
 39. ELECTRIC LAMPS AND FIXTURES.  
 40. ELECTRIC TELEGRAPHS AND TELEPHONES.  
 41. ELECTROLYSIS, [including Electrodeposition and Electroplating].  
 42. FABRICS, DRESSING AND FINISHING WOVEN AND MANUFACTURING FELTED, [including Folding, Wind-ing, Measuring, and Packing].



ABRIDGMENTS OF SPECIFICATIONS.

43. FASTENINGS, DRESS, [including Jewellery].
44. FASTENINGS, LOCK, LATCH, BOLT, AND OTHER, [including Safes and strong-rooms].
45. FENCING, TRELLIS, AND WIRE NETTING.
46. FILTERING AND OTHERWISE PURIFYING LIQUIDS.
47. FIRE, EXTINCTION AND PREVENTION OF.
48. FISH AND FISHING.
49. FOOD PREPARATIONS AND FOOD-PRESERVING.
50. FUEL, MANUFACTURE OF.
51. FURNACES AND KILNS, [including Blowpipes and blow-pipe burners; Smiths' forges and rivet hearths; Smoke and fumes, Treating].
52. FURNITURE AND UPHOLSTERY.
53. GALVANIC BATTERIES.
54. GAS DISTRIBUTION.
55. GAS MANUFACTURE.
56. GLASS.
57. GOVERNORS, SPEED-REGULATING, FOR ENGINES AND MACHINERY.
58. GRAIN AND SEEDS, TREATING, [including Flour and meal].
59. GRINDING, CRUSHING, PULVERIZING, AND THE LIKE.
60. GRINDING OR ABRADING, AND BURNISHING.
61. HAND TOOLS AND MACHINES FOR THE USE OF METAL, WOOD, AND STONE WORKERS.
62. HARNESS AND SADDLERY.
63. HATS AND OTHER HEAD COVERINGS.
64. HEATING, [excepting Furnaces and Stoves].
65. HINGES, HINGE-TO DOOR AND GATE FURNITURE AND ACCESSORIES, [excepting Fastenings, Lock, latch, bolt, and other].
66. HOLLOW-WARE, [including Buckets, Pans, Kettles, Saucers, and Water-cans].
67. HORSE-SHOES.
68. HYDRAULIC ENGINEERING.
69. HYDRAULIC MACHINERY AND APPARATUS, [excepting Pumps and other means for raising and forcing water].
70. INDIA-RUBBER AND GUTTA-PERCHA, [including Plastic compositions and Materials of constructive utility other than metals and stone].
71. INJECTORS AND EJECTORS.
72. IRON AND STEEL MANUFACTURE.
73. LABELS, BADGES, COINS, TOKENS, AND TICKETS.
74. LACE-MAKING, KNITTING, NETTING, BRAIDING, AND PLAITING.
75. LAMPS, CANDLESTICKS, GASALERS, AND OTHER ILLUMINATING APPARATUS, [excepting Electric lamps].
76. LEATHER, [including Treatment of hides and skins].
77. LIFE-SAVING, [MARINE], AND SWIMMING AND BATHING APPLIANCES.
78. LIFTING, HAULING, AND LOADING, [including Lowering, Winding, and Unwinding].
79. LOCOMOTIVES AND MOTOR VEHICLES FOR ROAD AND RAIL, [including Portable and semi-portable engines].
80. MECHANISM AND MILL GEARING.
81. MEDICINE, SURGERY, AND DENTISTRY.
82. METALS AND ALLOYS, [excepting Iron and steel Metallurgy].
83. METALS, CUTTING AND WORKING.
84. MILKING, CHURNING, AND CHEESE-MAKING.
85. MINING, QUARRYING, TUNNELLING, AND WELL-SINKING.
86. MIXING AND AGITATING MACHINES AND APPLIANCES [excepting Centrifugal machines and apparatus].
87. MOULDING PLASTIC AND POWDERED SUBSTANCES, [including Bricks, building and paving blocks, and Tiles, and Pottery].
88. MUSIC AND MUSICAL INSTRUMENTS.
89. NAILS, RIVETS, BOLTS, NUTS, SCREWS, AND LIKE FASTENINGS.
90. NON-METALLIC ELEMENTS.
91. OILS, FATS, LUBRICANTS, CANDLES, AND SOAPS.
92. ORDNANCE AND MACHINE GUNS.
93. ORNAMENTS.
94. PACKING AND BALING GOODS.
95. PAINTS, COLOURS, AND VARNISHES.
96. PAPER, PASTEBOARD, AND PAPIER MÂCHÉ.
97. PHILOSOPHICAL INSTRUMENTS, [including Optical Nautical, Surveying, Mathematical, and Meteorological instruments].
98. PHOTOGRAPHY.
99. PIPES, TUBES, AND HOSE.
100. PRINTING, LETTERPRESS AND LITHOGRAPHIC.
101. PRINTING OTHER THAN LETTERPRESS OR LITHOGRAPHIC.
102. PUMPS AND OTHER MEANS FOR RAISING AND FORCING WATER, [excepting Rotary pumps].
103. RAILWAY AND TRAMWAY VEHICLES.
104. RAILWAYS AND TRAMWAYS.
105. RAILWAY SIGNALS AND COMMUNICATING APPARATUS.

106. REGISTERING, INDICATING, MEASURING, AND CALCULATING, [excepting Signalling and indicating by signals].
107. ROADS AND WAYS.
108. ROAD VEHICLES.
109. ROPES AND CORDS.
110. ROTARY ENGINES, PUMPS, BLOWERS, EXHAUSTERS, AND METERS.
111. SEWAGE, TREATMENT OF, [including Manure].
112. SEWING AND EMBROIDERING.
113. SHIPS, BOATS, AND RAFTS, DIV. I.
114. ————— DIV. II.
115. ————— DIV. III.
116. SHOP, PUBLICHOUSE, AND WAREHOUSE FITTINGS AND ACCESSORIES.
117. SIFTING AND SEPARATING.
118. SIGNALLING AND INDICATING BY SIGNALS, [excepting Railway signals and communicating apparatus].
119. SMALL-ARMS.
120. SPINNING, [including the preparation of fibrous materials and the doubling of yarns and threads].
121. STARCH, GUM, SIZE, GLUE, AND OTHER STIFFENING AND ADHESIVE MATERIALS.
122. STEAM ENGINES, [including Details common to fluid-pressure engines generally].
123. STEAM GENERATORS, [excepting Furnaces].
124. STONE, MARBLE, AND THE LIKE, CUTTING AND WORKING.
125. STOPPING AND BOTTLING, [including Bottles, jars, and like vessels].
126. STOVES, RANGES, AND FIREPLACES.
127. SUGAR.
128. TABLE ARTICLES AND APPLIANCES.
129. TEA, COFFEE, COCOA, AND LIKE BEVERAGES.
130. TOBACCO.
131. TOILET AND HAIRDRESSING ARTICLES, AND PERFUMERY.
132. TOYS, GAMES, AND EXERCISES.
133. TRUNKS, PORTMANTEAUS, HANDBAGS AND LIKE TRAVELLING BAGS, BASKETS, HAMPERS, AND OTHER WICKERWORK.
134. UMBRELLAS, PARASOLS, AND WALKING-STICKS.
135. VALVES AND COCKS.
136. VELOCIPEDES.
137. VENTILATION.
138. WASHING AND CLEANING CLOTHES, DOMESTIC ARTICLES, AND BUILDINGS.
139. WATCHES, CLOCKS, AND OTHER TIMEKEEPERS.
140. WATERPROOF AND SIMILAR FABRICS.
141. WEARING-APPAREL.
142. WEAVING AND WOVEN FABRICS.
143. WEIGHING-APPARATUS.
144. WHEELS FOR VEHICLES, [excepting wheels for Locomotives and tramway engines, Railway and tramway vehicles, Toys, or Traction engines and road locomotives].
145. WOOD AND WOOD-WORKING MACHINERY.
146. WRITING-INSTRUMENTS AND STATIONERY AND WRITING ACCESSORIES, [including Educational appliances].

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