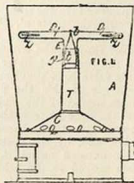


12,004. Ménetrel, L. July 31.

Boiling-pans.—Relates to apparatus for general washing, lixiviating, and extracting purposes. A vessel A is placed on a furnace and contains a cone C perforated at *c*, and carrying a tube T which is fitted with a short tube *t* constituting a hydraulic joint *y* for the central socket E of a reaction-wheel D. The latter is supported on a pivot *b*, and may consist of two or more arms which are curved or bent to suitable angles and end in flat adjusters *z* for spreading the liquid in the form of a sheet. The joint *y* is not watertight, but permits a portion of the ascending liquid to overflow and run down the outside of the tube T into the central part of the material under treatment. In a modified form, the wheel is mounted on a rod extending down to the bottom of the tube T.



12,248. Johns, H. W. Aug. 5. *Drawings to Specification.*

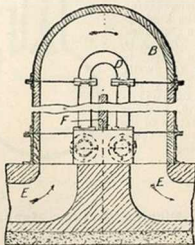
Non-conducting coverings and compositions.—Wood pulp, or wood pulp and sawdust, is treated or combined with fireproof or fireproofing-material, and when in the plastic state made into substantially the form of the surface to be protected. The covering may be additionally fireproofed by an interior lining and an external coating of cement or asbestos. To the wood pulp may be added cork, sponge, hay, straw, hair, or other equivalent material. The inmost layer is composed of an asbestos sheet, or formed from cement of asbestos, magnesia, clay, earths, plaster of Paris, mineral wool, or other substances. An outer fireproof covering is also employed, which in its turn is protected by canvas or similar coating.

12,249. Johns, H. W. Aug. 5. *Drawings to Specification.*

Non-conducting coverings and compositions.—The covering is made up of successive layers of soft, compressible, and porous sheets or slabs, corrugated or otherwise indented, of wood pulp, fireproofed and preferably waterproofed. In conjunction with the above, sponge or other suitable porous material, preferably of a fibrous nature, may be employed. Porous sheets of wood pulp are fireproofed and rolled round a mandrel of substantially the diameter of the pipe to be covered. They are then cut up to facilitate application. The sheets may be treated with the fireproofing-material when in the plastic state, and before drying they may be formed into

the desired shape. In a modification, a layer of asbestos or similar material may be rolled up with the covering, or an interior lining may be employed. Waterproofing-material may be also incorporated if desired. The whole may be protected by canvas, paper, or other covering.

12,331. Garvie, J. Aug. 7.

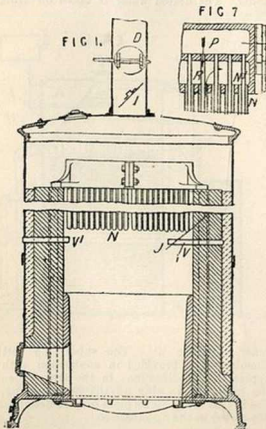


Heating air; heating liquids.—The tubular heater D is supported within the brick-lined chamber B, which connects the two portions of the furnace flue E. The chamber is constructed in suitably-jointed sections to facilitate erection and removal. The firebrick baffle F divides the two portions of the heater from each other.

12,372. Uhler, L. C., and Depresle, H. E. A. Aug. 7.

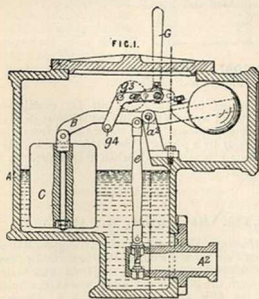
Heating gases.—Relates to apparatus for superheating steam, also applicable for heating air, gases, or vapours, and consisting essentially of a tubular structure heated by its own independent furnace. Fig. 1 shows the whole arrangement, and Fig. 7 an enlarged detail view of the superheating-chambers. Steam &c. admitted to the upper compartment P descends the internal tubes N¹, and returns to the lower compartment R by way of the outer tubes N. The whole is supported upon columns J embedded in the refractory and non-heat-conducting jacket of the furnace chamber. For large sizes the superheating-chambers may be made in halves, which when placed together form a narrow central passage for the furnace gases; the latter also pass to the chimney D by chambers in the setting. The chimney is provided with a pair of dampers I, one of which is readily movable, while the other is more or less permanently secured. To determine the temperature of the furnace an iron tube V, V¹, the central portion of

which is not shown in Fig. 1, is placed below the superheater, the intensity of its redness as viewed



from its open end affording an indication of the heat of the furnace gases.

12,388. McDougall, I. S., McDougall, J. T., and Sugden, T. Aug. 7.



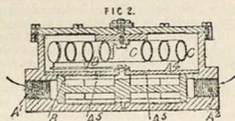
Steam traps.—Relates to improvements in details

of the apparatus described in Specification No. 6350, A.D. 1885. The float C in this case is preferably cylindrical and contained with its axis vertical in the similarly-shaped portion A¹ of the trap casing. When the float lever B is in operation it is supported upon the knife-edges a². When the equilibrium discharge valve E is upon its seating the weight of the float lever is taken off the knife-edges and transmitted to the valve through the spindle e. The outlet A² and the valve are removable together. The test-lever G raises or depresses the float through the stirrip g² and the pins g¹, g².

12,485. Firth, J. C. Aug. 9.

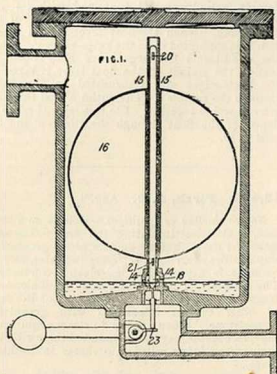
Non-conducting compositions.—Relates to a heat, cold, or electrical insulating and fireproofing substance for use with steam engines, steam generators, ships, railway carriages, refrigerating-safes, strong-rooms, safe depositories, and electric conductors. The composition consists of a mass of pumicestone fragments held together by a grouting of Portland or other cement intermixed with granulated pumicestone. When applied to steam engines and the like, coal tar may be incorporated therewith, the composition being rolled into sheets to facilitate usage.

12,565. Teed, H. W. Aug. 11.



Thermostats.—Relates to apparatus for mixing two fluids, such as hot and cold water, so that the temperature of the resulting fluid shall be uniform, or for delivering a single fluid at a uniform temperature. The application to a mixing-cock is shown. B is a rotary valve for controlling the inlets A¹, A² for the two fluids. It is operated by a Bourdon tube C, the outer end of which is attached to an arm D actuating the valve, the inner end being attached to a pointer by which it can be set. The Bourdon tube contains an expansible liquid, and is hermetically closed. The fluids pass through openings A³ in a diaphragm A⁴, and pass thence to the outlet, the mixture acting on the Bourdon tube, and causing the valve to move according to the temperature. When applied to geysers the outflowing liquid may act in a similar way on the supply valve, so as to control the rate of flow through the apparatus. Other devices, such as compound metal strips, floats, &c., capable of being influenced by variations of temperature, may be employed, connected if necessary with the valve by suitable gearing.

13,980. **Dunlop, M.** Aug. 19.

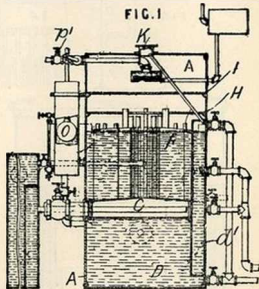


Steam traps.—Relates to the type of trap in which a float is used for operating the discharge valve. In order that the float may be of sufficient strength without being heavy, it is charged internally with gas at about the same pressure as that of the steam in which it works. In one form of trap the float 16, held in position by the tubular guide 15, is secured by keys 20, 21 to the spindle of the discharge valve 18. The latter, protected by the perforated cage 14, is assisted in its opening by the float may be increased by the addition of compound levers acting upon the valve. In a modification, the rising of the float operates a rack and pinion, to the latter of which a tumbler is secured. When the tumbler passes its vertical position it drops over and quickly opens the valve to its fullest extent. In some cases a disc is fitted to the valve spindle below the discharge opening, so that the impact of the falling water may assist the valve in closing.

13,017. **Lake, H. H., [Ferreira, C. E.]** Aug. 19.

Heating water.—Relates to apparatus for purifying and heating water in which the water is subjected to the action of both exhaust and live steam, and drawn off from a point between its surface and bottom to avoid carrying off floating and heavy impurities. In the arrangement shown in Fig. 1, steam is supplied to the chamber C, from which, by vertical pipes *f*, it enters the heating-space A. The water, regulated by a float O and cock *p*¹, is showered in from the strainer K

and further subdivided by diaphragms H, I, in which the sets of perforations alternate with each other. The heated water is taken off from the



inner chamber *d*¹. The subdivided settling-chamber D is provided in connection with the apparatus. Modifications in the arrangement of the pipes for drawing off the heated water, and also in that of the steam pipes &c., are described and illustrated in the Specification.

13,134. **Abel, C. D., [Maurin, J.]** Aug. 21.

Non-conducting compositions.—Pumice sand or pumice gravel is mixed with a binding-material such as lime, gypsum, or cement, and the mixture is moulded and dried.

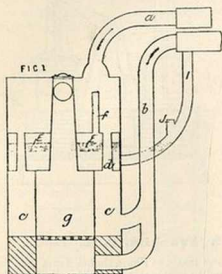
13,208. **Girdwood, H. M.** Aug. 22.
Drawings to Specification.

Heating air.—Incoming air for ventilation is moistened by passing it upwards through a shaft in which it meets falling water raised from a lower reservoir by a pump. The water in the reservoir is heated by steam coils when it is desired to heat the air.

13,332. **Stevenson, H.** Aug. 25.

Heating buildings.—In the arrangement shown, heated air from the chambers *c* ascends by way of the tubes *d*, receives vapour from the boiler E through the pipe *f*, and passes round the building by the flow and return tubes *a, b*. Condensed vapour enters the boiler by the pipe I, which is

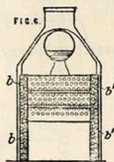
provided with an expansion aperture at J. In a modification, the boiler is pear-shaped, while in



another arrangement the air-heating chamber and the boiler are in separate casings.

13,432. Edwards, E., [Willmann, E.]. Aug. 26.

Heating water.—The arrangement, applicable to steam generators or other boilers, is shown in connection with a water-tube boiler. A series of water-tubes *b, b'*, enclosed in suitable refractory material, form the sides of the boiler and the furnace space. When extended downwards the arrangement may form supports for the boiler.

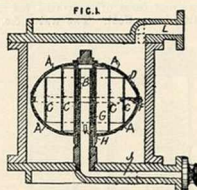


13,621. Guild, J. F. Aug. 29.

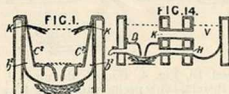
Steam traps.—Water which condenses from expansion in the cylinders and valve-chests of steam engines finds its way into a well with inlet L. As it accumulates it raises an ellipsoidal float A attached to a tube B which slides upon an inner fixed tube G, pierced by slots H. When the slots become uncovered the water escapes by a channel J. The float is strengthened outside by meridional ribs D, and inside by concentric cylinders C and a band secured by bolts F. In a modification, the float is connected by levers to a small slide valve over the mouth of the channel J.

(For Drawing see next column.)

13,621.



13,903. Mackie, S. A. Sept. 4.

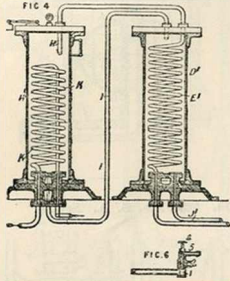


Boiling-pans; heating water.—The apparatus, which is an improvement on that described in Specification No. 5917, A.D. 1890, is employed for the washing and cleansing of wool, cotton waste, esparto and other grasses, wood, sawdust, straw, guncotton, and other fibrous vegetable, animal, and mineral substances. It may also be used in boiling petroleum or other fluids for making gas or in generating vapour for vapour engines, for various chemical purposes, or for heating buildings, &c. The principle of the invention is illustrated in Fig. 1 as applied to a domestic copper. The internal lining *c'* separates the downflow water from that which ascends the annular circumferential space *b'*, and discharges at the upper end through apertures K. In place of the annular space, tubes or tubular passages may be employed. Fig. 14 shows the arrangement in which the heated water from the boiling-pan D passes to the external vat V through the conduit H and returns through the passage K. The heated water, instead of passing in direct to the washing-troughs, may enter through an external pipe over their top edges, and circulate circuitously before passing away. Oil or grease which separates and floats during the cleansing operations may overflow into, and be removed from, a catch-basin. Rinsing, wringing, squeezing, drying, and electrical plant may be added to the apparatus if desired.

14,051. Rouart, H. Sept. 6.

Heating liquids; thermostats.—Relates to apparatus for sterilizing water, wine, beer, milk,

beverages, and other liquids by heating them under pressure to a temperature of 120° C. or over. Fig. 4 shows one form of apparatus for carrying the invention into effect. The water &c. enters



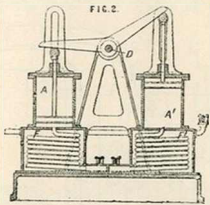
the vessel D', Fig. 4, through the pipe J', and ascends therein, being preliminarily heated by the hot liquid descending through the coil E', the latter liquid being simultaneously cooled. The liquid then passes through the pipe I into the vessel H', where it is heated to the required temperature by the steam coil K. In a modified form, the apparatus is rendered portable and the liquid is heated in a coil in the chamber H' by a furnace or gas burners. In another modification, the water is first heated in a coil and then in a boiler, and arrangements are made for drawing off hot or cold water as required. In the case of gas-heated boilers the supply of gas to the burners is regulated by causing it to pass from the pipe 5, Fig. 6, through a chamber 1 situated in the boiler and containing mercury, the level of which can be adjusted as required by the screw 4. The contraction and expansion of the mercury by the gas diminishes and increases the space for the passage of the gas to the exit pipe 2, and a great expansion will close it altogether.

14,109. Rossiter, J. A. Sept. 8.

Heating gases.—The heat evolved by the compression of air or other gases is employed for heating purposes generally. The compression takes place in the cylinders A, A', each of which is provided with a reciprocating piston the rod of which is provided with an antifriction roller and is actuated by a rocking beam as shown. The heat evolved is taken up by the body surrounding the coils F, F', the latter of which communicate with the respective cylinders. Motion is conveniently imparted to the rocking shaft D through a suitable eccentric.

(For Drawing see next column.)

14,109.



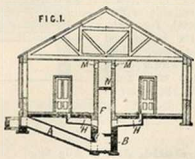
14,125. Franklin, C. A. Sept. 9.

Heating water.—The exhaust from gas engines is utilized to heat water by passing it through tubes in a boiler or tank or other vessel.

14,289. Smith, F. H. Sept. 11. Drawings to Specification.

Heating air.—The air for ventilating a room &c is heated by a gas burner or other means enclosed in a tube within the tube conveying the fresh air.

14,346. Oldroyd, E. Sept. 11.



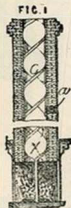
Heating buildings; heating air.—Relates to arrangements for warming and ventilating hospitals, wards, and other rooms, and for disinfecting the air as it passes from such wards or rooms. In the cross-section of a hospital illustrated, atmospheric air enters by the underground passages A to the central chamber B, from which it passes to the air-heating compartment F immediately above. It then passes by conduits H to the various rooms requiring ventilation.

14,380. Johnstone, L. Sept. 12. *Drawings to Specification.*

Heating air.—The calcined material from a cement or like kiln is collected in cooling-chambers through which air to be heated is passed.

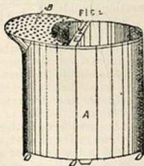
14,456. Moore, T. T. Feb. 17, [date claimed under Sec. 103 of Patents &c. Act, A.D. 1883].

Heating buildings.—Flues, described as adapted for chimneys, but stated to be applicable for "conducting heat" for heating buildings, are formed with single or double spirals C of terracotta, metal, or other suitable material.

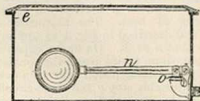


14,470. Close, M. Sept. 13.

Heating liquids.—Relates to an utensil for boiling and straining milk, cream, and similar frothy liquids, made of block tin or other material, and is provided with feet D, a handle E, F, and a strainer B. It is heated by placing in a vessel containing water.



14,558. Cormack, J., and Cormack, W. Sept. 16.



Steam traps.—The drain pipe of the system to be cleared of condensed water opens by an aperture *e* into the upper portion of the trap. The accumulating water raises the float lever *n* and opens the disc valve *o*, thereby providing a discharge outlet. A snifting-valve is provided in the cover.

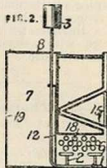
14,604. Dewey, M. W. Sept. 16.

Heating by electricity.—Relates to a method of heating bars and blanks of metal or other material for welding and working in various ways, such as soldering, brazing, bending, cementing, &c. Consists in embedding the bars E in yielding conducting or semi conducting material A, such as powdered carbon, coal, or metal, or metal mixed with carbon, sand, or pumicestone, contained in a non-conducting casing R. This material is heated by the passage of an electric current through it between the terminal plates C. To prevent the latter from being overheated, they may be of larger area than the sectional area of the conducting-material, or the material in the neighbourhood of the plates may be of higher conductivity than that in the middle of the bed. For welding purposes, the plates C are placed in the bottom of the non-conducting case B with a non-conducting material between them. The bars to be welded are held in clamps, one of which is adjustable for effecting the weld.



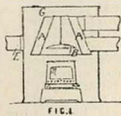
14,690. Bayly, J. P., [Brandt, J.] Sept. 17.

Heating water.—Relates to submerged gas or oil heated apparatus employed for heating water in bath tubs, church baptisteries, tanks, pools, and other receptacles. The casing 19 contains the cold-air chamber 7, enclosed at the top by the perforated plate 8, and the burner chamber 1 divided from the former by the sliding plate 12. The burner gases ascend by tortuous flues 15. Transverse tubes 18 are provided through which the water in the bath &c. circulates. The oil reservoir for feeding the burners 2, 6 is located above the arrangement, as seen at 3. By means of cross-bars secured to the face of the casing, the heater may be supported on hooks or projections on the sides of the tub, tank, &c.



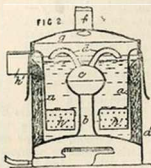
14,857. Saul, D. H. Sept. 20.

Heating water.—The apparatus is heated by oil or gas, and is applicable for warming conservatories and the like. The annular conical water-circulating boiler A is supported immediately above the heating-medium and enclosed by a suitable casing G carrying the escape flue E. The suspended baffle B assists in the distribution of the heat.



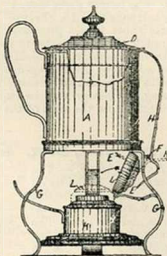
14,878. **Watson, T.** Sept. 20.

Heating liquids.—Relates to apparatus for boiling mussels, applicable also for heating water or other liquid, so as to afford a continuous supply for heating greenhouses &c. It is heated by a Bunsen or other burner. The boiling-vessel has a double casing *a, a'*, the inner being formed of lead. The space between the two contains baywood sawdust and alum, or other non-conductor. A flue *b* leads from the convex bottom of the vessel, and terminates in a chamber *c*, provided with two downward-projecting pipes *d* for directing the products of combustion on the water; the products that are not absorbed escape with the steam by the flue *f* in the fixed half of the cover *g*. The mussels are contained in the perforated vessels *h* with hooked handles supported in slots in the sides of the vessel. The box *h'* contains the mussels to be cooked. For heating water the vessel is provided with an automatic supply valve with a cock for drawing off the water, and with a gauge glass and thermometer; the temperature may be controlled by a thermostat. The apparatus may be connected with a system of pipes for heating a conservatory &c.

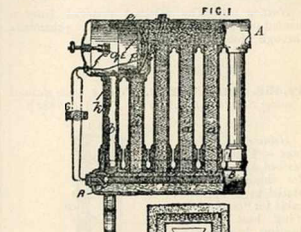


14,955. **Thompson, W. P.,** [Moll, L., trading as Pflzer Metallwaaren Fabrik]. Sept. 22.

Heating liquids.—Relates to milk-boiling apparatus in which the flame is automatically extinguished when the milk boils. The vessel *A* containing the milk is provided with a cover *D* in the form of a float, and is heated by a spirit lamp or gas burner *K*. A lever *H*, pivoted at *F* to one of the legs *G*, has its short end *E* arranged in connection with the gas cock or behind the pivoted cap *L*, while its long end is held by the cover *D*. When the lever is released by the boiling milk raising the cover *D*, the flame is extinguished by the lever *H* closing the cap *L* or the gas cock.

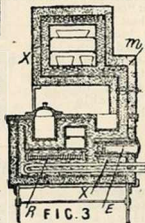


15,043. **Lake, W. R.,** [Abshagen, E.]. Sept. 23.



Heating by electricity; thermostats.

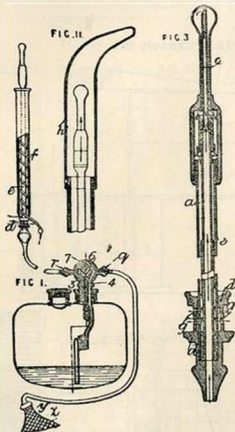
—Resistance coils are surrounded by a badly-conducting radiating-medium such as sperm, cotton-seed, lard, or other oil. Fig. 1 shows the application to a radiator for heating buildings. The resistance coil *R* is carried in the lower chamber *B* which, with the vertical tubes *a* and the upper chamber *A*, contains the badly-conducting medium. An overflow pipe *b*, having an air-hole *k*, receives a portion of the liquid contents when the expansion device *E* comes into operation. To allow of the expansion of the oily substance without putting the structure under pressure, one end *e*, Fig. 1, of the chamber *A* is constructed in the form of a piston which slides outwards as the liquid expands and returns by atmospheric pressure when contraction takes place. Fig. 3 shows the application of the resistance coils *R* surrounded by the oily medium *X* to a cooking-stove, in the various operations, such as boiling, roasting, &c., being carried on in the chambers penetrating the heating-liquid. The exterior surfaces are enclosed in a material *m* which is a non-conductor of heat. The expansion device illustrated and described in Fig. 1 as applied to a radiator is shown at *E*. On undue expansion of the heating-medium taking place, the contact-piece *p*, carried by the sliding piston expansion device *E*, strikes the adjustable stop *q* and short-circuits the current from the generator *G* until the temperature of the liquid is reduced, with the consequent withdrawal of the contact.



15,209. **Paquelin, C. A.** Sept. 25.

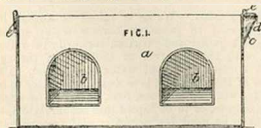
Heating air.—Relates to a thermo-cautery, and to a carburetor and blowpipe for use therewith. The

cautery may be converted into a hot-air desiccator for dental and other purposes. The cautery, Figs. 1 and 3, has a central tube *a*, through which a combustible gas is passed to the tube *c* made of



platinum or other gas-condensing metal. The products of combustion pass off through the annular space between the tube *a* and a sleeve *c*, and escape through openings *g* in the boss *d* at the end of the handle *f*. The handle is kept cool by blowing cold air or water (condensed from the products of combustion) through the space between it and the sleeve *c*, or this space may be packed with a non-conductor of heat. The point of the cautery may be formed by a partitioned tube, or a tube folded on itself. The cautery is converted into a hot-air desiccator for dental and other purposes by fitting a nozzle over the end. Air is blown through the nozzle on to the part under treatment.

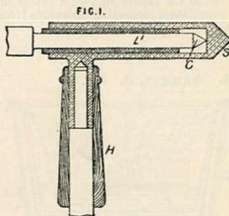
15,323. Hughes, E. Sept. 27.



Footwarmers.—Consists of a closed vessel *a* made of sheet metal or earthenware, having two or more

recesses *b* for the feet of the user or users. The vessel is filled with hot water through an inlet *c* closed by a screw cap *d*, and handles *e* are provided for carrying it. The temperature of the water may be maintained by a lamp let into a recess in the side of the vessel.

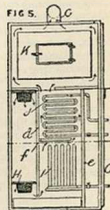
15,328. Zipernowski, C. Sept. 27.



Heating by electricity.—Relates to a method of apparatus for applying electric currents to produce heat for various technical and industrial purposes such as heating, boiling, drying, melting, and soldering. The apparatus may be constructed in the form of portable or stationary heating-arrangements in apartments or vehicles or stoves for heating rooms or other purposes. The Specification describes and illustrates the invention as applied to a soldering-iron, of which Fig. 1 is given as an example. The principle consists in making small or imperfect contact at C between the electrical conductor *L*, which may be made of carbon, and the enveloping iron cylinder *S* which is utilized for the heating purposes. The handle of the apparatus is shown at *H*.

15,556. Macdonald, W. R. Oct. 1.

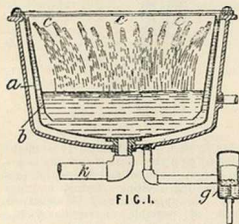
Heating air.—Relates to the treatment of air for ventilating hotels, prisons, hospitals, &c. In each of a series of apartments is placed a cabinet, provided with a door *C* to admit of access from a corridor, and containing devices for treating air. These may consist of partitions *d*, *e*, *f*, to guide the air (which enters at a suitable inlet and escapes at *c* to the compartment), a steam radiator *I*, a refrigerating-coil *J*, and a tank *K* containing ice or a freezing-mixture. The various devices may be used to suit the requirements of the apartments.



15,698. Robertson, R. A., and Ballin-gall, D. Oct. 4. *Drawings to Specification.*

Heating liquids.—Consists in utilizing the heat of the liquid or vapours in multiple-effect distilling, concentrating, and evaporating apparatus either for preliminarily heating the liquid to be afterwards treated in the apparatus, or for heating one or more other liquids. The liquid is run through pipes, coils, or chambers, situated within or adjacent to the vapour or liquid spaces in the several evaporators proceeding backwards from the last to the first.

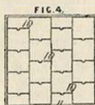
15,814. Gamgee, J. Oct. 6.



Boiling-pans for washing. Relates to coppers such as are described in Specification No. 5330, A.D. 1888. The copper *a* is provided with the inner linings *b*, between which and the shell the heated water rises and overflows through the perforations *c*. For heating the copper a steam jacket is provided, the condensed water from which, escaping by the trap *g*, is used for washing purposes. The pipe *k* is provided for emptying the copper.

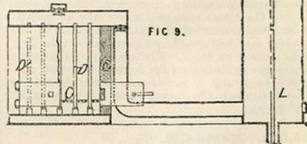
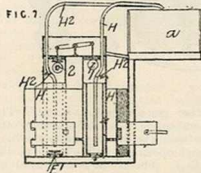
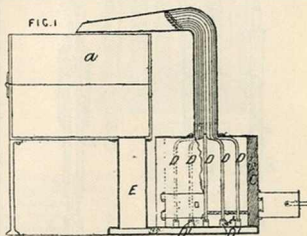
15,900. Sterne, L. Oct. 7.

Non-conducting coverings.—Relates to the manufacture of cellular non-conducting blocks, such as are used in refrigerating chambers, or as non-conducting coverings for boilers, stoves, and the like, and other analogous purposes. Each tier or series of cells is made up of a series of cardboard or other strips extending from side to side or from end to end of a block, or of a continuous strip or portions of such. Fig. 4 shows an example of one modification of the construction, in which the cells 10, enclosed in the casing 11, break joint and interlock with each other, the whole forming a single block. All adjacent parts are glued to each other to assist in keeping them in position. The cells may be of various



shapes, and their abutting surfaces suitably formed to facilitate their retention in position. If desired, the blocks may be dipped in a waterproofing-composition.

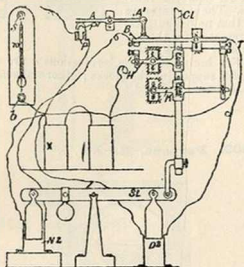
16,550A. Fraser, M. Oct. 17.



Heating water.—Water is raised or forced by being heated in tubes or narrow water spaces, grouped together and situated vertically in a furnace, with check valves at the bottom through which a supply of cold water is obtained. The object of the invention is to enable the water to be used for working engines, lifts, dynamos, or washing-machines, or to be forced into accumulators, as well as to be used for domestic and factory purposes. Fig. 1 shows the vertical tubes *D, D*, heated in the furnace *C* so as to deliver a constant stream of water into the tank *a*, from which a supply of

water reaches the tubes D by the pipe E and valve D¹. Fig. 7 shows an arrangement in which water is forced up pipes H² by the generation of steam in a pair of vessels H fitted with float valves 1, 2 at the top as well as check valves E¹ at the bottom so as to act alternately.

16,736. Gratton, J. Oct. 21.

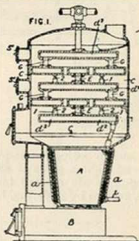


Thermostats.—Relates to a means for automatically controlling the ventilation of halls, conservatories, greenhouses, hothouses, dwelling-houses, stables, stoves, ships, banks, schools, factories, mills, offices, theatres, railway and other vehicles, mines, baths, ovens, barns, sewers, and other places, and also the heating of halls, churches, chapels, incubators, and steam boilers, and liquids &c. in chemical works, metal works, breweries, distilleries, &c. A rod CL, connected with a valve or damper of the heating-apparatus or with a window, door, grid, slide, or other ventilator, is connected with a lever SL operated, one way or the other, by solenoids N², D² when the latter are brought into circuit with the electric batteries X. To effect this, they are, as shown, connected by wires with contact-blocks on the lever B and with the batteries, the latter being also connected with contact-blocks on levers H, K and with a binding-screw b; a second binding-screw s is connected with a small coil P, also connected with the batteries. A lever A carries a magnet P¹, and is linked to the lever B. The screws b, s are respectively connected with the mercury or other liquid in a thermometer, and with a wire extending down into the tube to the degree of temperature corresponding to that required in the space ventilated or heated. When the mercury makes contact with this latter wire, the lever A rocks, contact is made between B and K, the solenoid D² is brought into circuit, the rod CL descends, and the ventilator (for example) is opened more. When the mercury falls, B and H make contact and N² is brought into circuit and the ventilator is shut partly, and so on. The Provisional Specification states that, should the

temperature rise, the apparatus may be made to bring another battery into action to open the ventilator wider.

16,881. Pease, J. F. April 7, [date claimed under Sec. 103 of Patents &c. Act, A.D. 1883].

Heating water.—Relates to circulating boilers for heating buildings. A series of disc-shaped water chambers d², alternately connected to each other by central and circumferential pipes E and G respectively, are located within the combustion chamber C supported above the water-jacketed fire-chamber A and ashbox B. Outflow takes place by the pipe a, and the return to the annular jacket, when the latter is employed, or to the lowest water chamber by the pipe i. Cleaning-doors S¹ are provided. Adjustable supports 1, 2 are fitted to the disc chambers to relieve the central pipe connections E of a portion of their weight.



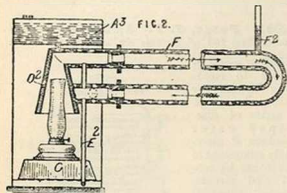
17,237. Calliburces, P. Oct. 28. Drawings to Specification.

Heating air for use in apparatus for distilling, evaporating, and concentrating liquids. The air is heated in a vessel provided with several concentric passages through alternate ones of which the air and steam circulate, so that the steam heats the air.

17,253. Sharp, W. F. Oct. 28.

Heating water.—Consists in improvements in hot-water apparatus, especially applicable for heating greenhouses and the like. The oil lamp C is employed to heat the water in the tubular boiler D², F, the horizontal portion of which is carried throughout the length of the chamber to be heated. The combustion products are carried, as denoted by the arrows, through the interiors of the heating-tubes before escaping into the external atmosphere. Water is supplied to the system from the chamber A³, while steam is allowed to escape by the pipe F². Condensed water is drained away from the flues by the pipe E². The lamp is enclosed in a suitable casing provided with a door, which preferably

opens from the exterior of the building to be heated. The floor of the stove is perforated with air-supply holes. The bottom of the door is provided with a projecting chamber having a slotted

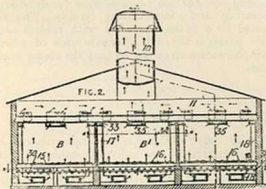


front, and a swing baffle-plate to prevent the ingress of sudden gusts of wind. The lengths of heating-pipes are secured together by convenient means, such as by soldering, bolting, &c.

17,342. Tettweiler, B. Oct. 30. *Drawings to Specification.*

Non-conducting compositions for walls for sheds, huts, magazines, &c. Coarse fibrous material is painted or woven to form mats, which are impregnated with glue or the like; fabrics or fibres are then pressed on one or both sides, and the whole is varnished or waterproofed. Other methods may be adopted for connecting the mats and fabrics &c.

17,503. Bayly, J. P., [Arnold, P.] Nov. 1.

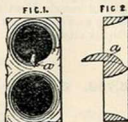


~ *Heating air for use in drying materials of all kinds, more especially clay products such as bricks, sewer pipes, pottery, &c.* The air is admitted to drying-chambers B, B' by trunks 17, 18, arranged below a series of independent supply and exhaust steam pipes 30 over which the air travels before passing the slats 15 of which the drying-floor is composed.

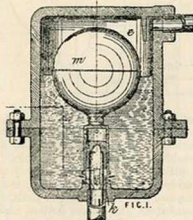
17,647. Batchelor, J. G. H. Nov. 4.

Heating gases and liquids.—In order to facilitate the flow of gases or liquids through tubular structures such as heating-apparatus, refractory facings having bell-mouthed apertures are placed over the tubes. The apertures are such that no flat surfaces are presented for the impingement of the gases

&c. For horizontal tubes, projections *a* are provided for supporting the blocks; otherwise screws, studs, &c. are employed.



17,800. Parsons, H. Nov. 5.



Steam traps.—By the rise of the float *m*, due to the presence of condensed water in the receiving-chamber *e*, the water is discharged through openings *k* in the upper end of the outlet pipe. As shown, the latter pipe is formed with a packed blind end, but in a modification it is open to suit a double-beat equilibrium valve carried by the float. In another arrangement, to steady the action of the float, the valve sleeve is formed with an additional bearing surface upon the blind end of the outlet pipe, packing in this case being dispensed with.

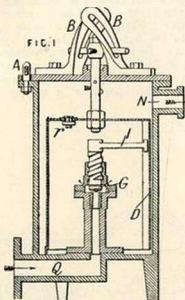
17,819. Probst, V. A. Nov. 5.

Steam traps.—Water entering the trap chamber by the passage Q passes the valve G and overflows by the opening N. As soon as steam enters, the bell float D is raised and the quick-threaded valve closed through the partial rotation of the float, this being effected by the guides B and the arm I, which engages with a groove on the float. Air is expelled through the self-closing india-rubber disc

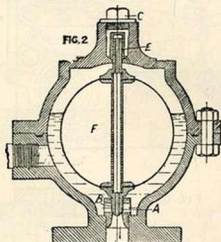
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ABRIDGMENT CLASS HEATING.

valve *r*. The cover of the chamber is secured in place by easily-removable cottars A.



17,841. Royle, J. J. Nov. 6.

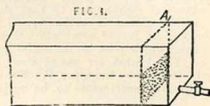


Steam traps.—Consists essentially in means for balancing the float valve to enable it to open with the least resistance. The float F is mounted upon the hollow valve spindle B, the upper end of which in the example shown works in the accurately-fitting thimble E. The area of this upper extension is about equal to that of the valve A at the lower end. Steam leaking into the thimble passes away to the exhaust by way of the hollow spindle. In a modification, the spindle may be packed with asbestos. In addition, an air-escape valve may be fitted to the cap C.

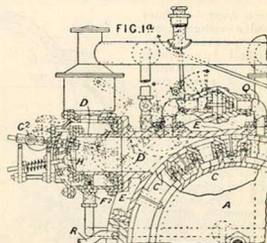
18,099. Hinde, T. P. Nov. 10.

Boiling-pans for heating water and wort for brewing. The pans, Fig. 1, are made rectangular in shape and shallow, with a strainer A fitted as shown or fitted over the exit-pipe. The pans may be heated by a gas or other furnace, special gas

burners being employed and shields fitted around the burners to prevent loss of heat and escape of bad odours.

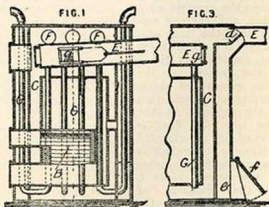


18,161. Sayer, R. C. Nov. 11.



Heating buildings.—Relates to a gas impact engine, the waste heat from which may be used as a source of heat, or the same apparatus may be used for heating without using it as a motor. A number of cylinders D, Fig. 1^a, are arranged tangentially to a wheel A running in a casing E, and provided with peripheral chambers C. A weak and rich mixture are admitted simultaneously through the valves F² and G², and are ignited on mixing and propel the wheel. The valves are worked by a system of cams or the wheel through tappets and linkwork.

18,253. Macdonald, W. R. Nov. 12.



Heating air.—Relates to self-contained apparatus

designed for heating air for warming purposes and for drawing off the foul and vitiated air from apartments, water-closets, soil-pipes, &c., and supplying pure air in its place. Fig. 3 shows a partial section at right-angles to that shown in Fig. 1. Air is heated in a chamber C formed round the firebox B and combustion chamber G, the gases from which pass to the outlet flue E or otherwise. The heated air passes away to the rooms to be warmed by the pipes F. For ventilation purposes the apartments to be purified are

connected up to the pipes G, which pass through the heating-chamber and open out to the flue E, the latter of which extends to the chimney or outside of the building. When no hot air is required, the flap valve *d*, Fig. 3, is moved so as to close the aperture to the hot-air chamber and open that to the conduit *e*. By this means, on the inlet air valve *f* being shut, foul air, dust, &c. from the rooms to be ventilated is sucked into the heating-chamber, and through the aperture *g* to the discharge flue E.

18,458. Brophy, M. M. Nov. 15.

Steam traps.—Relates to valve cistern apparatus, particularly adapted for feeding boilers, but applicable also as a steam trap. The principle of the invention consists in the periodic or constant admission of steam to a float chamber, from which, at intervals, the water is discharged by gravity or automatically ejected. Fig. 1 shows the apparatus arranged for boiler-feeding purposes. Feed-water is admitted to the cistern *a*, the configuration of which is adapted to that of the internal floats, through the valvular opening *b*, the steam-inlet aperture *d* and the water-discharge passage *e* being closed. As the cistern fills, the small float *n*¹ with its lever rises and releases the large float *f* from its engagement with the hanging lever *l*, by pushing the latter back against the pressure of a spring, and thereby setting free the float projection *m*. The large float, immediately rising to the surface of the water, closes the steam aperture and opens that to the boiler. At the same time the float is retained in an elevated position by its projection *m* engaging with notches on the second lever *l*. On the discharge of water taking place, the fall of the governing-float retracts the lever,

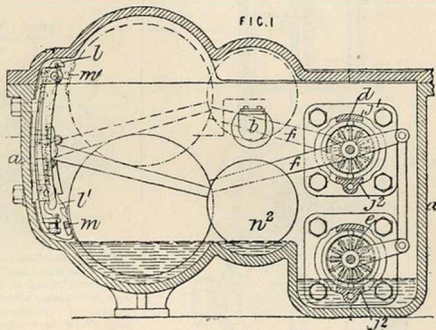
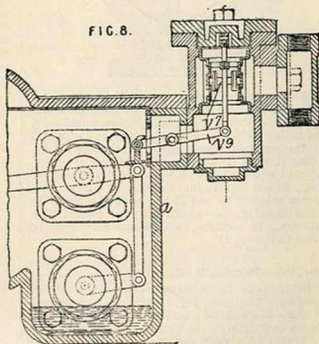
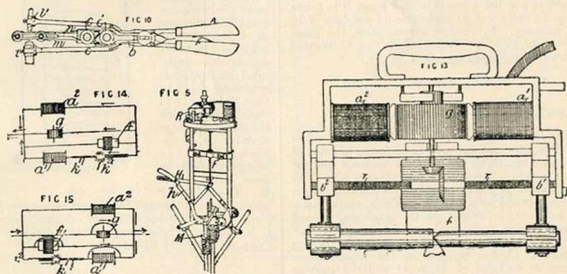


FIG. 8.



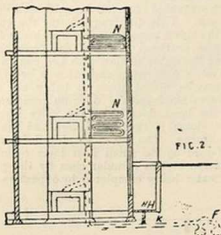
which retains the large float in its elevated position, and allows the latter to fall, with the consequent opening and closing of the steam and discharge apertures respectively. The valves are of the flat rotating grid type, and, when high-pressure steam is used, are prevented from sticking by securing their spindles to a diaphragm upon the back of which the steam acts. This diaphragm forms the end of a chamber attached to the arms j^1, j^2 , in the latter of which the steam passage to this chamber is formed. In the upper portion of the cistern an air-escape valve is also provided. It is of flap form, and shut by the float n^1 striking a closing-lever. If, instead of allowing the water to flow into the cistern under pressure, it is desired to lift the water from a lower level, a condensing-apparatus is provided for producing a vacuum in the apparatus. Such a condenser may be placed above or below the cistern. This combination serves as a pump. Fig. 8 shows the valve employed for opening communication between the cistern and the condenser. On a descent of the large float lever, the valve lever v^1 is operated and the cylindrical grid valve v^2 lowered. The steam is then condensed and the water drawn up into the cistern. The grid valve is returned by a spring. The steam employed for ejecting the water may be used expansively. This expansion is effected by the small float lever operating a valve which opens a cylinder to the valve cistern. A piston in this cylinder rises by the pressure of steam, and shuts off the supply, the discharge of the water being completed by expansion of the entrapped steam.

18,523. Zerener, H. Nov. 17.



Heating by electricity.—Relates to apparatus for heating, welding, soldering, melting, or gasifying solid bodies by electricity, and consists in magnetic means for deflecting an electric arc. Several forms of apparatus are described, that shown in Fig. 5 comprising a regulator R consisting of two electromagnets in the main and shunt circuits respectively. One of these operates a cross-piece F which by means of levers separates the carbons. The other magnet operates a screw spindle within the left-hand framing rod and thereby acts upon the cross-piece F for regulating the arc. An electromagnet M with its poles on opposite sides of the arc is moved up and down with the carbon points by the levers h, H . In Fig. 10 is shown a soldering-apparatus comprising two handles A pressed apart by a spring f and hinged together. At the other end of the hinged arms are two clamps l, l' carrying the carbons. On a piece of insulating-material surrounding the hinge is mounted a rod n carrying an electromagnet m in a shunt circuit b . For regulating the deflecting action of the magnet, the conductor b , which is bare at intervals, is wound upon two rotatable cylinders C, C^1 , and in passing from one to the other the wire slides between two conducting-springs c connected with the windings of the magnet. The current round the magnet may be increased by winding the conductor from the cylinder C to the cylinder C^1 so as to bring one of the bare places between the springs. In Fig. 13 an electric welding-apparatus is shown consisting of a pair of carbons carried by the nuts b^1, b^2 on a right and left handed screw r , which is rotated through bevel gearing by an electromotor consisting of two magnets a^1, a^2 acting differentially, and an armature g . Only one half of the deflector f is shown in the Figure. The arrangement of circuits is shown in Fig. 14. For currents of large quantity the arrangement of shunt circuits shown in Fig. 15 is used.

19,044. Oades, E. Nov. 24.



Heating buildings.—The smoke and gases from fireplaces are led through coiled pipes N in other rooms on their way to underground conduits F in the roadway. In another arrangement, the gases from a fireplace are passed between corrugated plates forming an overmantel.

19,201. Johns, H. W. Nov. 25.

Non-conducting compositions.—Consists of a fire-proof composition for use as a non-conductor of heat, also applicable as a sound-deadener and for other uses to which similar products are put. The composition is made up of the following ingredients:—wood pulp, plaster of Paris, chalk, diatomaceous or infusorial earth, magnesia, ground asbestos, clays, with sawdust, straw, hay, cork, or sponge, or with hair, asbestos, or other fibrous materials. When applied in the plastic form, linings or coatings of fireproof material such as asbestos are provided. The Provisional Specification mentions the addition of silicate of soda and the soaking of the sponge or straw in an antiseptic, to render it vermin-proof, and the addition of oil, to render the composition waterproof.

19,202. Johns, H. W. Nov. 25.

Non-conducting compositions.—Relates to an improved composition for use as a non-conductor of heat, also applicable as a sound-deadener and for other uses to which similar products are put. Comminuted or disintegrated sponge is worked up with fibrous material such as asbestos, with oxides of metals such as zinc, and also with chalk and powdered minerals such as agolite, actinolite, chrysolite, hornblende, mineral wool, and the like; and also metallic turnings or filings, and suitable sizing-substances such as silicate of soda, rubber solution, starch, glue, and the like. To render the composition additionally fireproof, the sponge may be treated with silicate of soda or the like. Disinfecting and antiseptic substances may be also added

to render the mixture vermin-proof and to adapt it to sanitary purposes generally. The composition may be also waterproofed with oil or its equivalent. The product may be made, if desired, by pulping the said bodies with water in an ordinary paper-makers' apparatus.

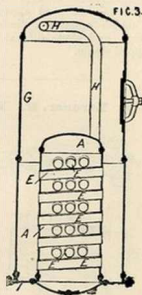
19,550. Kirkaldy, J. Dec. 1.

Heating liquids.

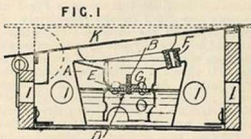
—Relates to surface apparatus for heating and evaporating water and other liquids by means of steam.

Fig. 3 shows a vertical form of apparatus, the same principle being employed in the case of horizontal heaters. The water &c. to be evaporated or heated is contained within the cylindrical chamber G to which the steam heating-chamber A is applied, the latter being traversed by cross water-tubes E. The pipe H

which descends through the heated liquid serves to carry off the vapour. Instead of the base-plate I, as shown, a cast-iron bottom divided into compartments may be employed.



19,580. F evrier, J. F. Dec. 1.



Footcarmers.—An oil vessel A is formed with an turned or cup-like portion D in which floats a piece of cork G carrying a light or wick B. Perforations E are made in the part D for the oil to reach the floating light. Oil is introduced into the vessel A through a stoppered opening F. This vessel is enclosed in a casing having a hinged copper lid K, and openings I are made in the sides

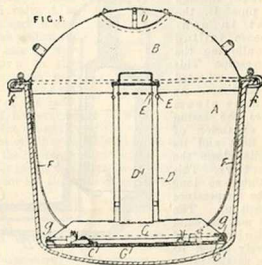
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ABRIDGMENT CLASS HEATING.

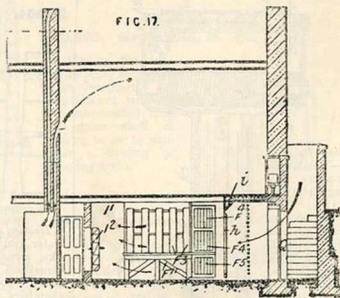
of the casing for the admission of air. The lid may be inclined as shown, or may be raised to a horizontal position when desired.

19,736. Hart, A. Dec. 3.

Boiling-pans.—Relates to apparatus which may be adapted to any suitable vessel, such as coppers &c. for boiling, infusing, steaming, washing, and bleaching purposes. The arrangement shown in Fig. 1 comprises a boiler A which is fitted with a dome-shaped lid B, provided with subsidiary hinged lids such as *b*, and contains a plate C, carrying two concentric tubes D, D' closed at the top, but provided with suitably-shaped openings E, E' for discharge of the boiling liquid. The plate C is kept down in position by wires F secured on the rim of the boiler by clamps *f*. A netting or other perforated tray G may be fixed below the plate C by means of a rim *g* and catches *c*'. Other forms of the apparatus are described in which the tubes D, D' are of other forms than circular, and are placed in other positions, such as towards one side, or formed partly in the wall of the boiler. In some cases the inner tube D' passes through the top and bottom of the boiler and acts as a flue. The apparatus may also be applied for cooking purposes.

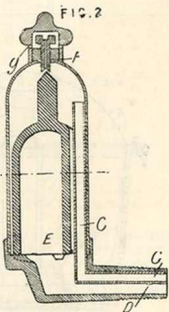

19,900. Key, W., and Tindall, R. Dec. 6.

Heating air; heating water.—Relates to improvements in and relating to the heating of air for heating and ventilating school-houses, churches, and other buildings, and in the apparatus therefor. The air is heated by a system of hot-water circulation pipes in connection with coils specially arranged in a furnace. These pipes are arranged in sets of coils F³, Fig. 17, supported over or behind each other in the basement chamber. By means of suitable doors F⁴, F⁵, the whole or portion of the incoming air may be passed over the heating-coils, so that the temperature of the air passing to the buildings may be closely regulated without alteration in the working of the furnace or the circulation of the water.


20,074. Haddan, H. J., [Auken, C. E. van]. Dec. 9.

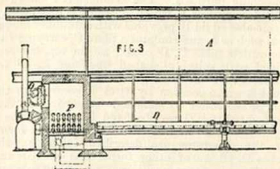
Heating buildings.—Relates to an automatic air-valve for steam radiators. The object of the valve is to allow air to escape from the radiator but to prevent the outflow of steam or water of condensation. Air driven from the radiator through the pipe C escapes from the casing by an opening in the adjustable screw F and the aperture *g*. As soon as water enters, the float E rises and closes the aperture in the

screw above. The air which is entrapped in the casing by the closing of the escape aperture forces a certain quantity of water back into the radiator through the pipe D, the float in consequence falling and allowing the air to escape. This may be repeated several times. As soon as steam enters the casing the expansion of the float and its spindle closes the aperture. This continues so long as the temperature is kept up. The float may be solid or hollow, and entirely closed or open at the lower end as shown.



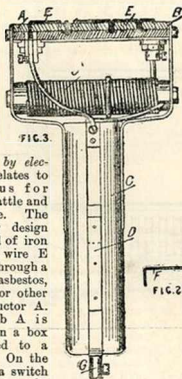
otherwise included in the circuit. Terminals G are provided for connecting to the source of electricity. To facilitate the change of the design, it may be made up of separate pieces of wire F, Fig. 2, the legs of which are passed through the slab A and clamped or secured at the back thereof.

20,323. Hutzler, S. L. Dec. 12.



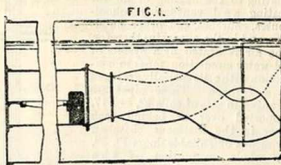
Heating air for drying. Coffee, cocoa, pepper, &c. are dried by hot air on a perforated rotary table D in a building A provided near the top with suitable ventilating apertures. Air is forced through the apparatus by a fan Q, and in its passage to the space beneath the table passes over a series of pipes P heated by steam &c.

20,304. Woodhouse & Rawson United, [Storer, J.]. Dec. 12.



Heating by electricity.—Relates to apparatus for branding cattle and the like. The letters or design are formed of iron or other wire E threaded through a slab of asbestos, porcelain, or other non-conductor A. The slab A is mounted in a box B attached to a handle C. On the handle is a switch D which may be arranged to operate when the handle is grasped. An adjustable resistance J may be mounted in the instrument, or may be

20,364. Jackson, C. L. Dec. 13.

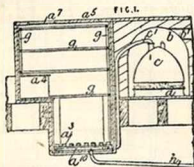


Heating water.—The internal flues of steam and water-heating boilers are constructed of a wave-like, serpentine, spiral, or angular form of any transverse section, with or without cross-circulating tubes and square or other intervening chambers. Fig. 1 shows an application of the invention to a Lancashire boiler in which the sinuosities occur in vertical planes. In other cases the flues may be laterally waved. By this arrangement the heating-surface and evaporative efficiency is increased, the lodgment of soot reduced to a minimum, and the boiler water uniformly heated.

20,414. Nawell, F. D. Dec. 15.

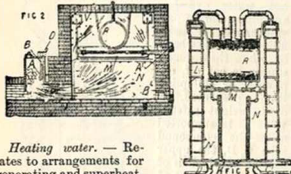
Footwarmers; bed-warmers.—These consist of solid blocks or lumps of firebrick, fireclay, or terra-cotta, completely glazed or enamelled over. They may be provided with suitable handles.

20,434. Witham, J. Dec. 15.



Heating water for vapour &c. baths. A boiler *c* is fixed in a small chamber *b* alongside the bath and heated by a burner *d*. The vapour is carried to the bath by the pipe *a*. The products of combustion escape by *b*.

20,535. Fales, E. Dec. 16.

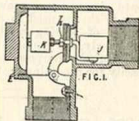


Heating water.—Relates to arrangements for generating and superheating steam, or for heating water for heating buildings &c. Fig. 5 shows a transverse, and Fig. 2 a longitudinal section of the apparatus. Rectangular water-boxes *L* are connected with each other by the water casing *K* and by the steam partition *M*. From the lower transverse casing vertical water slabs *N* rise. These slabs, secured to the casing by suitable shoes, are each riveted to a continuous frame. The combustion products from the space below the partition *M* pass away to the chimney through the flue *B*; Fig. 2, while those from the upper chamber escape through the passage *A*¹. The lateral water slabs open into the steam-superheating drum *R*, which is located in the path of the furnace gases. Feedwater is supplied by the pipe *C*. When used as a circulating boiler another pipe *D* is fitted. The upper portions of the central water slabs communicate directly with the lateral water chambers by pipes *V*.

20,551. Stager, H. E. June 2, [date claimed under Sec. 103 of Patents &c. Act, A.D. 1883].

Heating buildings.

—Relates to return bends for steam radiators. The balanced valve *h* is fitted in such a way as to close against its seat in case of any pressure in the return pipe, and thereby prevent flooding of the radiator. If, however, there is water or steam pressure on the other face of the valve, the float *J*, of soapstone or other suitable material, will rise, overbalance the counterweight *K*, and open the valve. By means of the cap *E*, access is easily obtained to the interior for the removal of the valve &c.



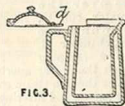
20,631. Aubertin, N. A. Dec. 17.

Hand-warmers; footwarmers; bed-warmers; hot-water bottles and similar heating-apparatus.—The heating-substance, such as water, live charcoal, &c., is contained within a holder, which is enclosed by a larger chamber of suitable material, shape, or size. In the interspace some non-conductor of heat is packed. Suitable covers, lids, or screw stoppers are provided.

20,636. Greenfield, E. Dec. 17.

Heating liquids.

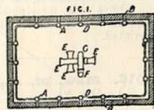
Milk jugs, pans, and like receptacles for liquids are jacketed or surrounded with an outer shell or casing so as to contain a heating or cooling agent.



20,735. Parsons, F. Dec. 19.

Heating air.

Fresh air for ventilation enters a workshop &c. through openings *B*, and is heated by a steam pipe *D* passing round the room and fitted with spiral coils *A* opposite each opening.

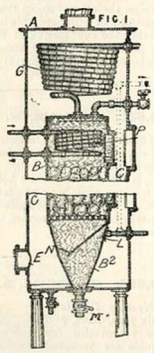


20,955. Clausen, O. Dec. 23. *Drawings to Specification.*

Heat storing apparatus.— Porous magnesian bricks, with recesses, ribs, or perforations, are dipped in water containing magnesia powder. These bricks are used in stoves, flues, &c., for the purpose of storing up heat and giving it out again slowly, the magnesia being deposited in the pores for the purpose of giving an increased capacity for absorbing heat.

20,975. Stark, D. Dec. 23.

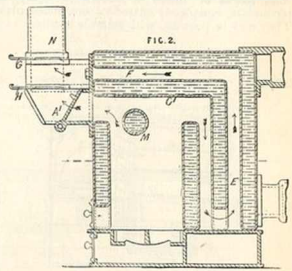
Heating water.— Consists of improvements on the apparatus for heating feed water described in Specification No. 8568, A.D. 1888, particularly adapted for use in situations where the steam engine is not constantly running and where consequently the supply of exhaust steam is interrupted. The apparatus is now stated to be applicable for heating water for other purposes. Exhaust steam, sent into the chamber A, passes over the feedwater coil G, and round the inner chamber B, before escaping through the lower aperture E. The chamber B contains the live-steam coil P, over which the feedwater passes, and filtering-material such as gravel &c., by means of which the water is purified before entering the lower portion B'. From the latter, which contains the apron N, the water passes away through the pipes L. When constructed for use with condensing steam engines the annular exhaust jacket C is suppressed, the steam being led away from above the filtering-chamber B. By this means the cooling effect of the expanding exhaust is obviated.



21,016. Maw, M. A., [Executrix of Maw, J. A.]. Dec. 24.

Heating water.—Relates to independent circulating box boilers, such as are employed in the heating of buildings and structures. Instead of forming the fuel-feeding tube in the crown of the boiler, it is placed at one side A', so that the crown is free for the direct impingement of the flames.

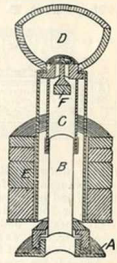
In addition, by means of the L-shaped water space C, auxiliary flues E, F are provided, the combustion products either passing direct to the chimney



N around the water-tube M, or by way of the additional flues. Dampers G, H determine the course of the gases.

21,133. Wilson, M. Dec. 29.

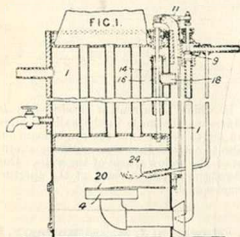
Heating water.—The object is to ventilate hot water cylinders and pipes, and to provide means for easily filling the same whereby, when the ordinary supply is cut off, explosion or collapsing may be prevented. A dead-weight safety-valve E is supported upon the compound tube C, B, the upper portion of which is of glass and the lower of thin metal, the arrangement being secured to the water cylinder by means of the flange A. The dead-weight valve also carries the vacuum valve F. The bowl D is employed for supplying the system with water.



21,227. Ruud, E. Dec. 30.

Heating water; thermostats.—The tubular boiler 1 is heated by the gas burner 4, the supply of which is regulated by the temperature of the water within the boiler. For this purpose the valve 9 located within the supply pipe is operated through the lever 11 by the expansion and contraction of the metal rod 14, such contraction &c. taking place for

instance on the entry of feedwater by way of the pipe 18 and sleeve 16. Simultaneously with the operation of the valve a perforated plate 20 is slid over the surface of the ring of burners, and thus

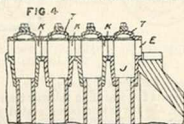
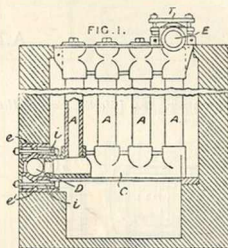


the entry of cold air avoided. For re-igniting the extinguished gas, the small jet 24 is employed. In a modification, a rod is suspended within the boiler with its lower end fastened to an enveloping expansion jacket, which jacket is secured to the top plate of the boiler. Thus the expansion of the sleeve is communicated to the enclosed rod, the upper end of which operates the lever and gas valve.

21,243. **Lake, H. H.**, [Burpee, G. H.].
Dec. 31.

Heating water.—Relates to the "fuel economizers" employed in heating water for steam generators and for other purposes. The lower cylindrical chamber D, to which the pipes C are connected at right-angles, is carried between the

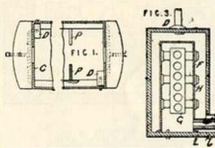
plates e, e' in the side walls of the flue. It is strengthened by transverse and longitudinal ribs, while the handhole covers are secured by T-bolts 7. The lower ends of the vertical tubes A, and also



the open ends of the lower transverse pipes C, are secured in position by conical jointing-surfaces. The upper ends of the tubes are outwardly coned, Fig. 4, and are dropped into corresponding seatings in the pockets J through handholes immediately above. Covers T for the latter are held in position by cross-rods and bolts as shown. The chambers E are connected with each other by butt joints K.

A.D. 1891.

30. Downing, G., [*Morton Safety Heating Co.*] Jan. 1.



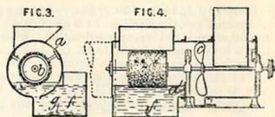
Heating buildings; heating air.—Relates to arrangements for warming railway trains by steam-heated air, the invention being stated to be applicable for heating dwellinghouses and other buildings. Air-heating chambers D are placed at opposite corners of thecar C, Fig. 1, (one of which is shown enlarged in Fig. 3). Each of these chambers contains a steam box F, to which steam is admitted by pipes L lined with some non-heat-conducting material. The air is admitted by pipes D and, after flowing round the steam chambers and pipes, escapes in a heated condition by the open-ended pipes P. To store up heat for disposal after the steam valves are closed, in addition to lining the steam pipes, the steam chamber is provided with the porous perforated earthenware block G, which is supported upon the transverse open-ended tubes H. A suitable outlet is provided for condensed steam.

591. Goupil, E. A. Jan. 12. *Drawings to Specification.*

Heating air.—Relates to the ventilation and heating of buildings. Air from the outside or from the bottom of the room enters into a compartment below a distributor and is conducted by a pipe through a partition and round the parts of the fireplace which are not utilized for heating ovens. From thence it returns to the upper part of the distributor, and is discharged into the apartment through a mouth at the upper part. By means of suitable flaps or valves, hot or cold pure air can be admitted into the room, or the vitiated air can be drawn off by the stove or by

flues in which a current is produced by lamps. Apertures may be made in the walls to allow the heated air to escape into the atmosphere outside, and also to connect the rooms with one another by means of the hollow spaces of the walls. Concave sound-reflectors are provided at the apertures to intercept sound.

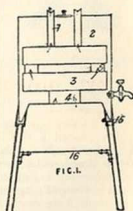
973. Howorth, J. B., and Howorth, F. C. Jan. 20.



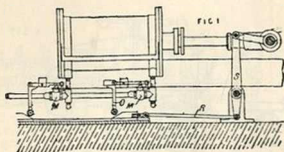
Heating air.—Air is heated or cooled and moistened by passing it by means of the fan c through the chamber A in which hot or cold water is sprayed by the revolving brush b. The chamber a communicates through a passage a' with a tank f supplied with water through a ball cock and which may be heated by steam or hot-water circulating pipes g. A conical screw-down valve is fitted at the mouth of the air-discharge pipe.

986. Shrewsbury, G. Jan. 20.

Heating water.—Relates to apparatus particularly suitable for heating the supply to baths, lavatories, and wash houses by oil or gas. The boiler consists of the cylindrical casing 2, provided with the central flue 4, flat chamber 3, duplicate flues 5, a second chamber 3, and ascending smoke-tubes 7. The boiler is made detachable from the stand 15, which is provided with the shelf 16 for supporting the lamps &c



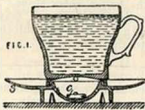
1061. **Makin, R.** Jan. 21.



Heating buildings; heating liquids.—Consists in means for utilizing steam from engines for heating and other purposes. The pipes by which the steam is conveyed may be connected to the low-pressure valve-box or receiver pipe in the case of compound &c. engines, and stop or reducing valves may or may not be provided. In other cases the apparatus may be put into connection with the cylinder drain valves M, and the latter be operated automatically at each stroke by suitable gear S, R, O, as shown in Fig. 1. The apparatus is applicable for heating mills, weaving-sheds, and other buildings, and for boiling size.

1188. **Mills, C. K.**, [Berger, A., Cornet, C. H., and Martin, C.]. Jan. 22.

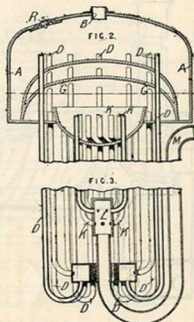
Heating liquids.
—Relates to means for maintaining the heat of liquids for drinking in cups, milk jugs, glasses, bowls, and similar vessels, and consists in providing between the saucer or support and the vessel a space for receiving a piece of fuel. Fig. 1 shows a saucer S with a central capsule to receive a piece of fuel c, passages or holes being made in the base of the saucer, in the capsule, and in the base of the cup, for the passage of air and of the products of combustion.



1231. **Glanville, R. P.**, [Payne, W. J.]. Jan. 23.

Heating liquids.—The water or other liquid to be heated is contained within the tubular apparatus shown in section in Fig. 2, the whole being enclosed within a suitable casing which also contains the heating-arrangement, such for instance as a system of gas burners. The liquid is introduced through the aperture B from the dome-shaped chamber A from which it overflows by tubes D to the inner chamber G. Thence the water passes by the

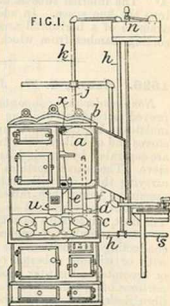
pipes K to the lower container L, from which it escapes through the outlet pipe M. Any steam



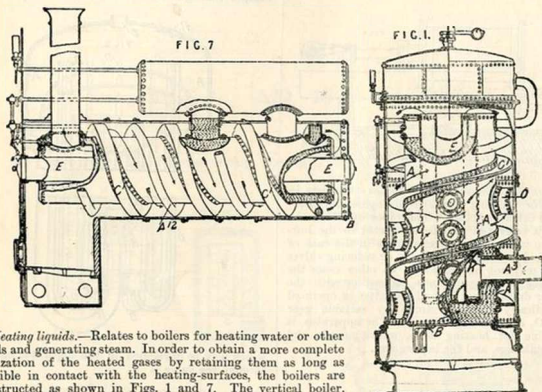
which may be developed in the apparatus escapes through the valve R

1415. **Brewer, G. T.** Jan. 26.

Heating water; heating buildings.—The boiler a is contained in a hot-closet b, elevated above the hot-plate c of a cooking-stove into which the products of combustion pass from the flue u. An outflue x leads to the chimney. The boiler is connected by pipes e, f with a water-back d to the fireplace. The water-back is supplied by a pipe h from an elevated tank n. A stand-pipe j leads from the top of the boiler and branches to circulating pipes or radiators from which there is a return pipe s to the supply pipe h. A vent pipe k connects the stand-pipe with the top of the reservoir.



1478. Alzugaray, J. B., and Benjumea, J. D. de. Jan. 27.



Heating liquids.—Relates to boilers for heating water or other fluids and generating steam. In order to obtain a more complete utilization of the heated gases by retaining them as long as possible in contact with the heating-surfaces, the boilers are constructed as shown in Figs. 1 and 7. The vertical boiler, Fig. 1, is constructed of the annular water space A around which in a sinuous path, as determined by the baffle C, the furnace gases pass. After having traversed the exterior surface of the water chamber within the casing B, they may pass direct to the chimney or descend through the annular space K to the outlet A³. The internal tube E may also form a portion of the boiler water space. Pockets O may project into the flue space. In addition, a feed-heating coil such as A¹², Fig. 7, may be also fitted. As an example of a horizontal arrangement Fig. 7 is given. In this case the internal tube E may form a cooling-chamber from which the evolved gases pass into the firebox.

1526. Aston, C. H. Jan. 28.

Non-conducting compositions.—Relates to improved methods of utilizing the dust which accumulates in hot-blast stoves, and in the flues of such stoves and of boilers. The fine and coarse particles are separated by an air blast and by the use of a sieve. The coarser portions are also separated by carrying them off with water, the finer particles remaining being then mixed with clay which has been previously brought to a creamy consistency. The dust, mixed with various substances, is capable of a large number of applications. For non-heat conducting compositions the dust is used with clay, with or without asbestos, coal or wood tar, resin, or creosote, and gas-tar products, and various proportions of brushmakers' waste bristles, hair, and fibre, flock, and papermakers' waste; also coco-nut fibre, mungo, and shoddy, flax, hemp, and waste.

1565. Thompson, J. K. Jan. 28. *Drawings to Specification.*

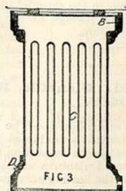
Heating buildings; heating air.—Air is taken to chambers at the backs of or within fires or furnaces, from which it is conveyed or distributed to the

various rooms or apartments from distributing-boxes contained therein.

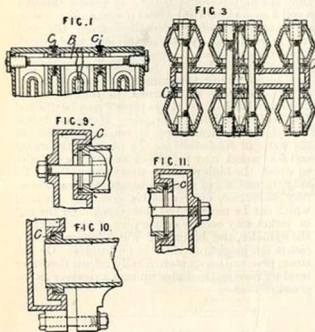
1875. Fisher, R. P. Feb. 2.

Heating buildings.

—To avoid liability to leakage in radiators, and at the same time to facilitate access for cleansing purposes, the pipes C and the top and bottom chambers B, D are cast in one piece. A single or double row of tubes may be employed, the tubes being oval in cross-section. The chambers are closed by plates, screwed, bolted, or secured in any other convenient manner.



1971. Rosser & Russell and Russell, 2149.
J. N. Feb. 3.



Heating buildings.—Relates to radiators. By connecting together the upper ends of the loops, the accumulated air may be readily discharged through a single tap. Figs. 1 and 3 show two modifications of radiator in which the air from each loop is collected in a single chamber at the upper end, Fig. 1 being an elevation and Fig. 3 a plan. For securing tight joints between the sections, metal rings C with knife-edged faces are employed. In Fig. 1 the rings are kept in place while the holding-bolt B is inserted by projections C'. Figs. 9, 10, and 11 show various means by which the supply pipes are secured to the radiator loops. The loops may be arranged along a straight line or in curves.

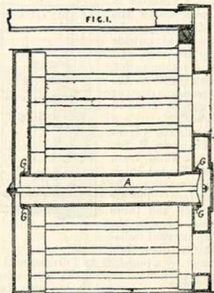
2138. Bell, A. Feb. 5. *Drawings to Specification.*

Boiling-pans.—Domestic coppers for washing purposes are provided with a steam outlet pipe, opening into the smoke-flue.

2149. Ladds, P. Feb. 5.

Heating water.—In boilers in which the fire is surrounded on three sides by water-tubes, and rests on water-tube firebars, an additional tube A is placed across the centre of the furnace. It is secured in place by a bolt, and tight joints are made by elastic rings G, G.

(For Drawing see next column.)

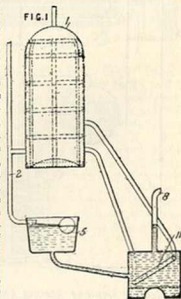


2587. Simpson, J. Feb. 13.

Heating air.—Compressed air to be used for the jet-propulsion of ships is heated by passing it on its way from the compressors through the surface condenser, in which it acts as the condensing-medium.

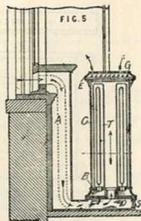
2525. Carter, C. W. Feb. 13.

Heating water.—Relates to improvements in domestic hot-water supply apparatus, whereby the risks of explosion and collapsing are minimized. The water in the cylinder 1 is heated on travelling through the passage 11 in the stove boiler, the latter being fed from a small cistern 5 at or about the same level. The stove boiler is ventilated by means of the vertical escape pipe 8. The hot-water cylinder 1, supplied from the main 2, is prevented from collapsing by providing therein a metal cage made up of T-iron and the like, or by strengthening the cylinder by stiffening-rings.

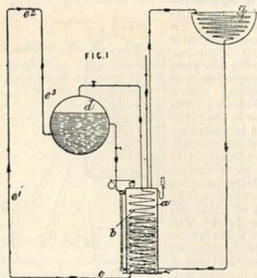


2779. Skilton, J. A. Feb. 16.

Heating air; heating buildings.—A chamber A on the wall below the window of a room can be opened to the air outside by raising the sash, and put into communication with a chamber D on the floor by opening a damper F. Over an aperture in the chamber D stands a heater, consisting of an annular chamber B for steam or hot water, from which rise divided tubes T for increasing the heating-surface. The air rises between the tubes and passes off into the room. To prevent radiation from the tubes, they are enclosed by a polished and ornamental jacket G, having a perforated top E. To more effectually destroy radiation a second jacket may be used, having a space between the two. A damper S in the chamber D controls the circulation about the tubes of the air already in the room. When a heater is used without the chamber A the basal chamber B is made whole instead of annular, and the air is admitted to the tubes through openings at the bottom of the jacket.



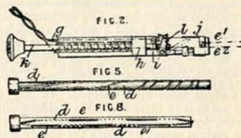
2806. Lea, H., and Trueman, H. P. Feb. 16.



Heating liquis; heating buildings &c.—Relates to steam loops for supplying feedwater to steam generators, part of the apparatus being applied for heating purposes. When water has to be returned from a point at which the pressure is very low, a great height of loop is necessary.

In order to obviate this defect, the following additions are made to the steam loop as described in Specification No. 18,435, A.D. 1888. Steam from the high-pressure boiler *d* is passed through a coil *b* in a cylindrical vessel *a* containing water, and the water of condensation from the said coil is returned by the steam loop *e, e', e'', e'''*. Low-pressure steam is generated in this cylinder, and supplied to the heating-system *g* in this case placed above the cylinder so that the water of condensation is returned to the latter by gravity. The heat from the pipes *g* may be utilized for heating buildings, wort, &c. If placed below the cylinder a steam loop is employed to return the water of condensation. In place of the steam coil *b* a jacket may be placed round the cylinder to which the high-pressure steam is supplied. To vary the amount of steam generated the water level may be varied, or a movable coil may be used which can be more or less submerged. Or the coil or jacket may occupy only a part of the length of the cylinder, the bottom of which is formed by a piston the height of which is adjustable. Or the steam pressure may, automatically, adjust the water level by forcing the water up into a receiver as the pressure rises.

2840. Watson, G. H., and Antonini, F. E. Feb. 17.

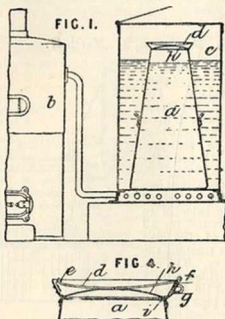


Heating by electricity.—Relates to a method of heating tongs or irons for curling or goffering. A wire *e*, heated by the current, is wound or otherwise held on an insulator *d*, which is placed in one or both legs of the tongs. One end of this wire *e'* is continued unbroken to *h*, and in the other *e''*, *g* a switch device is placed. This consists of the two contacts *i, j*, which are joined when required by the bell-crank lever *l* operated by a spring push *k*, placed in a suitable position in the handle. Other switches or devices may be used.

2853. Middleton, J. J. Feb. 17. *Drawings to Specification.*

Non-conducting coverings.—Relates to coverings for steam boilers, cylinders, valves, piping, and the like. One or more layers of paper, thin cardboard, paper mounted on textile fabric, felt, or similar materials are inserted between an inner covering of slagwool or silicate cotton, and an outer covering such as brickwork, cement, or a wood or metal casing.

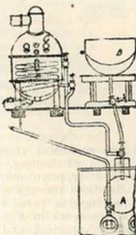
2944. **Oakhill, J., and Leaker, R. H.**
Feb. 18.



Heating liquids.—Milk is sterilized by first heating it and afterwards cooling it. The milk is placed in a receptacle such as a churn *a*, which it nearly fills. The churn is closed as described below, and placed in a water chamber *c* heated by steam from a boiler *b*, or by an open fire. During heating, the lid *h* of the churn is forced slightly upwards and gases escape. After sufficient heating the churn is removed and cooled either by cold water or by placing in a refrigerator. The can *a* has a cover *h* resting on a rubber washer *i*, and is pressed down by a spring *d* secured at one end by a catch *e*, and at the other by a hasp *f* and staple *g*. This allows the lid to rise slightly and gases to escape while the can is being heated, but causes it to close immediately afterwards.

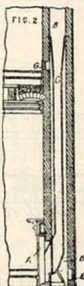
2966. **Thompson, W. P., [Kriener, A.]**
Feb. 18.

Heating liquids.
—Where liquids are heated by steam from a boiler *A*, in double-bottom apparatus *B* or worm stills *C*, the water of condensation is allowed to flow back by gravity again into the boiler.

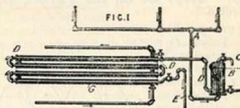


2971. **Pryor, W., and Macintosh, C. J.,**
[trading as Wm. Pryor & Co.]. Feb. 18.

Heating buildings; heating air.—Relates to means for warming and ventilating an upper room or rooms from the stove of a room below. For this purpose the stove *A* has a smoke flue *C* leading up the chimney *B* and terminating above the outlet *G* in the room above. The ordinary chimney *B* has an aperture *D* for the entrance of air, preferably outside the house, and the fresh air thus entering is heated by contact with the flue *C* and flows into the upper room through *G*. A valve may be fitted to the opening *G* to regulate or cut off the current of air.



3435. **Nelson, E.** Aug. 30, A.D. 1890, [date claimed under Sec. 103 of Patents etc. Act, A.D. 1883].

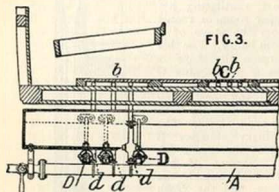


Heating water.—The hot "drips" from leakage of steam pipes, valves, cylinder cocks, and the like in establishments in which steam machinery is used are collected into a common pipe *A* and led into a chamber *B*, where the oily matters separate out and are drawn off at the top by a cock *C*. The cleared watery waste is then conveyed through a sinuous pipe *D* surrounded by cold-water pipes *G*. The cooled liquid is delivered by a connection *E* into the sewers, while the water which has passed through the pipes *G* and absorbed the heat of the waste liquor serves as feedwater for boilers or may be otherwise utilized. A modification has two separating-tanks.

3713. **Lancrenon, M. F.** March 2.

Heating buildings.—Hospitals, schools, and other buildings are heated by mixed air and steam under pressure conveyed in pipes fitted with means for regulating and equalizing the temperature. Fig. 3

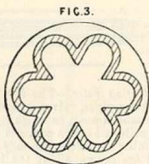
shows a section of part of a railway carriage fitted with the apparatus. A main pipe A traversing the whole length of the train is connected to a reservoir on the locomotive, into which compressed air



and steam (from the boiler, air pump, or other source) are forced. In each carriage are a number of heating-pipes *b, b* covered by a plate *C*, which forms the floor. These pipes, which may be arranged in zig-zag fashion or otherwise, are connected at one end to the main pipe, their other ends being either open to the atmosphere or connected to other points of the main pipe *A*. The pipes are fitted with valves *d*, which may be operated from the side of the carriage or by the passengers for regulating the temperature.

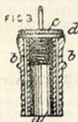
4046. Urry, E. C., and Farini, G. A. March 6.

Heating buildings.—Tubes for facilitating the absorption and radiation of heat are made of the section shown with three or more corrugations. The ends are made circular in section and tapped or otherwise formed for securing to plates &c. in ordinary ways.



4081. Currie, W. March 7.

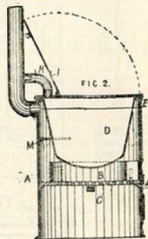
Hot-water bottles.—In the filling-nozzles for hot-water bags and the like there is provided in addition to the central filling-passage a one or more vents or passages for the escape of air. These passages may be formed in the nozzle itself or by means of a second tube surrounding it, and may extend through part or the whole of its length.



They may be closed by the screw cap or plug *c* and washer *d* which closes the filling-passage.

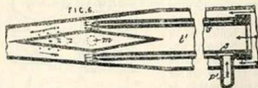
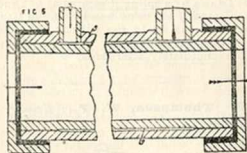
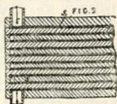
4356. Rushton, I. March 11.

Boiling pans.—Relates to set-pans or coppers. The pan *D* is supported by the rim *E* upon the casing *A*, which contains the fire-grate *C* and the fuel holder *B*. The combustion products are caused by the baffle *M* to pass round on all sides of the pan before reaching the chimney. The pan is provided with a hinged lid *I* and a steam pipe *K*.



4596. Watkinson, W. H. March 14.

Heating liquids.—Relates to improvements in the methods of heating liquids and generating and utilizing vapour for motive power and like purposes, and in



appliances connected therewith. The fluid for vaporization or heating, which may be water, ammonia, ether, petroleum, spirit, or other suitable liquid, is passed through a series of heated cells *a*, Fig. 3, arranged in parallel or in series, or through annular spaces as in Fig. 5. The fluid may be completely vaporized and even superheated or

heated to such a temperature without vaporization that when allowed to escape for utilization it wholly or partially flashes into vapour. The amount supplied to the heater may be automatically regulated according as it is used up in the motor. Fig. 6 shows a modification of the concentric tubular type as arranged for driving a turbine. The liquid enters by the pipe p^1 , traverses the annular space s heated by furnace gases, and mixes in the contracted nozzle of the apparatus with the furnace gases from the interior t' and sometimes with circulating liquids from the chamber m . Condensed vapour may be returned to the heater by means of an injector automatically regulated by the motor according to the amount of work being done.

4597. Shaw, T. A., and Rushton, I.

March 14.

Heating liquids; heating by air or steam circulation.—Relates to apparatus for cooling, heating, or drying liquids and other substances by the direct contact of air or (in the case of heating or drying) steam.

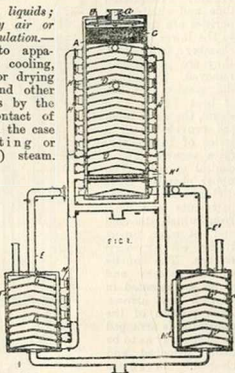


Fig. 1 shows one form of the apparatus arranged for cooling liquids, but substantially the same apparatus may be employed for heating. Air is supplied to the spaces between the perforated plates D, G, G¹ by pipes H¹, H², and chambers

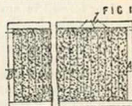
K, K¹, M, M¹. Liquids are supplied through the inlet a , and are distributed by a plate B over the filter C, whence they pass through the plates D of the receiver A to the pipes E, E¹, and finally through the plates G, G¹ of the reducing-chambers F, F¹. In a modified arrangement, the liquid is caused to trickle down a series of vertical sheets of canvas or other porous fabric between which the air passes. Solid substances, such as fibrous materials and chemicals, are placed upon the perforated plates or their equivalents.

5247. Dewey, M. W. March 24.

Heating by electricity.

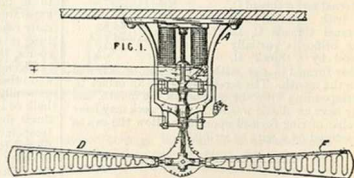
—Electricity is passed through heat-developing conductors arranged in parallel or in series and embedded in a suitable elastic radiating material.

Fig. 1 shows the interior of a heater in plan in which the conductor A of platinum or other metal is arranged in series, the ends of each of the bends being supported by porcelain hooks b . The elastic fibrous material, preferably of asbestos, is shown at B. The casing of the apparatus is formed with ribs or projections to increase its radiating power. In a modification, the conductors are arranged in layers, metal plates suitably insulated in the embedding-material separating each layer.



5595. Dewey, M. W. March 31.

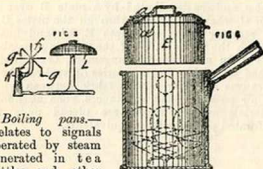
Heating by electricity; heating buildings.—The arrangements are designed with the view rapidly to radiate and diffuse the heat evolved from electrical warming-apparatus. This may be effected by constructing the heaters as blades of a centrifugal fan, or by otherwise suitably rotating the warming-devices. In another arrangement, the heaters may be fixed and a fan rotated in proximity thereto. Fig. 1 shows an arrangement in which the blades D of a centrifugal fan form the heaters, the fan being rotated by an electric motor supplied from the source feeding the heater. The fan and motor are suitably secured by the framework A to, for instance, the ceiling of a room. Convenient circuits, resistances, &c. are provided. In place of the electric motor any other suitable



motor are suitably secured by the framework A to, for instance, the ceiling of a room. Convenient circuits, resistances, &c. are provided. In place of the electric motor any other suitable

apparatus may be employed. When high-tension electricity is available, it may be reduced by transformers, means being employed for converting direct currents into alternating currents. In place of the heating-coils F, strips of metal or wire netting supported on insulating-frames may form the blades of the fan. In another modification of heater the wire is helically arranged upon insulating-discs.

5635. Planner, H. G. April 1.



Boiling pans.—

Relates to signals operated by steam generated in tea kettles and other vessels. A whistle, formed of one or two dished and perforated discs, *a, a'*, or formed in any other manner, is fixed to the lid, body, handle, or spout of a tea kettle, saucapan, or other vessel used for boiling water &c., so that when the water or liquid boils a signal will be given. The lid of a vessel may be formed with a deep rim E to enclose the steam when generated. In a modification, a pipe, which may be provided with a whistle, is connected to the vessel or its lid, and a bell signal may be given when the water boils by means of the attachment shown in Fig. 9. A bell L is struck by clappers *g* carried by vanes *f* rotated by steam issuing through a nozzle K placed over a pipe communicating with the tea kettle, saucapan, &c.

5698. Morby, G., and Butcher, C.
April 2.

Hot water bottles, stoppers for. The neck A of the bottle has an external screw thread C, or both external and internal threads C, D. The orifice is partially closed by a block B, either formed in one with the bottle or screwed into the mouth. The screw cap E has an orifice G, corresponding with the opening in the mouth, and may have an elastic washer I. The neck may have a collar or ring formed upon it to allow the cap to be secured by a wire or string.

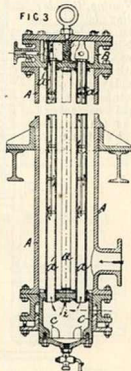


5775. Johnston, D. April 3.

Heating water.—The steam heating-chamber A is rotated with a series of descending and ascending

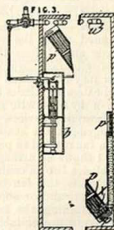
tubular water passages *a, a'* through which the water passes to receive heat from the surrounding

steam. Precipitated lime and similar impurities are deposited in the lower settling-chamber *c*, from which they are periodically removed. To extract the greatest amount of heat from the steam, the water tubes are provided with a series of baffling-surfaces secured to a central spindle. The upper chamber B is divided into two compartments into and from which the cold and hot water respectively enter and emerge. The courses of the steam and water are denoted in Fig. 3 by arrows. Each portion of the apparatus is arranged in such a way as to be easily detached and cleaned. In some cases the baffles within the tubes are provided with means for agitating them from the exterior. The various elements may be modified.

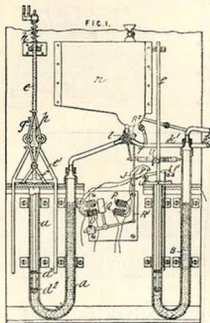


6035. Shiels, A. April 8.

Thermostats.—Relates to a method of, and apparatus for, automatically regulating temperature in ships, buildings, rooms, railway cars, refrigerating-chambers, and other confined spaces generally. Variations in bulk of liquid or gaseous fluids, due to changes of temperature, are employed to operate valves or other suitable devices for either regulating the inlets to the chambers or for controlling the supply to motors, whether driven by electricity,



steam, or other agents. Fig. 1 shows the duplex thermostatic appliance employed for these purposes.

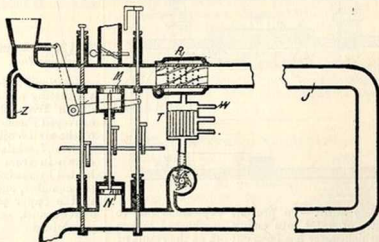


The liquid, of which the volume is changed by the variation of temperature, acts upon the

surface of mercury contained in the siphon tube *a*. The rising of the mercury lifts the pistons *d*¹, *d*² and rod *e*, to the latter of which the triangular frame *e*¹ is attached. In consequence of this movement the framework *g*¹, the lower end of which is pivoted to the fixed bracket *f*, is widened out on the inclines *e*¹, the rod *h* lowered, and the desired motion communicated to the proper quarter. To prevent a fracture of the apparatus through a large expansion of the liquid taking place when large variations of temperature are dealt with, the auxiliary siphon tube B is provided. This arrangement acts simultaneously with the former but more slowly, owing to the relatively small area of the expansible liquid which is acted upon. As the piston-rod rises, electric contacts are made at I, I¹, and the valve *l* controlling the passage to the siphon *a* is locked in position through the rods R¹, R², and the armature Q of the magnet O. On the temperature in the chambers continuing to rise, electric contacts are made at J, J¹ and the magnet P brought into action. This has the effect of moving the valve *l* and opening communication between the liquid pipes *k*¹ and the reservoir *n*. At the same time the passage to the first siphon is shut off. A locking bolt arrangement is illustrated at U, T. Fig. 3 shows a refrigerating-chamber complete, with the thermostatic appliance at *b*, the tubes containing liquid for actuating the sensitive siphon tube arrangement at *p*, the tubes for the second siphon at X, and the circulating tubes containing the cooling-medium at *u*².

6057. **Munns, W. H.**, [Kaffenberger, G.]. April 8.

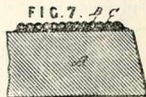
Digesters.—Arrangements are provided for carrying on the process of digestion in a practically continuous manner. The digester J is divided up into a series of chambers by periodically-operated slide valves which permit of the charging and discharging of the material while the operation of boiling is being uninterruptedly carried on. The material is carried forward by the reciprocation of the pistons M, N, and by the helical blades of the rotating draining-bush R. Liquor from the latter is pumped through the steam-heated chamber T mixed with fresh liquor from the pipe W and propelled into the end of the digester, where the more lean or refractory material is situated. In addition, weak liquor may be pumped through the pipe Z to operate upon the newly-charged material at the feeding end. In modifications, one or more details of the arrangement may be suppressed. Suitable devices are provided for simultaneously operating the valves &c.



In addition, weak liquor may be pumped through the pipe Z to operate upon the newly-charged material at the feeding end. In modifications, one or more details of the arrangement may be suppressed. Suitable devices are provided for simultaneously operating the valves &c.

6072. Carpenter, C. E. Sept. 27, A.D. 1890, [date claimed under Sec. 103 of Patents &c. Act A.D. 1883].

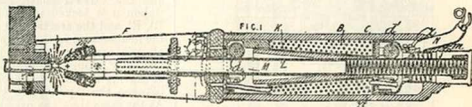
Heating by electricity.—Consists in insulating and securing electric-resisting or heat-developing coils to radiators by an adhesive enamel of suitable composition. The invention is illustrated in the Specification as applied to an ordinary radiator, of which Fig. 7 shows a portion in section. The resistance coil B may be folded or arranged in any convenient manner and placed on a bed of enamel C which has been previously applied to the sole-plate A. The coil is then covered in a further coating of enamel.



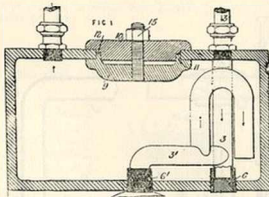
6125. Ritter, J. J. April 9.

Heating by electricity.—The apparatus is shown in connection with a soldering-iron, but when the bit is replaced by a plate with radial projections it is applicable for heating purposes generally.

The soldering-bit H is supported on the end of a perforated metal tube F, insulated from the handle C, and carries a metal rod which forms one pole of an electric arc and is connected through the tube F and binding-screw y^1 with the wire y , which passes round the solenoid B and emerging at z^1 passes away to the pipe N. The other wire is attached to the metal tube L which carries the carbon rod M. This rod is pressed against porcelain supports m^1 by a spring m . The tube M carries a conical iron core K which is drawn into the solenoid against the pressure of a spring N when a current is established in the circuit; the motion of the tube M is facilitated by rollers d, d^1 .



6343. Davies, R. April 14.



Heating water.—To prevent explosions due to the entry of water into empty overheated boilers from which water has been cut off, as the result of frost &c., the supply pipes 3, 3¹ are provided with fusible plugs 6, 6¹ which melt when a high temperature is reached, and thus allow the feed to pass into the fire instead of into the boiler. The pipes are arranged as shown in order to obviate a chance of the water entering the boiler when the plugs are melted. If desired, one plug only may be employed. The handhole is enclosed by a pair of plates 9, 10, each of which, by reason of the

conformations shown at 11, 12, exactly fall into their proper positions. They are secured in place by screwing up the nut 15.

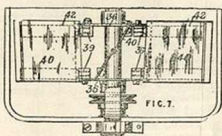
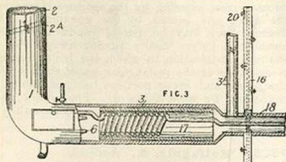
6513. Thomson, J. April 16. *Drawings to Specification.*

Heating buildings.—Relates to apparatus for ventilating and warming buildings. Air is withdrawn from the floor of the building and is conveyed thence by a chamber from which a part of the air is withdrawn by a fan or "exchange-wheel," while the remainder (mixed with air drawn in from the outside through openings) is heated by steam or hot-water pipes or stoves in the chamber, and, by means of a blower, is forced to the upper part of the space to be ventilated and warmed, so that a continuous circulation is maintained.

6821. Pye, R. April 21.

Heating buildings; heating air.—Relates to means for heating, cooling, and ventilating factories, weaving-sheds, spinning-mills, &c. Fig. 3 shows a plan of a system of pipes for supplying heated or cooled moist air to a factory. The air enters from the outside of the room through the pipe 2 with

valve 2A: it is heated or cooled by steam or water circulating pipes 3, and is impelled and moistened by steam or air and water jets issuing from nozzles 6. The pipe 3 may, if desired, be continued into



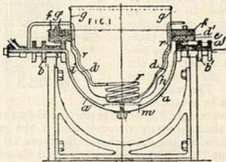
the branch pipes 16, and thence the steam may escape in jets to induce the air currents or to warm the building; the exhaust steam escapes by a pipe 3A. Various forms of nozzles, with two adjustable concentric orifices, are described. A nozzle may be surrounded by adjustable truncated cones to facilitate the induction of an air current. The pipes are provided with suitable deflecting-plates 18 and doors 20 for the escape of the air. These doors are arranged so that no condensed water can drip from them, and may be actuated simultaneously by mechanical means, or by a metallic thermostat.

6888. Mehner, H. April 21. *Drawings to Specification.*

Heating-apparatus.—The object of the invention is to construct a machine for the production of motive power which is worked by fluid pressure in a closed cycle without rejection of the latent heat of vaporization. In certain modifications, the machine simultaneously produces cold and evaporates fluid under pressure, which, when its tension is very low, is used for heating purposes. The first essential principle of the invention is the employment in a condenser of some suitable solid substance which is liquefied under the action of the exhaust steam or vapour from the motor (or other source) and is further of such character as to absorb the latent heat of the said steam or vapour. A second principle is the generation of steam or vapour from the saturated solution withdrawn from the condenser by the heat of crystallization of the solid assisted by a small increment of external heat. As examples of the substances employed may be mentioned water and saltpetre, used at a temperature of from 120° to 130° C., at which point the latent heat of steam is equal to the

latent heat of fusion of the quantity of saltpetre required to saturate the water of condensation resulting from the steam. Other substances are ethyl ether and crystallized acetic acid. In this case the resulting temperature is low enough for the production of ice, but the tension of the vapour is insufficient for use in a motor. Other substances mentioned are ammonia in combination with certain ammonium salts. In some cases it would be necessary to liquefy a larger amount of the salt, in order to absorb all the latent heat of the vapour, than could be liquefied by the vapour alone. In such cases an additional quantity of liquid is caused to circulate between the generator and the condenser sufficient to liquefy the excess of salt necessary.

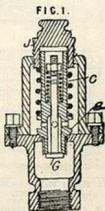
6994. Brierley, W. April 23.



Boiling-pans.—Relates to the manufacture of confectionery at one operation. A circular or other shaped copper pan *a* is mounted on hollow trunnions *b*, *b'*, and within it is placed a second corrugated pan *d*. A joint is made between the flange of the curb *g*, the flange *d'* of the pan *d*, and the flange *a'* of the pan *a* by means of cement, interposed metal rings *e*, *f*, and bolts *g'*. The pan is heated by steam passed into the cavity *h* through the hollow trunnion *b*, and through a coil *r* arranged in the pan *d*. A steam pipe *i* is passed through the trunnion *b* and carried down below a perforated plate or nose *m* to give additional heat to the pan towards the end of the operation, after the moisture has been evaporated.

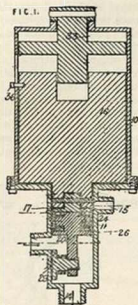
7008. Horrocks, J. April 23.

Heating water, safety-valves for boilers for. A safety-valve *B* of the spring, lever, or dead-weight type is fitted with an inner valve *G* controlled by a spring. The inner valve opens in the opposite direction to the main valve and prevents vacuum. In the case shown the tension of the spring *C* can be altered by the screw cap *J*.

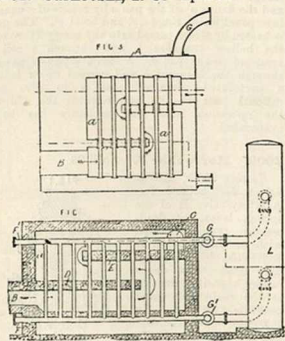


7109. Fisher, F. W. April 24.

Heating water, safety-valves for boilers for. Relates to safety-valves specially applicable to kitchen boilers which have a continuous circulation, but applicable to other boilers supplied with water under pressure. A piston 20 sliding in a cylinder 11 has attached to it a valve 29 which, in its normal position, is below the water inlet. The piston is loaded by a weight 16 attached to it, and sliding in a cylinder 10. When the pressure increases the piston is lifted, and the valve 29 closes the inlet. The weight 16 is now in contact with another weight 33, which is prevented from falling more than a certain distance, and if the pressure continues to rise, the piston uncovers an escape opening 15. 36 is an indicating-hand showing the position of the weight 16 and its appendages. The piston consists of a packing-ring 24 forced outwards by springs 26, and confined between two rings 17.



7302. Jarkovski, I. O. April 28.

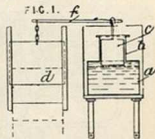


Heating water.—Relates to circulating boilers. As shown in Fig. 1, a series of vertical water-tube rows *a*, supported by and penetrating the

toruous flues *D, E*, open into horizontal passages *F, F*, which are united at their ends by the cross-pipes *G, G'*, and communicate at different levels with the water chamber *L*. By this arrangement, ample water circulation is provided for. The furnace gases entering by the aperture *B* traverse the flues, and escape by the opening *C*. If desired, they may be passed round the water chamber *L* before finally passing away. Fig. 3 shows a modification, in which the boiler setting is made up of the rectangular water chamber *A*, the upper and lower portions being additionally connected by water tubes *a*. The outlet and inlet tubes from the external chamber are shown at *G*.

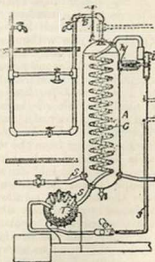
7306. Wolfsholz, A. April 28.

Thermostats.—Relates to means for operating valves and cocks for temperature-regulating purposes, and for emptying water conduits to prevent bursting by frost. Fig. 1 shows the apparatus arranged to operate a sluice valve *d*. A casing *a* and its trunk *b* are, at ordinary temperatures, nearly filled with a liquid, such as oil, having considerable expansibility under the influence of rising temperature. In the liquid is a float *c*, of specific gravity nearly equal to that of the liquid, and connected by a lever *f* with the valve *d*. Should the temperature rise the liquid expands and entirely fills the trunk, so that the float is entirely submerged, and in consequence rises and closes the valve *d*. The latter may, of course, be reopened at any time by hand. By modifying the connection between the float and valve, the latter may be opened by a fall of temperature.



7315. Dewey, M. W. April 28.

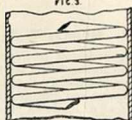
Heating water; heating buildings; thermostats.—Relates to electrical apparatus for heating water, and to systems for supplying hot water for consumption and heating purposes. A current from a secondary electric generator or induction transformer *T* is conducted by copper rods or cables *s* to a perforated iron coil *C*, which heats the surrounding water in the boiler *A*. The pipe and



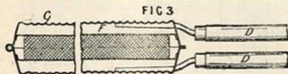
boiler A may be coated with some insulating paint or enamel, which will not obstruct the heat. The circulating and service pipes B may be included in the electric circuit, and the pipe and boiler may be dispensed with. To prevent the temperature of the water from rising beyond desirable limits, the boiler is fitted with a piston *h*, which forces back a lever *i*, and breaks the secondary circuit. The hot water is distributed throughout the building by a series of pipes B, which are fitted with the necessary cocks, valves, and radiators. Water is supplied to the boiler by a pipe S.

7556. Willoughby, J., Ackroyd, W., and Ackroyd, T. H. May 1.

Heating liquids.
—An arrangement of vertical pipes, Fig. 2, located round the internal periphery of the furnace chimney of a marine boiler or a single coil, Fig. 3, similarly situated, is employed for heating feedwater or "for other suitable purposes." For cleaning purposes removable screwed metal plugs or flanges *c* are provided.



7622. Hackforth, L. May 2.

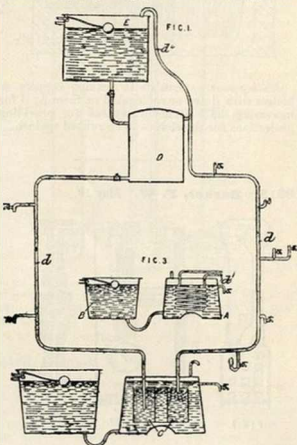


Heating apparatus.—Relates to a holder for heating articles over a fire or gas flame, more particularly for use in the sick room for heating poultices, flannels, &c. The holder is formed in two parts hinged together and provided with handles *D* which, when the apparatus is closed, may both be grasped with one hand. The sides *C* may be corrugated and the article may be protected from them when heated by removable internal sheets *F* of perforated sheet metal or other suitable material, and one of the plates *C* may be perforated to allow of the escape of steam.

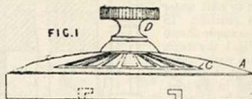
7776. Mackenzie, A. May 5.

Heating water.—The boiler C, which supplies hot water for heating buildings or for domestic supply, is contained in another low-pressure one supplied from a cistern which is, at all times, open to inspection, so that any failure of supply can be detected. The inner boiler C, as shown, is an annular copper one, but a coil of piping, as shown in Fig. 3, may be substituted. The inner boiler is connected, by pipes provided with draw-off cocks at various levels, to a cistern D to which cold

water is supplied from a cistern E, and from which steam escapes by the pipe shown on the right.

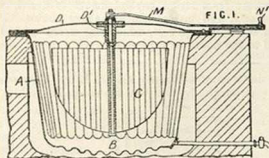


7901. Coxon, E. May 7.



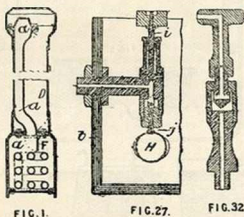
Boiling-pans, covers for. The cover A is formed with a segmental opening C which is closed by rotating, through the knob D, a lining-plate beneath the opening. For partial closure that portion of the lining plate which is formed with perforations or radial slots is similarly rotated into position. The cover is fixed into position by a bayonet joint.

8458. Smith, C. May 16.



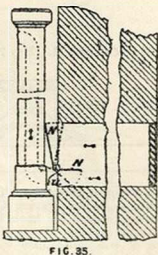
Boiling-pans.—Consists in making coppers or boilers with fluted or corrugated surfaces A, B for increasing the heating-surface and for providing projections for the clothes to be rubbed against.

8515. Barker, F. W. May 19.



Heating buildings; heating water.

—Steam or hot water, at high or low pressure, is used to heat water in a radiator. In the example shown in Fig. 1, the steam or hot water passes through a coil of piping in the base. The radiator tubes are of U-section and enclose air channels D. A valve F allows the circulation through the tubes to be stopped without cutting off the main steam or water supply. Various modifications may be made in the apparatus. For instance, the base may be divided into two compartments, one

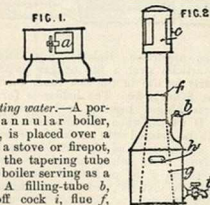


communicating with the radiator tubes and the other containing the heating-medium. Or the radiator tubes may communicate with a coil of piping in the base containing the steam or hot water. The air channels may be entirely surrounded by the radiator tubes or may be otherwise modified. Expansion of the water may be provided for by an elevated cistern or by a valve, as shown in Fig. 27. When the water expands the weighted valve *i* is lifted and the water flows into a cistern. When cooling takes place the water returns by lifting the float valve *j*. Fig. 32 shows a screw-down valve by which air or water may be drawn off, the escape taking place through the key or handle. The radiator may be placed in front of the inlet ventilator of a building as shown in Fig. 35.

8746. Gougy, F. E. May 22.

Non-conducting coverings and compositions.—Relates to arrangements for protecting steam boilers, pipes, and vessels. For this purpose pads of suitable shapes and dimensions are made up of cork, powdered or in pieces, enclosed in convenient bags. Sometimes the pads are dipped in silicate of soda. After fixing in position the covering may be coated with plaster, fabrics, and one or more layers of paint.

8835. Geen, H. S. May 25.



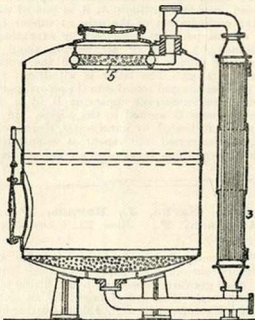
Heating water.—A portable annular boiler, Fig. 2, is placed over a fire in a stove or firepot, Fig. 1, the tapering tube of the boiler serving as a flue. A filling-tube *b*, draw-off cock *i*, flue *f*, chimney top *c*, and handles *h* are fitted to the boiler, and, in a modification, a steamer for steaming food is also arranged over the boiler. When tea or coffee is made in the boiler, a strainer is placed round the outlet leading to the tap, or a cylindrical strainer is suspended from the filling-aperture. When the boiler is taken off the stove, the fire may be used for frying, baking, or boiling with ordinary utensils. The stove has a door *a* at one side and a grating underneath.

9293. **Kruschina, C.** June 2.

Heating liquids.—Relates to a cooking range or apparatus, comprising a steam boiler, steam-cooking chamber, oven, milk-boiling appliance, and tea and coffee making apparatus. A vertical boiler is set in a fireplace on each side of which are steam-cooking chambers and ovens. The milk-boiling appliance consists of two receptacles L , L^1 connected by a coiled pipe L^2 passing inside the boiler. The milk is placed in the receptacle L and heated during its passage through the pipe L^2 to the receptacle L^1 .



9303. **Hawksley, G. W.** June 2.

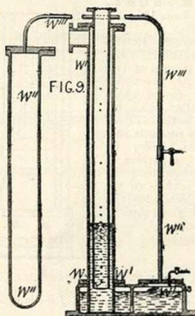


Digesters.—In boilers for esparto grass &c. of the class described in Specification No. 4976, A. D. 1890, the circulator or cylinder of steam tubes 3 is placed outside instead of inside, and is connected as shown to the space beneath the perforated false bottom and to a ring-shaped sprinkler 5.

9457. **Parkinson, J. H.** June 4.

Thermostats.—Relates to means for obtaining a uniform temperature in gas-heated furnaces for obtaining oxygen and nitrogen. A retort w^{11} is placed in the furnace near the main retorts, and is filled with a gas, such as air, and connected by a tube w^{11} to a closed chamber w^1 containing a liquid, such as water. This chamber is connected with an annular tube w enters. The heating gas is admitted either through w , escaping out of the annular casing, or

vice versa. As the temperature in the furnace increases, the air in the retort and tube expands, and the water is thereby driven further up w^1 , thus



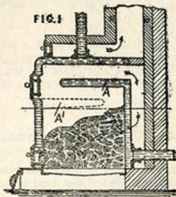
allowing less gas to pass; while as the temperature falls the amount of gas allowed to pass increases.

9688. **Smith, A. H.** June 8.

Non-conducting coverings and compositions.—Consists in the construction of easily-removable non-conducting mats for covering boilers and steam pipes, applicable also as breach-mats or life-buoys, and as protectives against fire. Flat bags or mattresses of asbestos cloth or other suitable materials are filled with non-heat-conducting substances such as asbestos, silicate cotton, fossil meal, charcoal, cork, cement, and the like, and are provided with rings, chains, cords, &c. whereby they may be easily joined up or separated. When used as non-heat-conductors, the bags are filled up with cork.

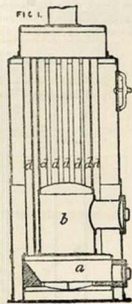
9718. **Mather, J., and Kitchen, J.** June 9.

Heating water.—Vertical boilers are constructed with one or more waterways midfeathers A , A^1 to divert the combustion products, and absorb a greater amount of heat.

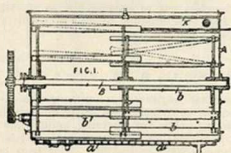


9891. **Kendal, G. C.** June 11.

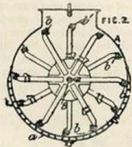
Heating water.—Relates to vertical boilers. The firebox is formed of two portions *a, b*, the upper and lower one of which is of smaller diameter than the lower. The combustion products pass through the boiler by the tubes *d*, a portion of the gases returning to the below in the firebox through an outer ring of tubes.



10,135. **Justice, P. M.,** [Billings, A. W.]. June 15. Amended.



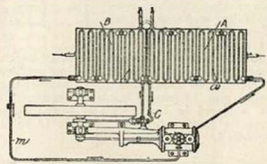
Boiling-pans.—Relates to apparatus for brewing. Fig. 1 shows a longitudinal vertical section, and Fig. 2 a cross-section of mashing-apparatus which may be used as a boiling-pan. It consists of a cylindrical vessel *A* with a jacketed bottom *a* and sides, central shaft *B* carrying two sets of stirring-blades *b, b'*, and pipes for the admission of steam and hot or cold water as required.



10,400. **Zimmermann, F. O. C., and Behrend, E. G.** June 18.

Solar heat, utilizing.—Relates to apparatus for utilizing the natural heat of the earth and sun, or heat obtained from other sources, for the production of motive power and for refrigerating, and comprises improvements on the invention described

in Specification No. 19,098, A.D. 1889. The method consists in employing vapours, possessing at ordinary temperatures considerable tension, in an engine of ordinary construction, in combination



with certain tubular "counter-current" apparatus for enabling the working substance to be used in a closed cycle. The counter-current apparatus is divided into two portions *A, B*, in one of which *A* the condensation of the exhaust vapour from the engine, partially condensed by expansion, is continued by water or air flowing about the serpentine pipe *a*, through which the working substance flows. The latter is withdrawn from the first portion and forced into the second portion of the counter-current apparatus *B* by a compressing-pump *C* worked by the engine. In this portion it is heated by warm water, steam, or the like, and converted into vapour at comparatively high tension, which is supplied to the engine by the pipe *m*.

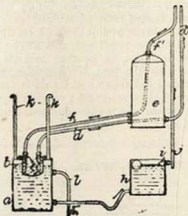
10,487. **Clarke, J., Haynes, W., and Robinson, F.** June 20. Drawings to Specification.

Thermostats.—Relates to apparatus for automatically controlling gas supply to heating-burners &c. The gas valve consists of a bell fitting into a mercury seal. The bell is raised by an electromagnet, the current through which is varied by an electric thermometer arrangement; the motion of the bell may be controlled by a spring.

10,559. **Walker, J.** June 20. Amended.

Heating water.—The kitchen boiler *a* has an inner chamber *b*, from which lead two pipes *f, d* to the cylinder *e*, after which *d'* leads to the ordinary supply cistern and *f'* to a greater height, where it is open to the atmosphere. Sometimes *e* may be dispensed with, and the pipes continued as shown in dotted lines. The cold-water supply is by the pipes *d', d*, to the former of which draw-off taps may be fitted as convenient. The hot water passes up *f, f'*, the latter being also fitted with taps, and a pipe *j* leads from *f'* to the small cistern *h* (fitted with a ball-cock *i* for the usual purpose), so that the water supplied to the outer chamber *a* is hot. The chamber *a* has two steam-escape pipes *k, k* and a draw-off pipe *l*. By this arrangement, an explosion owing to the blocking of the pipes *f', d'*

by frost &c. is prevented; for water in *b* cannot rise above boiling point until the contents of *a*



have all boiled away, and in this case there will be communication with the atmosphere through *f*, *f'*, *j* and the ball-cock *i*.

10,591. Lindemann, O. June 22.

Heating water.—

Relates to boilers for generating steam and for other purposes.

A series of cast-iron sections *a*, one of which detached is shown in plan in Fig. 3,

communicate with each other by the tubular portions *b*.

The space enclosed by the sections forms the fuel chambers.

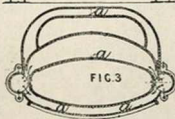
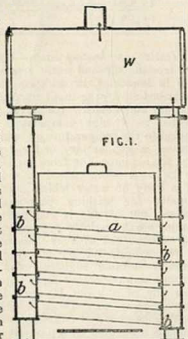
The quantity of heat taken up by the boiler is regulated by vertically-acting slides which shut off the fire from certain of the sections.

When employed for steam-generation purposes, the drum *W* is added.

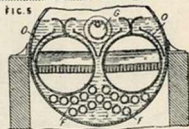
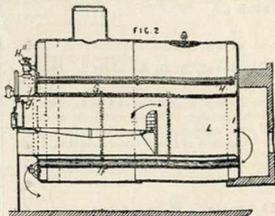
The sections are preferably placed in an inclined position to facilitate water circulation.

Similarly, the spaces between the rings are formed with inclined sides to prevent the lodgment of fuel.

If desired, the heating-surfaces may be increased by the use of corrugations or gills.



10,625. Galt, J. June 22.



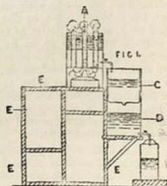
Heating water.—Relates to boilers for generating steam and other purposes, the invention being stated to be applicable to hot-water boilers or circulators. The combustion products from the internal furnace flues *L* pass again through the boiler water space by means of tubes *F* at the sides of and below the main flues. They then enter external flues in the ordinary way. Each of the flue shells is partially surrounded by plates *O*, Fig. 5, in such a way as to leave thin layers of water round them, for promoting circulation. The feed is passed from the chamber *g* into the closed cylinder *G* contained within the boiler water space. It passes into the boiler by entering the pipe *H* through perforations provided therein. The passage of the heated water into the boiler is controlled by the valve *H'*. In this chamber incrustation is deposited and is blown out on operating the proper cocks. The feedwater chamber also serves as a stay.

11,172. Haughton, B., [Haughton, W. R.] July 1.

Heating water.—

Relates to a device for boiling and filtering water, and consists of a tubular boiler *A* heated by a lamp and discharging the boiled water into a filter,

consisting of two parts *C* and *D*, the upper of which contains filtering-medium. The water thence falls

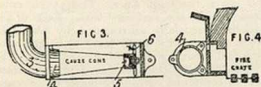
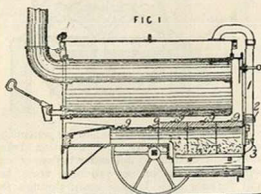


into a receiver E. The apparatus rests on a stand which is convertible into a box for containing it when not in use.

11,259. Sorel, E. E. A. July 2. *Drawings to Specification.*

Non-conducting compositions.—A composition of magnesia, magnesium chloride, and light or fibrous material such as chopped wood, bark, cork, straw, leather, &c. is used as a heat non-conductor. Limestone or flints may be added.

11,443. Healey, B. D. July 6.

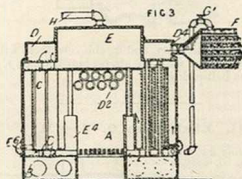


Boiling-pans.—Relates to cauldrons for melting pitch and fatty substances. The pipes 1 for drawing off gases from the pan to the grate are made about four times as large as before. They rest in glands 2, below which are movable elbows 3, provided with D-shaped flanges which enter D-shaped flues at each side of the grate. A gland 4, at the end of each elbow, secures the larger end of a safety gauze cone, the small end being held between two conical cups 5 and 6. The central heating-flues are made with cramps 9 for holding down the separate parts to the main casing. The front, back, and top plates of the casing are bolted to outside angles so as to be readily removable. The top angles of the pan ends are put outside and bent down at each end, so as to be joined to the top angles of the pan sides at each outer corner. The side heating-flues are made much larger than before, the side seating angles of casings being turned inwards and secured to the pan seating angles by means of bolts.

11,691. Berly, J. A., [Pagniez, T. A.]. July 9. *Drawings to Specification.*

Thermostats.—Valves for controlling the passage of fluid are actuated from a balanced lever carrying at one end a column of liquid acted on directly by the pressure to be regulated, and at the other by a weight, a dash-pot, or another column in communication with the first. When temperature is to be controlled the column of liquid is acted on by the pressure of the vapour of a volatile liquid generated in the space where the constant temperature is required.

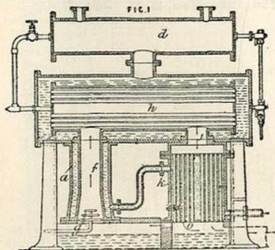
11,694. Murray, W. H. July 9.



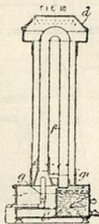
Heating air; heating water.—Relates to apparatus for treating air and water specially applicable for use in laundries, in addition to which there is described an arrangement of plant suitable for a laundry and a centrifugal dryer. The air is first heated to a high temperature and afterwards cooled to the temperature at which it is required for use in the laundry, or for drying meat, foods, &c., the air in cooling from the higher temperature to the lower being caused to assist in the heating of a body of water which may be used in the laundry for washing purposes, feeding steam boilers, &c. A fan is employed for drawing or forcing air through the apparatus, which comprises a fire-chamber A with air chambers B at each side of the ashpit, the air entering these chambers through suitable registers, and passing thence through water-jacketed pipes C to chambers D on each side of a boiler E, the said chambers communicating at one end with pipes D' which traverse the fire-chamber and communicate with a chamber which is connected by a pipe D' with the cooler F consisting of a drum containing water and traversed by tubes. Cold water enters at the lower part of the cooler, and passes thence by the pipe G' to the jackets surrounding the air pipes C, whence it passes to the boiler E, from which it is drawn off by the pipe H. The bridge walls E' of the fire-chamber are made hollow so as to contain water, and all the metal parts which are in proximity to the fire-bed and are apt to be highly heated are protected by water jackets. The products of combustion pass over the bridge walls and jacketed pipes to a pipe E' communicating with a smoke duct. In a modification, the jackets surrounding the tubes C are dispensed with, and the cooler F

communicates directly with the boiler E. The invention is described as applied to the plant used in a steam laundry, the large steam boilers commonly employed being dispensed with.

11,753. **Lishman, T.** July 10.



Heating air; heating water.—Relates to apparatus for generating steam or for heating air or water. Fig. 1 shows a steam boiler heated by a series of gas burners *g*, located in the vertical member *a* of the boiler. The combustion products are received by the internal chamber *h*, and discharged through the tubular feed-water-heater *k*, smoke and fumes being arrested by water in the tank *o*. Feed-water is supplied automatically from a contiguous reservoir by means of a float which raises or closes a feed-valve. In place of gas or liquid fuel a coal or coke furnace may be fitted. In this case the vertical limb *a* is constructed of a larger diameter. Sometimes the furnace is arranged with its axis horizontal, and, in addition, a second furnace of similar form is provided, the water heater being placed between the two. When the water is to be heated for domestic purposes and for heating rooms, the arrangement is similar to that shown in Fig. 1, except that the limb *a*, which carries a water coil above the flame, opens direct to the partially-filled chamber *d*. Fig. 10 shows a simple arrangement for heating air for warming compartments. The Bunsen burner *g* is placed below the U-shaped tube *f*, around which the air circulates before discharging through the perforated cap *d*. The waste gases are washed in the water trough *i*. Unburnt gas may re-enter the flame through the pipe *g'*.

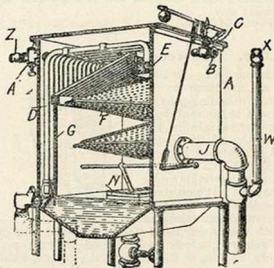


A modification of this arrangement with a water-heating apparatus is employed for cooking purposes.

11,896. **Cottancin, R. J. P.** July 13.
Drawings to Specification.

Heating buildings.—In buildings formed with an internal metal skeleton of wire netting or lattice work, tubes are connected to or placed in the skeleton to form passages for heating-fluids such as hot air, steam, hot water, &c.

11,961. **Webster, W.** July 14.



Heating water.—Relates to heating and purifying feedwater for steam generators and the like. Feed is automatically supplied to a tank under reduced pressure and supplied with exhaust steam. The feed enters the tank *A* by the pipe *B*, and travels through the series of pipes *D* to the open chamber *E* over the edge of which the water flows. It then passes over and through the series of inclined perforated plates *F* to the bottom of the tank, passing through the exhaust steam from the pipe *J* on its way. The supply is automatically controlled by the float *N* which acts upon the valve *C* in the supply pipe. Grease &c. is trapped by the curtain *G*. An air-exit valve is provided at *Z* and an air-inlet valve at *A'*. By this means the fluctuating or varying pressure of the partial vacuum in the tank is automatically regulated. When the pressure in the tank is the same as that of the atmosphere the exhaust steam passes up the pipe *W* and opens the escape-valve *X*.

12,029. **Fitzmaurice, J. S.** July 15.

Heating by electricity.—Consists of an electrically-heated brand or hot stamp for marking animals or inanimate objects. The letters or design are formed of material which is a bad conductor of electricity placed in circuit with a dynamo, battery, or other source of electricity. The design is preferably set in a non-conductor of



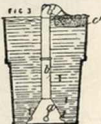
heat, such as asbestos or porcelain &c. A resistance may be used to regulate the temperature of the branding-design. When high-tension alternating currents are employed, they may be reduced, by a transformer, to currents of low tension and large quantity.

12,076. Plews, A. S., [Brocklehurst, G.]. July 16.

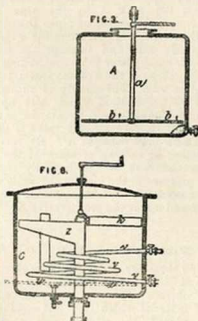
Non-conducting coverings.—Infusorial earth or Barbadoes tripolite is made into a plaster with water, coal tar, cement, lime, cowdung, hair, or other fibrous material, with or without silicate of soda and sodium chloride, and is applied in the ordinary way.

12,077. Fortescue, F. H. July 16.

Boiling-pans.—Relates to an appliance to be placed in boiling-pans or coppers to prevent boiling over, to aid in the circulation of the liquid, and to strain off hops or other substances contained in the liquid under treatment. It consists of a vertical tube *b* with a perforated base *a* through which the liquid passes up the tube and falls on a strainer *c*, which may be fixed in the pan as shown, or hung or fixed around the tube *b*, which may or may not have a curved part *b'*.



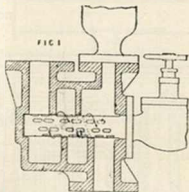
12,659. Denamur, V. July 25.



Boiling-pans.—A boiling-copper *A* for brewers'

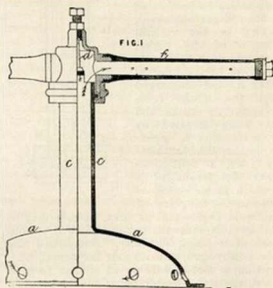
wort is adapted to be closed by a lid provided with a cotton-wool filter for a supply of sterilized air and a tube for conveying the steam to the other parts of the apparatus to sterilize them. The boiler has also a vertical tube *a* and perforated rotary arms *b* through which a supply of air is forced into the wort to aerate it.

12,786. Morison, D. B. July 28.

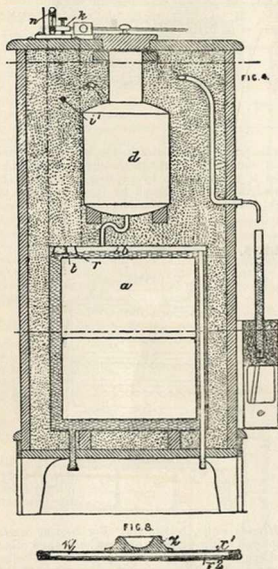


Heating water.—To heat the feedwater for water-heating boilers, steam is blown in through a perforated nozzle such as that shown.

12,939. Askew, J. July 30.



Boiling-pans.—Relates to water-circulating apparatus for use in coppers or boilers for washing clothes &c. On the bottom of the boiler is placed a perforated bowl *a* having a vertical tube *c*, on the upper end of which rotates a pair of perforated arms *f*. Hot water rises up the tube *c*, escapes through the perforations in the arms *f*, and so rotates them. This rotation distributes the water uniformly over the clothes being washed. The arms are shown as rotating on a pivot *d*, but ball bearings may be substituted.

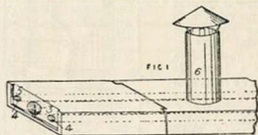
13,178. **Hearson, C. E.** Aug. 4.

Heating by water circulation; thermostats.—Incubators and other apparatus are maintained at an equable temperature, either above or below that of the atmosphere, by being enclosed in a water jacket, kept at a uniform temperature by the admission of hot or cold water, under the control of a thermostat. The water is fed to the jacket direct from a main or tank or through a heater or ice chamber. In Fig. 4, *a* is an incubator, *b* the water jacket, *e* the heater, *d* the ice chamber, and *r* the thermostat, preferably such as is described in No. 5141, A.D. 1881. The latter, in expanding and contracting, vibrates a weighted lever *k* which swings the supply pipe *n*, so that it delivers direct to the jacket through pipes *i* and *j*, or through the heater *e* or ice chamber *d*. The heater or ice chamber may in some cases be dispensed with. Fig. 8 shows a thermostat acting by expansion of a volatile liquid. Copper or brass diaphragms *x* are lined with blotting-paper, which absorbs the

volatile liquid. They are soldered over a metal frame *w*, and the upper one has a socket *z* to receive the transmitting-rod.

13,468. **Nelson, E.**, [trading as F. McNeill & Co.]. Aug. 10.

Non-conducting coverings.—Hair felt for use as a covering for steam boilers and pipes is strengthened by inserting a central layer of woven or other open wire or lattice work, or metal, string, yarn, or other netting.

13,471. **Kenyon, T.**, and **Blackledge, E.** Aug. 10.

Heating air; heating buildings.—Relates to means for supplying, moistening, and heating or cooling air for weaving-sheds, workshops, and other buildings. Porous bricks or blocks formed with passages 3, 4 and connected by tongued, rabbeted, or other joints 5, made water-tight by cement, are let into the floor of the building. Air passes through the passage 3, and cold or heated water through 4. The bricks become saturated with the water and air, and the water evaporates from the surface and cools, heats, or moistens the air in the room. The cooled or heated air also escapes into the building through pipes 6, or through gratings. Some parts of the bricks may be glazed. The bricks may be in two parts, the upper parts having projections entering the water in the lower part. The air circulation may be attained by the action of a ventilator or a fan, or by like forcing or exhausting means. The bricks may be made of fireclay, cement, burnt clay, &c. Steam may be employed with the warm water for heating by radiation.

13,491. **Köpke, C. H.** Aug. 10.

Non-conducting compositions.—Coke, poor in combustible properties, such as the coke from bog-head coal, is calcined and ground. The material may be used as a cement, either alone or in combination with cements, lime, and gypsum. Firebricks and other articles may be moulded from the material in admixture with cork, quartz, firebrick powder, coke, lime, soluble glass solution, hair, clay, organic substances, alkalies, alkaline earths, and magnesia.

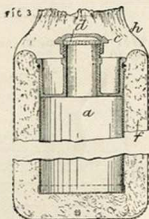
13,554. **Mitchell, W.** Aug. 11.

Heating by electricity.—Relates to electric steam generators and heaters. A series of concentric water cylinders C, communicating with an upper steam and water reservoir B, are enveloped in coils of wire D through which the electricity is passed. The coils are not placed in close contact, but at a distance of about ten times the diameter of the wire from each other. The coils of wire are preferably embedded in asbestos.

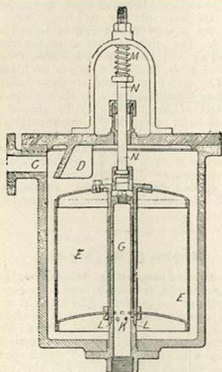


13,969. **Nichols, D.**
Aug. 19.

Hot-water bottles.
—A metal cylinder a is provided with a screw cap c having a metal valve d to make a joint. It is covered with wadding or other non-conductor f, and after being filled is enclosed in a linen slip h.



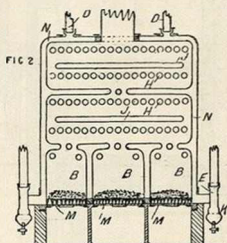
13,990. **Sellier, A. L.** Aug. 19.



Steam traps.—Steam and water enter at C and are deflected, by a baffle D, off the annular float E which moves on a central tube G perforated at K.

As the water accumulates in the trap it raises the float and escapes through the openings K. The float is pressed down by a spring M, and may be tested or moved by hand by the spindle N. A tight joint is made by shoulders L.

14,235. **Linden, L.** Aug. 22.



Heating water, boilers for. For heating water employed in the warming of greenhouses and other buildings, the rectangular water-circulating boiler shown in Fig. 2 is employed. It consists of the water jacket N connected across the flue space by alternations of water tubes H and flat water spaces J. The water flows out by the tubes D and returns by the pipes E, at the lower portions of each of which pipes the settling-chambers K are provided.

14,271. **Poat, J., and Watts, C. J.** Aug. 24.

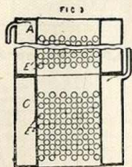


Heating water.—Tubular boilers, such as are described in Specification No. 20,661, A.D. 1889,

are made with only one row of water-tubes on top, the other being replaced by a water jacket containing a flue *c*. The opening *d* into this flue may be near the front, so that the combustion products have to traverse the whole length, and it may be divided by a longitudinal diaphragm, so that they traverse it twice before passing away to the chimney.

14,395. Henderson, T. Aug. 25.

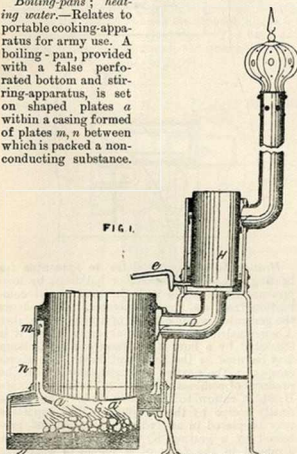
Heating water.—Relates to means for heating feed water for steam boilers, and water for baths &c., by waste furnace gases, or by gas or other burners. The water to be heated is passed through a series of superposed or otherwise arranged drums *A* &c. and water-tubes *E'* &c., which cross the central flue space. The water at first enters the cooler drum, and afterwards passes to those more highly heated. The drums may be placed in any suitable positions relatively to the furnace chimneys or stacks, or may themselves form the chimney. For heating water for baths, a series of gas or other burners are placed below the apparatus.



casing, the products of combustion passing along zig-zag flues formed by vertical partitions to the chimney *o*. A water tank *H*, fitted with a pipe and cock *e* for supplying the boiling pan, is set in the chimney and heated by the waste gases, as shown. The flues are constructed in a similar manner to those of the boiling-pan. Long hooks are provided for removing the false bottom from the boiling-pan. Ladles having long pivoted handles are provided for removing the food, and a funnel may be fixed on the side of the apparatus for distributing the same. A crane may be fitted to the side of the apparatus for raising the lid, and a collapsible step-ladder may be provided for use with the apparatus. The parts of the apparatus are connected by bolts and nuts so that they may be readily disconnected to facilitate transport.

14,454. Pingetti, N. Aug. 26.

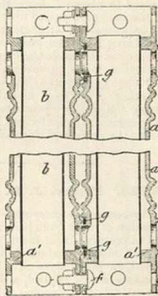
Boiling-pans; heating water.—Relates to portable cooking apparatus for army use. A boiling-pan, provided with a false perforated bottom and stirring-apparatus, is set on shaped plates *a* within a casing formed of plates *m, n* between which is packed a non-conducting substance.



A fireplace *G* is bolted to the bottom of the

14,743. Wenham, W. P. Sept. 1.

Heating buildings; heating air.—Relates to heating-coils or radiators consisting of a double row of vertical concentric tubes *a, b*. Through the interior of the inner tubes the air to be heated passes, while in the annular spaces formed between the tubes the heating medium, such as steam or hot water, is conveyed. Each of the external tubes *a* are cast with end flanges *a'*, to which the air has access, and which afford means

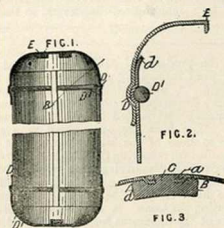


for securing the sections together by bolts *f*. Packing-rings *g* are placed round the openings into the annular chambers. An ornamental cover or cap may be provided as usual.

14,820. Henderson, C. J. Sept. 2. *Drawings to Specification.*

Heating buildings.—Hot air from a stove room is admitted to apartments and passed out through suitable openings to the atmosphere. The outlet ventilating-tubes may contain pipes for supplying gas to burners for lighting the apartment &c.

14,889. **Barker, G.**, [Shipe, W. S.]. Sept. 3.



Heating water.—The object is to produce a boiler which has a smooth outer surface free from projections, and which may be highly polished or nickel-plated. The longitudinal joint B, shown enlarged in Fig. 3, is provided with grooves into which the edges of the boiler are forced and secured by pressing down the rib C. The heads of the boiler are passed over circumferential heads D, enclosing for strengthening purposes the internal ring D'. The heads may be shrunk on or compressed in position. More securely to seal the respective joints, grooves such as at *d*, Figs. 2 and 3, are constructed, into which the galvanizing or other protecting material flows. To form simple and effective joints between the boiler and its connections, inner flanges, such as E, are stamped during the process of formation.

14,926. **Fisher, J. A.** Sept. 3.

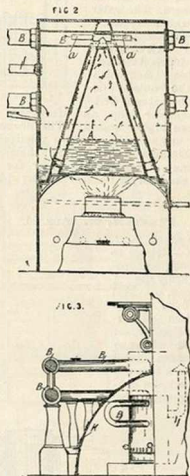
Non-conducting coverings.—In order to prevent radiation of heat from boilers, pipes, and the like, and to preserve from disintegration the cork dust or cork shavings which have hitherto been employed, an inner layer of mineral non-conducting substance is first applied, and an outer protecting non-conducting covering placed over the cork. The inner layer, of about an eighth of an inch in thickness, consists of asbestos, fossil meal, or other mineral substance, applied in the form of a plaster made up with some agglutinating material, such as Portland cement. The cork stratum is similarly worked up, as, for instance, with silicate of soda. The outer envelope may be of the same material as the inner lining, or of some other suitable non-conducting substance.

14,935. **Hart, J. A.**, and **Baynes, D. C.**
Sept. 3. *Drawings to Specification.*

Heating air.—Relates to means for ventilating workshops and other apartments or buildings. Air-admission pipes lead into the apartments, and

contain in their down-turned ends suitably-driven centrifugal fans. The air drawn in is discharged from the fans in thin horizontal layers in the upper part of the apartment. The air may be heated or cooled by contact with pipes in which a heating or cooling medium is circulated, these pipes being arranged in the air-admission pipes.

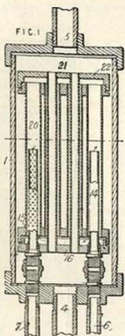
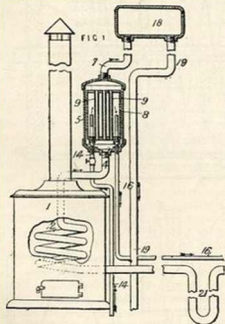
14,940. **Parish, E. W.** Sept. 4.



Heating buildings.—Relates to apparatus for heating greenhouses, rooms, or buildings, by low-pressure steam mixed with the products of combustion from the steam generator. Fig. 2 shows the generator, which consists of a conical chamber A surrounded by a water tank, from which it is separated by a flue. Gas flames or a spirit lamp may be used as the source of heat. The steam escapes at the nozzles *a, a*, and, along with the products of combustion, passes to the heating-pipes B, which return to the water tank. The fumes finally escape by the flue pipe I. The apparatus may be placed in an ordinary fireplace and protected by a grating K, and the pipes may be arranged in the form of a fender or guard, as shown in Fig. 3. Or it may be placed in the roof of a building to ensure ventilation.

15,166. Pass, E. de, [Leland Car Heater and Steam Coupler Co.]. Sept. 8.

Heating water.—Relates to apparatus for warming railway vehicles. Water is heated by means of live steam, and circulated through suitable pipes in the cars. The heater consists of a cylindrical casing 1 in which are two heads 16 and 22, each consisting of two parallel discs, to the inner of which are secured the ends of pipes 20, while to the outer are secured the ends of smaller pipes 21, which traverse the larger pipes 20. Live steam enters by a pipe 6 connected to a short open pipe 14 inside one of the pipes 20, and traverses the annular spaces between the pipes 20 and 21, escaping ultimately by the perforated pipe 15 and branch pipe 7 connected thereto. Water is admitted by a pipe 4 and passes through the pipes 21 and around the pipes 20, and the heated water is led through a pipe 5 to the circulating-pipes in the cars. The head 22 is entirely out of contact with the external casing to allow of expansion of the pipes.

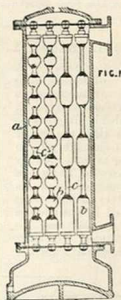

15,167. Pass, E. de, [Leland Car Heater and Steam Coupler Co.]. Sept. 8.


Heating water.—Relates to apparatus for warming railway vehicles, and consists in an arrangement

of radiating pipes for circulating through the cars water heated by steam heaters of special design in combination with a coil heater of ordinary construction. Fig. 1 shows an elevation of part of the apparatus. The ordinary heater 1 is located at one end of the car, and arranged to heat the water in the coil 2, the continuation from which at 4 enters a steam heater consisting of a cylindrical casing 5 containing a concentric drum 8 which is traversed by open-ended tubes 9. The drum 8 is heated by steam which enters it by a pipe 14 led from the train-pipe, and leaves it by a pipe 16. The water from the pipe A traverses the tubes 9 and the annular space between the drum and its casing, and then passes through a pipe 7 into an expansion tank 18, whence it passes through a pipe 19 leading to a series of radiating bends in a pipe arranged at one side of the car. This pipe then crosses to the other side of the car, and delivers the water to an auxiliary heater similar in construction to the heater 5 but heated by the steam which leaves the heater 5 by the pipe 16. The water then passes through a second series of radiating bends, one of which is shown at 21, and is finally led to the bottom of the coil 2 in the main heater 1. A three-way cock is fitted in the train-pipe by which steam may be shut off from the heater 5 from one or both ends of the train-pipe.

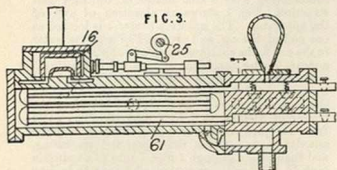
15,192. Row, O. M. Sept. 8.

Heating water ; heating air.—A series of tubes *b*, with a succession of indentations, depressions, or flats *c* on opposite sides, preferably alternately at right-angles, are secured in a casing *a*. Other forms of apparatus are described in the Specification for heating air, feed-water, &c., or for cooling, evaporating, and condensing, in which similar pipes are used; and several varieties of pipes made on the above plan are also described.


15,292. Dixon, L. P. Sept. 9.

Heating water.—Relates to steam pumps in which provision is made for heating the water passing through the pump by means of the exhaust steam. Fig. 3 shows a vertical section of the pump. The heating of the pumped water is effected in a tubular apparatus extending in a central situation from the valve chamber to the rear end of the steam cylinders. The exhaust steam and suction

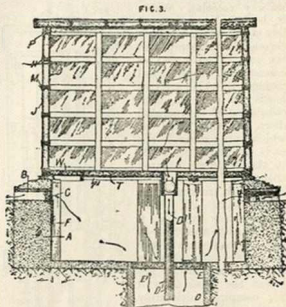
water mingle around the tubes 61, while the delivery water is forced through the same.



15,347. Der Heyden, W. van. Sept. 10.

Heating buildings; heating air.—Relates to glass dwellinghouses, the walls and roof of which are constructed of glass tanks or double sheets of glass containing a solution of alum, the object being to admit sunlight freely and at the same time stop the passage of heat rays. Air enters into the basement through openings B and layers of cotton C, and, after passing through a filtering-layer of cotton E in a double grating E', is carried into the room by a vertical pipe D'. Vitiated air may escape from the room by openings P in flues communicating with a heated escape shaft. When it is required to heat the air before it enters the room, the floor aperture at the top of the pipe D'

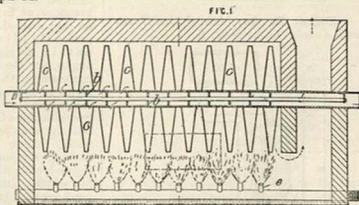
is closed, and air from the pipe D' passes into a casing surrounding a stove. The heated fresh air enters the room through the apertures P, and escapes after respiration through a pipe in the



floor leading to the fireplace of the heating-stove. In another modification, air enters the room through the pipe D' as described in the first arrangement, and is drawn off by the stove as described in the second arrangement.

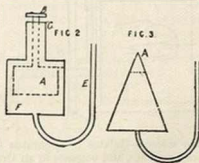
15,541. Leeds, L. W. Sept. 14.

Heating water.—A series of hollow discs C, C are mounted on a perforated pipe B, divided by diaphragms b so that the water flows through all the discs, as indicated by the arrows. The whole is mounted in a refractory casing, and is heated by gas burners e. A coil may be substituted for the arrangement shown.



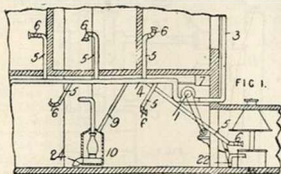
15,781. McHardy, J. Sept. 17.

Thermostats.—Relates to apparatus by means of which any material may be caused to open or close an air-admission valve by its contraction or expansion, or vice versa. The material may be a solid metal, water, mercury, &c. In the form shown in Fig. 2, cold air passes from the pipe E through mercury contained in a vessel F. In the mercury is a float A carrying a valve B controlling the outlet C. As the temperature of the mercury falls, it contracts, and the float drops and closes the valve. In that shown in Fig. 3, compressed air



passes through water in the conical vessel, and in expanding cools the water, which freezes and stops the flow of air through A.

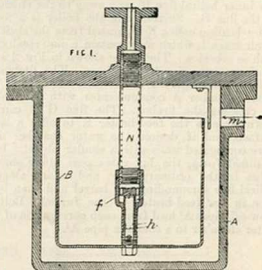
15,873. **McCreery, J.** Sept. 18.



Heating air; heating buildings.—Relates to a system of heating and ventilating buildings, laundries, vessels, and railway cars. Fig. 1 shows the system applied to a building. A fan blower 1, driven by any suitable power, takes air from a pure atmosphere through the pipe 3 and supplies it to a main 4, from which branch pipes 5 and adjustable nozzles 6 conduct it to the desired apartments. In order to moisten the air prior to its delivery into the rooms, a tank 7 is provided for supplying water thereto. For supplying heated air, a pipe 9 communicates with the jacket of a stove 10. In a special form of air-heating furnace the air chambers surround the furnace chamber.

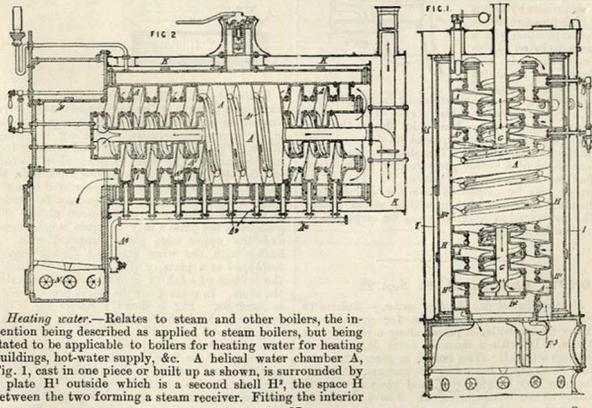
For removing foul air from the floors of apartments, such as kitchens, a pipe 22 or 24 leads into the combustion chamber of a stove.

16,319. **Rothschild, J.** Sept. 25.



Steam traps.—Steam and water enter the vessel A at *m*, and in time the water flows over into the open float B and causes it to sink and draw away the end of the perforated tube *h* from a valve *f* in the discharge pipe N. The water in the float is then blown out, and the float again rises and closes the valve.

16,330. **Alzugaray, J. B., Benjumea, J. D., and Torres, J. B.** Sept. 25.



Heating water.—Relates to steam and other boilers, the invention being described as applied to steam boilers, but being stated to be applicable to boilers for heating water for heating buildings, hot-water supply, &c. A helical water chamber A, Fig. 1, cast in one piece or built up as shown, is surrounded by a plate H' outside which is a second shell H', the space H between the two forming a steam receiver. Fitting the interior

of the water chamber A is a flue or tube G which rests on the plate B'. The bottom of the water chamber is formed by a plate below which is the furnace. The gases pass through the annular opening F', up the external helical flue A', down the inner helical flue B', and away to the chimney by the flue G. Surrounding the boiler is a feed-water-heating casing K separated from the shell by an air space I, which may contain a non-conductor such as asbestos. The boiler shown in Fig. 2 is of similar construction to the above. The firebox is not provided with the usual water casing, and the water chamber A communicates with a cylinder A' crossing the firebox. The flue G is carried downwards in the feed-heater K to offer a large surface, and if desired the water chamber may have corrugated walls with a similar object. In a modified form, the hot gases pass along smoke-tubes in the ordinary way, and return along a helical flue surrounding the barrel and then by a pipe in the feed-heater to the funnel. Bottom blow-off pipes A² lead from each corrugation of the water chamber to a common pipe A¹.

example shown, with a water tray I, but this may be dispensed with.

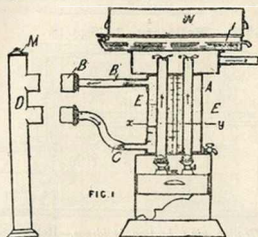


FIG. 1

16,469. Allott, J. B., and Paton, J. McC. C. Sept. 29.

Heating air.—Relates principally to improvements in, and modifications of, the apparatus described in Specification No. 1245, A.D. 1888, for disinfecting clothing and other articles by means of high-pressure steam. In combination with a steam-jacketed disinfecter there is employed an apparatus for drying or slightly superheating the steam, or drying or heating the air, supplied thereto. This consists of a chamber C containing a coil c, heated by steam, through which the steam or air is passed on its way to the disinfecting-chamber A. The steam jacket B contains steam of a higher pressure and temperature than in the disinfecting-chamber A. The air or vapour may be exhausted from the disinfecting-chamber by connecting it with a steam nozzle. The air, heated as described, may be employed to dry the disinfected goods.

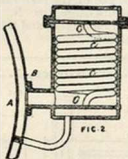
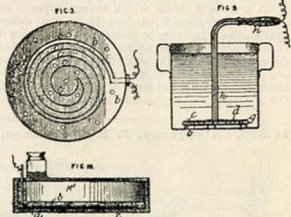


FIG. 2

16,767. Schindler-Jenny, F. W. Oct. 2.



Heating by electricity; heating water.—Different forms of apparatus are heated by passing an electric current through a platinum or other wire embedded in, or arranged between, refractory insulating-plates. Fig. 3 shows a plan view of a heater for a cooking-range. The wire c is arranged in the form of a double spiral within a groove formed in the face of a firebrick plate b, and is covered by a thin mica or other plate. The plates may be secured in a metal casing or between metal plates. The grooves in the plate b may be made much deeper, and the upper mica plate dispensed with. A heater with the wires arranged zig-zag may be employed as a plate or dish warmer, or fixed to the bottom of a fish or cooking kettle for heating the same. In some cases the wires are embedded in sand &c. Fig. 5 shows a heater for boiling purposes, in which the wire c passes through a hollow handle h, h and is arranged in a spiral form between plates b, d enclosed by a casing g. In a modification, the wire is coiled in the form of a vertical spiral. A complete cooking-range may be constructed with a boiler on one side and an oven on the other, its top plate being provided with three heaters as previously described. The water

16,497. Phillips, H. P. Sept. 29.

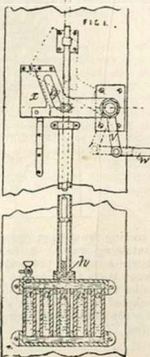
Heating buildings; heating water.—Relates to hot-water heating apparatus for greenhouses. Water from a boiler A passes along a pipe B to a standard D, with a movable cover M, and back through a pipe C. The boiler, as shown, has two flues E, E, and is heated by oil burners. A single flue only may be employed, and gas may be employed as the heating-medium. Above the boiler is placed a propagating-pan N provided, in the

in the boiler is heated by a heater as shown in Fig. 5. The oven is formed of refractory material grooved to receive the heating-wires, or of metal-coated asbestos over which the wires are placed. Fig. 15 shows a smoothing-iron heated by a wire *c* arranged in a zig-zag groove formed in a fireclay slab *b*, and held in position by a second thin mica slab *d*. A weight *K* may be placed within the iron.

17,033. Shiels, A. Oct. 7.

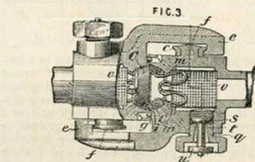
Thermostats.

—Relates to apparatus for automatically controlling the temperature of gas and oil engine cylinders. A tubular apparatus *a* containing salt water or some other sensitive fluid is fixed in the tank connected with the gas-engine cylinder jacket. The expansion of the fluid raises a piston *b*, which turns the weighted bell-crank lever *x*, *v*, and through the rod *w* opens the hot-water exit cock. The inlet is controlled by a ball valve. The straight part *g* of the slot in the lever *x* is to allow the piston to rise after the cocks are opened, as shown by the dotted lines.



effect is produced by the action of a jet or jets of fluid, such as air, steam, gas, or other fluid. The leading feature of the invention is the employment of exceedingly small jets, either singly as in Fig. 3, or in various combinations as in Fig. 3^A, for example, which jets are delivered through nozzles of special form in cross-section, as shown in Fig. 1. The nozzles may be inserted in the form of removable plugs, combined into roses, or furnished with a divergent extension as shown in Fig. 2. In order to keep the roses and nozzles clear, and fit the air for ventilation, the entering current may be passed through sieves or wash-bottles, or it may be heated or cooled if desired.

17,139. Gold, E. E. Oct. 8.



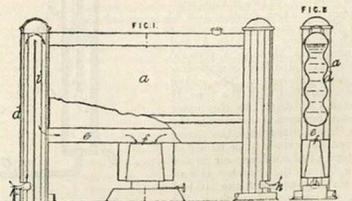
Steam traps.—Relates to traps for railway brake and heating pipes &c. Fig. 3 shows a coupling. A water relief valve *s* is held in its place by a gland *g*, and its spindle *t* projects horizontally and is weighted at *u*. The valve has thus a tendency to tilt sideways, and allow any water which gathers in the coupling to escape. It is protected from dirt by a strainer *v*. The spindle *t* may be either straight or bent, but in every case it causes the valve to tilt as above described. Receptacles for collecting liquid provided with such valves may be placed in any position in the pipes.

17,133. Zechmeister, L. Oct. 8.

Heating air; heating water.—Relates to apparatus, such as ventilating-apparatus and air and water heaters or coolers, in which the desired

17,445. Deards, S. Oct. 13.

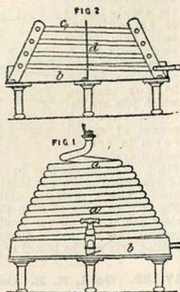
Heating water; heating buildings.—The apparatus consists of a corrugated water chamber *a* supported on hollow standards *d*. Under the water chamber is a flue *e* communicating with the standards, which are divided by diaphragms *i*. Oil or gas burners are placed under the opening *f* in the flue *e*, and their hot products pass along the said flue to the standards, and finally escape at openings *k*, *l*.



The water chamber radiates heat to warm the conservatory or other building in which it is placed.

17,487. Villiers, D. E. de, and Biss, J. Oct. 14.

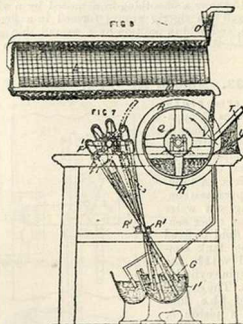
Heating water.—Water for baths &c. flows through a coil of piping *a* arranged in the form of a truncated cone resting on a tray *b*. A casing with air inlets encloses the coil. The coil is heated by a gas burner consisting of a perforated coil of gas pipe *c* supported in standards *d*.



17,570. Moore, T. Oct. 15. *Amended.*

Boiling-pans; heating liquids.—Relates to a continuous process for making sweetmeats of various kinds. The syrup is first prepared in boiling-pans or vessels, then run slowly through or over a continuous boiler or heater, thence through or over a continuous cooler, and into a creamer, grainer, or sponger. Several forms of apparatus are described for carrying out the process. Figs. 3 and 7 show

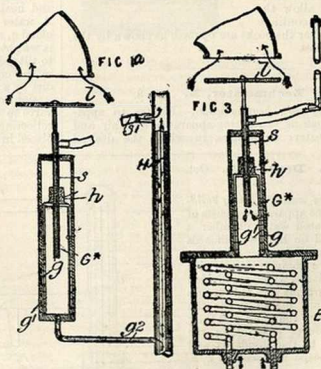
one form. The syrup is prepared in jacketed boiling-pans containing an internal heating-coil, and run into a feed-trough *O*, whence it passes over a continuous boiling or heating coil *L, M*, and on to



a cooling-drum *Q*, provided with end flanges *R* and containing water. A feed-trough *T* and a discharge scraper *U* press against this drum, and between them is placed an oiling-medium *V*. The boiler or heater may consist of one or more steam-jacketed tubes, through which the syrup flows, or of a conical coil of piping over which the syrup flows.

18,001. Wagner, F. Oct. 20.

Thermostats; heating water.—A valve *l*, controlling the air supply to the furnace or stove of a water-heating apparatus, and also, when required, a similar valve admitting air behind the grate to cool the boiler flues, are controlled by the arrangement shown in Fig. 1^a. An outer casing *g*¹ has concentric with it an open-ended tube *g*, and the space between the two is filled with mercury in which floats a bell *h*. The bell is carried on a tube *s* which supports the valve *l*, and communicates through a pipe *s*¹ with a stand-pipe *H* in communication with the boiler. The casing *g*¹ communicates with the pipe *H* through a tube *g*². As the boiler pressure increases water rises in the tube *H* and passes into the casing *g*¹, eventually closing the mouth of the pipe *s* and confining air in the space *G*^o above. Further rise of the water compresses the air and lifts the bell, and with it the

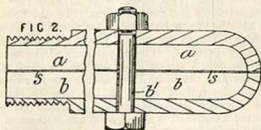


valve *l*. Further rise of water may open a valve and admit air behind the grate. A modification, in which a thermostatic appliance is used, is shown in Fig. 3. The flow or return pipe from the boiler is cooled in a water chamber *E* forming a lower extension of the chamber *g*. With increase of temperature the water in *E* expands and actuates the apparatus, as previously described.

18,123. Thompson, W. P., [*Soc. Anonyme Pour le Travail Electrique des Metaux*]. Oct. 22. Drawings to Specification.

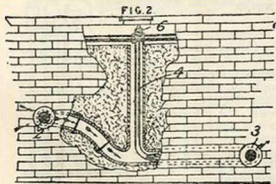
Footwarmers; heat-storing apparatus; heating by steam circulation and electricity; heating liquids.—Consists in the application of steam and electricity for re-heating by fusion solid bodies which give off heat when passing again from a liquid condition to a solid one, and which are used for filling footwarmers and the like. Among the different solid bodies which produce this effect, acetate of soda is the one generally employed. Footwarmers so charged are heated by steam passing through a worm in each of them, or by a rheostat, or by a combined steam and electric apparatus.

18,146. Gent, G. Oct. 22.



Steam traps.—The longitudinal halves of a split metallic tube *a*, *b* are secured together by a bolt *b'*. Cold water and condensed steam escape between the halves of the tubes. When hot steam enters, the halves expand and close up the longitudinal aperture *s* between them.

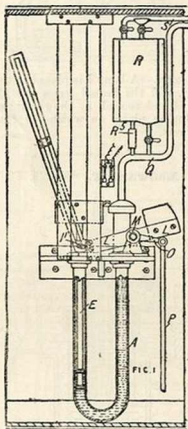
18,381. Williams, W. C. Oct. 26.



Heating water.—For heating and circulating the

water of swimming-baths, a number of short tubes are let into the slide wall. Water enters at 2 and leaves at 3. The circulation is kept up by a steam jet delivered through a pipe 4 and regulated by a cock 6. A number of these tubes are fitted around the bath.

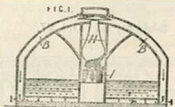
18,449. Shiels, A. Oct. 27.



Thermostats.—Relates to apparatus for regulating the temperature in ships, buildings, &c., but particularly adapted for regulating the temperature in meat-refrigerating chambers. In the latter are placed a number of serpentine tubes or others offering considerable surface, filled with alcohol or other expansible liquid. These pipes communicate through the pipe *Q* with one leg of a siphon *A*, containing mercury. In the other leg is a weighted piston *B* which, by means of pins *F*, operates a lever *L* which rocks a shaft *M* and, through a second lever *O* and rod *P*, controls the supply of steam to the refrigerating engine, or the supply of refrigerating-fluid to the chamber. In place of using the lever *O* and rod *P*, a pinion on the shaft *M* may gear with a pinion on the steam or supply valve spindle, or with a rack gearing with the said valve; or the lever *L* may be keyed on the valve spindle. Liquid is supplied to the pipe *Q* from a tank *R* by compressed air supplied by the pipe *S*, and a safety-valve *R'* allows the liquid to return to the tank in the event of excessive expansion.

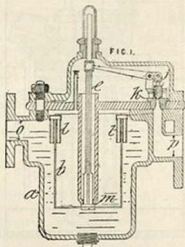
Reference is made to Specification No. 6035, A.D. 1891. When the piston rises to a certain height, it completes the circuit through an electric bell and so gives notice of an excessive temperature.

18,582. **Richards, E.** Oct. 28.



Footwarmers.—A lamp I is placed in the central passage H, and the heated gases pass down the channels B and ascend, as shown, through perforated sloping plates on which the feet of the passenger rest.

18,656. **Ledward, T.** Oct. 29.

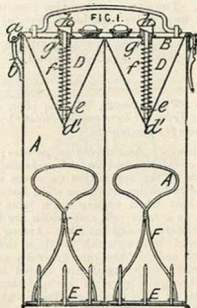


Steam traps.—Steam and water enter the chamber a by the aperture o. The condensed steam rises round the floating chamber b until it flows into the latter by U-shaped tubes l. The float then begins to descend, and leaves the valve seating m at the same time that the discharge valve j is opened by the same means. The water within the trap is then forced up through the central tube e, and discharged through the valve aperture k and outlet p.

18,901. **Torres, J. B., and Benjumea, J. D.** Nov. 2. *Drawings to Specification.*

Heating water, boilers for. To increase the heating effect, a spiral structure is inserted in the flues of furnaces and stoves of all descriptions as used for heating fluid, solid, or liquid substances. The spiral may be made hollow and placed in communication with the water space of the boiler. The core may, however, be solid.

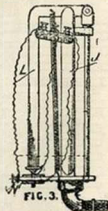
19,310. **Lake, H. H.,** [Viviers, C. L. de]. Nov. 7.



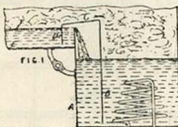
Footwarmers; heating by chemical action or molecular combination.—Relates to footwarmers and the like. The vessel A is divided into two compartments and contains lime. To the cover B are attached funnel-shaped water reservoirs D with orifices d' closed by needle valves e kept on their seats by springs f. The upper ends of the needles pass through a sleeve g bevelled at its upper part. By turning the head h the needle can be raised to permit the fall of water on the lime to slake it and thereby generate heat. A grate E, with jointed handles F, is arranged at the bottom of the footwarmer for use in removing the slaked lime. In a modification, the hot-water reservoir is a perforated cylinder contained in a tube pierced with holes; the holes are brought into coincidence by a partial turn of the cylinder, and the water comes into contact with the lime in the body A of the footwarmer. One or more compartments, as desired, may be used.

19,329. **Lister, J. T.** Nov. 9.

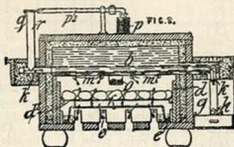
Thermostats.—Relates to apparatus comprising a thermostat, for automatically regulating the supply of feedwater to steam boilers. Fig. 3 shows the thermostat. On the lowering of the water level in the boiler, steam is admitted to the tube J, which, lengthening in consequence, moves the L-shaped lever L and makes contact at N'. This



energizes the corresponding set of magnets, with the resulting opening of the stop valve in the steam pipe of the feed-pump. As soon as the magnets have done their work, they are put out of action by a switch. On a filling up of the boiler and corresponding cooling of the thermostat, the reverse takes place.

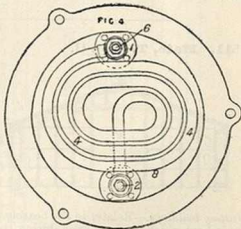
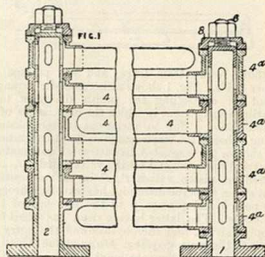
19,364. Chapman, A. Nov. 9.


Boiling-pan.—Relates to the separation from saccharine and other liquids of the scum which rises to the surface during boiling. A heating-vessel A is provided with a skimming-pan or trough E, having a partition D, and strainer F. The partition D is connected by a plate C to a vertical partition B, which is fitted to the vessel A. When the liquid in A boils up, the scum passes over the plate C, and is arrested by the strainer F. Heating-pans having a skimming-gutter around the upper edge are provided with a vertical pipe, which lies within the heating-cylinder, and has its upper edge turned over so as to dip into the gutter, and come into contact with an annular strainer.

19,460. Keys, A. M., and Spagnoletti, J. E. Nov. 10.


Thermostats.—Relates to incubators. The egg-drawer is heated by a hot-water tank *b* heated by a number of parallel flues connected together by removable elbows to facilitate cleaning. The first flue *k* is formed with an elbow which projects over the lamp *h* in the lamp box *g*. At the opposite end of the first flue *k* is inserted a vertical flue *r* closed by a damper *q*, which when opened allows the heated air to pass out of the apparatus without passing through the remaining flues. The last flue terminates in a vertical chimney with a cowl. The temperature is regulated by means of an

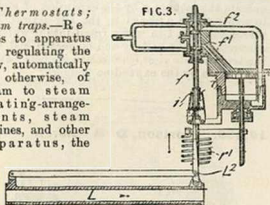
electromagnet *p* which operates the lever *p'* carrying the damper *q*. The electric circuit is closed to operate the magnet *p* by the expansion of mercury in a thermostat *o* placed in the egg-drawer. The thermostat has two wires fused into it which are connected to the battery and magnet *p*, and, when the temperature rises, connection is made between these wires by the expanding mercury.

19,486. Morison, D B Nov. 10


Heating liquids.—Relates to tubular surface apparatus for heating liquids by means of steam. One form is shown in sectional elevation in Fig. 1, and on a smaller scale in plan in Fig. 4. The spiral heating-tubes 4, immersed in the liquid to be evaporated, connect the common inlet and outlet standards 1, 2 through thimbles 4', which are secured in place by the caps 8 and nuts 6. The heaters are particularly suitable for receiving and utilizing the steam and water of condensation from steam-engine cylinder jackets. By this means circulation is kept up in the jackets.

19,509. Schmidt, K. Nov. 11.

Thermostats; steam traps.—Relates to apparatus for regulating the flow, automatically or otherwise, of steam to steam heating-arrangements, steam engines, and other apparatus, the



outflow from steam traps, and the passage of other fluids. Fig. 1 shows a thermostatic arrangement for controlling the supply of steam to a heating-arrangement in which the movements of a metal ribbon *a* due to variations in temperature bring either of the electromagnets *A* into operation. As shown, the magnet *A* has attracted an armature *d* carried upon the end of the valve spindle *f*, and placed the piston valves *f*¹, *f*² in such a position that steam from the main pipe has travelled through the port *h* and passage *k* to the low side of the piston *m*. The latter having risen has raised the supply valve *u*, and thereby allowed the entry of steam to the heating-system. On an undue elevation of temperature in the apartment which contains the

thermostat, the other magnet is energized and the converse of the above gone through. In a modification, a single magnet is employed, return movements being effected by springs. Such an arrangement is somewhat similar to that shown in

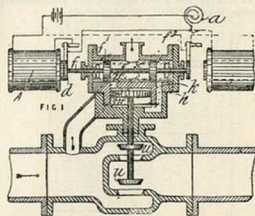
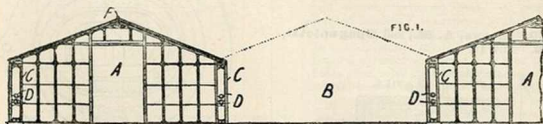


Fig. 3, in which the movement for steam-trap purposes of the pipe *L* due to expansion and contraction supplies the movements previously imparted by the magnets. In this case the triggers *i* by means of the lever *L*² are alternately pushed out of gear with the spindle *f*, the spring *r*¹ supplying the movement of the valves *f*¹, *f*². In cases in which electricity is employed, suitable automatic switching-apparatus is provided for breaking the circuit as soon as the current has done its work.

19,511. Main, T. Nov. 11.

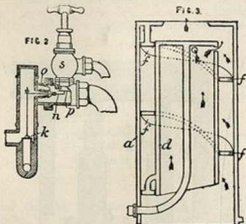


Heating buildings.—Relates to the heating of a series of portable glass houses which may be altered to cover in land which has been open during the summer and to uncover the land that has been covered during the summer to allow it to lie fallow. A series of fixed standards *C* are arranged in equidistant parallel lines, and are fitted with lines of stationary or portable heating-pipes *D* within them. The roof is built up of a number of sashes bolted to the standards *C* and also to a ridge piece *F*. The side sashes may be fixed at either side of the standards *C* so as to enclose the heating-pipes. The end walls are similarly portable. At the end of the summer the glass house *A* is built over the vacant space *B* for the object stated above, or the roof sashes may be simply slid down to form lean-to frames.

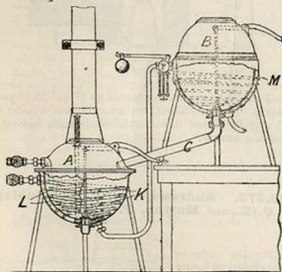
19,725. Righton, W. J. Nov. 14.

Heating water, boilers for. The heating-vessel consists of two annular chambers *a*, *d* connected, as shown, by a flat helical tube *f*, which forms a helical flue between the two chambers. The feed-pipe is connected to the bottom of the outer vessel, and the delivery pipe to the top of the inner one. Oil lamps or gas burners furnish the heat. An arrangement by which the water supply regulates the gas supply is shown in Fig. 2. Below the water stop valve *s* is a valve *p* on a lever *n* which

actuates the gas valve *k*. An india-rubber sleeve *o* makes a tight joint between the gas and water chambers.



19,762. **Morton, R., and Morton, T.**
Nov. 14. [Complete Specification but no Letters
Patent.]



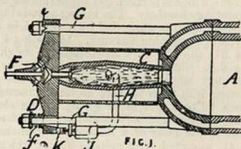
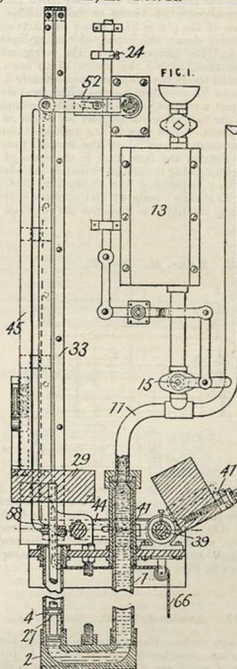
Boiling-pans.—Sugar or other material is treated in a pair of pans. It is first liquefied and gently heated in the jacketed pan B, supplied with exhaust steam from the other pan A by a perforated coil of piping M. From the pan B the sugar &c. is discharged through the pipe C into the other pan A, which is jacketed and heated by an imperforate coil L in its interior and a perforated coil K in the jacket.

19,773. **Johnson, J. Y.,** [Pieper, C.]
Nov. 14.

Thermostats.—Relates to means for regulating the temperature of vaporizers for petroleum engines. The air and petroleum are admitted through a valve F to the vaporizer C, which is supported by a yoke D held to studs at one end by a knife-edge *i* and at the other by a spring *f*. The longitudinal expansion of the vaporizer causes the yoke D to act on a spring lever K which controls the petroleum supply valve J of the heating-burner H.

(For Drawing see next column.)

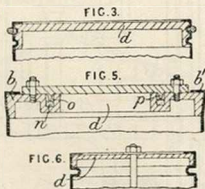
19,773.

20,368. **Shiels, A.** Nov. 24.

Thermostats.—Relates to apparatus of the kind

described in Specifications No. 6035 and No. 18,449, A.D. 1891, which is particularly applicable for use in refrigerating-chambers. The tubing containing the expansible liquid is connected by a pipe 11 to a U-tube 1, 2, 4 containing mercury. In the leg 4 is a piston 27, the rod of which carries a weight 29 arranged to slide between T guides 33, or rod guides may be used. A crosshead 58 has ends projecting into slots in bars 45, and is connected by cords 66 to a weight or spring. The slotted bars are bent at the bottom and are connected by links 44 to the ends of a double counterbalanced lever 41, mounted on a spindle 39, by which the engine valve or the valve controlling the flow of cooling-liquid is actuated. At the top the bars 45 are linked to levers 52, so that they move parallel to themselves when rising or falling under the influence of the piston 27. When the parts are in the position shown the supply of cooling-liquid is small, and the temperature in the refrigerating-chamber rises, lifting the piston 27 to open the valve until the desired temperature is reached. If the piston 27 continues to rise after the valve is fully open, a contact-piece on the weight completes an electric bell circuit and gives an alarm in the engine-room. The pins in the crosshead during this movement travel along the vertical portions of the slots in the bars 45. In the event of the temperature rising to such an extent as to endanger the tubing containing the expanding fluid, the weight 29 strikes a stop 24 and opens a valve 15 and allows the liquid to pass into the reservoir 13.

20,482. **Rose, G.** Nov. 25.

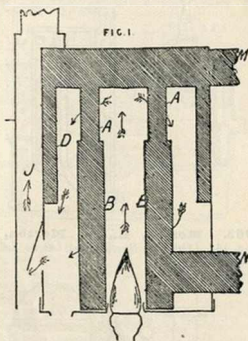


Footwarmers.—The side walls are made from sheet metal, and the ends *d* of malleable cast iron, steel, or stamped sheet metal. The edges *b*, Fig. 5, of the side walls are bulged outwards to receive the ends, which are secured by folding the projecting edges *b'* over them; or the ends may be secured as shown in Figs. 3 and 6.

20,493. **Ashford, F. W.** Nov. 25.

Heating water.—Relates to boilers for heating water for greenhouses, baths, &c. A vertical section of one form is shown. An inner cylinder B is connected, by short tubes A, to an outer

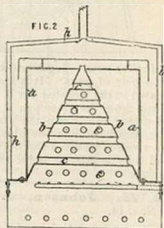
shell D, the two together forming a boiler. The arrows show the path of the combustion products from a gas or oil burner to the exit flue J. Inlet



and outlet pipes are connected at N and M respectively. In a modification, two cylinders similar to B may be placed in one outer shell, each having a heating-burner.

20,670. **Andrews, W. J. F., Copley, C. E., and Horton, F.** Nov. 27.

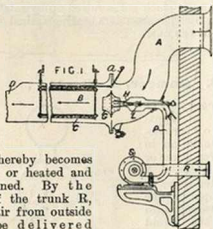
Heating water.—A cylindrical boiler *a* is formed with a conical heating-chamber *b* through which the water-tubes *c* pass, and below which the gas burners are situated. The whole is enclosed by the asbestos-lined casing *h*, upon which the chimney is mounted.



20,822. **Bracewell, W.** Nov. 30.

Heating air.—In the ventilation of ships, schools, &c., a chamber C of circular section is used, enclosing a porous tube R. Water, which may be heated, is sprinkled upon the latter and upon a perforated chamber G from perforated water pipes *a*.

An air jet issues from a nozzle H connected by a pipe P with a blower S, and induces an inflow of air from the outside, through the pipe A. The air is forced through the chamber G and along the chamber C to the tube D,



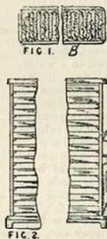
and thereby becomes cooled or heated and moistened. By the use of the trunk R, pure air from outside may be delivered along the tube D.

A steam jet L may be employed for moistening and heating the air, and may induce an inflow from the nozzle H, if used alone. The tube D may have branch tubes leading therefrom at an acute angle, the air escaping from these branches through oblong openings. The tube D may be placed midway between the floor and ceiling, or it may be carried around the latter or the walls, and may have moulded strips for ornamentation. Fans along the ceiling may exhaust foul air. The Provisional Specification states that a coil of steam or water pipes may be employed for heating or cooling the air.

20,936. Dewey, M. W. Dec. 1.

Heating by electricity.—

Relates to apparatus for the production of heat by the passage of electricity through resistance coils, and is similar to that set forth in Specification No. 5247, A.D. 1891. Fig. 1 shows one of the heating-elements with covers removed, Fig. 2 a stack of elements for useful purposes, and Fig. 7 a switch arrangement for putting either or all elements into circuit. The heat-developing coil, Fig. 1, is suitably supported in the frame B, and embedded in some heat-retaining medium such as powdered or granulated fireclay or loose material such as asbestos. At the side of a block of elements the special switch F may be located. Other similar devices may be employed for analogous purposes; for instance, by

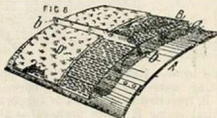


rotating a barrel the coils may be put in parallel or linked up in series.

20,945. Nelson, E., [trading as F. McNeill & Co.]. Dec. 1.

Non-conducting coverings.—A covering for boilers, pipes, &c. consists of a sheet of hair felt having a central layer of woven or other wirework combined with a layer of silicate cotton or asbestos, or a mixture of both, having a backing of wire gauze or wirework to keep it in place.

21,113. Lake, H. H., [Hayes, G.]. Dec. 3.

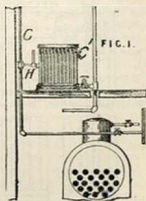


Non-conducting coverings.—A covering for boilers, pipes, furnaces, and other chambers or passages from which radiation is to be prevented consists of metal sheets B, upon which are formed projecting flanges a so as to leave an air space C between it and the heated surface B. Other flanges b permit the sheets to be easily secured to each other. Up-turned ears and ragged apertures on the sheets B afford a secure lodgment for layers D of inferior non-conductors of heat, such as mortar, with or without an admixture of asbestos. The arrangements may be modified; e.g., the flange a may touch the heated plate at only a few points.

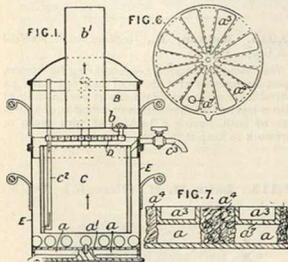
21,423. Jensen, P., [Paul, A. G.]. Dec. 8.

Heating buildings.

—In apparatus for heating buildings by steam or hot water, means are provided for automatically extracting the air which collects in the system. Each heat-radiator C is connected with an air pipe C, from which air is exhausted by some suitable arrangement. A valve H is provided in each connection between the radiator and the air pipe in such a way as to open when cold, as when the system is first started, and to close when the apparatus is hot. By this means air is expelled but the heating-medium retained. The invention is equally applicable to a double-pipe heating-system.

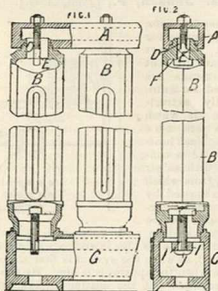


21,621. Aggers, W. Dec. 10.



Heating water.—Relates to portable apparatus for heating water by gas or oil burners. A cylinder B, traversed by a flue b' , is supported on a cylindrical casing E which encloses an annular water chamber C connected, by a pipe c' , with a flat water chamber D which is divided by vertical partitions so that the water takes a zig-zag course from the inlet b to the outlet c' . The boiler is heated by gas or oil jets, the combustion products from which flow away as indicated by the arrows. A plan of an oil lamp is shown in Fig. 6, and a vertical section to a larger scale in Fig. 7. A circular trough has a number of equidistant radial air channels a^2 , between which are asbestos or other wicks a^1 dipping into the oil vessel a , which is filled through an opening a' in one of the air channels. A cover with radial openings corresponding to the wick openings is used to regulate the flame.

21,773. Wilson, W. Dec. 12.

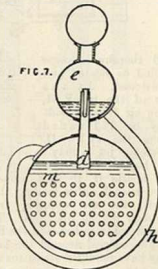


Heating buildings.—Radiators are formed of a

series of iron pipes B, B connected to top and bottom boxes A, G. The top connections are made by T-head bolts E passed through rectangular slots D and turned so that the head bears on the shoulders F. At the bottom T-head bolts are also used bearing on ribs I, and provided with rectangular nuts which are screwed up by rotating the pipe B, which has shoulders bearing against opposite corners of the nut.

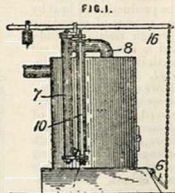
21,838. Gamgee, J. Dec. 14.

Heating liquids.—Relates to apparatus for promoting circulation in boilers for water or other liquids. A perforated dome or open-topped cone is provided, into which the liquid rises as it is heated; tubes lead from the lower part of the dome to other parts of the boiler. Similar supplementary domes or cones may be fitted to these tubes. Or, as shown in Fig. 7, a second water level is provided; the two chambers m and e are connected by a rising pipe d and by other pipes h , which may be either external or within the vessels.

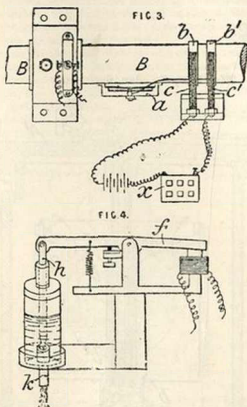


22,176. Watts, J. E. Dec. 18.

Thermostats.—Relates to means for automatically controlling furnace dampers, shown as applied to a water-circulating boiler. The variations in length due to changes in temperature of the tubular extension 7, which opens to the boiler at both ends, is made use of to operate the damper 6. The chamber 7 is rigidly fixed at its lower end, while its upper end, by reason of the elbow piece 8, is free to move. The pivoted lever 16, resting upon the post 10 formed of some material, such as wood, having a low co-efficient of expansion, follows the movement of the expansion chamber, and in consequence varies the position of the furnace damper.



22,190. **Dion, C., and Brebner, A.** Dec. 18.

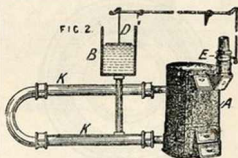


Thermostats.—Relates to means for indicating overheating of shafts, bearings, &c., and for automatically supplying lubricant in case of heating. A number of thermostats are attached to a shaft or to its bearings to complete electric circuits when the shaft &c. becomes overheated. In the thermostat shown, a bent strip of copper &c. is fixed at its ends in a frame *a* attached to the bearing or to the shaft *B*. When the thermostats are fixed to a shaft they are connected to pairs of rings *b, b'* which run against contact-brushes *c, c'*. The brushes or the thermostats are connected up to an indicator *x*, and if the thermostats be graduated or set to different temperatures, the gradual rise of temperature will be indicated. When a shaft or bearing becomes overheated, an electric circuit including an electromagnet is completed, and the armature then operates a lever *f* and withdraws a pointed valve rod *k* from a tube *k'* communicating with the oil reservoir.

22,701. **Murrie, J.** Dec. 29. *Drawings to Specification.*

Heating liquids; boiling-pans.—Relates to the utilization of steam for motive-power and heating purposes, and consists in means for using a range of boilers, of which some work at one pressure and others at another, as a whole and yet supply the respective engines or apparatus with steam at the appropriate pressures. Instead of using the volumes of steam generated in the high-pressure and the low-pressure boilers apart from each other, the high-pressure steam is supplied to a low-pressure engine, but the exhaust therefrom is led direct to the range of low-pressure boilers, whereby a back pressure is set up in the low-pressure engine. By a suitable disposition of valves and cocks, the high-pressure boilers may be entirely shut off when it is desired to work the engine from the low-pressure boilers in the usual way. The arrangements are applicable where the low-pressure steam from the boilers is used for boiling, heating, or distilling purposes. In these cases furnaces are still retained under some of the low-pressure boilers to raise steam in them sufficiently for their requirements. Reducing valves may also connect the high-pressure boilers with those working at low pressures.

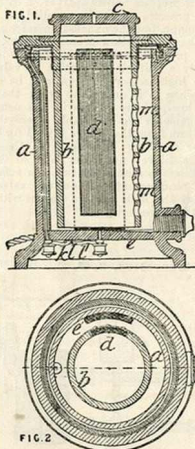
22,795. **Lascalles, C. T. E.** Dec. 30.



Thermostats.—Relates to apparatus for automatically controlling the heat of a greenhouse or other building. The damper *E* of the stove or furnace *A*, or a valve for regulating the air supply, is placed under the control of a float *D*. This float is placed in a vessel *B* containing water communicating with the heated water in the pipes *K*, so that as the temperature of the water increases the float rises, and *vice versa*.

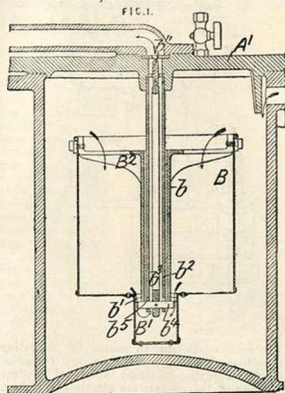
A.D. 1892.

259. Woakes, A. B. Jan. 6.



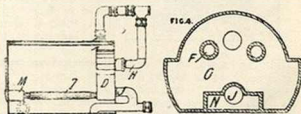
Heating liquids by electricity. The carbon electrodes *d* and *e* are attached to the cylinders *b* and *a* are connected to the terminals *k* by wires *l*, *p*. The current in passing through the intervening space between the electrodes *d* and *e* heats the contained water or other liquid. By turning round the jar *b*, the distance between *d* and *e*, and consequently the heating effect, can be varied. The holes *m* in the cylinder *b* serve to promote the circulation of the water &c. A portable form of electric water-heater is also described, in which a pair of electrodes are fitted in a vessel provided with water inlets, and with a handle by which it can be carried. Another modification has the electrodes arranged in series with a wire placed below and conveying the current, so that when water covers the electrodes a current passes, but when below the level of the electrodes, the circuit not being complete the current is stopped. The vessel may be used for sterilizing water, the organic compounds being destroyed by the process.

265. Mackie, J. Jan. 6



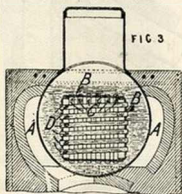
Steam traps.—The discharge valve *b¹¹* is opened and shut by an open float vessel *B* having a small well *B¹* in the bottom. From a bridge-piece *B²*, across the top of the float, depends a tube *b* with a slotted flange *b¹* inside the well, and from the cover *A¹* of the trap depends an inner tube *b²* slotted at *b²*. Through two opposite slots passes a cottar *b⁴* secured to the valve spindle *b³* by a pin. When water has accumulated sufficiently in the casing it flows into the float, which sinks and opens the discharge valve *b¹¹*. The water in the float is then blown out, and the float again rises and closes the valve.

396. Weston, W. H. Jan. 8.



Heating water.—Relates to hot-water circulating boilers, applicable also as steam generators. An

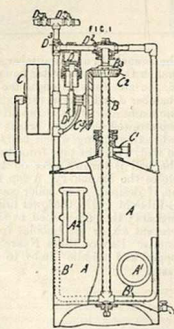
annular water chamber encloses a furnace which is provided with a series of water-circulating firebars 7. The bars connect the water-firebridge D, shown to a larger scale in Fig. 4, with the hollow dead-plate M. The firebridge is formed into two compartments O, N, the circulating water entering by the passage J, flowing to the dead-plate by the central firebars, and returning to the bridge by the outer bars. It then rises to the water casing by the pipe H. In addition, the inlet pipe J communicates with the lower part of the casing. The firebridge is pierced with short tubes F to allow of an additional escape for the furnace gases.

436. Boulton, A. J., [Mignot, A.]. Jan. 8.


Heating liquids.—A horizontal boiler for heating liquids or generating steam is provided with an internal rectangular flue B which is traversed by water-tubes C, D, in sets approximately at right-angles to each other. A similar arrangement may be applied to boilers with internal fireboxes, and to boilers of other descriptions.

546. Thomson, J. S. Jan. 11.

Heating liquids.—Relates to a churn or apparatus which may be employed for churning milk or for heating milk or other liquids. The apparatus comprises a cylindrical vessel A with a central rotary tubular spindle B having a pair of bent stirrers or agitators B', perforated on their underside. The vessel A is fitted with a cleaning door A', a window A', and a door in the top through which the churn is filled. The

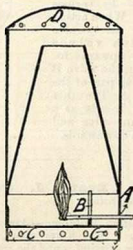


spindle B works in a stuffing-box B³ at its upper end, and is in connection with pipes and cocks D⁴, D⁵, for supplying water and air respectively. The pump D with ball valves D⁴, D⁵ is provided to force the air or water through the spindle B. The spindle B is driven by the bevel gearing C¹, C², and the pump D by the eccentric D¹ from the shaft C, which is actuated either by hand or by other power. A crown C¹ having a branch is fitted to the top of the vessel A for the escape of the air, or the branch may be connected by an exhaustor for producing the current of air through the apparatus.

566. Griffiths, J. Jan. 12.

Hand-warmers.

—A match is introduced through a hole A, and ignited by striking on a plate B. Air enters through openings C and passes round, or through, the perforated bottom plate. The products of combustion escape at D, D. The bottom plate is hinged, and, if desired, the shell may be double to contain water or other liquids.


587. Thwaites, R. G. Jan. 12.

Heating water.—Relates to a method of prevent the freezing of water pipes by keeping up a constant circulation by means of the heating effect of a gas or oil stove. A boiler D, consisting of a copper shell D¹, with an internal chamber D² filled with asbestos balls, is enclosed in a cast-iron shell D³

