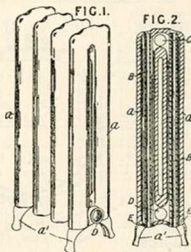


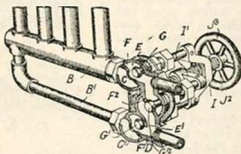
other by lower and upper passages D and C when hot water is used, and by the lower passage only when steam is used.



**5108. Haacke, A.** March 17.

*Non-conducting coverings and compositions.*—Pasty clay is added to a mixture of cork cuttings or granulated cork with pulverized pitch. The composition is then moulded into slabs &c., or a sectional non-conducting covering. The moulded material is kept for some time in a drying-room at a moderate heat, and is finally dried at a heat sufficient to liquefy the pitch dust. The clay paste is preferably used hot.

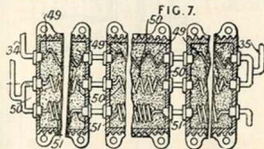
**5186. Martin, T. S.** March 19.



*Heating buildings &c.* Relates to valve-controlling mechanism for regulating the flow of fluids, and especially for use with steam radiators. The invention is shown applied to a radiator in the Figure. The valve casing D has chambers C, C', which communicate with the inlet and outlet pipes B, B' respectively. Chambers E, E' are separated from the chambers C, C' by partitions F, F', with openings controlled by valves G, G', and from each other by the partition F<sup>2</sup> with its valve G<sup>2</sup>. The spindles of the valves G, G' are fixed to the head I, and the spindle of the valve G<sup>2</sup> is fixed to the head I'. These heads are mounted on oppositely-threaded portions of the rod J', so that, when the

hand-wheel J<sup>3</sup> is turned, the valves G, G<sup>2</sup> move oppositely to the valve G<sup>1</sup>.

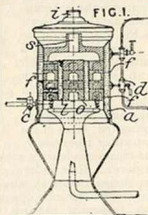
**5191. Westinghouse Brake Co., [Newell, F. C.]** March 19.



*Heating by electricity.*—In electric cars, the current generated by the motors in the local braking-circuit can be employed for heating purposes. Fig. 7 shows three boxes or casings, in each of which are arranged three coils of different diameters connected in series. The controller handle regulates the supply of current to the heater. In some cases, the current entering by the wire 34 passes successively through the groups of coils 49, 50, 51, or part of the current may be shunted by the lead 35 to the coils 50, 51, or the current may be shunted round the coils 49 and 50, or both these coils may be entirely cut out.

**5499. Vanderborcht, G.** March 23.

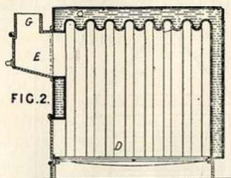
*Heating water.*—A bath heater, consisting of two concentric water chambers heated by contact with refractory bodies which are heated by suitable means, such as a gas burner, is shown in Fig. 1. The superposed slabs *f* of porous refractory material are furnished with openings and conduits arranged one above the other in zig-zag form, and are fitted within the spaces in and between the chambers or boilers *a, l*. The heater is supplied with a ring burner, an inlet cock *c*, an outlet and regulating cock *d*, and tubes *s* and *i* for the escape of the combustion products. The water chambers may be in the form of coils.



**5517. Newsum, G., and Newsum, F.** March 26.

*Heating water.*—A boiler for hot-water apparatus for heating buildings and the like is shown in Fig. 2. The firebox D is corrugated and wagon-shaped,

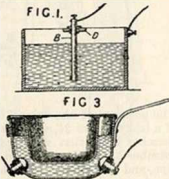
having an arched crown. Fuel is fed through the hopper E, the products of combustion escaping



through the opening G or through an opening provided at the other end of the boiler.

**5727. Trudeau, J. A. G.** March 27.

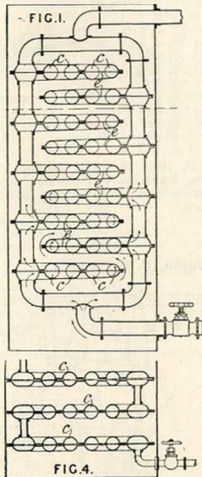
*Heating by electricity; heating liquids; foot-warmers; hot-water bottles.*—Relates to electric heating, applicable to the heating of liquids or vessels containing food or other articles, to water and steam radiators, water and steam boilers, urns, tea kettles, coffee pots, stew-pans, egg boilers, chafing-dishes, farina boilers, plate-warmers, steam cookers, foot-warmers, glue pots, bath-heaters, and hot-water bottles, in which a liquid or chemical solution of naturally low resistance is employed as the resistance or heating-medium. In the apparatus shown in Fig. 1, the vessel forms one electrode, while the electrode B is supported by the insulating-piece D and is adjustable. Two free electrodes like the electrode B may be employed, the vessel being open, or the liquid used as the heating-medium may be enclosed between an inner and an outer vessel, as shown in Fig. 3, in which the application to a saucepan is shown.



**5835. Becker, B.** March 28.

*Heating liquids.*—A number of sections, constructed of embossed plates secured together so as to form tortuous or spiral channels, are arranged one above another in a casing and connected together so that water flows through them in succession from the bottom to the top. In the construction shown in Fig. 1 in sectional elevation, there are two series of sections arranged alternately. Each section is divided by a central plate c, with an opening at the extreme end of the tortuous

passage formed by the hollow projections or "ribs" c, so that water entering a section below the plate flows beneath it to the end of the passage, and returns above it to an exit opening above the point

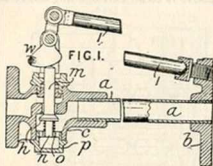


of entry, whence it passes to the next section. In the arrangement shown in Fig. 4, the sections are not divided, but have at the end of the tortuous passage discharge openings, through which the water passes to the next section. The heating-gases from a furnace or other heating-agent, pass to and fro between the sections as indicated by arrows.

**6148. Brooke, R. G.** April 2.

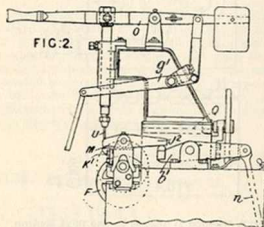
*Steam traps.*—Relates to traps of the kind in which the movements of the water discharge valve are brought about by the contraction and expansion of one or more metal tubes, to which the water of condensation is admitted, and from which it is intermittently discharged and replaced by steam. In the trap shown in Fig. 1, the actuating-tube a is fixed to the flange b and to the valve casing c. The conical valve h is carried by the stem m, and is guided by the lower stem n, which works in the guide o carried by the screw plug p. The cam surface w is operated through the medium of the rod l, which is adjustable as regards its operative length, and when the tube a

contracts the cam *w* depresses the valve *h* and the water discharges. In a form of trap described in this Specification and in Specification No.



14,950, A. D. 1900, the rod 1 actuates a spring-pressed arm, which bears at one end on a hand-adjusted screw-head, which in turn bears on the valve stem *m*.

6218. Coffin, C. L. April 3.

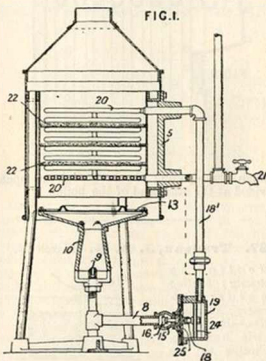


*Heating by electricity.*—Metal is welded, or heated for upsetting or otherwise working by electricity, by fixing the metal *M* in two clamps *K*, the upper jaws of which are operated by a treadle through levers *B*, *J*. The clamps can be moved towards or away from each other, and are both carried on a slide which can move in a direction at right-angles to the plane of the paper. A carbon electrode *U*, carried on a lever *O*, is brought near the metal to be heated in order to form an arc therewith, and it can be adjusted to the right or left by a screw *Q*. A coloured glass screen on the lever *g* is moved with the electrode, but through a greater space.

6234. Thompson, W. P., [McCallum, W. W., Blakney, J. S., and Bartlett, C. R.]. April 3.

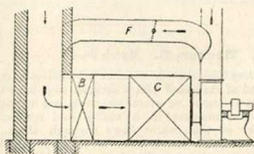
*Heating water.*—Relates to a house water-service system in which the turning on of any hot-water tap lights the heater, and so gives a supply of hot

water. The gas-supply pipe 8 has a chamber 15, in which a valve 16 normally stops the gas from passing to the discharge nozzle 9, mixer 10, and perforated burner 13 of the jacketed heater 5.



The position of the valve 16 is regulated by that of a leaky piston 24, which is arranged in the water chamber 19 so that water can leak past it. This chamber has a connection 18 with the water-supply pipe, and a tube 18<sup>1</sup> allows the water to pass from the chamber round the coils 20 of the heater to the hot-water tap 21. The valve 16 and piston 24 are rigidly connected by a rod which passes through a flexible diaphragm 25. Opening a hot-water tap 21 relieves the pressure on one side of the piston 24, and the pressure of the water on the other side forces back the piston and the valve 16, and so opens the gas supply. The gas is lighted by means of a bye-pass from the chamber 15. An asbestos layer 22 supported on wire is placed above the coils 20.

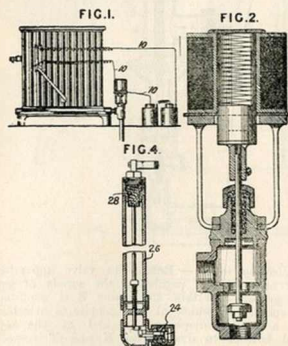
6598. Haylock, R. H. April 10.



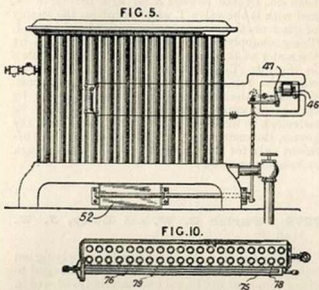
*Heating buildings &c.; heating air.*—In apparatus for heating and ventilating rooms and buildings for

air which is passed through a wet air screen B or filter, a bye-pass F is provided, by which a portion of the heated air is taken from the heater C to warm the incoming air and prevent the screen from freezing.

6706. Paul, A. G. April 10.



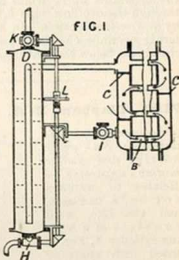
out when desired, and the radiators may be on the single or double pipe systems. In the arrangement shown in Fig. 1, the thermometer, which is clipped to one of the radiator pipes, ensures that the supply valve, Fig. 2, is closed when the electric circuit 10 is made, and an armature attracted by a coil against the action of a spring. In another arrangement, in which there is an air-escape pipe, a valve 24, Fig. 4, in that pipe is closed by the expansion of an expansible substance 28, contained in a tube 26 which can be clipped on to the radiator, when a determined temperature is reached. In the arrangement shown in Fig. 5, the damper 52, which admits cold air to cool the radiator when a certain temperature is reached and the electric circuit made, is worked by the electromagnet 46, which attracts the armature 47. In a modified apparatus, the thermometer controls, by means of an electromagnet, a valve in the air pipe, to the end of which an exhauster in the form of a jet of steam or water is attached. The connections between the electromagnet and the thermometer being flexible, the thermometer may be moved about or taken from the radiator. Another means of regulating the heating is shown in Fig. 10. Inside the tube 75, which is placed in front of the radiator pipes and has apertures 78 with covers 79, is an expanding member 76 used to close the valve in the air pipe. By removing a cap or cover, any aperture may be used for heating the air in the tube 75. The tube 75 may be flexible, with only one aperture at the end, and may be bent into the desired position.



6800. Peck, S., [Carroll, J. E.]. April 11.

*Heating water.*—

Relates to apparatus for purifying water for steam generators and other purposes, in which the water is heated by passing through tubes B surrounded by steam, and is then passed through a settling-chamber D. Multiple-way valves at I, H and K are connected by gearing so that all are moved simultaneously to their appropriate positions, and the connection between



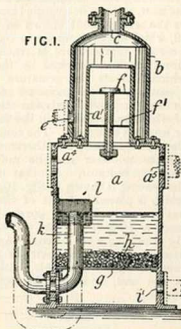
*Heating buildings; thermostats.*—Relates to steam and like radiators for heating buildings and the like, and to thermostatic means for automatically controlling the heating, by regulating the supply of heating-fluid, or by operating a valve in the air exhaust pipe or in an air flue, especially applicable to the system described in Specification No. 21,423, A.D. 1891. The thermostat is adapted to be adjusted to any part of the radiator, and to be cut

the hand-wheel L and the gearing is of a ratchet nature, so that the different operations must always occur in proper order. The gearing is connected to a recording-apparatus to record the number and time of the different operations. These operations comprise entrance of cold water at I and discharge at K, entrance of steam for blowing out at I and discharge at H, entrance of hot boiler water at I, and discharge of displaced steam at H.

Suitable valves are shown. Baffle-plates *c* are provided, or the tubes are connected by bends. The heater may be connected to a boiler, or may be placed in it. Where condensed exhaust steam is utilized, it is first run through a settling-tank to allow the deposition of most of the oil.

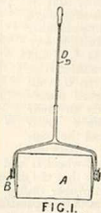
**6884. Davis I.** April 12.

*Heating water.*—Water for boiler feed and other purposes is heated by direct contact with steam, and filtered in the same apparatus to remove precipitated impurities. Steam is admitted at *a'* or *a<sup>s</sup>* to the chamber *a*, and water at *e* to the dome *b*. Rising in the dome, the water overflows into the chamber *a* over the edge of the extension *a<sup>1</sup>*, which is preferably fitted with baffle-plates *f*, *f<sup>1</sup>*. Surplus steam escapes at *c*. Filtering-material *h* is supported on a grating *g*. The purified and heated water leaves the apparatus at *i*, while any excess overflows through the overflow pipe *k*, which is surmounted by a wire-faced cap *l*. In a modification, an external overflow chamber communicates with the chamber *a* below the grating *g*.

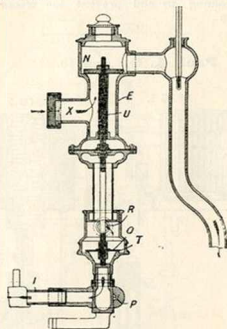


**7159. Clapham, E. A.** April 18.

*Footwarmers; bed-warmers; hot water bottles and similar heating apparatus.*—Relates to warmers for beds, carriages, and the like, and consists of a heating-cylinder *A*, Fig. 1, fitted with studs or knobs *B*, to which the handle *D* is clipped or hooked. The hollow cylinder can rotate, and contains hot water. If solid, the cylinder may be heated in an oven. The handle *D* may be in parts screwed together.



**7213. Le Heron, A. J.** Jan. 17, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1883].

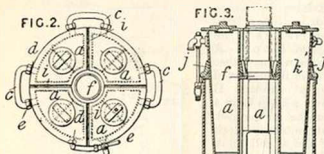


*Heating water.*—Relates to valve apparatus for automatically regulating the supply of gas to geysers. Within the casing *E* is mounted a spindle *U*, which at the middle is attached to a flexible diaphragm *o*, and at the top and bottom to disc valves *N* and *T* respectively. As water passes from the geyser to the bath &c., by the passage *X*, it lifts the valve *N*, and with it the valve *T* which regulates the supply of gas from the pipe *R* to the burner by the pipe *I*. The gas supply is thus automatically regulated by the water as it leaves the geyser. A small hole *o* in the disc *T* allows a supply for the pilot jet when the valve is closed. To increase the sensitiveness of the valve, it may be balanced either by springs or water pressure. The arm *I* may be swivelled, so that, as it is turned outwards from the geyser, the main supply of gas is cut off, and sufficient only for the pilot jet allowed to pass through an annular groove *P*.

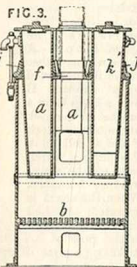
**7279. Parish E. W. and Eady, J. W.** April 19.

*Heating liquids.*—An apparatus for supplying hot liquids is shown in Figs. 2 and 3. It is arranged to give a supply of hot liquid not materially reduced in temperature by the admission of cold liquid, and consists of a series of detachable sections *a* arranged side by side and divided by partitions *k* into compartments, which communicate alternately at the top and bottom. The cold liquid, entering by the inlet *d*, passes from section to section by the pipes *c*, and finally leaves as hot liquid by the outlet *e*. The inlet and outlet may be simultaneously regulated by cocks connected together. The tapered sections *a* are situated in

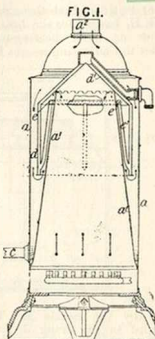
the cylindrical casing provided with a perforated plate *i* for supporting the collars or flanges *j* of the



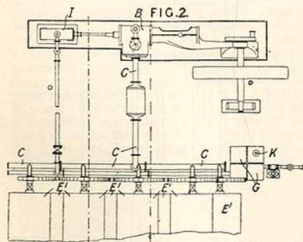
sections. The products of combustion from the furnace *b* ascend by the central flue *f*, one section being shorter than the others to admit fuel. The apparatus may be heated by gas.



The outer cylindrical wall *a* and the inner conical wall *a'* form an annular water-receiving chamber with outlet *c*. The heater *d*, *d'* is connected with the inlet, and with the perforated discharging-ring *e* by tubes *e'*, so that the water is discharged on to the inner casing *a'*, which may be corrugated or roughened. The combustion products pass round the internal heater in the direction of the arrows, and leave by the flue *a''*.



**7311. Dixon, J., and Lumsden, T. T. M.**  
April 20.

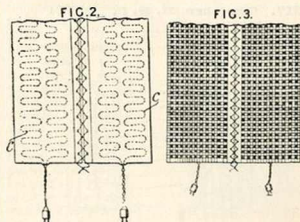


*Heating buildings &c.*—In a paper mill, exhaust steam from the driving-engine *B* is supplied by pipes *C* to the drying-cylinders *E'*, while the pressure in the cylinders is reduced by means of an air pump *I* actuated by the engine. The condensed water passes to the closed well or tank *G*, from which the boiler is supplied; *K* is a pipe, which may be passed from the tank *G* or other part of the system to the roof or over the paper machine, for the purpose of heating the machine room and preventing the condensation of moisture.

**7337. Hatcher, F.** April 20.

*Heating water.*—A gas geyser for heating water for baths and the like is shown in Fig. 1.

**7482. Timar, I.** April 23.

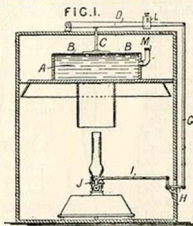


*Heating by electricity.*—Relates to an electric sweating-mattress. The mattress is composed of asbestos in which are embedded one or more electric circuits *c*, and is in two or more parts, which may be laced together and removed without much disturbance of the patient. The circuits are arranged with a space corresponding to the spine and adjacent organs of the body, but approach nearer together under the legs. An openwork badly-conducting fabric is placed over the asbestos, to prevent contact of the body with it.

**7498. Rathbone, J. J.** April 23.

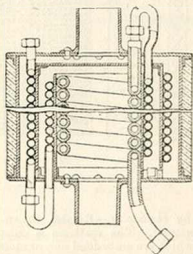
*Heating-apparatus; thermostats.*—Fig. 1 shows heating-apparatus with means for controlling the supply of heat. The tank *A*, containing water and air, or air alone, has a flexible top *B*, or

it may be side, which through the rod C and levers D, G, H, I regulates the heat from the oil or gas burner or other heating-means. The lever D carries the adjusting-weight L, and the tank A is



filled by the nozzle M. The wick winder is clamped to the crank J by a screw clip. The invention is applicable to incubators and small rooms or places, the tank A serving the double purpose of regulating and radiating.

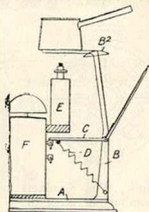
7617. Thofehn, H. G. C. April 24.



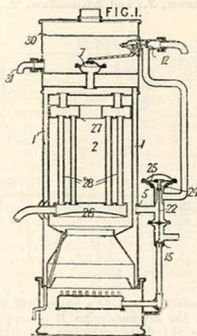
*Heating gases*—Helical coils of tubing, connected in series, are arranged, as shown, in concentric casings through which the hot gases proceeding from a gas or oil burner are passed in succession. Water to be evaporated, steam to be superheated, or gas to be heated is passed through the coils in a direction opposite to that of the heating-gases. The coils are in contact with the casings on one side to keep the latter from burning. The inner coil is of thicker metal, (preferably steel), than the others, which may be of steel or copper. A fourth coil may be placed in contact with the inner wall of the intermediate casing. The apparatus may be employed to heat gases used as motive fluids, which are stored in a compressed or liquid state.

8059. Bowness, F. May 1.

*Heating water.*—Relates to means for igniting a lamp by means of an alarm clock. A saucepan or other vessel is supported by a standard B over a lamp E on a bracket at the back of an alarm clock F and a bell crank C holding a match rests on the alarm winding-handle. When the alarm is operated, the bell crank is left free to the pull of a spring D, so that the match strikes on a plate B<sup>2</sup> and lights the lamp.



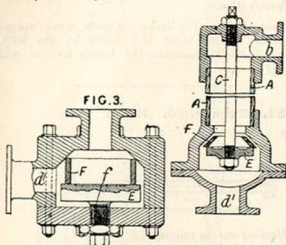
8139. Winterflood, J. May 2.



*Heating water.*—Fig. 1 shows a water-heater or gas geyser with automatic valve attachments for controlling and regulating the supplies of water and gas. Within the double cylindrical casing 1 is arranged the tubular boiler 2, which is made up of the two disc-shaped vessels 26, 27, and the vertical tubes 28. The water supply to the inlet is controlled by the contained air pressure on the rubber disc 7 through the medium of levers and the valve 12. The box 30 with the outlet 31 is provided to carry off leakage water. The gas supply is controlled through the disc gas valve 15, which is worked by the spindle 22, through the action of the water flowing to the heater on the diaphragm 25 and perforated tube or valve 24.

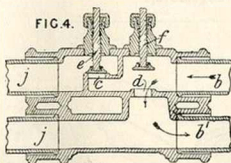
The gas and water valve attachment may be arranged in the outlet of the apparatus instead of in the inlet.

**8252. Thompson, W. H., and Thompson, R.** May 4.



*Steam traps.*—Relates to steam traps in which circumferential expansion of a ring with or without longitudinal expansion of a tube is employed. The expansion tube A, Fig. 1, and the expansion ring F are of expansible metals, while the casing, spindle C, and disc E are not. The ring F is adjusted in position by screwing the spindle C. Steam enters by the inlet *b*, and the condensed water is drained off from the outlet *d'*. The ring F is conical, but may be annular, and may have a supporting corrugated web. It may be used alone, as in the modified form of trap shown in Fig. 3, the adjustment being provided for by supporting the ring F on the disc E, which has the shank *f* screwed.

**8263. Dilworth, W., and Carr, E.** May 4.

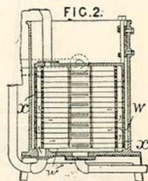
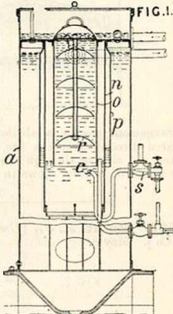


*Heating buildings &c.*—A valve suitable for heating apparatus and other purposes is shown in Fig. 4. As applied to a hot-water heating apparatus, the supply pipe *b* opens into a chamber containing ports *c*, *d*, which are controlled by lift valves *e*, *f*. By opening one port and closing the

other, the water can be turned directly into the return pipe *b'*, as shown, or can be made to circulate through the pipes *j*.

**8354. Harris, A.** May 5.

*Heating water.*—Relates to improvements in apparatus of the kind described in Specification No. 19,621, A.D. 1899, for purifying water for boiler feed and other purposes. The water to be purified is heated in the vessel *a*, Fig. 1, in which it is treated, by means of steam in a jacket *n*, closed at the top and surrounding the internal cylinder *o*, through which the water passes. Surrounding the steam jacket is an air jacket *p*. Baffles *r* bring the water into intimate contact with the wall of the cylinder *o*. The reagent is admitted at *c*, being forced by a steam jet at *s*, and delivered in a tangential direction to impart rotary motion to the water. The heated and purified water is preferably caused



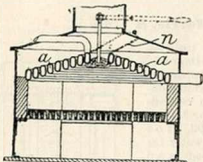
to impart its heat to the incoming impure water in a heat-interchanger of the form shown in Fig. 2, consisting of a series of thin discs *w*, separated by rings *x*, which divide the apparatus into a number of shallow compartments. Alternate compartments are put into communication in series by ports and passages in the rings, and the intermediate compartments are similarly placed in communication to form a second series by a second set of ports and passages at right-angles to the first set. The hot and cold water respectively are passed in opposite directions through these two series of compartment.

**8507. Dawson, C. E.** May 8.

*Heating water.*—The tubes or coils of water-tube boilers for generating steam or heating water are

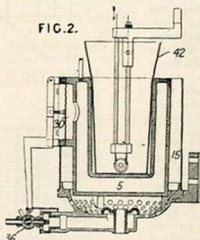


placed close together over the furnace, in such a way that the furnace gases are compelled to pass through the spaces by forced or exhaust draught, and so that no flame can pass through. In the



arrangement shown, a shallow conical coil *a* is placed directly over the fire, which may be fed from the side or through the centre of the cone by means of a shoot shown in dotted lines at *n*.

**8521. Boulton, A. J.**, [United Shoe Machinery Co.]. May 8.



*Thermostats.*—The supply of gas to the burner of a wax-pot in a sewing-machine is controlled by

**8953. McConnell, J. A.** May 15.

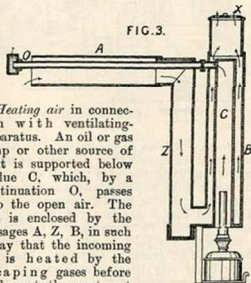
*Non-conducting coverings and compositions.*—Relates to coverings for pipes and like tubular bodies composed of layers of wool paper, of asbestos fibre and paper, of plastic magnesia with asbestos fibre, or of other fibrous, granular, or plastic materials set in coiled or convoluted form, and having a circuitous passage within the coils through which the pipe passes in applying the covering. The covering shown in Fig. 3 is secured together by staples, but the sheets may be pasted or sewn together. Two or more concentric layers with joints formed out of line, as shown in Fig. 4, may be applied to the pipe to be covered.

the steam pressure in the hot-water jacket 5 acting through a diaphragm 30 on a lever connected to the gas valve 36.

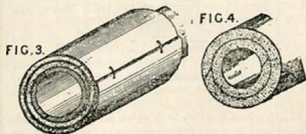
**8638. Löblich, F.** May 10. *Drawings to Specification.*

*Heating water for baths.* A cock, when opened to admit water from the boiler to the bath, simultaneously connects the boiler to the cold supply.

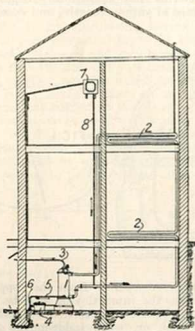
**8832. Ternor, M.** May 12.



*Heating air in connection with ventilating-apparatus.* An oil or gas lamp or other source of heat is supported below a flue *C*, which, by a continuation *O*, passes into the open air. The flue is enclosed by the passages *A*, *Z*, *B*, in such a way that the incoming air is heated by the escaping gases before discharge to the apartment by the register *X*. The outer walls of the tubes *A*, *Z*, *B* are preferably covered with non-conducting material, to avoid the deposition of moisture upon them. The lamp may be supported in any convenient manner below the flue. When the tube *A* passes through a window, the glass may be cut away at its corner, and a perforated metal plate substituted for the portion excised. The outlet of the tube may be provided with a wire-gauze cap.

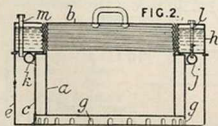


## 8994. Whitwell, T. May 15.



*Heating buildings &c.; heating water.*—Relates to steam-heated hot-water circulating apparatus for heating buildings, in which the water of condensation is retained and utilized. Steam is admitted by the pipe 3 to the coil within the heater 1, which is of usual construction, and the steam trap 4 is connected to the pipe or coil outlet. The trap 4 is connected with the water space of the heater by the pipe 5 through the non-return valve 6. The cistern 7 is connected with the cold end of the circulating pipes 2 by the pipe 8, which may have a U-shaped portion at the end, and may be furnished with a regulating-valve. The cistern is provided with a pipe for the overflow, which may be returned to the steam boiler.

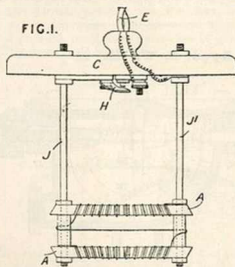
## 9121. Pills, F. von. May 17.



*Heating by chemical action or molecular combination.*—The receptacle *a*, such as a can or canister for containing preserved food &c., is provided with a screw lid *b*, and is fitted with receptacles for containing chemical substances by which the food &c. may be warmed. Surrounding the receptacle *a* is a hermetically-sealed receptacle *c* containing crystallized sodium carbonate, and surrounding the receptacle *c* is a receptacle *e* containing

calcium oxide, crystallized sodium carbonate, and charcoal. Above the receptacles *c* and *e*, and surrounding and threaded to the receptacle *a*, is a receptacle *h* for containing sulphuric acid. Below this is a ring tube *j* having perforations *k* on its underside. A screw *l* passes through the receptacle *h* and ring *j*, which, on being unscrewed, permits the sulphuric acid to fall into the receptacle *c*; the acid decomposes the contents of the latter and produces heat by which the contents of the receptacle *c* are melted, thus heating the food &c. The gases &c. circulate through the perforations *g* in the flange of the receptacle *c*, and escape through a tube *m* at the top. The receptacle *h* has a filling-aperture, (not shown).

## 9263. Leask, A. R., and Bellis, P. M. May 19.

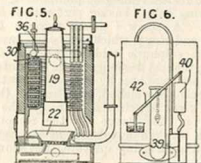


*Heating liquids.*—An electric heater, which may be placed in any ordinary vessel, such as a tea-pot, coffee-pot, kettle, cup, tumbler, shaving-mug, or food-warmer, consists of resistant wire wound across one or more rings or frames *A* of insulating-material, these being supported by nuts and distance-pieces on two rods *J, J'* attached to a larger insulating-piece *C*, which is intended to rest on the top of the vessel, and is provided with a knob. Electric connection between supply conductors *E* and the heating-wire is made by the rods *J, J'*, and a spring switch *H*, which is closed by the weight of the heater when placed on the top of the vessel; the underside of the spring is coated with insulating-material.

## 9378. Tellier, C. May 21.

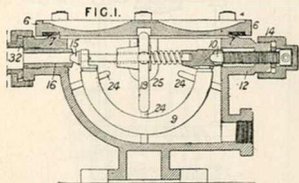
*Thermostats.*—Relates to cold-air machines for ice-making and refrigerating, and to appliances used therewith, including a furnace for heating the air used in driving the compressor, and an air-pressure apparatus for raising water. The furnace for

heating compressed air is shown in Figs. 5 and 6. Air supply for combustion is controlled by a valve worked by a thermostat, consisting of an air pipe or



chamber 36 in the furnace connected to a vessel 39, from which undue expansion of the air drives liquid into a vessel 40 hung on a counterweighted lever 40 attached to the valve.

9402. Lyon, C. W. May 22.

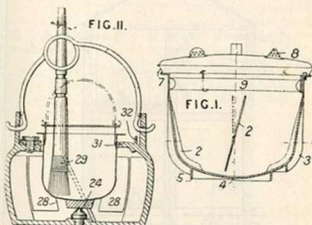


*Steam traps.*—The steam trap shown in Fig. 1 is of the kind in which an expansion vessel 9, filled with fluid readily susceptible to changes in temperature, actuates the valve 15 governing the pipe 32 to be trapped. The bearing-plate 19, carrying the expansion vessel and the valve stem, can be readily inserted or withdrawn, since internal ribs 24 and 25 are provided to fix the parts in position. The cap or cover 6 has a flat-faced packing-strip for bearing upon the convex face of the rib 7, and is bolted to the casing. The valve seat 16 consists of a tube which is inserted from the outer end into a boss in the casing, and the adjustable set-screw 10 is protected by the covering-cap 14 screwed on to the boss 12.

9558. Gardner, S. May 24.

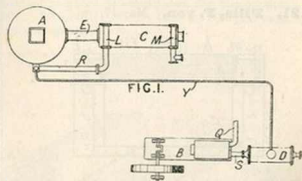
*Boiling-pans.*—To promote a rotary circulation of the currents produced in the contents of coppers, boiling-pots, pans, &c., ribs, beads, vanes, or flanges of various shapes and sizes are formed or placed on the inside or outside, or on both sides, of the vessels. Improvements are also effected in the

lids. Fig. 1 shows, by way of example, ribs 2, 3, 5 applied to the outside and inside of a cast-iron copper. The ribs may be variously disposed, and may be formed of various lengths, and constructed



integrally with or separate from the copper. In the latter case, the internal ribs may be carried upon a frame capable of insertion or withdrawal from the vessel, or, when independent of each other, they may be fitted in grooves or notches or formed with tangs passed through holes in the body of the vessel. Fig. 1 shows a deflecting-head 9 suspended round the mouth of the copper. The lid is dome-shaped, without the usual rim, and is retained in position merely by its weight. The inclined rim 7 returns the water to the copper. Steam outlets are provided, with perforated covers 8. For insertion in a saucepan or similar culinary vessel, the bottom of the frame which carries the ribs may be formed with an upwardly projecting perforated cone. Fig. 11 shows the application to a boiling-pot for glue.

9585. Wilson, A. May 24.

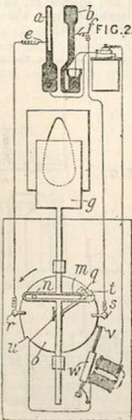


*Heating gases; heating liquids.*—The hot gas from a gas-producer A is led, through as short a tube E as possible, to a vessel C, in which it gives up heat to air, water, or steam, which is introduced through a tube M, and passes out through tubes L, R to the producer. The cooled gas, after passing, if desired, through purifying and storing

apparatus, is led to a gas engine B by a tube Q. The exhaust from the engine passes by a tube S to a steam generator D, and the steam obtained passes by a tube Y to the producer A. The vessel C consists of a rectangular casing having two sets of vertical tubes, connected above to two boxes, an inlet and outlet one, and connected below to one box, so that the fluid can pass from its inlet down one set of tubes, near the outlet for the hot gases, to the lower box, and then up the second set of tubes, near the inlet of the gases, to its outlet. The arrangement is fitted with mechanical scrapers similar to those used in Green's economizers. The steam from the steam generator D may be superheated by passing through the vessel C before passing to the producer.

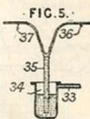
#### 9884. Dugenaît, H. May 29.

*Thermostats and other apparatus for automatically regulating temperature.*—Relates to apparatus for maintaining approximately constant temperature in a compartment, or approximately constant pressure in a boiler. For regulating temperatures between prescribed limits, the mercury thermometer *a*, Fig. 2, has the electric contact *e*, and the spirit thermometer *b* has the contact *f*; these contacts are connected with the pieces *r*, *s*, and fix the temperature limits. The air valve or damper *g* is worked by the pin *n* and slot *m* when the disc *o* turns through half a revolution. The spring-pressed armature *w* carries the hook *v*, which engages with the teeth *t*, *u* alternately, as the temperature falls and rises. At each half revolution the contact-piece *q* on the disc *o* passes from the contacts *s* and *r*, breaking the circuit in positions between these contacts. The disc *o* is intermittently driven by clockwork in the direction of the arrow. For regulating pressures, the thermometers are replaced by a pressure gauge with electric contacts at the pressure limits to make contact with the dial finger.



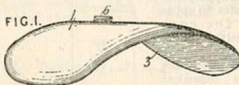
#### 10,514. Bower, A. S. June 8.

*Thermostats.*—A thermostat is employed to cut off the supply of gas to a burner used for heating a vaporizer or retort in which oil is vaporized for use in carburetting air. Within the base of the vaporizer is a metallic rod of a more expansive nature than the material of the retort. When the retort becomes too hot, this rod expands, and its free outer edge engages with a lever which is connected to the gas plug by means of a link. Another method of regulating the temperature is shown in Fig. 5, in which the bottom of the retort is hollow, and the air imprisoned therein communicates by the pipe 33 with a vessel 34, containing a liquid such as mercury. A tube 35 dips into the mercury, and is continued upwards to a Y-shaped tube, through which the gas supplying the burner passes. As the temperature in the retort increases, the mercury rises in the stand pipe 35, until finally the flow of gas from 36 to 37 is more or less cut off.



#### 10,517. Haddan, R., [Lavigne, A. A., and Miller, H. F.]. June 8.

FIG. 1.

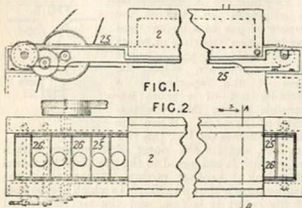


*Hot-water bottles.*—A receptacle for containing hot or cold water or other liquid for application to the body comprises an upper and a lower layer 1 and 3 respectively, joined together and rounded off at the edges, and is provided with a suitable filling-device 6. The surface 3 is flat in cross-section, but is curved longitudinally, as shown, to fit the body, and prevent the weight of the receptacle from resting on the body.

#### 10,739. Gracey, T. June 12.

*Heating by steam circulation.*—Relates to apparatus for heating hermetically-sealed or airtight tin boxes or cans and their contents, the goods being fed by a conveyer consisting of endless moving chains 25, running longitudinally through the steam heating-chamber 2, and provided with transverse slats or bars 26 adapted to push the cans or tins slowly through the chamber. The chamber 2 has an inner and outer casing, between which steam circulates, and is provided with hinged doors at the ends to allow the goods to travel through the chamber. The pulleys and gear-wheels shown in Fig. 2 enable the goods to be heated to be passed

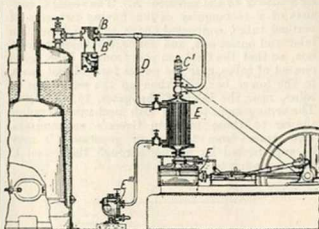
through the steam chamber at a predetermined rate.



**10,768. Murrie, J.** June 13.

*Steam traps.*—Relates to apparatus for regulating the pressure and temperature of the steam before entering an engine, in which a steam tubular superheater or drier E is placed intermediate to the engine F and the governor C', the steam on the

boiler side of the governor, conveyed by a branch pipe D, being employed as the heating or drying



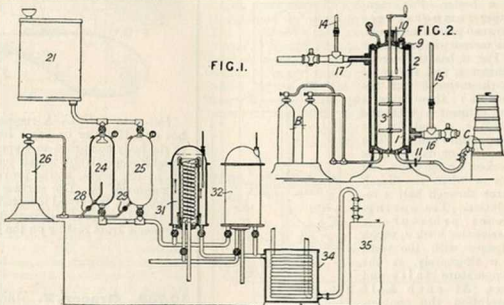
agent. The steam is freed from water of condensation, before it enters the drier, by a separator B and ejector B', and water of condensation is discharged from the superheater or drier by a steam trap E<sup>11</sup>.

**10,973. Freeman, T. K.** June 16.

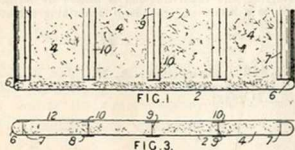
*Heating liquids.*

—Relates to apparatus for continuously or intermittently treating milk &c. by the process described in Specification No. 7371, A.D. 1898, [*Abridgment Class Stopping &c.*]. In the form shown in Fig. 1, the milk is fed from a reservoir 21 into cylinders 24 and 25, one of which is being filled, while the other is being treated with gas from a reservoir 26 connected to tubes 28 and 29 having stop cocks as shown. Stop-cocks enable the supply of milk to be cut off, when the gas is introduced.

After treatment, the milk is conveyed through one of two steam-heated appliances 31, 32 arranged as shown. It is then cooled by passing through a vessel 34 having a cold-water coil, and is finally fed into a vessel 35 for storage or transit. Stirrers may be fitted to the aerating-cylinders. Fig. 2 shows a form in which the milk undergoes the successive operations in a vessel 1 having a jacket 2 through which either steam or water can be passed by pipes 14, 15, 16, and 17. The chamber is filled through an aperture 10 closed by a plug 9, and is then connected with the gas cylinders B, the contents being stirred by an agitator 3 mounted as shown. A tube 11 finally conducts the milk to the can C.

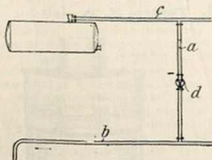


11,189. Long, J. de, and Homergue, J. B. d'. June 20.



*Non-conducting coverings and compositions.*—Linings for carpets, refrigerator cars, cold-storage houses, dwellings, buildings, &c. are formed for insulating against heat and cold, and for deadening sound. A filling-material 4 composed of raw cattle hair, used separately or mixed with cellulose formed from ground corn-stalk pith, is enclosed between sheets 2, 12 of paper or other suitable material. The edges of the bottom sheet are turned up at 6, and secured by chain-stitching 7. Tapes or strips 8, 10 are arranged at intervals in the manner shown, and are connected together by chain stitching 9. The top sheet is fixed to the turned-up edges 6 and to the upper tapes 10 by cement, glue, or paste.

11,201. Fürth, B. June 20.

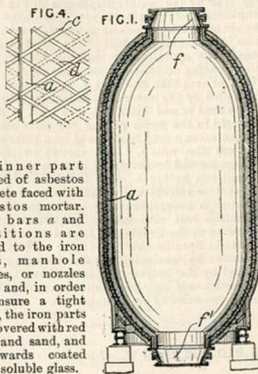


*Heating by steam circulation.*—In conduit systems for heating by superheated exhaust steam, the pressure of the exhaust steam in the pipe *b* is automatically rendered independent of the working of the steam engine by connecting the exhaust pipe *b* near the superheater with the branch pipe *a*, fitted with a pressure-reducing valve *d*, leading from the main steam pipe.

11,514. Nobis, L., and Wenzel, A. June 25.

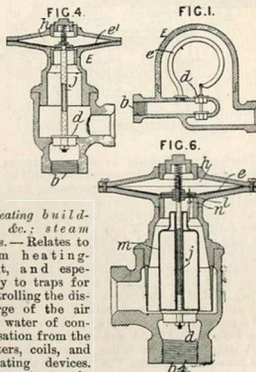
*Boiling-pans; digesters.*—Tanks, boiling-vessels, &c. are constructed so as to be fireproof and capable of resisting the action of acids &c. Figs. 1 and 4 show the application of the invention to a cellulose boiler. A skeleton framework is made up of U-shaped bars *a*, provided with metal strips having slots to receive two lattice-work partitions *c, d*, each made up of two layers of bars. The partitions are arranged so that the interstices of one come opposite to the interstices of the other, as shown in Fig. 4.

The partitions and frame bars are connected to each other by interwoven wire. The framework is filled in and faced with concrete, preferably asbestos concrete or mortar. Ordinary concrete may be used for the outer part of the walls, and



the inner part formed of asbestos concrete faced with asbestos mortar. The bars *a* and partitions are joined to the iron caps, manhole frames, or nozzles *f, f'*, and, in order to ensure a tight joint, the iron parts are covered with red lead and sand, and afterwards coated with soluble glass.

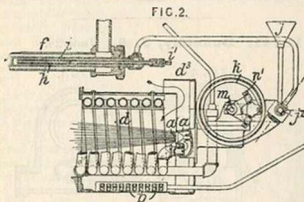
11,741. Donnelly, J. A. June 23.



*Heating buildings &c.; steam traps.*—Relates to steam heating-plant, and especially to traps for controlling the discharge of the air and water of condensation from the heaters, coils, and radiating devices. The automatic differential-pressure valves *E*, Figs. 1 and 4, are located in the

outlets of the heating-devices or between the outlets and the vacuum or exhausting pump employed to keep up the difference of pressure required for working. The outlet *b* is controlled by the valve *d*, which is operated by the Bourdon spring *e*, Fig. 1, or by the flexible diaphragm *e'*, Fig. 4, communication being made between the outlet *b* and the chamber *h* by means of the duct or tube *j*. The tube *j* may be independent of the valve stem. To control the operation of the valve by the conditions existing on the inlet side, the vent *l*, Fig. 6, of larger area than the duct *j*, is provided and is controlled by the water of condensation by means of the float *m* and valve *n*. The float *m* may be arranged in the upper part of the valve body, and the pin valve *n* may be replaced by a plate adapted to close the vent *l*. The suction or discharge passage formed by the duct *j* may be regulated by a small cap having a small tubular orifice. The valves close automatically when the pressure in the radiator is lower than that in the return. The difficulties met with in heating-systems, such as, according to the Provisional Specification, that described in Specification No. 13,319, A.D. 1895, are overcome by employing a valve-operating motor, worked by the pressure or conditions existing on the outlet side or return, and controlled by the conditions existing on the inlet side.

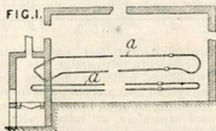
11,810. Miller, T. June 29.



*Thermostat.*—Relates to vapour burners with automatic regulating-apparatus controlled by variations in the temperature produced, and more especially suitable for use in connection with the steam boilers of motor cars, but applicable also for other purposes. Oil is vaporized in a coil *d*, and the vapour is delivered through a nozzle *a*, which is fitted with a regulating-valve *a'*, air being supplied through a hood *a''*. The valve *a'* is opened by the pressure of vapour against the action of a spiral spring, and it is also connected to an arm on a rock-shaft *m* which is operated by a "Bourdon" coil *k* according to the varying pressure in a closed tube *h* containing water and exposed to the steam as it issues from the boiler through the pipe *f*. The connection between the "Bourdon" coil and the shaft *m* is adjustable by means of set-screws *n'*. The tube *h* is fitted with an inner tube *i*, and water is run through it from a funnel *j* until it trickles

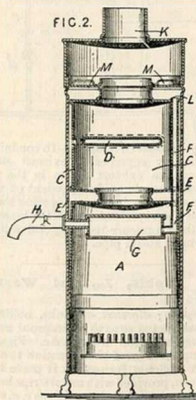
out through the valve *i'*; this valve and a valve *j'* are then closed, thus sealing up the tube. At starting, the vaporizing-coil is heated by burning oil in a series of troughs *p* containing asbestos wicks.

11,932. Gandillot, R. P. Jan. 27, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1885].



*Heating-apparatus and methods of heating.*—High-temperature stoves, drying-chambers, and heating-apparatus for liquids or apparatus in general, are provided with tubes *a* of any desired form and section, bent back and joined at the extremities. The tubes contain water or other liquid, and part of the tubes are heated, the remaining portions being situated within the chamber or space to be heated.

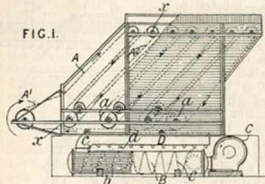
11,942. Fenlon, H. T. July 2.



*Heating water.*—A gas geyser or like water-heater is shown in Fig. 2. The water to be heated enters

the space between the casing E and the internal cone A, and passes through the flat tube D to the top of the chamber C, and by the tube F to the compartment or boiler G above the burner, finally leaving by the outlet H. The entrance to the pipe F is provided with the lip L, and the cover M prevents the gas from acting upon the water. The products of combustion ascend round the boiler G and tube D to the uptake K. The water is heated during the whole passage through the apparatus, and receives the greatest heating near to the outlet.

11,990. **Robinson, E.** July 3.

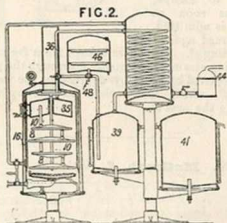
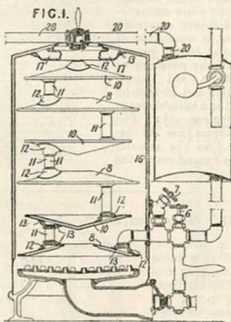


*Heating air.*—Apparatus for drying wool, yarn, and textile and other materials is shown in Fig. 1. A suitable framework supports an upper and a lower row of horizontal axes *x* carrying pulleys *a*, rollers, or the like. An endless travelling band A of network or other suitable construction passes round the pulleys. An air-heating cylinder B is placed under the bands, and contains a series of steam-heated tubes *b* which pass through a spiral partition *c* in the cylinder. A fan or blower C forces air through the spiral passage in the cylinder, and the heated air passes into a discharge-tube D. Additional steam heating-pipes may be placed under the drying-apparatus, and the heating-apparatus may be used with other kinds of drying-appliances.

12,034. **Leigh, H. H.,** [McCartney, J.] July 3.

*Heating water.*—Relates to water heating, distilling and sterilizing apparatus, and more especially to the construction of the heater, Fig. 1, to the arrangement of a chamber 46 for sterilizing surgical instruments, and to the arrangement of two distilled-water receptacles 39, 41, as shown in Fig. 2. The gas burner for the heater may have two chambers 29, 30, with inlets controlled by valves as shown in Fig. 3. In Fig. 1 the heater is shown in conjunction with a water tank, the whole being suitable for heating houses. The heating-chambers 8, 10 are disc-shaped, and are connected by short pipes 11 screwed into bosses 12, which are recessed to receive the upset edges 13. The combustion products follow a tortuous course. The valves 6 and 7 regulate the supply of water to the chambers

and the casing 16. The chambers 8 and 10 and the casing 16 are connected at the top to the bridge pipe 17 and to the outlet pipe 20. The overflow pipe 28 may provide hot water for



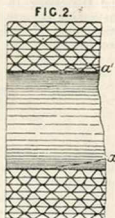
culinary or other purposes; or it may be connected to the distilling and sterilizing apparatus. In the heater shown in Fig. 2, the water enters the casing 16, passes to the chambers 10 and 8, and leaves as water or steam by the pipe 36 from the tank 35. The tanks 39 and 41 may be kept at different temperatures, and a filter 44 for the tank 39 may be employed. Steam is introduced to the sterilizing-cabinet 46 by the two-way valve 48.

12,212. **Watkins, S.,** [Thompson Norris Co.] July 6.

*Non-conducting coverings.*—A tubular pipe covering, composed of alternate layers or plies of plain



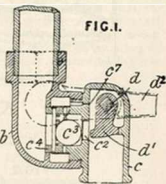
sheets  $a$  and corrugated sheets  $a'$  of paper or asbestos or similar material, is shown in Fig. 2. The compound sheet, consisting of the plain and corrugated layers cemented together, is wound round a mandrel to the proper size, and the covering so formed is slit longitudinally, and hinged or secured in a suitable manner along one side. The corrugations are so arranged that the annular air cells extend round the tube.



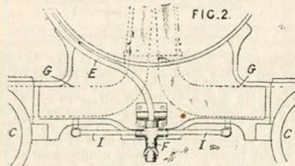
**12,332. Gresham, H. E.** July 7.

*Steam traps.*—

Relates to a valve for discharging condensed steam from heating-pipes. A ball valve  $c$  is fitted to the perforated guide-chamber  $c'$ , and, when there is no pressure in the elbow  $b$ , allows water to escape, but, as soon as steam is admitted, it is forced against the seating  $c'$ . The valve is kept from freezing by admitting steam to the casing  $c$  through the port  $c''$ , and is opened by hand by depressing the weighted lever  $d$ , which is attached to the spindle  $d'$  carrying the arm  $d''$ .



**12,460. McGrath, J.** July 10.



*Steam traps.*—Relates to automatic exhaust drain valves for locomotive steam engines, which provide for the draining away of water of condensation from the pipes of

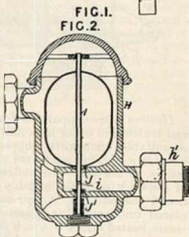
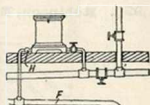


the pump and from the exhaust branches of the locomotive cylinders. A ball-controlled drain valve  $F$ , shown in section in Fig. 4, is secured towards the rear of and between the engine cylinders  $C$ , and the exhaust pipe  $E$  from the air pump is led directly into the top of this valve. Branch pipes  $I$  on each side connect the valve to the exhaust branches  $G$  of the cylinders  $C$ .

**12,605. Russell, J.** July 12.

*Heating buildings &c.; steam traps.*—

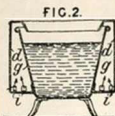
Relates to apparatus for heating buildings by the circulation of steam or vapour, in which the circulation is maintained by the formation of a vacuum in the return portion  $F$  of the system, and the steam or vapour is prevented from passing into the return pipes, while the air contained in the condensed vapour is allowed to escape, as is also the water of condensation. In the outlet or condensed water main of each heater, radiator, or coil, the float valve or trap  $H$ , Fig. 2, is arranged in combination with the permanent by-pass  $I$  for the air. The by-pass  $I$  is used as a spindle for the double-beat valve  $J$ ,  $J'$ , but it may be independent of the valves. The orifice  $i$  is provided in the tube  $I$  between the valves, and opens into the passage leading to the outlet  $h'$ . In a modified form of trap, there is one valve  $J$  operated by a float with a pivoted arm, through which the tube  $I$  carrying the valve  $J$  passes.



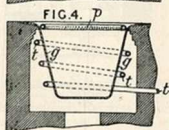
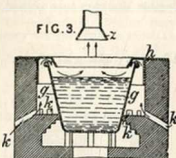
**12,673. Voelker, A.** July 13.

*Heating by electricity.*—In the manufacture of glass, the ground raw materials are mixed with a conducting-material such as graphite, powdered charcoal, &c., and are melted by the passage of an electric current through the mixture between suitable electrodes.

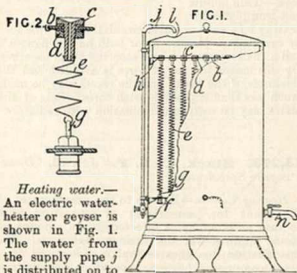
**12,706. Schlobach, F., and Wentzlau, F.** July 13.



*Boiling pans; heating by air circulation.*—To prevent excessive boiling and generation of steam, in cooking-apparatus &c., and also the raising of noxious fumes in dye and chemical works, a current of heated air is caused to pass over the surface of the liquid. In the arrangement shown in Fig. 3, the air is led in through passages *k* in the masonry, and circulates round the pan *g*, and finally over the surface of the liquid. The cover may be flat or inclined as shown. In Fig. 2, the vessel *g* is shown with a casing *d* with air inlet apparatus *i*. Fig. 4 shows an arrangement in which air is forced through a pipe *t*, escaping through apertures *p*. A funnel-mouthed pipe *z* may be arranged over the vessel to collect the hot air, steam, &c. for heating purposes.



**12,762. Greville, A. E., and Greville, A. W.** July 14.

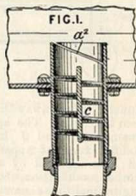


*Heating water.*—An electric water-heater or geyser is shown in Fig. 1. The water from the supply pipe *j* is distributed on to the metal plate *b* through the basket *l*, and flows down the electric conductors *e*, which are heated, to the plate *f* and to the bottom of the heater and the outlet *n*. The plates *b, f* are supported on insulating-brackets *h*.

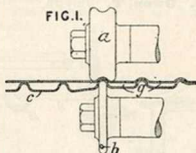
The wires or strips *e* may be grooved, or hollow, or zig-zag, or tapered, or disposed in any manner, and may be fixed to the nipples *c*, Fig. 2, as shown, or by soldering, or by the screw nut *d*, and to the pins *g* below, as shown in Fig. 2. Suitable terminals are provided. To prevent short-circuiting, the wires may be encased in porcelain or other tubes, in blocks, or in pillars.

**12,889. Ibert, F.** July 17.

*Heating buildings; heating water.*—Nozzles for leading steam into tanks, mash tubs, cookers, &c. used by brewers, or into radiators, or for use with steam pipes generally, are made with a helical web *c* and a lateral discharge slot *a*. The web *c* may be fixed, or may be mounted to rotate in bearings carried by brackets inside the nozzle.



**12,892. Stjernström, N.** July 17.

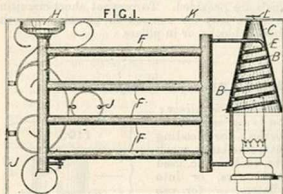


*Heating gases; heating liquids.*—Relates to the manufacture of double-walled metal bodies with channels for the circulation of fluids, and applicable as water-heating pipes or apparatus such as bath stoves or geysers, and as pasteurizers or other apparatus. One metal sheet *c* is first bent by the rollers *a, b* along predetermined lines, a second sheet *d* is placed upon it, and afterwards both sheets are passed between the rollers and firmly pressed together at the bends, leaving channels *g*, which may be spiral. The sheets are then welded or folded together to form the cylindrical body.

**12,925. Soutter, E.** July 18.

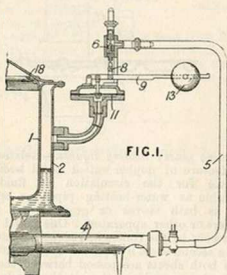
*Heating water; heating buildings &c.*—Relates to radiators or heaters for use with hydrocarbon, gas, or other lamps or stoves, and consists in arranging above or about the lamp or stove a series of water

tubes B surrounded by the conical metal funnel C, and connecting the spiral tubes to the longitudinal heater F. A receptacle H enables the radiator to be filled, and a cowl L, attached to the apex of the



funnel C, takes away the products of combustion from the lamp. The apparatus is enclosed in an ornamental stand J having a cover K. In a modified form of apparatus, the conical heating-coil B is replaced by a dome-like hood, and, in another modification, the arrangement is such that longitudinal tubes communicate with vertical tubes so that an ornamental stand or support is formed for the apparatus.

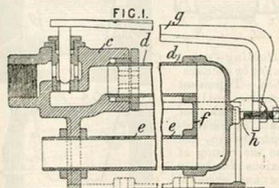
13,026. Owen, T. July 19.



*Thermostats.*—An apparatus fitted with a thermostatic appliance and used for drying tobacco samples and the like is shown in Fig. 1. The material is placed in the drying-chamber 1, which is surrounded by a water jacket 2 and heated by a suitable burner 4. The gas supply to the burner is regulated by a slide valve 6, controlling the supply pipe 5 so as to maintain a constant temperature of 212° F. in the chamber. The steam space of the water jacket is connected to the underside of a flexible diaphragm 11, which is connected to a

lever 9 carrying an adjustable weight 13 and connected to the valve by a link 8. In a modification, a rotary plug valve actuated by a coiled flexible Bourdon tube is used.

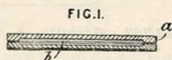
13,154. Haigh, N. N. July 20.



*Steam traps.*—The steam trap, shown in Fig. 1, consists of the expandible inlet and discharge tubes e and d, a plug valve which is controlled through the single cranked lever g, the frame, and the valve casing c. The lever g is pivoted, and is adjusted by the screw h, so that, for the temperature of steam, the valve is closed. Instead of the tubes e and d being united by the casting f, a single bent tube of expandible metal may be used.

13,156. Kaeflerle, F. July 20.

*Heating by steam circulation; heating by water circulation; heating buildings.*—Thin hollow cast-iron plates for heating by steam or water-circulation are produced by casting two plates, one or both having flanges a and a shallow recess b, and securing them together. By this means the use of cores is avoided, and the thickness of the plates and the recess may be made much less than is possible with cores. Sets of the plates may be used in combination with radiators.

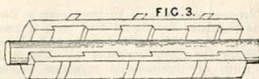


13,273. Stack, T. L. F. July 23. Drawings to Specification.

*Heating liquids.*—Relates to the arrangement of the plant for pasteurizing or separating milk so that an economy is effected in the amount of steam required for the various operations. The Specification describes several modifications in a plant comprising heaters, separators, pasteurizers, and coolers. The heat abstracted from the milk in the cooling operation is used in one of various ways for preliminarily heating a fresh supply of milk. The milk is further heated in the scalding or pasteurizer by steam from the exhaust of the

engine or steam pump, with or without additional live steam from the boiler. A suitable arrangement of pipes and valves for this purpose is described. The pipe which conveys the water from the cooler to the preliminary heater may have a steam or hot-water jet inserted in it, so as to raise the temperature of the milk to such a point that one of the heaters may be dispensed with.

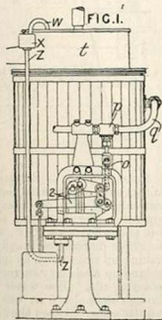
**13,297. Hallwood, J. T.** July 24.



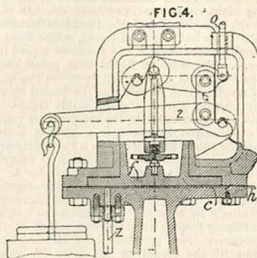
*Non-conducting coverings.*—Non-conducting coverings for pipes, tubes, boilers, or other vessels are made slab-like, with circumferential grooves or corrugations on their inner surfaces, as shown in Fig. 3, to form air spaces round the surfaces to which they are applied, and to increase their efficiency. The grooves or corrugations may be longitudinal. The blocks or sections are formed in suitable moulds.

**13,348. Casso, W. F. E.** July 24.

*Heating liquids; thermostats.*—Relates to apparatus for heating and sterilizing milk and other liquids, in which the liquid to be treated is heated by steam, water, or the like, and the temperature is maintained constant by the loaded thermostatic apparatus shown in Fig. 4. The liquid is heated in the vessel *t*, which is jacketed and supplied with heat from the pipe *q*. A pipe in the vessel *t*, influenced by the heated liquid, is half filled with a volatile liquid. This pipe is closed at one end, and is connected at the other end with the pipe *W*, the chamber *X*, and the pipe *Z*, which is filled with mercury and leads to the closed space *c* below the piston *f* of the thermostatic apparatus. The supply valve *p* is controlled by the rod *o*, through the medium of the transmitting and multiplying levers of the thermostat and the piston *f* with its flexible diaphragm *h*.



The greater the load on the lever 2, the higher is the temperature at which the liquid is treated.



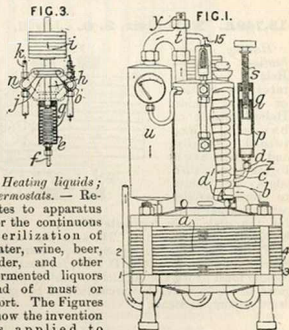
**13,491. Güssow, G. E.** July 26.

*Non-conducting compositions.*—Relates to the manufacture of artificial-stone building-blocks of low specific gravity and having considerable fire-resisting and non-conducting properties. The material from which they are moulded is composed of a mixture of clay and silicious sinter together with asbestos fibre, magnesite or bauxite, and finely-divided peat-wood, straw, or like organic material. The moulded blocks are burnt like ordinary bricks.

**13,749. Nabouleix, S. G.** July 31.

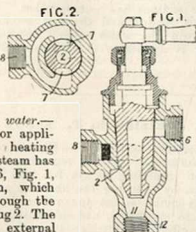
*Heating liquids; thermostats.*—Relates to apparatus for the continuous sterilization of water, wine, beer, cider, and other fermented liquors and of must or wort. The Figures show the invention as applied to sterilizing liquids.

The liquid to be sterilized is fed into a pipe,





## 13,848. Walsh, G. E. Aug. 2.

*Heating water.*—

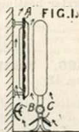
A valve or appliance for heating water by steam has an inlet 6, Fig. 1, for steam, which passes through the hollow plug 2. The plug has external recesses 7, Fig. 2,

which connect the branched water inlet 8 with the interior 11 of the valve casing where the steam and water mix, so that heated water emerges from the discharge nozzle 12. The temperature of the water is controlled by varying the position of the plug so as to admit the required proportion of

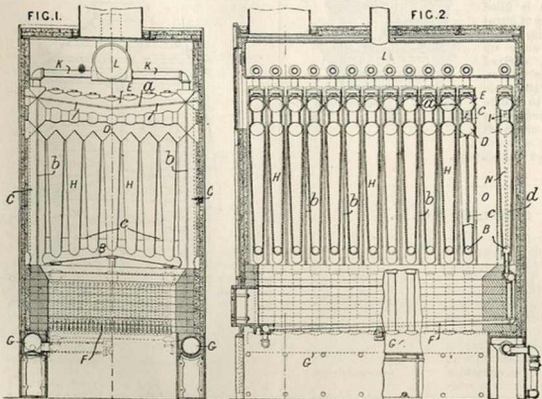
steam and cold water. The steam and water inlets may be interchanged.

## 13,923. Charlton, R. E. Aug. 3.

*Heating buildings &c.*, radiators for. Relates to shields or screens for radiators used in rooms, ships, buildings, and the like, to be fixed to the radiator, or to a wall, or to the object to be protected from the heat of the radiator. The shield or screen may have upon it a design, or ornamentation, and it may be curved or bent, or have the surface extended or increased by projections or indentations, or both, to aid in heating the air around. The shields or plates may be used in combination with felt or asbestos or other material. The plate A is fitted between the radiator and the wall, the plate B between the radiator pipes and the wall, and the plate C between the radiator and the floor.



## 14,107. Newton, C. W. Aug. 7.

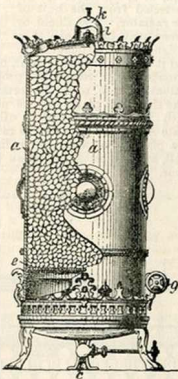


*Heating water.*—Relates to steam and hot-water boilers, the invention being described as applied to a steam boiler. A series of transverse vertical sections are arranged side by side, all being connected with a common steam drum L and mud drums G, G. Each section consists of a lower manifold B of angular form but circular in cross-section, a straight intermediate manifold D, and an upper angular manifold E reversely arranged with reference to the lower one B, all three being

connected by conical water tubes H, short tubes I, and circulation tubes C, C. The tubes C, C are prolonged to the mud drums G, and are connected to the steam drum by the pipes K, K. On each section are ribs *a* and *b*, which come in contact when the sections are put together. The rear section is separated by a fine space O from the others, this section and the last section of the main body being provided with depending webs *c* and *d* between the water tubes. The rear section is also connected to a water-tube firegrate F. The boiler is applicable as a water-heater for a hot-water heating system.

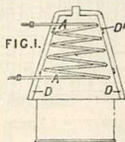
**14,486. Müller, T., and Thomas, R.** Aug. 13.

*Heating buildings &c., radiators for.* The apparatus, for use in a steam heating system, consists of the sheet-metal receptacle *a* provided below with the perforated false bottom *c*, steam inlet *g*, and water outlet *e*, and above with the safety-valve *i*, dome *k*, and steam whistle or alarm. The upper part of the apparatus is filled with pieces of burnt clay, kaolin, or the like, to store up the heat derived from the steam, and, after the steam is cut off, to radiate the heat and warm the room or building. The steam is admitted periodically.



**14,501. Smith, S.** Aug. 14.

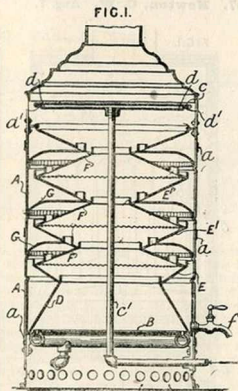
*Heating liquids.*—Relates to coil boilers for heating water and other liquids. The coil A is enclosed in the conical casing D, which has corrugated strips of metal D' fixed on its surface for the purpose of keying on a suitable non-conducting covering. The apparatus is placed on or in a suitable stand containing an atmospheric burner or other form of heater. Two coils, one right-handed and the other left-handed, may be substituted for the single coil A.



**14,555. Watzlawik, F.** Aug. 14.

*Non-conducting coverings.*—Cloths or sheets &c. are formed of animal, vegetable, or mineral fibres for insulating sheets for heat and electricity, &c. by reducing the fibres to a fleece in a carding-engine so as to give a longitudinal direction to the fibres, and depositing the fleece on a travelling band which is coated with an adhesive, and compressing it, then coating the fleece with an adhesive, and adding to it a fresh fleece, and so on, the sheet being finally stripped from the travelling band.

**14,646. Bout, A. J.,** [Cohen, M. I.] Aug. 15.



*Heating water.*—The gas geyser shown in Fig. 1 is constructed so that the parts may be nested together for transport. The casing A is in two semi-cylindrical sheet-metal sections, which are fastened together by hoops *a*. The vertical pipe *c'* feeds the spraying-ring C with water. The ring or head C has inner perforations *d* and outer

perforations  $d^d$  in its under side. Above the burner B is the trough D with the discharge spout  $f$ , and a stack of annular pans E, F, E', flaring alternately upwards and downwards, and also corrugated at their bases. Water-spreading rings G with corrugated bases are arranged between the pans. The water is sprayed from the ring or head C both within and without the pans.

14,701. **McRae, J., and Broadbent, J. C.**  
 Aug. 16.

FIG. 2.

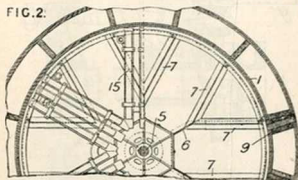
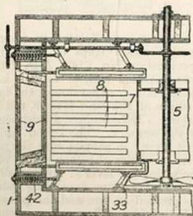


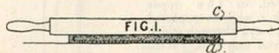
FIG. 10.



*Heating apparatus.*—Relates to means for refrigerating, heating, or otherwise treating goods in a closed atmosphere, and more especially for continuous work in cooling successive charges of goods such as chocolate confectionery. A chamber 1, preferably cylindrical, with insulating walls and top, contains a rotary receiver constructed of a central shaft 5 and partitions 6, 7, forked as shown to make parallel-sided radial chambers in which trays 8 can be placed. A door 9 is provided in the wall of the main chamber, and shutters are arranged to close the top and bottom of the revolving chamber opposite the door. These shutters may be fixed, or may be hinged and lifted by a cam disc on the shaft, or may be swung on links 33 as shown in Fig. 10, so as to be drawn down by springs 42 when the door is opened. The shaft 5 may be driven by hand gearing or otherwise, and may have an air-circulating fan and an indicator thereon. The cooling-medium

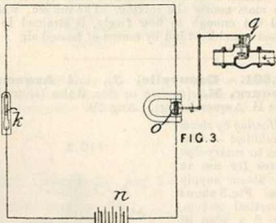
may be circulated through tanks 15 disposed in sets of three.

14,722. **Horstmann, O.**, [trading as Horstmann & Co., O.]. Aug. 16.



*Non-conducting coverings and compositions.*—Relates to the preparation and use of a composition consisting of a mixture of asphaltum, paraffin oil, and ground cork. The asphaltum and paraffin oil are melted, and afterwards mixed with the ground cork in a second heated vessel. The composition is formed into sheets by pouring into a flat mould  $a$  and rolling with a roller  $c$ , the surface of which is moistened with mineral oil. The sheet is turned out on to a plane surface covered with cork dust to cool. The sheets are applicable for use with refrigerators &c., and may be applied in layers by heating the sheets so as to bend them to the required shape. Bandaging and paint may be applied externally.

14,727. **Riches, H. R., and Wool, Hide, & Skin Syndicate.** Aug. 16.



*Thermostats.*—In a depilating process for hides and skins, the temperature of a chamber containing steam and ammonia gas is regulated automatically by the thermostat device shown in Fig. 3. The steam valve  $g$  is controlled by the armature  $o$  of a magneto motor, in series with which is a circuit-closing thermometer  $k$  and battery  $n$ .

14,738. **Saunders, S.** Aug. 17.

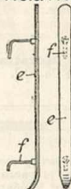
*Heating buildings, radiators for.* Relates to means for attaching baffle or deflecting-plates to radiators used for heating air for ventilating purposes. With double-column radiators side plates are fixed at the ends to carry top and



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From rods or bolts to enable the hooks *f* of the baffles *e*, Figs. 3 and 4, to be engaged. An extra rod may be provided at the top to prevent unhooking when not required, or the upper hook *f* may be replaced by an eye through which the rod may pass. With single-column radiators the baffles *e*, Fig. 9, may hook below on to a rod or on to the water pipe, and above may be provided with spring clips *i*, or oblong heads on screws *k* to engage with the upright tubes.

FIG. 3. FIG. 4.



#### 14,886. Ogilvy, D. J. Aug. 20.

*Heating liquids.*—Relates to a process for manufacturing printing-inks and paints by heating the mass to a temperature at which the viscosity is practically destroyed, mixing, and straining. A quantity of a fusible alloy, or of a strongly-saline liquid, is first put into a suitable vessel, the mixture is placed above it, and the whole is heated while thoroughly stirred by means of revolving paddles. The molten alloy &c. forms a cushion at the bottom of the vessel, and its dispersal through the mass assists the mixing. The ink &c., while still hot enough to flow freely, is strained in a closed vessel kept hot by means of heated air.

#### 14,891. Grouvelle, J., and Arquebourg, H., [trading as Soc. Jules Grouvelle et H. Arquebourg]. Aug. 20.

*Heating by steam circulation.*—Relates to rotary-disc valves for use in the steam supply pipe. Fig. 3 shows a vertical section, Fig. 5 a plan of the valve seat, and Fig. 7 a plan of the disc valve proper. The disc *a* is provided with a stud *a'* which enters a recess in the plug *a<sup>2</sup>* upon which the operating-handle *b* is mounted, and the disc is pressed down on its seat by the spring plunger *a<sup>3</sup>*. The handle *b* moves over a dial *b'*, which is graduated

FIG. 3.

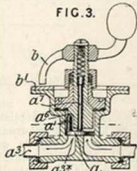


FIG. 5.

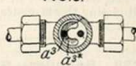
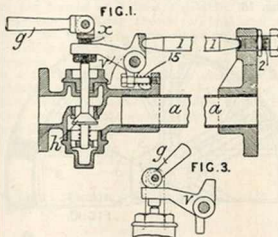


FIG. 7.



to show the position of the valve. The part *a<sup>2</sup>* of the valve seating which communicates with the passage *a<sup>3</sup>* is formed as a crescent-shaped collecting-channel, as shown. The four orifices 1, 2, 3, 4 are of such proportions that the area of any one is smaller than the sum of the other three, and, when one registers with the inlet passage, the others are in communication with the outlet passage *a<sup>2</sup>*.

#### 14,950. Brooke, R. G. Aug. 21.

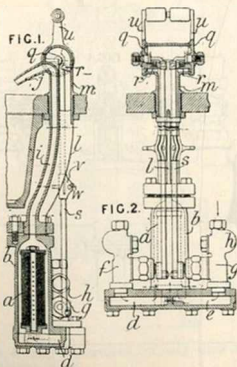


*Steam traps.*—Relates to improvements in expansion steam traps of the kind described in Specification No. 6148, A.D. 1900, in which the spring-pressed control valve *h* is operated by the contraction or expansion of the tube *a* through the medium of the bent lever *v*, rod 1, and adjustable screw 2. Longitudinal adjustment is provided for by the screw 2. The coiled spring 15 keeps the bent lever *v* in contact with the rod 1. The hand-lever *g* enables the trap to be blown through by depressing the lever *v*. In a modified form of trap, there are two non-expanding rods 1, and the lever *v* is pivoted at one end and pressed upwards by a coiled spring. The cam or eccentric arrangement shown in Fig. 3 may be used for enabling the trap to be blown through.

#### 15,186. Brophy, M. M. Aug. 25.

*Heating water.*—Relates to apparatus of the type described in Specification No. 12,163, A.D. 1899, for supplying through a single nozzle hot or cold water in bathrooms, lavatories, pantries, and other places, the hot water being obtained by introducing steam into the cold water. The present invention consists in preventing undesired heating of the parts near the nozzle. Steam flows through the pipe *e* to the water-heater *a*, and water passes into the surrounding chamber *b* through the pipe *d*, the flow of the steam and water being controlled by cocks *g*, *f* operated from the rods *s*. A single pipe *i*, provided with a flange *l*, passes from the chamber *b* to the nozzle *j*, to which is fitted a T-shaped chamber *m*. The rods *s*

pass into the chamber, and are secured to crank-pins *r* on discs *q*, which are mounted in the chamber and which are rotated by means of the handles *u*. One handle overlaps the other, so that opening

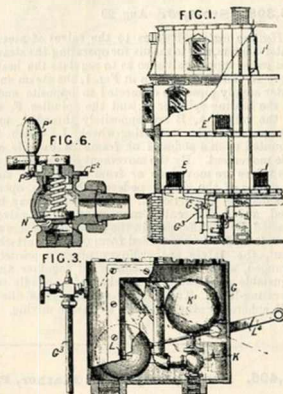


the steam cock also opens the water cock. The cocks are preferably of the type described in Specification No. 15,187, A.D. 1900, and are provided with separators *h*. Each rod *s* is in two parts, which have overlapping ends secured together by a split clamp *r* having a set-screw *se*.

**15,307. Broomell, A. F.** Feb. 5, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1883].

*Heating buildings &c.*—The steam heating-plant, shown in Fig. 1, is such that the radiators are open to the atmosphere, the amount of steam is regulated and the working noiseless, water cannot accumulate in the radiators, the production of steam in excess controls the boiler-furnace damper and automatically operates relief-devices, small pipes may be used, and the water of condensation is returned to the boiler. Any suitable boiler, preferably one having a low water line, is used, and the return pipes lead to the receiving-vessel *G*. The receiver, Fig. 3, is supplied with the pressure gauge *G*<sup>2</sup>, and with the floats *K*, *L*. The float *K* operates the relief valve *K* by excessive rise of water in the receiver, and the float *L* controls the furnace damper through the lever *L*<sup>1</sup>. Condensing-radiators *I* are connected with the receiver and with a condensing-drum *I*<sup>1</sup>, which is useful only when the formation of steam is excessive. To

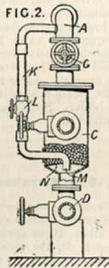
admit steam to the radiators and to open a vent to the atmosphere when steam is cut off, the valves *E* are employed. The feed-valve, as shown separately in Fig. 6, is provided with feed-ports and an air



port *S* controlled by the spring-pressed valve *N*. The casing head has holes *E*<sup>1</sup>, into which the stop pin *P*<sup>2</sup> fits as the control handle *P*<sup>1</sup> is turned.

**15,395. Stott, J.** Aug. 29.

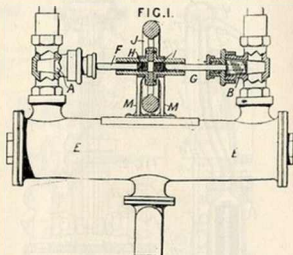
*Heating water.*—Relates to apparatus for heating by steam a large quantity of water, such as water for swimming-baths, or water in vats or tanks, and for maintaining the water at an equable temperature. The heating-apparatus is shown in Fig. 2. The cylinder *C* is connected with the bath or tank by the pipes *C*, *D*, the water-supply pipe is opposite to the pipe *C*, and steam enters by the pipe *A*. Between the steam pipe *A* and the lower part of the cylinder, the valve *L*, controlled by the pipe *L*, is fixed, so that, when the



water-supply valve and the steam valve G are closed, the water in the bath or tank may be circulated and re-heated or kept hot by the auxiliary steam supply. The end M of the pipe K is fixed in the grating N.

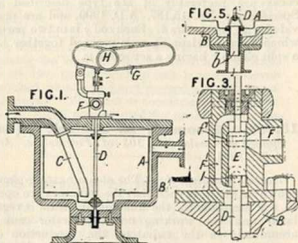
**15,396. Stott, J.** Aug. 29.

*Heating water.*—Relates to the valves of steam water-heaters, and to means for operating the steam and water supply valves so as to regulate the heating. In the heater shown in Fig. 1, the steam and water supply pipes are connected to opposite ends of the heating-cylinder E, and the spindles F, G of the valves A, B are oppositely threaded, and engage with the actuating-wheel J, which is mounted upon a pedestal or frame M capable of side movement. By the movement of the wheel J the valves are moved to or from their seats, and by means of the sliding pedestal the valve openings may be proportioned. The pedestal may be fixed, and a differential movement of the valves effected by a difference in the pitch of the screw-threads H, I. In a modified form of valve attachment, the valves are ordinary plugs, oppositely arranged, with the stems connected together and adjustable as to lead in the socket of a handle or operating-lever. The heating-cylinder E is filled with spheres or other material to ensure mixing.



**15,406. Shackleton, E., and Flather, F.** Aug. 29.

*Steam traps.*—Relates to steam traps and mechanism applicable for feeding boilers or forcing liquids by steam into steam or other containers. The apparatus shown in Fig. 1 comprises the bucket A which is directly connected by the rod D to the valve E, Fig. 3, controlling the live-steam inlet F and the exhaust I. The siphon pipe C dips to the bottom of the bucket, or it may be dispensed with, and the discharge pipe b, as shown in Fig. 5, substituted. The spindle D is extended upwards and attached to the fall-over motion comprising the lever G and the rolling weight H. Live steam is admitted by the inlet F when the bucket is at its lowest position, and passes by the annular port  $f^1$  round the valve E to the passage F<sup>1</sup>, which is horse-shoe shaped surrounding the valve, and to the vessel B. When live steam is cut off, the exhaust I is opened. After filling with water, the bucket sinks, steam is admitted, and the water is passed to the boiler. Specification No. 9116, A. D. 1901, is referred to.

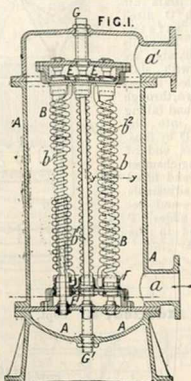


**15,455. Kershaw, H. B.** Aug. 30.

*Heating gases; heating liquids.*—Relates to apparatus for heating, cooling, evaporating, or condensing liquids or gases. For heating water by steam, the apparatus consists of the battery of tubes B, comprising the inner water tube  $b^1$ , and the outer spirally-grooved or coiled steam tubes  $b, b^2$ , the steam chambers E, E<sup>1</sup>, with the steam inlet G and outlet or drain G<sup>1</sup>, and the water chambers A with the inlet a and outlet a<sup>1</sup>. The corrugated tubes b have ferrules F at their ends into the sides of which the spiral tubes  $b^2$  pass. The compound tubes B may be applied to

coolers, evaporators, condensers, radiators, and other similar apparatus; in radiators the central

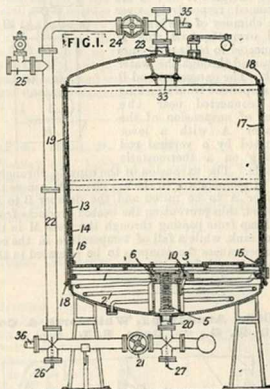
of chains or netting hooked at points to chains suspended from eyelets on the inside of the kier.



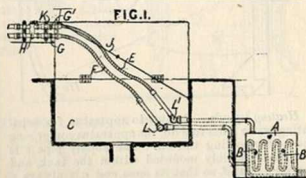
tube  $b'$  may be omitted, or may allow for the circulation of air.

**15,486. Lishman, W. W. L., Haughton, T. W., Kirkpatrick, J. J., and Lishman Process Bleaching Co.** Aug. 31.

*Boiling-pans.*—Relates to kiers for boiling, bleaching, dyeing, and like purposes in which provision is made for circulating the liquors. Above the usual false bottom 1 is arranged the adjustable perforated bottom 3. This bottom is carried by the screw 5, which is surrounded by the worm-wheel 6 and is operated through the worm 10 from outside. A rack and pinion may replace the worm gear. To hold the bottom 3 securely, the screws 15 carried by the flanges 16 can engage with the holes 14 in the plates 13, or the bottom may be locked in position by levers and catches. Below the bottom 1 an ordinary steam coil 2 is arranged. The pipe 22 connecting the inlet pipes 20, 23 is provided with valves 21 and 24, a connection 25 to the liquor supply tank, and a circulating steam injector 26. Another injector 27 is provided, and steam may also be supplied by the pipes 36 and 35. A perforated liquor spreader 33 is placed at the top. Suitable manholes and relief and other valves are provided. The wood or other lagging 17 is held between angle-iron rings 18 secured to the kier sides and connected by bolts 19. When used with non-boiling liquors for dyeing and bleaching, a centrifugal pump is employed instead of the injectors. In a modified form, the kier has an adjustable false bottom, composed of a number



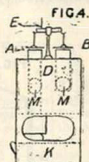
**15,688. Milne, J.** Sept. 4.



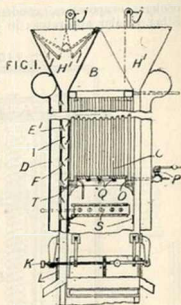
*Heating water.*—Relates to means for heating water for fire-engine or other portable steam boilers. The water tank A is fixed below the boiler level, and is heated by the water or steam coil B. The flow and return pipes E, F are connected to the boiler pipes through the double stop-cock or plug valve H, and by two loose taper plug connections G, G'. Two swivel valves L, L' are arranged inside the tank C in the flow and return pipes. When the boiler is withdrawn, the flexible rod, cord, or chain J pulls the lever K of the valve H so as to close the valve, the connections G, G' are broken, and the pipes E, F and fittings fall into the tank C, closing the lid and turning off the cocks L, L'.

15,719. Whitby, W. G. Sept. 4.

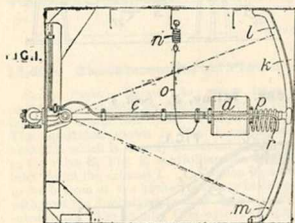
*Thermostats for incubators.* Two dampers A and B are arranged respectively over the chimney of the lamp K, and over the exit flue D connected to horizontal flues M passed through the water tank. The dampers A and B are suspended from a rocking bar, connected near the point of suspension of the damper A with a lever actuated by a vertical rod resting on a thermostatic capsule. The expansion of the capsule, through a rise of temperature in the egg chamber, causes the damper A to be raised and the damper B to be lowered, thus preventing the heated products from the lamp from passing through the flues M in the water tank, while a fall of temperature in the egg chamber causes the dampers to be operated in the reverse direction.



with closely-packed steam-heated tubes C, which drain into a trough O fitted with a safety-valve P. The walls of the chamber are pierced with slots E, so that heated air is drawn, through the slots and falling material, into the passages D by fans. The lower end of the heating-chamber is closed and fitted with an adjustable valve Q, and regulating-slides T are placed in the passages A.



15,868. Armstrong, Whitworth & Co.,  
Sir W. G., and Orde, E. L. Sept. 6.

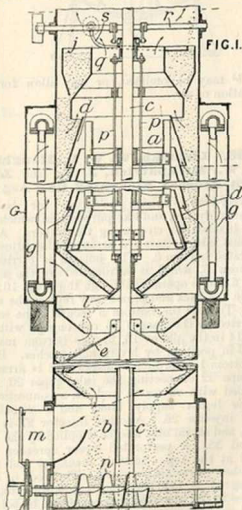


*Heating liquids.*—Relates to apparatus for separating water from fuel oil, the apparatus comprising means for heating the oil. The supply pipe c is hinged or flexibly mounted within the tank, and carries a float d, so that its open end r is always a certain distance below the surface of the oil. A steam heating-coil p is provided in proximity to the end of the pipe, to facilitate the separation of the oil and water.

15,948. Mallinson, C. Sept. 7.

*Heating air.*—An apparatus of the kind described in Specification No. 2970, A.D. 1898, [Abridgment Class Drying], for drying and conditioning granular or pulverulent materials, is shown in Fig. 1. A vertical chamber B, of square or other polygonal cross-section, is double-walled so as to form passages A for the material, and is lined

16,083. Mucklow, R. Sept. 10.



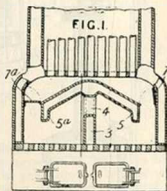
*Heating air.*—A vertical drying-chamber for drying grain &c. consists of an upper drying part a and a lower cooling part b. A slowly-revolving

central shaft *c* carries louvres *d* and cones *e*, which agitate and guide the moist material as it passes from the hoppers *j* through the chambers to the discharge worm *n*. A fan *m* forces cold air into the chamber to cool the dried material, and the air is deflected into a jacket *G* containing steam pipes *g*. The heated air repasses through the perforated wall of the jacket into the chamber, and dries the incoming material.

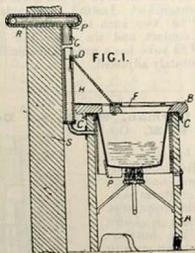
**16,152. Bump, C. M.** Feb. 15, [date applied for under Sec. 103 of Patents *etc.* Act, A.D. 1883].

*Heating water.*—

The firebox of a boiler or "heater" is divided into two parts, which are alternately supplied with fuel, by a water containing partition 3 with an opening 4 and with laterally-extending hollow wings or deflectors 5, 5', between which and the side walls are dampers 7, 7'. The arrangement is such that the smoke and gases from the freshly-charged division pass over the incandescent fuel in the other division.



**16,381. Whitaker, O., and Whittaker, G.** Sept. 14.



*Heating water; boiling-pans.*—Relates to water boilers for domestic and other purposes, and to improvements in the boilers described in Specification No. 19,368, A.D. 1898. The earthenware or like casing *A* is provided with the dish-shaped earthenware cover or top *B*, which is enamelled or salt-glazed on the upper surface and has the rib *C* on its under surface. The cover or top is fitted

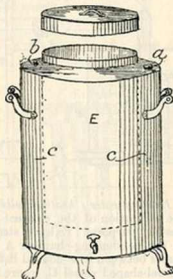
with the hinged lid *F* giving access to the boiler. The hood *H* conveys the steam from the pan to the uptake *G*, and the damper *O* controls the opening between the hood and the uptake. A groove with dovetail edges enables the hood *H* to be fitted and bolted to the cover. An inner lining between the pan and the casing and a deflector *P* are provided. The hollow block or brick *R* is built transversely into the wall *S*, and projects from the wall, so that it may be connected with the uptake and may have lateral discharge openings.

**16,974. Naef, P.** Sept. 24.

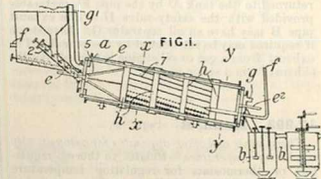
*Heating air; heating water.*—Air or water is heated in the process of cooling gases for use in ice-making *etc.* machines. The heated air or water may be used for supplying a gas engine, furnace, or boiler.

**17,023. Rhamm, A.** Sept. 25.

*Heating apparatus.*—Relates to a warmer for bath towels and under-clothing, consisting of an inner receptacle *E* for the articles, closed by a lid and surrounded by a hot water jacket *C*. A feed aperture *a* is provided, and a punctured cap *b* allows air to escape while the jacket is being filled.



**17,054. Naef, P.** Sept. 25.



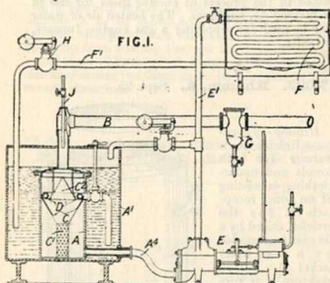
*Heating liquids.*—Relates to a process and apparatus for treating materials with liquids and gases. Fig. 1 shows an inclined cylinder *a* into which the solid is passed by a screw *2*, while liquid and gas are passed in the reverse direction, entering

at  $f$  and  $g$  respectively at the lower end. The liquid is carried away partly by the tube  $f$  above,



and the gas escapes by the tube  $g'$ . The tubes  $e$ ,  $e'$ , and  $e''$  are heating or cooling pipes.

**17,235. Strode, W. W., and Clark, T. W.**  
Sept. 28.

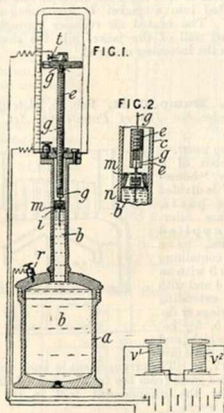


*Heating water; heating buildings &c.*—Relates to the utilization of the exhaust from an engine for heating purposes. Exhaust steam or gas is admitted to the condensing-chamber A by the pipe B, and passes between the conical baffle plate C<sup>2</sup> and the funnel-shaped vessel C, where it meets water from the spray pipe D. The heated mixture passes through the perforations C<sup>3</sup> to the pipe A<sup>4</sup>, and is forced by the pump E through the pipe E<sup>1</sup> to the heating-coils F or radiators. The cooled water is returned to the tank A<sup>1</sup> by the pipe F<sup>1</sup>, preferably provided with the safety-valve H. The exhaust pipe B may have an oil separator G. Live steam if required may be introduced by the pipe J. The exhaust from a gas or oil engine is treated like the exhaust from a steam engine.

**17,293. Kann, R.** Sept. 29.

*Thermostats and other apparatus for automatically regulating temperature.*—Relates to thermo-regulators or thermostats for regulating temperature between predetermined limits. The apparatus shown in Fig. 1 consists of the thermometer-like casing  $a$  and stem  $b$  of nickel steel, enclosing mercury or other medium, of the float  $m$ , Fig. 2, of the set-screw  $e$  with its central needle  $g$ , and of the electric connections with the electromagnets  $e'$

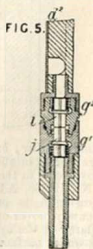
and  $e''$ , which augment or diminish the supply of heat respectively. In the lowest portion of the float  $m$ , the platinum plate  $n$  makes contact with the minimum contact piece  $i$ , so that the current



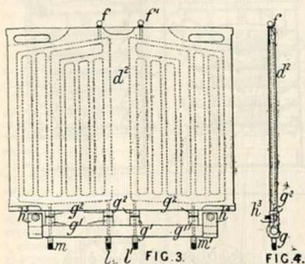
from the battery passes by the binding-screw  $t$ , the needle  $g$ , and the binding-screw  $r$ , to excite the electromagnet  $e'$ . In the highest position of the float the current flows by the lower screws to the electromagnet  $e''$ . Instead of a single tube  $b$ , there may be two such tubes, one having the maximum contact, and the other the minimum contact. The yoke has a scale to enable the screw  $e$  to be accurately adjusted.

**17,340. Dorman, W. H., and Dorman & Co., W. H.** Oct. 1.

*Heating by steam circulation.*—Relates to combined valves and pipe couplings for steam heating and like apparatus. The invention is shown applied to the heating-plate of a platen press in Figs. 3 and 4, the valves and couplings being shown in Fig. 5. The plate  $d$  is connected to a steam boiler by the inlet pipes  $l, l'$  and outlet pipes  $m, m'$ , and, when placed in the press, the upper portions  $g^2$  of the couplings

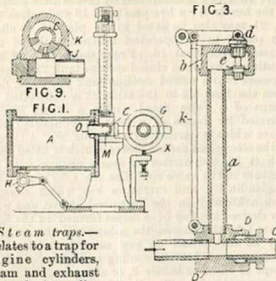


attached to the plate  $d'$  fit into the parts  $g^1$ , which are carried by a bar journalled and supported by hooks  $h^2$ ,  $h^4$ . The spring-pressed valves  $i$ ,  $j$  open when the coupling-parts are in position; when



the plate  $d'$  is withdrawn from the press, the valves close. If the pressure of steam is high, the cones  $g^1$ ,  $g^2$  may be held together by a screwed union, the cone  $g^1$  being screw-threaded, and the cone  $g^2$  having a flange. Air-escape outlets  $f$ ,  $f^1$  are provided.

17,532. Musgrave, W. M., [Johnson, J. W.]. Oct. 3.



*Steam traps.*—Relates to a trap for engine cylinders, steam and exhaust pipes, drying-cylinders, tins, and the like, comprising a cylinder mounted on a trunnion and balanced, and a vertical expansion pipe fitted at the upper end with a valve box and valves for admitting air. One form of trap is shown in Fig. 1, Fig. 3 showing the upper part of the trap. The trunnion C is provided with the passage M and the projection O, to which is secured the cover

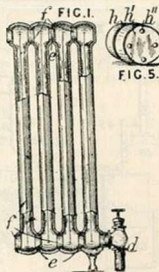
of the cylinder A. The underside of the cylinder A is provided with the outlet valve H and attached levers, and the cylinder is balanced by the movable weight G which bears on the adjustable screw X. The bearing D, Fig. 3, for the open end of the trunnion carries the expansion pipe  $a$  and valve box  $b$ , with the valves  $d$ ,  $e$ , and the lever attachments. The difference in expansion of the tube  $a$  and rod  $k$  causes the air valves  $d$  and  $e$  to be opened or closed. In a modified trap, a pipe dips into the balanced cylinder A from the trunnion, and the double-ported outlet valve J, Fig. 9, is situated in the bearing K, and is made operative by the movements of the cylinder A.

17,576. Perkins, J. W., and Perkins, R. W. Oct. 3.

*Hot-water bottles and like heating-apparatus.*—Metallic hot-water bottles and the like are made from two, or double, sheets of metal, such as tin plate and zinc, worked and fashioned together as one sheet, and joined at their edges where necessary by one set of seams.

17,607. Travers, F. J. Oct. 4.

*Heating buildings, radiators for.* Hot-water or steam radiators are constructed with a number of loops or sections, terminating at the ends in chambers with ports. Adjacent chambers are united by coupling-nipples  $f$ ,  $e$ , which are either unstricted in their passage, or have webs  $h^1$ , as shown in Fig. 5, with air-holes  $h^2$ . The nipples  $e$  and  $f$  are placed alternately from the inlet pipe  $d$  in such a manner that the heating-fluid passes up and down the legs alternately. Instead of the restricted nipple  $h$ , a small open nipple may be inserted in walls provided in the sections or loops where required.

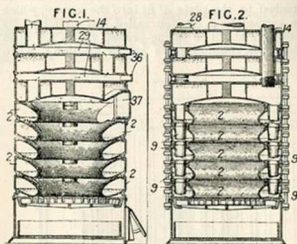


17,869. Lafrenière, J. de C., and Elliott, P. W. Oct. 8.

*Heating water.*—Relates to hot-water heaters or circulating boilers for heating buildings, applicable also for generating steam, and consists in arranging annular water tubes in tiers above the furnace grate, and in providing a superstructure to heat

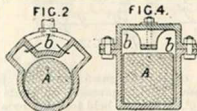


the return water without disturbing the circulation in the water firebox. The water chambers or tubes 2 are connected together by nipples 9, which hang, as shown in Fig. 2, so as to trap steam or air above the water. The circulation takes place in the boiler, down one side and up the other, from the return pipe 28 to the hot-water outlet 14. The superstructure for warming the return water by the products of combustion consists of a number of superposed hollow discs with passage ways 29 between them. The upper discs are provided with deflectors, which cause the return water to traverse their interiors before passing to the lower disc. The tubes and discs are bolted together as shown in the Figures, and the furnace door 37 is provided in the upper tube. Doors 36 are arranged for the cleaning-out of the heating-passages 29.

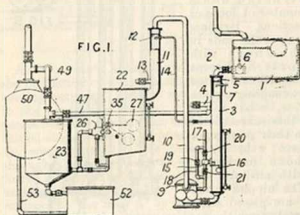


17,920. Jacobi, L. W. A. Oct. 9.

*Heating-apparatus.*—Tubes or conduits for use in the carbonization or heating of briquettes A or other solid bodies are provided on the inside with one or more longitudinal grooves b, as shown in Figs. 2 and 4, for collecting and carrying away the gases developed during the heating.



17,924. Lillie, S. M. Oct. 9.



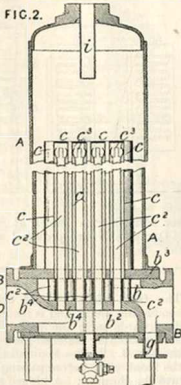
*Heating liquids.*—Relates to the treatment of sugar juices, and other solutions, for the purpose of precipitating matters contained therein. The solutions or juices, which may be treated with lime, sulphurous acid, carbonic acid, phosphoric acid, or other reagent, are fed from a reservoir 1 into a heater 3, supplied with low-pressure steam from a pipe 4. A perforated pipe 5, in the upper part of the heater, breaks up the liquid as it leaves the feed-pipe 2. A suitable float valve 6 regulates the feed. Gases or vapours may be conducted by means of a pipe 7 to any apparatus in which they may be used for heating purposes. The partially-heated solution may be drawn from the heater 3, by means of a pump 9, and delivered along a pipe 10

into a heater 11, provided with a perforated plate 12, and supplied with high-pressure steam from a pipe 13. Gases or vapours may be conducted by means of a pipe 14 into the heater 3. The steam pipe 17 of the pump 9 is provided with a valve 15 which is controlled by means of a float 16 in the heater 3; a bye-pass pipe 18 and valves 19, 20, 21 may also be fitted to the pipe 17 to allow the pump to be operated independently of the action of the float 16. From the heater 11 the solution flows into a closed storage tank 22, whence it passes into a closed cooling-tank 23. The flow from the tank 22 to the tank 23 is controlled by means of a valve fitted within a casing 26 and actuated by means of a float 27 connected to a sleeve which is carried by a spindle 35. Adjacent to the sleeve is a second sleeve, which is fitted upon a shaft 35, and carries an arm engaging with an aperture in the valve rod. The shaft 35 is movable longitudinally, and carries a key which engages with a keyway in the valve-rod sleeve, and with any desired keyway of a series formed in the float sleeve; by this means the solution in the tank 22 may be maintained at any suitable level. The steam generated in the cooling-tank may be led by a pipe 47 into the heater 3, or along a pipe 49 into an evaporator 50. The liquid is discharged from the tank 23 into a suitable separating-apparatus, such as a filter 52, and the separated solution may be fed along a pipe 53 into the evaporator 50. The tanks 22, 23 may be used in conjunction with surface heaters, instead of the jet or spray heaters shown. The apparatus may be used for treating sea-water, or saline solutions, as a preliminary to evaporation.

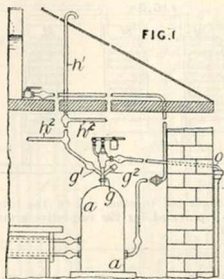
**18,051. Chamberlain, J. G., Player, R.,**  
[trading as Wright & Co., J.], and Radcliffe, J.  
Oct. 10.

*Heating liquids.*

—Relates to heaters or condensers in which steam is passed through tubes in a casing into which water or other liquid, or air for condensing, is passed. An apparatus for heating water by steam is shown in Fig. 2. The casing A surmounts the base B, which consists of the two chambers  $b, b^2$ , separated by the division  $b^1$ . Tubes  $c$ , closed at the top, rise from the plate  $b^1$ , and inner tubes  $c^2$ , open at the top and held by bowed pieces  $c^3$  within the tubes  $c$ , rise from the plate  $b^2$ . Steam admitted at D passes up the inner tubes  $c^2$ , and down the outer tubes  $c$  to the outlet  $g$ , while the water to be heated enters the casing A and passes to the outlet  $i$ . The casing A and base-plate  $b^1$  are readily removable to facilitate cleaning &c. Suitable manhole doors and grease and scum cocks are provided.



service-pipe  $h^2$ , and is provided with the usual relief-pipe  $h^1$ , while the branch  $g^2$  has a screwed cap which can be removed to allow the reservoir to be filled. The upper end of the pipe  $g$  carries a

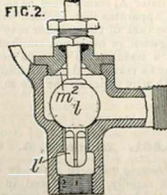


weighted safety valve provided with an escape pipe  $o$ . Fig. 2 shows a longitudinal section of the safety-valve. The valve  $l$  is spherical, and is made of rubber, rubber compound, or other material. It is guided by wings  $b$ , and the stem may pass through a stuffing-box. Or a tight joint may be made when the valve is blowing off, by the ball resting on a seat  $m^2$  on the cover. This safety-valve is effective when the relief pipe is stopped from any cause.

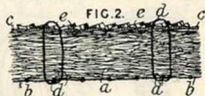
**18,232. Davey, J.** Oct. 13.

*Heating water.*

—Relates to the provision of a safety-valve in domestic and like hot-water supply systems. Fig. 1 shows an arrangement in which a reservoir  $a$  is provided. From the upper end of this reservoir is led a pipe  $g$  having branches  $g^1$  and  $g^2$ . The branch  $g^1$  is connected to the



**18,339. Christie J.** Oct. 15.

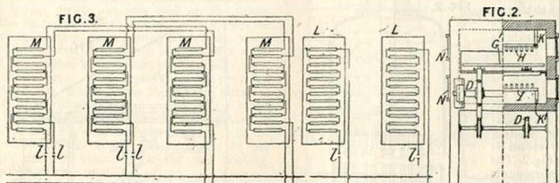


*Non-conducting coverings.*—Slabs or coverings for walls, ceilings, bulkheads, &c. are made of silicate cotton  $a$ , secured between wire netting  $b$  and expanded metal sheets  $c$  by staples or wire fastenings  $d$ . The ribs of the expanded metal are inclined to retain plaster, and a sheet of strong paper  $e$  may be interspersed between the metal and silicate cotton.

**18,431. Byham, C. M.** Oct. 16.

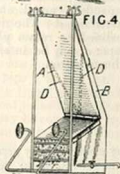
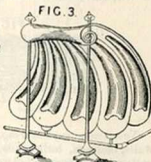
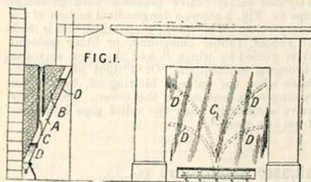
*Heating by electricity.*—A travelling-oven is heated by electricity by arranging rods or resistances H, Fig. 2, capable of being put in or out of circuit as required to regulate the temperature, in insulating-holders I carried by hangers K or supports K' respectively above and below the upper

ends of the endless chains D supporting the trays G<sup>1</sup>. The resistances may be spaced evenly from end to end of the oven, or, preferably, a greater number are placed towards the entrance end. The bars constituting a resistance may be connected in series as shown at L, Fig. 3, or alternate bars



may be connected together and to the bars of another resistance as shown at M, and one or two switches *l* provided for the respective arrangements. Dampers *N* are provided at different parts of the oven.

**18,486. Maclairin, R., and Moffat, A. J. H.** Oct. 17.



The front plate *A* is of copper or other good-conducting metal, and is inclined to direct the heat downwards on to the floor. The back plate is of non-conducting material placed against firebrick or the like *B*. Baffles *D* direct the hot gases all over the front plate before passing through the pipe *C* into the chimney. A hinged plate allows of access to the gas jets for lighting and other purposes. An oil lamp may be used instead of gas jets, and in that case a door or hood is provided to allow the lamp to be put in place or removed. Fig. 2 shows a brazier-like apparatus heated by an oil lamp. The hot gases enter at the bottom, and escape through a pipe *C*. Fig. 3 shows a shell-like radiator heated by gas jets, and Fig. 4 shows an apparatus in which gas jets play on asbestos or fireclay balls, coke, charcoal, peat, or other glowing materials, the hot gases therefrom passing into a radiator *A*, constructed as shown in Fig. 1. Such an apparatus may be used without gas or oil jets. The back of the radiator may be made of asbestos, slagwool, or other non-conducting materials resting on a metal plate or wire netting. The radiator may be corrugated or provided with gills, or packed with wire gauze or the like to absorb heat.

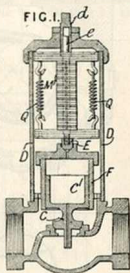
*Heating buildings.*—Relates to heat-radiators utilizing the hot gases from gas jets or oil or spirit lamps or from comparatively smokeless fuels such as wood charcoal, coke, and peat. Fig. 1 shows an apparatus fitted to an ordinary fireplace, and heated by gas jets.

**18,561. Dillon, T. A.** Oct. 18.

*Heating air.*—In order to dry peat &c. evenly and rapidly, it is placed in a suitable chamber heated by waste steam from a steam engine, or by live steam, which is passed through a coil arranged in the chamber. The air in the chamber is heated by the steam, and a draught is induced by surrounding the small discharge orifice of the steam pipe with a short tube, through which the air is discharged.

**18,652. Bickel, F. L.** Oct. 18.

*Steam traps.*—The trap, shown in Fig. 1, comprises the main valve C, which forms a piston  $c^1$  sliding in the cylinder F, and the secondary valve E, which is controlled by couplers M built up of brass and iron. The couplers M have outer layers of brass and inner layers of iron; they are strung on the valve stem  $e$ , and are pressed together by spiral springs Q. The secondary valve closes by the expansive action of the metal couplers only when steam rises into the dome D. The screw  $d$  enables the valve E to be adjusted.



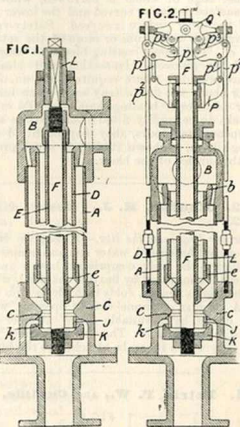
**18,860. Rensing, C.** Oct. 22.

*Methods of heating.*—Relates to a process for heating by steam under pressure for hardening calcareous sandstones and for other purposes. Air or other suitable gas is forced into the heating vessel until the requisite pressure is approximately obtained, after which steam at the desired pressure is introduced. The pressure steam is thus mixed with a quantity of air or gas, and the rigid, pasty, or liquid masses are subjected both to pressure and to the action of the steam.

**18,873. Thompson, W. H., and Thompson, R.** Oct. 23.

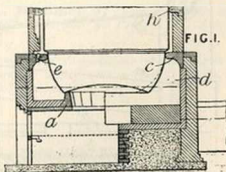
*Steam traps.*—Relates to improvements in steam traps of the kind described in Specification No. 8252, A.D. 1900, in which circumferential expansion of a ring or valve is employed, with or without longitudinal expansion of a tube or tubes. In the trap shown in Fig. 1, the inlet chamber B is connected to the outlet chamber C by the brass or expansion tube A. The non-expandible tube D is fixed to the webbed ring  $b$ , and is connected to the inner expansion tube E by the reducing-socket  $e$ . The valve spindle F is non-expandible, and carries on the disc  $k$  the expansion ring or valve seating J. The adjustment of the ring J is effected from outside the trap by the adjustable plug L. In a modified form of trap, the spindle F is expandible and hollow, so as to permit of being cooled, and the ends pass through suitable stuffing-boxes in the inlet and outlet chambers. A suitable valve may also replace the ring J and disc K. The travel of the valve seating may be increased by a system of levers as shown in Fig. 2. In this trap the central expansion tube E is provided with the crosshead P to support the levers  $p^1$  by links  $p^1$ . The outer ends of the levers  $p$  are connected to

the rods  $p^2$ , which are screwed to the outlet chamber, and the inner ends are connected to the crosshead Q by the links  $p^1$ . The levers  $p$  may be compounded, if desired, and a guide or guides



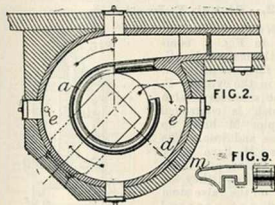
may be used to stay the central expansion tube. In another form of trap, the upper and lower valve seatings  $c$  and  $k$  and the ring J are employed without expansion tubes. A screen or strainer may be employed to catch impurities; it may be arranged round the inlet tubes and within the tube connecting the inlet and outlet chambers, or preferably it may be arranged above the inlet chamber by forming an upward extension of that chamber.

**18,968. Foulton, W.** Oct. 23.



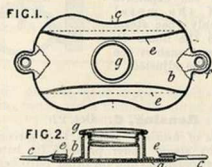
*Boiling pans.*—Relates to firebrick, clay, or like blocks, and to the method of arranging them for setting brewing-coppers and like vessels. The

brewing-copper shown in Figs. 1 and 2 is supported by the semicircular point-like or narrowed surface seating-blocks *a*, arranged in the form of part of a ring. The setting-blocks *c* form a ring, the inner edge of which is narrowed, while the upper surface is flat or curved and the lower portion of the inner surface is curved. Safety-valves *e* are arranged within one or more of the setting-blocks *c*. The upper setting-blocks *h* may be recessed or grooved. Inspection and cleaning doors are provided where required, and an upper chamber above the flue *d* may serve as an inspection or additional heating chamber. To enable the blocks to be readily fitted or chipped to serve as compensation blocks, they may be fitted with chipping-ribs *m*, as shown in Fig. 9, which project above the surface of the block.

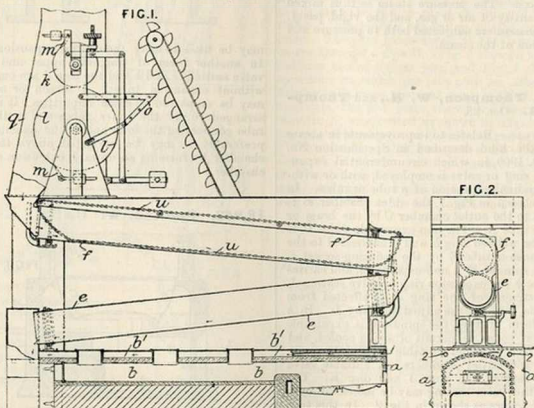


18,972. Haddan, H. J., [Meinecke & Co.].  
Oct. 23.

*Hot-water bags and the like.*—A bag or receptacle, for containing hot water &c. and adapted to be applied to the body, comprises a base *a* and an upper part *b* connected by flexible material, which, when the bag is empty, folds into pleats *e* on each side. A tubular or funnel-shaped opening, which can be closed by a suitable screw stopper *g*, is provided in the part *b*. The bag is formed with eyelets *f*, by which it can be attached to the body.



19,081. Petrie, F. W., and Cunliffe, R. Oct. 25.



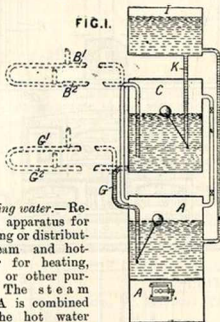
*Heating air.*—The products of combustion from a furnace *a* circulate round two inclined drying-tubes *e*, *f*, into which the material is fed from a hopper *c*. The furnace is surrounded by a row of

1900]

ABRIDGMENT CLASS HEATING.

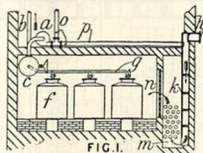
tubes 1, through which air is admitted to the heating-chamber  $b'$ , surrounding the furnace chamber  $b$ . The heated air passes through the drying-tubes to the chimney  $q$ . By means of damper-controlled tubes 2 cold air can be admitted to the drying-tubes after the drying operation.

19,318. Godfray, A. Oct. 29.



*Heating water.*—Relates to apparatus for supplying or distributing steam and hot water for heating, drying, or other purposes. The steam boiler A is combined with the hot water tank C and the water supply tank I by means of the pipes shown in Fig. 1. The pipes G and K are fitted with ball float valves. Steam may pass along the pipes  $B'$ ,  $B'$ , or direct to the water tank C, and hot water may pass through the pipes  $G'$ ,  $G'$ , or direct to the boiler A. In a slightly-modified form of apparatus, the various distributing-pipes are fitted with suitable valves.

19,485. Meyer, A. Oct. 31.

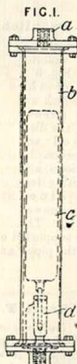


*Heating air.*—For ventilating fermentation rooms, store-rooms, and other confined spaces, the incoming air is cooled or heated, filtered wholly or partially, and, after exhaustion from the rooms, is discharged or re-used. Fig. 1 represents a section through a room which contains a series of fermenting vats  $f$ . By exhaustion, air is drawn through shafts  $h$  provided with non-return valves and with filters  $k$ , passed over cooling or warming

pipes  $m$ , and then through easily-removable partitions  $n$  into the room to be ventilated. Thence the air passes by funnel-shaped mouths to the vessel  $c$  provided with exhaustion pipes  $b$ . The vats communicate with the vessel by pipes  $g$ . To increase the ventilation, an exhauster  $a$  may be put into operation, by means of which the air may be discharged by the pipe  $o$ , or returned to the incoming air shaft by the pipe  $p$ .

19,629. Newton, J., and Edgerton, J. Nov. 2.

*Steam traps.*—A steam trap consists of a metal cylinder  $b$  connected by a projection  $a$ , on a detachable cover, to a steam pipe, cylinder jacket, jacketed pan, or the like, and containing a hard-wood or hollow metal float  $c$  connected by a forked projection and a pin to a valve  $d$  controlling an outlet in a detachable cover, at the bottom of the casing, and leading to a drain, receptacle, or steam generator.



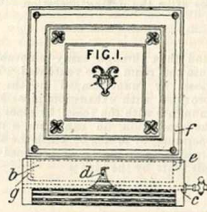
19,871. Hommel, J. June 26, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1883.]

*Non-conducting compositions* are prepared from the following ingredients:—vinegar, alum, glue, pulverized asbestos, and saltpetre.

19,923. Fröhlich, M. Nov. 6.

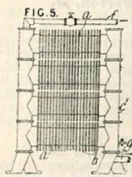
*Heating-apparatus.*—A gas-heated steam heating-apparatus is shown in Fig. 1. The boiler  $b$  is half-filled with water by means of the cock  $d$  when inverted, and is heated by the gas burner  $c$ . The steam is carried into the heating-chamber  $f$  by the

pipe *e*, and condensed water is returned to the boiler by the pipe *g*



**19,924. Fröhlich, M. Nov. 6.**

*Heating buildings &c.*—The radiator shown in Fig. 5 is composed of the tubes *a*, which are outwardly screwed to receive the discs *b* screwed and spaced thereon by distance-pieces, and the connecting tee-pieces *c* joined together by screwed nipples. The radiator is supported on feet, and the heating-fluid enters by the pipe *f* and leaves by the pipe *g*.



**20,032. Scott, F. J. Nov. 7.**

*Heating buildings &c.*—Consists in heating buildings &c. by passing the products of combustion from the fireplace in a lower room through flues formed in the fireplaces of the upper rooms, in which water-heaters or air-heaters may also be arranged. Figs. 1 and 1<sup>A</sup> show in sectional elevation the fireplaces in the lower and upper rooms respectively. The flues *a*<sup>2</sup> of the kitchen range *A* pass round the oven *a* and through the water-heater or the like *b* to flues *c*<sup>2</sup>, *d*<sup>2</sup> which are arranged on each side of the upper fireplaces *c*, *D*, and which pass through the heaters *b*<sup>2</sup>, *b*<sup>3</sup>. The flue *c*<sup>1</sup> of the fireplace *C* passes through the heater *b*<sup>2</sup>, round the fireplace *D*, and through the heater *b*<sup>3</sup>, and, in the same way, the flue from each fireplace passes round each fireplace above and through the corresponding heater. The flues are arranged so that the hottest occupies the best position for heating the room, and the coldest the worst. The heaters may communicate by pipes *e* with a water-circulating cistern *E*, and draw-off taps *f* may be provided. The vertical pipes *e* are preferably enclosed in a shaft *i*, open at the top to the atmosphere, to which air can pass from the rooms through gratings *i*<sup>1</sup>. The upper fireplaces may be provided with hot-closets for airing linen and the like, and

each fireplace may be adapted for burning fuel of any kind.

FIG. 1.

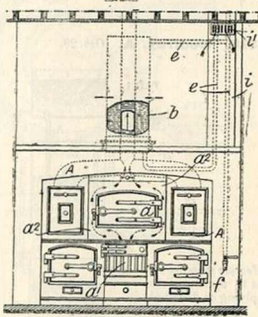
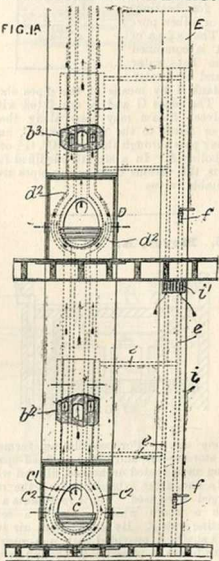


FIG. 1A

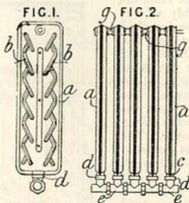


20,044. Nafzger, C. F. Nov. 7.

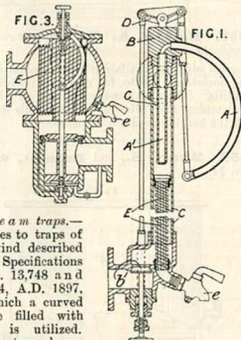
*Non conducting coverings and compositions.*—A cork insulating-material for pipes, conduits, &c. is made of coarse particles of cork united by a small quantity of binding-material. The mass thus produced is coated on the exposed part with a waterproof and airtight layer consisting of finely-divided particles of cork united by a large amount of binding-material. The two layers may be made separately, and united by pressing; or the constituents may be mixed in a cold state, pressed, and united by heating in the mould.

20,047. Fröhlich, M. Nov. 7.

*Heating buildings &c.*—The radiator, shown in Figs. 1 and 2, consists of sheet-metal plates *a* suitably stamped into shape and provided with strengthening and ornamenting impressed ribs *b*, and welded together in pairs along a common seam. The plates have semi-pipe-like projections *c* at their lower ends, the projections being held in contact by rings *d* welded or soldered thereon. The tee-pieces *c* are screwed on to the rings *c*, and are united together by screwed nipples, while the upper ends of the component parts are connected by cylindrical pieces and sleeves *g*.



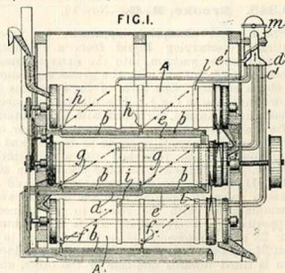
20,150. Thompson, W. H., and Thompson, R. Nov. 9.



*Steam traps.*—Relates to traps of the kind described in Specifications Nos. 13,748 and 22,434, A.D. 1897, in which a curved tube filled with spirit is utilized. In the trap shown in Fig. 1, the curved tube *A* is joined to, or is in one with, the straight tube *A'*, and these tubes contain the expansible liquid. The union piece *B* carries the casing *C* and supports the lever *D*, which is connected by rods to the end of the tube *A*, and to the outlet-controlling valve *b'*. A screen or strainer *E* and a blow-off cock *e* are provided. In a modified form of trap, the curved tube *A* is contained within a chamber, and a flat screen may be bolted within

the casing to check or catch impurities. In the trap shown in Fig. 3, the screen *E* is cylindrical and of gauze, the type of trap being that described in Specification No. 22,434, A.D. 1897.

20,196. Jäger, W. Nov. 9.

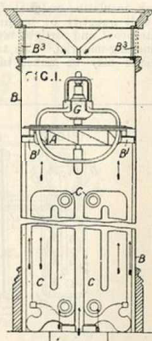


*Heating air.*—A rotary drying-apparatus, fitted with a device for heating air for drying purposes, is shown in Fig. 1. A continuous channel *b* passes under the cylinders *A*, and steam or superheated air is passed through the channel. Cold air is sucked into channels *d, e* placed under the channels *b*, and the air is heated in its passage through the channels, and then enters the drying-cylinders.

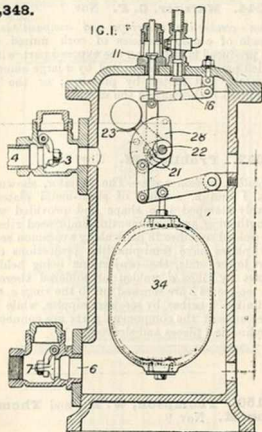


**20,239. Keith, J.** Nov. 10.

*Heating air; heating buildings.*—Relates to apparatus for heating air for heating and ventilating apartments. The apparatus shown in Fig. 1 comprises the tubular pillar B, the radiators C, preferably of the circular type described in Specification No. 19,233, A.D. 1894, and the electric fan A of the Blackman silent or other type. The fan is fitted upon the shelf B', and is driven by the motor G. The heated air is passed to the apartment through the lateral openings B'. The pillar B employed may extend from floor to ceiling, or may depend from the roof. In a slightly-modified form, the fan A faces the openings B', and, in another modification, the fan and motor are carried in a domed or other shaped head mounted on the column, and baffle-plates are arranged in the head to direct the air to the openings provided.



**20,348.**



**20,348. Brooke, R. G.** Nov. 12.

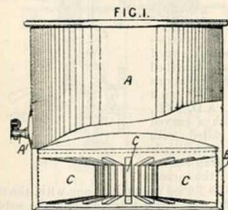
*Steam traps.*—Comprises apparatus for automatically discharging liquid from a chamber, normally under vacuum, into the external atmosphere, suitable for use with the grease separators of steam engines. One form of the apparatus is shown in section in Fig. 1. The collecting-chamber 1 has a liquid inlet 4, furnished with a non-return valve 3 and connected to the grease separator or other partially-vacuous vessel to be drained, and a liquid outlet 6 also furnished with a non-return valve 7. The collecting-chamber also has an air valve 11 opening to the external air, and a vacuum valve 16 opening into the chamber and communicating with the vessel to be drained. Supported by a cross-shaft 22 is a weighted arm 23 and a segmental plate 28 connected to a float 34. As the float rises and falls, the weighted arm is tilted towards one side or the other, and thus, by means of a slotted segmental plate 21, operates the two valves 11 and 16, opening one and closing the other. When the air valve is open and the vacuum valve is closed, the liquid can drain away past the valve 7, the valve 3 being kept closed by the atmospheric pressure; and, when the air valve is closed and the vacuum valve is open, the liquid can enter the vessel by the valve 3, the valve 7 being kept closed by atmospheric pressure.

(For Figure see next column.)

**20,358. Hart, J. A.** Nov. 12. *Drawings to Specification.*

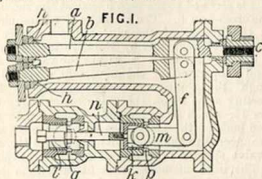
*Heating air for ventilating apartments and supplying moistened air to, for example, textile spinning mills.* The apparatus comprises, in addition to moistening and filtering devices, coils through which the heating-medium is passed.

**20,556. Ewart, S., and Bennett, W. H.** Nov. 14.



*Heating water.*—A cylindrical &c. water-heater is provided with radial tapered water pockets C situated in a central heating-space and opening into an annular chamber B below the boiler proper A, which has a dome-shaped bottom and a draw-off tap A'. In a modification, the water pockets depend from a flat boiler bottom.

## 20,885. Langridge, J. Nov. 19.



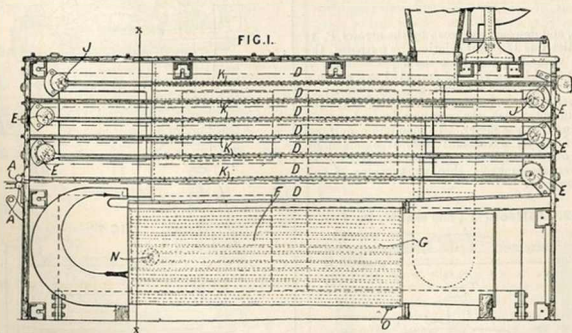
*Thermostats.*—Relates to thermostatic means for controlling the supply and exhaust valves of a building heating system and the like. The thermostat or regulator is shown in Fig. 1, and comprises the expansion rods *a*, *b*, the lever *f*, and the

connections *m* and *n* with the valves *l*, *i*, controlling the exhaust *p* and supply ports *q* respectively. The rod *a* is rigidly fixed to the casing at the screwed end *c*, while the free end passes out through a rubber gland *h* and is fixed to a plate which is pivoted between the ends of the rods *a*, *b*, so that movement of the rod *a* is communicated to the rod *b* and to the lever *f*. The expansion of the rod *b* further increases the movement of the lever *f* to close the exhaust and supply valves of the hot-water and other heating-system.

## 20,894. Goldschmidt, H. Nov. 19.

*Heating by chemical action.*—Molten iron for welding metals is obtained by igniting a mixture of aluminium and oxide of iron in a crucible.

## 20,894. Tattersall, J. Nov. 19.



*Heating air for yarn-drying apparatus in dressing and similar machines.* The heating-apparatus *F* is constructed to withstand high pressure, and contains tubes *G* through which air is forced by means of a fan. Steam is introduced by means of a pipe *N*, and water of condensation is removed through a pipe *O*. The heated air then passes into the drying-chamber *D*.

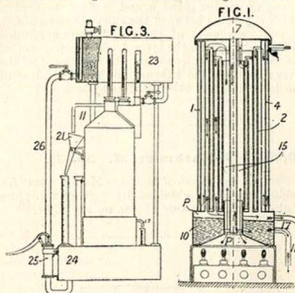
21,226. Brown, A. E. Nov. 23. *Drawings to Specification.*

*Heating air.*—Elongated drying-chambers, through which trucks containing earthenware or other articles are passed to be dried, are heated underneath by means of an aspirated current of furnace gases, which is finally passed through a tubular heating-chamber in which air, subsequently used in the drying process, is heated by being drawn through the chamber.

## 21,465. Simmance, J. F., and Abady, J. Nov. 27.

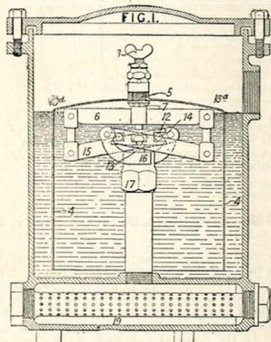
*Heating water.*—Relates to water-heating apparatus for domestic and calorimetric purposes. The heater is shown in Fig. 1, and the calorimetric arrangement is shown in Fig. 3. Water is fed to the outer annular chamber 1, which is divided longitudinally by the partition 4, and flows upwards to the cross-tube connecting the chambers 1 and 2 and afterwards down and up the succeeding

chambers to the chamber 7 at the top. From this chamber the heated water flows to the chamber 10 and to the outlet 11. The products of combustion from the oil or gas burners rise through the central



flue 15, and descend, as shown by the arrows P, to the outlet flue 17. For calorimetric purposes, the heated water is taken from the upper chamber 7, and is passed by a swinging funnel 21 to a measure for the same period of time that the quantity of oil measured by a balance is consumed, or for the time during which the consumption of gas is measured by a gas meter. To maintain a uniform flow of water, a constant head is obtained by means of the tank 23, which is connected with the overflow tank 24 through the pipe 26 and feed pump 25.

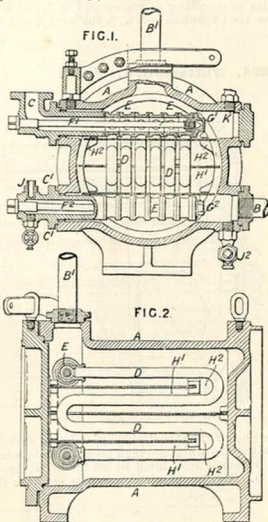
21,842. Allison, T., and Shaw, F. Dec. 3.



Steam traps.—The steam trap shown in Fig. 1 is

of the inverted float type. The inverted cup-like float 4 is screwed to the pipe 5 against the shoulder in the cross-arm 6. The air holes 7 communicate with the interior of the pipe 5, the aperture of which can be regulated by the adjusting-screw 8. The conical trap valve is within the valve casing 17, and is operated by the movement of the float through the compound-lever mechanism. The projecting arms 16 on the valve casing carry the levers 15, which have pins 14 engaging with the slotted ends of the cross-piece 12. The cross-arm 6 is connected to the levers 15 by the links 18, and the valve spindle 13 is carried by the cross-piece 12. The inlet chamber 19 is fitted with a perforated tube to prevent dirt from entering the trap.

21,908. Binny, W. M. Dec. 3.



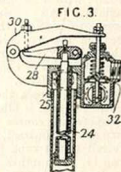
Heating water.—The apparatus shown in Figs. 1 and 2 comprises the casing A with the water inlet B, the water outlet B', the steam inlet C, and the outlet for the condensed steam C', a number of bent metal tubes D the ends of which are connected to the headers E, in parts checked together and strung on the bolts F<sup>1</sup>, F<sup>2</sup>, screwed into the caps G<sup>1</sup>, G<sup>2</sup>, closing the inner ends of the pipes. Baffle-plates H<sup>1</sup> may be arranged within the casing A, and secured by snugs H<sup>2</sup>. Each unit of the apparatus consists of a bent tube D and two rings

or headers E, and numerous units may be employed. A thermometer for testing purposes is placed in the cup J on the outlet branch C'. A cleaning-cock J', a relief valve on an outlet K, and suitable openings for inspection and cleaning are provided.

**21,977. Bole, W. A., and Ruud, E.**

May 5, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1883].

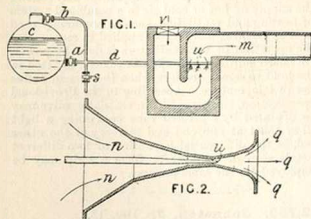
*Thermostats.*—The current of water from the cylinder jacket of an explosion engine to the jacket of a carburettor is controlled by the temperature of the return current, which heats a brass tube 24 and steel rod 25. The tube is fixed at the top and closed at the bottom, and contains the rod 25, which actuates levers 28, 30 attached to the valve 32 in the water pipe.



**22,099. Jagsch, J.** Dec. 5.

*Non-conducting coverings and compositions.*—The top plates of cooking-ranges are covered with a non-conducting lagging, which may suitably consist of a mixture of kieselguhr and clay.

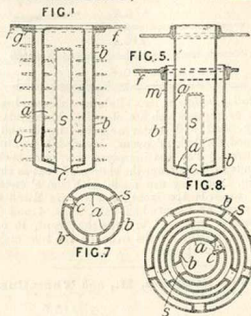
**22,300. Lake, H. H., [Sconfietti, L.].** Dec. 7.



*Heating air.*—The air supplied to workshops and factories is moistened and cooled by admitting to it water under pressure from a steam boiler in such proportion that the air absorbs all the water without becoming completely saturated, and it may be heated by mixing steam with the water or by a separate heater before being moistened. Fig. 1 shows a steam boiler *c* with air and steam pipe *d* supplying nozzles *u* in a passage *m* supplied by a fan *c*. The cocks *a* and *b* control the steam and water supply, and the cock *S* drains waste water from the pipe *d*. The air may be induced by the water jet *u*, Fig. 2, through the passage *n*, and discharged at *q*.

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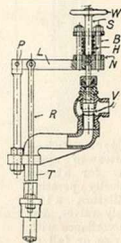
**22,354. Blackburn, G. W.** Dec. 8.



*Heating gases; heating liquids.*—Elements for cooling, condensing, and heating apparatus are constructed of two concentric semicircular or segmental shells *a, b*, joined together along their edges *c*, or made in one piece by casting, so as to leave two or more gaps *S*. The ends of the inner shell may be connected by a fluid-tight diaphragm, or, like the outer shells, they may be connected to headers or plates *g* or by glands or ferrules *m* or otherwise. The shells may be provided with gills or ribs, or may be corrugated. The elements may be arranged in concentric circles, and more than one element cast in a piece.

**22,552. Foster, F.** Dec. 11.

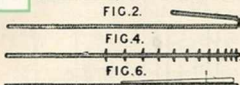
*Steam traps.*—A steam trap, operating by differential expansion, is shown in the Figure. The tube is of brass, and by its contraction relative to the rods *R* opens the outlet *V* of the trap. The lever *L* is pivoted to the pin *P*, and carries the spindle *S*, which is screwed to the loose plate *N* capable of sliding on the studs *B* under the pressure of the spring *H* when the pressure on the spindle *S* is excessive. Straining of the parts is prevented, when grit or foreign matter passes through the valve, owing to the elastic construction of the valve-operating means. The outlet-controlling valve may be opened, and left open, when turning steam into a long line of piping, by means of the wheel *W*.



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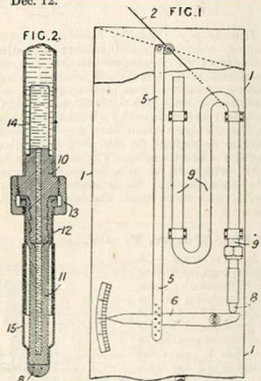
P 2

**Schroeter, J. F.** Dec. 11.

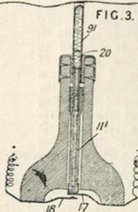


*Heating buildings &c.*—Relates to steam heating tubes or pipes which are closed at both ends and partly filled with water or other liquid and are designed for bakers' ovens, drying-kilns, or other structures. The heating-pipes are bent back at the ends farthest from the source of heat as shown in Fig. 2, or they are made with more metal in them towards the front, or they are fitted with transverse or longitudinal ribs, Figs. 4 and 6, or the base is increased towards the front, in order that the heating in the oven or the like may be made more uniform.

**22,666. Simpson, H., and Thomlinson, R.** Dec. 12.

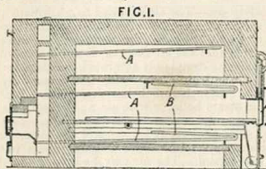


*Thermostats.*—Relates to apparatus for automatically operating ventilators, air supply valves, &c., in accordance with the rise or fall of temperature. Fig. 1 shows the application of the invention to a Tobin tube. The spindle of the air valve 2 is connected to a lever 5 adjustably



coupled to another lever 6 pivoted to the casing, one end of this lever forming a pointer moving over a graduated scale, and the other end being acted upon by expanding end piece 8 of the tube 9 attached to the casing of the tube 1 or other suitable object. The tube is closed at one end, and is filled with oil or spirit, such as coco-nut oil, to which a little ammonia is added. The other end of the tube has a nozzle 10, Fig. 2, secured thereto, and carrying a rubber bag 11, bound round with wire &c. so that it can only expand axially. An encircling tube and a nut 13 serve to connect the nozzle and bag, and at the bottom the bag is secured to a tube 15 sliding on the tube 12 and provided at the bottom with a piece 8 to make contact with the operating-lever of the ventilator. A flexible capsule 14 of tin foil &c. encloses the top of the nozzle, and the enclosed space is filled with water. A variation in temperature causes the liquid in the tube 9 to expand or contract, and this movement is transferred to the tube 15 through the capsule 14 and bag 11. A number of tubes may be employed to multiply the effect. In another arrangement, shown in Fig. 3, the end of the tube 9' is secured to a wooden base, and, instead of a capsule 14, a wad 20 of gelatine containing alum, or of oxidized linseed oil &c., may be employed. The end of the bag 11' may be guided by attaching it to a spring 17. In addition to opening a ventilator, the apparatus may sound an alarm bell when the rise or fall of temperature exceeds certain limits, and in the case of very high temperature, as in a fire, the ventilator may be closed by attaching the levers 5 and 6 together in such a manner that they are released, say by a fixed cam making contact with the coupling-pin. The apparatus may control the supply of hot or cold air in a combined system of heating and ventilating, such as commonly used in hospitals &c., and may be applied in cases where the operation of the ventilators is done by power. On board ship &c., the apparatus may be fitted in the hold to signal on deck when there is an undue rise in temperature. According to the Provisional Specification, the pivot of the ventilator valve may be operated by a pivoted tube containing a light oil or spirit at one end and mercury at the other end, or the differential expansion of two different metals secured together to form a strip may be employed for the same purpose.

**22,736. Johnston, J.** Dec. 13.

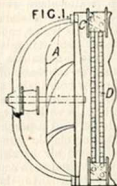


*Heating-apparatus.*—Relates to heating, baking, and drying apparatus of the Perkins tube type,

and consists of an improvement on the invention described in Specification No. 10,955, A.D. 1889, [*Abridgment Class Cooking &c.*]. The radiating surface of the hermetically-sealed tubes A is increased by bending them at the front part of the apparatus or oven and returning them towards the back as shown in Fig. 1.

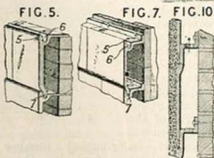
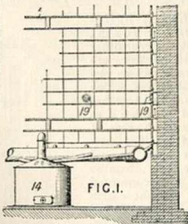
**22,793. Robinson, A., and McDowell, K. C.** Dec. 14.

*Heating air.*—Relates to apparatus for heating air to be used for drying yarns and fabrics. The heating-coil D is fixed vertically, the tubes being bent or coiled and screwed at the top and bottom into the short flanged cast-iron pipes C. The coils D are arranged so that the air has to pass in zig-zag fashion. Live or exhaust steam is passed from the top cast pipe to the bottom one. A fan or blower A is placed at one end of the casing.



**22,853. Anderson, D. W., Thaw, E. B., Chalmers, J. F., and Wright, J. T.** Dec. 14.

*Heating buildings.*—Relates to the heating, cooling, or ventilating of buildings by air circulating through conduits or passages extending substantially throughout the entire area of

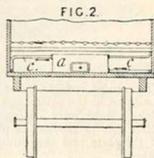


the walls of the buildings. A heating-system is shown in Fig. 1. The wall facing comprises interlocking tile sections provided with transverse

perforated projections which obstruct the ascending currents of air and direct them along the horizontal conduits. The tile shown in Fig. 5 has a flange 5 which fixes the tile to the wall, a groove 6 to receive a tongue, and a tongue 7 to fit into the tile below. In another form of tile, the groove and tongue are deeper, and the outer surface of the tile is roughened or grooved to facilitate plastering. Modified forms of tiles fixed to the walls by nails are shown in Figs. 7 and 10. The heater 14 is connected by radiating-pipes with the lower conduit formed between the bottom tiles and the walls. Registers 19 are placed at suitable points.

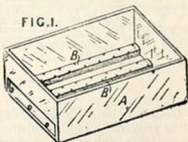
**23,134. Bellis, T. K.** Dec. 18.

*Heating water.*—Relates to means for heating railway carriages and other vehicles, ships' cabins, buildings, and rooms. Fig. 2 shows the application to a railway carriage. The circulating pipes c communicate with the tank a, containing water heated by an immersed electric device comprising a coil of thin wire, which may be arranged in the manner described in Specification No. 9263, A.D. 1900. The current is supplied from a dynamo driven from the axle of the vehicle or otherwise.



**23,299. Pollard, W., and Howarth, T.** Dec. 20.

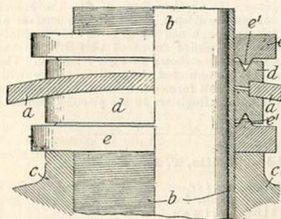
*Boiling pans.*—Low boxes A or similar vessels in which liquids or articles or materials are subjected to steam boiling, are, to avoid corrosion, made of earthenware, with perforated steam pipes B of the same material integral therewith along the bottom as shown.



**23,367. Makin, E.** Dec. 21.

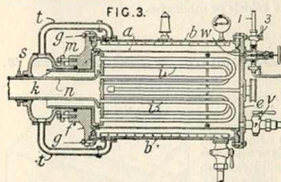
*Heating water.*—Relates to means for securing pipes or rods to the flues and shells of boilers and the like, and is particularly applicable to the pipes connecting the interior of the boiler with the hollow-walled cones described in Specification No. 19,016, A.D. 1896. In the Figure, a is the shell or flue plate and c the wall of the cone. On each side of the plate a is placed on the pipe b a copper

or other soft metal washer *d* having a slightly-tapered boss fitting the hole in the plate. Behind each of these washers is a nut *e* made with an annular projection *e'*, which, when the nuts are



screwed up, is forced into a groove in the washer. The conical bosses are forced against the edges of the holes in the plates, and also against the tube to make a tight joint. Rings or eyelets of copper or other soft metal may be placed between the edges of the plate and the conical bosses to protect the latter.

**23,377. Mongiraud, P., and Labranche, H.** Dec. 21.



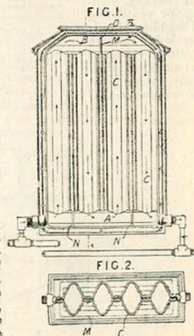
*Heating liquids.*—Relates to apparatus for sterilizing milk &c. The sterilizing-apparatus, Fig. 3, comprises a cylinder *a* surrounded by a steam-jacket *b* permanently closed at one end *e* and secured at the other end by bolts *g* to a disc *f* formed with a gland *m* in which rotates a sleeve *k* carrying U-shaped pipes *t*, which open into a steam supply pipe *n* mounted in a gland *s* and rotated by worm gearing. The steam from the sleeve *k* passes through pipes *t* to the jacket *b*, and escapes through pipes *t* to the jacket *b* and escapes through a cock *g*. A valve *w* operated by a screw connects the cylinder *a* with an exhaust tube *l* and a milk overflow pipe *2*. The cylinder is nearly filled with milk by first exhausting the cylinder through the pipe *l* and then connecting a cock *v* with the milk supply. Steam is then admitted to the pipe *n*, and the milk sterilized.

**23,388. Dickmann, M.** Dec. 21.

*Non conducting coverings and compositions.*—Relates to the manufacture of elastic, fireproof, waterproof, airproof, sound-deadening, heat non-conducting materials for floor coverings, wall coverings, &c. Paper, peat, or other animal or vegetable fibre or pulp, or asbestos, or other material, is rolled, moulded, or pressed into sheets, and treated in the pulp or sheet form with oxidized linseed oil, metallic oxides, alum, sulphate of iron, soap, water-glass, resins, paraffins, wax, size or glue, gelatine, potassium chromate, casein dissolved in ammonia water, caoutchouc, flour, salt, formaldehyde, or cuprammonia, or mixtures of two or more of these substances. Grooves or recesses are formed in the back of the sheet, and perforations or hollow corrugated spaces or cells may be formed in the interior of the material. The spaces may be filled in with peat, sawdust, india-rubber, cork, linoleum, gutta-percha, leather, or other sound-deadening elastic, non-conducting material, or with compressed air by sizing or gluing the sheet in a chamber filled with compressed air. Inlaid patterns may extend into the material, and granite or marble may be imitated by mixing coloured pieces with the raw material or pulp. Parquetry or mosaic patterns are produced by rolling strips or sections of the material together. For imitation tapestry, the grooves or open spaces are in communication with one another to permit free circulation of air.

**23,494. Sinclair, D.** Dec. 22.

*Heating buildings.*—Steam, water, air, or other fluid radiators are formed in two vertical halves, which are bolted together and packed as shown in Figs. 1 and 2. The hollow base *A* and the top chamber *B* are connected by upright corrugated elliptical columns *C*. Baffles *M* are placed alternately at the top and bottom to direct the flow of the heating fluid. These baffles have small openings *N*, *O*, to permit of the getting rid of the water of condensation and air. In arranging a number of radiators around a continuous feed-pipe, the radiators are placed in parallel, and the connecting-pipes are proportioned, as regards their diameter, to the distance from the supply, the whole set of connections being

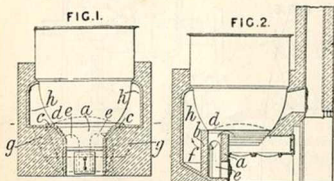


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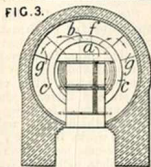
ABRIDGMENT CLASS HEATING.

equal to or less than the area of the flow or return pipes; or the connecting-pipes may have valves which can be adjusted to regulate the fluid flow.

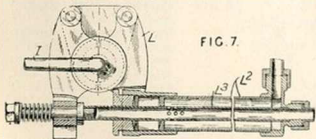
23,506. Worssam, H. J. Dec. 22.



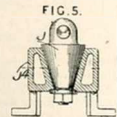
**Boiling pans.**—Relates to a method of setting brewers' coppers so as to prevent destructive action of the flame on the "lag" or angle which the concave bottom makes with the side of the copper, and to render ebullition more uniform. Figs. 1 and 2 show vertical central sections at right-angles to each other, and Fig. 3 shows a horizontal section. Behind the firebride *a* is built a wall *b*, which forms a continuation of the circular structure *c* on which the "lag" *d* of the copper rests. Two openings *e, e* are made through this wall into a deepened part *f* of the back flue, and from this part is made a slope *g* on each side leading up to the level of the side flues *h*. The wall *b* serves to protect the "lag" *d* from the direct action of the flame and hot gases.



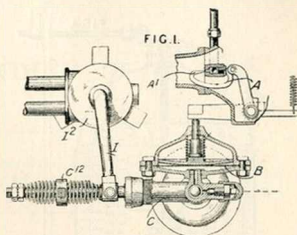
23,794. Clarkson, T. Dec. 29.



**Thermostats.**—Relates to heat regulating apparatus, applicable, more particularly, in connection with instantaneous steam generators for motor cars, but also applicable for use with vapour generators for supplying fuel to large burners and



for other purposes. The flame of a vapour burner is diminished when the temperature of the steam generator rises above a certain limit, preferably by the adjustment of a chisel-edged regulator in the



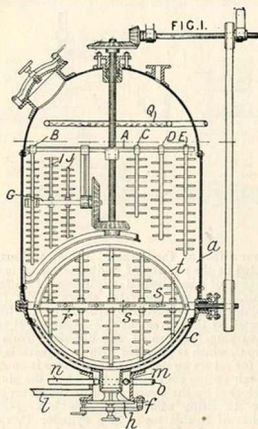
vapour orifice of the burner. The control may be effected on the melting of fusible metal, or in consequence of the unequal expansion of different metals. With the apparatus shown in Fig. 1, the regulator *A*<sup>1</sup> is adjusted by the lever *A*, which is operated by the movement of a diaphragm *B* under the varying pressure of the discharge from the pump *C*, which is provided with an adjustable by-pass for return circulation. The pump is operated through spring connections *C*<sup>1</sup>, when the plunger is unlocked on the temperature of the steam generator &c. rising sufficiently. The locking-device consists of fusible metal in a cylinder *P*, round which water from the steam generator circulates, and which, when solid, holds fast the arm *I*. Fig. 5 shows a modified locking-apparatus, in which the expansion of the casing *J*<sup>1</sup> liberates the plug *J* to which the lever *I*, Fig. 1, is attached. Fig. 7 shows a further modification, in which gripping-levers *L, L* embrace the hub of the locking-lever *I* until they are separated by the unequal expansion of two tubes *L*<sup>1</sup>, *L*<sup>2</sup>, between which the water of the generator circulates. The expansion apparatus described in Specification No. 5775, A.D. 1899, may be employed.

23,796. Lancaster, E. W. Dec. 29.

**Boiling-pans; digesters.**—Relates to a construction of brewers' mash tuns so that, in addition to fulfilling their usual purpose, they may also be used for boiling wort, and in general as digesters. The tun *a* is made of metal, preferably of the shape shown in vertical section in Fig. 1. It is provided with a perforated false bottom *d* and a valved discharge opening *f* leading into a drainage chamber closed by a door *h* through which the grains and other solid materials are discharged. The wort is drawn off through a pipe *l*. The pipes *m, n, o* serve for the admission of hot and cold liquors, air, and steam to the vessel *a*. Rakes or stirrers are provided in the vessel on the shafts *A, r* respectively. On the shaft *r* are mounted two sets of rakes *s* at right-angles to each other and

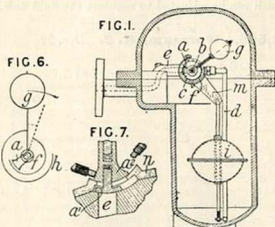


provided at their extremities with angle irons *t*. On the shaft *A* are mounted rakes or stirrers *B*, *C*, *D*, *E*, and in the rake *B* is journalled one end of a shaft *G* on which are mounted stirrers *I*, *J*. The



shafts *A*, *r*, *G* are operated by suitable means. *Q* is a sparger. The vessel *a* is fitted with a valve for the emission of vapour, a snifting-valve, pressure gauge, thermometers, &c.

23,841. Bischoff, A. von. Dec. 31.



*Steam traps.*—Consists of a form of draining-apparatus for condensation water in which the counterweight and float are made as small as possible, owing to the weight being allowed to have a free fall and acting by impact. The escape valve also is a rotary slide valve, providing a double closure and thereby reducing leakage. The complete apparatus is shown in Fig. 1, and a diagram showing the float and weight action in Fig. 6. The valve *a* works in a box *c* to which the escape pipe *d*, *e* is connected. The valve spindle *b* carries an incomplete cylinder *f*, on which the arm of the weight *g* can act, as shown in Fig. 6, whenever it is pushed from its vertical position by means of a second incomplete cylinder *h* connected to the float *i* by an arm *m*. The fall of the float, after discharge of the condensation water through the cylinder *h*, again resists the weight. Fig. 7 shows the double closure of the rotary slide valve. The part *a*<sup>1</sup> slides on the outlet *e*, and the part *a*<sup>2</sup> on a box *n* containing the part *a*<sup>1</sup>.

## APPENDIX.

The following twenty-nine abridgments should be added to those appearing in the volume of this class for the period A.D. 1877-83.

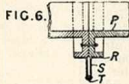
## A.D. 1877.

1760. Jones, W., and Walsh, J. May 5.  
 [Provisional protection only.]

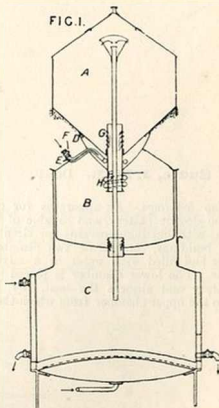
*Boiling-pans.*—An expansion joint for large cast-iron pans used in chemical operations in which considerable changes of temperature take place, consists of an L-shaped flange formed on each of the outer projecting flanges, thus producing a double or T-shaped flange outside the pan. Two wrought-iron or steel angle-iron plates are riveted to this flange, their long projecting webs being secured together, but separated by a caulking-strip at the ends.

2481. Jones, W., and Walsh, J. June 27.

*Boiling-pans.*—An expansion joint, applicable for large cast-iron pans subject to considerable changes of temperature in chemical operations, consists of L-shaped flanges R formed on the segments and carrying wrought-iron or steel angle-irons S which are fitted with a caulking-strip T.



means of gas passing through a perforated plate on the top of a gas chamber. The boiler A may be covered with felt or other non-conductor, and the



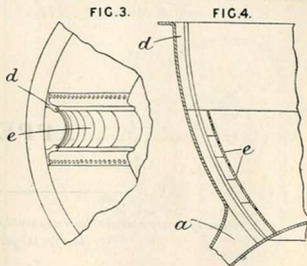
3548. Brecknell, J. Sept. 21.

*Heating water; boiling-pans.*—Water is heated in a boiler A of a brewing-apparatus by means of a bunsen gas burner D, and is passed down a pipe G and a coil H to the mash tun B. Steam is then conveyed from the boiler A to the wort boiler C, which is also heated at the bottom by

wort boiler C may be surrounded by a jacket, to which may be admitted cold water for cooling the wort.

4194. **Steel, J.** Nov. 9.

*Boiling-pans.*—In order to facilitate the drawing off of brewers' worts from a copper or boiling-pan, leaving the hops for use with a subsequent charge of worts, the copper is provided with two guides *d*, Fig. 3, which extend upwards from the bottom to the top on each side of the outlet. A number of curved perforated copper plates *e*, Figs. 3 and 4, are slipped into these guides, so as to form a tube extending from the outlet *a* to the top of the copper. When drawing-off the wort, the plates *e* are lifted successively by engaging a hook in eyes formed on them, and the upper layers of liquid are thus drawn off first, the hops being left at the bottom of the copper. In a modification, a telescopic pipe rising from the outlet is compressed from the top downwards, when the worts are required to be drawn-off.



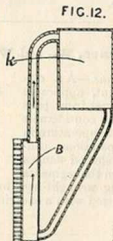
4275. **Heinke, F. W.** Nov. 15. [*Provisional protection only.*]

*Heating by electricity.*—The heat of an arc lamp is used to generate steam in a boiler placed above the carbons.

A.D. 1878.

5041. **Sudre, J. M. E.** Dec. 9.

*Heating buildings.*—An apparatus for cooling one side of a thermo-electric battery, and capable of being used in combination with heating-apparatus for circulating warm air for heating buildings, consists of two chambers *B*, *k* connected by pipes and filled with water or a mixture of water and glycerine. The lower chamber is placed against one side of the battery and absorbs the heat, the heated liquid then rising to the upper chamber from which the heat is radiated.

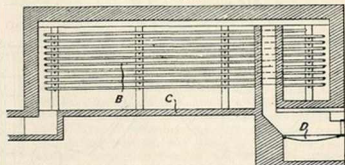


## A.D. 1879.

## 2939. Carey, E., Gaskell, H., and Hurter, F. July 18.

*Heating liquids.*—In the purification of alkaline solutions, the prepared solutions are forced by a pump through a coil B, or through passages, arranged within the chamber C, which is heated by the furnace D, the products of combustion escaping by the chimney *a*. The liquid is kept under pressure, and a pressure gauge and accumulator are placed between the pump and the coil to prevent bursting of the coil. The exit pipe is forked and provided with loaded valves.

FIG. 1.



## 4155. Kingsford, C. Oct. 14. [Provisional protection only.]

*Heating air.*—The waste heat of coke and other ovens or furnaces is employed to heat air for use in evaporating liquids in chemical and other manufactories. A reservoir or vessel of boiler plate or other suitable material is placed round or in close proximity to the coke or other oven or furnace. Cold air is forced into the vessel, and, when heated, is withdrawn by pipes provided with suitable valves. The vessel is heated by the waste heat from the combustion of the fuel in the furnace.

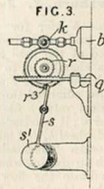
## A.D. 1880.

## 1203. Fidler, W. March 20. Drawings to Specification.

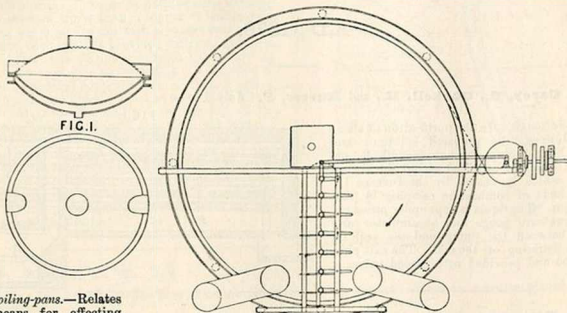
*Boiling-pans.*—Pots for use in the manufacture of salt-cake and other salts are made with the bottom in one piece. A wrought or rolled steel plate is made red-hot and pressed between dies or worked or hammered to the required shape. The rim may be made separately or in one piece with the bottom.

## 1416. Jensen, P., [Brin, Q. L., and Brin, A.]. April 7.

*Thermostats.*—A furnace for heating retorts *b*, Fig. 3, containing a material which absorbs oxygen from the air, and from which the oxygen is afterwards withdrawn at a "reduced pressure," is provided with two thermostats for regulating the temperatures during the absorption and the exhaustion processes respectively. In the first thermostat the end of the bar *q* engages with a toothed wheel *r* and thus regulates the blast by means of the valve *s'* and the admission of air to the retorts *b* by means of the valve *k*. The lever *s* may have an adjustable fulcrum. In the second thermostat the peg *r'* is fixed to the rod *q*, and the gearing is dispensed with.



2417. Newall, R. S., and Newall, F. S. June 15.



*Boiling-pans.*—Relates to means for effecting chemical decomposition, as for instance the decomposition of common salt in the manufacture of sodium sulphate. Instead of the usual thick pan, heated by a furnace, a thin pan of phosphor bronze, heated by superheated steam or air, is employed. Fig. 1 shows a cross-section of a pan, having a double bottom to contain the heating medium, a central feed opening, and side openings for the escape of the hydrochloric-acid gas and spent materials.

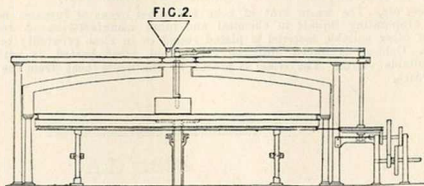
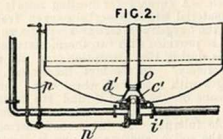


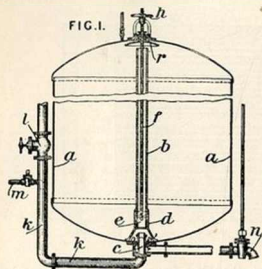
Fig. 2 shows a plan and a vertical section of a rotary apparatus. The salt and sulphuric acid are fed continuously at the central opening, and slowly carried towards the periphery by the stirring-apparatus, which may be of the kind described in Specification No. 5230, A.D. 1879, [*Abridgment Class Furnaces &c.*]. The rotary pan has a perforated bottom to admit steam, and is preferably driven by a wire rope or chain in the manner shown. The stirrers are vibrated by a crank of variable length on the vertical driving-shaft. The process may be completed in a roaster of ordinary form or may be completed in the apparatus shown, which in this case is raised to a temperature of 350° C.

2868. Hawthorn, J. July 12.

*Boiling-pans.*—A kier for use in boiling and scouring cloth and other goods and fibrous substances, is fitted at the base of the puffer pipe *b*, Fig. 1, with a chamber *d*, to which the liquor is passed through the nozzle *c* and the pipes *k*, *m*, steam being also admitted through the valve *l*. A hollow cylindrical valve *e* fits the cylindrical part of the chamber *d*; it is actuated by means of the rod *f* and hand-wheel *h*, and takes its seat upon the collar of the nozzle. The nozzle *c* projects into the shell *a* through an opening which is larger than the nozzle, to facilitate the flow of liquor through openings in the chamber to the discharge pipe *j*.



When the valve *e* is raised as shown, steam admitted through the valve *l* draws the liquor from below the goods and injects it through the puffer pipe into the space above the goods to maintain the



circulation. To discharge the liquor from the kier, or to discharge the air before admitting the liquor, the valve *m* is opened, the valve *e* is closed upon

the nozzle, and the steam passes above the goods. In a modified form, the nozzle *c*<sup>1</sup>, Fig. 2, is arranged to slide in the branch *i*<sup>1</sup>, and its upper end fits a seating *o* in the base *d*<sup>1</sup>. To discharge the air or liquor, the nozzle is raised by admitting steam through the pipe *p* to the space beneath the piston head formed at the bottom of the nozzle. When the steam for blowing through is admitted at the upper end of the kier, the puffer plate *r*, Fig. 1, is suspended from a weighted lever or pair of levers, and the plate is just overbalanced by a counterweight, so that the puffer pipe is closed by the plate when the steam is admitted, and at other times is open.

**4827. Dennis, J. H.** Nov. 22. [*Provisional protection only.*]

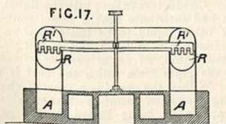
*Boiling-pans.*—Pans for salt cake or sodium sulphate are made of three thicknesses of metal, e.g., cast iron inside and outside and a sheet of copper between. Steel and other metals may also be used, and a layer of asbestos or a fluxing cement may be inserted between the plates to allow for the unequal expansion due to the heating. This arrangement prevents the contents from escaping if a fracture occurs in one of the thicknesses, and also permits the fracture to be repaired.

## A.D. 1881.

**715. Tongue, J. G.,** [*Lacomme, A.*] Feb. 18. [*Provisional protection only.*]

*Heating by electricity.*—Relates to various arrangements of carbons in arc lamps, stated to be applicable also to heating-apparatus. Two or more pairs of carbons are mounted on an axis which is rotated by means of an electromagnet, worm and wheel, or other gearing, to bring a fresh pair of carbons uppermost and into action when the previous pair are nearly consumed.

**3714. Barrow, T.** Aug. 25. *Drawings to Specification.*



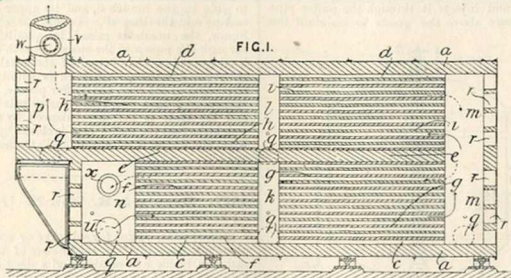
*Boiling-pans.*—Fig. 17 shows a circular brewing-pan *R* fitted with a rotary stirrer *R*<sup>1</sup>, and arranged over a flue *A* containing a rotary annular furnace.

**4576. Brewer, E. G.,** [*Edison, T. A.*] Oct. 19.

*Apparatus for automatically regulating temperature.*—The box containing the electric meters of an electric-lighting system is fitted with a carbon or filament *E*, or an incandescent lamp, through which, when the temperature is low, a current is sent by a switch *F* operated by the contraction of the spring *G*. When the temperature rises sufficiently, the spring expands, removing the switch *F* from the stop *e*, and cutting out the current.



4655. **Hartley, J.** Oct. 24.



**Heating gases.**—Regenerative hot-blast stoves for heating the blast for smelting iron ore, and for heating gases and vapours for other purposes, are divided into two or more horizontal divisions or chambers, in each of which are arranged two or more sections of brickwork chequering with dust chambers formed between. End dust chambers are also provided and holes are formed to facilitate cleaning. Fig. 1 shows a stove having a cylindrical casing *a* divided into two chambers *c*, *d* by a horizontal partition *e*, in each of which chambers are arranged two sections of brickwork chequering *f*, *g*, *h*, *i* with dust chambers *k*, *l* between. End dust chambers *m*, *n*, *p* are also provided, and openings *r* are formed in the end covers to facilitate the cleaning of the passages. The accumulated dust is removed through openings *q*. The openings *q*, *r* are normally closed by covers, but they may be slightly opened for admitting air, if desired; special valves are also provided for this purpose. The air and gases for heating the stove enter at *u* and pass in the direction of the full-line arrows to the chimney *v*; when the stove is sufficiently heated, the gases are shut off and air is admitted at *w*, which passes in the opposite direction, as shown by the dotted arrows, becoming heated in its passage and escaping at *x*. The stove casing may be of any shape, and arranged horizontally or vertically.

**5171. Kinder, A.** Nov. 26. *Drawings to Specification.*

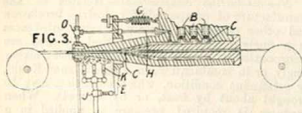
**Heating liquids.**—An attenuator or rouser for use in brewing, described in the Provisional Specification, consists of a hollow flat spiral coil mounted on a hollow shaft through which water or steam is passed to operate on the liquid at various depths. The upper half of the coil slides on the shaft, the outer casing rotates with the shaft and is made telescopic.

**5229. Lake, W. R.,** [Williams, J. S.]. Nov. 30. [Provisional protection only.]

**Heating by electricity; heating water.**—Heat is produced by the passage of an electric current through pulverized or granulated particles of carbon or the like, enclosed in a transparent tube or chamber, which is exhausted of air and hermetically sealed. The chamber may have one or more portions of greater cubical capacity than those which constitute the heat-giving part of the lamp. In order to compensate for the waste of the carbon, the chamber has a reservoir or feeder, which is so arranged relatively to the smaller portions of the

chamber that the material is fed by its own gravity. Another part of the invention relates to the utilization of a liquid conductor, or a conductor which liquefies at a low temperature in a vacuum for the development of heat by the passage of an electric current through it. A glass vessel has a space or chamber for the reception and distribution of the conductor, so that the electric circuit is completed through the liquid. The vacuum is produced by filling the space with liquid, and then pouring off some of it by the inversion of the chamber. The liquid may be mercury, or alloys, or compounds which liquefy at a low temperature. Conductors extend into the liquid. To maintain and distribute heat, a vessel containing water or other liquid to be heated has an inlet pipe to admit the cold liquid, and an exit pipe for the heated liquid, so as to produce circulation through the pipes from which the heat is to be evolved. Within the vessel is a vacuum chamber containing a strip of metal or other suitable substance capable of being heated by the passage through it of an electric current. Similar arrangements may be employed for heating solids, the heat being distributed by a liquid, or a liquid in combination with a solid.

5367. **Lake, W. R.**, [*Mazin, H. S.*]. Dec. 8.  
[Provisional protection only.]



*Thermostats.*—In a machine for covering insulated electric conductors with lead by squirting, the temperature of the molten metal is regulated automatically by the movements of a rod H, which is forced into the annular chamber C by a spring G, and connected directly with the valve O of the water jacket D, and by an arm E with the gas valve J of the burners K. When the lead gets

too cold, the pressure in the annular chamber increases, and the rod H is forced outwards, thus closing the water valve and opening the gas valve. In a similar manner, when the lead gets too hot, the pressure decreases and the rod H moves inwards, closing the gas valve and opening the water valve.

5743. **Pfannkuche, G.**, and **Dunston, R. E.** Dec. 31. *Drawings to Specification.*

*Footwarmers; heating buildings &c.; heating by electricity.*—Electric resistances, consisting of wire &c. embedded in glass, plaster of Paris, or other non-conductor of electricity, are used as heating-appliances for railway carriages, ships, houses, &c. In the case of railway carriages, the dynamo may be worked from one of the axles, and the resistance blocks may take the form of a footstool running the breadth of the carriage.

## A.D. 1882.

700. **Williams, J. S.** Feb. 13.

*Thermostats.*—The temperature of a thermo-electric battery heated by means of steam, hot air, gas, water, oil, &c. is regulated by a thermostat which is operated by a float, or by the expansion and contraction of a metal rod or other medium, the supply of steam, gas, &c. being controlled by means of a cock, plug, gate, damper, or the like. Or the current generated may excite an electro-magnet, the armature of which is connected to a valve. The elements may be controlled in groups or independently.

*Footwarmers.*—The current from a thermo-electric generator is utilized to heat a railway or tramway vehicle by passing it through suitable resistances, the heat being regulated by a thermostat and applied either directly to footwarmers or to circulating liquids &c.

*Solar heat, utilizing.*—A thermo-electric generator is enclosed in a glass case and heated by the sun's rays.

902. **Haddan, H. J.**, [*Tricier, T.*]. Feb. 24.

*Non-conducting coverings.*—Asbestos fabrics are woven, knitted, or plaited from yarns or threads made by surrounding a core of linen, hemp, silk,

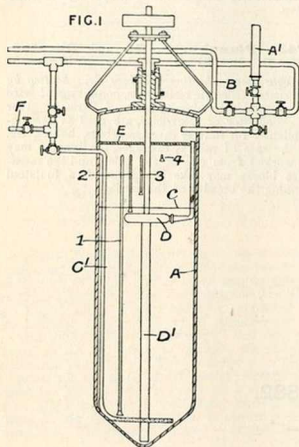
wool, cotton, or any similar twisted or untwisted non-conducting material with asbestos or other similar substance. A similar fabric may be made by embroidering a textile fabric on one or both sides. Another fabric is made by using a warp of asbestos thread and a weft of whalebone, cane, wooden, or similar strips, which may be solid or hollow. Flax, hemp, cotton, woollen, or other textile threads may be used instead of the asbestos threads. Other fabrics may be made by using asbestos threads, with or without a core, combined with asbestos, textile materials, &c.

1479. **Varicas, L.**, [*Heckel, H.*]. March 28.

*Digesters.*—In the extraction of glycerine from fats or oils preliminary to saponification or other treatment, the fats are subjected to the action of hot water and high-pressure steam in a digester A. The fats are introduced through a pipe A<sup>1</sup> and pass through a perforated diaphragm E into the lower part of the digester. The high-pressure steam is then introduced through the perforated pipe C<sup>1</sup>, until the internal pressure is the same as that in the steam boiler, and hot water is then passed into the fat from a pipe B until the liquid



level  $c$  is as shown; gauge or try pipes 1, 2, 3 and 4 are provided on the digester. A rotary pump  $D$ , which is connected and driven as shown, is finally used to raise the charge through the pipe  $D^1$  from



the bottom and to discharge it above the diaphragm  $E$ , so that the fats and water are intimately mixed. The steam pressure is maintained during this action. If the liquid level rises too much, the liquid level is drawn off through the pipes  $c^1$  and  $F$  to a receiver. At the end of an operation, the glycerine solution and the fats are drawn off in succession through the pipe  $C^1$  to different receivers, the steam pressure being maintained in the digester for this purpose. The pump  $D$  may be arranged outside the digester.

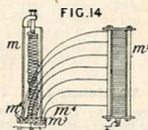
2518. Page, G. S. May 26. [Provisional protection only.]

*Non-conducting compositions.*—Relates to the manufacture of compounds for electric insulation and other purposes. Certain mineral substances in a finely-divided state and dried by heat are incorporated with certain organic substances, either singly or in combination, in a liquid, semi-liquid, or gelatinous condition, which condition may be brought about by heat, or by solvents. When hardness is required, pressure is applied in a graduated manner at a more or less elevated temperature, a highly electrical and heat-insulating material being thus obtained. The mineral substances include oxides, silicates, phosphates, aluminates, borates, carbonates, sulphur, selenium, or compounds of these; also sulphides, compounds of tungsten, "pseudo-carbons," and carbons. The organic substances include preparations from coal tar, coal-tar oil, mineral oil, or shale oil, naphthalene, anthracene, pyrene, chrysene, and their homologues and derivatives; also bitumen, asphalt, natural gums and resins, mineral wax and hydrocarbons, gutta-percha, caoutchouc, camphor, cellulose, waste organic substances containing albuminoid nitrogen, tannin, leather, horn, &c.

5899. Allen, P. R. Dec. 9.

[Addition to Abridgment on page 136.]

This device may consist of a compound spiral  $m$  of brass and iron or iron and copper, which untwists when the temperature attains a certain limit, and causes an arm to which it is attached to move a contact piece  $m^2$  over studs  $m^4$  connected as shown with a resistance  $m^5$  in the circuit of the heating-apparatus, the amount of current passing being thus reduced. In another arrangement, the expansion of the heating-coils themselves is utilized for operating a lever controlling a variable resistance in the circuit; this resistance may also be controlled by hand.

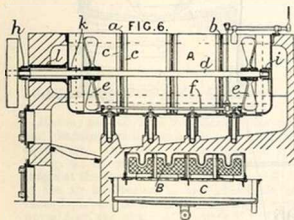


## A.D. 1833.

## 980. Snelus, G. J. Feb. 22. Drawings to Specification.

*Non-conducting compositions.*—A composition used in a steel ingot soaking-pit to make a non-conducting and close joint is formed of fireclay, dried, sifted, and heated, and then ground with tar to form a stiff mass.

## 2294. Boulton, A. J., [Deinhardt, F. T. U.]. May 5.



*Boiling-pans.*—Relates to apparatus for boiling wort with hops in two or three stages, so as to extract the hops thoroughly without losing the more volatile principles. An oblong boiler or copper A divided into two or more compartments by wire-work partitions *a, b* may be used. Hops which have been previously partly boiled are placed in the compartment nearest the fire, and

the fresh hops are introduced into the compartment furthest from the fire. The boiler may have a shaft *d* passing through it from end to end, by means of which a screw *c* near each end of the boiler is made to agitate the hops. The shaft is supported in bearings *h, i* at each end, and passes out through a stuffing-box *k*: a pipe *l* of clay inserted in the brickwork protects the shaft from the fire beneath. The partitions or sieves *a, b* may be movable, sliding in between angle-irons *c*, and are provided with small doors so as to pass over the shaft *d*. Or the hops may be contained in suitable receptacles suspended from above. To avoid the trouble of changing the hops from one compartment to another, each compartment may have an exit pipe at the bottom leading to a division of a straining-apparatus B which has a collecting-vessel C below it. The cocks in the exit pipes are actuated by levers carried by a shaft *f* which is connected through levers with a hand-lever *i* above. The exit pipes are surrounded by fireclay to protect them from the hot fire gases. Instead of using a divided boiler, several independent coppers may be employed. A round boiler with vertical and radial, or with horizontal partitions may be used.

## 5984. Williams, J. S. Dec. 31.

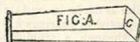
*Non-conducting coverings and compositions.*—Relates to the application of asbestos paint for insulating and heat-resisting purposes in the construction of electric apparatus. The asbestos paint is applied as a uniform coating to the surface of the article to be treated, and may be mixed with a cementing material such as oxidized oil, gum, marine glue, gutta-percha, &c. These materials render the coating impervious to moisture, and may otherwise be applied separately over the asbestos coating.

The following four abridgments should be added to those appearing in the volume of this class for the period A.D. 1893-96.

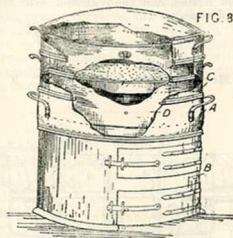
A.D. 1894.

15,237. Jones, A. M. Aug. 9.

*Hand warmers.*—A nickel &c. hollow handle, of an umbrella or a whip &c., is adapted to contain hot water to keep the hand warm in cold weather, the aperture being fitted with a suitable stopper, and covered by a flap C.



downwardly-projecting rim, the space within which serves as a steam generator. The apparatus may be provided with rotary agitators.



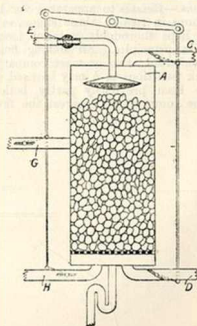
15,650. Parish, E. W. Aug. 17.

*Boiling pans.*—Relates to apparatus such as that described in Specification No. 9579, A.D. 1890, [Abridgment Class Cooking &c.]. Fig. 8 shows one form of the apparatus. A pan A for holding water is adapted to be placed over a fire or stove, or on the portable stove B. On the pan A is fitted an outer cylinder C, formed in one or more sections for varying the size. Within the outer vessel is placed the receiver D fitted with a

A.D. 1895.

16,781. Mond, L. Sept. 7.

*Heating air.*—Relates to the production of a mixture of steam and heated air for use in gas producers, by bringing hot gas-engine exhaust or other waste products of combustion, alternately with water, into contact with an extended surface of a refractory material, such as iron. Specification No. 8973, A.D. 1885, [Abridgment Class Furnaces &c.], is referred to. A diagrammatic representation of the apparatus employed is shown in the Figure. Through two or more chambers A, loosely stacked with iron balls or the like, exhaust or waste gases are passed in a downward direction from the inlet C to the outlet D. Alternately with the gases, water is introduced by the pipe E, leaving by the pipe H. The heat imparted to the balls by the exhaust is given up to the water which escapes by the passage G as steam.



**21,521. Pinckney, P.** Nov. 13. *Drawings to Specification.*

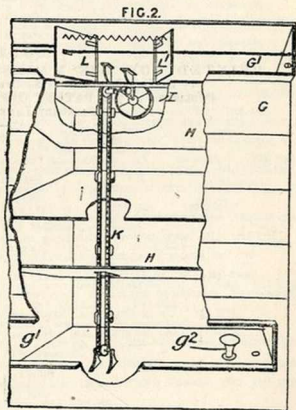
*Heating liquids; boiling-pans.*—In order to increase the “convective capacity” of heating surfaces, ridges, spikes, grooves, or other suitable inequalities are provided. The application to coppers and liquid-heating apparatus in general is mentioned.

*Non conducting coverings.*—Glass, or other vitreous equivalent, is employed in the form of beads, granules, or powder, either alone or in combination with any plastic or suitable material, with or without a sheathing, for heat-retaining purposes in steam and gas engines.

A.D. 1897.

**16,633. McCreery, J.** July 13.

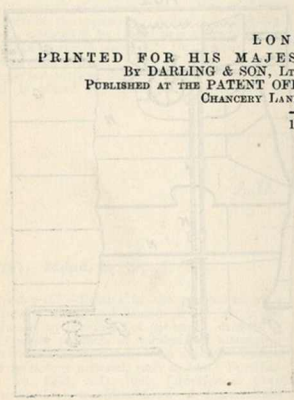
*Heating air.*—Relates to apparatus for moistening, cleansing, cooling or heating air to be used in ventilation. One form of the apparatus is shown in Fig. 2; it consists of a case G into which air enters at the top and water by the pipe G<sup>1</sup>. Part of the air is directed by two adjustable inclined vanes L, L' on to a windmill I, which turns, by worm gear, the chain of buckets K. This chain raises water from the bottom of the case, and discharges it alternately at opposite sides at the top. Air and water follow a zig-zag course over the baffle-plates H from the top and bottom, the air finally escaping at g<sup>1</sup> and water at g<sup>2</sup>. Ice may be placed at the bottom of the case to cool the air. After the air has passed through the cleansing apparatus it may be heated by passing it through a radiator consisting of a number of flat parallel chambers heated by steam or otherwise.



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 6. AGRICULTURAL APPLIANCES FOR THE TREATMENT OF LAND AND CROPS, [including Gardening-appliances].  
 7. AIR AND GAS ENGINES.  
 8. AIR AND GASES, COMPRESSING, EXHAUSTING, MOVING, AND OTHERWISE TREATING.  
 9. AMMUNITION, TORPEDOES, EXPLOSIVES, AND PYROTECHNICS.  
 10. ANIMAL-POWER ENGINES AND MISCELLANEOUS MOTORS.  
 11. ARMS, INSTRUMENTS AND MATERIALS.  
 12. BEARINGS AND LUBRICATING-APPARATUS.  
 13. BELLS, GONGS, FOGHORNS, SIRENS, AND WHISTLES.  
 14. BEVERAGES, [excepting Tea, coffee, cocoa, and like beverages].  
 15. BLEACHING, DYEING, AND WASHING TEXTILE MATERIALS, YARNS, FABRICS, AND THE LIKE, [excepting Dyes].  
 16. BOOKS, [including Cards and card cases and the like].  
 17. BOOTS AND SHOES.  
 18. BOXES AND CASES, [excepting Trunks, portmanteaus, hand and like travelling bags, baskets, hampers, and other wickerwork].  
 19. BRUSHING AND SWEEPING.  
 20. BUILDINGS AND STRUCTURES.  
 21. CASES AND BARRELS.  
 22. CEMENTS AND LIKE COMPOSITIONS.  
 23. CENTRIFUGAL DRYING, SEPARATING, AND MIXING MACHINES AND APPARATUS.  
 24. CHAINS, CHAIN CABLES, SHACKLES, AND SWIVELS.  
 25. CHIMNEYS AND PLUES, [including Ventilating-shaft tops].  
 26. CLOSETS, URINALS, BATHS, LAVATORIES, AND LIKE SANITARY APPLIANCES.  
 27. COIN-FREED APPARATUS AND THE LIKE.  
 28. COOKING AND KITCHEN APPLIANCES, BREAD-MAKING, AND CONFECTIONERY.  
 29. COOLING AND ICE-MAKING, [including Refrigerators and Ice-storing].  
 30. CUTLERY.  
 31. CUTTING, PUNCHING, AND PERFORATING PAPER, LEATHER, AND FABRICS, [including the general treatment of paper after its manufacture].  
 32. DISTILLING, CONCENTRATING, EVAPORATING, AND CONDENSING LIQUIDS, [excepting Steam-engine condensers].  
 33. DRAINS AND SEWERS.  
 34. DRYING.  
 35. DYNAMO-ELECTRIC GENERATORS AND MOTORS, [including Fractional and influence machines, magnets, and the like].  
 36. ELECTRICITY, CONDUCTING AND INSULATING.  
 37. ELECTRICITY, MEASURING AND TESTING.  
 38. ELECTRICITY, REGULATING AND DISTRIBUTING.  
 39. ELECTRIC LAMPS AND FURNACES.  
 40. ELECTRIC TELEGRAPHS AND TELEPHONES.  
 41. ELECTROLYSIS, [including Electrodeposition and Electroplating].  
 42. FABRICS, DRESSING AND FINISHING WOVEN AND MANUFACTURING FELTED, [including Folding, Winding, Measuring, and Packing].  
 43. FASTENINGS, DRESS, [including Jewellery].  
 44. FASTENINGS, LOCK, LATCH, BOLT, AND OTHER, [including Safes and strong-rooms].  
 45. FENCING, TRELLIS, AND WIRE NETTING.  
 46. FILTERING AND OTHERWISE PURIFYING LIQUIDS.



47. FIRE, EXTINCTION AND PREVENTION OF.  
48. FISH AND FISHING.  
49. FOOD PREPARATIONS AND FOOD-PRESERVING.  
50. FUEL, MANUFACTURE OF.  
51. FURNACES AND KILNS, [including Blowpipes and blow-pipe burners; Smith's forges and rivet hearths; and Smoke and fumes, Treating].  
52. FURNITURE AND UPHOLSTERY.  
53. GALVANIC BATTERIES.  
54. GAS DISTRIBUTION.  
55. GAS MANUFACTURE.  
56. GLASS.  
57. GOVERNORS, SPEED-REGULATING, FOR ENGINES AND MACHINERY.  
58. GRAIN AND SEEDS, TREATING, [including Flour and meal].  
59. GRINDING, CRUSHING, PULVERIZING, AND THE LIKE.  
60. GRINDING OR ABRADING, AND BURNISHING.  
61. HAND TOOLS AND BENCHES FOR THE USE OF METAL, WOOD, AND STONE WORKERS.  
62. HARNESS AND SADDLERY.  
63. HATS AND OTHER HEAD COVERINGS.  
64. HEATING, [excepting Furnaces and kilns; and Stoves, Ranges, and Fireplaces].  
65. HINGES, HINGE-JOINTS, AND DOOR AND GATE FURNITURE AND ACCESSORIES, [excepting Fastenings, Lock, latch, bolt, and other].  
66. HOLLOW WARE, [including Buckets, Pans, Kettles, Saucepans, and Water-cans].  
67. HORSE-SHOES.  
68. HYDRAULIC ENGINEERING.  
69. HYDRAULIC MACHINERY AND APPARATUS, [excepting Pumps and other means for raising and forcing liquids].  
70. INDIA-RUBBER AND GUTTA-PERCHA, [including Plastic compositions and Materials of constructive utility, other than metals and stone].  
71. INJECTORS AND EJECTORS.  
72. IRON AND STEEL MANUFACTURE.  
73. LABELS, BADGES, COINS, TOKENS, AND TICKETS.  
74. LACE-MAKING, KNITTING, NETTING, BRAIDING, AND PLAITING.  
75. LAMPS, CANDLESTICKS, GASALIERES, AND OTHER ILLUMINATING-APPARATUS, [excepting Electric lamps].  
76. LEATHER, [including Treatment of hides and skins].  
77. LIFE-SAVING, [MARINE], AND SWIMMING AND BATHING APPLIANCES.  
78. LIFTING, HAULING, AND LOADING, [including Lowering, Winding, and Unloading].  
79. LOCOMOTIVES AND MOTOR VEHICLES FOR ROAD AND RAIL, [including Portable and semi-portable engines].  
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82. METALS AND ALLOYS, [excepting Iron and steel manufacture].  
83. METALS, CUTTING AND WORKING.  
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85. MINING, QUARRYING, TUNNELLING, AND WELL-SINKING.  
86. MIXING AND AGITATING MACHINES AND APPLIANCES, [excepting Centrifugal machines and apparatus].  
87. MOULDING PLASTIC AND POWDERED SUBSTANCES, [including Bricks, building and paving blocks, and tiles, and Pottery].  
88. MUSIC AND MUSICAL INSTRUMENTS.  
89. NAILS, RIVETS, BOLTS AND NUTS, SCREWS, AND LIKE FASTENINGS.  
90. NON-METALLIC ELEMENTS.  
91. OILS, FATS, LUBRICANTS, CANDLES, AND SOAPS.  
92. ORDNANCE AND MACHINE GUNS.  
93. ORNAMENTS.  
94. PACKING AND BALING GOODS.  
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99. PIPES, TUBES, AND HOSE.  
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101. PRINTING OTHER THAN LETTERPRESS OR LITHOGRAPHIC.  
102. PUMPS AND OTHER MEANS FOR RAISING AND FORCING LIQUIDS, [excepting Rotary pumps].  
103. RAILWAY AND TRAMWAY VEHICLES.  
104. RAILWAYS AND TRAMWAYS.  
105. RAILWAY SIGNALS AND COMMUNICATING-APPARATUS.  
106. REGISTERING, INDICATING, MEASURING, AND CALCULATING, [excepting Signalling and indicating by signals].  
107. ROADS AND WAYS.  
108. ROAD VEHICLES.  
109. ROPES AND CORDS.  
110. ROTARY ENGINES, PUMPS, BLOWERS, EXHAUSTERS, AND METERS.  
111. SEWAGE, TREATMENT OF, [including Manure].  
112. SEWING AND EMBROIDERING.  
113. SHIPS, BOATS, AND RAFTS, DIV. I.  
114. \_\_\_\_\_ DIV. II.  
115. \_\_\_\_\_ DIV. III.  
116. SHOP, PUBLICHOUSE, AND WAREHOUSE FITTINGS AND ACCESSORIES.  
117. SIFTING AND SEPARATING.  
118. SIGNALLING AND INDICATING BY SIGNALS, [excepting Railway signals and communicating-apparatus].  
119. SMALL-ARMS.  
120. SPINNING, [including the preparation of fibrous materials and the doubling of yarns and threads].  
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122. STEAM ENGINES, [including Details common to fluid-pressure engines generally].  
123. STEAM GENERATORS, [excepting Furnaces].  
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126. STOVES, RANGES, AND FIREPLACES.  
127. SUGAR.  
128. TABLE ARTICLES AND APPLIANCES.  
129. TEA, COFFEE, COCOA, AND LIKE BEVERAGES.  
130. TOBACCO.  
131. TOILET AND HAIRDRESSING ARTICLES, AND PERFUMERY.  
132. TOYS, GAMES, AND EXERCISES.  
133. TRUNKS, PORTMANTEAUS, HAND AND LIKE TRAVELLING BAGS, BASKETS, HAMPERS, AND OTHER TRICKETWORK.  
134. UMBRELLAS, PARASOLS, AND WALKING-STICKS.  
135. VALVES AND COCKS.  
136. VELOCIPEDS.  
137. VENTILATION.  
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139. WATCHES, CLOCKS, AND OTHER TIMEKEEPERS.  
140. WATERPROOF AND SIMILAR FABRICS.  
141. WEAVING-APPAREL.  
142. WEAVING AND WOVEN FABRICS.  
143. WEIGHING-APPARATUS.  
144. WHEELS FOR VEHICLES, [excepting wheels for Locomotives and tramway and traction engines; Railway and tramway vehicles; and Toys].  
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