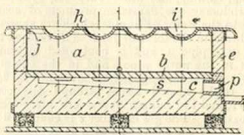


18,151. Laird, D. Sept. 11.

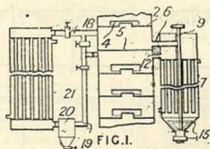
Heating liquids.—In an apparatus for heating infusions, solutions, and liquids, a water bath or tank *a* rests on a fireclay or other refractory slab *b* forming the crown to an inclined furnace flue or flame bed *c* of fireclay. The tank is surrounded by fireclay slabs *e*, the whole being enclosed by a thin sheet steel envelope bound together by hoops. A tray *h*, having recesses *i* to receive metal or other saucers containing the liquid to be treated, has a ledge *j* fitting closely inside the tank, or in a gutter containing water. The steam from the tank is condensed in a coil and returned, and the level in the tank is kept constant by a drip cock and a pipe opening into the tank and embracing an overflow pipe. Liquid hydrocarbon and air under pressure are fed by concentric burner pipes to a combustion chamber *p*, the flame being spread by deflecting-ribs *s*.

FIG. 1.

**18,159. Koppers, H.** Sept. 11.

Heating-apparatus.—Leakage of furnace gases through the porous heat-transmitting walls or partitions of two-roomed heating-appliances, such as coke ovens, gas-retort furnaces or ovens, muffle ovens for zinc distillation, and recuperators, is prevented by blowing into the heated retort or chamber fine mineral dust of the same or a similar nature to that of which the partition is made, the suspended dust gradually filling up the pores and cracks.

ammoniated brine, is passed down a column having partitions 2 with central holes covered with distributing-bells 4. At intervals there are unperforated cross-partitions 5, so that the liquid is

**18,248. Herdman, G. A.** Sept. 12.

Non-conducting compositions.—A non-conducting composition for preventing the radiation or transmission of heat is made from slagwool, dried and finely-ground ordinary yellow clay, and a weak solution of silicate of soda, with or without a fibrous material such as cow-hair or coco-nut fibre worked up with the composition to form a bond for the mixture while in the plastic condition. The composition is applied to boilers, steam pipes, and other surfaces in the ordinary way of plastic covering-materials.

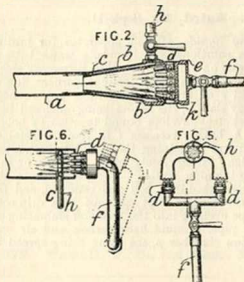
compelled to pass out through a tube 6 to a tube system in a vessel 7, which is divided into two parts by a vertical partition 9. Heating-liquid is circulated around the pipes. The lower part of the vessel is conical, and is provided with an agitator 15. The bicarbonate collects in the conical portion, and is withdrawn, while the liquid is carried back through the tube 12 to the column. Meanwhile, the gas for treating the liquid is passed upwards, and if its temperature also is to be regulated, it is led by a tube 19 past a trap 20 for liquid, through a tubular temperature adjuster 21, and back to the next higher compartment of the column through a tube 18. Valves are provided to allow the gas to pass upwards, or the liquid to pass downwards, without passing through the vessels 21 or 7. In another arrangement, both the gas and the liquid are adjusted in temperature in the same tube apparatus, which is set horizontally. The liquid and gases pass in reversed directions through the tubes, the heating-medium passing outside the tubes. Reference is made to Specifications No. 13,771, A.D. 1899, [Abridgment Class Acids, Alkalies, &c.], and No. 23,404, A.D. 1899.

18,335. Naef, P. Feb. 13, [date applied for under Sec. 103 of Patents *dc.* Act, A.D. 1883].

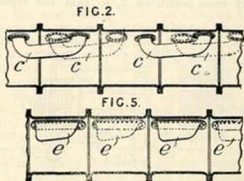
Heating liquids and gases.—Liquids are treated with gases for the purpose of precipitating solids therefrom (especially for precipitating alkaline bicarbonates during their manufacture by the ammonia-soda process), for evaporating, or for distilling. The essential feature consists in heating the liquid, or the gas, or both, several times during the operation. One or more vertical columns or rotary-inclined cylinders may be used. In the example shown, the liquid which may be

18,344. Waldbaur, A. Sept. 13.

Heating liquids.—Relates to a method of and apparatus for heating water and other liquids for cooking, bathing, and other purposes, by injecting or introducing gas flames or products of combustion into the water or liquids which are sprayed or introduced in the form of jets. The heating takes place in a pipe *a*, and is controlled by suitable valves in the water pipe *h* and in the gas-supply pipe *f*. In the arrangement shown in Fig. 2, the water to be heated issues around the conical nozzle *c*, and the bunsen jets *d* are placed within the nozzle *c*. The gas chamber *e* is connected with the part *b* by the sleeve *k*, which is provided with the air openings for the burners. The burners may be placed as shown in Fig. 5, and the water sprayed out behind the flame inlets by the rose *h*, or the water may be injected as an annular spray, and the burners situated behind as shown in Fig. 6.



18,623. Sheen, W. Sept. 18.

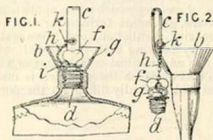


Boiling-pans; heating water.—Water tubes, in the form of shallow loops as shown at *c* in Fig. 2, or pockets of similar form as shown at *e* in Fig. 5, are fitted in the upper parts of the horizontal flues of steam boilers, or similarly in the flues of heating or boiling pans. The Provisional Specification mentions the application to externally-fired boilers. The tubes or pockets are preferably deeper, but narrower, at their front ends than towards the rear, and they are arranged on each side of the centre so as to point downwards towards the axis of the flue. They may be riveted or welded to the flue. The pockets are connected with the water space of the boiler &c. by two holes, one at each end.

18,719. Struebing, M. Sept. 19.

Non-conducting coverings and compositions.—A mixture of about 80 parts of peat fibre, 12 parts of gypsum, and 18 parts of infusorial earth is moulded into slabs or plates for covering or building walls, ceilings, &c., or for covering steam pipes. The slabs may be plastered, glued, or otherwise secured together.

18,752. Haddan, H. J., [Meinecke & Co.].
Sept. 19.

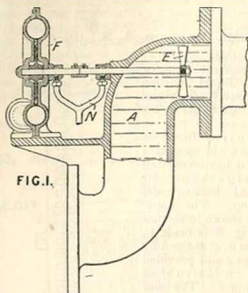


Hot-water bags and the like.—The screw stopper *d* of a bottle or hot-water bag is secured against loss by being connected to the vessel. The neck *b* of the vessel is funnel-shaped and provided with a handle *c*. A ring *g* loosely encircles the neck of the stopper *d*, the enlarged head *f* of which prevents the ring from becoming detached. A ring *i* loose on the ring *g* is connected by a chain &c. *h* to a ring *k*, which is attached to the handle *c* or to the neck *b*, so that, when the stopper is withdrawn, the chain can be prevented from dangling by the hand which holds the handle. The connection permits the insertion and removal of the stopper, and lies within the funnel-shaped part of the neck when the stopper is in its closing position.

18,930. Row, O. M., and Royles, Ltd.
Sept. 23.

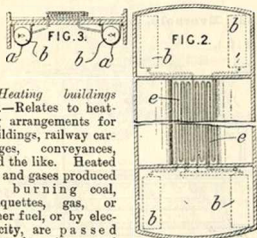
Heating water.—Relates to hot-water heating-apparatus used for heating rooms &c. Into the flow or the return pipe near to the heat generator is introduced the casing or chamber *A*, and within such chamber is arranged the small fan *E*, motor, turbine, or the like, to circulate the hot water. The rotary engine *F* for the fan *E* is preferably supplied with steam from the calorifer supply pipe, and the steam after doing duty is delivered to the

calorifier or heater. With a heater with thermo-
static connection, such as is described in Specifi-
cation No. 19,416, A.D. 1893, the supply pipe for
the motor leads from an automatic control valve,



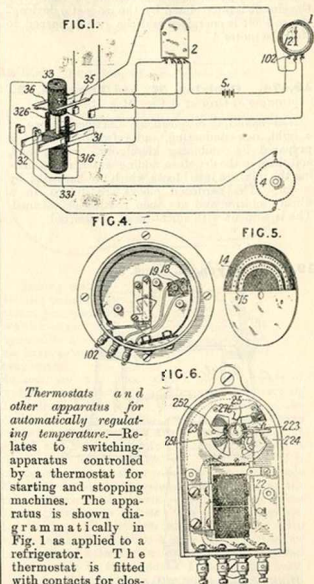
so that, when the steam is cut off, the fan as well
as the heater is checked. Small drain pipes and
bosses N are provided. There may be two or
more fans employed, and with non-automatic
heaters the steam may be controlled by a small
valve.

18,956. **Seilheimer, C. M.** Sept. 23.



*Heating buildings
&c.*—Relates to heat-
ing arrangements for
buildings, railway car-
riages, conveyances,
and the like. Heated
air and gases produced
by burning coal,
briquettes, gas, or
other fuel, or by elec-
tricity, are passed
through pipes and
radiators to heat the
structure &c., the inlet of fresh air to the heating-
apparatus and the passage of the heating-medium
being assisted by an exhauster. Figs. 2 and 3
shown in plan and section a system for an electric
tramcar. The combustion apparatus or stove *b*,
preferably a lime-coke-briquette stove, is sur-
rounded by the metal casing *a*, and the hot gases
are drawn through the radiator pipes *e* by a
suitable exhauster.

19,072. **Singer, W. F.** Sept. 24.



*Thermostats and
other apparatus for
automatically regulat-
ing temperature.*—Rel-
ates to switching-
apparatus controlled
by a thermostat for
starting and stopping
machines. The appa-
ratus is shown diag-
rammatically in
Fig. 1 as applied to a
refrigerator. The
thermostat is fitted
with contacts for clos-
ing, momentarily
under certain conditions,
the battery circuit 5
through an electromag-
netic device 2, which in
turn closes a circuit
around one or other of
the solenoids 33, 331,
to close or open the
main switch 31, 32
for supplying current
to the motor 4. The
thermostat employed
is shown in Figs. 4
and 5. The pointer 12
is electrically connect-
ed with the terminal
102, and is adapted
to engage with one
or other of two contact
plugs which are passed
through openings in
the dial and fit in
holes in contact-plates
14, 15, against which
contacts 18, 19
press. The arrange-
ment of the magnet on
a relay 2 is shown in
Fig. 6. The armature
22 of the electromag-
net carries a finger
223 and detent
224. A contact disc
25 is adapted to be
rotated by a spring
23, and is provided
with notches 252
and insulating-wings
251 which hold up a
spring contact 276.
When the magnet is
energized, the disc
25 rotates and the
contact 276 engages
it, thus completing a
circuit through, in
the position shown,
the coil 33 thus clos-
ing the switch 31, 32.

the switch is "on," the arms 216, 326, lift spring contacts 35, 36 to make connections so that when the circuit is next closed by the magnetic device 2 the coil 331 is energized and the switch opened to stop the motor 4.

19,474. Croizier, H., and Thomine, E.,
[trading as Croizier & Cie., H.]. Sept. 30.

Non-conducting compositions.—Artificial stone of a light, non-conducting, and refractory nature is prepared by combining kieselguhr, quartz, sand, and lime, in the dry state, adding water, and moulding the mixture into blocks which are hardened by steam. The hardened blocks are dipped in a silicate solution and are then roasted or calcined. The treatment with silicate may be omitted.

19,500. Boyes, E. Sept. 30.

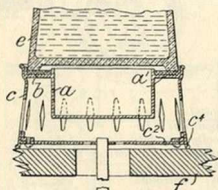


FIG. 2.

Heating-apparatus.—Relates to means for maintaining in a heated condition decoctions of coffee and tea or other liquids, and consists of a heating-apparatus for a single jug or vessel comprising a circular open-topped water boiler, and means for heating and supporting the boiler. One form of heating-apparatus is shown in Fig. 2. The water boiler *a* is provided at its upper part with the annular flange-like trough *a'*, adapted to receive the packing-ring *b*, which serves to form a seat for the jug *c* and to constitute a steam-tight joint between the boiler *a* and the flange of the jug or other vessel. The cylindrical or conical metal shell *c* serves as a stand or support for the boiler, and as a shield for the gas, spirit, or other heating flame. The bottom edge of the stand is formed with a curl *c'* to leave an insulating air space above the top of the table or counter *f*. In a modified apparatus, the flange or trough *a'* of the boiler projects inwards, instead of outwards, and the upper part of the casing *c* forms one of the sides of the trough *a'*. The base-plate *c'* is also formed separate from the casing *c*, and is provided with

supporting-feet. In another form of heater, the casing *c* takes the form of a band to which are fixed legs at their lower ends cranked and spread out to form feet.

19,584. Barham, A. S. Oct. 1.

Heating liquids.
Hot and cold milk or other liquid passing respectively from and to a pasteurizer are caused to flow in opposite directions through apparatus similar to a corrugated refrigerator, for mutual heating and cooling. The apparatus shown in section in Fig. 3 is made in halves *a, a'* secured by clamps *c* and provided with india-rubber packing *i*. The cold liquid is poured into a perforated trough *d*, and passes outside the corrugated sheets to a trough *e* and pipe *f*. The hot liquid passes between the corrugated sheets, inlet and outlet pipes being provided at opposite corners.

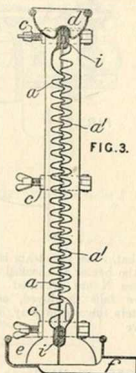
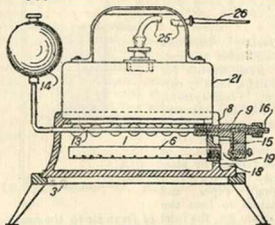


FIG. 3.

19,732. Eversole, O. P. Oct. 3.

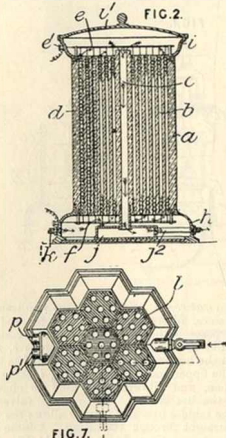
FIG. 1.



Footwarmers.—Relates to the construction of a portable spirit stove which may be employed for vaporizing chemical solutions for fumigating plants or as a heating-apparatus for greenhouses or for warming, heating, or cooking for domestic purposes, or for heating hand-irons, or as a foot-warmer, or for any other purpose to which it is applicable. A receptacle *l* shaped like, and on

occasion used as, an ordinary box iron, is supported on a stand 3 and is fitted with a gasolene burner. The burner is mounted in a support 9 bolted to the side 8 of the receptacle 1, and consists of a perforated combustion tube 6, a gasolene supply tube 13 connected to the reservoir 14, a passage 15 with regulating set-screw 16 which delivers the gas into the tube 6, and a receptacle 18 to hold gasolene which is first ignited to start the burner. The vapour becomes mixed with air in its passage across the space 19 between the outlet of the passage 15 and the tube 6. A plate surmounted by a grid is placed on the receptacle 1 when used as a foot-warmer.

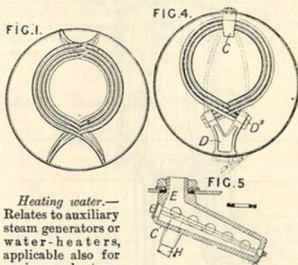
19,760. Greville, A. E. Oct. 3.



Heating water by electricity. The electric water-heater or geyser shown in Fig. 2 is constructed of a block *a* of porcelain or other material provided with longitudinal holes *b* in which the coiled electric wires *d* are arranged. The extremities of the wires *d* are connected to the end plates *e, f*, which are connected to terminals *e', f'*, upon the top flange *i* and the base *h* respectively. Water is admitted by the inlet *k* to the base *h*, and ascends to the top and descends to the chamber *j* and the outlet *j'* through the central hole or down-take *c*. In a modified construction of heater, the outlet chamber *j* is arranged beneath the chamber formed by the base *h*, and the electric wires are attached at the ends to wires suitably coiled, or the wires are connected to two segmental plates connected to two terminals arranged on opposite sides

of the heater at the base. The geyser may also be constructed of separate blocks *l*, as shown in Fig. 7, and the naked wires may be arranged together and connected to two sets of terminals *p, p'*.

19,806. Stocks, H. B. Oct. 4.

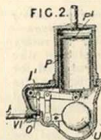


Heating water.—Relates to auxiliary steam generators or water-heaters, applicable also for use in superheaters, evaporators, condensers, and the like.

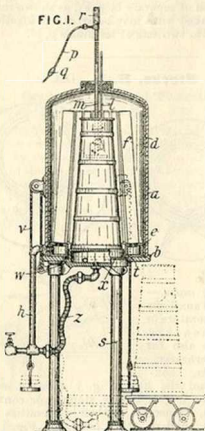
Fig. 1 shows a series of water tubes, looped and in stepped or converging formation, connected at their extremities to the boiler flue shell or other part, and Fig. 4 shows looped tubes connected above to the header *C*, Fig. 5, and below to the forked header *D* which is fitted with cleaning-plugs *D'*. The header *C* is connected to the shell or other part by the nipple *E*, and is fitted with nozzle-like projections at the sides to receive the tubes. Supplementary tubes *H* are provided to induce a flow of water through the header. The headers may be provided with valves which close when a tube bursts. Two or more rows of holes for two or more rows of tubes may be made in the header. In a modified form of header, sleeves having tube nozzles are threaded upon the tubular header, and are held in place by a bevelled shoulder and tightened by a nut.

20,022. Rockwood, G. I. Oct. 7.

Steam traps.—Relates to apparatus for maintaining the water line in a steam boiler, comprising a water reservoir, a pump, a check valve, and a steam trap *I* communicating with the boiler at the water line and with the pump between the check valve and the pump.



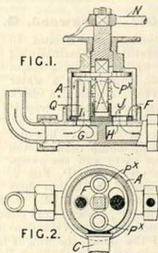
The steam trap *I*, Fig. 2, consists of the hollow float *P* which, when it fills with water through the opening *P'*, descends and closes the opening *O* by the conical valve *V*, and so enables the pump to feed the boiler, the weight *U* not being sufficient to counterbalance the float *P* when full of water.

20,125. Newton, J. E. Oct. 8.


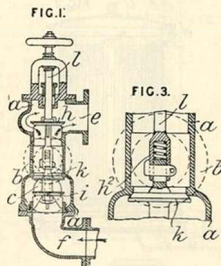
Heating liquids.—An apparatus for sterilizing milk by heating &c. comprises a dome *a* having an asbestos lining *d* and mounted on a base *b* supported by pillars *s*. Steam is admitted from a pipe *h* to a chamber *e* connected to a system of pipes *f* enclosed in the dome. The milk can is placed on a hollow box *t*, supplied with steam by a flexible pipe *z* mounted on the pillars *s*, and supported by cords *v* and weights so that the can may be lifted into the dome *a*, the opening in the base *b* being then closed by a rubber-faced flange *x* on the box *t*. A thermometer *l* is fitted in the dome.

20,216. Pearson, S. O.
Oct. 10.

Heating water; heating buildings.—Relates to rotary or oscillating disc valves adapted for supplying baths with hot or cold water, for use with gauge glasses, radiators, and for other purposes. As adapted for supplying hot or cold water to baths, a steam or hot water inlet *G*, Figs. 1



and 2, and a cold-water inlet *H* are arranged at the bottom of the casing *A*, which has a lateral outlet *C*. A disc valve *F* pressed on its seat by springs *P*^x has an operating-handle *N* and apertures *I*, *J* corresponding to the inlet apertures. The aperture *I* has a tube *Q* to silence the inflow and the aperture *J* is elongated to allow cold water to be admitted alone, or mixed with a variable proportion of hot water or steam. The inlet and outlets may be arranged in the same plane. In another modification, a cut-away disc can be rotated so as to cover or uncover the discharge aperture.

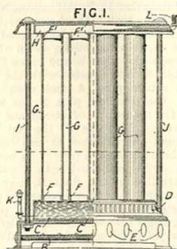
20,229. Hocking, H. Oct. 10.


Heating water.—A valve apparatus applicable to water-heaters, filters, steam generators, and for other purposes is shown in Fig. 1. The casing *a* has an inlet *b*, outlet *c*, and connections *e*, *f*, to and from the heaters &c. The spindle *l* has three valves, the upper and lower valves *h*, *i* being normally open, and allowing the fluid to circulate through the heater &c. When these valves are closed, the middle by-pass valve *k* allows the fluid to pass straight through the casing. A loose connection, such as a pin-and-slot device *h*², Fig. 3, in the spindle provides a large opening for the upper valve, and a possibility of escape past the lower valve under undue pressure.

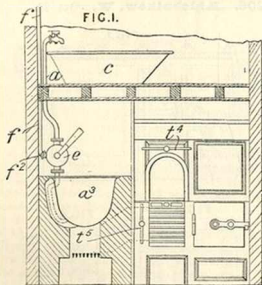
20,415. Swan, J. M. Oct. 12.

Heating by steam circulation.—Fig. 1 shows a gas heating-stove, in which a bunsen or other burner *B* runs along the base of the apparatus, under a boiler *C* connected by tubes *G* with a chamber *H* through which the steam or vapour circulates. Openings *D*, *E* are made in the base. A water gauge *K* and a safety valve *L* are provided. The joints *F*, *F*¹ of the tubes *G* with

the boiler and upper chambers H are made steam and water tight. The rods I, J, provided with nuts, clamp the upper and lower parts firmly together.



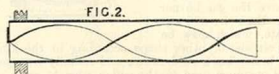
20,449. Webb, H. C., and Webb, A. A.
Oct. 12.



Boiling-pans.—Relates to hot and cold water supplies or systems for domestic use, for baths, and the like. The hot water for the bath *c* &c. is heated in a copper or boiler *a*², and is pumped from the copper to the bath &c. through the pipe *a* to which cold water under pressure is preferably laid on. The copper can be filled with cold water, cold water can be supplied to the bath, or cold water can be mixed with hot water either in the copper or in the supply pipe *a* as the water is being pumped to the bath. The pump is arranged as near as possible to the opening of the pipe *a* to the copper. The cold-water pipe *f* is connected to the pump casing by passages so that cold water may pass to the bath or to the copper depending on the position of the two-way cock *f*².

The hot water passes through the centre of the pump, the outlet being provided with a non-return valve. An independent cold-water tap may be provided for filling the copper, and the cold-water pipe may connect with the pipe *a* above the pump, or below the pump, so that the cold water also flows through the centre of the pump. The flues of the grate or range and the copper or boiler furnace communicate, and are provided with the dampers *b*, *b*¹ so that the heat from the fire-grate or range can be passed under the copper to heat without, or with, a fire in the fire-chamber of the copper.

20,972. Howden, J. Oct. 19.

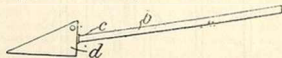


Heating air.—Spiral baffles for the fire tubes of steam boilers, air heaters, and the like are formed with a bent end which prevents them from entering the tube completely and increases the baffling effect. The bent portions may be divided, the two halves being bent in opposite directions.

21,065. McLay, J. C. S., and Moth, C.
Oct. 21. Drawings to Specification.

Non-conducting coverings.—Coverings for boilers and pipes are made from tubes of cloth or paper rendered fireproof and waterproof, preferably by treating with water-glass and lime. These tubes are filled with loose fibrous material, such as carded wool, are closed, and are fixed on fireproof and waterproof cloth to form a covering which may be readily applied or removed. The covering may be fixed by means of bands. To form mattresses, the tubes are placed between two layers of cloth. The coverings are applicable to refrigerating-vessels.

21,143. Johnson, T. Oct. 22.

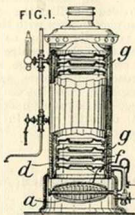


Bed-warmers.—The hot water warming-pan shown in the Figure is converted into a foot warmer by unscrewing the handle *b* from the socket *c*, and strapping a suitable carpet cover round the pan *d*.

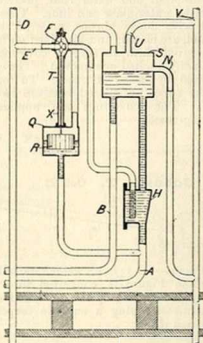
21,180. Boulton, A. J., [Vanderborght, H.].
Oct. 22.

Heating liquids.—

Relates to apparatus for heating water or other liquids, and more particularly to upright heaters for baths, heating-systems, and the like. The boiler consists of a double-walled cylindrical casing *d* for the water, with the heating-plates *f, g*, supported on the inner wall and arranged above the gas burner *a*. Each heating-plate, which may be of circular or other shape according to the kind of boiler, has a solid centre and radially-arranged slot openings near to the outer edge to serve as passages for the gases. U-shaped bridges are left between the slot openings, and the plates may be made from sheet metal, or cast. The lowest plates are reversed so that the grooves are uppermost, and the plates are arranged with respect to one another so that the bridge-pieces alternate with the slot openings. The hot gases pass in a zig-zag manner upwards near to the inner wall of the water or liquid containing chamber *d*, and the liquids are heated rapidly.



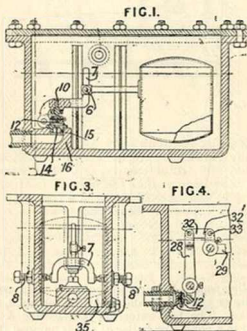
21,192. Reck, A. B. Oct. 22.



Heating water.—Relates to hot-water heating-apparatus wherein steam or air is introduced into,

or steam is developed in, the circulating water in such a manner as to produce a suction effect to accelerate the motion of the water. The hot-water apparatus is for heating buildings, and is of the kind described in Specifications Nos. 14,473 and 14,474, A.D. 1899. In the apparatus shown in the Figure, the heater *H*, connected with the return main *A*, receives steam from the supply pipe *D* through the pipe *E* and valve *F*, and the separator tank *S* is connected with the main pipe *B* and the return pipe *A* and with the float chamber *Q*, the overflow pipe *N* for water, and the pipe *U* for the escape of steam and air. The float *R* governs the valve *F*, the rod *T* passing tightly through the chamber *Q* and through the tube *X*. The main escape pipe *V* is open to the atmosphere, or is connected with a pump. The valve *F*, controlled by the float *R*, may be placed in the escape pipe *V*, and the overflow pipe *N* is then connected to a special return pipe. The draught regulator of the steam boiler for the heater *H* may in some cases be controlled by the float in the chamber *Q*, or, when the water is heated directly by a boiler, and not by steam, the draught regulator is governed by the float.

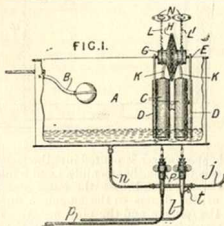
21,206. Khlebnikow, W. Oct. 22.



Steam traps.—Relates to steam traps of the float type, in which the discharge valve is so suspended from the lever mechanism as to be capable of oscillatory motion. In the trap shown in Figs. 1 and 3, the valve 12 is concave and is suspended to the rod 10 by a split pin or by a pair of pins so as to oscillate on the rod 10. The float arm is adjusted to the upward branch of the lever 7 by the screw 6, and the lever 7 is pivoted on the studs 8. Partitions 35 may be provided in the trap, and may be fixed in grooves or in the corrugations of

the casing when the casing is corrugated. The outlet passage 16 may be cast in one with the casing, or may be separate, or the outlet pipe may be fitted to the trap as shown in Fig. 4, and the valve 12 actuated by the lever mechanism 28, 32, 29 connected to the float and made adjustable by having holes 32 provided in the lever 32 for bearing-screws 33. The valve seat 15 is inserted into the outlet, and may be held in position by a screw, and the discharge orifice 14 is placed eccentrically.

21,252. Smith, C. W. Oct. 23.

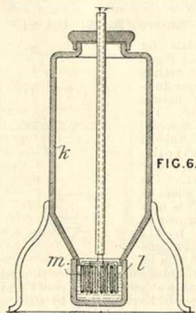


Heating water.—The supplies of gas and water for a geyser or the like are turned on and cut off simultaneously by the following device:—The tank A is supplied with water by a float valve B, and has two floats C moving within guides D. Above the floats is a shaft E carrying two drums G, between which is a hollow wheel H. A rod (not shown) connected to the wheel H, normally rests upon the edge of the tank A, and is engaged by an eye or loop on the ends of the curved rods K connected to the floats C. As the floats rise and fall, the drums G are rotated, the chains or the like L, L', connected thereto and passing round pulleys N, actuating plug valves P. One of these valves regulates the supply of gas from the tube *j* to the burner supply tube *l*, while the other regulates the supply of water from the tube *n* to the water supply tube *p*. A by-pass *t* for the gas is provided. The drums G and wheel H may be omitted, the rod and the chains being directly connected to the shaft.

21,292. Danilevsky, C. Oct. 23.

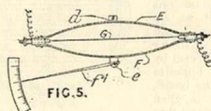
Heating by electricity.—Heat is produced, for generating steam or other purposes, by passing electric current between electrodes through distilled water, alcohol, glycerine, or other liquid of high resistance. The electrodes may be concentric tubes of metal or carbon, held apart by insulating blocks, and either straight or coiled helically,

spirally, or otherwise; or plates may be used. They are perforated to allow free passage of liquid. Fig. 6 represents a radiator for warming a room



consisting of a receptacle *k* heated by steam produced from water in a vessel *l*, containing electrodes *m*; the heating is regulated by varying the immersion of the electrodes, which are movable by a central rod, or by cords or chains, and may be secured at any height by a clamping-device.

21,335. Batault, E. Oct. 24.

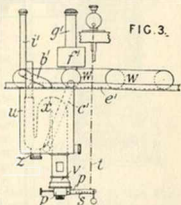


Thermostats.—An apparatus for causing the thermal expansion or contraction of a wire or strip to produce an amplified movement, applicable to thermostats, consists of a pair of resilient bows E, F connected at their ends to the wire or strip G under tension, and at their middle points to a stationary support *d* and the part to be moved. The bows may be made of metal having a smaller expansion coefficient than the wire. A single bow may be used similarly. Each resilient bow may be replaced by a pair of rigid links, pivoted at their ends, and acted on by a helical or other spring tending to align them. Instead of a single straight wire G, the wire may be laid round grooved pulleys or blocks held by the ends of the bows, two or more parallel lengths of wire being thus obtained. The bow may act through a toggle on the part to be moved, to further increase the movement. A number of the pairs of bows may be connected in

series, at their middle points, to give a large movement due to the variation in length of all the heated wires.

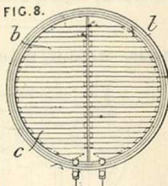
21,368. Lawry, R. H. Oct. 24.

Thermostats for incubators. Fig. 3 shows the heating and temperature-regulating devices detached. The lamp *v* is provided with a tubular flame-controller surrounding the wick-tube. The controller slides on guides, and is operated by a pair of connected bell-crank levers, one arm *p* of one of which is weighted and provided with notches *s* for the adjustable attachment of a cord *t* connected to a counterpoised lever operated by a rod resting on a capsule in the egg chamber.



21,433. Smith, T. V., and Watts, C. J. Oct. 25.

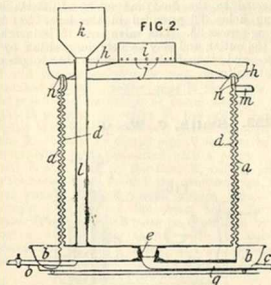
Heating by electricity.—Resistant wire *c*, such as Eureka wire, an alloy of nickel and platinum, is laid to and fro on one surface of an asbestos board *b*, and looped under tongues formed by notching opposite edges of the board. The wire is then pressed against thin mica or enamel on a metal surface to be heated, by a backing of asbestos boards, which may be enclosed in a metal case *l* by a back plate secured by screws, in order that the wired board may be readily accessible if damaged. Other refractory non-conducting material may be used, in rods or other forms, and the surfaces may be grooved to receive the wire. The wired board may be used on a stand to heat an ordinary enamelled tea-kettle, or the whole apparatus may be attached to the bottom of a coffee-urn. The metal case may form the platen of an embossing or gold-lettering press.



21,458. Barham, A. S. Oct. 25.

Heating liquids.—Apparatus for attemperating or cooling and heating milk from and to a

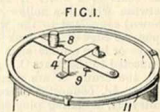
pasteurizing-apparatus is shown in Fig. 2. The hot milk from the pasteurizer flows into the vessel *k*, pipe *l*, and between the surfaces of the drums *a*, *d*, to the outlet *m*, while the cold milk on its



way to the pasteurizer is poured into the receptacle *i*, and passes through the openings *j* and *n* into and from the cover *h* and over the outer and inner surfaces of the drums to the trough *b* direct, or through the plug *e* and the pipe *g*. An outlet *c* for the trough is provided, and also a drain pipe *o*.

21,736. Helling, C. H. S. May 6, [date applied for under Sec. 103 of Patents *dc.* Act, A.D. 1883].

Boiling-pans.—The cover shown in Fig. 1 is designed for use with pots, kettles, cooking-utensils, or like receptacles having flanged top edges engaged by lugs on the covers. The fastening lever 4 is pivoted eccentrically to the cover in such a way that from the position in which its hooked end is free of the flanged top edge of the receptacle, it may be guided to a position in which it engages with the flange and secures the cover in position. When the cover is locked the segmental space 11 is obtained, through which liquids may be discharged and the solid contents retained. A knob 8 enables the lever to be moved readily while the stop 9 prevents the lever from oscillating too freely.



21,789. Kitchen, E. E. Oct. 30.

Heating water.—The water tubes within a fire-box boiler for hot water or steam heating are constructed in removable sections A, B, each of



which is connected as shown to the side and top water spaces. Doors and cover plates F, L are provided to give access to the sections and their

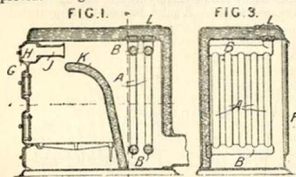


FIG. 1. FIG. 3.

FIG. 1. joints. Fresh heated air is admitted to the fire, through tubes J from a chamber H exposed to the action of the flames; G denotes a regulator.

21,847. Martin, R. H. Oct. 30.

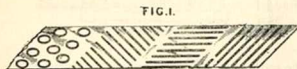


FIG. 1.

Non-conducting coverings.—Non-conducting coverings for pipes, boilers, tanks, and similar structures are made from sheets of asbestos, paper, felt, or other material having applied to them finely-divided material such as flocculent asbestos of short fibre, or shoddy, or equivalent substance of low cost, and made to adhere by paste, silicate of soda, glue, or the like, in various air-enclosing patterns. The sheets are rolled on a mandrel to the requisite thickness for pipe coverings, and for flat coverings the sheets are superimposed with the ribs separating the layers. The sheets may be fireproof; the non-fireproof coverings are suitable for cold-storage chambers. For finishing the covering, it is preferred to have the last sheet of plain paper with a smooth surface.

21,971. Webb, G. Oct. 31.

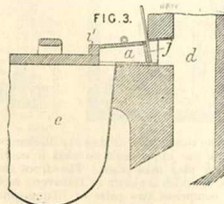


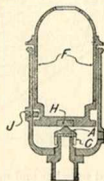
FIG. 3.

Boiling-pans.—The steam rising from a domestic copper or boiler *e* is conveyed to the flue *d*, Fig. 3,

by the device *a*, which is a metal box open at the front and is provided at the back part with a suitable hinge valve *j* or a sliding valve to close, when desired, the flue passage. The strip *i* is flush with the top of the front of the box or chamber *a*.

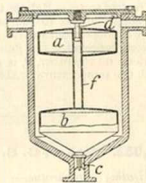
22,059. Jeffreys, J. Nov. 1.

Heating water.—A dead-weight safety-valve for steam and hot water boilers has a conical valve disc A with guide-arms C fitting over the valve seat. The rounded top of the valve disc works against a pad H in the chamber F which can be loaded with lead, and which is secured by a stud J engaging in a groove in the chamber.



22,338. Schwaninger, V. Nov. 5.

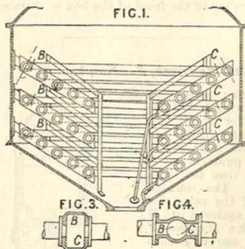
Steam traps.—Two floats *a*, *b* are connected together by the tube *f*, and guided above by the vertical pin *d* and below by the ribs of the outlet valve *c*. The dead weight plus the steam pressure load are overcome only by the combined lifting powers of the floats, but, when the valve is open, the lifting power of the lower float is sufficient to keep the valve open.



22,455. Blake, M., and Smart, R. H. Nov. 7.

Heating by steam circulation.—Relates to vacuum pans heated by steam worms in which one or more worms composed of a number of separate coils or groups of coils are connected at one end to a steam distributing box or branch pipe, and at the other end to a condensed-water collecting-box or branch pipe, there being one steam box and one condensed-water box for each worm. Three worms are shown in the pan in Fig. 1, with five circular coils sloping a little from the steam-chests B to the collecting-boxes C. The coils are bolted to the chests, being flanged as shown in Fig. 3 or Fig. 4, and the three

chests may be joined together with partitions forming three separate chambers. To reduce the number of flanged joints within the pan, the coils may be

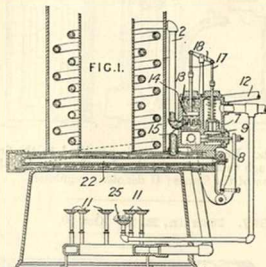


grouped together and united by brazing to sockets, which are then fixed by flanges to the chests or boxes.

22,485. Rund, E. Nov. 7.

Heating water.—Relates to a gas geyser, in which the supply of gas to the burners 11 is controlled by two independent valves. One valve, 7, is operated in accordance with the flow of water through the heater, and the other, 9, is operated in accordance with the temperature of the water drawn off. The

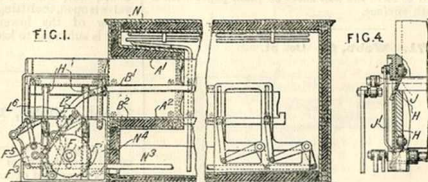
spring-controlled gas valve 7 controls the gas supplied to the casing 8, within which is the valve 9 governed by the expansion thermostat 22 through lever mechanism. A pilot burner 25 is provided.



The water-supply pipe 12 leads to the casing 13, in which is the piston 14. The piston 14 and the valve 7 are connected together by the rods 17 and the pivoted lever 18. When the piston moves down, it uncovers the recesses 15, and allows water to flow to the coil supply pipe 2. The water-supply valve 14 may be modified by arranging the piston to act, not as the supply valve, but on a separate spring-controlled valve placed below or above the piston.

22,656. Baker, G. S. Nov. 9.

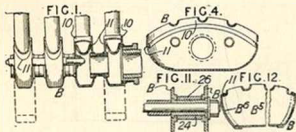
Heating apparatus.—Consists of conveyer apparatus by which articles to be treated in a cooling, drying, heating, or like chamber may be introduced and withdrawn without exposing the interior of the chamber to the external atmosphere. The chamber has a charging mouth A¹ and a discharging mouth A², preferably one above the other, and the articles are contained in receptacles which fit these mouths. These receptacles are connected together and run on rails B¹, B², in line with the mouths. At the end of the rails within the chamber is an elevator apparatus on to which the last receptacle of the upper train runs and is then lowered into line with the lower train on the rails B². An elevator apparatus in front of the mouths of the chamber



returns the receptacles, as they are discharged, into line with the upper rails so that a continuous circulation may take place. The front elevator, one side of which is shown in transverse section in Fig. 4, comprises two pairs of lifting-springs H, and a pair of rail sections J supported on springs J¹ so that the rails J are pushed aside as the receptacle rises and then drop into place under it.

The rear elevator consists of a rising and falling pair of rails, and in a modification the front elevator is similar. The receptacles in each train are coupled together by vertical bell-mouthed grooves, and tongues, so that when raised or lowered as described above they are at the same time coupled or uncoupled. The upper and lower trains are moved alternately by reciprocating spring pawls. These pawls and also the elevators are moved in proper sequence by means of toothed quadrants F^1 carried on a rotary shaft F and engaging toothed wheels F^3, L^1 , with locking portions F^3, L^1 . The heel F^3 , by means of the linkage shown, operates the elevators, and the wheel L^1 the pawls which move the receptacles into, and out of, the chambers. The cooling &c. fluid may be circulated in the chamber by pipes N having gutters under them to convey away any condensed moisture to a discharge gutter N^2 and outlet N^1 . Various modifications are admissible. The receptacles, for instance, need not fill the mouths of the chamber but may carry ribs or plates for that purpose. Or the coupling tongues may be omitted, and the receptacles advanced and withdrawn by pushing.

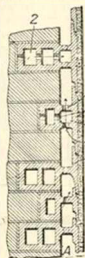
22,816. Wilmot, F. A. Nov. 12.



Heating buildings &c.—Relates to steam or hot-water radiators of the type described in Specifications No. 19,813, A.D. 1899, and No. 19,814, A.D. 1899, in which the radiator pipes are fixed in cupped headers made of wrought metal. The headers B , Fig. 4, are formed with collars 10 to receive the pipes and are made up of two or more sections stamped from wrought metal, the joints 11 being formed either towards the top or bottom of the header with the projecting parts on the inside or on the outside of the header. The side sections of the headers B have openings counter-sunk externally to receive flanges upon cross tubes 24. Fig. 11, which are surrounded by tubes 26. The ends of the tubes 26 abut against the inner sides of the headers, so as to prevent expansion and collapsing. When the header is formed from three blanks, the sides, bottom, and top are in one piece B^1 , Fig. 12, and the ends B^2 are secured to the main piece by joints 11. Reference is made to Specification No. 6824, A.D. 1897, [Abridgment Class Pipes &c.].

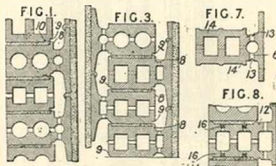
22,827. Anderson, D. W. Nov. 12.

Heating buildings &c.—Walls with conduits, passages, or flues, for heating, cooling, or ventilating buildings by the circulation of air, are constructed of combined hollow bricks and tiles A built into ordinary brickwork or masonry. The horizontal passages in the wall communicate with one another by means of perforations 2 through the bricks, and by vertical perforations 6 in the webs, out of line with one another.



the webs, out of line with one another.

22,828. Anderson, D. W. Nov. 12.

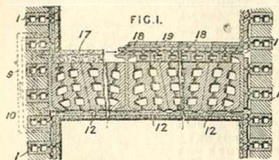


Heating buildings &c.—Hollow walls, floors, &c. adapted for the heating, cooling, or ventilation of buildings by the circulation of air, are constructed of combined hollow bricks and tiles which may be used alone, or with ordinary or special bricks.

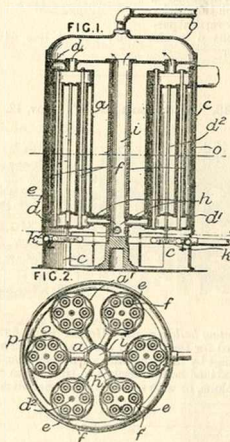
22,829. Anderson, D. W. Nov. 12.

Heating buildings &c.—Relates to the ventilation, or heating, of fireproof floors, walls, columns, and the like, by the use of hollow bricks, blocks, and tiles. Fig. 1 shows a wall constructed of hollow perforated brick-tiles 1, and a floor constructed of hollow perforated blocks 12. The air spaces in the wall above and below the floor are connected by air pipes 9, 10. Air circulates freely throughout the structure in order to prevent explosions in case of fire due to the heating of air confined in limited spaces. Hollow perforated bricks, blocks, and tiles

of various shapes are used in the construction of floors, arches, and ceilings, and for protecting wood and metal columns and girders.



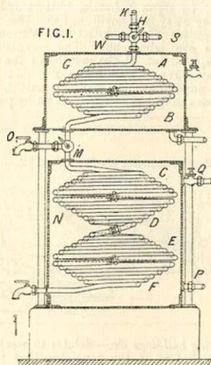
22,845. Kane, W. Nov. 12.



Heating water.—In the apparatus shown in Figs. 1 and 2 for generating steam or heating water, there are a number of independent vertical generating sections *a*, *a'*, &c., arranged above separate burners *k* or heating-devices, so that heat may be supplied to one or more of the sections as required. Each section is enclosed in a casing *o*, and all sections communicate above with the dome *b* and below with the central tubular support *i* by means of the tubes *h*, and are enclosed by the casing *c*. The burners *k* are secured by screwing to the base of the sections, or are supported by

the tie-rods *d*², which pass between the heads *d*, *d'*. Each burner has a control valve *k*². The heat flues *f* are carried up through the water tubes *c*, and are expanded into plugs which screw into apertures in the walls of the heads *d*, *d'*. The heads are corrugated to provide vertical heat flues *p*. The number of tubes in each generating-section, and the number of sections employed, may be varied.

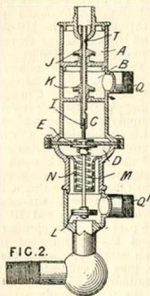
22,875. Pakes, W. C. C., and Barnes, W. H. Nov. 12.



Heating liquids.—Milk or other liquid is sterilized by allowing it to flow from a suitable reservoir through a pipe *K* fitted with a four-way cock *H*, and leading to inclined conically-arranged coils *A*, *B* contained in a chamber *G* heated by steam from a suitable pipe. On leaving the chamber *G*, the milk &c. is conducted by a pipe *M* through similar coils *C*, *D*, *E*, *F* enclosed in a chamber *N* through which cold water or brine is led by pipes *Q*, *P*. The pipe *M* is fitted with a thermometer and with a branch pipe *O* governed by a three-way cock through which the hot milk may be removed. The coils are cleaned by introducing steam or water through pipes *S*, *W* leading to the cock *H*. When used for liquids which give a sediment when heated, a settling-chamber fitted with a suitable lid is provided between the chambers *G*, *N*.

22,960. Winterlood, J. Nov. 13.

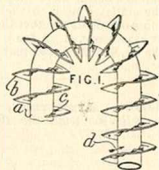
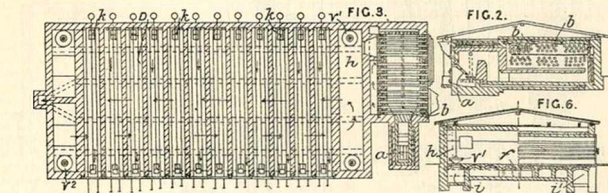
Heating water.—Relates to automatic valve attachments for geysers and like water-heaters so constructed that, on turning off the water outlet of the heater, the gas and water inlet valves are automatically closed by the pressure of the water contained within the heater without shock and strain upon the heater. Fig. 2 shows the valve attachment with the valves open. Four chambers A, B, C, D are formed in the tubular attachment; the upper chamber A is connected to the geyser, the water inlet Q is attached to the chamber B, the chamber C is connected with the chamber A by a pipe or by the tubular stem T of the valve spindle I, and



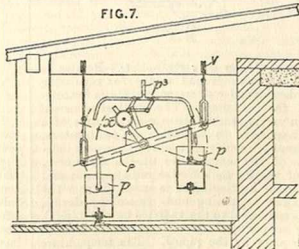
the lower chamber D is connected with the gas inlet Q' and with the burner. The spindle I carries the valves J, K, L, and the flexible spring-pressed diaphragm E between the water and gas chambers. The opening of the gas and water supplies takes place by the action of the spring M with the perforated guide-box N. The valve attachment is shown attached to a conical coil geyser.

22,975. Sauerbier, F. Nov. 13.

Heating buildings.—Relates to tubes for radiators and the like, and consists in applying to the pipes a band spirals *b* which have rolled wavy surfaces *c* to facilitate radiation and to ensure a hold on the pipes or which have smooth surfaces if the spiral band is thick. The band *b* is twisted on to the pipe *a* in the direction of the arrow *d*.

**23,129. Herberz, H.** Nov. 15.

Heating air.—A drying-apparatus in which air heated by furnace gases is passed through a series of drying-chambers is shown in Figs. 2, 3, and 6. Gases from the furnace *a* pass through nests of heating tubes *b* through which air which may be charged with oxygen is forced by a fan and passes into a chamber *h*, the furnace gases passing into a central flue *f* underneath the drying-chambers *D*. The heated air passes into one of the lateral flues *i, i'* through a valve *v, v'*, enters the drying-chambers through apertures *k, l*, and, after traversing the chambers, passes into the opposite flue and thence through a valve to an underneath flue and to the chimney.

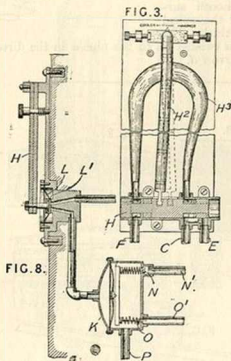


23,134. Dowson, J. E. Nov. 15.



Heating air.—Air is heated by being drawn through the inside of the casing *b*, which surrounds the tubes or pipes *a* through which the hot gaseous exhaust products of combustion from a gas or other engine are discharged. The air is drawn in through one or more openings at *f*, and leaves by the outlet *h* near to the exhaust inlet *i*. The tubes *a* connect together the inlet and outlet boxes or chambers *c*, *d*. A fan *x* may be employed for the air, and the heater may be horizontal, vertical, or sloped.

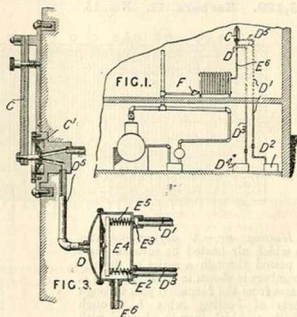
23,138. Armstrong, C. G. July 29, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1883].



Heating buildings &c.; thermostats.—Relates to processes or methods and means for regulating heating devices and systems, such as steam heating-systems for buildings. The method consists, firstly, in varying the effective radiating-area of a heater responsive to variations of temperature, and, secondly, modifying a checking action, independent of the temperature of the apartment, the act of varying the effective radiating-area and before all the heating-agent is expelled from the heater. The regulating and controlling device, Fig. 3, is connected to the radiator by the pipe C, to an air supply by the pipe F, and to an exhaust device or pump by the pipe E. The temperature

of the steam radiator is controlled by regulating the admission of air to the radiator, and this admission is intermittent or regulated to prevent too rapid displacement of the steam. The cold air is led through the tube *H*² placed behind the compound bar *H*¹ of the thermostat to increase the action of the thermostat. The bimetallic bar *H*² operates the air-controlling valve *H*. In another arrangement, the thermostatic bar makes contact with one or other of two electric contacts, so controlling one or two air valves placed between the air supply and exhaust pipes *F*, *E*. The air-valve stem is surrounded by a wire coil, through which a current may flow to cause the valve stem to expand and the valve to open. Fig. 8 shows another arrangement of thermostatic control. The controlling diaphragm valve *K* is actuated by air from the air supply, and the admission of this air is controlled by the rod *H*² and diaphragm *L* and valve part *L*¹. The spring-pressed valves *N* and *O* control the openings of the pipes *N*¹, *O*¹ from the air-supply source and the exhaust respectively. The pipe *P* connects the controlling-valve with the radiator. At some point between the radiator and the steam supply a hinged valve is employed to confine the steam and air in the radiator and prevent air from passing into the pipes. This valve also allows the water of condensation to flow out when the steam pressure opens the valve.

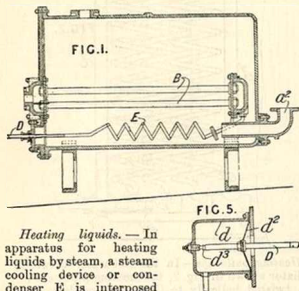
23,139. Armstrong, C. G. Nov. 15.



Heating buildings &c.—Relates to heating devices and systems, especially steam heating-systems, and to the process of regulating them. Fig. 1 shows a single-pipe steam heating-system embodying the invention, and Fig. 3 shows the construction and arrangement of the controlling valves and pipes. The heater or radiator has its effective radiating-area varied or governed by the insertion into the heater or radiator of a displacing medium such as air, and the act of varying the

radiating-area is checked independently of the temperature of the room to be heated, so as to prevent the too rapid insertion of the displacing-fluid. A valve F adapted to admit the heating-fluid to the radiator is located between the source of supply and the radiator, and the controlling-valve D with the valve C¹ governed by the thermostat C is placed so as to communicate with the radiator by the pipe E², with the air supply or pump or reservoir D² by the pipe D¹, and with the withdrawing-device or vacuum pump D⁴ by the pipe D³. The air pipe D³ is controlled by the thermostat, and the valves E¹, E² open outwardly and inwardly respectively. The seating-spring E¹ is not so strong as the spring E², so that the valve E² is more readily actuated than the valve E¹.

23,235. Kirkland, T. Nov. 16.

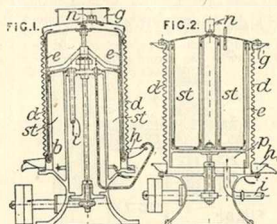


Heating liquids.—In apparatus for heating liquids by steam, a steam-cooling device or condenser E is interposed between the steam pipes B and the exhaust pipe D, which is controlled by an exhaust valve, steam trap, or the like capable of being closed by the expanding of a part of the apparatus. The exhaust controlling or trap device may consist of the pipe D, Fig. 5, the diaphragm d^2 , and the stationary and adjustable valve d^3 , or the diaphragm d^2 may be omitted and the chamber d may be attached to the wall of the apparatus by rods. The heating-cylinder may be arranged with the steam pipes vertical. The liquid to be heated enters the cylinder by the pipe a^2 near to the coiled-tube condenser E. The parts are bolted together to facilitate cleaning &c., and the vessel may be tilted as desired.

23,305. Ahlborn, E. Nov. 18.

Heating liquids.—Relates to heat interchangers suitable for sterilizing liquids and consists in providing a drum e , Fig. 1, of non-conducting material which revolves between concentric heating and cooling surfaces, b , d and thereby brings the liquid into intimate contact with the surfaces. The liquid

first flows from the tank g over the exterior of the corrugated casing d into a tray h from which it is pumped up through the pipe i into the space between the revolving drum e and the steam-heated chamber st from whence it rises in the space

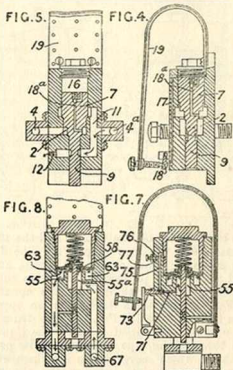


between the exterior of the drum e and the inside of the casing d to the draw-off pipe n . The drum e serves as an air chamber for the pump, and is provided with small projecting wings to compel the liquid to travel with it. In the apparatus shown Fig. 2, the liquid travels in an opposite direction to that shown in Fig. 1. The drum e is formed of two bell-shaped parts. The liquid is pumped through the pipe i into the under part p of the drum which serves as an air chamber for the pump, it next rises between the outer surface of the drum e and the inside of the corrugated casing d and then flows down between the drum e and the steam-heated vessel st , and finally rises to the outlet n , from which it flows into a tray g and down the outside of the corrugated casing d to a tray h .

23,506. Nash, N. E. Nov. 20.

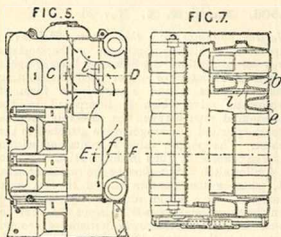
Heating buildings &c.; thermostats.—Relates to temperature-regulating appliances or thermostatic valves for controlling the flow of a heating-agent through a radiator or other heat-distributing appliance. Figs. 4 and 5 show one form of thermostatic valve which is interposed in the pressure-fluid pipe between the reservoir and the pressure-operated diaphragm valve attached to the radiator. The puppet valve 7, contained within the valve chamber 2, when in the position shown in Fig. 4, allows the fluid to flow to the radiator valve, that, when in the position shown in Fig. 5, it arrests the flow. Fluid, entering by the inlet 4 when the thermostatic blade 19 keeps the lever 18 against the outlet passage 17, circulates around the stem 3 to the passage 18^a and the chamber 16, and keeps the puppet valve closed and communication between the inlet 4 and outlet 4^a shut off. When the blade 19 expands and opens the by-pass 17, the puppet valve is raised, and a plunger valve is caused to cut off the flow of the heating-agent. The chamber 11 is provided with an escape opening 12 to relieve the pressure-operated valve of the dead pressure. In the controller shown in

Figs. 7 and 8, the plunger valve 73 governs the ducts 71, 75, and the spring-pressed diaphragm valve 58 seats on the flange 55, to cut off the flow of liquid from the inlet port 67 through a duct and the bore 55^a to the chamber 63. The waste



outlet 76 is regulated by the adjustable screw 77. The apparatus may be used either with steam or hot-water plants.

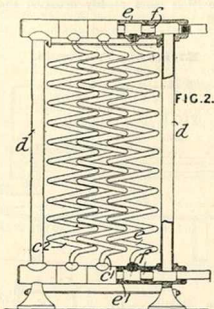
23,594. Wagstaff, J. G. Nov. 21.



Heating water.—Relates to sectional boilers for heating water and for generating steam, composed of a number of transverse vertical sections or elements bolted together to enclose a firebox. Fig. 5 shows the improved boiler in front elevation, the left-hand side being in section on a plane passing between two of the elements. Fig. 7 shows the boiler in plan, partly in section at *b*

on the line C-D, Fig. 5, and at *e* on the line E-F. Each section is made in two identical halves, which meet together at the centre, and each has a lower water leg *f* and an upper inwardly-projected chamber perforated at *i*. Ribs are provided, as shown, on the exterior of the sections which, when they are bolted together, form flue spaces for the passage of the heating-gases from the fire as indicated by arrows in Fig. 5. Back and front water chambers, the latter with suitable doors &c., are provided as shown.

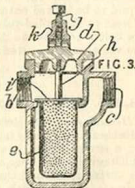
23,636. Reck, A. B. Nov. 21.



Heating buildings.—In the hot-water or steam radiator shown in Fig. 2, the heating-pipes *c, c', c''* are twisted helically to the right and left alternately, and are screwed to separate pieces of T-shape, which are joined together by screw or taper nipples *f* to form the lower and upper chambers *e', e*. In a modification, the helical pipes are joined to the upper and lower chambers by flanges. The columns *d* may be utilized as heating-surfaces.

24,019. Osbourn, M. P. Nov. 26.

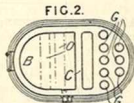
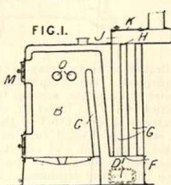
Heating buildings &c.—Relates to dirt traps or strainers especially applicable to steam heating-systems, and shown applied to a heating-system provided with valves such as are described in Specifications No. 13,085, A.D. 1899, and No. 11,741, A.D. 1900. The dirt trap, Fig. 3, comprises the strainer *e*, which is supported between the water inlet *b* and the



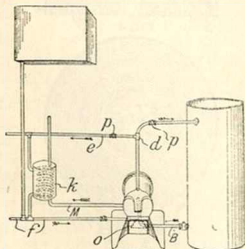
outlet *c*, and is connected by the cross-bar *i* and rod *h* to the movable cap *d*. The cap *d* is secured in place by the screw *j*, which is carried by the yoke *k* engaged by lugs on the sides of the trap body. When the trap requires cleaning, the cap *d* is loosened and raised, so permitting trapped water to escape by the outlet instead of flooding a room, and is afterwards removed to enable the strainer to be taken out and cleaned. The traps are arranged in the heating-plant in front of the inlets of the radiator valves on the exhaust or vacuum side, and screens in such valves may be dispensed with.

24,079. Binns, J., Speight, W., and Binns & Speight. Nov. 27.

Heating water for heating buildings &c. Figs. 1 and 2 show a hot-water boiler, which is modified slightly, as by the addition of a steam chamber, for steam-heating purposes. Within the firebox *B* the inclined water way *C* is arranged. The heated gases pass over the water way *C* and up the vertical tubes *G* fixed in the plates *F, H* to the smoke-box *J*. One or more water tubes *O* may be arranged across the firebox. Cleaning and examining doors *D', K* and a feed-door *M* are arranged at suitable parts of the boiler.



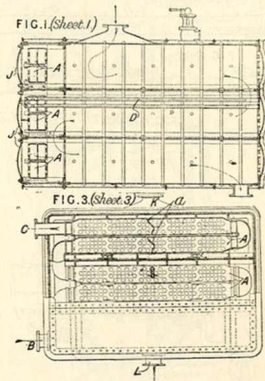
24,120. Grimsley, J. G. Nov. 27.



Heating buildings.—Relates to the utilization of the hot water generated by or derived by cooling

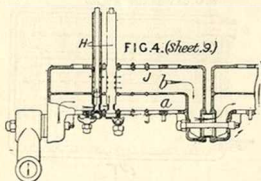
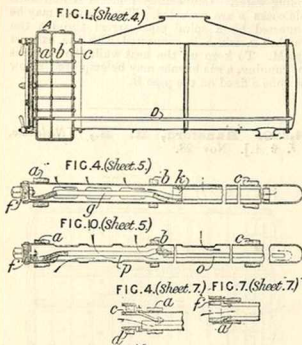
the cylinder of a gas or oil engine. The flow and return pipes of the heating-plant are connected respectively to the return and flow pipes of the water tank which supplies the cylinder jacket with cooling-water. Connecting T-pieces *d* and suitable cocks *p* are provided. The pipes *e, f* may be connected by a spiral pipe carried through the chamber *k*, which is connected with the exhaust pipe *M*. To keep up the heat while the engine is not running, a gas burner may be employed below the cone *o* fixed on the pipe *B*.

24,220. Ransford, R. B., [Nielausse, J. & A.] Nov. 28.



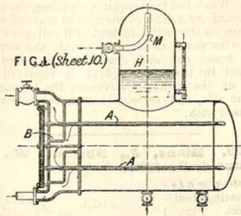
Heating liquids and gases.—Relates to heat-exchangers in which the system of circulation and of jointing of the parts as employed in the Nielausse boiler is used. The heat-exchangers may serve either to heat feedwater, or to condense or superheat steam, and the examples of heat-exchangers given in the Specification comprise feedwater-heaters for boilers or other purposes, exhaust steam condensers, steam superheaters, and evaporators such as are suitable for evaporating sea-water to produce fresh water for drinking purposes or for feeding marine boilers. (1) Feedwater and other heaters.—The heater comprises a number of tubes *D* of the type used in the Nielausse boiler, the collectors or heaters *A* with or without transverse partitions, and the casing with the detachable doors or lids *J* and a non-conducting. The feedwater enters by the pipe *B*, and passes from one collector to another by the tubes and leaves by the pipe *C*, while steam is admitted by the pipe *K* and together with the

water of condensation leaves by the pipe L. (2) Condensers.—In one form of condenser, shown in Fig. 1 (Sheet 4), the heater A is divided into two compartments, and the Niclausse tubes D pass



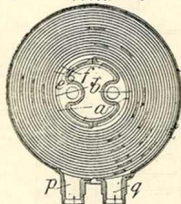
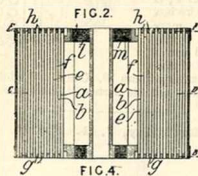
through the partitions *a*, *b*, and *c*, and are made tight by a slightly-conical joint. The tubes *D*, Figs. 4 and 10 (Sheet 5), are closed at one end, and receive a plug *f* at the other. This screw plug carries the strap *g* or *p*, which is attached to the inner and directing tube or to the strip *o*, which is Z-shaped and fitted within the outer tube. In another form of condenser, there is only one compartment in the header *A*, and the tubes are of two types, one with an inner directing-strip, and the other with an inner directing-tube. The tubes are kept in place by means of a collar *c*, Fig. 4 (Sheet 7), screwed in the plate *d* fixed to the header, or by the collar screwed to the part *a* of the collector or header *A*. (3) Steam superheaters.—The superheater is generally placed in the assemblage of boiler tubes, dividing the tubes into two groups. Steam from each group passes to the drum, and then to the superheater and to the steam pipe. The superheater, Fig. 4 (Sheet 9), consists mainly of Niclausse tubes *H* and of

headers *J*. Steam passes from the boiler into the fore compartment *a* of the header, then into each of the directing-tubes, to the compartment *b*, and to one or more other headers, if desirable. Several



collectors or headers may be coupled together and superposed. (4) Evaporators.—An evaporating-boiler for marine service is shown in Fig. 1 (Sheet 10). The boiler or evaporator consists of Niclausse tubes *A* fitted to the collector or header *B*, which is divided into compartments, and is fitted with inlet and outlet pipes. The steam generated passes to the dome *H* and through the pipe *M* to the condenser. Suitable valves are provided.

24,404. Desmaroux, J. Oct. 5, [date applied for under Sec. 103 of Patents &c. Act, A.D. 1883].



Heating liquids.—Relates to temperature exchanging apparatus for fluids or liquids especially

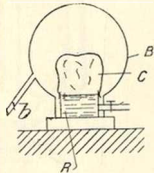
for cooling and heating water to be sterilized. Two metal sheets *a, b* are rolled in a spiral, and two metal bands *g, h* are rolled between them and brazed on the opposite edges so as to form two distinct passages *e, f*, closed on one side and open on the other. The two faces of the spiral coil are then closed by india-rubber discs and end-plates (not shown) drawn together by bolts. Inlets and outlets are provided at *l, m, p, q*, in the core and periphery. More than two plates may be used to make a corresponding number of passages.

spindle *e*, in lieu of a stuffing-box, the long cylindrical hole *h*, having grooves *i* located in the wall as shown in Fig. 2, and serving as a water lute, is provided, or the flexible cap or cover *o*, enclosing the projecting part of the valve spindle and adapted to extend and shorten in concertina-fashion, is attached to the cover *g* in which is the hole *h*. The cap *o* may be attached to or detached from the valve spindle, the helical spring *p* may assist in extending the cap, and the valve may be free to move without the spindle.

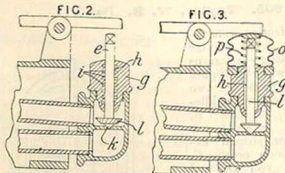
24,414. **Beurrier, A.** Nov. 30.

Solar heat, utilizing.

—Relates to means for utilizing solar heat to raise water from a well &c. Submerged in the water is a closed vessel connected at the top by a pipe *b* to a chamber *B* of larger capacity. Within the chamber *B* is a vessel *R* having an expandible part *C*, and containing ammonia. The chamber *B* is placed where it is exposed to variations of temperature, e.g., day and night temperatures, and the bag *C* is consequently expanded and contracted alternately, and so alternately allows water to enter the submerged vessel and forces it therefrom by a delivery pipe. The inner end of the delivery pipe is fitted with a float-actuated valve which closes before it becomes uncovered, thus preventing the bag *C* from bursting owing to reduction of pressure on its outside.

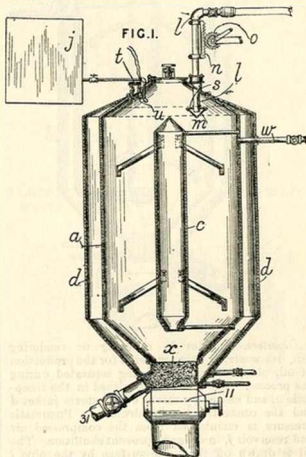


24,518. **Geipel, W.** Dec. 2.



Steam traps.—Relates to traps operated by the expansion of metals or liquids, applicable in whole or in part to the traps described in Specifications No. 7860, A.D. 1893, No. 21,571, A.D. 1894, and No. 21,783, A.D. 1897. To ensure rotation or change of position in the valve *k*, Fig. 2, the enlargement *l* of the valve is formed with blades or vanes. To prevent escape of fluid past the valve

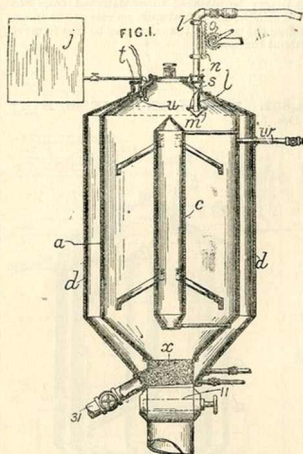
24,602. **Haddan, H. J.,** [Edson, E. R.] Dec. 3.



Digesters.—Relates to apparatus for reducing fish, fish-waste, or other material for the production of oil and glue or gelatine. The material is placed in the receptacle *a*, and heated by means of the steam jacket *d* and the connected heating-drum *c*. Pneumatic pressure is maintained from the compressed air &c. reservoir *j*, in order to prevent ebullition. The oil is drawn off from the surface by the pipe *l* which is adjusted by the rack and pinion *n, o*, and is provided with a conical receiving-end *m* covered by a strainer *s*. The solution of gelatine &c. passes through the filtering-material *x* to the draw-off pipe 31. While passing through the filter, the temperature of the liquid is maintained by the lower part of the steam jacket *d*. When the operation is complete, the contents of

the receptacle *a* and the filtering-material *x* are discharged through the slide valve 11. A sight-glass *t*, lamp *u*, and water pipe *w* are provided.

24,603. Haddan, H. J., [Edson, E. R.].
Dec. 3.

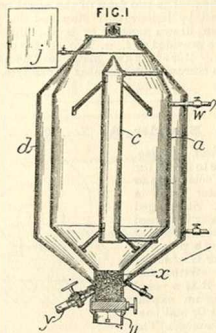


Digesters.—Relates to reducing or rendering fish, fish-waste, or other material for the production of oil, glue, and gelatine being separated during the process. The material is placed in the receptacle *a*, and heated by means of the steam jacket *d* and the connected heating-drum *c*. Pneumatic pressure is maintained from the compressed air and reservoir *j*, in order to prevent ebullition. The oil is drawn off from the surface by the pipe *l* which is adjusted by the rack and pinion *n*, *o*, and is provided with a conical receiving-end *m* covered by a strainer *s*. The solution of gelatine &c. passes through the filtering-material *x* to the draw-off pipe 31. While passing through the filter, the temperature of the liquid is maintained by the lower part of the steam jacket *d*. When the operation is complete, the contents of the receptacle *a* and the filtering material *x* are discharged through the slide valve 11. A sight-glass *t*, lamp *u*, and water supply pipe *w* are provided.

24,604. Haddan, H. J., [Edson, E. R.].
Dec. 3.

Digesters.—Relates to the production of a liquid which will yield glue or gelatine from fish,

fish-waste, or other material. Fig. 1 shows a section of the apparatus. The material is placed in the chamber *a* heated by the steam jacket *d* and the internal drum *c* in communication with it.

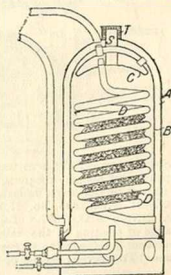


Ebullition is prevented by pneumatic pressure maintained by the compressed air &c. reservoir *j*. Water may be admitted through the pipe *w*. The liquid containing gelatine &c. continually passes through the filtering-material *x* heated by the jacket *d*, to the draw-off pipe *y*. At the conclusion of the operation, the contents of the chamber *a*, and the filtering-material *x*, are discharged through the slide valve 11. Any oil which rises to the top during the operation may be drawn off.

24,605. Taylor, W. B. Dec. 3.

Heating water.—

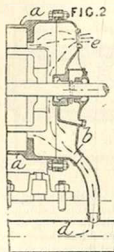
The hot-water heating-apparatus shown in the Figure comprises the two dome or saddle-like shells *A*, *B*, the crescent or other shaped expansion crown *C*, the coil *D*, and suitable burners and a stand for the boiler. The crown *C* is in communication with the annular water space of the boiler and the coil *D*. A pilot burner is provided, and a thermostatic



valve for the gas supply. The coil space is filled with asbestos blocks. The top flue S may be covered with the perforated cap T. There may be two spiral coils employed, and part of the boiler wall may be cut away to show the coil and the asbestos. The expansion crown piece C may be omitted in small boilers.

24,672. Schönfeld, H. Dec. 4.

Heating air.—An electric motor, applied directly to the driving-shaft of a spinning-machine, is enclosed in a casing *a*, the end-plates of which are provided with openings *b* through which air is introduced from a conduit *d* in connection with a ventilator or fan, so as to keep the motor cool. The heated air escapes through the openings *e*, and may be utilized for heating the rooms.



24,798. Kelly, G. Dec. 5. *Drawings to Specification.*

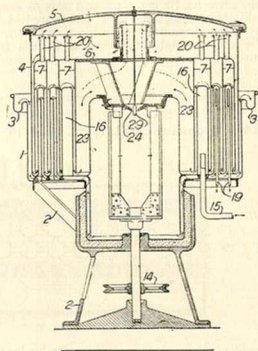
Non-conducting coverings. Heat insulating boards, slabs, tiles, &c. for cold storage are made of mineral wool and paper pulp. The ingredients are formed into a pulp, and, after draining on a screen, are subjected to a light pressure and dried.

24,800. Fliegell, J. Dec. 5.

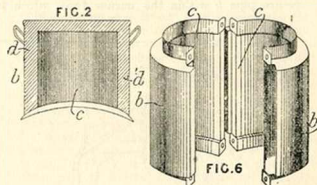
Heating liquids.—Relates to apparatus especially applicable for sterilizing milk. The outer cylindrical vessel 1 is rigidly mounted on the frame 2, and provided with the overflow channel 3. The cylinder 4 is covered by the lid 5, through which the liquid to be heated is fed, and is furnished with a rotary agitator consisting of the plate 6 and the downwardly-projecting annular pieces 7. The stirrer is driven from the pulley 14. The steam pipe 15 supplies steam to the chamber 16, and air or vapour exhaust pipes 19 are provided. The hot liquid is fed from the heating-chamber 23 past the thermometer 29 through the opening 24, and passes out in an opposite direction to the flow of the liquid to be heated. The chambers 7 communicate with the inflow chamber by the channels 23, so that the vapour is utilized for preliminary heating.

(For Figure see next column.)

24,800.



24,875. Whitworth, J. W., and Whitworth, T. Dec. 6.



Non-conducting coverings.—Relates to non-conducting covers comprising inner and outer sheet-metal casings with cotton or wool enclosed for protecting the manhole, economizer, or like fittings of boilers, or for the steam pipes. The cover, Fig. 2, comprises the casings *b, c*, non-conducting lining *d*, and suitable handles, and it may be square, rectangular, round, oval, or of other form. For enclosing a steam pipe, the cover is made in two parts, as shown in Fig. 6.

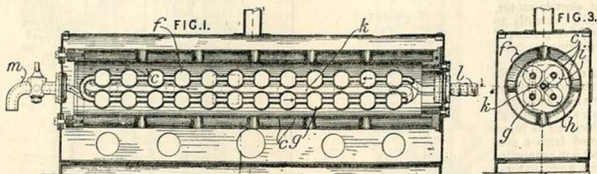
25,118. Aslatt, F. Dec. 10.

Non-conducting compositions.—A composition or material for covering steam generators, boilers, steam pipes, and other vessels or ducts to prevent or reduce radiation of heat is made from paper or wood pulp, 45 per cent., cork, 20 per cent., fine

breeze or ashes, 20 per cent., hair cotton or like fibrous material, 10 per cent., and clay or cement and silicate of soda, 5 per cent., and is applied in a moist or liquid condition or in bands or sheets. To render the material pliable when in the form of covering sheets or bands, the ashes may be

omitted, and the material is laid on a canvas backing of open texture, silicate of soda being used as an adhesive. For great pliability, pulverized paper, wood, hair, and fibre are deposited on canvas by means of an air blast, silicate of soda in solution being sprayed with the blast.

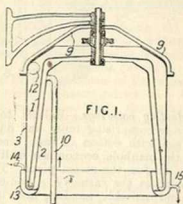
25,141. **Sensenschmidt, M.** Dec. 10.



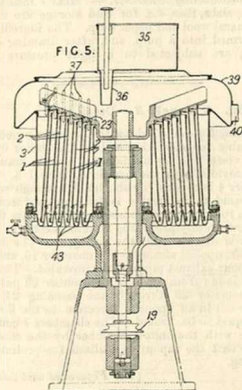
Heating water.—A gas geyser or water-heating apparatus, applicable as a bath stove and for the supply of warm water in kitchens &c., is shown in Figs. 1 and 3. The apparatus comprises the four ball pipes *f*, *g*, *h*, *i*, and the return pipe *k* within the burner tube, which is

supplied with gas and air and has flame apertures *c* in the inner cylinder. The whole is enclosed by a suitable casing, and the water is supplied by the pipe *l* and leaves by the cock *m*. The water is heated in its zig-zag passage through the water pipes.

25,183. **Ramstedt, C. W.** Dec. 10.



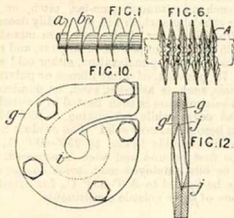
Heating liquids and gases.—Relates to apparatus for effecting exchange of heat between liquids or gases for sterilizing, heating, or cooling purposes. One form of heat-exchanger is shown in Fig. 1. The bell-like conical partition *1* is rotated between the stationary vessels or walls *2*, *3*, and is at such a distance from the inlet wall *2* that liquid or gas entering by the pipe *10* is caused to accompany or take part in the rotation of the partition *1*. The steam heating-jacket *13*, having inlet *14* and outlet *15*, is arranged around the junction of the walls *2*, *3*. Arms *9* support the vessel *3*, and the discharge pipe *12* is



arranged tangentially to the cover 12 of the vessel 3. In slightly-modified forms of apparatus, the wall 3 is parallel to the walls 1, 2, and the walls or vessels taper downwards. In the multiple apparatus shown in Fig. 5, the partitions 1 are carried by the rotating disc 23, which has compartments to receive the fluid to be treated when delivered from the holder 35 through the adjustable passage 36, and the walls 2 are removably attached to the plate 43 of the heating chamber by bayonet clutch joints to facilitate cleaning. Skimming-tubes 37 convey the fluid from the outer spaces to a trough in the disc 23, so that the fluid is discharged to the casing 39 and the outlet 40. The apparatus is rotated from the pulley 19.

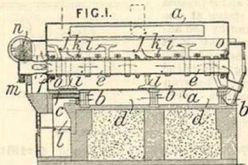
Fig. 6. is corrugated, the strip is coiled edgewise on the tube by the apparatus shown in Figs. 10 and 12. After the tube is introduced into the aperture *i* of the die plates *g, g'*, the plates are clamped together, and when the tube is rotated, the corrugated strip, brazed to the tube at one end, entering the interior of the die plates, is drawn on to the tube so that the corrugations are flattened out or effaced towards the outer edge as they enter the space *g*. The flat straight strips are corrugated by being passed between two spur-wheels.

25,214. **Tarpin, J., and Boyer, H.**
Dec. 10.



Heating buildings.—Relates to gilled tubes for radiators, coolers, condensers, and other apparatus, and particularly to gilled tubes for motor vehicles. A flat metal strip or web *b* is presented edgewise and helically coiled round the tube *a*, the close contact of the strip with the tube being ensured by a rolling and drawing action on the metal during winding on. When the strip *A*,

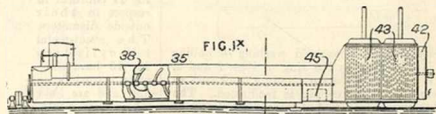
25,400. **Boult, A. J., [Baumann, A.]**
Dec. 12.



Boiling-pans.—A boiler *a* or heating-apparatus for asphalt, bitumen, pitch, and other substances rests on brackets *b* and is protected against the direct action of the flames from a grate *l* by a shield *c* of refractory material. A longitudinal firebrick partition *d* is preferably arranged under the boiler to divide the furnace gases and ensure uniform heating of the two sides. The spent gases escape into a smoke-box *f* through perforations in a central metal tube *e* mounted in bearings *o*, rotated by a worm *n* and pinion *m*, and carrying radial blades or paddles *i* to knead and stir up the mass. The outer part of the tube *e* is scraped by stationary scrapers *j* fixed to cross-bars *k*. In a modification, the cylinder *a* is carried by a portable metal casing or jacket mounted on wheels.

25,425. **Speltie, F. V.** Dec. 12.

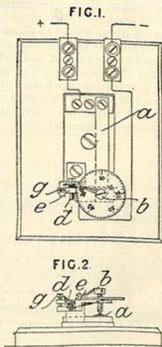
Heating air.—Relates to the treatment of fish for the extraction of oil and fat, and for the production of guano. After extraction of the oil &c., the solid matter is conducted to the steam-jacketed drier 35, through which it is carried by the conveyer 38 in the opposite direction to a current of hot air forced by the fan 42 over



the re-heating tubes 43. The fish paste thus dried and converted into "guano" is discharged through the lateral opening 45.

25,614. Rennert, O. Dec. 14.

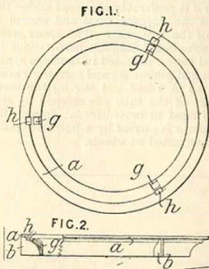
Thermostats.
—Relates to a thermostatic indicator in which a pointer indicates upon a scale the temperature at which an electric alarm is given. The thermometric strip *a* makes or breaks a circuit through the contact-screw *b*. The contact-screw *b* is mounted upon the lever *c*, which is pivoted to the pin *d* and is pressed by a spring at one end and by the adjusting-screw *g* at the other end. The screw *g* adjusts the distance between the contact screw and the thermometric strip.



25,776. Young, F. S., and Griffiths, W. S. Dec. 17.

Non-conducting compositions may be formed of magnesium carbonate, prepared according to a process described.

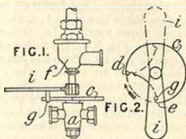
26,129. Row, W. T. Dec. 21.



Boiling-pans.—A household washing or boiling copper is supported by the ring *a*, Figs. 1 and 2, which is built into the surrounding brickwork so that removal of the copper is facilitated. The ring *a* has in its inner curved surface the slots *g* to receive projections or lugs on the copper, and the slots *h* above the slots *g* permit of the insertion of a tool. The lugs *b* on the setting-ring *a* facilitate the proper setting in the brickwork of the ring.

26,252. Trendel, F. Dec. 23.

Heating water.—A safety tap device for gas stoves for heating water for baths is shown in Figs. 1 and 2. The handle *i* of the water tap *f* has a pin *g* projecting into a cut-away part *d, e* of a disc *c* on the plug of the gas tap *a*, so that when the handle is moved the water tap is first opened. The pin device may be modified.

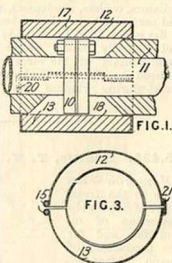


26,363. Karavodine, V. Dec. 24.

Non-conducting coverings and compositions.—Consists in producing insulating material with a basis of resinous substances or drying oils. Powdered resin such as bitumen, gum-lac, pitch, or other similar substances which will not readily decompose at 250°–300° C., or drying oils, are mixed with 25 to 35 per cent. of powdered sulphur, and to this mixture is added by malaxation, either cold or hot, 30 to 70 per cent. of inert fibrous or pulverulent materials, such as asbestos, sand, or pumicestone. The whole mixture is then heated in a vessel with a loaded cover while still mixing, to 350°–400° C., until it becomes almost solid. The product is compressed in moulds heated to 250°–400° C., or it may be first ground and then compressed. The resins or oils employed may, prior to use in the process, be heated to 300°–350° C., for driving off a portion of their volatile constituents.

25,449. Chalmers, D. F. Dec. 27.

Non-conducting coverings.—Relates to coverings for pipe joints for use in connection with non-conducting pipe coverings. Fig. 1 shows the easily removed cover applied to a flange joint where the pipe flanges 10 and the pipe covering 11 conform in respect to their outside diameters. The sheet-metal half-cylinders 12, 13 have their ends turned in or out, and are held together by means of staples 15, Fig. 3, or sliding pieces 21, or are joined by a pin 20 forming a hinge. The non-conducting material 17 may be retained in position by the wire netting 18, and by hooks or other



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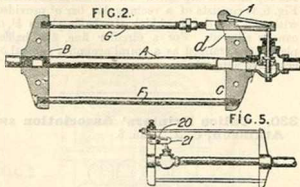
ABRIDGMENT CLASS HEATING.

equivalent devices. End covers are provided, if desired, when the cover parts 12, 13 have the ends or sides turned in to form a joint. Applied to a T-junction or to a pipe provided with a stop valve, the junction cover is I-shaped, and the metal casing is held together by sliding pieces 21.

26,733. **Lake, H. H.**, [Kieley, T. J., and Mueller, F. T.]. Dec. 31.

Steam traps.—In the trap shown in Fig. 2, the expansion pipe A is screwed to the crossheads B, C, which are further connected by the tie-rod F. The finger or toggle piece I bears on the end of the adjustable rod G passing through the opening *d* in the crosshead C and is inclined at an angle less than 45°. The motion of the crosshead due to the expansion and contraction of the pipe A

is transmitted to the valve spindle by the toggle-lever I. In a slight modification, the valve seats upwards, the operating or toggle lever being

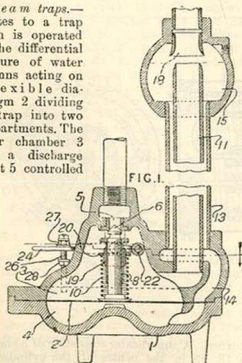


arranged below the upper rod G. In the modification shown in Fig. 5, the toggle or finger piece 20 bears on the lever 21 which controls the valve.

A.D. 1902.

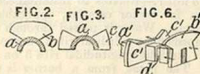
235. **Flinn, R. J.**, and **Aborn, G. P.** Jan. 2.

Steam traps.—Relates to a trap which is operated by the differential pressure of water columns acting on a flexible diaphragm 2 dividing the trap into two compartments. The upper chamber 3 has a discharge outlet 5 controlled



the action of the coiled spring 10. The pipe 11 is surrounded by the pipe 13, which connects the reservoir chamber 15 with the passage 14 of the lower chamber 4. The drainage inlet is provided with the flaring nipple 18, so that the pipe 13 and lower chamber 4 are supplied with water when the flow is slight. Discharge takes place when the water collected in the pipe 11 overbalances the outside column of water, which is also opposed by the spring 10. A forked lever, attached to the rocking spindle 22, which projects through a stuffing-box in the casing, and has the lever 24 fixed to it, engages with the flange 20 of the sleeve 19. The slotted lever 24 enables the tension of the spring 10 to be adjusted, or the valve to be opened. Stop nuts 27, 28 for the lever 24 are arranged on the screw 26.

299. **Thompson, T.** Jan. 4.

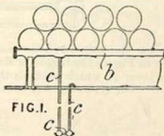


Heating water.—The flues through which the flames pass to heat the boilers of kitchen ranges and similar hot-water circulating devices are provided with removable baffles to direct the flames

by the valve 6, the steam of which slides in the tubular guide 8 and bears on the diaphragm 1 by

upon the boiler. In Figs. 2 and 3, the removable device consists of a half pipe *a*, stopped at one end, and fitted with baffles *b*, *c* alternately on the top and on the sides. In the form shown in Fig. 6, it consists of a rectangular bar *a*¹ provided with grooves *d*, into which the baffle-plates *b*¹, *c*¹ can be slipped. For a circular flue, the baffle-plates are arranged as a spiral around a central or eccentric support.

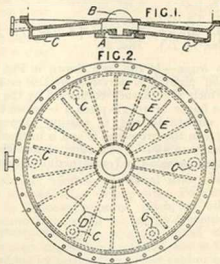
330. Calico Printers' Association and Atkinson, C. J. Jan. 6.



Steam traps for steam-heated drying-cylinders, low-pressure steam mains, and the like. The trap consists of a water lute or seal in the form of an inverted siphon or V-shaped pipe *c*, having one leg connected to the hollow frame *b*, and the other and open leg of sufficient length to balance, when filled, the maximum steam pressure. For cylinders heated by exhaust steam, the long and closed leg of the trap is fitted with an air vessel to prevent the pulsations from blowing out the water seal. In a modified trap, any number of

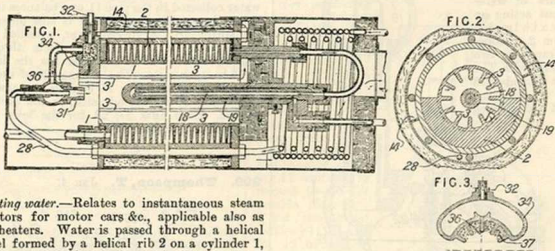
drainage pipes are led into a tubular casing or pillar having an outlet near the top.

450. Meura, P., and Delannoy, G. July 1, A.D. 1901, [date applied for under Patents Act, A.D. 1901].



Boiling-pans.—The bottoms of steam-heated coppers or boilers, such as those used in breweries, are cast in one piece of convex form, as shown in Fig. 1, are made hollow, and are divided internally into sectors by radial partitions *D, E*. The steam inlet *A* is central and the cap *B* is opposite the inlet to receive the impact of the steam. Outlets *C* are provided in each main sector *D*.

468. Oates, R. M. Jan. 7.

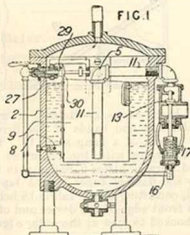


Heating water.—Relates to instantaneous steam generators for motor cars &c., applicable also as water-heaters. Water is passed through a helical channel formed by a helical rib 2 on a cylinder 1, which has straight longitudinal ribs 3 on its inner surface. The flame from a burner is delivered into the cylinder at one end, and the heated gases pass forward and backward through different portions of an annular flue space 14, passing finally through a chamber at the rear, which contains coils for heating the compressed air supplied to

the burner. A superheater consisting of concentric tubes 18, 19 in the centre of the cylinder 1 is preferably provided. A second helical channel, surrounding the first, may be provided, through which the water is passed before entering the

inner channel. The apparatus may be heated externally. The burner shown consists of a vaporizing-chamber 34, shown separately in cross-section in Fig. 3, to which liquid fuel is supplied at 32, and which is packed with asbestos. The vapour is delivered to the nozzle 31 within which is a nozzle fed with compressed and heated air by the pipe 28. For re-lighting the burner, a capillary duct 36 supplies liquid fuel to asbestos-packed pockets 37 in the under surface of the vaporizing-chamber 34.

470. McAuley, R. G. Jan. 7.

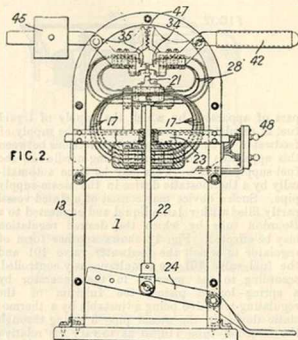


Steam traps.—The water &c. drains by an inlet 5 into the casing 2 fitted with an outlet 11 regulated by a valve 13. The outlet 11 dips into a bucket 9 pivoted at 8 and fitted with a projection 30 to engage with collars 29 on the stem of a valve 27, which regulates the admission of steam &c. to the underside of a piston 16 on the stem of the valve 13. In the position shown, the upward tendency of the bucket closes the valve 27, and thus leaves a spring 17 free to close the valve 13. When the water overflows into the bucket, it tilts, opens the valve 27, and admits steam to the piston 16, which rises and opens the valve 13. The bucket is thus emptied.

561. British Westinghouse Electric and Manufacturing Co., [Peck, J. S., Randall, K. C., and Scott, C. F.] Jan. 8.

Heating by electricity.—Rivets, or other small articles made of conductive materials, are heated by passing an electric current through them between a clamp 34, 35 holding the bodies, and a contact block 21 which is pressed against the heads; the middle of a rivet may thus be heated to a higher temperature than the ends. Contact with the head may otherwise be made by a liquid such as solder. In the construction shown, the contact block 21 is movable vertically by a rod 22 which slides in a guide 23 and is connected to a

foot-lever 24. The clamp has detachable jaws 34, 35 carried by levers, which are geared together at 47 and are pivoted between two parallel standards 13, one lever being provided with an



insulating-handle 42, and the other with a weight 45 tending to close the clamp. Upward pressure of the contact block 21 causes the rivets to be clamped more firmly. The clamping-levers and the contact block are connected by flexible copper strips 28, 17 to the secondary terminals of an alternating-current transformer 1, placed behind the frame 13; the primary winding has connections to two single-pole two-way switches 48, by which the current produced and the heating effect may be varied. In modifications, the clamping-levers and the contact block may be mechanically connected together for operation by foot or by hand, and the general arrangement of the machine may be varied.

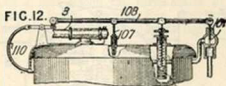
622. Boys, C. V. Jan. 9. Drawings to Specification.

Heating by chemical action.—The Thermite process is used in the welding of rail, pipe, and like joints, the mixture produced by the reaction of the aluminium and iron oxide being poured into moulds made from moulders' sand or loam and contained in iron casings clamped on the rails, so that the mould surrounds the joint.

642. Newcomb, E. C. Jan. 9.

Thermostats.—Relates to coiled-tube instantaneous steam generators, more especially for motor cars, and to means for automatically controlling

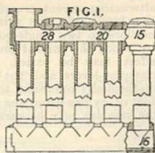
the supply of feedwater and liquid fuel thereto. To regulate the temperature of the steam, the relative proportions of water and liquid fuel supplied may be varied by adjusting a valve forming



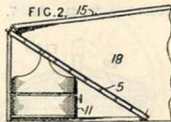
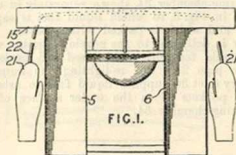
part of apparatus by which the supply of liquid fuel is regulated in accordance with the supply of feedwater, or by adjusting the connections between this apparatus and the regulating-needle of the fuel-supply nozzle. This may be done automatically by a thermostatic device in the steam-supply pipe. Such a device may consist of a closed vessel partly filled with volatile liquid and connected to a Bourdon tube by which the desired regulation may be effected. Fig. 12 shows another form of regulator in which the feedwater valve 101 and the fuel valve 107 are simultaneously controlled, according to the pressure in the generator by a spring-loaded piston, the fulcrum of the regulating-lever 108 being adjustable by a thermostatic device in the steam pipe 3 acting through the Bourdon tube 110, so as to vary the relative proportions of water and liquid fuel supplied.

735. Gill, J. Jan. 10.

Heating water.—Relates to fuel-economizers for steam generators and other like combinations of pipes or tubes, the object being to facilitate connecting the pipes or tubes with the connecting boxes or chests at their ends, and to allow a faulty pipe to be removed and replaced. The ends of the pipes are cast in chills axially concentric, the chilled ends are painted with asbestos paint or other refractory dressing, and the pipes to be united by the boxes are placed axially parallel and the boxes are cast on to the ends while the pipes are in position. Fig. 1 shows in elevation part of a fuel economizer. One of the chests 15, 16 is made with openings 20 cast by means of chills through which openings a faulty pipe can be withdrawn. One of the chilled ends of each pipe is tapered to facilitate withdrawal. The holes 20 are closed by screw caps 28.

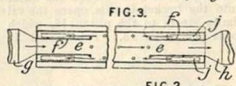
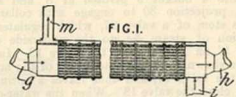


978. Meier, F. J. Jan. 14.



Foot and hand warmers.—Relates to means for warming the feet and hands of the driver of a vehicle by means of a lamp stove 11. The lamp hood communicates with the chambers between the inclined parallel plates 5, 6, and with the hand mitts 21 by the flexible tubes 22. A lap covering is provided, consisting of the fabric 15 held closely against the front edge of the device and of flaps 18 which are hooked to eyes at the outer edges of the plates 5, 6.

1310. Maslin, E., and Theryc, C. Jan. 17.

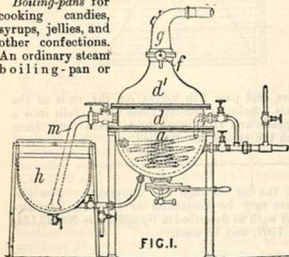


Heating liquids and gases.—Relates to heat-exchangers for the treatment of fluids, comprising a number of thin flat, corrugated, or like heat-conducting plates superposed parallel to one another and kept apart by elastic longitudinal bands of asbestos, caoutchouc, hemp, or the like, the plates being compressed by bolts or equivalent means, and compartments being formed

by the bands and plates for the passage of the fluids to be heated or cooled. The exchange of heat takes place indirectly by the lateral conductivity of the plates. In the apparatus shown in Figs. 1, 2, and 3, the hot fluid enters the passages *j* by the inlet *i*, and, after traversing the side passages 1, 3, leaves by the outlet *m*. The cold fluid enters by the inlet *g* and leaves by the outlet *h* after traversing the central passage 2. The plates *b* are provided with extension pieces *e* to fit within the sleeves *f*. In a modified form of apparatus, the bands separating the plates are at the edges of the plates, and the cold fluid passes through the odd compartments while the hot fluid passes through the even compartments.

1601. Brierley, W. Jan. 21.

Boiling-pans for cooking candies, syrups, jellies, and other confections. An ordinary steam boiling-pan or

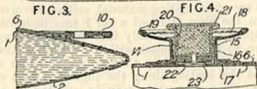
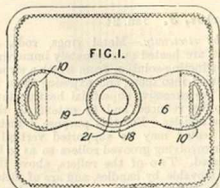


kettle *a*, such as that described in Specification No. 6994, A.D. 1891, is converted into a vacuum pan by providing it with a removable hood composed of two parts *d*, *d'*. A pipe or funnel *g*, leading to an air pump, fits in a recess and over a feed-hole in the part *d'*, and is secured by projections and pivoted clip pieces *f* or equivalent means. The cane-sugar, glucose, &c. is drawn into the boiling-pan through a pipe *m* from an ordinary melting-pan *h*, or introduced through the feed-hole in the hood, while butter, flavourings, &c. are introduced through the feed-hole only.

1671. Lake, H. H., [Williams, M. S.] Jan. 21.

Hot-water bags.—A hot-water bag of rubber, suitable for securing to the person, with no objectionable metal inlet or discharge nozzle and stopper, is shown in plan in Fig. 1 and in section in Fig. 3. The side walls 1, 2 are rectangular in outline with rounded corners, and the wall 1 is reinforced by the rubber sheet 6 which extends to and forms a part of the projecting ears 10. The inlet and discharge nozzle 14, Fig. 4, comprises the threaded metal thimble 15, and the rubber

tube 16, having the base flange 17 cemented to the sheet 6, and the upper flange 18 reinforced by a binding-strip 19. The stopper or plug 20 has a milled head 21, is screwed within the



thimble 15, and carries at its lower end the elastic disc 22, which engages the annular seat 23 on the thimble. By placing the bag with the nozzle away from the person, the person experiences no inconvenience in bed, and by running a belt through the looped ears 10 and over the nozzle the bag may be secured to the person.

1737. Phillips, A. Jan. 22.

Heating by electricity.—Relates to a robe heated by electricity, on, or in, which a patient is placed. Fig. 1 shows the robe open. It is made of a double thickness of fabric enclosing a sinuous wire 4 which is held in place by longitudinal seams 3. The wire is preferably made of german silver, the parts which cross the seams being of flexible material to allow folding. The wire is continued into the collar 5, as shown.



1820. Hurrell, G. C. Jan. 23. *Drawings to Specification.*

Heating by electricity.—Relates to conduits for electric conductors, and to means of laying the

conductors therein. A bare high-resistance conductor may be laid along the bottom of the conduit for melting the filling-material when a

change is to be effected in the conductors, or an ordinary bare conductor may be used for this purpose.

1961. Giriot, J. Jan. 24.

Heating by electricity.—Metal rings, rods, or other articles are heated by alternately immersing them in a conducting-solution from which a strong current is passed into them, and exposing them to air to allow the excessive superficial heating thus produced to be reduced and to extend to the centre of the articles. For this purpose a metal ring to be heated may be supported vertically between four revolving grooved rollers so as to be partly immersed. Two of the rollers, above the solution, are movable by handles, and are of metal to conduct the current from the ring; the lower rollers are of insulating-material, and are revolved to turn the ring. Part of a bar P may be heated by reciprocating it vertically into the conducting-solution, so that it passes within a hollow conical electrode O, immersed in the solution, in order to equalize the heating along the immersed part of the bar; the reciprocation may be effected by an eccentric K. The whole of a bar may be uniformly heated by passage horizontally through several heating-vessels and intervening air spaces; the bar may be conveyed by horizontal series of

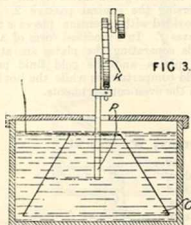
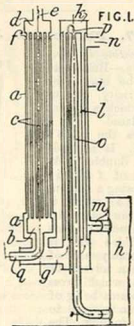


FIG. 3.

rollers, and pass flap valves on the ends of the vessels. Solution passing these valves falls into a receptacle and is pumped to a raised tank, from which the vessels are supplied.

1990. Dowson, J. E. Jan. 24.

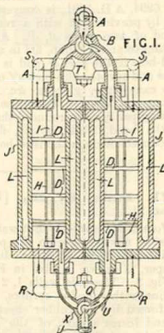
Heating air.—The air, to be used for the production of producer gas, is heated (1) by the exhaust from the engine using the gas, (2) by the hot gas produced in the generator, or (3) by both exhaust and hot gas. In the arrangement shown, the exhaust from the gas engine passes through a tube *g* to a box *b*, through vertical tubes *c* to another box *d*, and thence away through the tube *e*. Air is drawn at *f* into the casing *a* surrounding the tubes, and leaves the heater by an outlet *g*. It may then pass directly to the generator *h*, or, as shown, up a number of tubes *l* to a top chamber *k*, whence it is driven by a jet of steam, entering at *p* down a central tube *o* and thence into the generator *h*. The hot gases leaving the generator pass through a tube *m* to a casing *i* surrounding the tubes *l*, *o*, and then pass away through the outlet *n*. Instead of a steam jet, a fan or blower may be used to



force the air through the apparatus. The air-heaters may be horizontal or inclined. An air-heater such as described in Specification No. 23,134, A.D. 1901, may be used.

2071. Marchant, T. B. Jan. 25.

Heating liquids.—Relates to apparatus for heating, straining, and regulating liquid fuels and oils for steam-generator burners &c. Apparatus having duplicate parts as shown in Fig. 1 is used, to avoid stoppage on cleaning when required for long runs, as on motor vehicles, launches, torpedo boats, &c., otherwise single apparatus is used. Two jacketed cylinders *J*, heated by steam, hot air, &c., are provided with graded strainers *D* spaced by distance pieces *H* on removable bolts, pins, or screws *I*. A fuel-supply

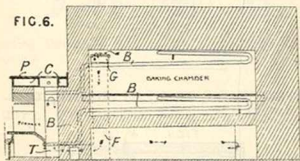




pipe A leads from an elevated storage tank to a three way cock B, and branch pipes to the straining chambers. These chambers have outlet pipes leading to a three-way cock X and burner-supply pipe U, which may be jacketed, and also steam or air supply pipes R and a three-way cock Q at the fuel-outlet ends, and corresponding outlet pipes S and a cock T at the opposite ends, for cleaning. The jacket spaces L are connected by branch pipes P having three-way cocks.

2102. Johnston, J. Jan. 27.

FIG. 6.



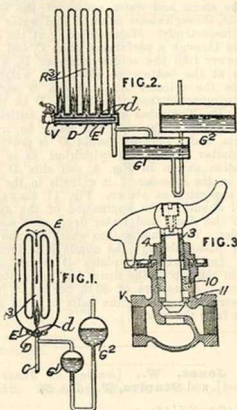
Heating water; heating-apparatus.—Relates to heating, baking, and drying-apparatus of the Perkins-tube type, being an improvement on the invention described in Specification No. 22,736, A.D. 1900, and consists in providing a hot-plate and boiler immediately over the furnace in front of the oven. Fitted below the hot-plate P is a boiler C for hot-water circulation &c., heated by the furnace beneath. The hermetically-sealed tubes B are bent at the furnace ends as shown, to obtain convenient working height for both the apparatus and oven and the hot-plate.

2132. Lindemann, O., [Körting, E.]. Jan. 27.

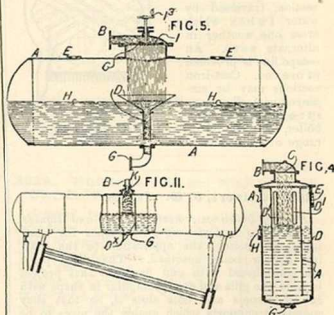
Heating buildings &c.; heating by steam circulation.—A steam heating-apparatus is shown in Figs. 1 and 2, and a valve for regulating the supply to the apparatus and to heating-apparatus in general is shown in Fig. 3. Steam passes from the pipe D within the channel E', through nozzles d, to the middle channels R² of the elements E, causing the contained air to circulate in the direction of the arrows. Condensed water passes off through the pipe C to the boiler, and a portion of the displaced air passes to the air vessel, which consists of the chambers G¹, G², connected by a siphon pipe. The supply valve has the screw-threaded sleeve 3 and the gland 4 removable, so that the maximum lift of the valve can be varied for the same extent of rotation of the stem by using sleeves and glands having different pitches. The stuffing-box arrangement 10, 11 allows the parts to be changed during working.

(For Figures see next column.)

2132.



2133. McPhail, H. Jan. 27.

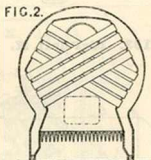


Heating water.—Relates particularly to feed-water heaters of the type described in Specifications No. 10,453, A.D. 1895, No. 5391, A.D. 1896, and No. 27,026, A.D. 1897, [Abridgment Class Steam generators], and is also applicable to heating, purifying, and softening other water in a vessel having a steam space. In the form shown

in section in Fig. 5, the apparatus comprises a horizontal cylinder A which is in communication with the steam and water spaces of the steam generator, through steam inlets E and water outlets H respectively. Water entering at the inlet B passes through a perforated plate C, and falls in a shower into the conical chamber D, which is open at the bottom to allow the water to pass into the cylinder A. A brush or scraper I can be operated from the handle P to clean the plate C. The tubes leading to the outlets H dip below the surface of the water to avoid the scum, and a blow-off outlet G is provided. The chamber D may be cylindrical as in the modification shown in Fig. 4, and slits D' are formed in the cylinder if it extends to the top of the apparatus as shown. Fig. 11 shows, in sectional elevation, the application of the apparatus to the steam and water drum of a water-tube boiler. The chamber into which the shower of water passes through the nozzle K is formed between two perforated plates D which may extend to the top of the drum but not quite to the bottom. A pressure of 80 lb. per square inch is necessary to separate the salts of lime and magnesia from the water.

2192. Jones, W., [trading as Jones & Attwood], and Staples, T. Jan. 23.

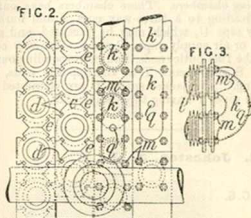
Heating water, water-tube boilers for. A partially cylindrical shell encloses a firebox of hexagonal cross-section, traversed by water tubes which cross one another in alternate sets. An escape flue is provided at one end. Cast-iron sections may be employed in the construction of the boiler, each section being formed with a separate range of water tubes.



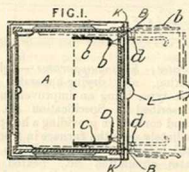
2269. Calvert, J. G. Jan. 28.

Heating buildings; heating gases and liquids.—Relates to batteries of gilled pipes for heating and cooling, the application to the heating of air being specified. The gilled pipes are constructed with end flanges c that project beyond the gills and are rectangular in shape with cut-off corners and bolt slots d, so that they constitute supports which enable the pipes to be stacked on one another, as shown on the left-hand side of Fig. 2, without being supported by the bends, Fig. 3, or other extraneous means. The spaces or openings e between the flanges c are closed by the flanges of the bends k being extended to fit over the openings more or less. The bends k are attached to the pipes l by the

bolts m. The external casing is screwed to the bosses q.



2343. Yates, H. J., and McNeill, D. R. Jan. 29.

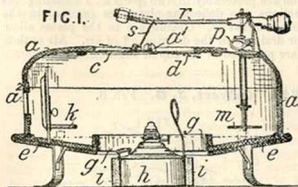


Heating by electricity.—A cooking-apparatus such as a grill is provided with double doors B, mounted upon hinges K. Each half is provided with a projection D, which engages in a curved slot C in a sliding bottom plate or shelf A. The latter has a finger-piece L projecting from beneath the door. When the shelf is drawn outwards or pushed inwards, the doors are opened or closed. The opening and closing of the doors by the withdrawal or insertion of the shelf may be accomplished otherwise. The shelf may have projections, and the doors have grooves or the like engaging these projections; the grooves may be differently shaped; hinged arms may be attached to the doors and the shelf; or the doors may be simply pushed outward by the front of the tray, and fall backwards by their own weight, in which case they are mounted upon pivots not placed above one another, or are provided with springs or weights.

2367. Wilson, T. Wilson-. Jan. 29.

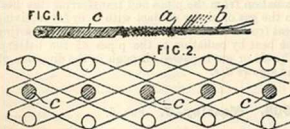
Thermostats for incubators. An opening c is formed in the top of the body a of an incubator heated by the lamp h. The temperature within the incubator is regulated by a damper d pivoted on trunnions mounted in slotted standards a' and

operated by a link *s* from a lever *r*. The lever *r* is actuated by a thermostat *m* of any suitable form



acting through a vertical rod and the pivoted cam *p*.

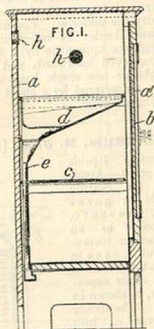
2377. Herrgott, J. M. C. Jan. 29.



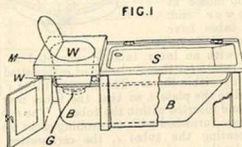
Heating by electricity; heating buildings &c.—Fabrics to be electrically heated for use as domestic heating-appliances in the form of carpets, cushions, furniture, or hangings, or to be combined with carpets or tapestries, or to be used for warming the feet or other parts of the body, contain special threads, Fig. 1, in which fine wires *a* are laid helically round a fibrous core *b*, and are then covered with insulating-thread *c*. The wire may be of copper, tinned brass, aluminium, or its alloys, or of galvanized iron, and the fibre may be hemp, cotton, silk, wool, jute, ramie, or asbestos. The fabric may be woven so as to have both surfaces formed entirely of fibre threads, as shown in longitudinal section in Fig. 2, the wired weft threads *c* being entirely enclosed. The fabric has a double selvage on each side, between the parts of which the looped ends of the wire weft *a* are connected at intervals to longitudinal conductors, by twisting the loops round the latter; the double selvage is closed over these connections, either in the loom or by sewing. The fabrics are specially applicable in the form of endless cloths in drying-apparatus, and for this purpose are provided with metal buttons, which lie on one surface, and are connected with the longitudinal conductors; when the cloths are in use, the buttons travel over stationary contact plates, by which current is conveyed to the heating-wires. The fabrics may be dressed, dyed, printed, or otherwise decorated. The endless cloths are applicable in paper-making, dyeing, dressing, or finishing machinery.

2444. Rutter, T. T. Jan. 30.

Heating apparatus.—The chamber *a*, which is preferably constructed of wood insulated or lined with compressed wood or vegetable fibre, is adapted for heating or drying plates, linen, &c. The chamber has a door *b* in front, and is fitted at the middle with shelves *c* to receive the articles. When it is desired to heat or dry the articles, a tray is fitted at the bottom, adapted to hold a heating-apparatus. The chamber has ventilating openings *h*.



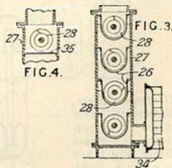
2518. Hodkin, H. H. Jan. 31.



Heating water.—A bath *B* is supplied with hot water by a boiler *W* fixed at the foot in a frame *M* and heated by a burner *G*.

2522. Whittaker, L., and Whittaker & Co., C. Jan. 31.

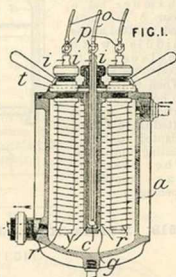
Heating by air circulation.—Relates to apparatus for mixing sand, lime, and water together in definite proportions, and to means for heating and partially drying the materials. The material is transferred by a conveyor to a mixing mill, and is raised by an elevator to a casing *27* containing a series of mixing-conveyers *28* which are



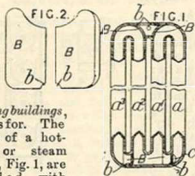
rotated in opposite directions in troughs 26, or over shelves 35. A current of heated air is forced along the troughs to promote chemical action, and to heat and dry the material. The air may be heated by a steam heater 34 or otherwise, and is drawn through the apparatus by a fan. The materials are conveyed backwards and forwards along the troughs, or one single long trough may be used, and is transferred by a shoot to a brick or block pressing-machine.

2592. Mills, B. J. B., [Prat, A.]. Jan. 31.

Heating liquids and gases.—Apparatus for heating liquids or gases under pressure, applicable as an ordinary or instantaneous steam generator or as a steam or air super-heater, is shown in Fig. 1. The strong reservoir *a*, into which the fluid to be heated is admitted, is provided with the tubes *r* open at the top and closed at the lower end. These tubes have each a platinum tube *c* with an inner tube *g* connected to the flexible tube *o* for the admission of carburetted air depending within them. The heating-tubes *c* are attached to the plate *t*, so that the tubes may be heated and inserted within the tubes *r*. The supply tubes *o* are furnished with controlling-cocks *p* and, after heating the tubes *c*, the carburetted air escapes by the openings *i* at the top of the tubes *c*. One or more perforated metallic tubes *y* may surround the heating-tube *c*, and the tubes *r* are winged or gilled.



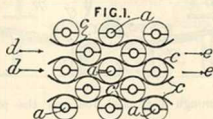
2603. Jackson, J. T., and Jackson, S. Jan. 31.



Heating buildings, radiators for. The sections of a hot-water or steam radiator, Fig. 1, are provided with deflecting-plates B, Fig. 2, at the top and bottom, so as to cause the circulation to be up

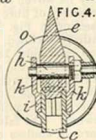
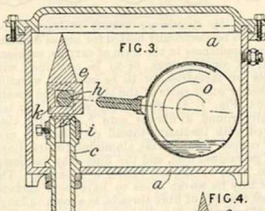
and down in the tubes *a*, *a'*, *a''*, *a'''* of the section. The plates B are of wrought iron or similar metal, and are preferably in two pieces. In casting the sections, the deflecting-plates are inserted in the core and cast in. Openings *b* in the plates allow for drainage or the drawing-off of air. Air outlets *c* are provided at the top of the sections.

2745. Calvert, J. G. Feb. 3.



Heating gases.—In a battery of gilled pipes *a* for heating or cooling air and gases, radiating sheets *c* of metal or other material are interposed between the pipes, for the purpose of receiving heat by radiation from the pipes and transferring the heat to the gas or air by contact with it, or for receiving heat from the air or gas by contact and transferring the heat by radiation to the pipes of the battery. The air or gas is passed through in the direction of the arrows *d*, *e*.

2908. Westley, J. Feb. 5.



Steam traps.—A steam trap for steam cylinders, cisterns, pipes, and the like is shown in Fig. 3, the valve and seating being shown in Fig. 4. The casing or box *a* open to the steam is fitted with the outlet pipe *c* having the valve *e*, which is opened and closed by the movement of the ball float *o* and the eccentric or cam *h*. The ball float contains a small quantity of water, which is vaporized and prevents the float from collapsing under pressure. The eccentric *h* is mounted in bearings formed in the side cheeks *k*

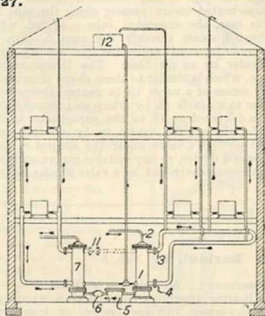
on the sleeve *i*. The valve *e* is conical above, and has wings to guide it upon its seating. Above a certain water level in the trap, the valve is open, to discharge the water of condensation.

2927. Dixon, J. Feb. 5.

Heating buildings; heating water.—Relates to low-pressure heating apparatus for warming buildings, and has for object the utilization of the condensed steam discharged from steam heaters or calorifiers used for heating water for heating systems. The calorifier 1 is supplied with steam by the pipe 2 and heats the water, which circulates by the pipe 3 to the radiators and returns by the pipe 4. The condensed steam is led through the steam trap 5 and non-return valve 6 to the second calorifier 7, to heat its circulating water. The cold-water supply cistern 12 is common to the two circuits, and the two circuits may be combined, as by the pipe 11. The steam and water of condensation in the calorifiers do not mix with the circulating water.

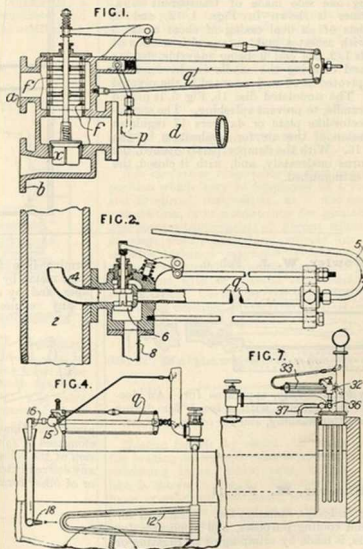
(For Figure see next column.)

2927.



2963. Ogden, J. E. L. Feb. 5.

Thermostats.—Relates to thermostatic apparatus for regulating the temperature of superheated steam by admitting a variable quantity of wet steam to mix with it, by returning some of it to the boiler or delivering a portion to another boiler, or by supplying a blast of air to cool the superheater. Fig. 1 shows one form of apparatus arranged to control the proportions of superheated and wet steam supplied to the engine. It is connected to the superheater at *a*, and to the boiler direct at *b*; *d* denotes the steam pipe. A portion of the superheated steam enters a small trumpet-mouthed pipe *p* and passes through an expansion tube *q*. The movements of the end of this tube, in accordance with the varying temperature of the steam are communicated, through the links and levers shown, to a cylindrical grid valve *f* which diminishes the supply of superheated steam as the temperature rises. The deficiency is made up by wet steam entering through the valve *x*, which is pressed to its seat by a light spring, but is otherwise free to rise. Fig. 2 shows a modification in which the expansion of the tube *q* acts to operate a valve 6 which controls the admission of wet steam

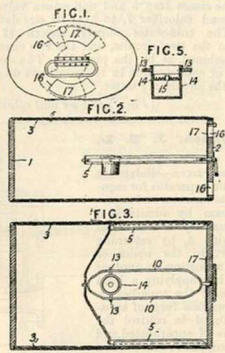


through the pipe 8 and branch 4 to mix with the superheated steam passing along the pipe 2. In this case, the expansion tube *q* is fed with superheated steam through the pipe 5. Fig. 4 shows one form of apparatus for cooling the superheater by an air blast. The thermometric device *g*, which is similar to those above described, acts by means of a valve 15 to control the supply of steam to a nozzle 16 by which an induced blast of air is delivered at 18 to the superheater tubes 12. The air may be drawn in by the furnace draught through a valve under the control of the thermometric device, or any suitable means, such as a steam engine controlled by a valve similar to the

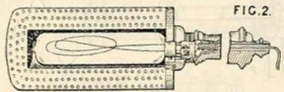
valve 15. Fig. 4, may be employed to project the air against the superheater. Fig. 7 shows an arrangement applicable to a battery of boilers of the Lancashire type, whereby an excess in the temperature of the superheated steam delivered from any superheater causes the return of some of this steam into one or more boilers the pressure in which is less than that of the superheater in question. The thermostatic device 33 operates a valve 32, which admits some of the steam at the excessive temperature to a pipe 36 from which branches 37, fitted with non-return valves, lead to the various boilers of the battery.

2981. Luciani, P. Feb. 5.

Footwarmers; bed-warmers.—Relates to a candle heating apparatus suitable as a warming-pan, foot-warmer, carriage heater, or incubator heater, and applicable as a lighting-apparatus and night-light when suitably modified as by having one side made of transparent mica. The warmer is shown in Figs. 1, 2, and 3, and consists of an oval casing of sheet metal 3 covered with asbestos and gauze, with wooden or other ends 1, 2, the end 2 being movable, having slides 5, and carrying the candle in the vessel 14 which is pivoted at 13 and mounted in the pivoted yoke 10. The undulated disc 15, Fig. 5, is placed over the candle, to prevent splashing. The spring-pressed sector-like plate or dampers 17 regulates the admission of the air for combustion by the openings 16. With the damper partly opened, the candle burns moderately, and, with it closed, the candle is extinguished.



3060. Fowler, W. J. Feb. 6.

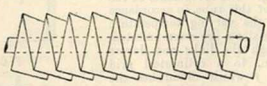


Heating by electricity, apparatus for. An electric heater is combined with a brush for drying ladies' hair after washing, and for other purposes.

3460. Shearer, M. Feb. 11.

Heating buildings, radiators for. A radiator for heating and cooling purposes, and applicable for motor cars, is made by crimping or corrugating or

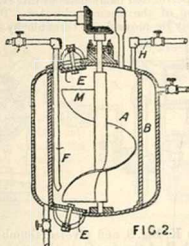
forming into folds sheet tin, copper, brass, or other metal, by passing these folds over a pipe or pipes, and by opening or spreading the folds out to any required extent. The fold-gills and the



pipes are tinned. The holes in the folds are elongated or suitably formed to permit of extension of the folds. The folds may be perforated to any desired extent, and may be circular, rectangular, or of other form in outline.



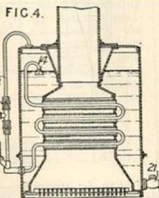
3468. Price, R. B. Feb. 11.



Digesters.—A vessel A, for use in de-vulcanizing rubber with superheated steam admitted through a pipe F, is provided with a jacket B and pipes for circulation of a heating-fluid, charging and discharging openings E, a revolving stirrer M, a pressure gauge, a safety-valve, a thermometer, and a blow-off pipe H; the stirrer may be omitted.

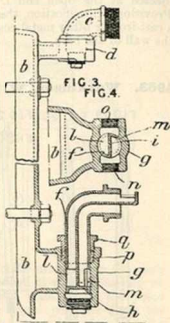
3731. Henneberg, R. Feb. 13.

Heating water.—Consists of an apparatus for the preparation of drinking water from impure fresh water. The apparatus comprises a boiler, Fig. 4, a cooler, an aerating device and filter, and two pumps, one for circulating the cooling water, the other for pumping the water through the boiler &c. These parts are mounted together on a frame which may be carried on wheels. The boiler is of the water-tube type and is worked at such a pressure that the water reaches a temperature of 100° C. The water enters at 21, and is drawn off by means of a coil dipping below the surface at 14 and passing through the water-tubes. The water is thus exposed for a relatively long time to the boiler heat. By means of the pipe 38 and cock 39, the cooler and filter &c. may be sterilized by steam.



3851. Kirkland, T. Feb. 14.

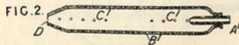
Heating buildings, radiators for. Relates to swinging radiators for cooling purposes, and consists in arranging and constructing the upper and lower pivots as shown in Figs. 3 and 4. The upper pivot or hinge or elbow-joint is arranged to carry the weight of the apparatus, the elbow c turning in the socket d carried by the bracket b. The lower elbow f turns in the socket g, and is provided with the closing-piece h and the cross-web or division plate i forming two channels in communication with the inlet and outlet pipe n, o. The ports l, m, serve to regulate the fluid supply according to the position of the radiator. A stuffing-box p and gland q are provided at the upper part of the socket g.



4137. Thompson, W. P. [Bevilacqua, G., and Bevilacqua, G.]. Feb. 18.

Non-conducting compositions.—Relates to a composition which may be employed as a rust-proof and fire-proof composition, or as a non-conducting composition, or as a substitute for glaziers' putty. The composition consists of fibrous silicates, such as slag wool, potassium silicate in solution, asbestos, calcined magnesia, graphite, or other refractory pigment, powdered cork, and powdered puzzolana, with or without some binding agent, such as lime. Certain of the ingredients may, if desired, be omitted.

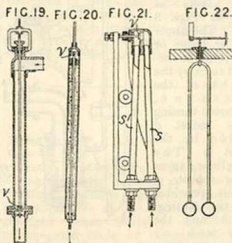
4812. Matthews, G. W. Feb. 26.



Heating liquids by steam. A nozzle or means for heating water and other liquids by steam, for swimming baths, tanks, pans, kettles, and the like, is shown in Fig. 2. The steam nozzle A', of brass or other suitable metal, is fixed in a suitable position, and has screwed to it the metal cover B' to reduce the noise. The cover is perforated with a number of small holes C'. The water or fluid to

be heated is drawn by the steam issuing from the nozzle A' through the holes in the cover B', and is ejected at the open end D. According to the Provisional Specification, the nozzle is fixed within a cast-iron or other metal cover, built or fixed into the wall of the bath.

4963. **Watkinson, W. H.** Feb. 27.

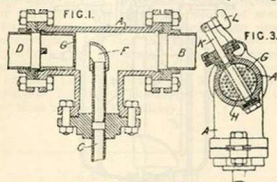


Thermostats.—Relates to various improvements in the construction, mode of heating, and regulation of steam superheaters. To regulate the temperature of the superheated steam, thermostatic apparatus is employed to control the supply of steam to the steam-jet blower of the furnace or gas producer, or to the engine driving the blast fan or the pump which supplies air to spray liquid fuel, when this is used. Similar apparatus may also act to regulate the flow of furnace gases to a superheater. Fig. 19 shows one form of thermostatic device, consisting of a rod of highly-expandable metal, within the steam pipe, operating a valve *v*. In another form of apparatus, Fig. 20, a part of the steam pipe is free to expand within a non-conducting casing, so as to vary the opening round a fixed valve *v*. Fig. 21 shows another device, consisting of two tubes *s, s'*, of metals having different coefficients of expansion, and acting to vary the opening of a fixed but adjustable valve *v*. An indicator may be connected to the U-tubes of a superheater, as shown in Fig. 22, to show the amount of expansion and consequently the temperature. The same arrangement may be employed to make the contact of an electrical alarm, or to operate a steam valve, as in the arrangements just described.

4976. **Firth, H.** Feb. 27.

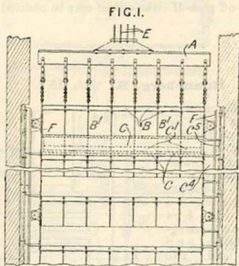
Heating water by steam. Steam-heating apparatus, particularly applicable for heating the feed-water supplied to machines for washing textile fabrics, is shown in Fig. 1. It consists of the T-connection A, into which the cold-water inlet B, the steam inlet C, and the discharge or delivery pipe D are fixed by suitable flange joints. The

small inner steam pipe terminates in an elbow nozzle F, and the steam and water are impeded by the fixed perforated baffle-plate or disc G, to aid in the mixing of the steam and water. The baffle-plate G may be movable or turnable by arranging



the spindle K, Fig. 3, and pivoted thumb-piece L, with the rib H of the disc G, in the manner shown in Fig. 3. In a modified form of heater, the steam pipe enters in line with the discharge pipe, and the straight steam nozzle is carried beyond the cold-water inlet.

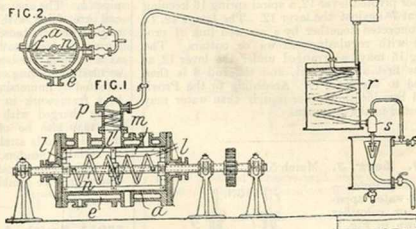
4997. **Cowey, L. E.** Feb. 27.



Heating by electricity.—Apparatus for storing plates, dishes, table cloths, serviettes, boxes, trays, trenchers, &c. in quantity, particularly as required in the method of serving and distributing cooked food described in Specification No. 4988, A.D. 1902, [Abridgment Class Cooking &c.], is shown in front elevation in Fig. 1. An electrically operated structure A carries rows of open compartments B, B' for table cloths, serviettes, boxes, trays, or trenchers, and rows of closed compartments C for utensils which are to be kept hot. The compartments C are provided with electric heating-apparatus *c* arranged below stages *c'*. Brushes *c''* on these compartments ride against conductors *c''*, which are conveniently arranged so that, whichever row of compartments C is being emptied, the heating-apparatus of the succeeding row is in circuit.

5015. Untiedt, H. Feb. 27

Boiling-pans.—Relates to apparatus for boiling, evaporating, and distilling. It is designed for use in the rapid preparation of foods and beverages, such as vegetables, whiskey, or beer, and is more particularly applicable for the manufacture of acetic acid from calcium acetate, and for the manufacture of sulphuric acid. Fig. 1 shows a longitudinal section of the apparatus, and Fig. 2 shows a cross-section of the vessel *a* in which the treatment is effected. This vessel is of cylindrical shape, and is provided with a jacket *e* which is divided into two compartments by a horizontal partition *f*; each compartment is supplied with steam from a separate regulated source, so that the substances under treatment and the vapours may be differentially heated. The vessel is provided with a rotary mixer and agitator consisting of rectangular frames *l, m* mounted on a shaft *n*, and



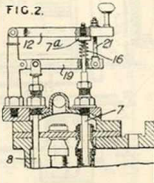
of one or more helical coils *l'* mounted on the same shaft and supplied through it with a heating or cooling liquid. A helical frame *p* in the dome aids in separating the liquid particles from the vapours. The vapours are condensed in a coil *r* connected with a chamber *s*, wherein a partial vacuum is produced either by the condensed liquid itself or by a steam or water jet, or by other means.

5118. Maardt, J. G. Feb. 28.

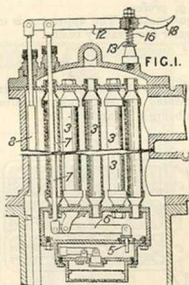
Non-conducting coverings and compositions.—A composition suitable for electric or heat insulating purposes is made from cork-dust, cork-waste, peat-dust, small peat, or the like, by saturating the same with water glass, pouring the resulting mass into moulds to set, and then hardening it by boiling in a solution of calcium or magnesium chloride, or other suitable chloride. The hardened mass may be washed or rinsed with water to remove any sodium chloride.

5307. Whitwell, T. March 3.

Heating liquids.
 —In water-heating apparatus, especially that described in Specification No. 11,070, A.D. 1901, a valve 5, Fig. 1, for regulating the passage of steam from the internal steam pipes 3 to the water space is controlled by the relative expansions of two rods 7, 8 arranged, respectively, in one of the steam pipes 3 and in the water space. The valve 5 is connected



to the rod 7 by a pivoted lever 6. In one arrangement, the rods 7, 8 are hinged to an external lever 12 having an aperture fitting loosely over a fixed stud 13, a spiral spring 16 forcing the lever upwards



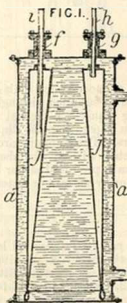
against adjustable lock-nuts on the stud 13. The expansion of the rod 7, when steam is admitted to the pipe, opens the valve 5 which is afterwards closed by the expansion of the rod 8 when the water is sufficiently heated. The valve 5 may be opened by depressing the lever 12 by means of a handle 18 at its end. In a second arrangement,

the rod 8 is hinged to an external pivoted lever 19, Fig. 2, and a nut 7^a on the rod 7 bears underneath another pivoted lever 12, a spiral spring 16 keeping the nut 7^a against the lever 12. The levers 19, 12 are connected together by a screwed link 21 provided with regulating screws or cottars. The spring 16 may be arranged under the lever 12, as in the first arrangement, and the rod 8 is then hinged to the lever 12. According to the Provisional Specification, other liquids than water may be heated in the apparatus.

5437. Legg, J. March 5.

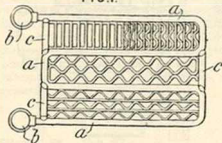
Heating water.—

A hot-water apparatus or calorifier is shown in Fig. 1. The outside heater or cylinder *a* is preferably of galvanized iron and is connected up to a boiler or hot-water heating system. The inner heater *j* is of copper, and may be in the form of a cylindrical shell or pipe or of tubes joined at the top and bottom by rings. The inlet and outlet pipes *h, i* for the water to be heated pass through gland joints *f, g*, preferably of gun-metal. The apparatus is suitable for heating water for lavatory basins.



5599. Grouvelle, J., and Arquebourg, H., [trading as Soc. Jules Grouvelle et H. Arquebourg]. March 6.

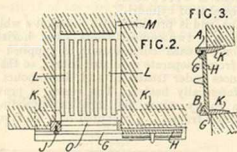
FIG. 1.



Heating gases and liquids.—Apparatus for heating fluids, or for evaporating liquids, or for cooling water &c., and particularly suitable for use in autocars, is constructed as shown in Fig. 1. A flattened tube *a* for conveying the fluid to be treated is parallel with one another, the structure assuming

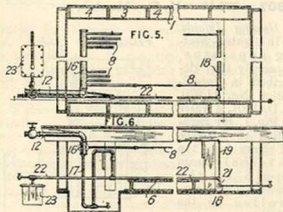
a rectangular form which is made rigid by struts *c*, and the ends of the coil *a* communicating with pipes *b*. The enclosures between the parts of the coil are filled with a network of metal strips, angle irons, flattened tubes bent to a corrugated form, or a combination of these, as shown to serve as a cooling or heating surface. This may be secured by brazing or soldering which is preferably effected by immersing the entire structure enclosed in a framework in a bath of solder, the coil *a* being charged with fluid under pressure. The coil may also be of a spiral or other shape, or instead of coils straight lengths of tubes mounted in suitable headers, preferably partitioned, may be used. The apparatus may be used singly, or several may be combined.

5781. Smith, A. March 8.



Boiling-pans; heating water.—The sliding doors *H* of stoves and closed fireplaces, washing and domestic boilers, &c., move in slots *G* in the top and bottom flanges *A, B*, of the framework, a removable stop *J* limiting the motion in one direction. The flanges are provided with ledgings *K*, the lower of which support the front of grate bars *L*. The bars *L* have extensions *M* at the back entering the brickwork. A space *O* is left between the door and the bars *L* to admit air. The door may be protected on its inner side by a refractory lining.

5874. Morton, H. J. March 10.

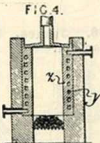


Heating air.—A chamber for drying lumber &c. by steam-heated air has a heating-apparatus arranged as shown in Figs. 5 and 6. The incoming

air ascends through the false floor 6 of the chamber, and is heated by a row of steam pipes 8. Steam from a pipe 12 enters a header 16 and passes into the heating-pipes 8 connected by vertical pipes 19 to a header 18. By means of a rising pipe 21 and a U-shaped bend 17 both connected by a pipe 22 to a steam trap 23, water seals are formed at the ends of the heating-pipes to regulate the heating.

6095. Willmotte, C., and Goddyn, M. March 12.

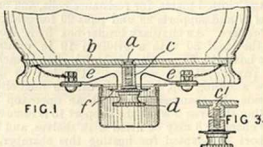
Heating air.—An apparatus for use in heating air for converters and reverberatory smelting-furnaces comprises a cast-steel casing *z*, formed with a helical coil *y*, and fitted within a suitable fireplace.



6148. Eckstein, A., and Archer, C. H. March 13.

Heating by electricity.—Cut-outs for use with electric heating and cooking appliances. A bridging or connecting piece is held up by a fusible screw or the like which melts when the heating is abnormal. Fig. 1 shows a construction. A stud *a* is fixed to the plate carrying the heating-wires, and on it screws a tube *c* of fusible metal. A nut *d*

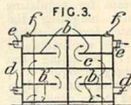
supporting a conducting plate *f*, screws into the tube, and the plate *f* connects the spring contacts *e*.



In the modified arrangement shown in Fig. 3, the screw *c'* is made of fusible metal.

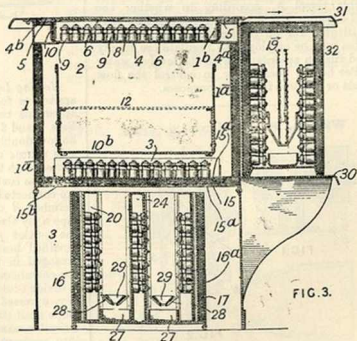
6206. Silbermann, J. March 13.

Heating air for ventilation. The air is passed through a chamber, Fig. 3, surrounding the sides and back of the fireplace and divided into two compartments by a vertical partition *c*. Baffles *b* are fitted in each compartment to make the air take a sinuous course before passing into the apartment through the conduits *e*. In a modification, the air is heated by a specially-constructed stove.



6331. Bayno, M. March 14.

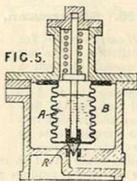
Heating by electricity.—Electric broiling, roasting, baking, boiling, &c. apparatus is shown in section in Fig. 3. A casing 1, made of sheet metal with asbestos &c. packing 1^a in parts, is provided with a top opening 1^b, an oven or chamber 2 with a door, a lower space or chamber 3 with a door, and a shelf or support 30, and extension 31 of the top. A shell or cover 4 rests on supports 4^a and closes the chamber 2 at the top, and a frame 5 with openings for covers 6 rests on a rim 4^b of the cover 4, and supports utensils to be heated. Grooved insulating-posts or blocks 9 secured to the cover 4, support resistance wires or coils 8 arranged in two independent circuits with switches. The chamber 2 contains an open shell 10 provided with shelves 10^b, 12 and disposed over resistance coils which are carried by a removable support 15 shown as metal plates 15^a with asbestos &c. packing 15^b. The chamber 3 receives a broiling-box 16 comprising



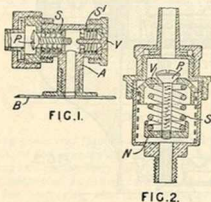
double walls 16^a with asbestos &c. packing 17, removable side supports 20, preferably provided plates, and a central support 24 consisting of two slotted plates, for resistance coils, and drip-pans 27 and supports 28 and pans 29 for gridirons or broilers. An auxiliary broiler-box 32 is shown on the shelf 30 with a gridiron 19 in position. The boxes 16, 32 are provided with doors notched for passage of the gridirons. The box 16 may have a sliding top, so that it can be used either outside the chamber 3, or with an open top for heating the oven 2 when the support 15 is removed. The chamber 3 may be fitted with shelves, and the support 15 adapted for heating this chamber, or the chamber itself is fitted with coils.

6509. Davey, H. March 17. [Grant of Patent refused.]

Steam traps; thermostats.—Relates to means for regulating and indicating the water level in steam boilers, applicable also for regulating the supply of liquid fuel, draining steam pipes and steam engines, or otherwise regulating the flow of fluids, for operating an indicator or alarm, or for other like purposes. The varying pressures in a closed vessel containing water or other fluid, and enclosed in another vessel which is subject to variations of temperature, are employed for the purpose of operating a valve or indicator. Fig. 5 shows a steam trap. The drain valve R is operated by the movement of the expansible vessel A, according to whether the vessel B contains steam or water. A piston may be substituted for an elastic diaphragm, and the apparatus may be employed to regulate the supply of liquid fuel in accordance with the level of water in a boiler heated thereby, or to control the flow of liquids or vapours for other purposes.



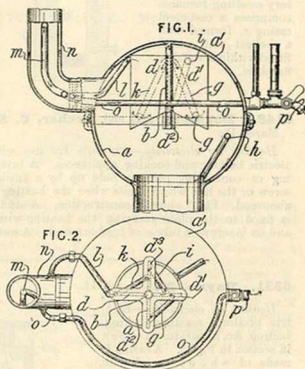
6690. Wilson, P. J. March 19.



Heating water.—A safety-valve for steam and

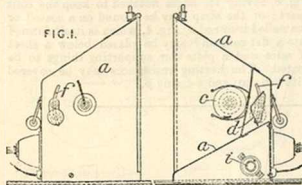
other boilers, hydraulic and pneumatic pressures, and the like, is shown in Fig. 1. A T-shaped casing A is placed on the boiler &c. B, and contains a valve P opening outwards and a valve V opening inwards. The valves are held against their seats by springs S, S'. The valve P allows excess pressure to escape from the boiler, and the valve V allows air to enter when the inside pressure falls. In a modification, the excess pressure valve P, Fig. 2, is seated on the inwardly-opening valve V, and is kept to its seat by a spring S working against a nut N.

6986. James, R. W., [Lorenz, F. W.] March 21.



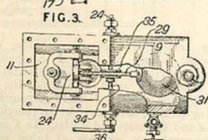
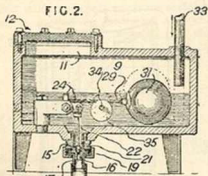
Heating liquids.—Relates to gas, spirit, or oil apparatus for heating water or other liquid, the apparatus being particularly applicable for baths. Figs. 1 and 2 show one form of liquid heater. The hollow double globe a, a' is arranged over a suitable source of heat, and the shell interior is connected with the inlet pipe h and with the chamber d' by the central pipe b. The chambers d', d', d', d are connected by the pipes g, i, k, and the fourth chamber d communicates with the annular exit pipe l by the pipe l. The heated liquid flows to the outlet p through the pipes m, o. In a modified heater, a hollow hemispherical shell is arranged in the interior of the globe in place of the chambers d', d', d', d. The hemispherical shell is divided into spiral chambers by a wire or other device brazed or fixed in the shell, and the outer globe shell may be divided into spiral chambers in a similar manner. The outer shell may be formed into segment-shaped compartments by puritons with orifices alternately at the top and bottom.

7071. Dowsing, H. J. March 22.



Heating by electricity.—Relates to improvements in the invention described in Specification No. 26,249, A.D. 1896, and in Specification No. 20,905, A.D. 1901, [Abridgment Class Medicine &c.]. Two incandescent lamps *c* are mounted in a hood *a* in front of an angular mirror *d* which can be adjusted in slots *f* in the ends of the casing. The lamps are in circuit with a pair of resistances *i*, one or both of which may be switched out at will. Air may be admitted through apertures regulated by a slide behind the lamp, so that it is heated before reaching the patient.

7382. Silk, A., and Light, P. April 4, A.D. 1901, [date applied under Patents Act, A.D. 1901].

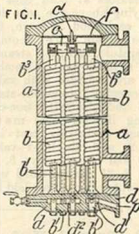


Steam traps.—In the trap shown in Figs. 2 and 3 there are arranged, within the closed housing 9, the float 31 and the valve-operating mechanism, which comprises the arm 29, and the angle lever 24 to which is connected the valve rod 22. The inlet opening is provided with the pipe 33, which may be arranged to lead the steam below the level of the condensed water in the trap, and the housing has the inlet 11 closed by the cap 12, to permit

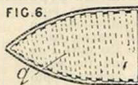
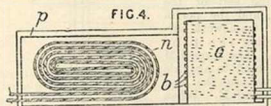
access to the interior. The outlet is controlled by the valve 15, and the valve seat 16 is fitted between the upper end of the pipe-attaching nipple 17 and the lower end of the semi-plug 21, the nipple 17 being held in position by the union 19. The float-arm is positively actuated by hand from the outside when it is required to remove sediment. This is accomplished by means of the eccentric cam on the rod 34 from the hand-lever 35, which may be fitted on one or other side of the housing.

7429. Hocking, H. March 27.

Heating liquids.—Relates to apparatus for heating or cooling water or other liquids by a fluid, and is specially applicable as a feedwater heater for a steam boiler. A number of coiled tubes or conduits *b* are arranged within the casing *a* and connected above and below by the chambers *c*, *d*. The compartment *d* of the chamber *d* is connected to the steam inlet *p*, and the compartment *d*² to the outlet for condensed steam. The tubes *b* are secured to the chambers *c*, *d* by the screwed nipples *b*¹ or by nipples *b*¹ having lateral holes, and are kept central by the spigot *c* and the cross-bar *f*. By disconnecting the steam chest or chamber *d* from the casing, the whole nest of tubes can be withdrawn. In a modified construction of apparatus, the steam chamber is not divided into two compartments, and both top and bottom chambers are connected to the tubes *b* by nipples having lateral holes.



7792. Lutz, L. April 3.



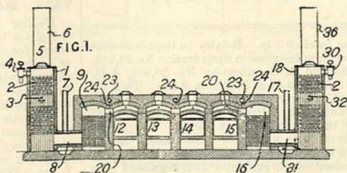
Heating by electricity; heating water.—Nickel strips are used as resistances for heating cooking-vessels, ovens, flat irons, and other

articles. Fig. 4 is a plan of an oven *o* and a flat heater *n*. The strips *b* may be wound round the oven or other article to be heated, on a layer of enamel or mica, spaces being left between the coils, which may be covered with a mixture of sand and soluble glass. Several layers of strips may thus be applied, with interposed mica. For heating a flat surface, insulated with enamel or mica, the

nickel strip may be wound on a sheet of mica *q*, Fig. 6, having its edges notched to keep the coils apart; or the strip may be wound on a coated or enamelled iron rod *n*, Fig. 4, which is itself formed into a flat coil, and may be placed below a sheet of mica and a plate for supporting things to be heated. The heating resistances may be covered with asbestos and a casing *p*.

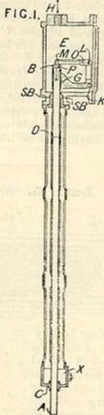
7826. Lowe, T. S. C. April 3.

Heating air.—The coking-plant shown in sectional elevation in Fig. 1 is arranged with regenerators at both ends for supplying above the coke line, first air to obtain the requisite temperature, and then steam to form a fixed gas. Chambers 1, 18 are provided with valves 5, 33 opening into smoke-stacks 6, 36 and also with non-conducting linings, loose metal packing, preferably cast-iron bars 2, and air-blast valves 4, 30 and water-sprays 3, 32. Flues 8, 31 are provided with gas take-off pipes 7, 17, and connect the chambers 1, 18 to generators 9, 16 containing loosely-laid firebricks.

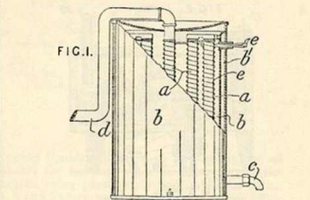


7868. Parnell, H. A. April 4.

Steam traps.—The trap shown in Fig. 1 comprises the metal pipe *A B* made in two parts coupled together at *D*, the valve *P* and lever mechanism *K, L, M* actuated through the snug *G* attached to the pipe *A B*, the box or casing *E*, the stuffing-box *SB* for the casing, the box *X* fixed to the pipe *A B* by nuts screwed on the end of the pipe, and the perforated framework surrounding the pipe *A B*. The lever *LM* is pivoted to an axle *O* fixed to the box or casing *E*. When water in the pipe *A B* cools the pipe, the contraction, the box *X* being fixed, causes the valve *P* to be discharged into the box *E* and to a drain through the outlet *H*.

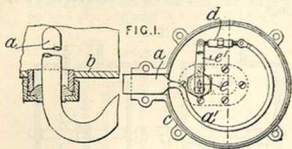


7954. Ewart, J. W. April 5.

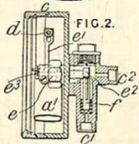


Heating water by electricity. The electric water-heater shown in Fig. 1 comprises the airtight and exhausted casing *b*, the water jacket *b'* into which the inlet *c* enters, the coiled tube *a* with the outlet *d* and surrounded by the heating-coils *e*, and airtight connections for the wires *e* and the inlet and outlet. In a modified form of apparatus, a number of tubes enclosed by heating-coils of wire penetrate the ends of the casing *b* by tight joints, and the apparatus is immersed in the water to be heated. According to the Provisional Specification, straight lengths of electrically-heated wires may also be arranged between thin partitions forming water jacket.

8073. Adams, W. B. April 7.



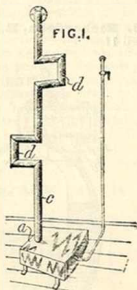
Thermostats.—Relates to apparatus for controlling automatically the supply of oil or gas to the burners of steam boilers, ovens, drying-chambers, and other heating-apparatus. A hermetically-sealed tube *a*, Fig. 1, contains water free from air, one end is inserted in the boiler, oven, &c. *b*, and the other end terminates in a flattened curved tube *a¹* which is connected by an adjustable to a link *d* forked arm *e¹* on the shaft *e*. An arm *e²*, Fig. 2, on the shaft *e* presses against the spring-actuated valve *f* to close the passage from the gas or oil inlet *c¹* to the outlet *c²* when the boiler runs dry, or when the temperature in the oven &c. rises above a fixed limit, the pressure in the tube *a*, *a¹* being then increased. The case *c* carries a dial graduated with an open pressure scale over which a pointer is moved by means of a lever *e³* on the shaft *e* carrying a pin engaging a slot in the pointer.



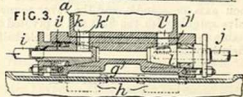
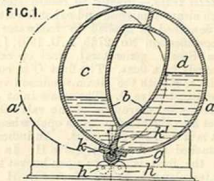
joints are made between the casings at the flanges L.

8276. Winter, W. April 9.

Heating buildings &c.—A warming-apparatus for rooms consists of a hollow receptacle *a* having a flue *c* with squared portions *d* and fitted with a lamp or gas burner.

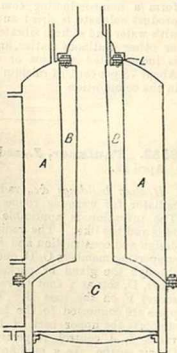


8297. Arnold, G. E. April 9.



8241. Augustus, E. M. April 9.

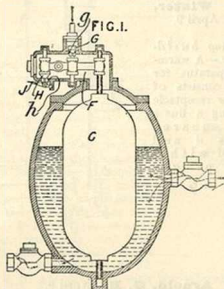
Heating water.—Relates to boilers for heating water for domestic or other purposes. The outer copper boiler *A* forms with the cylindrical or suitably-shaped central casing *C* the inner boiler *B*. The water heated in the outer boiler is used for domestic purposes, while the water heated in the inner boiler *B* is used for heating purposes. Inlet, outlet, and expansion pipes are provided, and suitable



Steam traps.—Two collecting vessels or compartments *c*, *d*, which may be formed by dividing the drum *a* into two compartments by the partition *b*, are adapted to be alternately filled and emptied in such manner as to oscillate the vessels or compartments and to control the valve, Fig. 3, which puts the vessels *c*, *d* into communication alternately with the pipe *i* to be drained and the discharge pipe *j*. The tubular control valve has a port *k* at one end and two ports *l* at the other end, while the compartments *c*, *d* have each ports *k¹*, *l¹* to correspond with the ports *k*, *l*. Stuffing-glands are arranged in conjunction with the

plugs i , j , and the casing or shell g is mounted upon antifriction rollers h .

8438. Richardson, R., and Matheson, F.
April 11.

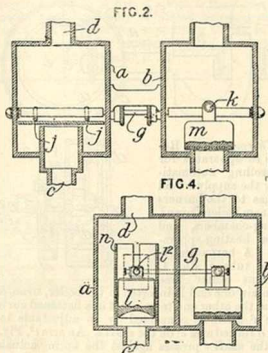


Steam traps.—Relates to return steam traps in which steam admission and exhaust valves, such as are described as applied to feedwater regulators in Specification No. 2735, A.D. 1901, [*Abridgment Class Steam generators*], are operated simultaneously by a float. The float C is connected by the lever F with the steam-admission valve G and the exhaust valve H . The steam inlet g is closed by downward movement of the valve G , while the outlet h to the atmosphere is open when the steam inlet is closed, and *vice versa*. An indicator lever J is attached to the outlet valve H . In a modified trap the float is of the open bucket type and is counterbalanced, both valves G , H are on a common axis or spindle, and the lever connecting the valve spindle with the float rod is pivoted on an adjustable centre formed by an adjustable ball in a cylindrical socket.

8444. Ewart, J. W., and Ewart, G. H.
April 11.

Heating water.—A combined gas and water regulating valve for water-heaters is shown in Fig. 2. A casing a , having a water inlet c and outlet d , and a similar casing b for the gas supply, have a common spindle g , carrying a hinged flap valve j and a heavy disc valve m loosely mounted on an arm k on the spindle. When the water supply is turned on, the water valve j is raised and causes the spindle to open the gas valve m . The valve closes automatically when the water supply is cut off. In a modification, the water valve i , Fig. 4, is carried by an arm l on the spindle g , and

its seat is surrounded by a perforated cylindrical casing n . Vertically-arranged valves are closed by springs.



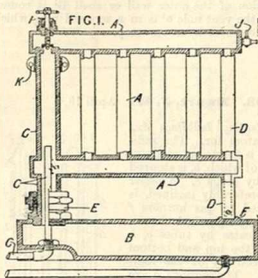
8463. Berry, G. F., and Lawes & Co.,
J. B. April 11.

Non-conducting compositions.—Calcium sulphate, obtained as a by-product in chemical industries, together with animal, vegetable, or mineral fibre, and a viscous or glutinous cohesive material, when mixed, form a non-conducting composition. The by-product sulphate is dried and ground, and mixed with water and sodium silicate, or a silicate colloid, or other glutinous matter, and with this mixture is incorporated asbestos or other suitable fibre. About 75 per cent. of calcium sulphate is employed in the composition.

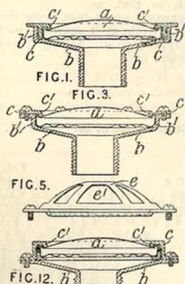
8552. Faulkner, J., and Faulkner, F. J.
April 12.

Heating buildings &c., radiators for. A swing radiator for warming rooms is shown in Fig. 1. The invention is applicable to hot-water towel rails and the like. The radiator A is of suitable design and construction and is provided with the supporting-members C , D , one of which, C , passes through the gland or packed joint E , and the other, D , acts as a foot to rest within the shallow socket F on the base B . The flow and return pipes are connected to the base B . The collar K supports the upper part of the radiator, and the valves I , J control, respectively, the supply and the air escape. In a modified form, the radiator

comprises a cluster of tubes which swing on extensions of the central member, and the flow passes up by a pipe and may be regulated by a valve.



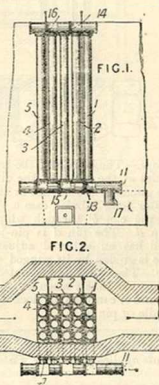
8634. Parsons, R. April 14.



Steam traps—Relates to steam traps, particularly of the type described in Specifications No. 4662, A.D. 1895, and No. 20,932, A.D. 1899, in which the operation is effected or controlled by the volatilization of a volatile liquid or substance contained in a condenser chamber, and especially to the fixing in position and protecting of the condenser chamber in that kind of steam trap. Various methods of fixing the condenser chamber *a* in its case *b* are shown in Figs. 1, 3, and 12. The vertical sides *b'* of the case *b* are internally or externally threaded to receive the flanged and screwed ring *c*, which bears against the chamber *a* by the flange *c'*. The ring *c* and internal flange *c'* may be merged in one, and the ring may have pin-holes or slots to enable it to be rotated. The case *b*, in the modification shown in Fig. 3, and in another modified form, is

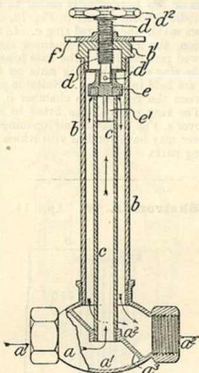
flanged, and the ring *c* is screwed to the flange. The ring *c* may be provided with a thin metallic diaphragm or top hermetically sealed to the ring. In the modified form shown in Fig. 12, a screwed ring screws within the flanged ring *c*. In a further modification, the ring *c* has inclined slots to fit over screwed pins carried by the case *b*, so that, by turning the ring and tightening nuts on the pins, the parts are held in position. Suitable packing is used between the ring *c*, the chamber *a*, and the case *b*. The ring *c* may have fitted to it a protecting-cover *e*, Fig. 5, having air openings *e'* in it, or the cover may have vertical ribs which act also as radiating parts.

8692. Ekström, A. W. April 14.



Heating liquids and gases.—Relates to heaters for water, liquids, or gases, and especially to feed-water heaters. The heater shown in Figs. 1 and 2 consists of a number of sections or groups 1, 2, 3, 4, 5, each composed of four or more vertical tubes. The tube sections communicate at the top and bottom with other tubes, which are composed of sections to facilitate the mounting of non-return valves 13, 15, 14, and 16 in them. The fluid passes through alternate tube sections in one direction and through the intermediate sections in the opposite direction. In blowing-off, the valves in the heater are opened by an additional pressure due to the generation of steam in the top of the last sections 5, 4. In a modified form of heater, the sections 1, 2 and the sections 3, 4 are connected together by curved pipes, and a narrow pipe connecting all the sections at the top distributes the pressure generated during the blowing-off operation.

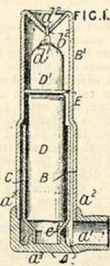
8767. Adams, E. A., Wood, C. W., and Gregory, J. W. April 15.



Steam traps.—The body *a* of the trap is provided with the inlet *a'*, the outlet *a''*, the dividing-web *a''*, to which is attached the central or internal tube *c* and the outer long tubular case *b*. The case *b* is closed by the cap *b'* through which passes the screwed pin *d*. The pin *d* is pin-jointed to the valve *e* and has an external adjusting-wheel *d'*. The valve *e* is guided by its winged stem *e'* within the tube *c*. The valve is regulated so as to be seated against the tube *c* when steam is present in the tube *c*, and it can then be locked by the nut *f* on the spindle or pin *d*.

9049. Leuthesser, F. W. Dec. 2, A.D. 1901, [date applied for under Patents Act, A.D. 1901].

Heating buildings, radiators for. An air valve for steam radiators is shown in Fig. 1. The outer wall or shell *B*, *B'* is screwed to the rim *a'* of the base or cup *A*, which is screwed to the radiator and has the inlet *a'* for the steam or water. The outlet or vent passage *b'* is arranged at the top, and is controlled by the head *d'* of the float *D*, *D'*, which is closed at the top, open at the bottom, and is arranged within the inner wall or shell *C* fixed by the contracted portion *C'* to the inner rim *a'* of the cup or



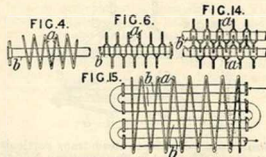
base *A*. The stem *d'* of the head *d'* passes through the vent hole *b'*. A guide-ring *E* is provided on the upper and narrower portion of the sheet-metal float. In a modified form of air valve, the upper portion of the outer wall or shell *B'* is rounded, and the vent hole *b'* is in a screwed plug which is covered over by a screw cap.

9108. Ewart, J. W. April 19.

Heating buildings &c., radiators for. The radiator is formed of sections, one of which, *b*, is stopped off by plugs *c*. A boiler *d*, preferably inclined, is heated by gas burners *f* on a gas pipe *e*, and communicates by tubes *g*, *h* with the top and bottom respectively of the radiator. The sections *a* are filled with water, and the section *b* partially filled with water. A siphon pipe *i* connects the sections *a*, *b*, so that, as the water expands under heat, some of it is driven from *a* into *b*, while, as it contracts on cooling, it flows back from *b* to *a*. A gauge *j* indicates the height of water in *b*.



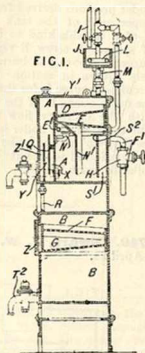
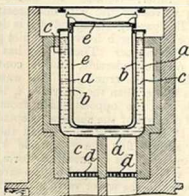
9204. Commichau, R. April 21.



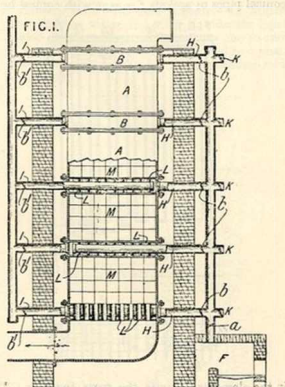
Heating liquids and gases.—Heating-pipes or tubular apparatus are formed with radiating gills *a* formed by integral plates bent or folded in a zig-zag manner, such as shown in Figs. 4 and 6, each fold being provided with an aperture for each pipe. A number of pipes *b*, Fig. 15, may pass through each fold. The folded parts or gills are connected to the pipes by zincing, soldering, or by other suitable means affording a metallic connection.

9233. **Tate, J. R.** April 22.

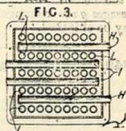
Heating liquids.— Fig. 1 shows a vertical section of an apparatus for heating, clarifying, filtering, and liquefying waste oils or lubricants, or their mixtures, with water. The oil &c. is discharged through pipes I into the trough J, heated by the coil L, and passes through pipes M into the casing A. It flows through the inclined strainers D, E, which are heated by pipes E'. The oil passes beneath the plate N', and rises to the pipe N, whence it escapes through the sieve Q, spaces X, Y, Z', and pipe R, to the tank B, which is provided with inclined strainers F, G, a door Z, and a cock T', or an outlet connected with a drawing-off pump. Water passes up the passage S', which is provided with a cover S'', and is drawn off through the cock H and pipe F'. If desirable, charcoal &c. may be placed in the spaces X, Y, or the strainers D, E, F, G may be covered with flannel &c. The strainers may be corrugated; they can be removed after lifting the cover Y', or opening the door Z.

9307. **Miller, G.** April 22.

Heating apparatus.—Crucibles or melting-vessels *e* are heated by being placed in pots *b*, which are immersed in a fusible substance *c* in a trough *a*, which is heated by fire on a grate *d*.

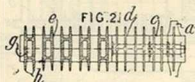
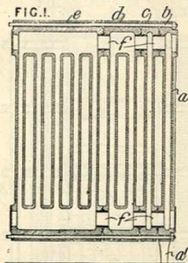
9535. **Daub, C., and Deuther, J. C.** April 24.

Heating gases during the manufacture of sulphuric anhydride. Apparatus for making sulphuric anhydride by the contact process consists of a column formed of alternate sections A, B, through which the gases, sulphurous acid, and oxygen are passed from above downwards. The alternate smaller sections B contain vertical tubes L for the passage of the gases downwards, and also perforated horizontal tubes H, I, one or more of which enter from opposite sides and extend nearly across the compartments. By means of these tubes, hot gases from a heater F, or cold air from the atmosphere, is passed through the sections for the purpose of regulating the temperature within the column as required to obtain the best results. The passage of the hot gases or cold air is regulated by dampers *a*, *b*, *b'*, and K.

9541. **Lamm, C. R.** April 24.

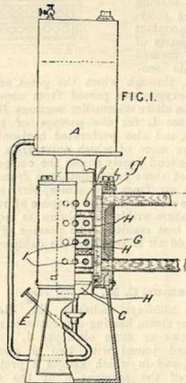
Heating buildings, radiators for. Relates to hot-water or steam heating-apparatus or radiators, in which two or more elements *d*, *e* are cast together and joined with two or more single elements *c*, and in which flanges *b* project from the walls of the passages *g* of the elements, and extend in the longitudinal direction of the elements. The side element *a* is provided with a

supporting-foot *a*, and is connected by the screws or bolts *b* with the other elements. The short conical pipes or sockets *f* engage with conical holes



in the elements to unite the parts together. The passages *g* are rectangular in cross-section, or they may be elliptical.

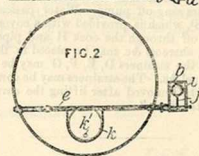
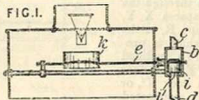
9648. Smith, G. R. April 25.



Heating buildings; heating water. — Apparatus for heating greenhouses, buildings, and the like by

liquid fuel, is shown in Fig. 1. Petroleum or other fuel is stored in the tank A, and is fed under pressure derived from compressed air in the upper part of the tank to the burner C, which if of a suitable kind to burn the fuel in the form of spray. A screw E regulates the supply to the burner. Above the burner is the flue H, preferably square in section. Cross or coil or other circulating-tubes I for the water are provided, and the outer casing G of the water boiler is connected with the ordinary flow and return water pipes. The top L of the boiler is removable, is bolted to the flange *g* on the boiler, and carries the flue H. It is preferred to mount the oil vessel A above the boiler to warm the oil.

9749. Ewart, J. W., and Ewart, G. H. April 28.

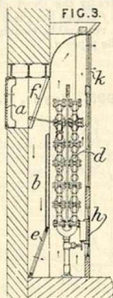


Heating water.—Relates to automatic gas-regulating valves for use with non-pressure water heaters. The gas-regulating valve *i* is located in the box or chamber *b* having the inlet pipe *c* and outlet *d* to the burner. The valve *i* has a rubber packing *i'* on the underside, and is connected to the spindle *e* by the crank *j*. The water-control device *k* is lighter than the gas valve *i*, is fixed to the spindle *e* on the opposite side from the gas valve, and consists of the shallow receptacle *k* with the hole *k'* in the bottom. When the water is turned on and it fills the receptacle *k*, the gas valve *i* is opened. In a modified form, the gas and water valves are arranged on the same side of the spindle *e* and the water valve is of a float type, the receptacle containing the float having a hole in its bottom.

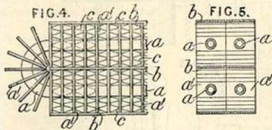
9877. Nesbit, D. M. April 29.

Heating air in connection with a system of ventilation. The air is admitted above the

ground level, passed down a passage within a recess or casement, through filtering-media, and led up around air-heating appliances such as radiators before being allowed to escape into the space to be regulated. Fig. 3 shows a sectional elevation of apparatus arranged in this way and placed in a casing fitted, if desired, with locked doors. The inlet grating appears at *a*, the filter at *e*, the heating-coils at *d*, and the outlet at *k*. The entry of air may be regulated by a valve *f*. A further outlet is provided at *h* when rapid circulation of air is desired. This self-contained, above-ground, apparatus may form part of a trunk line of conduits, in which case the air is passed, by means of a valve, either through the heating-chamber or through the recess behind. The supply of air from the trunk may be also regulated by a series of valves or louvres which are pivoted to a rod, so that, on a movement of the rod, the valves are simultaneously operated.



10,143. Grouvelle, J., and Arquembourg, H. [trading as Soc. J. Grouvelle et H. Arquembourg]. May 2.

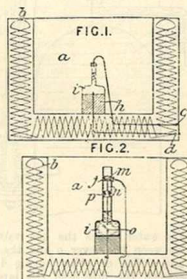


Heating liquids.—Relates to apparatus adapted for heating and cooling, and particularly adapted for use on autocars. Fig. 4 shows an elevation, and Fig. 5 a cross-section of one form of apparatus. It consists of one or more rows of metal pipes *a* arranged in serpentine or volute form, and provided with sheet-metal wings or gills *a'* united to the pipes *a* by tinning or soldering. The juxtaposed portions of the pipes are separated by interposed partitions or tie pieces *b* to which the wings *a'*, or some of them, are attached. Fillings *c*, consisting of sheet metal of corrugated, wavy, or zig-zag form, may be placed between the partitions *b*.

10,719. Paterson, W. May 9. *Drawings to Specification.*

Heating water and other liquids.—In apparatus for purifying water and other liquids, the liquid is heated by allowing it to drip from one to another of a series of shallow vessels situated in a chamber into which exhaust steam or other heating-medium is directed.

10,724. Eltz, V. May 9.

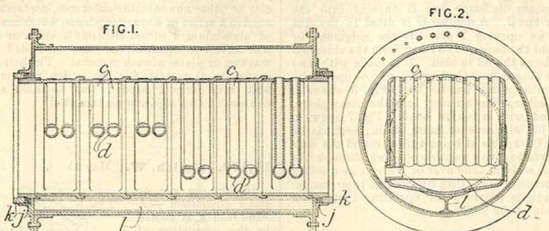


Thermostats.—Relates to apparatus for heating air or liquids by electricity and maintaining a constant temperature. The apparatus may be used for pasteurizing milk or liquids, for chemical and like purposes, and as a hatching-oven, air bath, or water bath. The liquid or air to be heated is enclosed in the receptacle *a*, which is heated by the coil *b*. The terminals *c*, *d* are connected to wires leading to mercury contained in the bottle-like vessel *i* on the insulating-stand *h*, so that the coils *b* are short-circuited and the heating diminished when the mercury expands with the rise in temperature. In the modification shown in Fig. 2, the coils *b* are in series with the inner mercury vessel, and, when the float *p* on the metal rod *n* rises with the expanding mercury, the metal piston *m* is raised from the contact *j* and the electric circuit is broken. In another modification, the lower wire *o* is carried up an insulating central tube to make contact with a metal cap attached to a float when the mercury in the bottle *i* is low.

10,801. Révai, O. May 10.

Heating liquids.—The gas geyser or fluid-heater shown in the Figure is provided with a supply regulator in which the water valve *e*, the gas valve *o*, and the regulating-device *c* are separate, and in which both valves *e*, *o* are opened and closed mechanically by the float *c* or by a piston or the like

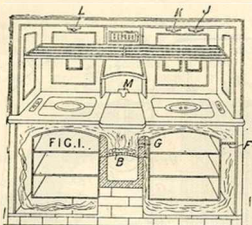
11,292. Allen, A., and Allen, B. G. May 16



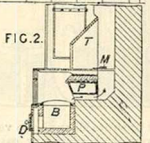
Heating water.—The furnace flue of a steam generator or water heater is constructed in sections, which are screwed together as shown. A rib *l* supports the flue. Each section is fitted with horizontal water tubes *d*, from which a number of

vertical water tubes *c* ascend to the crown of the flue. The joints with the end-plates of the shell are made by packing *j*, which is compressed by gland-like rings *k* screwed on the projecting ends of the flue.

11,315. Bowes, R. May 16.

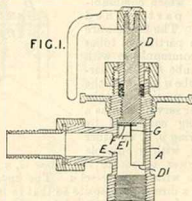


Heating water.—Relates to improvements upon the heating-arrangement described in Specification No. 20,616, A.D. 1893. Fig. 1 shows a front view, partly in section, of a kitchen range to which the improvements are applied, and Fig. 2 a vertical transverse section. Air is admitted to the trough below the firebars *B* through the hit-and-miss valve *D*. The portion of the trough above the bars may be perforated laterally, as at *G*. The circulation of the stove gases is regulated by the diaphragm *F*, and by the flue dampers *J*, *K*, *L*. The gases may escape from the trough by the aperture *G*, descend, and pass around the oven to a



flue below; by withdrawing the damper *M*, the whole of the heat will pass below the boiler *P*; on closing the damper *M*, the combustion products may ascend directly to the chimney below the canopy *T*. Hot-water pipes may be brought from the boiler to any part of a house. The boiler may extend over the top of the fireplace, circuitous passages for the gases being formed around the boiler. In some cases, the heat generated in the trough below the grate may be circulated around the boiler.

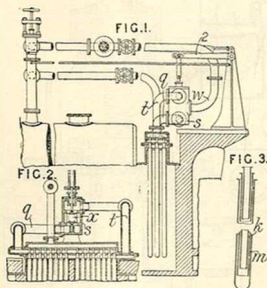
11,446. Marshall, L., and Naylor, S. May 20.



Heating buildings &c.; boiling-rans.—A valve for regulating the supply of steam to heating pipes, radiators, boiling pans, &c. is shown in Fig. 1. The passage *E* through the valve casing *A* is controlled by a valve *D* having a cut-away part *E'*. By rotating the screwed spindle *D*, the cut-away part of the valve can be moved so as to

regulate the outflow. The valve is slit at F, G to prevent it from sticking when expanded by heat.

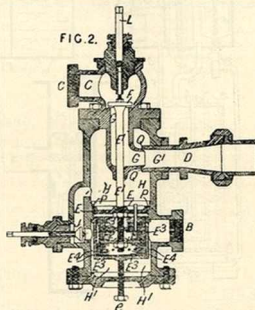
11,622. Bamford, F. May 21.



Thermostats.—Relates to means for controlling the temperature of superheated steam by regulating the proportions of steam at two different temperatures admitted to a mixing-chamber, or by adjusting dampers which regulate the flow of heating gases to the superheater. Fig. 1 shows one arrangement of apparatus for controlling the relative proportions of superheated steam at two different temperatures. The expansion or contraction of the steam pipe *w* acts, by means of a bell-crank lever 2, to operate a valve *s*, Fig. 2, in a casing *a*. Hotter steam enters the casing by the pipe *t*, and cooler steam by the pipe *q*, and the mixture passes away to the pipe *w*. The superheater consist of triple pipes arranged as shown in Fig. 3. The hotter steam is taken from the outer annular space *m*, and the cooler steam from the inner annular space *k*. Any suitable means of obtaining steam at different temperatures may be employed, and saturated steam may be similarly mixed in variable proportions with superheated steam. The movements of the steam pipe under varying temperatures may be communicated in any suitable way to the valve, or they may be caused to operate the valve of a fluid-pressure, relay cylinder, the piston of which operate the valve. This relay cylinder may be supplied with water of condensation from the steam pipes, and the movements of its piston may be checked by needle valves in the supply ports or passages. Arrangements of dampers are described for controlling the flow of furnace gases so as to pass them through the chamber in which the superheater is situated, or divert them therefrom. These are operated by a relay cylinder, the admission of motor fluid to which is controlled by the expansion and contraction of the steam pipe as described above in

connection with the steam-regulating valve, and a similar device may be employed for controlling an ordinary damper for regulating the flow of heating gases to a superheater.

11,715. Taylor, T., and Barter, C.,
 [trading as Parker, Ltd., B.] May 23.



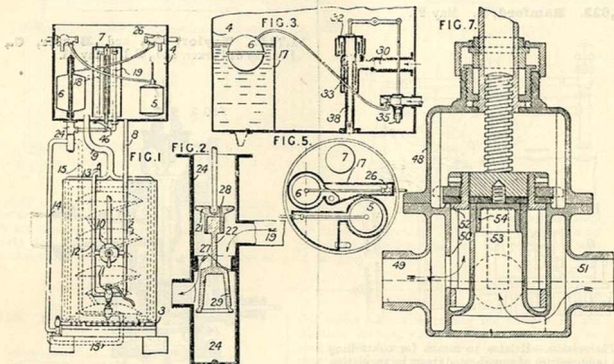
Heating water by steam. A water-heating apparatus or valve, for regulating the temperature of water passed through from the service pipe B to the outlet pipe D by means of steam admitted by the pipe C, is shown in Fig. 2. The piston E has its rod E' terminated by the steam valve F, which seats upon the upper end of the steam connection G. The steam valve is regulated by the vertical screwed spindle L. The cold-water chambers H, H' have a by-pass governed by the valve J. In the chamber H' beneath the piston E the disc E' in the frame E' is provided. The discs with the perforations F' is introduced to increase the water pressure. The position of the frame E' is regulated by the screw *e*. The walls P adjacent to the piston E are tapered, and the passage Q at the end of the nozzle G' can be adjusted by screwing up the pipe D.

11,787. Fried, S. May 23.

Heating liquids.—Relates to water and other liquid heaters analogous to geyzers, in which the liquid is passed in succession through chambers of relatively small dimensions, the system being supplied from tanks containing floats and heated by gas jets. Fig. 1 shows the arrangement, partly in section, for use as a bath-heater, Fig. 2 the apparatus for regulating the gas supply, Fig. 3 a second form of apparatus for regulating the gas

supply, Fig. 5 a plan of the water-tanks, its floats and partitions, and Fig. 7 a vertical section through the mixing-valve. The chambers of the bath-heater are shown at 2, Fig. 1, the gas burners at 3,

and the water-supply tank with its floats and gas-regulating system at 4. The float 5 regulates the flow of water to a cold-water compartment, and the float 6 the flow to compartment 17. The tube 8



supplies the cold water and the tube 12 the hot water to the mixing-valves 10, 11, one of which may supply the bath and the other a spray or douche. The tube 9 is connected to the heating-chamber 2, while the pipe 13 may convey the hot water to the place where it is required. From the gas-regulating system, the gas flows by the pipe 14 or 15 to the burners. When the pipe 15 is used, the valve in it may be connected with the mixing-valve, so as to make their actions mutually dependent. For regulating the gas, the gasometer 7 and its accessories are employed. The gas enters by the tube 18, and passes to the regulator 24 by the tube 19. The valve 22, Fig. 2, rise and fall with the float 6. On the failure of water from the cock 26 on the falling of the float, the valve 21, shown in its normal position in Fig. 2, closes the passage 27 with the exception of the small hole 28, which serves to keep the burner alight. On the filling of the tank, the float rises and takes with it the valve, which then shuts the passage 27 with the exception of the hole 29. In the second form of regulation apparatus, shown in Fig. 3, the gas enters by the tube 30 and passes to the tube 38 when the mercury sealed valve 32, 33 is raised through its connection with the piston 35, which is depressed on the entry of water due to the sinking of the float 6. The upper mercury seal

prevents the flow in the upper direction when the vessel is in its highest position. Gas, however, passes through tapered notches in the tube 33 and is proportioned to the movement of the float and vessel. A low partition having a V-shaped opening divides the compartment 17 into two portions, so that the float falls more rapidly towards its lowest position. To prevent an explosion due to passage of gas through the bye-pass 28, Fig. 2, after the gas main has been closed and then opened, the gasometer, when in its lowest position, closes the pipe 19, Fig. 1, and is secured by the spring hook 46. To mix the hot and cold water, the valve shown by Fig. 7 is employed. The cold water enters by the inlet 49 to the cylindrical port 50 which is closed by the slotted cylinder 52. The hot water enters at 51 and passes to the interior 53, which is closed above by the cap 54. When the part 52 is raised slightly, the cold water passes through the notches and enters the chamber 48. When the valve is raised so as to withdraw the cap from the lower casting, the hot water commences to flow. At the same time, the admission of cold water is checked by the part 52, which is unslotted at its lower part. The hot and cold water flow in parallel streams, but the direction of the mixture is reversed as it leaves the upper chamber 48, thus effecting a complete mixture.

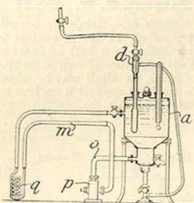
11,871. Engels, F. H. May 24.

Heating water. — Relates to a water-heating device comprising a shallow pan-like receptacle

applicable for holding cooking-utensils for the purpose of keeping the contents warm. The device A is pivoted to the hollow arms E, and is in communication with the water tank K

soldered. Seatings for side plates are provided. The side plates are constructed with bearings *c, c'* for carrying the rotating shaft of the fan, and are kept in place by tie bolts such as *d*. The bolts are covered with insulating-material such as steatite upon which the heating-wires *f* are drawn. In Fig. 7, the wires are shown as wound upon pegs *k* arranged upon the faces of the rotating plate *l*. The wires pass from an insulated peg on the inner circle to a second peg on the larger circle, and so on round the series of pegs such that the wires are arranged half radially and half circularly.

12,279. Ullmann, K. May 29.

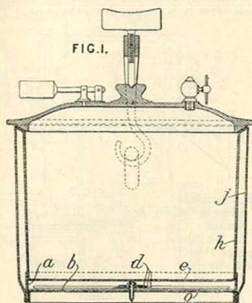


Heating by water circulation.—A heater *q* for medical use is kept warm by the circulation of hot water supplied by the vessel *a* and kept in motion by a rotary or other pump *p* driven by spring, weight, or electric action. The vessel *a* is heated by a gas burner controlled by a thermostat *d*. The pipe *o* connects the pump and vessel directly, the pipe *m* indirectly through the heater *q*.

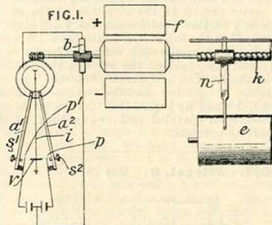
12,309. Mare, F. de. May 29.

Heating by electricity; heating liquids; digesters.—Carbon, metal, or other heating-resistances are enclosed in casings of copper, black or dark red glass, or other material, containing hydrogen, which is introduced after exhausting air from the casings through small tubes. These tubes are reduced in size so that they may be closed by fusion, or by nipping or soldering. A digester, shown in Fig. 1, consists of a metal vessel *h*, having its sides polished externally and surrounded by a casing *j* to retain heat, and the bottom *e* blackened to absorb heat from carbon loops *o*, which are carried by metal plates *d* in a casing formed by a ring *a* and a lower plate of polished metal *b*. Asbestos, mica, or other incombustible insulating-material is placed between the carbon loops *o* and the lower plate *b*. A heater, to be immersed in a liquid, consists of a carbon filament coiled helically on a tube of mica or asbestos, in a cylindrical casing, which

is provided with radial plates, and with a handle through which nickel conducting-wires pass.



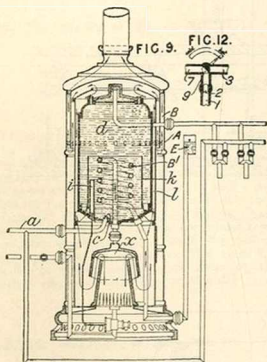
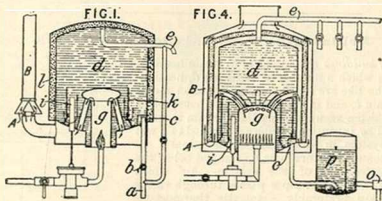
12,469. Weston, E., and Benecke, A. O. May 31.



Thermostats, registering movements of. The movements of the index hand *i* put in circuit with a divided battery *b* a small electromotor *f* which turns a screw *k* and so shifts a tracing nut *n* along a revolving record drum *e*. As a modification, the screw is driven by a weight acting through one or other of a pair of electromagnetic clutches circuted by the index. The circuit is made and broken as follows:—The worm-wheel, being in the circuit, carries a pair of arms *a*¹, *a*² which bear screw contacts *s*¹, *s*² and insulated flexible contacts *p*, *p*¹. The index hand not in the circuit is provided with a cross-pin *v* to press the flexible contacts against the screws. As modifications, (1) the index hand is in the circuit, and the screw contacts replace the flexible contacts, (2) resistances are employed with an undivided battery. The electromotor and recorder may be at a distance, another electromotor being used to drive the switch as above.

12,712. Junkers, H. June 3.

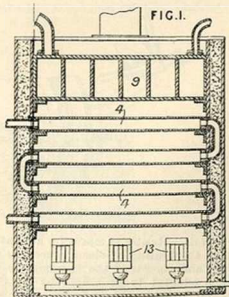
Heating water.—Relates to apparatus for, and a method of, heating water. The supply of heat takes place continuously, and the rate of supply is governed by a suitable temperature regulator. Low-pressure and high-pressure apparatus of various forms are described in the Specification. Figs. 1, 4, and 9 show forms of heaters embodying the features of the invention, and Fig. 12 shows the construction and arrangement



of means for supplying water at temperatures between hot and cold. In the gas-heated low-pressure apparatus shown in Fig. 1, cold water is supplied from the pipe *a* through the distributor *c* to the reservoir *d*, and hot water is drawn from the delivery pipe *e*. The cap *i* of the gas regulator is exposed to the water in the lower part of the vessel *d*. Around the heater *g* the circulation casing *k* is arranged, and surrounding the reservoir *d* is the insulating casing *l*. The eduction pipe *B* is interrupted as shown at *A*. The apparatus may be heated by steam, hot water, or the like. In the high-pressure apparatus shown in Fig. 4, the supply pipe is connected to the receptacle *d* without the intervention of the shut-off cock *b*. The water from the supply pipe flows through a water vessel or through a check valve *o* and air vessel *p* to the distributor *c*, to allow for the expansion of the water during heating. In another form of apparatus, the water of expansion is allowed for by a

combination of a check valve and a relief valve arranged in the water-supply pipe. In the high-pressure apparatus shown in Fig. 9, the heating-coils *B'* are supplied with heated liquid from the external apparatus *a*, the open vessel *E* is arranged on a stand-pipe and allows for expansion in the circulating-medium, and the eduction pipe *B* is interrupted at *A*. The valves 2, 9, Fig. 12, are arranged as shown in relation with the draw-off pipe 1, and with the cold and hot water supply pipes 3, 7. Boiling water or superheated water may be withdrawn from the apparatus by the use of a loaded automatic delivery valve, or by a stand-pipe.

12,757. Louat, P. C. June 4.

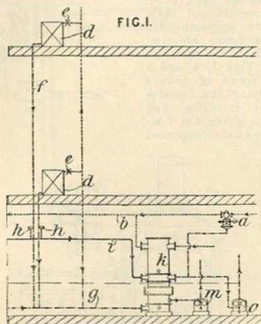


Heating liquids.—Relates to a method of generating steam by highly-heated oil or the like. Fig. 1 shows a heater for the oil and a preliminary heater for the water. The oil passes in succession through a series of flat chambers 4 between which

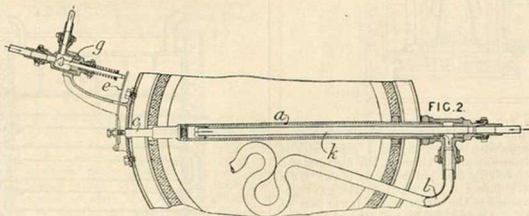
the hot gases from burners 13 pass to and fro. The water-heater consists of a tank 9 with partitions leaving openings at alternate ends.

12,944. Hollinworth, W. G., and Clowes, W. June 6.

Heating buildings &c.—Relates to steam heating-systems in which a number of radiators *d*, heating-coils, or the like are fed from one common steam supply main *b*, and in the return or exhaust pipes *f*, *g* of which a vacuum or partial vacuum is maintained. The invention is shown applied to a wet vacuum system, in which the exhaust pipes *f* are led to a common return pipe *g* arranged below the normal water line of the system. Air which collects in the exhaust pipes passes through valves *h*, which are preferably automatic thermostatic valves, to a pipe *i* leading to the condenser or economizer *k*, and thence to the vacuum pump *o*. High-pressure steam is lead through a reducing-valve *a* or low-pressure steam direct to the steam main *b*, and the supply to the radiators is controlled by valves *e*. The condenser or economizer *k* is preferably of the kind described in Specifications No. 21,020, A.D. 1897, and No. 12,007, A.D. 1898, and is connected to a feed-pump, injector, or like boiler-feeding device *m*. In applying the invention to a dry vacuum system, the return pipe *g* is arranged above the water line, and the thermostatic valves are arranged in the supply pipes below the valves *e*. The thermostatic valve may consist of a disc adjustably screwed to an iron rod bolted at the other end to an enclosing copper or like tube in constant communication with the radiator pipe.



13,030. Peugeot, P. G. A. June 7.

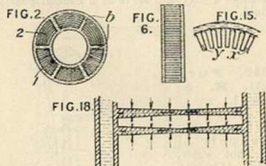


Thermostats.—Relates to means for automatically regulating the heating of steam generators of the flash type, and consists of the thermostatic device or tube *a* adapted to be heated by the furnace burners and cooled by the feedwater. The spring-pressed valve *g* controlling the supply of liquid vapour or gas to the burner is controlled by the tube *a* through the thrust-piece *c* and the

adjustable elastic spring *e*. Feedwater is admitted by the inner tube *k* to the outer tube *a*, and passes to the vaporizing-coils by the pipe *l*. A single tube *a* of U-shape, with the thrust piece *c* at the bend, may be employed instead of the outer and inner tubes *a*, *k*, and the expansion tube may be formed by one of the vaporizer coils. The valve *g* may have a bye-pass.

13,113. Junkers, H. June 9.

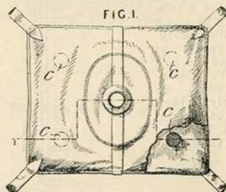
Heating liquids.—To transfer heat to the liquids, metal plates are placed in the paths of the heating-gases, the plates abutting at their ends upon the walls that are in contact with the liquids. The plates may be flat, bent, involute, or U-shaped, and may be of uniform thickness, or may vary in thickness, either in the direction of motion of the gases or at right-angles thereto, the result being that the cross-section of the flues is divided into narrow passages. Of the forms that the plates may take, and their positions, Figs. 2, 6, 15, and 18 show illustrations. In Fig. 2, the flue area between the liquid spaces *b*, shown in sectional plan, is filled with radial or curved plates. In Fig. 15, U-shaped plates *y*, forming flue spaces *x* between them, are employed. In Fig. 18, the plates are shown as varying in thickness.



13,150. Heiliger, F. June 10.

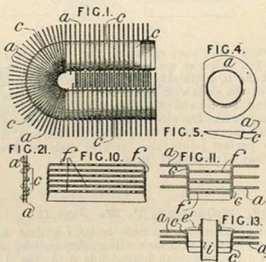


Heating by chemical action or molecular combination.—Relates to means or appliances for starting crystallization in thermophores and the like, and consists of bodies of suitable form and material disposed within the thermophore in such a manner that, by the external compression of the thermophore and the moving of the compressed parts in opposite directions, the bodies are rubbed together to start crystallization. Inside the pillow or bolster thermophore shown in Figs. 1 and 2, four bodies or rubber nipples *c* are arranged, and are provided with roughened friction surfaces. The bodies may be of gold lace, or of chain or chain mail, or of metal.



13,214. Walker, W. H. June 10.

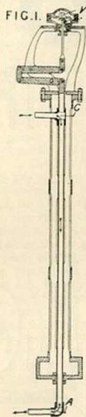
Heating buildings &c.—Relates to constructions of sections or units used in the manufacture of heat radiators. Each unit consists of a perforated disc *a* with an integral flange *c* made of wrought or cast metal. The flange may be tapered or thinned so as to fit into the next unit or it may be arranged to form a butt joint. It may also be inclined as shown in Figs. 4 and 5, in which case parts of the disc is removed so that bends may be built up. The disc may be corrugated or fluted annularly or radially, or may be provided with recesses and projections. The corrugations or projections on the disc may abut against the next unit as shown in Fig. 21, or the disc may be perforated with a suitable number of holes. The external form of the units and the passage through them may be circular, rectangular, or elliptical &c. The units may also consist of perforated plates *f* and flanges *c*, with or without the external parts *a* as shown in Figs. 11 and 10. The



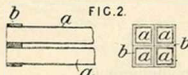
units may be held together and the joints rendered tight by galvanizing, or by electrically depositing metal on them when assembled. End pieces e^1 with tie rods or tubes i may also be used, and these tubes i may also serve as a central passage for fluid.

13,246. Purnell, H. A.
June 11.

Thermostats.—The supply of steam, hot water, or the like to heating apparatus is automatically controlled in accordance with its temperature, by utilizing the expansion and contraction of a tube A C, through which the heating-agent passes, to close and open a valve V. Multiplying levers are preferably interposed, as shown, between the tube and the valve.



13,365. Soc. Anon. des Automobiles Peugeot. March 21, [date applied for under Patents Act, A.D. 1901].

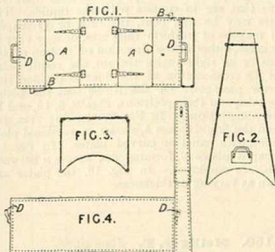


Heating buildings, radiators for. Clusters of tubes for radiators are constructed by providing each tube a , preferably of square or hexagonal form, at the ends with metal ferrules b of corresponding form, and then brazing or soldering together with ferruled tubes when assembled. Circular tubes may have square ferrules, and to obtain perfect joints, the ferruled ends of the tubes may be separately turned.

13,393. Holdaway, F. W. June 13.

Heating water.—A portable boiler for field or camp use consists of a tank with arched bottom to go over a fire, and with hinged lids A, A, Fig. 1.

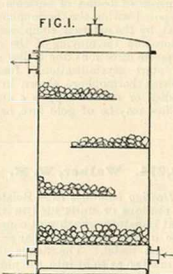
Fig. 3 shows a cross-section of the boiler. Water is drawn off at B, B. A chimney composed of two flat conical sections, fitted together when in use as shown in Figs. 2 and 4, is attached at one end



being held in place by one of the handles D, by which the boiler is carried. When not in use, the top half of the chimney is fitted inside the lower half.

13,512. Feeny, V. F., [Abwärmee-Kraftmaschinen Ges.] June 14.

Heating liquids.—Relates to a method of utilizing exhaust or waste gases from boilers, gas and oil engines, coke ovens, &c., for heating liquids of low boiling points such as for working waste heat or cold vapour machines using these liquids. The waste gases may evaporate water in an ordinary low-pressure heating-boiler or economizer, and the steam so generated may heat the vaporizer, or the gases may pass through a chamber containing coke, such as is shown in Fig. 1, in a counter-direction to a suitable quantity of water, to be purified and, together with the steam generated, pass to the vaporizer to heat the liquid.

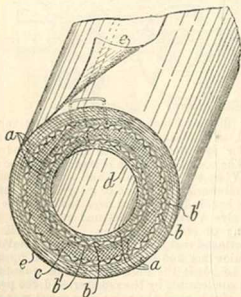


13,536. Castner-Kellner Alkali Co., Smith, A. T., and Baker, H. June 14.

Heating liquids.—To utilize the heat evolved in the preparation of slaked lime, and to avoid the inconvenience caused by the air being filled with

dust, the slaking is conducted in a large vessel provided with suitable exits. Short wide pipes conduct the issuing air, steam, and dust into a tower or the like, which may take the form of a jacket round the slaking vessel, and in which they meet and mix with a suitable liquid, such as water to be used for cleansing or boiler purposes. Its temperature is thereby raised and any precipitated salts of calcium or magnesia carry down suspended impurities.

13,641. Toope, C. June 16.

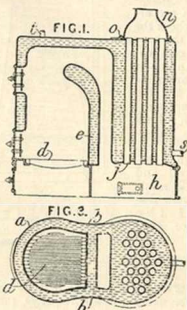


Non conducting coverings.—Non conducting coverings for steam pipes and other surfaces are formed of layers of material such as asbestos mill-board and hair felt, or asbestos fibre, in alternation with corrugated paper, whereby air spaces are preserved between the layers with which the corrugated paper alternates. In the pipe covering shown in the Figure, the corrugated sheet *b* with its plain sheet *b'* of paper is applied upon the asbestos mill-board *a* and the hair felt *c*, the layers being wound spirally. The covering is provided with an internal sheet of asbestos cloth or paper *d*, and an external sheet of waterproof canvas *e*. For boiler sheets or slabs for lining walls and the like, the layers are alternated in the flat.

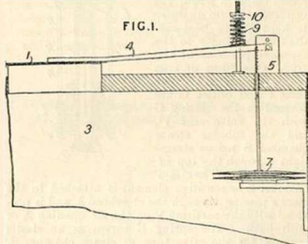
13,682. Parsons, R., Bennett, W., and Beddard, W., [trading as Bennett & Co.]. June 17.

Heating water, boilers for. Figs. 1 and 3 show a boiler for heating water for buildings and other purposes produced preferably from steel plates bent and machined in the configuration required and secured together so as to present an outer configuration with convex ends *a* and concave sides *b*. The mid-feather *e* curves inwardly over the

firegrate *d*. A number of smoke-tubes *j* connect the fire-space *h* with the chimney *n*, which is hinged at *o*. Water inlets and outlets *s, t* are provided.



13,816. Draper, J. E. June 18.

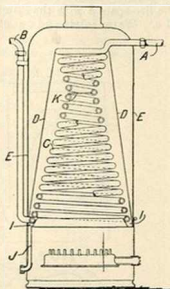


Thermostats.—The thermostatic capsule 7 acts to raise the damper 1 through the lever 4, which is hinged to the block 5, the point at which it begins to rise being determined by the spring 9 controlled by a nut 10.

14,142. Winterflood, J. June 21.

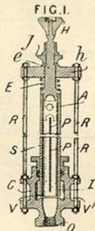
Heating water.—The water-heater or geyser shown in the Figure has the water pipe *C* coiled into a double conical or equivalent formation. The coil is surrounded by the conical or

other casing D connected to the cones at their bases, and one or more baffle-plates K are arranged to check the passage of the products of combustion. An outer casing E surrounds the whole, and the outlet B is arranged above or on a level with the water-supply pipe A. The trough I below the coil and the outlet J serve to collect and dispose of the moisture or condensation.



14,185. Tudor, F. July 3, A.D. 1901, [date applied for under Patents Act, A.D. 1901].

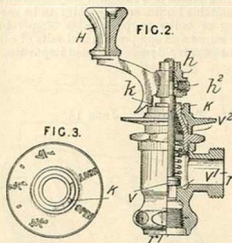
Steam traps.—Relates to steam traps or analogous apparatus, such as automatic air-valves for steam heating systems, or combined air-valves and steam traps, in which the condensed steam or water is kept out of heat-conductive proximity to the sensitive portions of the trap. One form of trap is shown in Fig. 1. The inlet I and outlet O are formed in the casting C with the valve seat V¹, and the tubular steam chamber S passes steam-tight through the top of the casting C. The steam chamber S or sensitive element is attached to the stem *e* passing through the crosshead *h*, and is provided with the partition P or the air opening A or with both. The spring E serves as an elastic cushion for the valve tube or steam chamber S. The trap is adjusted by means of the screw *j*, and the valve may be raised for cleaning &c. by the handle H. In another and modified form of trap, the rods R are replaced by an outer surrounding tube, which has a coefficient of expansion different from that of the inner or valve tube, and the valve is double seated.



14,278. Tudor, F. June 24.

Heating buildings, radiators for. Relates to low-pressure steam heating systems and more particularly to the provision for a radiator of a single admission valve which will perform the functions of a graduated valve adjusted to the maximum

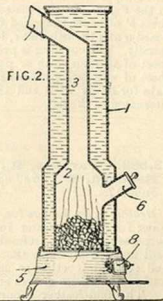
condensing-capacity under normal conditions, and will also be capable of use as an emergency valve which delivers a larger quantity of steam than such maximum. The valve is shown in Fig. 2, and the



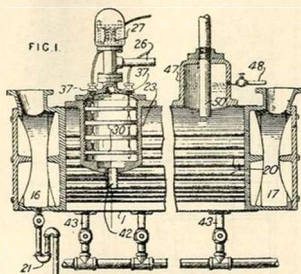
index dial or flange employed with the valve in Fig. 3. The steam passage between the inlet *r* and outlet *r*¹ is controlled by the spring-pressed valve V. The operating-handle H is secured to the valve stem V² by the screw hub *h*¹ and screw *h*², and the cam follower *k* attached to or integral with the arm of the handle H is moved over the cam K to raise the valve V from its seat and adjust the valve opening or steam admission. The cam K is so proportioned that a fraction of the pull rotation of the follower *k* and handle H suffices to open the valve to admit the normal maximum quantity of steam condensable by the radiator, and the portion of the cam beyond the point of normal maximum steam delivery is of greater pitch than the initial opening portion. The full movement of the valve is limited to one revolution of the cam follower.

14,538. Lund, A. I., and Lyche, O. June 30.

Heating water.—A water-heater, suitable for baths, is shown in Fig. 2. The fireplace 2 and smoke flue 3 are completely enclosed in the water space within the outer casing 1. The feeding opening 6 projects from the side of the heater. The parts are supported on the foot-piece 5, the upper part of which forms the grate and bottom for the fireplace, and in the side of which is arranged the ash-pit opening 8.

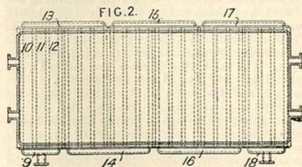


- 14,644. Clark, C. C., Bleakly, H. G., and Carson, J. G. July 1.

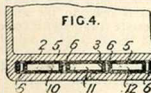


Heating water.—Relates to apparatus for purifying water by electrolytic action. Within a cylindrical chamber 1 is mounted a chamber 23 containing the electrodes 30, positive and negative alternately. The ends of the chamber 1 consist of hollow heads 16, 17, connected by tubes 20, through which a suitable fluid is circulated, e.g., steam when feedwater is being heated and purified. 21 denotes a trap for discharging condensed steam. The liquid enters at 26 and, together with the separated impurities, passes through the vertical pipe 42 into the chamber 1. Heavy impurities are discharged through pipes 43 controlled by cocks, and floating impurities collect in a dome 47, from which they are removed by a valve-controlled pipe 48. The pure liquid is withdrawn from a point below the surface by a pipe 50 passing through the dome. A safety-valve 27 is provided.

- 14,709. Schwaninger, V. July 1.

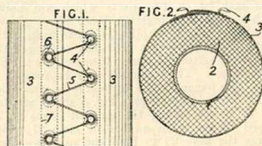


Heating liquids.—Apparatus or receptacles for heating or cooling liquids, applicable for explosive liquids, are made with heating or cooling channels in the walls



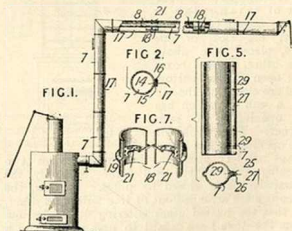
or bottoms, the channels being lined with rolled or similar material. The apparatus is shown in plan in Fig. 2. The channels 10, 11, 12 are formed by the wrought iron sheets or plates 5, separated by a number of cross-pieces or plates 3 connected by rivets 6. The plates 5 are soldered to the cast-iron bottom 2 of the receptacle, and the channels in series of three are put into communication with one another by the connecting-pieces 13, 14, 15, 16, 17, to form a serpentine pipe having an inlet 9 and outlet 18.

- 14,735. Porteous, C., and Bannerman, W. July 2.



Non-conducting coverings.—A non-conducting covering 2 for steam pipes and the like has an external canvas or like cover 3, secured in position by a cord 5 passed over lacing-hooks 4, the hold of which is improved by washers 6, or metal, leather, or similar strips 7 inserted in the turned-over edges of the canvas. The stems of the hooks are inserted through holes in the canvas and washers, and then expanded.

- 14,801. Washington, W. H., Stanton, G. M., and Woore, R. July 2.

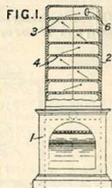


Heating apparatus.—Relates to a heating and protecting system for pipes, fire-plugs, hydrants, and other water or fluid containers and conductors. A series of jackets 7, which are independently removable from and surround the pipe 8 or other object to be protected from frost, are provided in

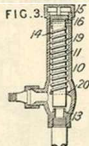
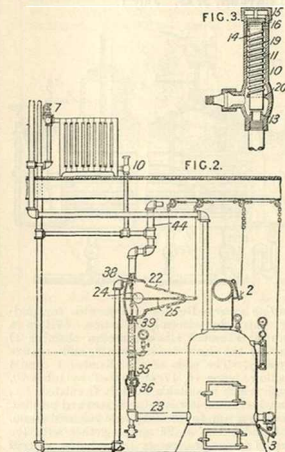
combination with heating means, which may be an air-heating furnace, as shown in Fig. 1, or steam-boiler gas burners, oil burners, or electric heaters may be employed to supply the heat. The jackets consist of sheet-metal tubes, Figs. 1 and 2, with edges 14 bent over to form grooves to receive the tongues 15, 16 on the coupling or retaining strips 17, which are adapted to be applied to, or released from, the jackets by an endwise sliding movement. The jackets are removably connected together by the coupling-devices 18. Each coupling-device 18, Fig. 7, has segmental perforated flanges 21 forming portions to bear against the pipe and to hold the jackets centered thereon, and beads or rims 19, against which the ends of the jackets abut. The tubular jacket coupling-pieces may be in two parts which are bolted together, or hinged together, there being grooves in the faces of the coupling-pieces to receive the jacket ends, or the jacket ends may be flanged and bolted to the external rim or flange of the tubular jointing piece. The jackets 7 may be formed in halves, with flanged edges to receive on either side locking or retaining strips. Fig. 5 shows another form of jacket, having the straight edges 25, 26 engaged by the V-shaped bar or strip 27, which receives the keys 29 to hold the parts together. In another modified form of jacket, the jacket is in two parts, and the edges engage grooves in double grooved coupling or retaining strips. An elbow-jacket having a bolting-flange and an apertured pipe-centering flange, is preferably employed at angles. Lugs in lieu of flanges may be formed upon the jacket to hold the pipe 8 centered.

14,873. Gindra, C. July 3.

Heating buildings &c.—A radiator, heated by the waste gases from stoves, more especially gas stoves, is constructed of a number of triangular or other shaped boxes 2 of clay, fire-brick, or the like, placed one above the other. These boxes are open at the bottom and are closed at the top by a wall 3, which has an opening 4 in each corner. The whole of the openings in the lower boxes are left open, in the higher boxes two openings, and in the still higher one only, the remainder being closed by plugs. Further, the openings are arranged out of line with each other, so that the heated gases entering at the bottom from the stove 1 are caused to pass upwards in a sinuous course to the outlet 6. Each box is formed at the upper edge with a ledge to prevent lateral movement of the box above it, and the joints between the several boxes are made tight with clay and the like. The radiator is placed in a recess behind the stove, or, in some cases, is set directly against it.

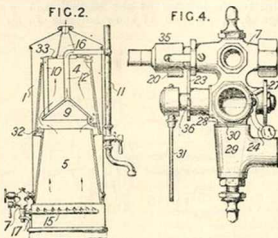


14,876. Dietrich, H. A. R. July 3.



Heating buildings &c.—A low-pressure steam heating system is shown in Fig. 2. The boiler or generator dampers 2, 3 are controlled or reversely operated by the float 24 within the receiver 22, which is placed above the boiler water line and is connected with the return pipes. Within the pipe 23 connecting the receiver with the bottom of the boiler is placed the check valve 36, having on the stem 35 the stops 38, 39 for engagement with the float lever 25. The valve 7 for controlling the admission of steam to the radiator is of any desired construction, while the return valve 10, shown in Fig. 3, automatically permits the escape of air and water and prevents steam from entering the return pipes. The valve 10 comprises the casing 11, the expansible valve plug 14 situated above the valve seat 13, and the heads 15, 16 for adjusting the valve plug. The plug 14 is supported by the coiled spring 19, which bears on the horizontal support 20 and on the lower edge of the cap or head 16. The valve 14 is normally open for the passage of air and water. The air escapes to the vertical air pipe 44, which is of a suitable height and is open to the atmosphere. As the boiler pressure rises water is forced into the receiver 22, and the float 24 is raised and the dampers 2, 3 operated, until the upper stop 38 is engaged and the check valve 36 is closed to prevent more water from leaving the boiler.

14,989. Ranke, H. J. July 5.

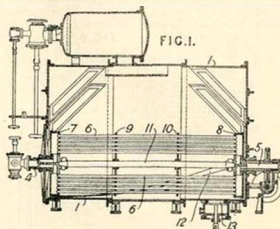


Heating liquids.—A water heater for baths and other purposes is formed of an outer casing 1, which is entirely detached from the hot-water jacket. The water enters through a valve 7 to a conical annular casing 5, the inner side of which is corrugated, and thence passes through a union 32 to a second similar casing 4. From the latter it passes in succession through a flat annular pipe 33, a vertical pipe 10, a reversed funnel casing 9, and a tube 12 leading to the delivery pipe 11. The hot gases from the burners 15 pass in the direction of the arrows to the outlet 16. The gas cannot be lit until the burner is withdrawn from the casing and the water is turned on, and the latter cannot be turned off until after the gas has been turned off. To effect these objects, the gas valve has a disc 23, having a slot 36 into which a feather 20 on the socket 35 of the water valve engages, so that, to enable the water to be turned off, the disc 23 must be in such a position, that the feather 20 and the slot 36 can engage, that is, in the position when the gas is turned off. Further, the burner 15 is rigidly attached to a small hinged door 17, and to a socket 29 surrounding a tap plug 28. The socket 29 carries a cam-disc 30, which, when the burner is swung out of the casing, engages with a counterweighted two-armed lever 24, and removes it from engagement with an opening in a disc 27, and thereby allows the gas to be turned on by means of the handle 31.

15,031. Czaplowski, J. July 5.

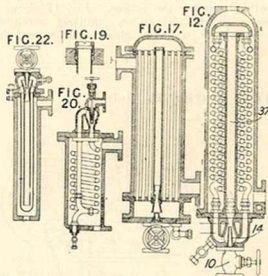
Boiling-pans.—A vacuum pan or boiler for boiling sugar juices and the like is shown in Fig. 1. Inside the horizontal boiler 1 is mounted a rotary mixer and heater comprising the hollow arms or heads 7, 8 and the tubes 6. The arms 7, 8 are carried by the hollow gudgeons 4, 5, which serve as inlet and outlet for the steam or water. The plates 9, 10 support the tubes 6, and the central shaft or tie-bar 11 is secured to the hollow heads. The mixer and heater is rotated by suitable worm gearing, and the spiral scraper or knife 12 attached to the mixer is adapted to remove the adhering

juices from the bottom of the boiler, and convey them to the outlet or opening governed by the valve 13. After boiling, cooling water or fluid is



passed through the mixer to cool the mass and render it more liquid for removal.

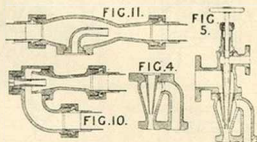
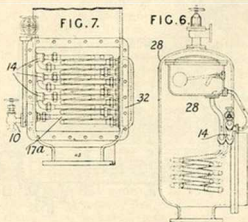
15,066. Andrews, J. July 7.



Heating liquids and gases.—The tubes of surface apparatus for heating, cooling, evaporating, or condensing fluids are arranged in one or more closed circuits, in which circulation of the heating or cooling fluid, or the fluid to be heated, cooled, or condensed, is maintained by means of an injector, means being provided for removing the water of condensation, or other excess of fluid admitted through the injector. Fig. 6 shows a sea-water evaporator with a double steam-heating coil connected up to an injector 14 and to a tank with a float valve, through which excess of water of condensation is withdrawn. In place of the tank a hand-operated drain valve may be connected to the bottom of the coil or elsewhere. Several pairs of flat coils, each with a separate injector 14, may be

arranged as shown in Fig. 7, their outer ends having a common connection to a chamber 32, whence an extra coil 17^a leads excess of water of condensation to a drain valve 10. Similar sets of

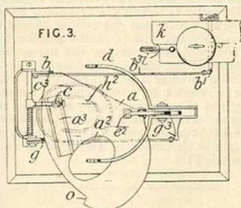
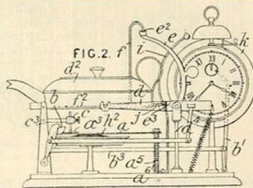
coils may be arranged in series, the excess of steam and the condensed water from the first being supplied to the injector of the second, and so on. Figs. 4, 5, 10, and 11 show suitable forms of



injector. Fig. 12 shows a heater having four coils in two concentric series for the return circulation, and a single central pipe 37 for the flow induced by a central injector nozzle 14. 10 is a drain cock, but any suitable drain trap may be employed. In a modification of this arrangement, two of the coils serve for the flow of the heating-medium, and the other two for the return. Fig. 17 shows a heater with straight tubes, similarly arranged. Fig. 19 shows a screw gland arrangement for

securing the tubes in the tube plates. Fig. 20 shows a heater with a single coil and straight return tube, and Fig. 22 a heater with concentric straight flow and return tubes. The applications of the invention to the evaporation of sea-water for drinking and boiler-feeding purposes, to vacuum pans for sugar manufacture, to heating water and air, to condensing steam, and to heating, cooling, and condensing fluids generally, are mentioned in the Specification.

15,170. Clarke, F. July 8.



Heating liquids.—Relates to apparatus for automatically heating water for making tea or coffee, also applicable for heating other liquids. Fig. 2 shows an elevation, and Fig. 3 a plan, with the kettle removed, of the apparatus, which comprises an alarm clock *k*, kettle *h*, spirit lamp *h*, and a movable shutter-plate *a*, which, when the alarm goes off, is moved so as to expose and light the lamp; when the water in the kettle boils, the kettle automatically tilts over and pours its contents into a cup containing the tea &c. The kettle is mounted in a forked frame *d* pivoted to a

pillar *d*, and has a plate *f* hinged to the inside of its bottom. A wire *f* attached to the plate engages at its upper end with a notch *e* in the end of a pivoted arm *e* having at its other end a lug *e* engaging with a projection *j* on the kettle. The shutter *a* is pivoted to a pillar *a*, and is provided with an opening *a* and a striker *a*. When the alarm goes off, the winding-key of the clock operates a lever which, by means of a link *b*, actuates a catch *b* holding the shutter in position. The shutter is then moved by a spring *a* until a catch *g* engages with the part *o*; the opening *a*

is thus brought over the spirit lamp which is then lit by a match carried in a socket *e* mounted on a spring-actuated rocking-bar *c*²; this match is struck by the striker *a*² during the movement of the shutter. When the water boils, the plate *f*² is lifted and releases the arm *e* allowing the kettle to

tilt over by its own weight and pour the water into the cup. As the frame *d* swings over, links *g*² disengage the hinged catch *g* and allow the spring *a*² to swing the shutter further over so as to extinguish the lamp, at the same time an arm *i* is struck by the shutter and rings the bell of the clock.

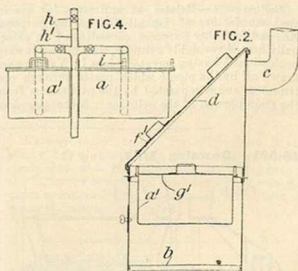
15,228. Heintz, A. July 8.

Thermostats.—A thermostatic draught regulator for hot-water boilers used in heating-systems &c., consists of a spring tube 8 containing an expansible liquid, such as naphtha, and enclosed in a casing to which the hot water has access. One end of the tube is fixed, and the other end is attached to an arm on a spindle 4, which carries the balanced lever 10. One end of the lever is connected to the chimney damper and the other to the ashpans door of the boiler furnace.



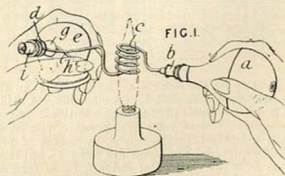
15,329. Cummins, H. A. July 9.

Boiling-pans.—Relates to a closed-in apparatus for disinfecting excreta and ped pans, urinals, spittoons, and other medical appliances. A boiler or "copper" *a*, Fig. 2, covered by a lid *g*¹, is supported by flanges &c. within a chamber *b* provided with means for heating by coal, petroleum, or gas. The chamber *b* is closed in front by an inclined hood *d* having a lid *f*¹, and is provided with a chimney *c* at its upper portion. Two boilers may be mounted in the same chamber, and the whole may be made in movable parts so as to be portable. Fig. 4 shows apparatus for drawing off the liquid contents of the boiling-pans. A down-tube *h*¹ supplied with water through a valve *h*, is connected by a branch arm with pipes *i* which dip into the pans *a*, *a*¹ so that, when the water is turned on, the contents of the pans are siphoned off.

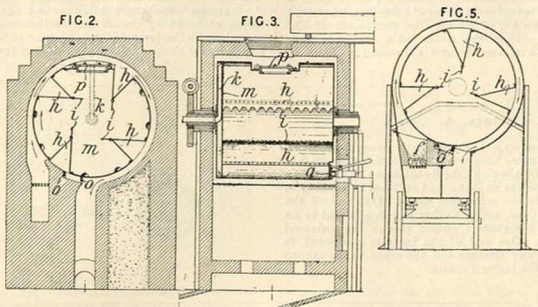


15,512. Soc. dite Pharmacie Centrale de France. May 20, [date applied for under Patents Act, A.D. 1901].

Heating liquids.—A spray producer or inhaler is constructed so that the liquid or vapour can be heated before it issues from the nozzle. An air bulb *a* is fitted with a nipple *b* adapted to contain cotton-wool, silk, &c. for filtering the air. A tube *c*, connected at one end to the nipple, is coiled so that it may be heated by an alcohol lamp &c. The other end of the tube *c* is connected to a spraying-nozzle *d*. The air which is heated in the passage through the tube *c* serves to heat the liquid sprayed.



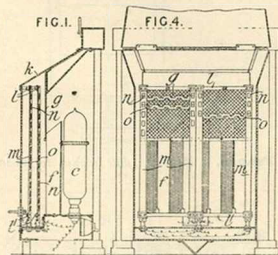
15,528. Montupet, A. July 11.



Boiling-pans.—Relates to apparatus for use in the manufacture of asphalt for paving purposes &c., and for other purposes, consisting of an externally heated revoluble cylinder, with hollow inward projections *h* having serrated edges *i*. Vapours are drawn off by the pipe *k* which passes through one trunnion, and is separated by the partition *m* from the main portion of the cylinder. A charging-door

is provided at *p*, and a valved aperture at *q* for withdrawing the charge. Flames and gases from the furnace *f* pass round the cylinder to the discharge flue. Brushes are provided at *o* to clean the cylinder and act as packing. The whole apparatus may be made portable, or a removable furnace may be provided as shown in Fig. 5.

15,591. Dowsing, H. J. July 12.

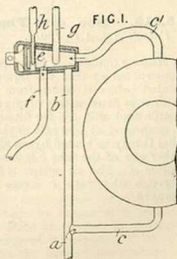


Heating by electricity.—An improvement in the electric stove described in Specification No. 4124, A.D. 1899, consists in obtaining additional heating by means of detachable resistances *o*, removably fixed to upright metal strips *m* by means of projecting springs. The strips are fixed to, but insulated from two horizontal strips *l*, *l'*, so forming a variable-resistance frame, which is placed in a chamber forming the back of the stove. Incandescent lamps *c* are fixed in the front part of the

stove, and a polished corrugated reflector *f* separates them from the resistances. Above the reflector is a grating *g*, and a top *k* is perforated so that hot air escapes into the atmosphere. The top may be made flat, to support articles to be heated. Switches may be used to vary the number of lamps and resistances in circuit.

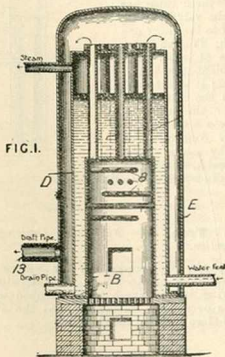
15,693. Révai, O. July 14.

Heating water.—Relates to a system of hot and cold water supply, consisting of a cold-water pipe *a* provided with a valve, not shown, above which it divides into two branches *b*, *c*. The former leads direct to a mixing-cock, while the latter passes through a heater below the level of the mixing-cock, with which the heater is connected by a pipe *c'*.



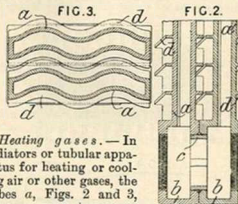
The mixing-cock has a hollow plug *e* with the open end of which the pipe *c*¹ is always connected. The plug also has lateral holes registering when desired with the pipe *b* and with the pipes *f*, *g* leading to a bath and to a rose. It also has an opening which leads to or receives a thermometer *h*. When the pipe *b* is in free connection with the inside of the plug, the latter receives its supply from the pipe *b*, which is straight, rather than from the more circuitous passage through the heater, and the result is that practically cold water is delivered to the pipes *f* or *g*, whichever happens to be open to the plug at the time. If the opening of the pipe *b* into the plug is constricted by partly turning it, tepid water is obtained, while by turning the plug so as to close the pipe *b* hot water alone is obtained. The holes in the plug are made so that either of the pipes *f* or *g* can be opened whatever the condition of the water. A handle having a pointer and a graduated dial shows the position of the plug.

15,786. Logan, F. July 15.



Heating water.—Relates to steam and hot-water boilers. The firebox shell *B* and the boiler shell *D* are both outwardly flanged and bolted together as shown. Water tubes *8* in horizontal layers, crossing one another, traverse the upper part of the firebox. The fire tubes are secured by nuts at their upper ends, yielding packing-washers of asbestos or the like being employed to provide for expansion. The whole is surrounded by an outer casing *E*, near the base of which the chimney flue *13* is attached.

15,970. Mower, G. A. July 17.



Heating gases.—In radiators or tubular apparatus for heating or cooling air or other gases, the tubes *a*, Figs. 2 and 3, have a wavy transverse section, and are provided with a series of external ribs *d*, which are waved or curved in a direction transverse to the length of the tube. The external ribs *d* may project a uniform distance from the tube walls, or the rib edges may be rectangular. The radiator may consist of one row of tubes or of several rows, and the coupling-boxes *b* may be connected by the screw nipples *c* or by other means. The air to be heated or cooled passes between the tubes, or may be forced by a fan or other means, while the heating or cooling fluid passes through the tubes.

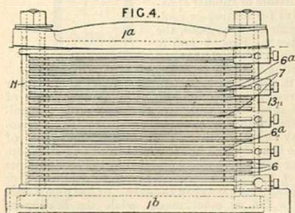
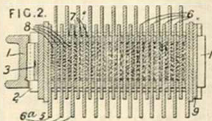
16,021. Hoynes, J. F. July 18. Drawings to Specification.

Heating water, boilers for. The bore of the smoke tubes, which may be straight or coiled, diminishes with the decreasing heating power of the flame. The external diameter of the tube may taper correspondingly, or, when it is constant, the internal diameter may taper.

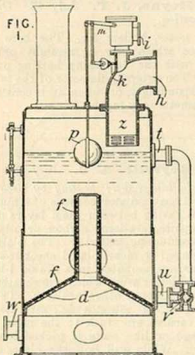
16,041. Reyrolle, A. C. July 18.

Heating buildings &c.; heating by electricity.—An electrical heat radiator consists of a number of metal plates having between them layers of compressed graphite, powdered carbon, or other powdered non-conducting material. The plates *6*, *6*^a, Fig. 2, of tinned or nickel-plated sheet iron, or of other metals, are mounted in a frame *1* between its upper and lower arms, which are sheathed with pieces *2* of mica or other insulator. Thin rectangular rings *7* of asbestos &c., saturated with shellac or varnish, are stuck to the metal plates, and plumbago or like paste is packed into them and is dried. While still hot, the plates are put together as shown, and are squeezed in a screw press until the plumbago &c. forms practically solid layers *8*. The assembled parts are held in the frame *1* by a coach spring *3* at the closed end of the frame, and a plate *9* at the open end. In the modification shown in Fig. 4, the plates *6*, *6*^a of metal, and layers *7* of non-conducting material, are held between bars *1*^a, *1*^b, the bar *1*^a being slightly

curved. The bolts 11 are placed in an insulating-sleeve 13. Some of the metal plates are provided with binding-screws.



16,193. **Hailwood, J.** July 21.

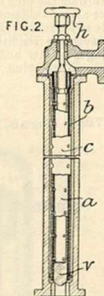


Heating water.—Relates to apparatus for removing scale-forming constituents from water, which may be heated at the same time. Fig. 1 shows apparatus adapted for treating water under atmospheric pressure. The water is delivered at *i*, the reagent at *k*, and live or exhaust steam at *h*, and all are discharged through a "spray box" *z*

into the upper part of the purifying-vessel. A conical perforated plate *d*, with a cylindrical perforated extension *f*, both of which are covered with filter cloth separate the upper and lower parts of the vessel. The purified and filtered water is drawn off at *v*. The supplies of water and reagent are simultaneously regulated by valves operated automatically by the float *p*. Scum is withdrawn at *t* and sludge at *u*, both outlets being controlled by a single three-way cock *v*. A steam-heating coil may be fitted in the reagent tank.

16,395. **Ertel, H.** July 23.

Steam traps.—Expansion traps are constructed with three or more concentric tubes, connected together alternately at the top and bottom, and alternately of more and less expansible metal, so that an increased movement is given to the valve. In Fig. 2 three tubes are shown, the valve *v* being attached to the inner one *a*, which, like the outer one *c*, is of brass. The intermediate tube *b* is of cast iron; it is attached below to the tube *c* and above to the tube *a*. The tube *a* is movable in its screw connection at the top, by means of the hand-wheel *h*, so that the valve *v* is independently adjustable.

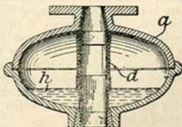


16,478. **Froc, L.** July 24. *Drawings to Specification.*

Heating air.—Compressed air for use in the administration of anesthetics &c. is passed along a pipe having in its length a dome-shaped worm which fits over a gas burner, so that the air is warmed before entering the chamber.

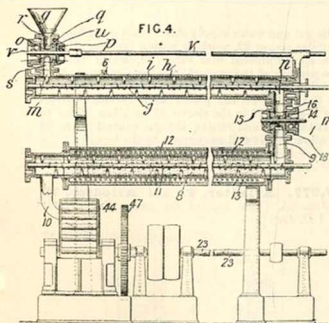
16,545. **Still, W. M.** July 25.

Steam traps.—The discharge from a steam trap is conducted through a flexible pipe *d* in a vessel *a* containing a volatile liquid *h*. When the water is followed by steam, the liquid *h* becomes heated, with the result that the increased pressure



collapses and closes the tube *d*. The lower end of the tube may be closed by a spring valve. The liquid *h*, it is stated in the Provisional Specification, may be enclosed in a hollow rubber ball filling or partly filling the chamber *a*.

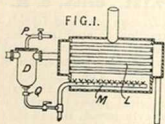
16,590. Shaw, E. July 25.



Digesters.—Fig. 4 shows a longitudinal section of an apparatus employed for the production of a coffee extract by digesting coffee berries with water. The digester consists of a horizontal tube *h* containing a screw conveyer *i* supported by the end covers, and has inlet and outlet branches *m*, *n*; the interior of the tube and its branches is enamelled with a vitreous composition, or electroplated with silver or like material. A rotary plug *o* in the casing *p* between the hopper *g* and inlet *m* has pockets which receive berries and hot water, and deliver them to the digester through a passage *s*. Steam is supplied to the digester by a pipe 6.

16,738. Kelly, J. D., Fisher, D. P., and Wix, N. V. G. July 28.

Heating air.—Air supplied separately to each individual in a theatre, hall, church, school, ship, mine, office, or chamber, is forced by pumps through tubes *L* heated by gas jets *M*,

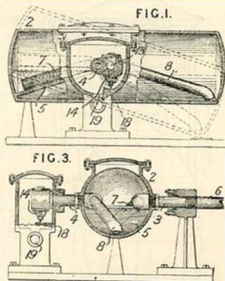


and a moistening-chamber *D* heated by a gas jet *Q* and supplied with water by a pipe *P*.

16,832. Doebbel, G. A. July 29. Drawings to Specification.

Heating air.—The air supply to the furnace of a steam boiler is taken from a preliminary heating-chamber heated by waste steam passing through radiator pipes and built in the upper masonry of the boiler.

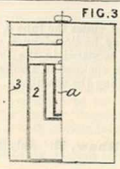
16,836. Bonar, J. July 29.



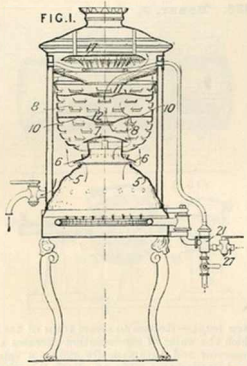
Steam traps.—Relates to steam traps of the kind in which the water of condensation operates a tilting reservoir and automatically moves a valve to allow of its discharge. The receptacle 2 is mounted upon the hollow trunnions 3, 4, and extends on both sides, having the short end portion provided with the inclined bottom 5. The steam pipe 6 leads to the trunnion 3, from which the pipe 7 leads to the bottom of the receptacle, and the pipe 8 leads from the bottom to the trunnion 4, which communicates with the valve chamber. The ball valve 13 is operated through the stem 14 and the projection 18 by the tilting of the receptacle 2 on the water flowing over the upper edge of the inclined bottom 5. When the water is discharged through the outlet 19, the receptacle automatically returns to its normal position. The removable cover fixed to the top of the receptacle is preferably at a greater distance above the axis of the trunnions than the receptacle bottom is below that axis, so that the tilting is accelerated. The outlet valve may have its stem loosely connected with a lever fixed on the trunnion, or it may be fixed to a bell crank which is worked by a slotted lever on the trunnion.

16,903. **Huish, C. H.** July 30.

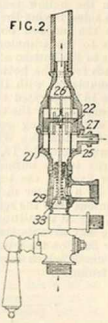
Heat-retaining chambers.—The semen of animals is collected, transported to the females at a distance, and injected artificially with the apparatus described in Specification No. 15,362, A.D. 1898, [Abridgment Class Medicine &c.]. To maintain the vitality of the semen during its transportation, it is enclosed in a bottle which is placed within a hollow-walled felt-lined vessel *a* surrounded by a chamber 2 filled with warm water. The whole is finally enclosed in a wooden box 3.



16,938. **Godeau, J.** July 30.

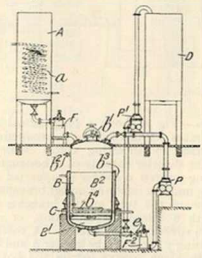


Heating liquids.—A gas geyser for baths and the like or liquid heating apparatus is shown in Fig. 1, its valve attachment being shown in Fig. 2. The liquid to be heated is directed upwards in a spray against the baffle 17, and falls in succession upon the central perforated diaphragms 11, 10, which are arranged within the cup-shaped shell having the lateral openings 8. The metallic netting 12 covers the central orifice of the diaphragm 10. The domed piece 5 above the gas burner has mounted above it the heating-neck 6 provided with the lid or cover 7.



The gas and water supply attachment comprises the annular piston 22, working within the box 21, and the spring-pressed disc valve 29, which controls the passage of the gas. A pilot gas opening 33 is provided in the valve seating. When water enters by the socket 27, the piston 22 is raised, uncovering the slots 26 in the sleeve 25 to allow water to pass through, and raising the gas-control valve 29 to allow of the full gas supply to the burners.

17,077. **Arledter, F., and Arledter, H.**
Jan. 25, [date applied for under Patents Act, A.D. 1901].

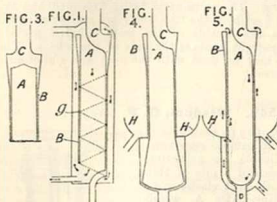


Boiling-pans.—In the manufacture of resin sizes, the materials are melted in a boiler *A*, heated by the coil *a*, and are passed through the filter *F* into the upper compartment *B*¹ of the vessel *B*. A screen *C* divides the vessel into compartments *B*¹, *B*², and the vessel is heated by the jacket *b*¹ and coil *b*¹.

17,131. **Cribb, C. H.** Aug. 2.

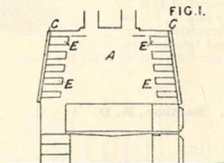
Heating gases and liquids.—Relates to the construction of appliances for use as condensers in distilling operations, applicable also for any purpose involving the transference of heat between liquids or gases. The Figures show different modifications. In all cases, the vapour admitted through the inlet *C* passes through the narrow space between the cylinders *A*, *B*. In the form shown in Fig. 1, cooling-liquid flows, in the direction indicated by

the arrows, on both sides of the vapour passage, and the vapours are made to take a spiral course by means of the wire or bead *g*. In the form shown in Fig. 4, cooling liquid passed through the



cylinder *A* overflows into the cup *H*. Fig. 5 shows apparatus in which the cooling-liquid flows completely around the cylinders *A*, *B*. In cases where the cooling-liquid flows over an outer surface, this may be covered with suitable fabric.

17,183. **McIntosh, M.** Aug. 5.



Heating liquids.—The boiler *A* is made with an external spiral flue *E*, and closed by a shell *C*.

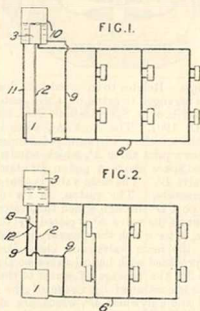
17,196. **Waterhouse, L. M.** Aug. 5.



Heating by electricity; heating water.—A resistance for heating a saucapan or other object, consists of a strip of mica, or other insulator, partly coated on one side with a thin layer of metal or other conductive-material, and protected by mica and sheet-metal covers *f*; the whole may be curved circularly to fit round a saucapan, the ends *k* being connected together by bolts to secure it thereon. The resistant coating may be made as described in Specifications Nos. 7782 and 12,229, A.D. 1895,

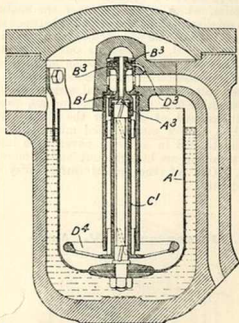
[*Abridgment Class Electricity, Measuring &c.*, and No. 10,585, A.D. 1898; it is thickened at the ends, where it is in contact with metal clips *d* on another strip of mica, which serves to cover the coating. The two mica strips are then enclosed between two longer metal strips, one of which, *f*, has openings to receive the clips *d*, and to pass out conducting-strips *e* attached to them. The same metal strip *f* has its ends doubled over and perforated at *k* to receive the bolts. The two metal strips are connected together by any suitable means, as by folding the edges *h* of one over the other. In a modification, two or more coated mica strips are joined end to end in a metal cover; the intermediate terminals are brought out and connected together. One of the metal strips may be dispensed with.

17,237. **Jørgensen, H. V.** Aug. 5.



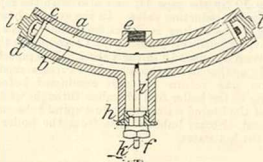
Heating buildings &c.—Relates to a method of increasing the circulation in hot-water plant by cooling the water in or near the top of the main rising tube. In the arrangement shown in Fig. 1, the cooled return water is conducted by the pipe 6 to the pipe 9, which is connected with the condensing-device 10 surrounding the expansion chamber 3. The boiler 1 is connected with the device 10 by the pipe 11, and also with the pipe 6 through a reduction valve. In the system shown in Fig. 2, the cooling is direct, as the main tube 2 is provided with the branch pipe 12 leading to the expansion chamber 13 in the tube 9. The pipe 12 ends in a tapered mouthpiece. In a further modification, the return water is conducted before passing to the boiler to a chamber through which part of the heated water passes in a spiral tube and is cooled. Steam bubbles pass from the boiler 1 with the hot water.

17,281. **Poole, W. J.** Aug. 6.



Steam traps.—Relates to inverted-bell float traps with valves arranged to grind on their seats in the manner described in Specifications Nos. 5938 and 11,801, A.D. 1901. The float A^1 , when it sinks owing to the overflow of water of condensation into it, opens a pilot valve A^2 , which admits water to the closed space above a piston B^2 attached to the main valve B^1 . The main valve is thus opened by fluid pressure. The piston, in its descent, uncovers a port D^2 through which the water above it escapes, until the valve A^2 is closed by the float rising again, after which the pressure in the apparatus lifts the main valve and closes it. Both valves are provided with helical vanes, so that they are rotated by the passage of water to them, and the rotation is continued by virtue of the inertia of the float and a flywheel D^1 , which are attached to the pilot and main valves, respectively, so as to rotate with them. The tubular spindle C^1 of the main valve is loosely attached to it, to allow the valve to seat itself readily.

17,464. **Slack, J. E., and Hutchinson, H.**
Aug. 8.

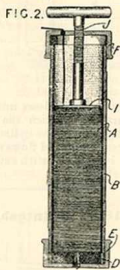


Steam traps.—The steam trap comprises a bow-shaped tube a of low expansion, a curved rod, tube,

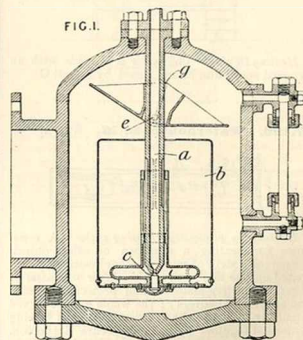
or plate b of higher expansion fixed rigidly at the ends by the caps c and nuts d to the tube a , and a discharge valve h attached to the rod b by a screwed spindle i . The outlet f is below the inlet e . The valve stem being extended and the part k without the trap, the valve may be adjusted from the outside of the trap. Plug; l provide steam-tight joints at the ends of the tube a . The trap may be used with the inlet and outlet ends reversed.

17,548. **Wisdom, G. P.** Aug. 11.

Heating by electricity.— An adjustable resistance, applicable as a heater, consists of a pile of thin slightly-bent elastic conducting-plates A , which can be pressed together to increase the surfaces of contact and thus diminish the total resistance. Somewhat irregular discs produced by stamping from sheet iron are suitable. They may be held between an insulator D and a plate I adjustable by a screw J in an enamelled tube B , closed by caps E, F ; the tube is perforated, or may be replaced by openwork, to allow circulation of air about the discs.



17,615. **Samson, R. D.** Aug. 11.



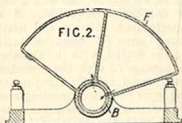
Steam traps.—The discharge pipe a is governed by a valve c carried by an open-topped float b

guided on the pipe *a*. A tipping-tank, divided into two compartments by a partition *g*, is pivoted at *e* below the inlet for the condensed steam. It is thus alternately discharged to the right and left. The sudden change of level thus produced in the trap prevents dribbling and leakage. In a modification, the tipping-tank is dispensed with, by enlarging the top of the casing and mounting the valve with a certain vertical play in a ring carried by the float.

17,638. Cockburn, J. Aug. 12. *Drawings to Specification.*

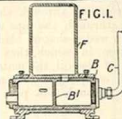
Hot-water bags and the like.—Water bottles and similar rubber goods are moulded into the shape which they assume when filled and in use. They may be moulded entire, or, as is preferable, the edges of the sheets of rubber-coated fabric are made to overlap and are cemented at their junctions, a thin coating of rubber being applied to the joint to impart a finish and to prevent opening-up on the inner side.

17,915. Ranoc, J. P. Aug. 14.



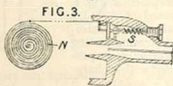
Steam traps.—

Relates to an automatic discharge valve for oil separators, for use particularly with steam separators for steam engines, and consisting of a divided rocking vessel *F* mounted on a fixed pivoted cylinder *B* with a transverse partition *B'*. Oil or oily water from the separator enters through the pipe *C* and passes through one or other of the ports into one or other of the divisions of the vessel *F*. When this division is filled sufficiently, it overbalances and reverses the apparatus, so that the other division fills, while the one just filled empties itself through ports on the other side of the partition *B'*.



18,032. Hawkins, E. C. Aug. 16.

Thermostats.—A coil of two metals *N* is attached to an adjusting spindle *S* by a metal which fuses at a maximum

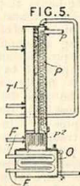


temperature. The coil is mounted in the furnace of a furnace gas engine, and controls the fuel supply directly or indirectly.

18,268. Abrams, H. H. Aug. 19.

Heating liquids

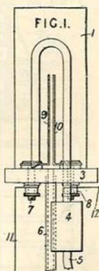
by waste heat given out in cooling air. Compressed air may be delivered through a pipe *E* to a cooling device shown in Fig. 5, where its heat may be imparted to feed-water &c. in the pipes *P*; thence it passes to another cooler, which reduces it to atmospheric temperature, and finally through the chamber *T'* to an engine.



18,420. Briggs, F. H. Aug. 21.

Heating liquids.—

Water or other liquid is heated in a glass vessel *1*, having an inlet pipe *6* and a siphon or other outlet pipe *5*, by an electric current passing through leads *11*, *12*, terminals *7*, *8*, plate or wire electrodes *9*, *10*, and a small thickness of the liquid. In heating water, a filter *4* may be arranged in the inlet or outlet pipe. The cylinder *1* is cemented water-tight to the base-plate *3* of porcelain or other non-conductor. In a modification, a float is used to bring the electrodes closer together as the level of the liquid rises in the vessel *1*.



18,487. Ragot, J., and Tourneur, H. Aug. 22.

Heating by steam circulation.—A viscous substance is mixed, and at the same time heated or cooled, by means of apparatus such as that shown in Figs. 1 and 3. The substance to be mixed is contained in a trough *1* within which rotates a tubular helix, or two tubular helices, mounted on a shaft or shafts *2*, the heating or cooling fluids circulating through the helix or