



PATENTS FOR INVENTIONS.

ABRIDGMENTS OF SPECIFICATIONS.

CLASS 64, HEATING,

[*Excepting* FURNACES AND KILNS; STOVES, RANGES,

AND FIREPLACES;

for which see Abridgment Classes 51, FURNACES &c.; 126, STOVES &c.]

PERIOD—A.D. 1897-1900.



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CHANCERY LANE, LONDON, W.C.

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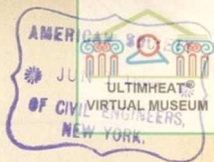
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EXPLANATORY NOTE.

The contents of this Abridgment Class may be seen from its Subject-matter Index. For further information as to the classification of the subject-matter of inventions, reference should be made to the *Abridgment-Class and Index Key*, published at the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C., price 1s., postage 6d.

It should be borne in mind that the abridgments are merely intended to serve as guides to the Specifications, which must themselves be consulted for the details of any particular invention. Printed Specifications, price 8d., may be purchased at the Patent Office, or ordered by post, no additional charge being made for postage.

SUBJECT-MATTER INDEX.

Abridgments are printed in the chronological order of the Specifications to which they refer, and this index quotes only the year and number of each Specification.

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ERRATA.

Pages 10 and 11. *Abridgment No. 5007* should be deleted.

Page 42. *Abridgment No. 24,680. For Frankeberg read Frankenberg.*

In the volume of this Class for the period A.D. 1893-96 :-

- Page iv. Under **Heating buildings and structures** delete '93. 3453.
" v. Under **Heating by electricity** add '93. 258.
" vi. Under apparatus combined with—insert water and other liquids and semi-liquids, raising and forcing apparatus for. '95. 9563.
Under by—air and gases; by—liquids; and for—heating air and other gases add '96. 28,588.
Under by—steam delete '95. 11,603 and add '95. 19,695.
" vii. Under for—heating buildings and structures add '96. 19,016.
" xi. Delete Horne, F. '93. 3453.
" 10. *Abridgment No. 2994* should be deleted.
" 12. *Abridgment No. 3453* should be deleted.

In the volume of this Class for the period A.D. 1889-92 :-

- Page iv. Under **Heating air and other gases** add '92. 17,304.
" v. Under boilers delete '92. 5589. 20,568.
" vi. Under by—liquids delete '92. 5589; and under for—water, purifying and softening delete '92. 20,568.
" vii. Under geysers delete '92. 20,568; under special vessels, in delete '92. 5589; under valves and cocks delete '92. 5589. 20,568; and under water supply delete '92. 5589.
" x. Delete Grove, D. '92. 20,568.
" xiii. Delete West, S. L. '92. 5589.
" 124. *Abridgment No. 5589* should be deleted.
" 158. *Abridgment No. 20,568* should be deleted.

In the volume of this Class for the period A.D. 1884-88 :-

- Page iv. Under **Heating air and other gases** add '85. 6971 and for '85. 13,446 read '85. 13,466.
" vi. Under for—hot-water supply add '84. 13,952. '85. 4834.

In the volume of this Class for the period A.D. 1877-83 :-

- Page iv. Under **Footwarmers, Carriage and like** delete '83. 2094.
Under Heating buildings and structures add '82. 1920.
" ix. Under Haddan, H. J. delete '83. 2094.
" x. Delete Norden, P. '83. 2094.
" 122. *Abridgment No. 2094* should be deleted.

HEATING.

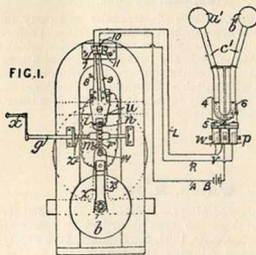
Excepting FURNACES AND KILNS; and STOVES, RANGES, AND FIREPLACES;

for which see Abridgment Classes FURNACES &c.; STOVES &c.

Patents have been granted in all cases, unless otherwise stated. Drawings accompany the Specification where the abridgment is illustrated and also where the words *Drawings to Specification* follow the date.

A.D. 1897.

660. Roth, E. Jan. 9.



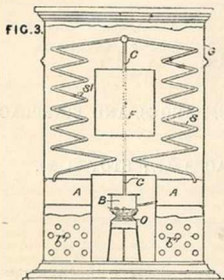
Thermostats.—Relates to a thermostat for controlling the raising and lowering of blinds, curtains, &c. Two air chambers a^1 , b^1 , one of which is painted black or filled with cotton wool or other material to make it a better absorber than the other, are connected by a U-tube c^1 containing mercury. Into this are passed three contacts 4, 5, 6, connected to binding-screws w , v , p which are

connected by wires L, R, A to terminals 7, 10, 11. Over these terminals moves a pivoted forked switch 8, 9, u . A battery B is placed in the wire A. The arms 8, 9 are connected to the commutator brushes Z, Z'. The armature b of a magneto machine is geared to a spindle W on which the blind &c. roller is fixed. A worm on the spindle W gears with a pinion r loose on the shaft g on which is fixed a disc pressed by a spring Z' against the pinion r . Projections m , n shift the fork 8, 9 when the shaft g is rotated. Starting from the position shown, if the air in b^1 expands under the action of the sun, contact is made at 4 and broken at 6, and the current flows and the armature rotates till the fork 8, 9 is shifted to 10, 11, when the battery circuit is broken. When the air in b^1 contracts, contact is made at 6 and broken at 4, and the current flows and the armature rotates in the opposite direction till the fork of 9 is shifted back to 7, 10, when the battery circuit is again broken. The shaft g may be turned by the handle x .

668. Poltavtseff, W. Jan. 9.

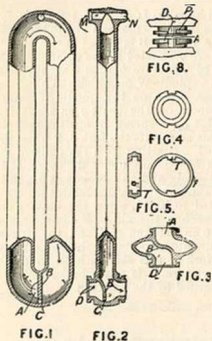
Heating buildings.—An arrangement of apparatus for heating buildings is shown in elevation in Fig. 3, and consists of a reservoir A from which water or other liquid flows to a boiler B, heated by a stove

or fireplace O. The vapour given off passes by a pipe *c* into coils *r, s*, and is condensed by liquid circulating in the casing G, the latter liquid in turn heating the room or compartment. To promote



the efficiency of the apparatus, a chamber F is formed at the back of the apparatus communicating with the room, so that air can circulate therein and afterwards escape by orifices *r*.

820. Jackson, J. T., Jackson, S., Keyes, J. A., and Travers, F. J. Jan. 12.



Heating buildings, radiators for. Relates to methods of constructing radiators so that the heating-fluid may circulate freely, the accumulated air

may be readily drawn off, and the sections may be easily assembled and taken apart. The heating-fluid enters at the base of each section by an inlet A, and is prevented from passing along the bottom of the loops by an S-shaped diaphragm plate B, which thus causes a circulation round the section before the heating-fluid escapes by the outlet D. The diaphragm plate is perforated at C, thereby allowing any condensation water to be collected, while a channel M, N, connecting the upper ends of the sections, also allows air to be drawn off. The sections are connected by clamp nuts T, which pass over the notched spirals P on the sections and draw them together, and, in a modified arrangement, the sections are connected by a right and left handed screw nut.

966. Leatham, S., and Simon, H. Jan. 13.

Heating air.—In flour-milling machinery, coils of hot-water, steam, or other heating-pipes, or electrical or other devices for heating air, are arranged within the casings so as to maintain a temperature which will take up moisture from the material under treatment. When metal casings are employed, jackets may be formed in them for circulation of the heating-agent. The moist air is constantly removed by means of a fan. The exterior surfaces of the casings may be covered with non-conducting material. A disclaiming reference is made to Specification No. 21,859, A.D. 1896, in which means are described for supplying flour-milling machinery with a regulated supply of heated and dry air.

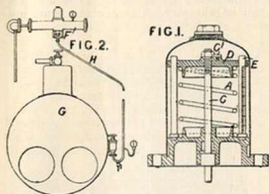
1023. Tiemann, F. Jan. 14.

Heating, methods of.—Granular and pasty materials are dried or heated in containers, preferably of globular or egg shape without angles, which are placed in an ordinary furnace or kiln, or otherwise heated. The containers are made in one or more pieces with suitable perforations. Powdered material is preferably formed in a paste before insertion into the containers.

1214. Wilson, H. M. Jan. 16.

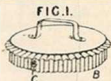
Heating buildings.—Relates to improvements in apparatus of the type described in Specification No. 20,550, A.D. 1894, for regulating the supply of steam and allowing the condensation water to escape. The present invention consists of means for balancing the float A by a spring A above, bearing against a collar D of the float spindle C. This spring is adjusted by a nut C' and scale E. To provide for the automatic return of condensed steam to the boiler, the regulator F, Fig. 2, is mounted at such a height above the boiler G as to give sufficient head for the feed-pipe H, together

with the pressure of steam at the regulator inlet, to force the condensed steam back into the boiler.

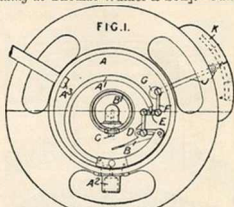


1420. Rydill, G. Jan. 19.

Boiling pans.—The lids and covers of coppers and other vessels are made with corrugations, flutings, or projections on the rim and flange, leaving spaces for the steam or vapour to escape and preventing boiling over. A pair or rivet C fixed in the rim B takes under the edge of the vessel to retain the lid in place.



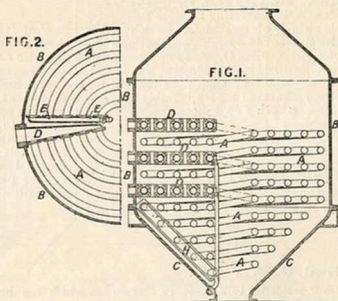
1814. Walker, T. F., and Walker, T. S.,
[trading as Thomas Walker & Son]. Jan. 23.



Thermostats.—The temperature of a vulcanizer having a boiler heated by a gas burner B' is regulated by a Bourdon tube A', connected at A' with the steam space, and operating a gas valve B, C, as shown in plan. The tube A' is placed in a box A surrounding the lower part of the burner. Gas enters this box at A², and is admitted at C to the burner, unless this opening is closed by a valve-lever B, connected to the free end of the pressure tube by a link D and lever E. These parts are adjustable, to vary the temperature, by a link F and a pin eccentric on a shaft G, which may be turned in a stuffing-box by an arm J, movable over a scale K, outside the box A. Or the link D may be adjusted along the slotted valve lever B. The lever B may carry a spring-supported valve.

2027. McOnie, W. Jan. 26.

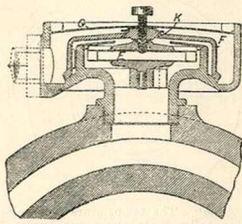
Heating by steam circulation.—In vacuum pans and other apparatus heated by steam coils, the coils A, as shown in Figs. 1 and 2, are arranged concentrically, and each is independently connected with a steam supply chest D and with a drainage chamber E, but these two chambers may be made in one casting instead of being separate, as shown. In the cylindrical part B of the vessel each tier of coils is entirely separate from the other tiers, but in the conical part C the central coil extends throughout the height of this part and opens into the lowest part of the drainage box H. The adjacent coil has one convolution less, and opens into the drainage box H just above where the central coil enters, and so on with the other coils.



2095. Holt, H. P. Jan. 26.

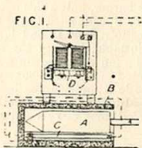
Thermostats.—The invention is described in connection with the circulation of water through the cylinder jacket of an internal-combustion engine. The valve F is opened and closed by the expansion and contraction caused by variations in temperature of a liquid contained in a vessel E

around which the water flows. The valve is returned to its seat by a spring G. The bye-passes are marked K.



2125. Edmunds, H. Jan. 26.

Heating by electricity; thermostats.—In order to save energy, electrically-heated apparatus is enclosed with a thermostat in an asbestos or other non-conducting covering, and the thermostat is connected with a switch to cut-off or supply current as the temperature increases or diminishes. Fig. 1 shows an electrically-heated soldering-iron A, in a covering B. The thermostat is a flexible strip C of two metals, which makes contact with either of two screws, and thus operates an electromagnetic switch D, which may be of the construction described in Specification No. 17,643, A.D. 1892, to cut-off or supply current to the soldering-iron. The invention is applicable to ovens, laundry irons, and other appliances.



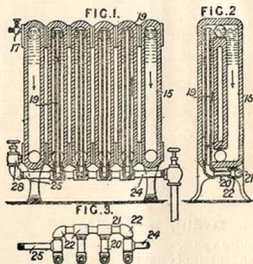
2321. Clark, A. M., [Bason, F.]. Jan. 28.

Heating buildings.—Radiators for a group of sections 15 connected in any usual manner are

2445. Zeal, G. H. Jan. 29.

Thermostats.—Relates to a mercury thermostat which can be set to close an electric circuit at any required temperature, in order to actuate a fire-alarm or temperature regulator. The tube from the mercury bulb *b* is divided into two branches *a* and *a'*, into one of which one terminal *c* of the electric circuit is introduced, the other terminal *c'* of the circuit being introduced into the bulb *b*. The board *d* on which the thermostat is mounted turns on a pivot *d'*. By setting this board at the required angle by means of a scale *d''* and pointer *e'*, the mercury can be caused to make contact with at any required temperature.

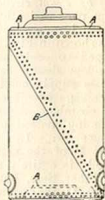
furnished with vertical steam heating-pipes 19, which traverse one leg of each section and are connected below by T-pieces 20, 21, 22 to the main steam supply pipe 24, 25. The outlet valve 28 can be adjusted so that steam entering the



radiator may condense and partly or wholly fill the radiator, or the valve may be fully opened to drain away all condensation water. An air valve 17 is provided, and the invention is stated to be applicable to existing radiators.

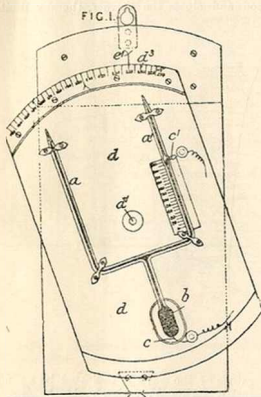
2354. Elwell, G. Jan. 29.

Heating water.—A hot water cylinder for use in bath-rooms, hot-houses, and the like is formed with fluted or corrugated ends A to increase its strength, and has a double riveted diagonal seam B for the purpose of strengthening it.



(For Drawing see next page.)

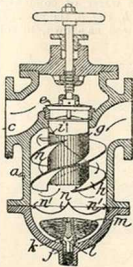
2445.



2458. **Pertwee, H. A.** Jan 29.

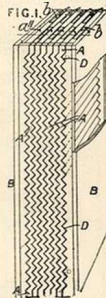
Steam traps.—

The casing *a* of a stop valve is elongated for the reception of a steam separator and a suitable steam trap. That shown consists of a discharge nozzle *f* having a cap *k*, which normally closes the openings *l*. When the level of the water in the trap rises, it lifts the float *m* attached to the cap *k* and thereby opens the passages *j*. When the water is discharged, the float falls and the passages are again closed. The plate *n* is bolted in the joint at the lower part of the casing *a*.



2513. **Braithwaite, I., and O'Brien, E.** Jan. 30.

Heating air.—Fig. 1 shows an apparatus for heating a current of fresh air, for drying or ventilating purposes, by means of a hot current of waste or exhaust air or vapour from drying-rooms for linen and other textile goods or clothing, from dye-houses, wash-houses, &c. A number of chambers are built up of frames *A* separated by corrugated metal sheets *D*, and having side pieces *B* and end pieces *a*¹¹. In the said end pieces there are openings *b*, through which the air passes. The exhaust air passes along one set of compartments, and the fresh air in the same or opposite direction through another set of compartments. The air may be drawn or forced in either direction by a fan.



2636. **Okes, J. C. R., and Stubbs, A.** Feb. 1.

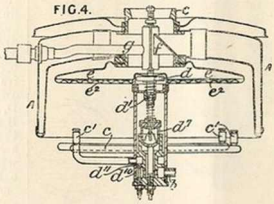
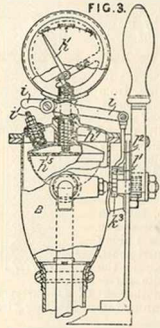


Steam traps.—Relates to traps in which the expansion and contraction of metals is employed, and is of the type described in Specification No. 11,110, A.D. 1896. A tube *B*, rigidly supported at one end *N*, carries a valve box *C* at the other, and is in operative connection with a valve *D* through the system of levers *G*, *H*. When steam fills the pipe, the latter expands and pushes the valve to meet its advancing seat and so close the outlet; but if water fills the pipe, the valve falls back and the condensed water escapes.

2755. **Lamplough, F.** Feb. 2.

Heating water.—An apparatus for supplying hot water to lavatories, restaurants, and the like is shown in sectional elevation in Figs. 3 and 4, in which *A* is a boiler, *B* a container, and *C* the connecting-tube. The gas supply for the burners *c* enters by a tube *b*, and passes up through a perforated cup valve *d*¹⁰ into a cylinder *d*¹⁰ connected to

the main burner tubes *c*. The position of the valve *d'* is controlled by an expansible capsule *d*, which expands and cuts off the gas supply when a certain maximum temperature is reached, the burners being then kept alight by gas supplied through the bye-pass *d''*. Water is supplied to the boiler by a pipe *g* feeding into a chamber *e* past a reducing-valve *f*, and, should the water pressure in the apparatus be too high, the corrugated plate *e'* is depressed and closes the valve *f*, thereby limiting



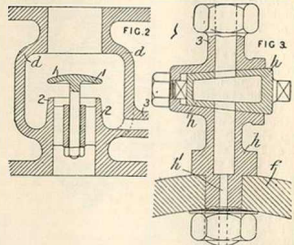
the amount of water passing into the boiler. The temperature of the water is indicated by an index finger *h*, Fig. 3, operated from a flexible diaphragm *h'* against a spring *h''*, and, should the pressure become excessive, the finger of a pivoted lever *i* is depressed and opens a valve *j* for the escape of steam. A pawl *l*, operated from the lever *i* by a link *P*, prevents a ratchet-wheel *k* upon the outlet-valve spindle from being rotated until the water is sufficiently hot.

2767. Thompson, W. P., [Durant, E. G.]
Feb. 2.

Heating buildings.—The walls are constructed of hollow blocks formed with perforations *a*, which register with one another to allow for the circulation of air for the purpose of heating or ventilation.



of the water of condensation is controlled by a valve *h*, Fig. 3, the passage *h'* to the boiler *f* being narrowed, as shown, to retain a head of water in



2852. Barker, W. B. Feb. 3.

Steam traps.—Relates to means for preventing water of condensation from interfering with the proper and instantaneous sounding of ships' steam signal whistles, sirens, &c. For this purpose a steam trap *d*, Fig. 2, having a non-return valve 1, is provided in the steam pipe leading to the whistle, or other sound emitter, the water condensed in the pipe being collected in the chamber *d* and conveyed back through a pipe 3 to the boiler. The return

the valve chamber and prevent the escape of steam through the valve when opened. Two modified forms of steam trap are described, from each of which the valve 1 is omitted.

2900. Hirzel, H. Feb. 3.

Heating liquids.—A column is divided into a number of superposed sections A provided with pipes D, either communicating with one another or separate for each section, through which hot liquids or steam may be passed. The column may be used for heating and other purposes.

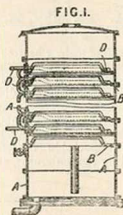
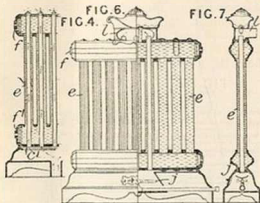


FIG. 3.


2943. Bennett, J. F., and Moorwood, H. S. Feb. 4.


Heating buildings; heating water.—Radiators are constructed of the form shown in Fig. 4, in which ornamental metal tubes *e* are secured in the upper and lower castings by a tube expander, and there are smaller concentric tubes *c*¹ passing right through both castings *f*, *f*¹, so that the air of a room or apartment can circulate therein and become heated. In a modified arrangement, a radiator *e*, Figs. 6 and 7, is provided with a gas burner *j*, and the products of combustion from this are led away by a flue *l*. Both forms of radiator may be used for heating and ventilating buildings, and hot water may be drawn off therefrom.

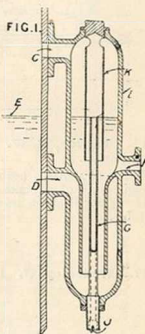
3031. Bardach, J., and Stern, R. von. Feb. 4.

Non-conducting coverings.—A thick layer of straw, sea grass, pampas grass, or the like is covered

on one or both sides with jute, and the composite sheet is sewn and pressed. The seams are preferably at right-angles to the direction of the fibre of the stalks. The outer coverings may be of other material than jute.

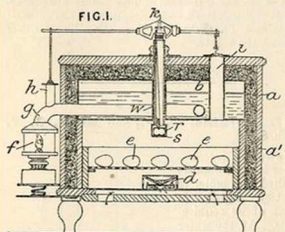
3267. Perkins, L. P., and Buck, G. F. Feb. 8.

Heating water.—Water is continuously supplied to a boiler in quantity slightly in excess of its requirements. At the water level is provided an overflow pipe through which the excess passes back to the hot-well or feed-tank under the control of a steam trap which, should the water level fall, prevents the escape of steam. To prevent the loss of hot water, the feed-water is, preferably, supplied to a vessel B connected at C and D to the boiler above and below the working level E. The connection D is trapped in the manner shown from the feed-inlet F. G is the overflow pipe, shielded above by a pipe K, and connected at J to a steam trap. When the feedwater is supplied direct to the boiler, the feed-pipe is placed near to, or within or around the overflow pipe, so as to utilize the heat of the escaping water.


3341. Jensen, P., [Sartorius, E.] Feb. 8.

Thermostats.—The invention is shown applied to an incubator, and consists of a lined casing *a*, *a*¹ fitted with a drawer *e* for the eggs, an air moistener *d*, and a boiler *b* heated by a lamp *f* connected to a heated flue *g*. The hot-air outlets *h*, *i* from the flue *e* and incubator chamber respectively are controlled by a lever *k* pivoted upon a rod *w* upon a compound metal spring *r*, which latter bears against the base of an adjustable tube *s*. When the temperature rises above the normal, the spring expands and raises the fulcrum bearing of the lever *k*, thereby tilting this latter and allowing the hot gases to escape from the flue *g* and incubator chamber, while a diminution of temperature closes the outlets.

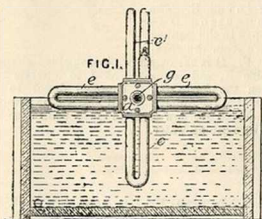
(For Drawing see next page.)



3411. Taylor, B. W. Feb. 9. Drawings to Specification.

Heating air.—Air is heated on passing over or through tubes of a boiler feedwater heater and purifier, exhaust steam travelling through or over the tubes.

3627. Whiteley, J. Feb. 11.



Heating liquids.—Relates to a rotary apparatus for heating liquids, and is an improvement in apparatus described in Specification No. 19,383, A.D. 1894. In the present arrangement, the apparatus consists of a number of U-tubes e, e' secured in sections a , and provided with ports or passages so that the liquids or gases may enter by the pipe f , and after traversing all the U-tubes emerge at the outlet g . For superheating steam, the apparatus is placed in the chimney flue of a furnace, and the water or steam flows through the pipes, which are provided with scrapers consisting of loose chains encircling the pipes.

3735. Winterflood, J. Feb. 11.

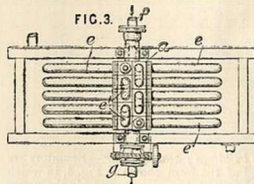
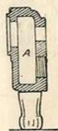
Heating water.—An annular casing A with a water inlet M is connected by pipes D and E to an inner boiler F provided with an outlet H . The hot gases from a burner K circulate in the spiral

3481. Murphy, H. A. Feb. 9. Drawings to Specification.

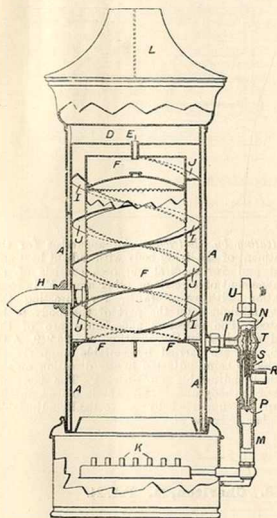
Heating water; heating buildings; footwarmers.—A perforated casing with sliding end doors holds a shallow tray provided with suitable receptacles for holding food, plates, dishes, &c. The heating is effected by a prepared carbon block which occupies one of the compartments, and various modifications of the apparatus may be used for heating water and as portable heaters for railway carriages, buildings, greenhouses, and the like.

3578. Russell, B. Feb. 10

Heating buildings, radiators for. The end supporting-feet of radiators are formed with a waterway A there-through, so that, when bolted or otherwise secured to the last section, the inlet or outlet connections can be attached to the foot. With this arrangement special end loops or sections are avoided.



passages I, J between the boiler and annular casing, thereby heating the water contained therein before escaping to the chimney L, which has a partition



to prevent the gas flame from flickering. A deflector V spreads the water flowing into the inner boiler F. The gas valve P and water valve N are on the same spindle, and are normally closed by a spring S opposing the water pressure in the pipe U. An india-rubber tube T prevents leakage of water into the gas pipe M.

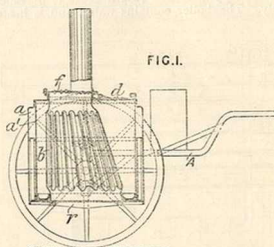
3955. Barker, R. W., [Hot Appliances Co.]
Feb. 13. *Drawings to Specification.*

Hot-water bottles and similar heating apparatus.—Hot water is circulated through a coil of flexible tubing secured to a flexible sheet, which can be applied to the person of the patient.

4050. Grove, D. Feb. 15.

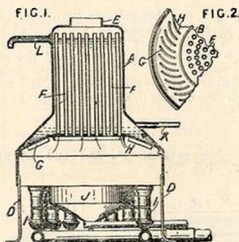
Boiling-pans.—A boiler *a*, mounted on a two-wheeled frame A, is fitted with an internal

heating-space *b*. Access to the boiler is obtained through the lid *d*, and fuel &c. is supplied to the



grate *r* through the lid *f*. The boiler is jacketed at *a* to prevent escape of heat.

4137. Fletcher, T., and Fletcher, Russell, & Co. Feb. 16.

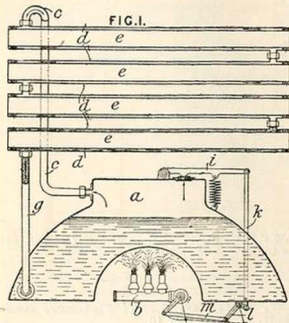


Heating water.—A cylindro-conical casing A supported on standards D forms the water container, and a series of vertical tubes F convey the products of combustion from the gas burners I to the outlet flue E, thereby heating the water which flows continuously into the casing A by a pipe K and escapes by a pipe L. The condensation water from the gas burners collects upon a rib H and drops into a funnel J provided with an escape pipe, and ribs G are formed upon the dish tube-plate to promote the heating efficiency.

4318. Kaczowski, S. de. Feb. 17.

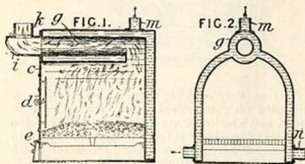
Heating buildings.—A portable apparatus for heating buildings is shown in sectional elevation

in Fig. 1, and consists of a boiler *a* connected to the annular spaces between the system of steam pipes *d, e* by flow and return pipes *c, g* respectively. The boiler contains water, and is heated



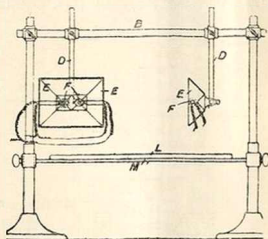
by a gas, oil, or other suitable burner *b*, and the supply cock is controlled by a system of levers *m, l, k, i* worked from the spring-loaded safety-valve, so that when steam blows off the supply cock is partly closed. The air of the room or apartment is heated by circulating in and around the open-ended tubes *d, e* through which the steam circulates.

4611. **Bramham, F. B., and Crippin, A. J.** Feb. 20.



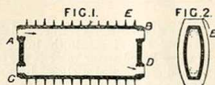
Heating water, saddle boilers for. Fig. 1 shows a longitudinal section, and Fig. 2 a cross-section of the boiler, having an unjacketed front end *c* provided with a firing-door *d* and ash door *e*. The saddle and rear end of the boiler are jacketed, and the hot products of combustion from the fire-grate escape by a jacketed flue *g* furnished with a soot door *i* and socket *k* for the uptake. The inlet pipes of the heating-system are connected to the sockets *n*, and the outlet to the socket *m*.

4786. **Dowsing, H. J.** Feb. 23.



Heating by electricity.—An apparatus for the treatment of the living body with radiant heat and light and for medical purposes consists of an arrangement of electric or other lamps *F*, in combination with reflectors *E*, for directing the heat and light upon the part of the body to be treated. The reflectors and lamps are of the kind described in Specification No. 26,249, A.D. 1896, and are carried by suitable supports *D*, capable of being adjusted in any direction on the vertically-adjustable cross-bar *B*. The body or part of the body under treatment is placed on the board *L* supported by a vertically-adjustable cross-bar or frame *M*.

4953. **Charlton, R.** Feb. 24.

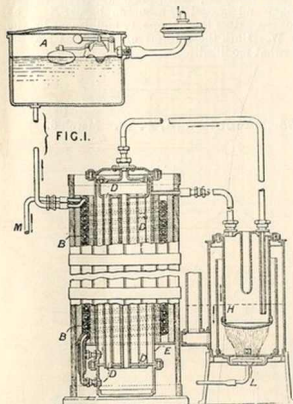


Heating buildings.—A box-shaped casing or radiator is furnished with external ribs or gills *E*, and has three or more apertures *A, B, C, D*, to one of which is connected the steam inlet pipe and to another the outlet pipe, the remaining openings being blocked up. The radiator is especially applicable for heating rooms and compartments on board ship. Slightly-modified arrangements are described.

5007. **Maiche, L.** Feb. 24.

Heating water.—Apparatus for sterilizing water, in which the water is first heated, and then cooled to a sufficiently low temperature for drinking. The water, fed from a tank *A*, passes through the

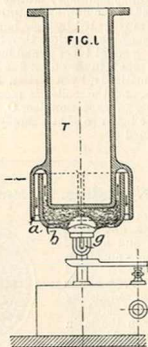
inner of two concentric coils B, enclosed in non-conducting material, and thence through a series of vertical pipes D, contained in a casing E, to a



vessel H heated by a burner L. From the heating-vessel it passes back through the casing E and the outer of the two concentric pipes B, in which it is cooled by the incoming water, and from which it issues by the pipe M, at a suitable temperature for drinking.

5020. Kirsten, P. Feb. 24.

Heating water.—A boiler T for heating water for baths and for like purposes is provided near the bottom with a bell-shaped extension a and an intermediate ring b. The flame from the burner g passes in and out between the parts, and its heat is thoroughly absorbed.

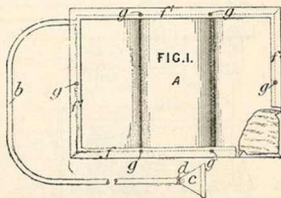


5147. Rolfe, S., and Hornby, F. Feb. 25.

Drawings to Specification.

Thermostats.—A flexible chamber filled with oil, glycerine, or fusible metal in contact with the cylinder of a gas engine controls the supply of combustible thereto.

5307. Stewart, E. J. Feb. 27.

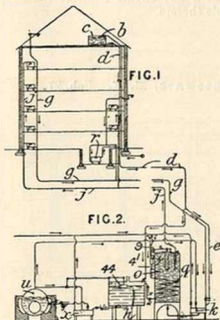


Hot-water bottles and similar heating-apparatus.—An apparatus for holding a poultice and maintaining and regulating its heat consists of a hot-water vessel A made of rubber, vulcanized rubber fabric, of the like, provided with a tube or tubes b, each terminating in a funnel c and fitted with a valve d, to facilitate the introduction and withdrawal or circulation of the heating-fluid. For the purpose or retaining the poultice, the vessel is formed with a turned-over rim or flange f^1 having eyelets g through which tapes or strings are passed. Internal partitions may be provided to prevent deformation of the vessel and secure a more even distribution of its contents.

5892. Court, S. à, and Binny, W. M. March 5.

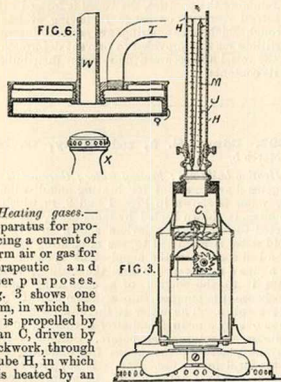
Heating buildings; heating water; thermostats.—A general arrangement for heating and distributing water is shown in Figs. 1 and 2, in which a building is shown heated by radiators r, and connected to the heating-devices shown in Fig. 2. Cold water is admitted to the circulating system by a ball cock b in the supply tank c, and is led by a pipe d and branch e into the main g, which leads it to the suction of a circulating pump k, whence it is pumped into a tank o heated by a sleeve coil q. The water is thereby heated, and flows out by a main j, and after circulating in the radiators is returned as before. Suitable valves may be placed in the mains for obtaining hot water for domestic use. Steam is supplied to the heating-coil by a boiler u, and the supply is controlled by a thermostatic capsule u^1 filled with

mercury and immersed in the hot-water supply tank. The capsule operates the valve of a steam cylinder 9, and the steam is controlled thereby. The condensed water from the coil escapes into



a feed-tank *h*, and is forced back into the boiler by a pump *z*. A float *44* in the tank *h* determines the steam supply to the feed-pump, and so controls its working.

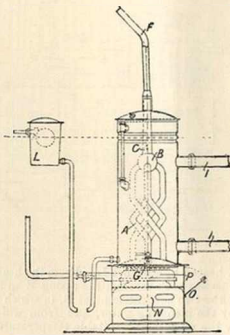
5928. Taylor, W. March 6.



Heating gases.—Apparatus for producing a current of warm air or gas for therapeutic and other purposes. Fig. 3 shows one form, in which the air is propelled by a fan C, driven by clockwork, through a tube H, in which it is heated by an electric current passing through a

coil of wire M wound on an inner concentric tube J. Fig. 6 shows another form, consisting of a shallow vessel R, fitted with a perforated diaphragm and heated by a bunsen burner X. The air or gas enters by the pipe T, and leaves by the pipe W. Both these forms of apparatus may be somewhat modified.

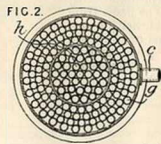
5965. McCullough, F. W. March 6.



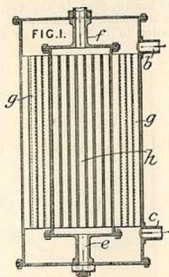
Heating buildings; heating water.—A boiler connected to the flow and return pipes *l* of a heating-system is heated by a gas burner *P*, and the products of combustion therefrom circulate in the zig-zag spiral tubes *A* and bulb *B*, finally escaping by a pipe *C* to the outlet flue *F*. Water is supplied automatically by a cistern *L* fitted with a ball valve, and the boiler is mounted upon a stand *N* having an inspection door *O*, while a tap *G* is fitted to the boiler so that a supply of hot water can be obtained.

6157. Maiche, L. March 9.

Heating water; heating air.—The tubes and flues of heating-apparatus are filled with small tubes or conduits of good conducting metal clustered together in the main conduit and bearing against the walls

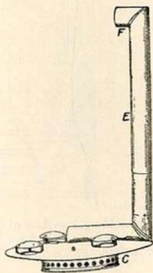


thereof and one another. The small conduits may be strips of metal bent without seaming or otherwise joining their edges. As an example, Figs. 1 and 2 show a sectional elevation and plan, respectively, of a heating-apparatus in which the active fluid enters by an inlet *b* and circulates in the closely-packed tubes *g* before escaping by an outlet *c*, thereby heating the fluid, entering by an inlet *e*, circulating in the tubes *h*, and escaping by an outlet *f*.



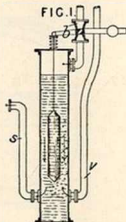
6371. Hearne, G. March 11.

Boiling-pans.—Relates to a spraying-appliance to be placed inside a copper or boiler for use in washing clothes. A piece of soap is placed inside the perforated box *C*. The water passes through the openings in the box *C*, rises up the pipe *E*, and is discharged at *F* upon the clothes beneath.



6511. Dervaux, A. March 12.

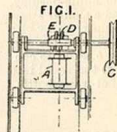
Heating water.—When water is purified by boiling by steam in open vessels, the cold water is supplied at the upper end of the vessel and is drawn off at the lower, while the steam is supplied to the lower end of the vessel. As shown in Fig. 1, the water is supplied by a pipe through a valve *b* controlled by an areometer, while it is drawn off by



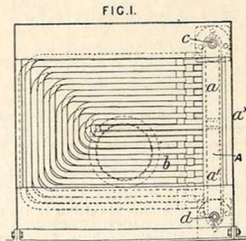
a pipe *S*, which maintains a constant weight of water in the heater. Steam is supplied by the pipe *V*. If desired, the steam supply may be controlled by the areometer, or a float may be used to control either the steam or water supply.

6528. Williamson, E., and Hammerton, C., [trading as W. Williamson & Co.]. March 12.

Boiling-pans.—Relates to laundry apparatus for use in the transference of clothes from the boiling-tank to the saddling or rinsing trough. The innercage of the boiling-apparatus is lifted and carried by an overhead carrier, Fig. 1, which is provided with a winding-drum *A* driven by the worm *D* and worm-wheel *E* from the chain-wheel *C*. The boiling-cage is provided with a bottom consisting of one or more hinged doors which are opened by the weight of the clothes when the securing-catches are freed, and are closed by counterbalancing weights when the clothes have fallen out.



6626. Bradford, W. L. March 13.



Heating by steam circulation; heating air.—An arrangement for preventing water of condensation from choking the pipes of a steam heating-apparatus is shown in Fig. 1. It consists of a vertical steam chest *A*, having a steam inlet *c* at the top and an outlet *d* for condensed water below; the steam chest is divided by a mid-feather *a^x* into two parts *a*, *a'*, connected by the steam heating-coils *b*; the flow of steam prevents the lodgment of water in the pipes.

6816. **Muxworthy, G.**
March 16.

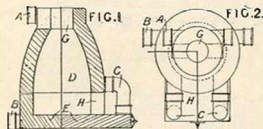
Hot-water bottles.
—A rubber, metal, or other reservoir A for an enema of the fountain type is provided with a screw stopper *e* at the filling-opening, and a similar screw stopper may be applied to the outlet *b* so as to convert the vessel into a hot-water bottle.



7159. **Reed, T. A.** March 19.

Non-conducting coverings for hot surfaces are made by stitching or quilting together sheets of felt or asbestos fibre with sheets of paper placed between to prevent hot air from passing through the covering.

7194. **Broers, H.** March 19.

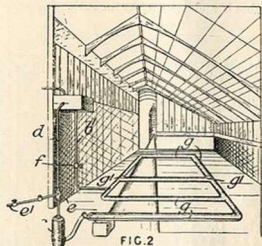
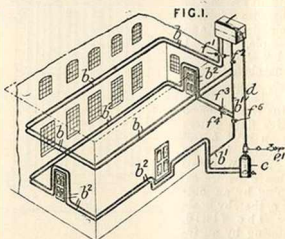


Heating water, boilers for. A sectional elevation of the apparatus on the broken line *a, c, b* of the plan, Fig. 2, is shown in Fig. 1. The boiler is in two separate parts D, E connected by pipes C, and is of an annular type and fired internally through the central opening G, while the ashes are removed through an opening H. The hot water flows out by the pipes A, and after circulating in the pipe system returns by the inlets B. The boiler is built in brickwork, so that the products of combustion from the firegrate may freely circulate around the outer shell before escaping to the outlet flue.

7321. **Allman, W., and Cope, J. T.**
March 20.

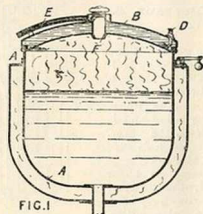
Heating buildings.—An arrangement for heating a building by hot water is shown in Fig. 1, in which there are two separate systems of piping *b, b²* connected to the main *b¹*. The upper supply tank *a* is connected to a cylinder *c* below by a pipe *d*, and in the latter there is a suitable injector supplied with steam from a pipe *e¹* and causing an upward circulation of heated water which may be diverted into

the heating-pipes by the valves *f¹, f², f³, f⁴, f⁵*. In a modified arrangement, Fig. 2, where it is desired to moisten the air of a conservatory or



other building, a system of open pipes *g, g¹* is added in which warm water from the injector is allowed to circulate.

7443. **Henderson, J. F.** March 23.



Boiling-pans A, especially those for extracting aromatic substances such as hops, are provided with

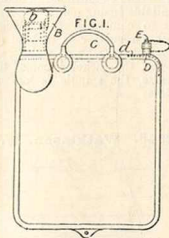
a hollow lid B through which a stream of cold water flows to condense the vapours produced and thereby prevent loss of the aromatic substances. The water enters at D in a tangential direction, and flows away at E. The central orifice F serves for supplying liquor to the pan.

7679. Hastie, J. C. March 24. *Drawings to Specification.*

Non-conducting coverings.—A layer of slagwool is lined on its inner side by sheets of paper and covered externally by a thick layer of felt protected by wire gauze, and the whole is roughly sewn together by string or wire. The layer of felt is of somewhat greater width than the rest of the materials, so that when wrapped round a pipe the edges of the sheet overlap.

8090. Martin, M. B. March 29.

Hot-water bottles.
—An india-rubber hot-water bottle is furnished with the usual filling-nozzle B closed by a cap b; and a separate air outlet D provided with a screw cap E. The nozzle D is fixed to the thickened edges of the bag by wing-pieces d and the handle C is placed centrally with the nozzles on either side.



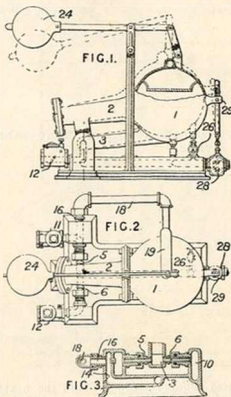
8134. Wildman, A., Wildman, H., and Wildman, W. March 30. *Drawings to Specification.*

Non-conducting coverings for steam boilers are made up of asbestos laid on wire netting which is secured to blocks on the boiler to be protected.

8193. Munro, J. March 30.

Non-conducting coverings.—Means are described for preserving frozen or other meat, fish, fruit, or the like in vans, trucks, barges, or other vehicles or vessels, and in safes and store-rooms. A damp-proof paper or cloth lining is first fitted, to which strips of wood are secured. Peat bricks or other non heat-conducting articles are secured to these strips so as to leave an air space between them and the lining. Another layer of damp-proof paper or the like is now tacked or otherwise secured to the bricks, and the whole may be finished with a canvas or wood lining, which may be painted.

8225. Waggoner, E. P. Sept. 17, A.D. 1896, [date claimed under Sec. 103 of Patents &c. Act, A.D. 1883].



Steam traps.—Relates to steam traps which return the water of condensation back to the boiler. A trap is shown in elevation in Fig. 1, and in plan in Fig. 2, while a cross-section of the trunnions is shown in Fig. 3. A receiving-chamber 1, with extension pipes 2, 3, is pivoted to hollow trunnions 5, 6, and, when sufficient water has flowed past the inlet valve 11 into the chamber, this drops by its own weight and pushes down a valve 28 to allow steam to pass by the compartment 14, the trunnion 16, and pipes 18, 19 into the upper portion of the bulb, thereby forcing the water, through the trunnion 6, chamber 10, and valve 12, back into the boiler again. As the receiver chamber lightens, it rises under the action of a pivoted weight 24, and an arm 29 closes the steam valve. As soon as the supply of live steam is shut off, the steam imprisoned in the trap opens an exhaust valve 26 and allows any returning water to enter the receiving-chamber, the action now commencing anew.

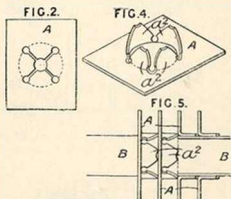
8482. Tattersall, W. April 2.

Heating liquids; heating gases; heating buildings.
—Relates to elements or sections for heating air, water, and other fluids, also applicable for heating or cooling buildings and the like. Each element is formed with its radiating-surface oblique to the line of connection, Fig. 3, thus presenting a large heating or cooling surface, and in a modified arrangement, Fig. 6, the elements have a double

obliquity, with their edges abutting to form channels for the circulation of the fluid under treatment.

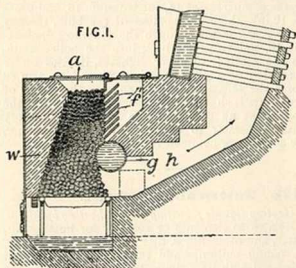


8496. **Grouvelle, J., and Arquembourg, H.** April 2.



Heating buildings.—To increase the heat-radiating qualities of pipes, they are provided with a number of plates *A* fixed on them, as shown in Fig. 5. Each plate is first cut out as shown in Fig. 2, the portions *a*² being bent up as shown in Fig. 4. They are then placed on the pipe *B*, which is expanded by fluid pressure or other means so that they are fixed in position.

8678. **Pampus, A.** April 5.



Heating water.—Slow-combustion stoves or furnaces are constructed as shown in Fig. 1. Fuel

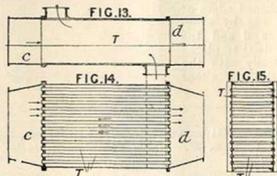
is fed through the orifice *a*. Air is supplied through side channels *f*¹ as well as beneath the grate. The firebrick wall *w* may be stepped, as shown, to allow of the more ready passage and circulation of air. A water-cooled tube *g* projecting into the fuel prevents the direct passage of air entering at *f*¹ to the flue *h*. The tube may serve as a feedwater heater or be connected direct to the boiler. The grate bottom is preferably arranged to slide vertically in guides, so that it can be lowered for cleaning or other purposes.

8844. **Helliwell, R. B.** April 7.

Boiling-pans; thermostats.—Means are described for preventing overheating. The pan is surrounded by a jacket containing a substance with a higher boiling point than the contents of the pan. Within the jacket is disposed a tube with a closed bottom, and containing a spindle *c* embedded in an alloy of suitable fusing point. This spindle is so connected to a damper or other regulator as to hold it open against a spring or weight, so that, when the jacket becomes too hot and the alloy melts, the spindle is loosened and the damper closes.



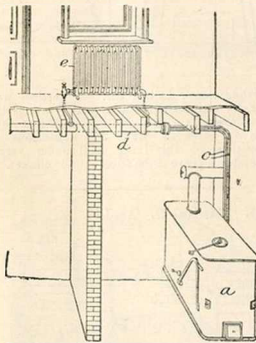
8845. **Watkinson, W. H.** April 7.



Heating air.—Relates to improvements in air-heaters and in the apparatus and appliances for facilitating and accelerating combustion in the furnaces of steam generators. The air-heater may take various forms, but in substance it is constructed of a series of sheet flues or flattened tubes suitably supported in a casing in such a manner that air may be driven through the tubes while furnace gases are passing over the external surfaces of the tubes. Figs. 13, 14, and 15 show various sections of one form of heater with the tube-plates either cast around the ends of the tubes or flanged so as to support them. As seen in Fig. 15, each tube *T* may be constructed of a plate doubled on itself and the abutting ends suitably secured, or may be formed of a pair of plates held together at the proper distance by strips of metal. The air in this example enters by a convenient

box *c* into which the tubes open and leaves by a corresponding box *d* at the other end of the heater, the furnace gases respectively entering and leaving by the openings *a, b*. To increase surface, the plates may be bulged or corrugated and provided with transverse rods or projections. In order still further to increase the temperature of the air from the heater, a portion of the gases from the boiler furnace is mixed with the air. This may be accomplished when the chimney draught is insufficient by the aid of a fan or steam blower or by the inducing action of the air itself. When a fan is used, its shaft bearings may be kept cool by sending some of the boiler feed or circulating water through them. Whenever high-pressure water is available, the fan is driven by a Pelton water-wheel or other suitable hydraulic motor. In such a case, this water is used for cooling the fan-shaft bearings.

8898. Perkins & Son, A. M., and Walton, H. April 7.

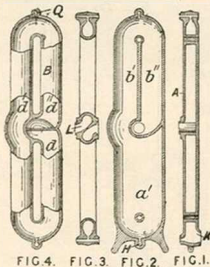


Heating buildings.—A low-pressure water pipe *d*, connected to the radiators *e*, is heated by a "Perkins" flow and return tube *c*, which is itself heated by a furnace *a*.

8912. Jackson, J. T., Travers, F. J., and Mills, J. A. April 7.

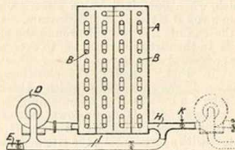
Heating buildings.—Radiators for use with steam and hot water are shown in the sectional views, Figs. 1 and 2, of an end section, and in Figs. 3 and 4, which are corresponding views of an intermediate section. The heating-fluid enters the end section *A* by an inlet *K*, and circulates in the

passages *a', b', b''*, escaping by an outlet *L* to the next section *B*, where it passes through the legs *d, d', d''* in succession and escapes by an outlet *L*, finally exhausting through an end section of a



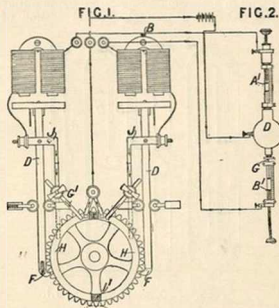
similar type to the first. There are drainage openings *H* in the lower ends of the loops, and air vents above. The sections are coupled together in any convenient way, and the various joints are made water-tight by compressible rings or gaskets.

9086. Calvert, J. G. April 9.



Heating air.—An arrangement for heating air is shown in sectional elevation, and consists of a chamber *A* provided with a battery of pipes *B* through which the tempering agent, such as steam, is passed. Air is admitted by an inlet *E*, and is forced through the passages of the chamber by a fan *D* and escapes by an outlet *H*. Part of the air may be allowed to escape for use, or it may be passed through a similar apparatus to the one described, to intensify the heating effect. The valve *K* may also be partly closed, so that only a portion of the air escapes and the remainder flows back to the fan through a by-pass pipe *I* and is again circulated through the chamber. The apparatus may be used for heating dwellinghouses, mills, or the like, and is also applicable for drying yarn or timber.

9135. Yerbury, H. E. April 10.

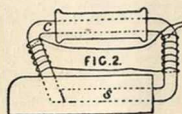


Thermostata.—Relates principally to electro-magnetic mechanism capable of turning an axis in opposite directions when certain fixed limits of temperature are reached. It is applied to regulating and controlling ventilation, flue dampers, fire-extinguishing apparatus, the temperature of incubators, &c. The electromagnetic mechanism, Fig. 1, consists of two electromagnets A, B, either of which, when energized by an electric current, pulls up a rod D attached to its armature. A pawl F on the end of each rod pulls round the toothed wheel H in the direction required to exercise the necessary control on the ventilator or other apparatus. In Figs. 1 and 2 the electromagnetic mechanism is shown combined with a thermostat consisting of a bulb D, Fig. 2, containing mercury which forces a rod G, G up or down as it expands or contracts. When the end of the rod G comes in contact with a terminal A', the circuit containing a battery and the electromagnet A is closed. An oscillatory motion is thereby imparted to the left-hand rod D by the automatic interrupter J fixed on the rod D, and the wheel H is turned round by the pawl F till the circuit is permanently interrupted by the passage of the insulating-section P under the brush G'. When the end of the rod G comes in contact with the terminal B' the electromagnet B is energized, and by a similar operation to that above described the wheel H is turned in the opposite direction. Instead of the thermostat, a maximum and minimum thermometer may be used.

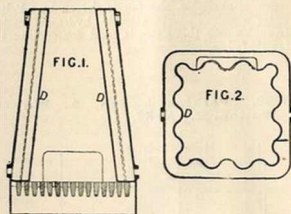
9194. March, O. April 10.

Heating by electricity.—Ironing-cylinders, flat irons, and other conducting-bodies are heated by making them the secondary circuits of electric

transformers, with closed magnetic circuits, such as c.

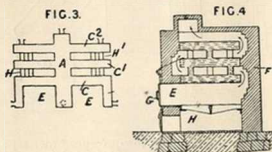


9349. Newsum, G. April 13.



Heating water, boilers for. A vertical water boiler, for connecting to a range of heating-pipes, has a firebox D with vertical corrugations to increase its strength, while the expansions and contractions of this inner shell under varying temperatures prevent the adherence of clinker.

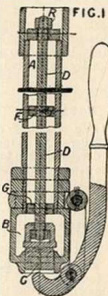
9394. Taplin, S. April 13.



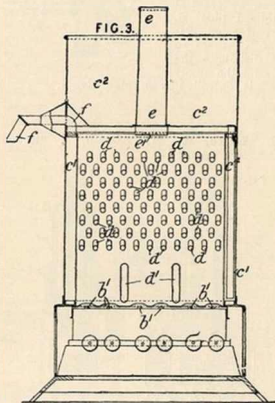
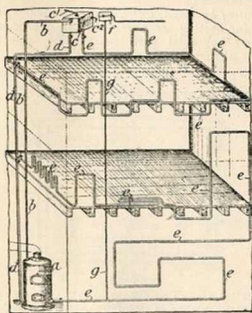
Heating water.—Relates to low-pressure water-heaters for buildings, greenhouses, and the like. The heater consists of a series of horizontal sections C, C', C'' branching from a central water column A and connected by vertical pipes H, H'. The boiler is built in a suitable brickwork casing F, and the flues are so arranged that the hot gases from two independent furnaces E exert a maximum heating effect before escaping into the chimney flue G'. Refuse coal mixed with clay is used in the furnaces, and these latter are preferably charged alternately to secure economy of fuel.

9494. **Grislain, J.** April 14.

Steam traps.—The condensed water flows into a tube A of which the lower end B is closed by a valve C, which is controlled by an expansion bar D, guided in the tube by winged collars F, G, and secured above by a nut R. The valve is normally open, but as soon as steam commences to flow, the expansion rod becomes heated and extends more than the tube, thereby closing the valve until cold water has accumulated in sufficient quantity to cool the expansion rod. In a modified arrangement, there are two expansion rods connected to a pivoted lever above whereby a quicker closing can be effected. The valve may be lifted by a hand-operated lever.



heated by a pipe *e* starting from the tank and connecting to the falling main *d*, while the lower storey is heated by a similar pipe *e* connected to the falling main above and to the boiler below. The tank is provided with a steam outlet *c'* and a water outlet *c''*, while any waste is repaired by a supply tank *f* connected to the system by a pipe *g* and governed by a ball valve. The circulation of hot water is controlled by valves, so that one or both apartments may be heated and taps (not shown) may be provided for drawing off hot water for domestic use.

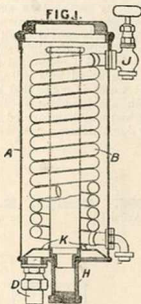
9696. **Thorpe, E., and Thorpe, A.** April 15.9650. **Allman, W., and Cope, J. T.** April 15.

Heating buildings; heating water.—An arrangement for heating buildings by hot water is shown in the diagram as applied to a two-storey building, in which *a* is a boiler connected by a rising main *b* to a tank *c* in the roof. The upper storey is

Heating water.—An apparatus for heating water for baths and domestic use generally is shown in sectional elevation in Fig. 1. The boiler consists of an inner and outer shell forming a water space *c'*, and is supplied with cold water by a pipe *c''* leading from a tank *c''* above, and heated by a number of oil burners *b'* below, the products of combustion from which circulate around the cross water tubes *d, d'* before escaping past a baffle-plate *e'* into the chimney *e*. Hot water may be drawn off continuously through an outflow pipe *f*, preferably situated opposite to the inlet *c''*.

9776. Pyle, J. H. April 17.

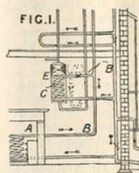
Heating water.—An apparatus for heating water by steam is shown in elevation in Fig. 1, and is especially applicable for supplying hot water for baths on board ship and in other situations where steam is readily available. A closed casing A is provided with a steam heating-coil B for heating the water which enters by an inlet D and circulates around the coil, escaping in a heated condition by a central open-topped pipe H. The perforated diaphragm K serves to evenly distribute the water, and the supply of steam is controlled by an inlet valve J.



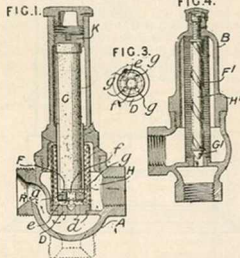
the temperature is reduced. In a modified arrangement, Fig. 4, a conical valve G¹ is operated by a compound spiral spring H¹, which uncoils as the temperature rises and pushes the valve down on its seat. The spring is coiled round a spindle F¹, capable of adjustment in the casing B. The apparatus is designed so that hand-operated valves may be easily converted into the types described above.

9860. Yates, A. April 20.

Heating buildings; heating water.—An improved domestic hot-water heating-system is described, which is so arranged that the heat may be cut off from one or more parts of it as required. The water is heated in a coil A in contact with the fire, and passes to the pipe B, from which and from the return pipe are branches leading to the various parts of the system, and controlled by cocks. A water supply is heated in the tank E by a coil C in connection with the heating-water. A regulating valve, which can be adjusted to various pressures, controls the pressure of the heating-water. In a modification, the tank E is in direct communication with the heating-water, the coil C being dispensed with.



9829. Lake, H. H., [Serrell, J. A., and Leitch, M.]. April 17.

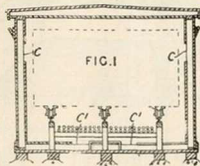


Steam traps.—A trap or valve, for allowing the discharge of air and condensation water from radiators, heating-coils, and the like is shown in sectional elevation in Fig. 1, and is especially adapted for use in a vacuum system of heating. The valve body is of an ordinary standard type and the seating d carries a valve seat piece D, the opening through which is controlled by an expansible member C of vulcanite or the like carried by an adjustable plug K. The water of condensation enters by an inlet H, and passes by the openings e, f, g, Figs. 1 and 3, to the lower part A of the valve, and away by the outlet R. When steam begins to enter, it circulates round the member C, thereby causing the latter to expand and close the passage f, until water begins to accumulate and

10,189. Lorenc, V. April 23. Drawings to Specification.

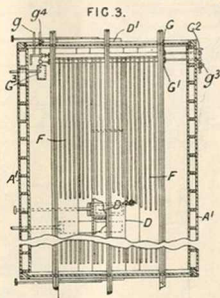
Heating by steam, water, &c. circulation.—Tubes used for heating are provided with one or more interior helicoidal partitions or ribs, extending wholly or partially across them.

10,299. Morton, H. J. April 26.



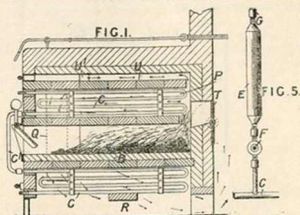
Heating air.—The Figures show a lumber drier in which lumber is dried by a current of hot air heated by means of steam pipes situated near the bottom of the drier. The steam pipes F are arranged in two rows extending from the pipes G and G¹ respectively, and those directly over one another are connected at the opposite end by short pipes. The two pipes G, G¹ are put in communication with one another by means of the valve G¹

when the apparatus is in use. The water of condensation flows into the pipe G^1 and thence into the steam trap G^2 . g^3 , g^4 are blow-off cocks, and the pipe g is in connection with the steam supply.



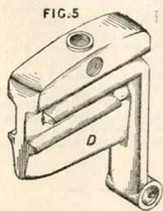
On first turning on steam the valve G^2 is closed, so that the steam introduced drives the air out of the pipes F . Air enters the drier at a point C^1 below the steam pipes.

10,359. Gibbs, R. R. April 26.

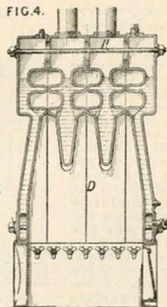
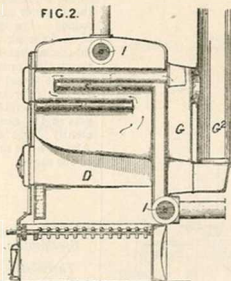


Heating water.—Improvements are made in the boilers described in Specification No. 12,613, A.D. 1892. The boiler is built of a number of sections each consisting of a tube C bent zig-zag fashion, the various sections being coupled by pipes C^1 outside the furnace. By this arrangement the joints are not exposed to the hot gases, while any section can easily be removed without necessitating the removal of any considerable amount of brickwork. A reservoir E , Fig. 5, communicates with one of the said sections C through a stop-cock F , and contains a supply of water filled in through a plug-hole C . This device provides a reserve of water to maintain the boiler and circulating system full.

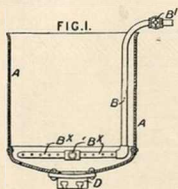
10,497. Mott, A. C.
April 27.



Heating water.—A water-heater is shown in vertical section in Fig. 2, and in section at right-angles thereto in Fig. 4. Fig. 5 shows a perspective view of one of the centre sections of the apparatus. The sections are bolted together by tie-rods I , I^1 , in such a way as to form a firebox D , through which the furnace gases pass, as shown by the arrows, on their way to the flue G and uptake G^2 . By this arrangement a series of narrow pockets or tongues depend into the firebox, the spaces intervening forming initial passages for directing the combustion products to the flues.



11,451. McPhail, H. May 7.

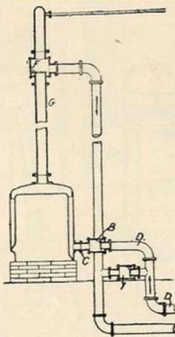


Heating liquids; digesters.—An apparatus for heating and evaporating liquids, digesting materials in liquids, and the like is shown in sectional elevation in Fig. 1. A is a pan containing the liquid or material to be treated, and B^x are perforated pipes connected by a main pipe B to a steam superheater. A valve B^o regulates the supply of superheated steam to the apparatus, and there is an opening c in the bottom of the pan to permit the escape of the liquid or material after treatment; the opening is normally closed by a cover D. Reference is made to Specifications Nos. 11,448, 11,449, and 11,450, A.D. 1897.

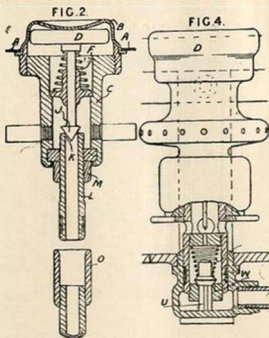
11,523. Mills, B. J. B., [Dreese, C.], May 8.

Heating water; heating buildings.—

Relates to means for effecting the circulation of water in the pipes and boiler of a heating-apparatus, and consists of an arrangement of valves, of which one valve F is in the outlet pipe G, a valve B in the return pipe C, D, and a valve I in the short junction connecting the flow and return pipes. The intermittent flow of water past the valve F displaces a certain volume of water in the pipes, and causes it to flow back into the boiler past the valve B. The third valve I is adjusted to open at the moment when the vacuum in the boiler is complete, thereby permitting the water to continue its movement until it receives a new impulse; a more or less continuous circulation is thus set up.



11,593. Lamplough, F., and Automatic Heat Regulator Co. May 10.

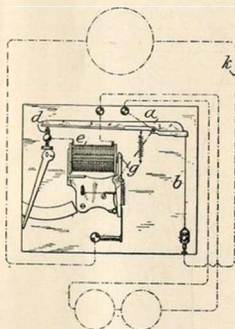


Thermostats.—Relates to improvements in the apparatus described in Specification No. 8199, A.D. 1895. In the arrangement shown in Fig. 2, a socket B is let into the bottom of the vessel A to be heated, and has a screwed collar for the reception of the high-pressure gas burner C. The expansion chamber D is normally supported by a spring F, and acts to control the thermostat J in the manner described in the prior Specification named. The valve seat K is adjusted by the collar M, and the pipe L is arranged so that it may slide in the socket O of the gas-supply pipe. Fig. 4 shows the apparatus fitted to a gas stove. In this case the vessel to be heated rests on the chamber D, and depresses it and the casing, so that the gas-supply valve U is opened. The thermostat acts in the same manner, the seating being sufficiently large to allow it to act as a by-pass. Atmospheric or high-pressure burners may be fitted to the stove.

11,609. Richard, J. May 10. Drawings to Specification.

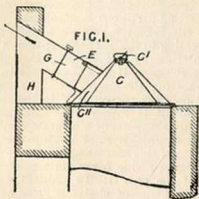
Thermostats.—In an electric system for enabling a thermometer to control the temperature at a distant station, the shaft of the armature of an electromotor may be connected to a cock by which the supply of heating-fluid to a room is regulated. When the cock is in either of its extreme positions, it breaks circuit for the motor.

- 12,019. **Berglund, R., and Wendel, Baron R. de.** May 14.



Heating by electricity; thermos'ats.—Relates to a device for maintaining a constant temperature in a metallic wire k heated by an electric current from a primary battery m . The heating-current flows through a fine resistance wire b , and, should the temperature rise above the allowable limit, the wire b elongates so far as to allow the completion of a circuit by a pivoted lever a and an adjustable contact-piece d , thereby energizing an electromagnet e , which pulls over an armature g and breaks the primary circuit. When the wires b and k have regained their normal temperature, the circuit is automatically made by the release of the armature. Slightly-modified arrangements are described.

- 12,064. **Loving, J., and White, H.** May 15.

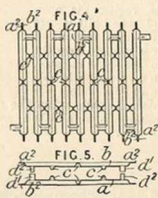


Boiling-pans.—Relates to means for disposing of the surplus steam generated in boilers or coppers

used for washing and brewing. Fig. 1 shows one arrangement, in which a lid C is formed of three conical segments pivoted to the ring-bolt C^1 and provided with an outlet flue E secured to the fixed segment C^1 . A damper G is provided in the flue and there is a soot chamber H . In modified arrangements, a wooden lid of an ordinary type is fitted with an earthenware outlet flue.

- 12,114. **Frank, S.** May 15.

Heating gases and liquids.—An apparatus for effecting interchange of temperature between fluids, or for heating liquids, is made up of a series of stamped plates a, b connected at their edges a^2, b^2 and provided with projections c bearing against each other to prevent distortion. The plates are provided with projecting nipples d^1, d^2 adapted to fit over one another when one of a pair of similar plates is reversed, and a number of these elements are connected together to form the complete apparatus. The fluid to be treated flows through the apparatus in the direction indicated by arrows, and the tempering-fluid circulates around the apparatus.



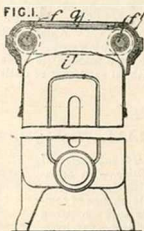
- 12,401. **Fehrmann, W.** May 19.



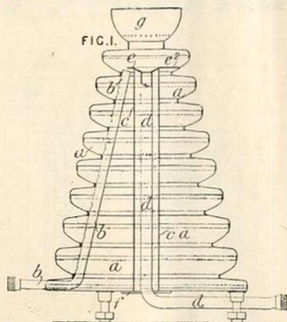
Heating water.—Relates to apparatus for drying and superheating steam, applicable also for heating water for boiler feed and other purposes. The apparatus consists of one or more elements each formed of two concentric tubes enclosing an annular space through which the steam or water to be heated is passed. Baffles consisting of corrugated rings F, F^1 , spiral strips, or inclined plates are fitted in the annular space, additional inclined plates E, E^1 being provided at the inlet and outlet if desired. These baffles also serve to conduct heat from the inner and outer tubes and transmit it to the steam or water. Such elements, singly or arranged in suitable groups, may be placed in the flues, chimneys, or smoke-boxes of steam-boiler or other furnaces, suitable arrangements being illustrated in the Specification; or they may be heated by a separate furnace.

12,421. Courtot, J. J. L. May 19.

Heating buildings.—Steam radiators are provided with caps having registers *g* and roller blinds *f*, *f*¹ arranged at each side, and connected by a sprocket-wheel chain *i*, so that the blinds or curtains can be lowered or raised simultaneously. When the register is open and the blinds are lowered, a current of air is induced over the surface of the radiator, and a considerable heating effect is obtained, while when the curtains are raised the draught is diminished and the heating effect lessened.

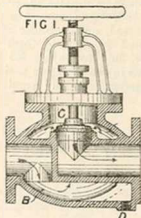


12,610.

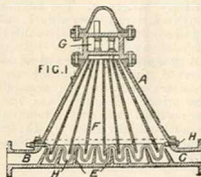


12,424. Thompson, W. P., [Kashren, G.].
May 19.

Steam traps.—Relates to a form of stop valve adapted to act as a steam trap. The casing is formed with an expanded chamber B into which the steam enters before reaching the valve C. The direction of the steam is thus abruptly changed so as to separate any contained water. The water of condensation is discharged through the vent D by means of a tap or the like. The same construction is applicable with valves in which the delivery pipe leaves the casing at right-angles to the inlet instead of in the same line as shown.



12,709. McDougall, I. S., and Collier,
A. May 22.



Heating water.—The improvements are more specially applicable to the oil extractors described in Specification No. 21,867, A.D. 1892. The purifier is constructed of a conical form A and with radiating partitions F which pass into spaces between ribs E on the base-plate. The steam pipe H conforming to the partition spaces is provided. Feed entering by the opening B is heated by steam in the pipe H and discharged in a purified condition from the outlet C. The separated oil rises between the partitions F to the chamber G, from which it is withdrawn. In a modification, the base-plate consists of a separate casting having ribs, some of which are not cast into the bottom of the plate. In this case sludge-cocks are fitted. In another form, a side cover permits of the introduction of the pipe H. In addition, a grid valve for the discharge of sludge is fitted between the bottom of the ribs of the base-plate and its lower surface. Chemical re-agents may be employed to facilitate the processes of heating and purification.

12,610. Jakeman, A. J. E. May 21.

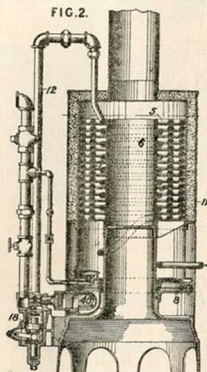
Heating liquids.—The liquid flows from a perforated cup *g* over the surface of the corrugated cone *a*, which is preferably built up of spun rings as shown. Hot water or steam is admitted by a perforated pipe *b*, and the outlet pipe *d* passes down through the hollow stay *c*, which is supported by plates *f*, *e*, the latter having arms *e*¹.

(For Figure see next column.)

12,836. **Wells, C. L.** Oct. 24, A.D. 1896,
[date claimed under Sec. 103 of Patents &c. Act,
A.D. 1883].

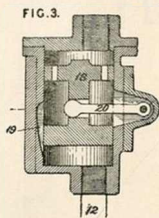
Heating buildings and structures.—Ditches and canals are constructed in the vicinity of volcanoes to guide lava and the like to centres or stations of transport, and the heat is drawn off and supplied to industrial establishments and buildings. Hot-water springs are also tapped for a similar purpose.

12,914. **Beckfield, J. C.** May 25.

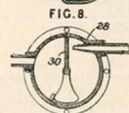
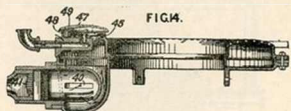


Heating water.—

Relates to a hot-water supply system in which the opening and closing of a tap at any part of a building &c. causes the automatic setting in action, regulation, and putting out of action of the heating-apparatus, so that, after a short interval, hot water may be obtained on opening the tap. The application to a house with baths, lavatories, and laundry appliances is illustrated in the Specification. Any suitable heater may be employed, but a special form of gas-heated apparatus is shown in Fig. 2,



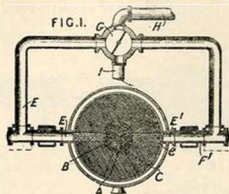
consisting of a single coiled pipe disposed in two or more close concentric coils 5 between an inner pillar 6 and a non-conducting casing 11, and heated by an annular burner 8 of special construction.



Several forms of automatic regulator are described.

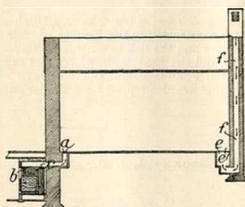
Fig. 3 shows one form, consisting of a piston 18 in a casing between the water-supply main and the heater. On a tap being opened, pressure above the piston is reduced, and water, entering at 12, lifts the piston, which uncovers the groove 19 and so admits water to the heater. The upward movement of the piston, by means of the lever 20, opens the gas cock 26, Fig. 2, regulating the supply to the burner. On closing a tap, the piston falls by its weight and cuts off both the water and gas supply. The groove 19 is so formed that the movement of the piston, and consequently the opening of the gas cock, will be in proportion to the volume of flow through the taps. In Fig. 2 a slightly modified form of regulator is shown, the parts being similarly numbered, and in a further modification the water is caused to enter the casing in a jet impinging on the piston 18; the outlet being situated beneath the piston. Fig. 8 shows another form, in which the water, entering at 28 when a tap is opened, impinges on a counterweighted vane 30 the spindle of which is directly connected to the gas cock. In a modification of this form, several vanes, on which the water may act in succession, are provided on the same spindle. Fig. 14 shows a section of the burner with its mixing-chamber 40 and pilot igniter 46. Gas enters at 41 through a vertical line of perforations on each side of which are openings (not shown) for air. The pilot igniter, which is fed by a branch pipe with ordinary atmospheric burner fittings, consists of a dish-shaped piece 45 with notched edges covered by a flat disc 47, and enclosed by a rim 48 and projecting domed cover 49 by which the flame is deflected downwards to ignite the main burner. Air for combustion is supplied to the igniter from the mixing-chamber 40 through perforations in the combustion chamber of the former.

12,936. **Newton, A. V.**, [Coles, A. H.].
May 25.



Heating by electricity.—In electric furnaces or other electric heating-apparatus in which a gas, vapour, or the like is passed through a mass of carbon or like material, for the purpose of treating either the material or the gas, means are provided for periodically reversing the flow of gas through the apparatus, in order to equalize or regulate the heating effect. Fig. 1 shows the application to an electric furnace A containing a mass of carbon B and a central electrode C. Side flues E, E', containing granulated carbon *c*, are fitted to the furnace, and communicate by water-jacketed pipes F, F' with a reversing-valve G, gas-supply pipe H, and discharge pipe I.

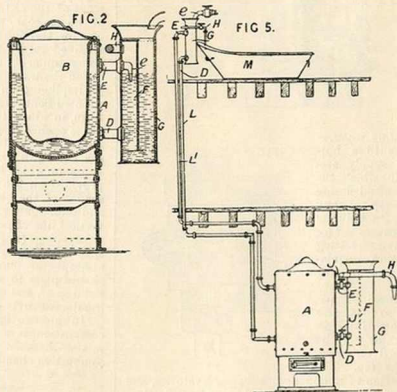
13,194. **Langfield, J.**, and **Kenworthy, G. H.** May 28.



Heating buildings.—Relates to improvements in apparatus of the type described in Specification No. 23,066, A.D. 1892, the object being to reduce still further the appreciable current of air in this type of apparatus. The air inlet shaft *c* is of greater sectional area than the combined sectional area of the tubes *b* of the heating-apparatus, and the outlet grid *e* is at least twice as large as the inlet grid *a*. The outlet grid opens into a reservoir *e'* having a sectional area twice that of the outlet grating *e*, while the chimney flue *f* has a sectional area of about one-third of the chamber *e'*.

13,356. **Parish, E. W.** May 31.

Heating water; boiling-pans.—Relates to improvements in low-pressure steam apparatus for cooking, water-heating, and similar purposes. The heating of the liquids is carried out in regulated quantities by aid of an independent water feed which is designed for use in lavatories, breweries, public institutions, dwellings, and other places. Fig. 2 shows a sectional elevation of the apparatus employed. A food-containing pan or inner cylinder B with indented bottom is carried by the water chamber A which is heated from below. The chamber A is connected to the expansion chamber F of the open mouthed feed-cylinder C by two pipes D, E, the upper of which is provided with a nozzle *e*. Through the nozzle *e* the steam or water is passed into the expansion chamber F, and when desired out of the supply pipe H, which may be arranged to turn in any desired direction. If a constant supply of cold water or other liquid is passed into the mouth of the feed-cylinder, a regular discharge is

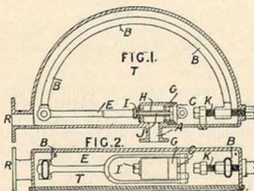


in any desired direction. If a constant supply of cold water or other liquid is passed into the mouth of the feed-cylinder, a regular discharge is

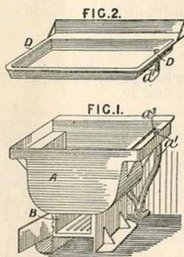
obtained from the pipe H without interfering with the cooking operation. The pan B, suitably secured to the outer cylinder, is provided with a cover. In a modification, a coned outer cylinder is provided with a vertical internal corrugated flue. The flue is fitted with a rod carrying baffle-plates for dispersing the heat of the oil lamp which in this case is used. When the apparatus is used for evaporating liquids, grain, or the like, the cover is removed when evaporation proceeds. The feed-cylinder may be secured without the intervention of connecting-pipes D and E, the feed-cylinder being secured to the side of the outer pan A. Fig. 5 shows the apparatus as applied to an ordinary bath. The pipe L receives the supply from the upper feed-cylinder supplied from the tap *l*, while the second pipe L conveys the hot water from the apparatus A in the basement to the expansion chamber of the upper feed-cylinder and into the bath M. When the feed-cylinder in the basement is not wanted, the cocks J are turned off.

13,748. Thompson, W. H., and Thompson, R. June 4.

Steam traps.—A casing T, provided with an inlet A and outlet R, is furnished with a spring tube B containing an easily-expandable liquid. The tube is adjustably threaded at one end upon a screw K, and controls a valve C by a forked link E. The valve is normally open for the escape of condensation water, but as soon as steam commences to flow it causes the spring tube to open out, and the valve is pressed against its seat. The valve seating G is held in place by a nut I screwing upon a shank H, which is bored out to receive the valve spindle J. In modified arrangements, two spring tubes may be used connected at their free ends by a link; the arrangement of valve and valve-chest may also be slightly modified.

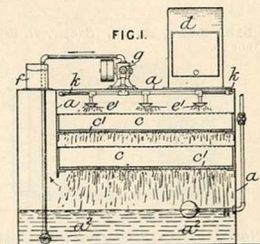


13,765. Newton, A. E. June 4.



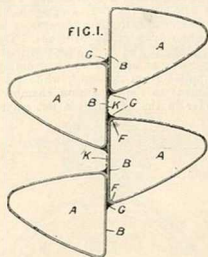
Boiling-pans.—Relates to a portable combined washing-furnace, sink, and bath. Fig. 1 shows a perspective view. The bath A is mounted over the fireplace B, and is provided with ledges a' to support the tray D, Fig. 2, when the appliance is used as a sink. Waste pipes d' , a' and a flue pipe are provided.

13,945. Hall, D., and Kay, J. H. June 8.



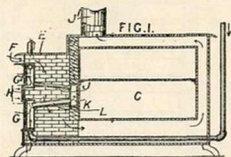
Heating air.—An apparatus for humidifying, filtering, and heating air is shown in sectional elevation in Fig. 1, and consists of a metal case or chamber *a* with an inlet *d* for air, which is drawn downwards by the action of a fan (not shown) through the perforated trays *c*, *c'* containing loofah or the like and moistened by the spray from the perforations *e'*. The air may be heated by a steam pipe *k* above, while the water collecting in the tank a' is heated by a steam pipe and is circulated by a pump *g*, while there is a suitable outlet *f* for the escape of the air.

13,983. Schmidt, W. June 8.



Heating liquids; heating by liquid circulation.—Straight or bent pipes A for building up condensers, heating or cooling apparatus, or the like, are made of the section shown. One side B is of straight or approximately-straight section, the others being rounded. The bends at F may be formed into flanges, or have flanges G attached, and are fitted together as shown. The tubes may be secured at their ends to uprights which aid in distributing fluid passed through them. Modes of applying the pipes are shown by drawings in the Specification. Distance pieces K may be used to separate consecutive pipes.

14,515. Lake, H. H., [Sawyer, H. de W.]. June 15.

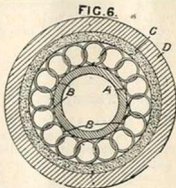


Heating buildings; heating water.—An improved form of apparatus for heating buildings, heating water, and the like consists of a fire-pot having a hollow water-containing front made in two independent sections G, G', so that the water passes from the lower one through inclined pipes L to a water box K at the inner or back end of the fire-box and away by pipes J to the upper section G', the circuit being completed in any desired manner through radiators or the like. The fuel is supplied from above through openings E, and air for combustion enters by apertures F and passes down through the fire, while the hot gases may circulate through an oven C before escaping to the chimney N, J'. A door H is provided for stoking and

sighting the interior, and there is an ash door below the sections.

14,561. Pickhardt, G. June 16.

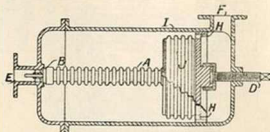
Non conducting coverings.—Relates to coverings in which a layer of air is imprisoned next to the object covered. The boiler pipe or the body A is first covered with spirals or rings B formed as a network or at suitable distances a part. Over this is wrapped an inner cover C of non-flammable non-conducting material, preferably asbestos, and upon this is applied a second and outer cover D of such material as felt, silk-tufts, or any suitable silicious compound. The edges of the covers may be sewn with asbestos or wire thread.



14,576. Whyte, G. June 16. *Drawings to Specification.*

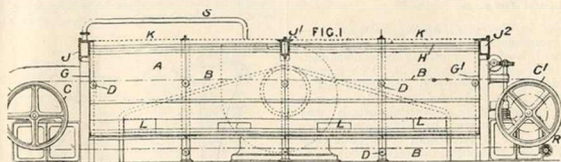
Thermostats for incubators. Consists of a metallic capsule filled with ether, by the expansion of which a rod is raised which operates the lever of a damper for closing an outlet in the cover of the incubator.

14,847. Thompson, W. H., and Thompson, R. June 19.



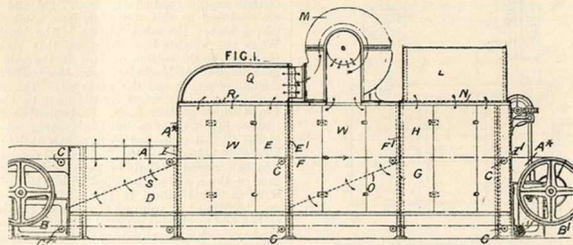
Steam traps.—A metal casing I, provided with an inlet E and outlet F, is furnished with a compound corrugated tube A, J having a valve B at one end to control the inlet opening, and furnished with a sliding piston H and adjusting-screw D at the other end. The corrugated tubes may contain an easily-expandable fluid such as spirits of wine, so that, when steam commences to enter the trap, the valve is forced against its seat by the expansion of the liquid. In a modified arrangement, the corrugated pipe J is dispensed with, and the tube A abuts against the adjusting-screw and is guided in its casing by suitable rings or collars.

15,105. Davidson, S. C. June 23.



Heating by air circulation.—Tea, tobacco, coffee, malt, wool, &c. are treated by a current of hot air in a chamber A through which they are conveyed by a travelling web E of foraminous material. Air enters the chamber through the perforated top K, and is heated by a range of steam pipes H, and thence passes through the web B and exhaust ports L to an air duct leading to a fan or other air-exhausting apparatus. The said web is mounted on rotating drums C and C', and is supported by rollers D. The steam pipes are secured to steam chambers J and J', and one or more intermediate chests J' may be used to prevent sagging of the pipes. A rotating brush R is arranged at the delivery end of the web to clear it of any adhering substance. The steam and material entering at the same end of the chamber cause the wet material to come in contact with the hottest part of the air current. The web enters and leaves the chamber by openings G and G', and may be tightened by adjusting-screws engaging with the bearings of the drum C. One engine may be used to drive the fan and the drum C', and its exhaust steam led by a pipe S to pipes H.

15,106. Davidson, S. C. June 23.

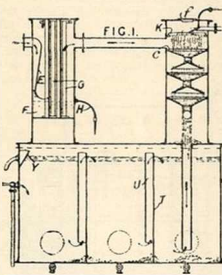


Heating-apparatus.—Tea, tobacco, coffee, grain, malt, fruit, &c. are treated by a current of hot air or dry air or mixed gas or gases and air in a chamber A' through which they are carried on a web A of foraminous material, the said web passing through the centre of the chamber and entering and leaving it by openings I and I'. The chamber A' is provided with transverse partitions E' and F', to cause the air to pass alternately upwards and downwards through the web. Inclined perforated plates O and S, having the area of the perforations less at the end towards the advancing current, distribute the said current of air or gas equally over the web. A fan M, situated as shown, draws air or gas from the duct L, leading from a heating-apparatus, through a perforated plate N and compartments H, G, and F, and thence drives the air or gas through the duct Q, perforated plate R and compartments E and D. The web A is driven by drums B and B' and supported by rollers C. V is a rotary brush for clearing the web of material sticking thereto, and W, W' are inspection doors. The fan, instead of being situated as shown, may be situated at either the inlet or outlet end of the chamber.

- 15,238. **Bachmann, J. F., Vogt, A., Kirchner, J., König, A., Weiner, C. C., and Jörg, A.** June 25.

Heating by electricity; heating buildings &c.—Electric resistances for these purposes are made of mixtures of powdered conducting and non-conducting or badly-conducting materials, which may be rendered plastic or liquid and moulded or cast to any desired forms, and dried or baked, or may be used as powders. The conducting-material may be formed in the baking, by using decomposable ingredients such as tar, sugar, or metallic compounds, or may be powdered metal or carbon. The other materials may be alumina, gypsum, cement, clay, &c., and binding-materials such as waterglass, zinc chloride, sugar, gum, &c. The resistances may be hardened with alum solution, and may be glazed or otherwise protected. Such resistances may be moulded in the form of receptacles which can be electrically heated for cooking or other purposes; the powders may be enclosed between a pot and an inner receptacle.

- 15,384. **Baker, W. J.** June 28.

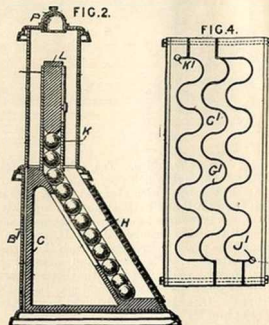


Heating water.—Relates partly to improvements on the invention described in Specifications Nos. 91 and 5516, A. D. 1895. The water passes through the strainer K and comes in contact with live or purified exhaust steam. The mixture passes through dishes packed to the sides of the vessel at c, whereby a further mixing and heating is obtained. A handhole f gives access to the strainer.

- 15,490. **Fraleigh, G. B.** June 29.

Heating by electricity.—Current is passed through a series of carbon blocks, or a continuous carbonized conductor, enclosed by firebrick blocks. In the

stove shown in section in Fig. 2 a hollow firebrick block C in a casing B¹ has channels of U-form in its sloping front containing balls H or other blocks of carbon; the channels are open, to some extent,

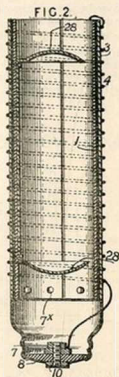


before and behind the balls. The channels terminate in metal tubes K, which contain weights L to press the balls together, and are connected with electric supply conductors. Both light and heat are produced by this apparatus, some combustion taking place; the ashes fall inside the block C. When the weights have fallen so that pins on them rest on the bottom of slots in the tubes K, more conducting-blocks are introduced after removing covers P and the weights L. The casing front is closed by doors containing mica sheets. Fig. 4 shows another form. Carbonized paper or like conductor G¹ is enclosed in grooves between blocks C¹ and connected to terminals J¹, K¹; the blocks are bolted together. Metal sheet conductors may be enclosed similarly between blocks, near the face of these, and are provided with rearward extensions to hold them in place. Or conductors may be formed by painting mixtures of powdered carbon and saccharine material into grooves in the blocks. Such apparatus is applicable for broiling or cooking.

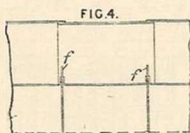
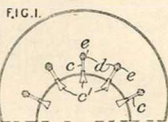
- 15,491. **Fraleigh, G. B.** June 29.

Heating by electricity.—Current is passed through a resisting-wire 4, coiled on asbestos or other non-conductor 3, surrounding a mica-covered cylindrical core 1. The wire is also covered with a thick layer of a mixture of talc, silicate of soda, and carbonate of soda, or other insulating-material, not shown. The core may be of copper, slit longitudinally, and perforated at 7 x to pass a limited air-current. Reflectors or baffles 28 are fixed within or near its ends. The core is supported by a cap 7, adapted

to screw into a metal sleeve in a porcelain or other holder. The upper end of the wire 4 is connected electrically to the core 1, cap 7, the sleeve, and a terminal; the lower end is connected to a central screw 10 on a porcelain disc 8, this making contact with a plate and a second terminal in the holder. For alternating currents the core 1 is provided with slits extending partly along it, from opposite ends alternately, so that heating-currents may be induced in it; or the core may be a conducting-plate, rolled up into several layers with intervening insulation, the inner and outer ends of the plate being connected electrically by rivets. In this form the core is carried in clamps near its ends. One clamp is insulated, and the ends of the wire are connected with the clamps. Additional layers of wire may be used, separated by asbestos.



the bolts are replaced by perforated annular plates *f* riveted between the flanged ends of the flue sections.



15,740. Green, J. R. July 2.

Non-conducting coverings.—Small tubes of asbestos paper or the like are used to cover the boiler or pipe to be protected, and over these is placed a layer of cloth, metal, or other suitable substance. There may also be a second layer of tubes arranged in a spiral upon the envelope. The tubes are heated and their ends sealed, so that when cold a partial vacuum is created, and they are thus more effective non-conductors of heat.

15,714. Bell, A. July 1.

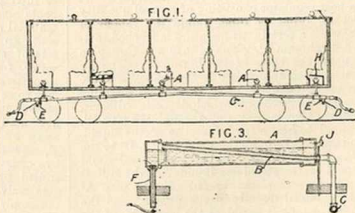
Heating gases and liquids.—An arrangement for heating fluids by direct conduction through metal plates is shown in Fig. 1 applied to a steam generator, in which *c, c* are bolts with enlarged ends *c'* projecting into the furnace flue, the outer ends of the bolts being connected by longitudinal frames *d, e*. With this arrangement the fluid in the boiler is heated by direct conduction through the bolts *c*. In a modified arrangement, Fig. 4,

15,917. Green, J. R. July 5.

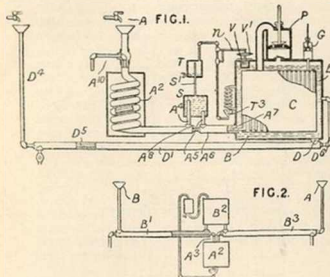
Non-conducting compositions.—Calcium hydrate, produced as a waste product by paper manufacturers, tanners, and bleachers, is mixed with spent tanners' bark and heated upon a hot plate. This material is then mixed with asbestos and the sweepings of grain mills to form a paste which is applied to the object to be protected.

15,969. Gold, E. E. July 5.

Heating buildings and structures.—Consists of improvements on the inventions described in Specifications No. 19,695, A.D. 1893, and No. 19,497, A.D. 1896, and is shown as applied to the heating of railway vehicles. Each radiator *A* is provided with an inclined pipe *B* through which steam passes from the train-pipe *C* and is condensed in the radiator, the overflow condensed water running down the pipe *B* to the tank *D*, where it is discharged by an automatic or hand-operated valve *E*. An automatic valve *J* is provided at the top of the radiator for the escape of air, and a screw valve *F* is provided at the bottom for draining purposes. Each radiator may be enclosed in a casing *H*.



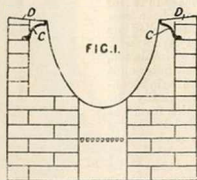
16,035. **Boult, A. J.**, [Waterhouse, A. G., and Case, A. W.]. July 6.



Heating gases and liquids.—Relates to means for utilizing the heat imparted to water and other liquids when they are being distilled, sterilized, &c., to heat fresh quantities of liquid. Fig. 1 shows one arrangement of distilling-apparatus, in which the liquid to be heated enters at A and flows through a coil A², through the middle of which passes the exit pipe A¹⁰ for the hot condensed liquid which has been treated in the still B. The fresh liquid passes through the pipe A¹ into a tank S, wherein air and gases in the liquid escape through the pipe S¹ into a vessel T, and if combustible may pass on to the burner T³. The liquid then flows through the pipes A⁵, A⁶ into the still B, wherein it is heated, if necessary, by an external source of heat T². The vapours generated in the still B are drawn off by a pump P and forced into a tubular condenser C, so that the liquid in B is under reduced pressure, while that in C is condensed under increased pressure, whereby the heat efficiency of the latter liquid with regard to the former is increased. The condensed liquid flows away through the pipes A⁷, A⁸, A⁹, A¹⁰, and heats the incoming liquid. At V is a heat regulator consisting of a small quantity of alcohol, brine, or other liquid the vapour of which, when a certain temperature is reached, acts upon a diaphragm V¹, which in turn acts through a rod a upon the valve of the burner T³. The air and gases which accumulate in the condenser C are blown off through the valve G. When distilling salt water or other liquid which deposits sediment, the sediment &c. is drawn off through the pipe D¹, and is used to heat a fresh quantity of the liquid, which is passed through the pipes D², D³, D⁴ to the still B. If it be simply required to heat water and then cool it for sterilizing liquids &c., the still B and condenser C would be cut off, the pipe A³ would be joined directly to the pipe A⁴, and the liquid in the tank S would, at the beginning of the operation, be heated to the boiling point. Fig. 2 shows a form of heat-exchanger where one liquid, such as water, enters at B, another, such as sewage,

enters at A, and each is heated at the beginning of the operation in the tanks A², B², and serves in turn to alternately heat and cool the other liquid. Other modified forms of these heat-exchangers are described, and they may be applied to first heat and then cool air for drying purposes. A modified form of the apparatus shown in Fig. 1 is described, in which the pump P is operated by an electric motor and the heat required is supplied by an electric coil. The heat regulator V acts upon an adjustable resistance to regulate the temperature of the coil.

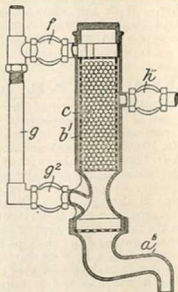
16,051. **Parsler, F.** July 6.



Boiling-pans.—The flues are covered in by plates C, C, preferably of cast iron, which are built into the brickwork setting and support the boiler. These plates have overlapped joints and may be enclosed in brickwork, cement, or concrete at D.

16,187. **Ballantine, R. F.**, and **Unsworth, W. S.** July 8.

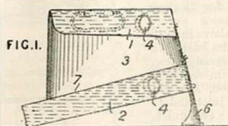
Heating water.—A closed vessel a having a steam inlet f and water inlet h and water inlet h is provided with an inner perforated casing b¹ or mixing-chamber containing loose material c, such as shot, so that the jets of steam and water from their respective nozzles may come into intimate contact. The hot water flows away by a nozzle a², and there is a bye pass g controlled by a suitable valve g¹ for the supply of steam direct to the nozzle.



16,363. Gibbs, R. R. July 10. Drawings to Specification.

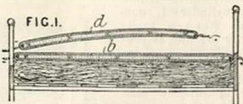
Heating buildings.—In order to dispense with the usual expansion chamber in a closed hot-water heating system, the radiator at the highest level is furnished with a stand-pipe of about half the height of the radiator, so that, when the system is filled with water, room is left for expansion in the upper half of the radiator. A relief valve may be provided, and the stand-pipe can be replaced by a metal band screwed into the radiator at a short distance from the top.

16,748. Davis, E. July 15.



Footwarmers; hot-water bottles.—An appliance especially intended for the use of patients suffering from heart disease and certain other ailments is shown in sectional elevation in Fig. 1. The apparatus is made in the form of a double slipper, and there are two hot-water receptacles 1, 2 with filling-apertures 4; a support 6 allows the warmer to be tilted to any convenient angle to accommodate the feet of the patient in the space 3. The supporting-casing may be hollow to contain hot water, and the apparatus may be constructed of metal, earthenware, or stiffened india-rubber.

17,338. Safran, S. July 22.

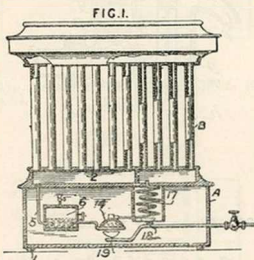


Heating by electricity.—Rheumatism and other ailments are treated by placing the patient between two hollow coverlets *b* and *d*, in the hollow spaces of which the air is continually renewed by means of a pump, and heated by electric conductors. By these means the patient is caused to perspire freely and discharge the impurities from his body.

17,475. Forbes, Abbott, & Lennard and Gaster, L. July 24. Drawings to Specification.

Heating liquids.—An apparatus for treating solids, liquids, and gases with each other for various purposes is provided with a jacket through which a heating-fluid may pass.

17,626. Thompson, W. P., [Winters, F. V.]. July 27.

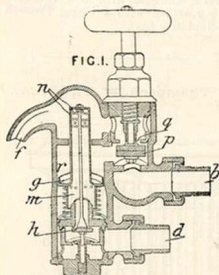


Heating buildings; heating water.—A portable radiator or heater *B* has a hollow base *A* containing a hemispherical boiler 6, which is supplied with water from a reservoir 14, and heated by a gas or oil burner 19. The steam from the boiler is first led into a superheating-coil 17, heated by a burner 18, and afterwards circulates through the pipes of the radiator, finally condensing in the chamber 2, and returning by a pipe 5 into the reservoir. The coils of the superheater are of varying diameter, in order to present as much surface as possible to the flame. In a modified arrangement, the radiator is separate from the hollow base.

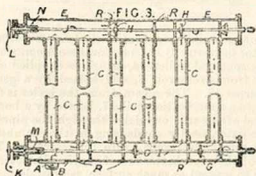
17,680. Ward, H., and Nock, F. W. July 28.

Heating water by steam. An arrangement of valves, for mixing steam with water and thereby heating the latter, is shown in sectional elevation in Fig. 1. Water is admitted by an inlet *b* and escapes past the screw-down valve *p* to a chamber *r*, where it presses down the annular piston *g* and steam valve *h*. Steam from the inlet *d* is thereby admitted into the space *m*, where it meets the water which has entered round the edges of the annular piston. The heated water passes away from the space *m* to the outlet *f* through the perforated sleeve *n* of the annular piston, and should cold water only be desired the valve *p* is only partially raised, to permit water to escape by the

opening *q* to the outlet direct. In a modified arrangement, the steam-admission valve is weighted, and the screw-down valve is dispensed with.



18,086. Green, Sir E. Aug. 3.



Heating water.—Fuel-economizers are constructed as shown in Fig. 3, in which B is the bottom pipe or box and E the upper one connected by tubes C. In the boxes are arranged spindles J, I carrying simple disc valves H, G registering with fillets R, so that water enters by an inlet A, flows upwards in the first two pipes, and downwards in the next two, and so on. The valves can be shifted longitudinally by screws M, N and handwheels K, L so that the water may flow upwards in all the pipes, or upwards in the first, downwards in the second, and so on through the whole series.

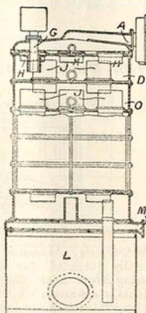
18,268. Western, C. B. Aug. 5. Drawings to Specification.

Heating air.—In an apparatus for drying cocoa, grain, &c. by means of a current of hot air, under a rotary table, on which the material is dried, are

arranged heating-pipes or other extended surfaces heated by steam or hot water. By this arrangement a current of air is heated while on its way to the said rotary table.

18,311. Chevalet, L. A., and Boby, W. Aug. 6.

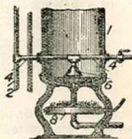
Heating water by steam. A steam heating-apparatus of the type described in Specification No. 24,337, A.D. 1895, is modified so that the steam for heating the water enters from above instead of at the base. In the arrangement shown in sectional elevation, A is the steam inlet and G the water inlet. The steam passes into the first section D by pipes H dipping below the water in that section, and escapes into the next section O by pipes J. The water flows by gravitation through the same system of pipes and, after passing through all the sections, of which the Figure shows five, is finally received into a receptacle L at the base, while the waste or exhaust steam escapes by an outlet M.



18,576. Sadtler, J. P. B. Aug. 10.

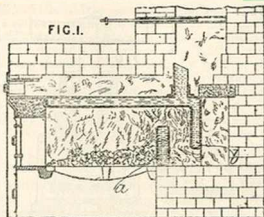
Heating water.—A hot-water cylinder 1, connected with a range boiler or the like, is provided with the usual inlet and outlet pipes, and in addition the range boiler is directly connected to the draw-off pipe 2, by a junction 4 provided with a draw-off cone 6, so that hot water may be drawn from the bottom of the cylinder.

A burner 8 is provided for directly heating the water in the cylinder, and may be used for obtaining hot water when the range is not in use.



- 19,068. **Bramham, F. E., and Crippin, A. J.**, [trading as Bramham, Joseph]. Aug. 18.

Heating water.—Relates to saddle boilers specially adapted for use in hot-water heating systems. A sectional elevation of the boiler is shown in Fig. 1. The boiler is fitted with a bridge *a*, and cheek end *b* arranged to form a flue in which the hot products of combustion circulate. The hot gases afterwards escape into flues extending along the sides of the boiler to the front, and thence along the crown to the rear, finally escaping by the uptake.



- 19,075. **Smith, H.** Aug. 18. *Drawings to Specification.*

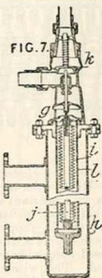
Heating buildings.—An oil cooking stove having side boilers is adapted for heating green-houses &c. by the use of circulating pipes communicating with a circulating tank or cistern.

- 19,081. **Ender, T., Kleindienst, A., and Procter, J.** Aug. 18. *Drawings to Specification.*

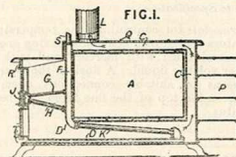
Heating air by steam circulation. In a drying-apparatus in which wool and cotton are dried by means of a current of hot air, the air is driven by a fan between steam pipes on its way to the drying apparatus.

- 19,426. **Desmaroux, J.** Aug. 23.

Thermostats.—In a process for sterilizing liquids, the liquid is only allowed to flow into the apparatus if the temperature in the sterilizer is sufficient. This is accomplished by a temperature regulator *g*, consisting of a chamber *h* in communication with the boiler, and containing a longitudinally-collapsible tube *i*, inside a tube *l* filled with petroleum or the like. A rod *j* is attached to the bottom of the pleated tube, and is adapted to lift up a water-supply valve *k*. As the temperature in the boiler rises, the liquid in the tube *l* expands and collapses the tube *i*, causing the rod *j* to open the valve *k* and admit water.



- 19,555. **Lake, H. H.**, [Sawyer, H. de W.]. Aug. 24.



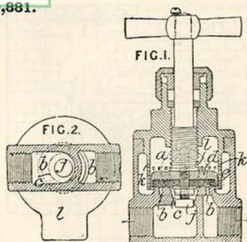
Heating water for circulatory systems. The fire-bars *G* consist of water-tubes opening into the box *J* at one end, and at the other into the water back *F*. Tubes *H* ensure circulation through the fire-bars. The sides and front of the firebox are water-jacketed as well as the back, and the flue *D* has beneath it a water-chamber *D* with which the water-tubes *K* communicate. The hot gases pass beneath the oven *A*, and through flues *C* at the back and above the oven, before reaching the chimney flue *L*. Openings *Q* and *R* are provided for utensils, and a hot-closet *P* for general purposes. Flow and return pipes *S*, *T* are used for circulating the water through radiators &c. for heating purposes.

- 19,881. **Palmer, T. C.** Aug. 28.

Heating water.—Relates to means for heating water by steam. A mixing-chamber *a* is provided with an annular water inlet *b*, and a central steam inlet *c*, both controlled by a screw-down valve *d*, so that, when the valve is raised, water and steam enter the mixing-chamber and the condensed steam and water afterwards escape past a perforated sleeve *k* to the outlet *l*. An adjustable plug *j* regulates the steam opening, and the valve is provided with a renewable face *e*, preferably of asbestos.

(For Figures see next page.)

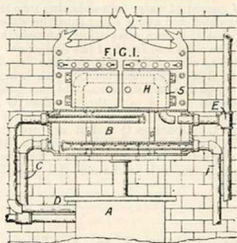
19,881.



20,288. Allioth, P. G. C. Sept. 3. *Drawings to Specification.*

Thermostats for controlling the temperature of incubators consist of a bent tube having one limb closed and filled with mercury and with ether or other volatile liquid. A float in the open tube by means of suitable connections operates a damper on the top of the flue from the heating apparatus.

20,568. Thompson, W. P., [*Winters, F. V.*] Sept. 7.



Heating water.—Relates to tanks or 'boilers' used in connection with stoves or like water-heaters. The cold supply enters the tank B by a pipe I and passes away by a pipe C to the stove back A or other heating-apparatus. The heated water re-enters the tank by a pipe D and finds an outlet through the pipe E. The tank is fitted with a 'relief' pipe, such as 5, which may be utilized for warming a hot-closet H, as shown in Fig. 1. In another arrangement, the tank is placed vertically and a three-way cock is fitted in order to divert

the stream of hot water from the boiler into the upper part of the tank, from which the hot supply may be directly drawn.

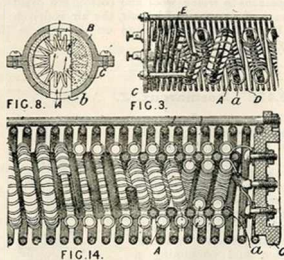
20,664. Fox, E. M. Sept. 8.

Non-conducting coverings and compositions.—Relates to a method of making pulp and sawdust non-inflammable by chemical treatment. Pulp is introduced into a boiler containing a hot solution of sulphate and phosphate of ammonia, and provided with stirring and mixing apparatus and means for regulating the temperature. After treatment, the pulp is removed and pressed free from moisture. This pulp when dried can be used for making paper and the like. Sawdust treated in a similar way may be used for jacketing pipes and the like to prevent loss of heat therefrom.

20,846. Golby, F. W., [*Lochmann, P.*] Sept. 10. *Drawings to Specification.*

Heating liquids.—Relates to a vessel for transporting liquids under gas pressure. A pocket is formed on the lid to receive a removable vessel containing hot water for warming the liquid.

20,923. Gold, E. E. Sept. 11.



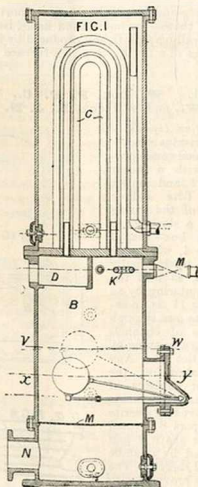
Heating by electricity; heating liquids; heating air.—Heaters for air, water, oil, or other fluids are made with resistant wire coiled into a small helix, which is itself generally coiled to form a large helix; this is supported internally or externally by open supports, so that all parts of the wire are exposed approximately equally to the fluid to be heated. The wires, or preferably the supports, are covered with thin insulation, such as vitreous enamel. Various supports are specified. In one arrangement, Fig. 8, the helix A is held in helical grooves in segmental insulators C, placed in a tube B; the tube may be in halves bolted together as

shown, and either solid to convey liquids, or slotted as at *b* to admit free passage of air to be heated, when the tube is fixed horizontally under the seat of a railway carriage or elsewhere. In modifications of this arrangement, the helix may fit in a helically-grooved perforated tube of insulating-material, or in or on a corrugated enamelled metal tube. In a second arrangement, Fig. 3, the helix *A* encloses one or more insulated supporting-wires *a* which are secured at their ends by nuts to discs, such as *C*, connected by bars *E* or slotted or solid tubes; a guard wire *D* may be coiled within or on the bars *E*, and may be insulated to serve as additional heating-wire. Instead of the tubular arrangement, the supporting-wires *a* may otherwise be formed into a flat spiral or zig-zag. In a third arrangement, Fig. 14, the conducting-helix *A* is held by its elasticity on or within a helically-coiled insulated supporting-wire *a*, both positions being shown. The supporting-wire *a* may be used for heating also, or as connecting-wire.

20,966. Hardy, C. Sept. 13.

Non-conducting coverings and compositions.—A mixture is made consisting of two and a half measures of a 'freestone rock,' three measures of shale, and one and a half measures of blue clay. To this is added a porous material such as cotton, flax, or the like, and in some cases a small proportion of tar and ammonia. These materials are thoroughly incorporated to form a paste, which can be applied by means of a trowel to the steam pipe or other object to be protected.

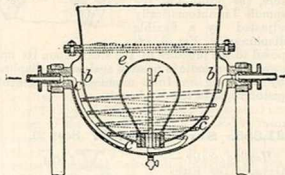
21,020. Nesbit, D. M., and Clowes, W.
Sept. 13.



Heating water.—Exhaust steam is passed through the tubular apparatus shown and condensed by

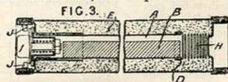
the surrounding cold water, which on becoming heated is used for feeding boilers or for other purposes. The steam enters the compartment *D*, and circulates through the tubes *C* around which the cold water is passing. Uncondensed steam escaping from the tubes is met by cold water jets from the serpentine pipe *K*. A steam-air ejector *M* removes air from the chamber *B* and assists in the condensation of the steam. When the condensed steam falls below the predetermined level *x-y* in the chamber *B*, a steam-distribution valve is operated by one of a pair of floats so as to shut off the steam from the boiler steam pump which is withdrawing the water from the chamber through the outlet *N*. At the same time another valve is opened by the other float and water, hot or cold, supplied to the spray pipes *K*. On the rise of water to, say, the level *v-w*, the reverse action takes place. The strainer *M* is fitted to the bottom of the chamber *B*. The arms of the floats may be hollow and open to the atmosphere.

21,285. Collier, J. L. Sept. 16.



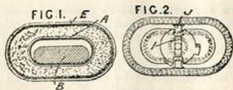
Boiling-pans.—The usual jacketed vessel or boiling-pan *b* is provided with an upwardly-projecting chamber *e*, in free communication with the jacket, and heated by a prolongation *f* of the perforated steam coil *c*. The pan *b* and vessel *e* may be in one piece, or made separately as shown.

21,548. Radelet, F. Sept. 20.

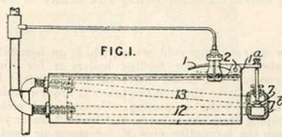


Footwarmers.—An iron bar *B* is heated and placed in the case *A* surrounded by a jacket of a

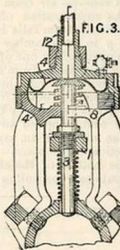
material B which is a bad conductor of heat, and which slowly absorbs and emits the heat of the iron bar. The end D of the case A is pressed by a spring H which allows for expansion. The cover I is secured beneath the lugs J by a bayonet-joint.



21,783. Geipel, W. Sept. 23.

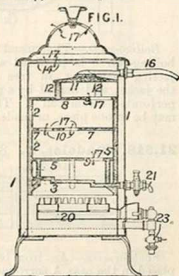


Steam traps.—Relates to steam traps of the type described in Specifications No. 7860, A.D. 1893, and No. 21,571, A.D. 1894. The pipes 12, 13 of differently-expanding metals are connected to the valve casing 7^b. The valve 7 is controlled by a lever 1^a, pivoted at 2 and having its outer end 1 clamped to the spindle 3. In order to render the trap independent of variations in steam pressure, the position of the spindle 3 is automatically adjusted by a flexible diaphragm 4, Fig. 3, exposed to the pressure of the steam upon its upper side. The spindle is pressed against the diaphragm by a spring 8. In a modified arrangement, a piston replaces the diaphragm.



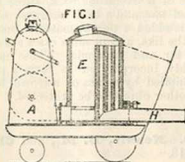
21,856. Shrewsbury, G. Sept. 23.

Heating water.—Geysers for baths and the like are constructed after the manner shown in Fig. 1, in which is a casing fitted with a heater 2 and gas burner 20. Water enters by a pipe 21 and circulates in the hollow flat sections 3, 5, 7, and 8 of the heater 2, passing from one to the other by suitable connections and the annular jacket. The hot gases from the



burner pass upwards by the openings 9, 10 and 11, 14, heating the water flowing in the same direction, and finally escaping by the outlets 17 in the cover. The hot water is drawn off by a pipe 16, and the gas supply is regulated by a tap.

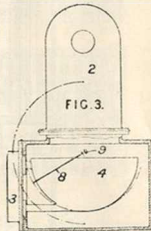
21,993. Watt, P. Sept. 25.



Heating apparatus.—Land, stone, mortar, and the like are thawed by hot air and flame, issuing from the swivelling pipe H, and produced by forcing air, by means of a fan A, through a furnace E.

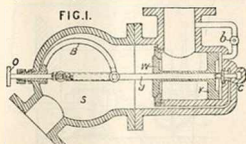
22,141. Willcox, P. F. C., Willcox, H. W., and Willcox, R. J. N. Sept. 28.

Heating liquids.—The apparatus consists of a closed vessel provided with a steam dome 2 and outlet pipe. The hollow door 3 of the casing acts as a steam chest to the box shaped heaters 4, which are divided up internally by ribs, so that the steam entering by an opening 11 is compelled to pass through a series of channels 12 before escaping by the outlet 13. Any incrustation on the exterior surfaces of the heating-elements is removed by a series of scrapers 8 pivoted upon a shaft 9 and operated by a handle secured thereto. The shaft is provided with means for lateral adjustment, so that the scrapers are pressed against the heating-elements.



22,310. Pinckney, P. Sept. 29.

Heating water; heating by water circulation.—The hot water from the cylinder jacket of an internal-combustion engine is used for heating purposes.

22,434. Thompson, W. H., and Thompson, R. Sept. 30.

Steam traps.—Relates to steam traps such as are described in Specifications Nos. 13,748 and 14,847, A.D. 1897. Fig. 1 is a longitudinal section of one form, in which the movements of a curved tube B are used to control a valve C. When the spindle J is raised clear of the valve, the latter is lifted by the pressure in the chamber S, and admits the pressure to the piston Y. The outlet valve W is thus opened to allow the water in the trap to be discharged. The spindle J is then caused to close the valve C, and, as the steam and water escape from behind the piston, the valve W closes. The discharge from the back of the piston is controlled, automatically or by hand, by a valve b, the movements of which may be shown by a pointer moving over a scale. In a modified form of trap, the tube B and valve C are placed in a subsidiary chamber communicating with the trap. In place of the curved tube B, a straight corrugated one may be employed, adjustment being effected by a screw O, as shown in Fig. 1. In another modification, the curved tube B is coupled, direct to the outlet valve, its movements being amplified by a lever or by a pinion gearing with fixed and movable racks.

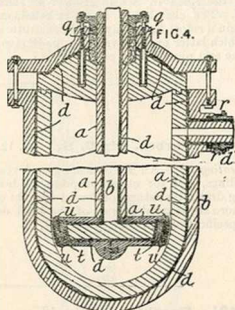
22,610. Brown, H. J., Schmidt, O. E. H., and Mackenzie, A. Oct. 2.

Non-conducting coverings and compositions for steam boilers and other purposes consist of mixtures of mica and silk in a finely divided or disintegrated state. The mixture may be felted or mixed with a cement such as resin, pitch, or shellac.

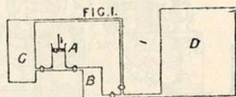
22,640. Thompson, W. P., [Marx, J.] Oct. 2.

Digesters.—Relates to acidproof articles used principally in chemical manufacture. Fig. 4 shows an autoclave or digester constructed according to the invention, the exposed inner parts b being made of earthenware, which are strengthened by the metal linings or casings a, the space between the earthenware and metal being filled with

plastic &c. material d. The stirring-rod works through a graphite box g, and the head of the stirrer consists of transverse tubes, which are



closed at the ends by covers t held in place by wedges u and filling-material. Fig. 4 also shows the method of connecting the tube r to the vessel.

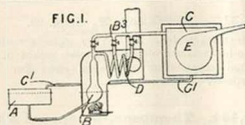
22,641. Kugler, M. Oct. 2.

Heating air; heating buildings.—Relates to means and apparatus for ventilating, heating, and cooling enclosed spaces such as buildings &c. Fig. 1 shows diagrammatically the general arrangement of the apparatus. The air is driven into the space D to be ventilated by a pump A, either through a cooling-apparatus B or a heating-apparatus C, suitable cocks being provided on the pipes to throw the one or the other into action. The heated or cooled air is discharged directly into the enclosed space D, as in Fig. 1, or it may be circulated in a coiled pipe placed in D.

23,054. Higgins, H. Oct. 7.

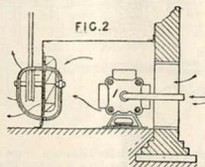
Thermostats.—Consists in the use of vapours generated from liquids, semi-liquids, or solids which vaporize at a temperature above the boiling point of water in order to maintain a constant high temperature. The substances employed may be toluene, xylene, or other suitable substance. The vapours are generated in apparatus such as is described in Specification No. 22,019, A.D. 1897, and comprising a feed-tank A from which the substance to be vaporized is fed into a pipe B heated

by a burner, and the vapours produced either pass directly through a pipe B³ to the heating-chamber C or are first passed through a superheater D of the kind described in Specification No. 7663, A.D. 1897. The chamber C is air-jacketed, and may contain a retort E, or may itself constitute a retort, in which latter case the vapour pipe B³ is connected to the exit pipe C¹ by a coil of pipes.

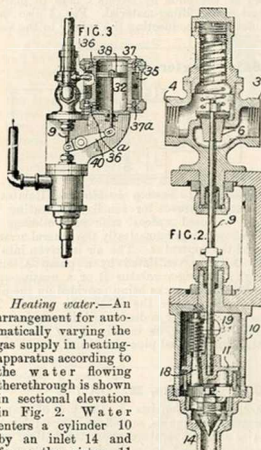


23,466. Forbes, Sir C. S. Oct. 12.

Heating air.—Air for warming and ventilating buildings, and for other purposes, is heated by being drawn by natural or forced draught over one or more steam condensers 1 of the kind described in Specification No. 3027, A.D. 1897.



23,491. Buerkle, A. Oct. 12.

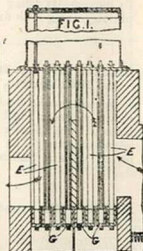


Heating water.—An arrangement for automatically varying the gas supply in heating-apparatus according to the water flowing therethrough is shown in sectional elevation in Fig. 2. Water enters a cylinder 10 by an inlet 14 and forces the piston 11 and valve 18 upwards until the spindle 19 of this latter is arrested by the upper cylinder cover, and a passage is opened for the water to the heater through the piston itself. A conical gas valve 6 upon the spindle 9 moves with the piston 11, and

thereby regulates the opening for the gas, which enters by an inlet 4 and escapes to the burner by an outlet 3. To prevent the extinction of the pilot light by sudden movements of the gas valve, there is an auxiliary cylinder 32, the piston 38 of which is operated from the main spindle 9 by a pivoted link 40. The movement of the piston in either direction lifts one of the ball valves 36, 36, and allows gas from the main to enter the cylinder, and by the same movement gas is forced past one or other of the ball valves 37, 37 into a reservoir in direct communication with the pilot burner, thereby reinforcing the gas supply thereto, and preventing the burner from blowing out.

23,564. Horton, C. P. Oct. 13.

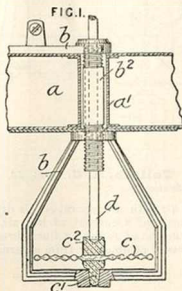
Heating water.—In water-tube boilers having pendent water-tubes E, provided with inner tubes for promoting circulation, the lower ends of the tubes E are connected to sediment chests G, which are arranged out of the direct action of the fire and provided with one or more blow-off cocks.



23,865. Everall, J. B. Oct. 16.

Thermostats for incubators. An arrangement for insulating the hot-water chamber from the

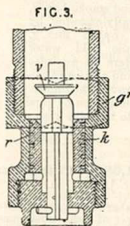
thermostatic device is shown in Fig. 1, in which *a* is the water-chamber and *c* the expansible capsule supported in a frame *b* by a wooden plug *c'*. The valve-controlling rod *d* is supported upon a non-conducting plug *c''* and passes through a sleeve *b'*



carried in the tubular recess *a'*, its upper end actuating the air-admission valve, not shown. The sleeve *b'* and frame *b* are insulated by suitable packing. The rod *d* may be of insulating-material, and there may be two or more capsules to render the apparatus more sensitive.

24,003. Blauhorn, E. Oct. 18.

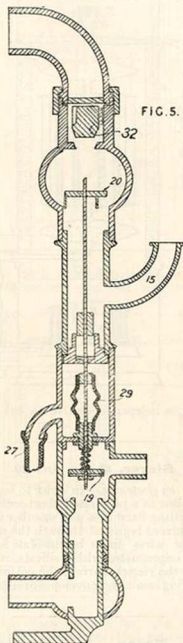
Steam traps.—The piston or plug *k* has annular grooves *r* round it, so that water collecting in the casing *g'* may escape between the grooves and the casing, while any steam passing tends to condense and form a water seal. The plug may be bored to receive a spring-loaded valve *v* for the escape of water independently, or a hand-operated plug cock may be provided for the same purpose.



24,108. Winterlood, J. Oct. 19.

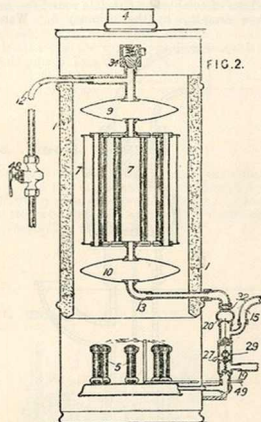
Heating water.—A sectional elevation of the apparatus is shown in Fig. 2; the valve arrangements are shown to a larger scale in Fig. 5. A double jacketed casing *l* is provided with a water-heater consisting of a tubular boiler *7* connected above

and below to chambers 9, 10 connected to the outlet pipe 12 and inlet pipe 13 respectively. The boiler is heated by a series of Bunsen burners *5*, and the products of combustion circulate round the heater before escaping by the chimney *4*. Water is



admitted by an inlet pipe 15, Fig. 5, and passes to the chamber 10 past the lift valve 20 and non-return valve 32. The gas valve 19 and water-admission valve 20 are upon the same spindle, and as the latter valve lifts, a passage for the gas to the burners is opened past the valve 19, but as soon as the outlet cock 48 is closed, the flow of water ceases, the spindle drops, and the main gas supply is cut off, the bye-pass 49 only remaining alight. To prevent water from leaking into the gas-supply pipe, a flexible rubber diaphragm 29 surrounds the spindle and an outlet 27 is provided for leakage water. Should the pressure of steam become

excessive, the escape valve 34 lifts, and allows the steam to act upon a diaphragm, not shown, thereby



operating an independent valve to cut off the gas supply.

24,278. Siever, G. L. Oct. 20

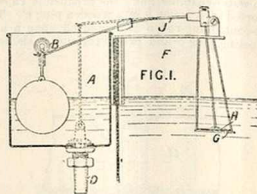
Heating by electricity.—In order to burn ceramic paste, applied to a perforated sheet-metal skeleton or wire netting fixed to a wall or other surface, an electric current is passed through the metal skeleton. The wires may be insulated by cotton coverings impregnated with a silicate, and on being heated by the electric current the cotton is burned away, leaving insulating-envelopes of silicate around the wires.

24,432. Mason, J., and Rixson, F. Oct. 22.

Thermostats.—The temperature of the water circulating through the cylinder jacket of a gas engine is controlled by a thermostat H supported on a platform G in the tank F, and comprising a sealed metal chamber containing blotting-paper soaked with ether or a mixture of ether and alcohol. A rise in temperature causes this vessel H to expand and lift the lever J, which tends to raise the lever of the float valve B in the tank A or to open a valve in the pipe D leading to the bottom of the tank F.

(For Figure see next column.)

24,432.

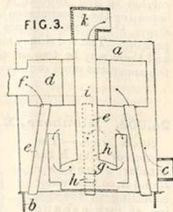


24,505. Tulloch, A. C. Oct. 22. *Drawings to Specification.*

Heating air.—In an apparatus for drying china clay by means of a current of hot air, the air is heated by means of radiating flues through which the products of combustion from a furnace pass.

24,508. Scott, F. B. Oct. 22.

Heating water.—Fig. 3 shows a sectional elevation of a boiler consisting of a shell *a* supported upon the casing *b* of a stove or heater. The hot gases and products of combustion circulate in the tubes *e* and smoke-box *d*, finally escaping by an outlet flue *f*, while cold water enters by an inlet *c* and circulates through the removable system of pipes *h*, *g*, *i* and away by an outlet *k* to the pipe system.



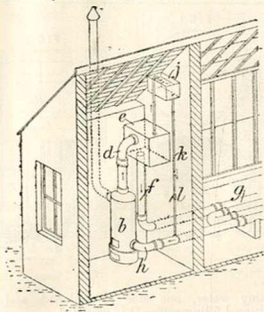
24,680. Frankeberg, E. W., [Frankenberg, E.]. Oct. 25.

Non-conducting coverings and compositions.—A layer of peat moss consolidated by rubber solution is enclosed between folds of a rubber-coated woven fabric.

24,862. Le Poidevin, F. Oct. 27.

Heating buildings.—An arrangement of apparatus for heating greenhouses and the like is shown in the Figure. The boiler *b* is set on the same level as the floor of the greenhouse, and the rising outflow pipe *d* is led into a tank *e* above,

while a down-flow pipe *f* leading from the bottom of the tank communicates with the pipe system *g* having a return pipe *h* leading back to the boiler. Any water forced out of the tank *e* by



steam collecting therein is received in a tank *j* and flows into the main pipes again through a pipe *k* provided with a cock *l*.

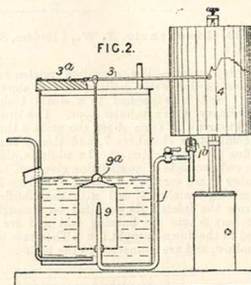
25,420. Lamplough, F. Nov. 2. *Drawings to Specification.*

Thermostats for use in apparatus for the saturation of fibrous materials with resinous matters. The temperature is kept constant by means of a regulator attached to a reservoir containing water, alcohol, &c. The regulator consists of a divided chamber the diaphragm of which is exposed on its upper surface to the pressure of the water or other vapour, while attached to the lower surface is a plunger for closing the gas or steam supply tube. The rod is raised by pivoted weighted levers.

25,456. Delepine, S. Nov. 2.

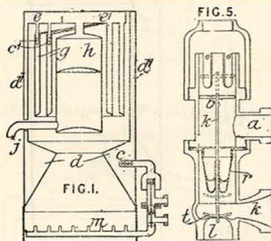
Thermostats.—The apparatus is primarily for indicating or registering the amount or the presence of air in steam or other vapour in a generator, and the moment of its expulsion; it may also be utilized, by closing electric circuits, to regulate the heating of the generator by an electromagnetically-actuated damper. The principle on which the apparatus acts is to condense the steam by cold water, thus separating the air, which may be measured. Fig. 2 shows a form of the apparatus, which may be variously modified. A bell *9* is carried in water which, due to an overflow pipe, cannot rise above a certain level. Steam and air are brought by the pipe *1* through a pressure-regulating valve *1'*, and, while the steam is being condensed, the air escapes through a narrow aperture *9'* controlled by a valve or a short column

through a narrow aperture of liquid. The bell is hung from a lever *3* mounted on a spring *3'* and carrying the required contact device. When the



steam is much charged with air, or is being too rapidly generated, the bell will rise and close contact.

25,515. Barralet, T. E. Nov. 3.

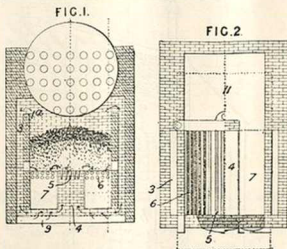


Heating water, geysers for. An annular water-jacketed casing *d, d'*, provided with a gas burner *m*, has a number of annular water casings *g, g'* communicating with a central boiler *h* by channels *e, e'*. Water enters the casing *d* by a perforated pipe *c*, and is delivered into the casings *g* in a circumferential direction by curved pipes *c, c'*, so that the water exerts a scouring action on the walls enclosing it. The hot gases from the burner circulate around the casings and heat the water contained therein, afterwards escaping by a suitable outlet pipe. The casings have bevelled tops so that the steam forming therein tends to collect and escape at the highest point, while the hot water is drawn off by a pipe *j*. The gas valve *f*, Fig. 5, and water valve *b* are secured upon a stem *k*, and are

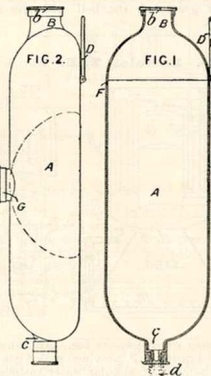
separated by a flexible diaphragm *r*. Water admitted by an opening *a* tends to lift the valve *b*, thereby affording a passage for the gas entering by an inlet *k* to pass to the burner supply pipe *l*.

25,639. Mackenzie, J. W., [*Bulden, S. A.*].
Nov. 4.

Heating water.—The invention relates to the furnaces of hot-water boilers, and is shown in Figs. 1 and 2 as applied to a steam boiler of the ordinary return tubular type. The ordinary draught circuit is from above the grate 6 through the combustion chambers 7, and thence through the flue 11 to the chimney. In addition, the hot gases and products of combustion given off in the chamber 1^a are carried off by the side flues 3 into the mixing-chamber 4, and with the addition of air from the inlets 9 they are fed up through the grate bars 5 into the burning fuel and are consumed in the down-draught fire. The grate bars 6 are hollow, and are connected to the boiler.



26,189. Waldner, E. Nov. 10.

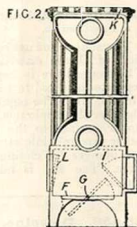


Hot-water bottles; heating water.—Relates to an appliance adapted to serve as a hot-water bottle, or for heating water &c. It consists of a cylindrical vessel *A*, Fig. 1, with rounded ends, the upper end *B* of which is furnished with a screw stopper *b*, while the lower end *C* is adapted to connect to a flexible tube *d* or filter. A handle *D* is provided for hanging the appliance upon a wall, and the cylindrical body is divided into two parts screwed together at *F*, so that when the upper part is removed the apparatus will serve as a food-warmer. In a modified arrangement, Fig. 2, for

heating water, one side is flattened and an additional filling-orifice *G* is provided.

26,530. Dargue, J. A., Griffiths, E., and Wright, C. H. Nov. 13.

Heating buildings &c.—Radiators heated by fluids or by electric currents are provided below with openings, closed by flaps *I*, *L*, to admit fresh air. The heated air escapes by the grid *K* above. A plate *F* is provided to receive the dust deposited by the air. It is supported on centres *G* or may slide in guides so that the dust can be easily removed by rotating or withdrawing it. Or a scraper or the like may be employed to remove the dust from the plate.

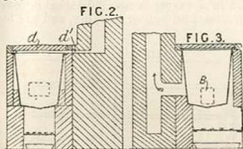


26,573. Caddick, D., and Oliver, C.
Nov. 15.

Boiling-pans.—Washing boilers are made of square or octagonal section of copper, tinned plate, or cast iron. The surrounding flue is divided by a mid-feather *B* to cause the hot gases to take a circuitous route to the chimney. Over the boiler is placed a wooden cover *d* set in a wooden frame, which is perforated to allow the steam to escape to the flue *d*.

(For Figures see next page.)

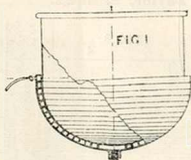
26,573.



26,738. **Allioth, P. G. C.** Nov. 16. *Drawings to Specification.*

Thermostats for incubators. The lamp chimney is provided with a damper suspended from one end of a pivoted lever, the opposite end of which is connected to a thermostat consisting of a float resting on liquid in a U-shaped tube, one limb of which is sealed and contains a volatile liquid, by the expansion of which the thermostat acts to close the damper.

26,961. **Morton, T.** Nov. 18.

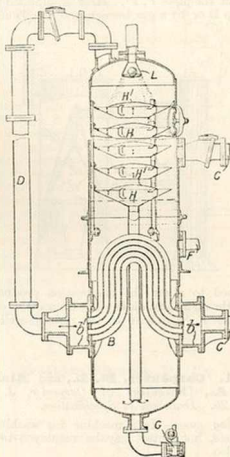


Heating liquids; boiling-pans.—Heating-pans, kettles, and other vessels are partly or entirely formed of a coil or series of pipes placed close together. Fig. 1 shows a boiling or evaporating pan consisting of a coiled pipe, the coils being soldered together.

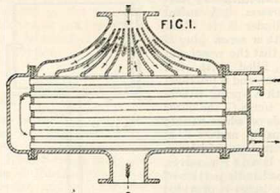
27,026. **McPhail, H.** Nov. 18.

Heating water.—Relates particularly to feedwater-heaters of the type described in Specifications No. 10,453, A.D. 1895, and No. 5391, A.D. 1896, but is stated to be applicable to heating, purifying, and softening other water. Steam is circulated through the pipe C, box b, pipes B, box b', and pipe D, and enters the heater at its top end. The water to be heated enters through a rose L and passes successively to the trays H, each of which has a central opening and is provided with a baffle-plate H'. The heated and purified water flows out through the pipe F, while impurities and precipitates may be blown out through the cock G.

Steam may also be admitted to the heater through a valve-controlled pipe.



27,198. **Martin, J. W.** Nov. 20.

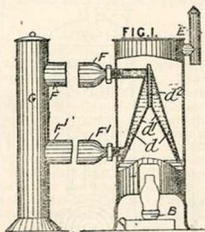


Heating water.—The ingoing heating-steam is caused to pass through a number of ports or passages, so arranged that it is divided into a number of diverging currents so as to be distributed as nearly evenly as possible.

27,471. **Mison, W. G., Carpenter, J., and Neville, A. O.** Nov. 23.

Heating water.—Relates to boilers for use in hot-houses and for other heating purposes. The

water space formed by the conical casings d, d' is in communication with the vertical cylinder G by means of the pipes F, F' . Heat is supplied by an oil lamp B or by a gas burner, and the funnel d'



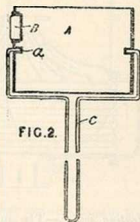
is formed to allow the combustion products to escape through the chimney E . In a modification, the tubes F, F' extend to the right as well as to the left.

27,711. Carpenter, M. L., and Blanch, H. A., [Executors of Carpenter, J. H.]. Nov. 25. *Drawings to Specification.*

Heating gases.—In a machine for washing air and gases, hot water may be employed to heat them also.

28,252. Linton, J. Nov. 30.

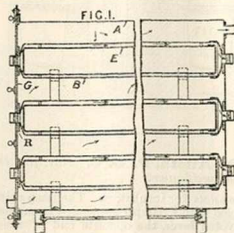
Bed-warmers; foot-warmers.—A metal cylinder A is fitted with a screw plug B so that the vessel can be filled with hot water, and is provided with a spring handle or tongs C , the outer ends of which fit into cups a and form centres on which the cylinder revolves. The handle portion of the tongs is provided with a split tube covering and pinching collar, not shown, to keep the pivots in place; when the apparatus is used as a body or foot-warmer, the handle may be removed.



28,379. Lake, H. H., [Moyet, A.]. Dec. 1.

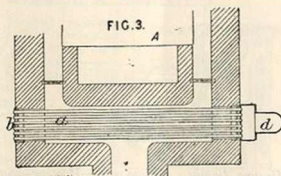
Heating by steam circulation.—An apparatus for heating dry meat to $100^{\circ} C$. to sterilize it is shown in section. The meat is placed in perforated

cylinders E , within thin metal cylinders B , which are held in a casing A by a detachable cover G , with unvulcanized rubber packing, and are heated



by circulating steam at atmospheric pressure through the casing. The ends of the cylinders B are open to admit air through filter pads when the cylinders and contents are removed and cooled.

28,437. Taylor, E. Dec. 2.

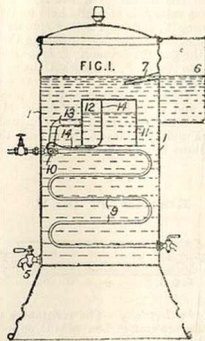


Heating air for warming rooms. An apparatus, for utilizing the waste heat of a boiler or furnace A for heating air, is shown in plan in Fig. 3, and consists of a number of tubes a open to the atmosphere at the left-hand end b , so that air may be drawn in by a fan and become heated by the hot gases circulating round the tubes. The heated air is afterwards led away by a pipe d for drying clothes or warming rooms.

28,535. Paul, E. Dec. 3.

Thermostats for regulating the flow of fluids in water-heating apparatus, boiling-pans, steam traps, and the like. Fig. 1 shows an application to a vessel 1, the water in which is heated by a coil 9 through which steam circulates. A thin cylindrical copper vessel 11, open at the bottom and having a perforation 12 at the top for the escape of air, is connected to the plug of the cock 10 by the lever 13. A small pipe 14 connects the boiler side of

the cock 10 with the inside of the cylinder 11. Normally, after the air has been expelled from the cylinder 11, it acts as a float and cuts off the steam supply or admits a small quantity of steam to the coil 9 to maintain the required temperature. If



water is drawn off through the cock 5, cold water from the cistern 6 flows through the pipe 7 and impinges on the top of the cylinder 11, causing a partial condensation of the steam therein, and the lever 13 is actuated by the falling float and causes the cock 10 to supply more steam to the coil 9. In a modification, the lever 13 takes the form of a pipe connected by an elbow-piece to the plug of the cock, and supplies the small jet of steam to the inside of the cylinder 11. The apparatus may be employed to actuate the supply cocks of gas stoves for water-heaters, a small generator being fitted to supply steam to the cylinder.

28,721. Helberger, H. Dec. 4.

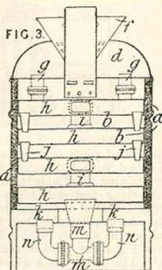
Heating by electricity.—Resistances for this purpose are made by pressing metal foil *b* by a punch into asbestos or other cardboard *a*, and removing excess metal.



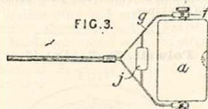
FIG. 1. *a b*

28,980. Somerville, J. Dec. 8.

Heating water.—The heater shown in Fig. 3 consists of casings *a, b*, a hollow dome *d*, perforated funnel *f*, and a series of vessels *h* connected by pipes *i* and expansion pipes *j*. A gas, oil, or other stove is placed under the T-piece *m*. Water introduced into the dome *d* through the funnel *f* flows through the pipes *g* and, circulating through the pipes and chambers *h, i, j, m*, and *n*, is rapidly heated and may be drawn off from the chamber *k* by a cock for use in baths or the like.



29,028. Grafton-Wignall, F. Dec. 8.



Hot-water bottles for warming beds are supported in a frame *g*, the clips of which engage with suitable necks on the bottle. A plain or silvered mirror *j* is attached to the frame and serves as a damp detector.

29,122. Grange, J. Dec. 9.

Non conducting coverings and compositions.—Relates to a composition applicable among other purposes as a non-conducting covering for pipes &c. Blast-furnace slag obtained in the manufacture of North Staffordshire pig-iron is ground to powder, and to each hundredweight is added $1\frac{1}{2}$ gallons of gas tar, 12 lbs. of salt, and 2 or 3 lbs. of starch. The last two ingredients may be omitted. In covering steam pipes, a layer of ordinary non-conducting composition may be applied first and covered with this material.

29,256. Sharpe, N. W. H. Dec. 10.

Drawings to Specification.

Heating air.—Air for use in drying tea &c. is heated by drawing it through tubes which are heated by means of furnace gases.