# 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. 1901-4.

LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
BY DARLING & SON, LTD., 34-40, BACON STREET, E.
PUBLISHED AT THE PATENT OFFICE, 25, SOUTHAMPTON BUILDINGS,
CHANCERY LANE, LONDON, W.C.

1906.

PRICE ONE SHILLING.

# 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. 1901-4.

LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
BY DARLING & SON, LTD., 34-40, BACON STREET, E.
PUBLISHED AT THE PATENT OFFICE, 25, SOUTHAMPTON BUILDINGS,
CHANCERY LANE, LONDON W.C.

1906.

# 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* (price 1*s.*, by post 1*s.* 6*d.*), and the *Appendix to Key* (price 1*s.*, by post 1*s.* 4*d.*), published at the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C.

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 8*d.*, 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.

# NAME INDEX.

The names in *Italics* are those of persons by whom inventions have been communicated to the applicants for Letters Patent.

## ERRATA.

Page 254. Abridgment No. **3989** should be *deleted*.

„ 279. Abridgment No. **10,664.** After date *add* [*Grant of Patent refused*].

*In the volume of this Class for the period A.D.* 1897–1900 :—

Page v. *Under* **Heating by electricity** *add* '97. 29,938. '99. 10,736.
„ ix. *Under* **Thermostats and other apparatus for automatically regulating temperature** *add* '97. 2755.
„ 225. *For* abridgment No. **20,894** *read* **20,895.**

*In the volume of this Class for the period A.D* 1893–96 :—

Page viii. *Under* **Thermostats and other apparatus for automatically regulating temperature** *add* '96. 2349.

*In the volume of this Class for the period A.D.* 1877–83 :—

Page iii. *Under* **Digesters** *add* '82. 1178.
„ iv. *Under* **Heating air and other gases** *add* '83. 1514.
„ v. *Under* boilers *add* '82. 3721 ; *and under* air and gases *add* '82. 3721.
„ vi. *Under* surface apparatus *add* '82. 3721.
„ vii. *Under* **Hot-water bottles and similar heating-apparatus** *add* '81. 270.

*In the volume of this Class for the period A.D.* 1855–66 :—

Page iii. *Under* **Boiling-pans** *delete* '58. 1330.

# HEATING.

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

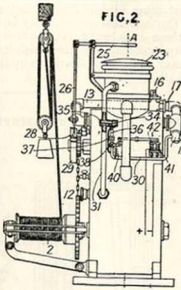
*for which see Abridgment Classes* FURNACES &c.; STOVES &c.

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. 1901.

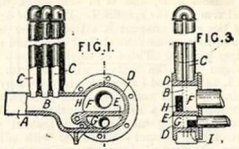
**51. Göhler, M.** Jan. 1.

*Heating water; thermostats.*—In an apparatus for carburetting air, the carburetting-vessel is enclosed in a hot-water jacket. The upper and lower portions of this jacket are connected by a circulating-pipe 31 in which there is arranged an enlarged portion 35, across the centre of which is a metal plate 34. This portion is heated by a gas burner 36. The gas employed is taken by a branch pipe 30 from the gas delivery pipe 19 of the carburetter. The burner is provided with a bye-pass 37 and a valve 38. The valve is turned on by a spring 40, and turned off by an electromagnet 41 acting upon an armature 42. The electromagnet is energized at the required temperature of the water by a thermometer which closes an electric circuit in the known manner.




**70. Harris, T. H.,** and **Hawes, D. M. A. G.** Jan. 1.

*Heating water; heating buildings,* radiators for. The heater or radiator consists of one or more sections or castings A, having internal vertical partitions B forming parallel troughs or chambers which are connected together in pairs by a series of U-tubes C, and of the drum or cylinder D

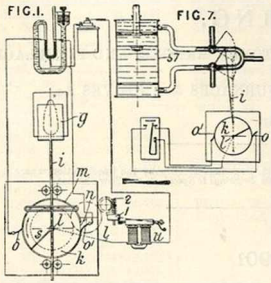



divided into two chambers by the horizontal partition E, the chambers being flow and return chambers for the steam used in the radiators. The flow chamber F is in communication by the port H with the flow trough, and the return chamber G by the port I with the return trough. The radiator tubes are of equal length and diameter, and are narrowed at the leg ends so that the tubes may be placed close together. The apparatus is applicable for heating air or water by exhaust or live steam, and for drying, warming, and ventilating purposes.

**105. Dugenait, L. H.** June 2, A.D. 1900, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

*Thermostats and other apparatus for automatically regulating temperature.*—Relates to automatic temperature or pressure regulators applicable for the operation of valves or cocks, furnace dampers, and ventilators, for admitting hot or cold air to chambers, or for keeping a liquid in a reservoir

at a constant level. In the thermo-regulator shown in Fig. 1, a maximum and minimum thermometer effects the closing or opening of an electric circuit, and the movement of the armature of




the electromagnet *u* allows a clockwork or similar mechanism to operate the rod *i* connected to the valve or register *g* of a furnace or to a cold-air valve. The insulating-disc *k* of the regulator has a part metallic rim *m*, which makes contact with the brushes *o*, *o*', and is in connection with the metal arm *s* of the spindle *l*. When the armature *n* of the electromagnet is attracted, the wheel is allowed to turn, and the shaft 2 drives the valve or damper gearing. Three or more brushes *o* may be arranged to make contact with the rim of the disc *k*, and the rod *i* may operate a cock by a cord passing round it and over guide-pulleys, or may be connected to a series of ventilators. A coiled bimetallic spring may be used instead of the thermometer, contact being made with adjustable screws. Instead of a temperature gauge, a double U-shaped pressure gauge, containing mercury and hydrogen or nitrogen, may be employed as the sensitive portion of the apparatus. In a further modification of the regulator, the electromagnet *u* is merely employed to bring into action a motor in a relay circuit, so that a number of ventilators may be worked by power. In another power-worked ventilating system, three-way cocks are arranged to be operated from the disc *k*, as shown in Fig. 7, and, by controlling the fluid to or from the pressure cylinder 57, Fig. 7, a number of ventilators are opened or closed by power.

---

**575. Schwarz, A.** Jan. 9.

*Heating liquids and gases.*—Relates to improvements on the invention described in Specification No. 4229, A.D. 1898, being means for and the process of transmitting heat for heating fluids or evaporating liquids. The heat-transmitting tubes are formed with internal or external straight or helical ribs, with internal or external transverse projections, or with transverse projections having serrated edges as shown in Fig. 9. Figs. 4 nd 5 show two arrangements for increasing the heat emission.

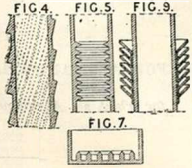



Fig. 7 shows a receptacle having circular grate-like projections at the bottom. These projections may be straight and transverse or otherwise disposed.

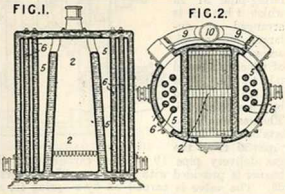
---

**670. Luria, A.** Jan. 10. *Drawings to Specification.*

*Bed warmers.*—Invalid or surgical bedsteads for use in hospitals and the like are provided with various fittings to regulate the temperature &c. A mattress and pillows are used which are adapted to be filled or inflated with hot water or air by means of pipes leading from a heater near the bedstead. The mattress is preferably laid on bars, and under these is a water tank which is heated by pipes underneath connected with the heater; the tank may be used for heating purposes, or may serve as a bath.

---

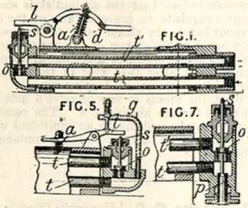
**796. Fox, S.,** and **Hartley & Sugden.** Jan. 12.




*Heating water.*—Weldless boilers for hot-water heating-systems are constructed with a central firebox 2 and two descending flues 5, one on each side, traversed by longitudinal water tubes 6. At the bottom the flues 5 communicate through external branches 9 with the chimney 10. The branches are provided with dampers by which either flue may be put out of action to reduce the heating power of the boiler.

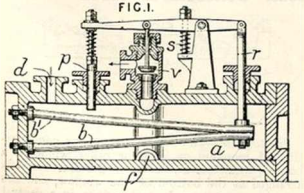
---

**809. Berry, C. H.** Jan. 12.




*Steam traps.*—Relates to steam traps of the type in which parallel tubes or rods, having different coefficients of expansion, are fixed at one end, where they form the steam inlet and water outlet, and are connected at the other end to a valve box, in which the valve is between the tube ends and has an upwardly-protruding stem. In the trap shown in Fig. 1, the stem *s* of the outlet valve *o* makes contact with the lever *l*, which is controlled by the spring *a* round the arm *d* secured at the centre of curvature of the curved portion of the lever. One or both of the tubes *t*, $t^1$ are preferably elliptical or semicircular, or so constructed that less metal is put under compression than is under tension. To prevent blowing off when the trap is started, a counteracting pressure proportionate to the steam pressure is exerted on the lever *l* through the bent tube *g* and its abutting spring, as shown in Fig. 5, or a plunger *p*, as shown in Fig. 7, may be connected to the valve *o* or may act on the lever *l* through linkage mechanism, or the plunger may be arranged to act on a spring and the lever *l* directly. According to the Provisional Specification, when the valve stem is controlled directly by a spring or weight, the pressure devices act upon the valve stem or its spring, and these devices may act either to retard or assist the escape from the trap.

**810. Berry, C. H.** Jan. 12.

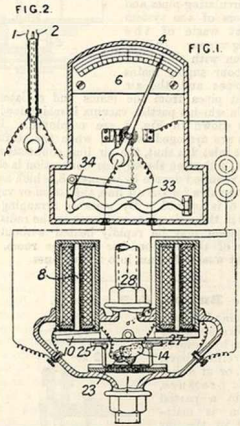



*Steam traps.*—The trap shown in Fig. 1 has two rods or tubes *b*, $b^1$, having different coefficients of expansion, secured at one end to and enclosed within the chamber *a*, which has a steam and water inlet *d* and a valve *v* controlling the outlet. The rods or tubes are connected at one end to the rod *r*, and motion is transmitted by rods and levers or like means to the valve. An annular chamber *f*, open at the bottom, is provided, and the plunger *p*, which is not claimed, adjusts for different pressures at which the trap may work. In a modified form of trap, the plunger *p* is omitted, and the rod *r* and spring *s* are on one side of the lever fulcrum, while the valve stem is on the other side.

**977. Matthews, C. W.** Jan. 15.

*Non-conducting coverings and compositions.*—Equal parts by measure of fine or granulated iron slag, sawdust, cork, and Portland, Roman, or other hydraulic cement, with or without colouring-matter, are thoroughly mixed in a dry state, and water is added just before the composition is used. The mixture is applied in the same manner as cement, and the floor produced is stated to be proof against fire, sound, vermin, and dirt, and soft to the tread.

**1082. Schultz, H.** Jan. 16.

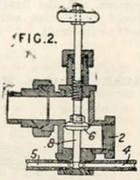



*Thermostats.*—Relates to apparatus for maintaining constant the temperature of gases or liquids, and shown as applied to a valve for regulating the gas supply to a stove. A hand or pointer 4 is adapted to make contact with either of the points 1, 2, Fig. 2, which can be adjusted to any

position along the arc 6, Fig. 1. When the point 1 is touched, the electric circuit is completed through the magnet 8 and a hollow glass switch 14 containing mercury. The armature 10 is then attracted, and operates the sliding-valve through the levers 25, 27, and tilts the switch 14 through an extension of the lever 27 engaging a fork 23, so as to break the circuit. The arm 4 is operated by a spring and a serpentine-pipe thermometer 33 connected to it by a lever 34 and a chain. In a modification, the circuits are made and broken by means of mercury in a bent glass tube into which a number of platinum wires are fused, alcohol being placed above the mercury. The wires may be connected to switches so as to enable the apparatus to work at different temperatures. In applying the invention to a stove, the inlet chamber 28 is connected to a bye-pass.

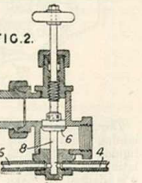
**1272. Russell, J. N.** Jan. 19.

*Heating buildings &c.*—Relates to the heating of buildings by the circulation of steam or vapour, and consists in providing means for enabling the air at starting or at any time to be removed from the circulating-pipes and radiators of the system without waste of the heating-vapour. In conjunction with the steam or vapour supply mains and pipes and the air exhaust pipes from the mains and radiators or pipes in which a partial vacuum is maintained, the valves shown in Fig. 2 are employed. These valves are arranged so that, when the steam or vapour inlet 2 is shut, the air line connection 4, 5 is open, and when the air line connection is closed to the required degree by the stem 8, which acts as a piston valve for the air line, the steam or vapour valve 6 is opened. By suitably arranging the valves in the main pipes and near to the radiators, the system may be rapidly heated without the escape of the confined air into the room, and without waste of steam into the air lines.

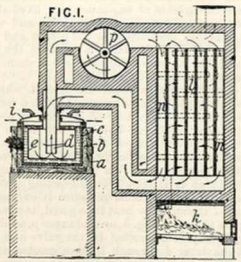



**1273. Russell, J. N.** Jan. 19.

*Heating buildings &c.*—In systems for heating by steam or vapour either above, below, or at atmospheric pressure, wherein a partial vacuum is maintained in the air line services from the mains and radiators or pipes, the valves shown in Fig. 2 are employed in connection with the supply mains and pipes and the air exhaust pipes from the mains and radiators. The valves are constructed so that the air outlet is shut to the degree requisite to prevent waste of the heating-vapour before the steam inlet can be opened, thereby enabling the system or any section thereof to be worked at pressures and temperatures of varying degrees lower than that in the source of supply without waste of heating-vapour. The stem 8 of the steam or vapour valve 6 acts as a piston valve for the air line 4, 5. The combination valve may be replaced by an equivalent valve, or by two ordinary valves worked in combination or otherwise.

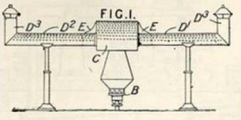



**1393. Marks, G. C.,** [*Hannetelle-Chapuis, A.*]. Jan. 21.




*Heating liquids and gases.*—Air or other gases and liquids are heated in order to be subsequently employed as the heating-agents for concentrating liquids. The air &c. is heated while being caused to circulate through vertical tubes *n* by a fan *p*, the heating being effected by a furnace *k* provided with tortuous flues *l* which surround the tubes *n*.

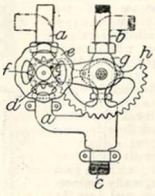
**1526. Wolfenden, B.** Jan. 23.




*Heating air.*—In order to prevent the condensation of moisture on shop or other windows, a bunsen, incandescent, or other gas burner B is arranged at the bottom of the window, and the hot air passes through perforations in a central chamber C, side tubes $D^1$, $D^2$, and through the open ends of the tubes $D^2$. The tubes $D^1$, $D^3$

fit over tubular arms of the hot-air chamber C, and are slotted to engage with ribs E of the chamber.

**1592. Bradley, I.,** and **Trenberth, T.** Jan. 23.

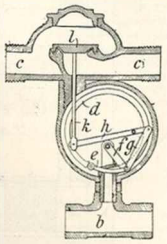



*Heating water* by steam. The steam water-heater shown in the Figure comprises the water inlet pipe *a*, the steam inlet pipe *b*, the outlet pipe *c*, and the water and steam supply valves in their respective casings *d*, *g*. The water supply valve is controlled by the hand-wheel *e*, and, after the valve has been opened to a predetermined extent, the wheel *f* comes into play, and gearing with the sector *h* opens the steam supply cock.

**1678. Clive, J. B.** Jan. 24. *Drawings to Specification.*

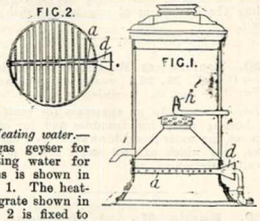
*Thermostats* for incubators. A capsule or other form of thermostat, in the egg drawer, actuates, by means of a vertical rod, a balanced lever, the end of which actuates a second balanced lever from which two dampers are suspended. The dampers are placed respectively over the flue from the lamp, and over a ventilating-pipe in communication with the interior of the incubator.

**1692. Roovers, L.** Jan. 24.



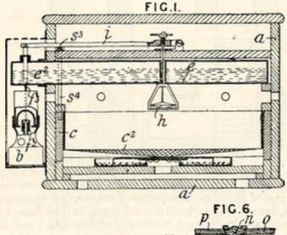

*Heating water.*—A bath-water heater, geyser, or similar apparatus is provided with means for automatically causing gas to be supplied to the burners when the water is turned on and for cutting off the gas supply when the water is turned off. The water-supply pipe *b* communicates with a Bourdon tube *d*, the free end of which actuates, through a system of levers *e*, *f*, *g*, *h*, the rod *k* of a liquid-seal valve *l*, interposed in the gas-supply pipe *c*.

**1693. Roovers, L.** Jan. 24.




*Heating water.*—A gas geyser for heating water for baths is shown in Fig. 1. The heating-grate shown in Fig. 2 is fixed to the base of the apparatus by the two ends of its central gas and air admission pipe *a*, one end being closed, and the other end being provided with the chamber *d* in which the gas and air are mixed. The water to be heated is distributed on to a conical plate by the nozzle *h*, which is of the kind described in Specification No. 12,562, A.D. 1896.

**1776. Gregory, C.** Jan. 25.




*Thermostats* for incubators heated by a hot-water tank. The water tank *e* is formed so that one end $e^2$ projects outside the casing *a* of the incubator, and is directly heated by an oil lamp *b* or by a gas burner. The temperature is regulated by adjusting the flame of the burner. In the case of an oil lamp, the extinguisher $f^2$ is operated by a link $f^3$ from a pivoted lever *i* operated by a rod from an ordinary thermostatic capsule *h*. In the case of a gas burner, the lever *i*, Fig. 6, carries a plug *m* and an oil seal *q*. The plug *m* acts against a seating *n* arranged between the gas supply and delivery pipes *o*, *p*. Additional means are described for lowering or extinguishing the flame when the egg drawer *c* is removed. A bell-crank lever $s^3$, $s^4$ is pivoted in the casing *a*. The arm $s^3$ acts upon the underside of the lever *i* to lower the flame. The arm $s^4$ is acted upon by a spring to raise the arm $s^3$ when the drawer *c* is removed. The

drawer, when in its normal closed position, bears against the arm $s^4$, compressing the spring and holding the arm $s^3$ out of engagement with the lever $i$.

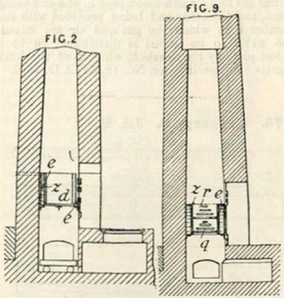
---

**1830. Froitzheim, E.,** and **Schumacher,** [*née* Greuel], **M. M.,** [*trading as* Schumacher, Wwe J.]. Jan. 26. *Drawings to Specification.*

*Heating water.*—In an apparatus for purifying and heating water for laundries and for other purposes, the water flows downwards over zig-zag plates, over which exhaust steam passes in the opposite direction.

---

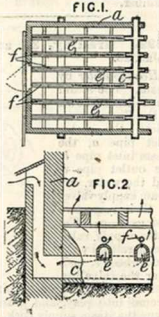
**2109. Ruelle, H.,** and **Montagne, E.** Jan. 30.




*Heating water.*—Relates to smoke-consuming apparatus, adapted for heating water. The smoke is passed through a separate furnace, or through the flames of gas burners, arranged in the base of a brickwork chimney as shown, or beneath a metal chimney. Fig. 2 shows such a furnace adapted for burning solid fuel on a grate $d$ and partly surrounded by a boiler $e$, the water from which may be used as feedwater for steam boilers. An air space is interposed between the casing $z$ of the fire space and the boiler. The boiler, which may be circular or rectangular, is preferably made in sections, vertically divided. Fig. 9 shows two sets of annular gas-jet pipes $r$ arranged in conical form within an annular boiler $e$. In a modification, shown applied to a metal chimney radial gas jets project through the boiler from an annular pipe surrounding it, the jets being inclined upwards at various angles. The various cocks for controlling the supply of gas to the burners and water to the boiler, and the levers for operating dampers for regulating the supply of air are conveniently arranged in proximity to each other.

---

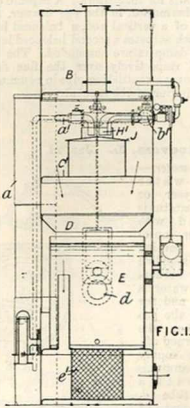
**2178. Sharp, D.,** and **Eatwell, E.** Jan. 31.




*Heating air* for drying sheds for bricks, tiles, &c. Transverse open-ended flues $c$ pass under the shed $a$ and are connected to longitudinal perforated air tubes $e$ over which steam pipes $f$ are placed so as to heat the inflowing air, which passes upwards through the open-work floor into the drying chamber. The air tubes may be arranged diagonally or otherwise, and may be steam-jacketed, or the steam pipes may be placed inside them.

---

**2197. Weddell, E. G., Player, R.,** and **Chamberlain, J. G.** Feb. 1.




*Heating water.*—Relates to apparatus for treating hard water with lime and soda, or either of these, or similar reagents, and heating it by direct contact with steam. The main portion of the

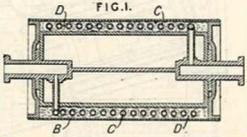
water is delivered to the apparatus by the pipe $H^1$, and the remainder is delivered through the pipe $a^1$, after having been passed through the vessel $a$ containing lime. Soda solution may be delivered through the pipe $b^1$ from the tank B, as an addition to, or substitution for, the lime solution. All the streams are delivered on a plate J, which distributes them over a perforated plate $C^1$, whence they fall in a shower through the steam in the heating-chamber D. The steam is admitted at D to the annular space surrounding the vessel E in which the water collects, and whence it is discharged through the filter $e^1$. The supply of water and reagents is regulated by float valves. The apparatus is specially adapted for treating feedwater.

---

**2273. Fues, E.** Feb. 1.

*Heating by steam or air circulation; heating by electricity.*—Relates to the heating of drying-cylinders used in the manufacture of paper and for other purposes. To prevent explosion, the cylinder B, Fig. 1, is heated indirectly by means of a medium D, enclosed within the shell of the drum and heated by means of a steam coil C. Oil, molten metal, sand, or other material may be used as the medium, and hot air, electricity, or other heating-agent may be used. In a modification, the heating-coil is placed inside the corrugated inner cylinder wall, and the space between the two cylinders formed by the corrugations contains a solid medium. In another modification, a medium such as paraffin oil is heated by a boiler and circulated through a number of drying-cylinders.

FIG.1.




---

**2292. Ahlberg, G. A. F.** Feb. 1.

*Heating water; thermostats.*—Relates to gas water-heaters in which the gas and water supplies are controlled by the turning on and off of the taps of the system and by thermostats. The heater is shown in Fig. 1 attached to a cooking-range, and the valve-operating mechanism is shown in Fig. 2. The cold water enters the heating-coil 1 from the pipe 24 through the water valve 12, which is connected by the spindle 9 with the spring-pressed gas valve 8. A screw plug 16 enables the controlling pressure of the spring 13 to be varied. The thermostat controls the bye-pass valve 28, and consists of the brass or expansible tube 20 with the steel or less expansible rod 29 to which the valve is fixed, or it may consist of an expansible liquid enclosed above a piston, spring-pressed and joined to the bye-pass valve, which is arranged with its seat above. The heated water passes through the thermostat and to the outlet 23, or it may pass round the liquid in the modified form of thermostat.

FIG.2.

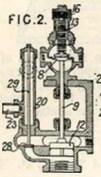
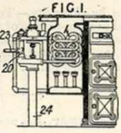



FIG.1.




---

**2418. Noble, K. D.,** and **Irving, J.** Feb. 5.

*Heating liquids.*—Relates to water-tube boilers with concentric water and flue tubes as described in Specification No. 4831, A.D. 1895, the invention being stated to be applicable also to evaporators and other heat exchangers. The front and back headers B, C extend upwards and are traversed by the steam drum D with which they communicate by means of holes as shown. In a modification, the steam drum extends merely between the headers. In the midst of the tubes is a combustion-chamber F with fireclay slabs at its base and sides. The furnace gases, after rising among the tubes, pass backwards through the combustion-chamber to the space $J^1$, whence they are led through the inner flue-tubes to the uptake K. In a modification, the opening $H^1$ is replaced by a series of small tubes traversing the back header.

In the front header is an opening L normally closed by a door; this may be formed by a tube screwed into the plates of the header. Fig. 4 shows a method of securing the tubes in the plates of the headers. The water tubes are secured by nuts M, M¹, and the flue-tubes by a nut N at one end and a stuffing-box N¹ at the other.

FIG.1.

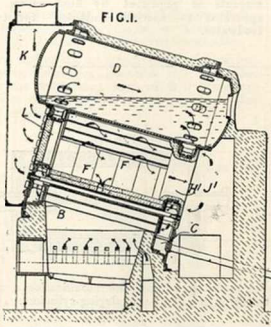



FIG.2.

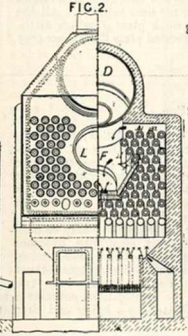
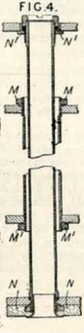
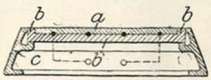



FIG.4.



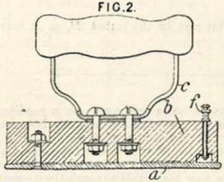

**2618. Loacker, A.,** and **Riedl, F.** Feb. 7.




*Heating by electricity.*—To reduce loss of heat, the actual heating-parts *a* of appliances for cooking, for heating curling or soldering irons, or for other purposes, are separated, by a bad conductor of heat *b*, from other parts *c* of the appliances.

**2619. Loacker, A.,** and **Riedl, F.** Feb. 7.

FIG.2.



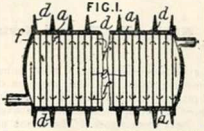

*Heating by electricity.*—Relates to electrically-heated smoothing-irons, and consists in forming the face *a* of a thin metal plate, and the body *b* of a bad conductor of heat, such as artificial stone. The plate *a* is bolted to the body. A usual handle *c* is fixed to the body. The heating-wire is inserted between the plate *a* and the body, and its ends are secured to binding-posts *f*.

**2679. Kronstein, A.** Feb. 7.

*Non-conducting coverings and compositions.*—Materials, such as paper, fabrics, ropes, linoleum, wood pulp, asbestos, asbestos paper, &c., forming articles, such as non-conductors of heat &c., are rendered waterproof and chemical-proof by impregnating or coating with wood oil, either alone, or with other oils and resins, which, when heated, solidify. The heating may be effected either in or out of contact with the air, according to the quality which it is desired to impart to the material. The oil may be mixed with colouring or disinfecting &c. substances.

**2892. Hildebrand, H.** Feb. 11.

FIG.1.




*Heating gases.*—The apparatus for heating gases, shown in Fig. 1, is provided with external ribs *d*

and internal partitions *e* having circular orifices *f* placed alternately above and below, to cause the gases passing through the apparatus to have a circuitous path. The partitions *e* may be slid into the cylindrical casing *a*, and may have flanges for connecting them to the casing.

**3092. Wertenbruch, F.** Feb. 13.

FIG. I.

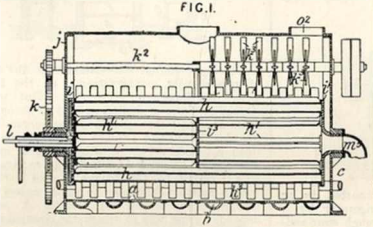
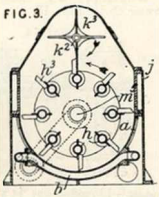


FIG. 3.



*Heating air* for rotary apparatus for drying adhesive materials, spent grain, &c. The drying-chamber consists of two discs $i$, $i^3$ with hollow shafts journalled in the opposite ends of a casing $j$ and connected by a ring of flanged heating-tubes $h$, an inner ring of tubes $h^1$ being placed between a central disc $i^2$ and the disc $i$. The wet material is inserted through an opening $o^3$, and falls into a trough $a$ formed of separate rings or sections, beneath which are passages $b$ connected together and supplied with steam by a pipe $c$. Air circulates under the steam-heated passages, and then passes through a pipe $m^5$ and the hollow trunnion of the disc $i^3$ to the interior of the apparatus. A pipe $l$ supplies steam to a chamber formed inside the disc $i$ and connected to the tubes $h$, $h^1$.

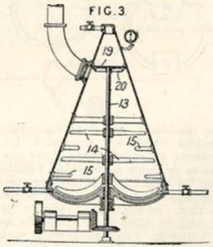
**3352. Shanks, J.** Feb. 16.

FIG. I.

*Heating buildings &c.*—The frame of a lavatory basin is made tubular, as shown, so that hot water entering at D may, after circulation, pass away at G. The basin may be supplied independently, or by a branch H. The hot pipes may be used as a towel rail or for heating the room. Baths may be similarly fitted.

**3470. Powter, N. B.** Feb. 18.

FIG. 3

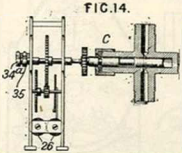


*Digesters.*—Relates to a process and apparatus for the extraction of oil and grease, and also in some cases glue and isinglass, from substances containing them, particularly waste products such as refuse meat, town waste, fish waste, garbage, or vegetable matter such as linseed, cotton seed, hemp seed, &c. Fig. 3 shows a section of a vessel which may be employed either as a digester or separator. The perforated screen 19 is kept clear by a scraper 20 carried by the rotating

shaft 13 which bears the stirring-arms 14. Baffles 15 are attached to the sides. In a modification, the vessel is composed of two conical parts separated by a perforated partition the main part tapering to the bottom.

**3495. Justice, P. M.,** [*Dry Air Refrigerator Co.*]. Feb. 18.

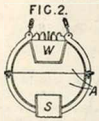
FIG.14.




*Thermostats.*—Liquefied gas is admitted to, or cut off from, the coil of a refrigerator by a plug cock C which is turned through spur-and-ratchet gearing from the armature of an electro-magnet 26 with a make-and-break attachment to cause the armature to vibrate. Current is supplied through one of two commutators 34°, 35 according to the position of the thermostat and the valve. Other forms of motor may be used.

**3553. Milnes, W. H.** Feb. 19.

FIG.2.



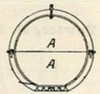
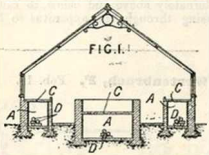




FIG.1.

*Heating buildings*, radiators for. Relates to heat-radiators which are suspended by chains, rods, brackets, or other means above gas, oil, or other flames or lights, and which, besides warming, may be used for disinfecting, decorative, vaporizing, and other purposes, such as protecting ceilings from smoke. The radiator is made globular, with or without radiating ribs, as shown in Figs. 1 and 2. The hemispherical parts A are bolted together, and the tube S, Fig. 2, serves to catch the water of condensation, or to hold water, scents, or disinfecting liquids in the trough around it, and the receptacle W serves to hold plants or flowers for decorative purposes. In a modified form of radiator, the globe is perforated and is suspended in a cradle, whereby it may be reversed and the entering tube S used for flowers or plants.

**3695. Johnstone, E. J.** Feb. 20.

FIG.1.




*Heating buildings &c.*—Relates to the heating of greenhouses, conservatories, or the like, or other buildings or structures. Hot water is circulated from a boiler, as usual, through the pipes D, which are placed in or surrounded by the closed tanks or troughs A, formed of bricks lined with cement or of other suitable material. The top or covering C, adapted to receive flower pots, is fitted to the trough A, and is provided with a suitable handhole to afford access to the trough. The number of troughs A provided depends on the way in which the circulating-pipes are arranged in the structure.

**3784. Salenius, A. T.** July 28, A.D. 1900, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

FIG.1.

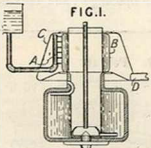
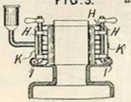



FIG.6.


FIG.8.

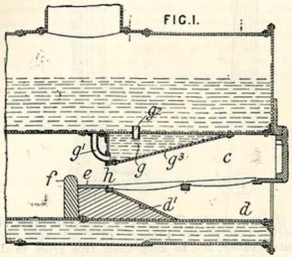

FIG.3.




*Heating liquids.* Milk or cream is heated or cooled in centrifugal separators or churns by jets of liquid, air, or gas. The liquid used may be milk. As shown in Fig. 1 the jets are delivered by a perforated pipe A against the upper part B of the separator and a casing C, and the pipe D collects the waste liquid. Instead of a single pipe, a number of vertical pipes leading from a ring surrounding the vessel may be used, or a jacket with internal perforations supply the liquid all round the vessel to be cooled &c. This vessel may have horizontal or vertical corrugations or projections R, Q of any suitable form, and the jets may impinge on it at an angle, as shown in

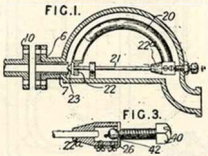
Fig. 6, to drive, or to aid in driving, the separator C. Spiral partitions L may be placed inside the vessel as shown in Fig. 8 to prolong the path of the liquid which then flows in thin streams over the cooled or heated walls. The perforated pipes H may have curved ends to pick up the cooling or heating liquid from the compartment I, Fig. 3, on the revolving vessel, and a guard K returns the liquid.

**3903. Christmas, C.** Feb. 23.




*Heating water*, boilers for. Relates to means for aiding the circulation of water in steam generators and water-heaters, and for preventing the formation of smoke in the furnaces, the application to a Cornish boiler being shown in section in Fig. 1. The back part $d^1$ of the ashpit $d$ slopes upwards to the dead-plate $e$, at the end of which is the bridge $f$ not quite so high as usual. Across the crown of the firebox $c$ is a water-baffle $g$ which consists of an attached chamber communicating by pipes $g^1$ and holes $g^2$ with the interior of the boiler. The front $g^3$ of the baffle slopes downwards to form a narrow outlet $h$ for the furnace gases. The baffle may be fixed underneath the boiler when the furnace is external.

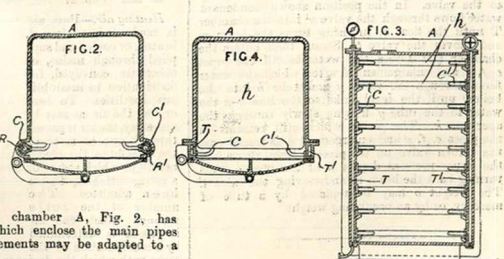
**4104. Whitaker, C. H.,** and **Whiting, A. C.** Feb. 26.



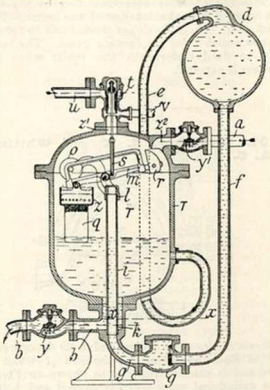

*Steam traps.*—The conical valve 23 is operated by the Bourdon spring 20, the end of which is fixed and is made adjustable as shown in Fig. 3. The cylindrical valve-seat 7 is flanged and bolted between the flanges 6 and 10 at the inlet end of the trap. The valve-stem 21 is connected to the lug 22 of the spring 20, and slides in the apertured lug $22^a$, which is screwed to the piece 26 which forms a horizontal fork for the neck 42 of the screw 40. The screw 40 beyond the neck 42 is enlarged, and provides for the adjustment of the Bourdon spring. The connection between the adjusting-device and the spring allows an oscillatory movement to the spring, to enable the valve 23 to seat properly.

**4126. Passburg, E.** Feb. 26.

*Heating by steam circulation.* To obviate frequent piercing of the walls of a vacuum drying-chamber A by heating pipes, the chamber is fitted with steam channels T, $T^1$, Figs. 3 and 4, connected by supply pipes $c$, $c^1$ to the trays or boxes $h$ of the chamber. In a modification, the chamber A, Fig. 2, has extensions C, $C^1$ which enclose the main pipes R, $R^1$. The arrangements may be adapted to a cylindrical chamber.

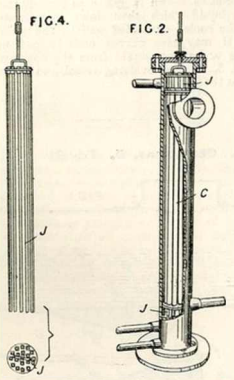


**4148. Schauer, P.** Feb. 26.



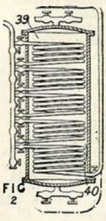

*Steam traps.* — Relates to means for returning to a boiler the water produced by the condensation of the steam. The closed chamber T, placed above the boiler, is in communication with it through the pipe *b* which is provided with a non-return valve *y*. The upper part of the chamber has an opening $z^1$ which leads either to the steam pipe *u* or to the vent-pipe *v* according to the position of the valve *t*, and a second opening $z^2$ leads through the non-return valve $y^1$ to the condensed-water pipe *a*. The tube *i* supports a bent tube *l*, to which is pivoted a beam *m* having a float *q* at one end, a counterpoise *r* at the other, and a sliding weight *o* between the two. The beam *m* is connected to the valve *t* by a pivoted rod *s*, which may move slightly relatively to the valve. In the position shown, condensed water flows through the valve $y^1$ into the chamber T until the float *q*, in rising, turns the beam *m* and moves the valve *t*. Steam then enters the chamber and forces the water to fill the pipes *e*, *f*, *g* and enlargement *d*, after which the water flows through the valve *y* and tube *b* into the boiler, until the level sinks to the line *x*–*x* the water in the tube *g* flowing slowly through the aperture *k*. The water which still remains in the pipes *e*, *f*, *g* and enlargement *d* is forced past the return valve up the pipes *i*, *l* and drops into the upper perforated part *z* of the float *q*, thus turning back the beam *m* and moving the valve *t*. The weight *o* may be replaced by a tube of mercury, or by an oscillating weight.

**4188. Horton, C. P.** Feb. 27.




*Heating water.*—To prevent the formation of incrustation in the tubes C of condensers and water-heaters, and to keep them free from mud, rods or close tubes J, shown detached in Fig. 4, are fitted within them, so as to leave a narrow annular space for the passage of the water, and provision is made for imparting a reciprocating longitudinal movement to such rods or tubes. The Provisional Specification describes also a modified arrangement in which the internal tubes serve for the admission of the water, their lower ends being open.

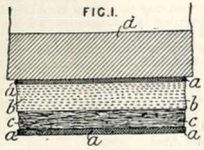
**4222. Chopard, G. A.,** and **Chopard, L. M.** Feb. 27.




*Heating air.*—Pure air is medicated, perfumed, heated, or cooled and supplied through mains, or otherwise conveyed, for distribution in insalubrious localities. To heat or cool the air, as may be necessary, the air is passed through one or more of the coils 40 in the chamber 39 to which steam, or a refrigerating-liquid, has been admitted. The number of the coils through which the air is passed is determined by a manipulation of the cocks with which the device is supplied.

**4276. Taylor, R. H. M.** Feb. 28.

FIG.1.



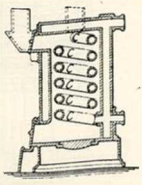

*Non-conducting coverings.* — A detachable non-conducting covering for steam generators, steam pipes, or other purposes consists of a layer *b* of asbestos fibre, silicate cotton, or the like, a layer *c* of hair, hair felt, or the like, and an enclosing-jacket *a* of woven asbestos cloth. The layers *b*, *c* are about half an inch thick, and are held in place by fastenings similar to those employed in mattresses. The covering is detachably secured to the heated part *d*.

**4330. Dowsing, H. J.** Feb. 28. *Drawings to Specification.*

*Heating by electricity.* — Incandescent lamps applicable for heating are provided with special holders.

**4460. Hulse, W. W.** March 2.

FIG.1.



*Heating water.*— A coil C, communicating with the water space, is arranged within the fire space of a vertical boiler for hot-water heating purposes or for generating steam.

**4604. Tänzler, E.,** and **Roessler, E.** March 4.

FIG.2.

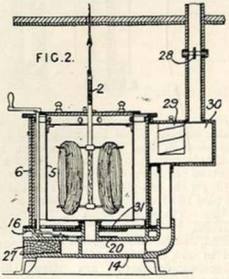
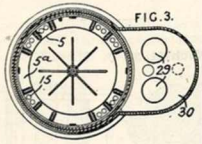



FIG.3.




*Heating air; heating by electricity.*—An appliance for drying and weighing industrial and agricultural materials has a heating and drying chamber as shown in Figs. 2 and 3. A balance is placed on the top of the drying-apparatus 6, and the load-pan supports a frame 2 on which the moist hanks &c. are placed. Air is admitted through a vessel 27 containing a suitable hygroscopic material and passes through an adjustable revolving damper 20 into a chamber 16 containing an electrical heating-plate 31, and then passes into the annular chamber 5a which is divided into cells containing electrical heating-coils 15. The heated air passes through perforations in the top of the drying-chamber 5 and is withdrawn through a pipe 14 at the bottom of the chamber. The exhausted air passes through a chamber 30 in which are electrically-heated vessels 29 for effecting a preliminary heating of the hanks, and the outlet pipe is fitted with a throttle valve 28. When the material has been dried, the throttle valve is closed, and the weight ascertained.

**4890. Calvert, J. G.** March 7.

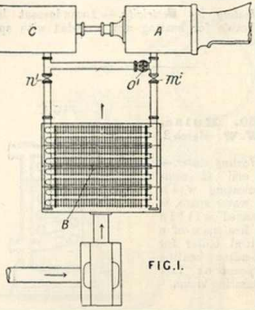
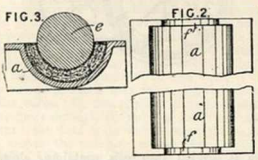



FIG.I.

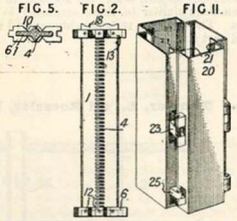
*Heating gases.*—Relates to utilizing the heat of exhaust steam from condensing-engines for heating air or other gases for warming, drying, and ventilating. A battery of heating-pipes B is placed in a branch or loop from the engine exhaust-pipe extending from the cylinder A to the condenser C. Regulating-valves are provided at $o^1$, $m^1$, $n^1$ for controlling the proportion and pressure of the exhaust passing through the heater.

**4970. Michell, H. C.** March 8.




*Non-conducting coverings and compositions.*—Non-conducting coverings, blocks, and slabs, suitable for covering steam pipes, boilers, and the like and for other purposes, are made by spreading a layer of a mixture of divided mica, a binding-agent, and non-hygroscopic material over the interior of a suitable mould *a*, arranging on that layer a layer composed of flake mica and loose open filling-material, and on this second layer a layer of flake mica. A rolling motion imparted to the core *e* supported on the brackets *f* brings the mica flakes concentric with the mould. A liquid binding-gent containing non-hygroscopic material is poured over the inner layer and core *e*. The crust or shell layers are rendered non-hygroscopic by acetate of lead with or without lime. The flake mica used may be such as is obtained by the process described in Specification No. 4969, A.D 1901, [*Abridgment Class* India-rubber &c.]. The filling-material employed may be wood fibre, slagwool, asbestos, granulated or flaked cork, or the like. The moulded material is dried in an oven or by exposure, and, when dry, may be covered with canvas. Instead of forming the coverings of separate layers, they may be formed of an intimate mixture of the materials moulded to shape and dried.

**5121. Justice, P. M.,** [*Erie Exploration Co.*]. March 11.




*Heating by electricity; heating air.*—A standard heater consists of an insulating strip 1, shown in side view in Fig. 2, and in section in Fig. 5, moulded with projections 4, between which a resistant conductor is wound, and with end-pieces 6, 13, 18, the end-piece 6 being recessed to receive the part 18 of another strip when two are placed in line. Transverse holes 12 for fastenings are provided in the ends. Such insulators, when wound, can be fitted together either edge to edge, end to end, or side by side; in the last case, the connecting-conductors are passed through the grooves 10 in the end-pieces. Or the wound insulators can be placed in holders 20, Fig. 11, connected mechanically and electrically by perforated lugs 23, 25; one such holder may be used alone, a projecting grid being placed under the inturned edges 21. A number of the wound insulators may be connected together end to end to form a ring, which is supported by radial adjusting-screws on a rotary fan, and surrounded by the rim of a guard made up of wire triangles connected together at their outer corners, the inner corner of each being hooked on a small ring.

**5219. Kirkaldy, J.** March 12.

*Heating water.*—Relates to portable distilling-apparatus which is particularly adapted for army requirements. Fig. 1 shows a plan of the apparatus, and Fig. 2 shows an elevation with some parts removed. It comprises a framework A, $A^2$ mounted preferably on four wheels and carrying a boiler B, a still C, an engine D, a pump $D^1$, a condenser E, a feed-water tank F, a feedwater heater G, a tank J for the distilled water, a seat $A^5$ for the driver, extra seats $A^7$ for attendants, and a folding chimney $B^2$. It may be drawn by horses, or may be self-propelling, and in the latter case it may be used also for towing purposes. The main elements of the apparatus are arranged so that the weight is equally distributed over the truck. Hot water for drinking, washing, medical purposes, stable purposes, &c. may be drawn off from various parts of the apparatus.

FIG. 1.

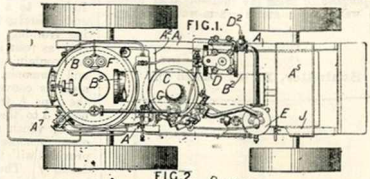
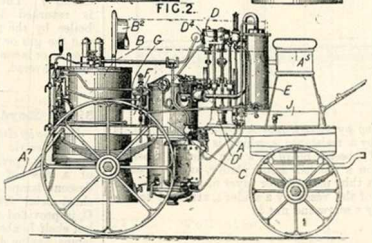


FIG. 2.



**5336. Stocker, J.,** and **Zander, H.** March 13.

*Non-conducting coverings and compositions.*—A substance which insulates against electricity and heat, serves as steam joint packing, and is fire-, water-, acid-, and damp-resisting, is made by dissolving caustic potash in water, adding borax, and then dissolving finely-ground soapstone until a thick liquid paste is formed, which is kept for some hours in a hermetically-closed vessel. After removing the superfluous liquid, calcined or feather alum is added, together with calcined magnesia, chloride of calcium, and some greasy material, preferably Brazilian wax having a high melting point. The compound may be coloured, run into moulds, heated in a stove, pressed, or treated with layers of paper, canvas, or the like, and may be worked into plates, tubes, bars, or fashioned into imitation marble, granite, slate, and the like for covering walls or roofs.

**5423. Leibow, L.,** and **Maitinsky, S.** March 14.

*Heating buildings &c.; heating water.*—The steam from the boiler of a heating-installation is freed from water by being passed through the separator *e*, and is further heated by being conducted in the pipe *t* up the chimney flue. The condensed water is returned to the boiler by the pipes *l*. Instead of the separator, a coil radiator may be

FIG. 1.

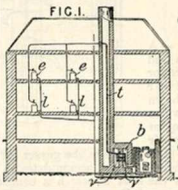
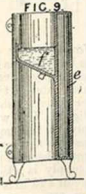


FIG. 9

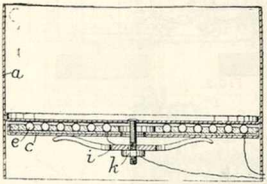


employed to dry the steam in the chamber *b*. In a modified arrangement of plant, a steam generator is employed at each level or floor to be heated, and the return pipes *l* are laid horizontally, enter the top of the boiler, and are provided with a back-pressure valve. The radiators *e*, Figs. 9 and 10, are provided with water holders *f* between the

FIG. 10

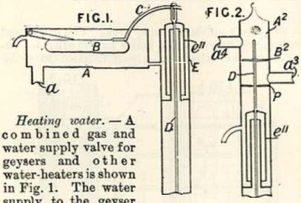
elements of the radiator to keep the air moist. A steam pipe may also be taken through the radiator for the purpose of using the radiator, after filling it with water, as a steam warm-water heating-element.

**5487. Schindler, F. W.** March 15.




*Heating by electricity.*—A cooking-vessel *a* is heated by a resistance *e*, which is coiled between strips of asbestos board on a thin mica or asbestos disc, upon a flanged metal plate *c*, and is pressed against a thin mica disc or layer of enamel on the bottom of the vessel by a spider *i*, attached to the vessel by a screw and nut *k*.

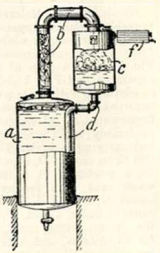
**5767. Barralet, T. E.** March 19.




*Heating water.*—A combined gas and water supply valve for geysers and other water-heaters is shown in Fig. 1. The water supply to the geyser passes into a reservoir A from whence a pipe *a* leads to the geyser. When the supply is adequate, water accumulates in the reservoir and lifts the float B, which is connected by an arm *c* to a rod D actuating an ordinary lift valve in the gas supply pipe. A tube E is supplied with water from the reservoir, and contains a water seal which may be a bell device $e^{11}$ as shown. In a modification, the reservoir $A^2$, Fig. 2, has an inlet $a^3$ and outlet $a^4$, and the passing water lifts the piston $B^2$ which is connected directly or indirectly to the valve-rod D. A perforated plate P allows water to pass to the water seal $e^{11}$.

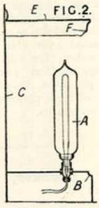
**5817. Erfurt, M.** March 19.

*Boiling-pans.*—Relates to a process and apparatus for boiling frothing liquids, such as resin soap, or tar containing water and ammonia. The scum is conveyed by the pipe *b* from the boiler *a* to the chamber *c*, which may be open or closed and provided with the condenser *f*. The liquid is returned to the boiler by the pipe *d*, and the gas or vapour escapes or is condensed and recovered.

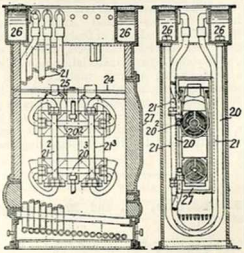



**5906. Boyd, R. W.** March 20.

*Heating by electricity.*—An electric heater, consisting preferably of a row of incandescent lamps A in a sheet-metal frame B, C, is provided with a hot shelf E above the lamps, having depending flanges F to retain hot air rising from them, and serving to warm vessels or dishes which may contain food or liquids, while the heater warms the room.



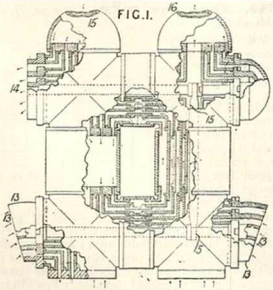

**5915. Sayer, R. C.** March 21




*Heating water.*—Apparatus for boiling and evaporating water is constructed of concentric

tubes arranged in connection with cross angle-pieces to form a frame of rectangular or other form as shown in Fig. 1, the whole being connected together so that its joints are tightened by

FIG.1.

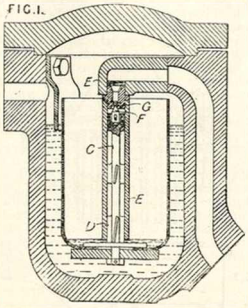



the expansion of its parts. Alternate annular spaces formed by the concentric tubes are occupied by the water and the heating-gases. The water enters at 15 and the steam escapes at 16. The heating-gases enter at both sides at 13 and escape at one side at 14. The joints between the straight tubes and the angle-pieces are butt or coned socket-joints, and the angle-pieces may be made in one casting, or built up in sections which are divided by radial or diametral planes, and united by bolts or rings shrunk on. The whole is secured together by external bolts $20^2$, $20^3$, $21^2$, $21^3$, Figs. 7 and 8, which are made hollow, and connected up to the feedwater-heating system so that they are kept cool; the joints are thus tightened by expansion. The apparatus is suspended in the furnace casing by a strap 25 from side supports 24, on which it may be run in and out of the furnace when the door 27 is removed. The feedwater is contained in the tank 26 and is heated by circulation through the tubes 20 and 21, which follow the walls of the furnace casing so as to form a lining therefor.

**5938. Poole, W. J.** March 21.

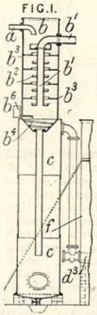
*Steam traps.*—Relates to means for equalizing the wear in the valves of steam traps and in valves in general. Spiral or inclined vanes are fitted to the valve-spindle to cause rotation by the fluid flow, and the spindle is weighted by a wheel or its equivalent to store up momentum. In the inverted bell type of steam trap, shown in Fig. 1, the central spindle C is guided by the spiral vanes D, and the valve F closes on the seat G in the interior of the discharge pipe E. The bell itself, by its weight, acts as the momentum storing part.

FIG.1.




**6129. Wollaston, T. R.** March 23.

FIG.1.

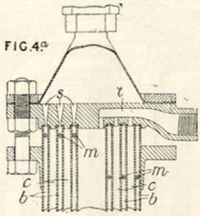


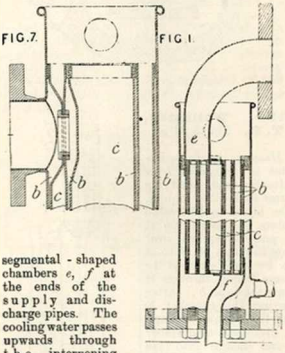

*Heating liquids.*—Relates to apparatus for softening and purifying water and other liquids. The liquid to be treated enters the chamber *b* at *a* and is spread over flanged plates $b^2$, $b^3$, so as to be well exposed to steam rising through it from the pipe $b^1$. After leaving the chamber *b*, the liquid flows through a first settling-chamber *c* and thence into the final settling-chamber, where the deposit collects on inclined baffle plates, from which it slides into side deposit chambers.

**6146. Bennett, F. E.** March 23.

*Heating liquids and gases.*—Relates to surface apparatus for effecting the transference or exchange of heat between fluids. The invention is described as applied to condensers, but may be applied to feedwater heaters, evaporators, and the like. The apparatus consists of a number of concentric tubes with intervening annular spaces, whereof alternate spaces are preferably very narrow, so as to increase the heating or cooling

surface in relation to the volume of fluid being acted on. Fig. 1 shows one form of condenser in which the narrow annular spaces *b* for the passage of the vapour are connected above and below to



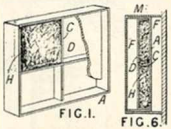




segmental-shaped chambers *e*, *f* at the ends of the supply and discharge pipes. The cooling water passes upwards through the intervening spaces *c*, which are open to the casing except at the parts occupied by the chambers *e* and *f*. In place of the closing pieces shown at the ends of the concentric tubes, the tubes themselves may be brought together in pairs at their ends and riveted or otherwise joined together. In a modification, the casing is closed at both ends. Two or more condensers may be arranged in series, being preferably slightly inclined from the horizontal one above another. Fig. 4a shows a modification, in which the concentric tubes are held between grooved end plates, one only of which is shown. The plates are formed with segmental chambers *t* for the passage of the vapour, and with ports *s* for the passage of the condensing water. Baffles of wire *m*, helically or otherwise arranged, may be placed in the annular spaces for the vapour. Fig. 7 shows another form, in which the vapour admission and outlet openings are at the side of the casing, openings being formed through the outer pairs of concentric tubes in the manner shown to admit the vapour to the inner pairs.

---

**6342. Thompson, W. P.,** [*Stevens, B. A.*]. March 26.

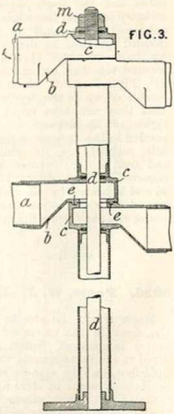
*Non conducting coverings and compositions* for refrigerators &c. A box D, divided by partitions C and filled with non-conducting material H, is inverted in a second open topped box A of greater depth, and this in turn may be inverted in a third box M of equal or greater depth. One or two air spaces F are thus provided when the blocks are built up to form a wall or lining with or without paper coverings. The partitions C may be made of wood, and the boxes of paper &c. glued or tacked together. The filling H may consist of mineral wool reduced to small pieces of approximately-regular size. This material is separately claimed as a heat-insulating material.




---

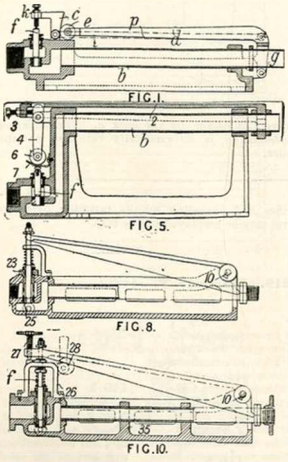
**6440. Worssam, H. J.** March 27.

*Heating liquids.*—Relates to pipe coils for brewers' attemperators and for all heating coils which are not subject to very high pressure, and comprises a special joint which is less liable to leak than the usual flanged joints, which can be easily taken to pieces for cleaning, and in which the angle between adjacent pipes may be varied. The pipes *a* of the coils are fitted into sockets *b*, each of which terminates in a head *c* with two opposite flat surfaces on it. One of these surfaces has a hole through it just large enough to allow the passage of a screw bolt *d*,



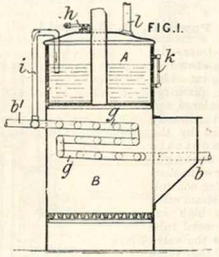
while the opposite surface has a hole through it of larger diameter than this. When these socket heads are to make joint with each other, they are placed together so that the wider openings coincide, and a bolt is passed through them on which is screwed a nut to tighten the joint. In most cases, a washer *e* is placed between the meeting surfaces. In Fig. 3, one bolt *d* and nut *m* are shown as serving to tighten together a number of joints which lie in the same vertical line.

**6522. Haigh, N. N.,** and **Sugden, T.** March 28.




*Steam traps.*—Relates to traps in which, under the expansion or contraction occasioned by the movement of a tube or tubes, a positive thrust or release of thrust is given to the spindle of a valve so as to open or cause to be opened such valves to discharge the water of condensation, irrespective of the pressure under which the trap is working. In the trap shown in Fig. 1, when the tube *b* expands, the roller *e* attached to the lever *d* fulcrumed at *g* travels up the curved lever *c*, so thrusting the pin *k* upon the valve spindle *f*. The free end of the tube *b* is connected to the steam pipe in such a way that the requisite movement is possible. Instead of the fixed lever *c*, a loose head and a tie-rod *p* may be employed. In one modified form of trap, the thrust is transmitted by rods and a spring-pressed lever to another lever, which actuates the valve spindle. In another modification, Fig. 5, the lever 2 is attached to the end of the tube *b*, and thrusts against the lever 4 by the pin 3. The roller 6 works on the spring-like cam plate 7. In a further modification, a pivoted lever acts directly on the valve spindle, and a second lever with an end roller works a pivoted thrust lever which increases the lever pressure, while the effort to raise the valve is constant. In the trap, Fig. 8, the moving parts are reduced to a minimum, and the valve seating is preferably formed in combination with the gland bush 23, or as a separate plug 25, and the joint 10 is a knife-edge bearing. A stronger form of simple trap is shown in Fig. 10. The valve spindle *f* passes through the bracket 26, and the screw 27 or cam 28 provides for blowing-off. Bosses or supports 35 are provided upon the casing. The valve is held upon its seat, in a further modification, by a dead weight on a graduated lever, instead of by springs. By varying the mounting of the levers and springs, the operations or thrusts may be reversed, when so desired, for any particular type of valve which is to be employed in the trap.

**6542. Rühling, J.** March 28.

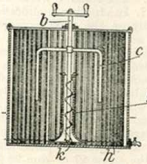



*Heating water; heating buildings.*—Relates to means for preventing freezing of water in house service-pipes and for heating the water-closet or other rooms of a house, a sectional elevation being shown in Fig. 1. The supply pipe *b* has two branches, of which one *g* passes through a heater B to rejoin the continuation $b^1$ of the supply pipe. The pipe *i* leads water from the branch *g* to a tank A, mounted within the heater, so that steam can pass through the pipe *l* to a coil of heating pipes arranged in any other room. By means of valves the water is supplied either directly to the taps or in cold weather, through the branch *g*. The tank A has a safety-valve *h* and a level indicator *k*.

**6595. Ecker, A.** March 29.

*Boiling pans.*—Relates to a washing-machine which may be constructed to be placed on the fire if desired. Fig. 1 shows a vertical section. The beaters *c* are carried on a rotary shaft *b*, which is provided with a worm *k* to cause a flow of water up the funnel *g* of the perforated false bottom *h*.

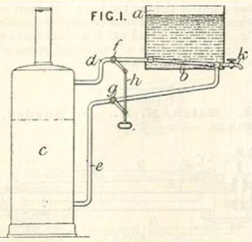
FIG. 1.




**6612. Hindley, L. A.** March 29.

*Heating liquids.*—The apparatus for heating water or other liquid by steam is shown in Fig. 1, and comprises the steam boiler *c*, the heating-tank *a* situated above the boiler water level, the heater *b*, which is in the form of a grid and slopes downward within the tank, and the flow and return pipes *d*, *e*. The valves *f*, *g* are operated simultaneously by the link *h* or other means. Air is

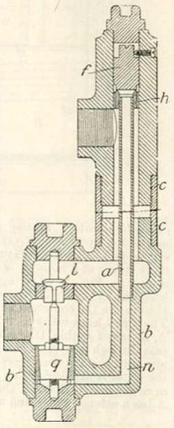
FIG. 1.




allowed to escape by the cock *k*. The water of condensation is automatically returned to the boiler.

**6814. Pownall, P. E.** April 1.

*Steam traps.*—In the trap shown in the Figure, the water discharge valve *l* is large, and is not directly controlled by the thermostatic tubular arrangement or equivalent means for controlling the steam valve *h*. The high expansion metal tube *a* carries the valve *h*, and the valve seat plug *f* is adjustable. Attached to the low-expansion tube *c* is the casting *b*, which has the steam port *n* and provides seats for the discharge valve *l* and the operating-piston *q* or an equivalent diaphragm for opening the valve *l* when the steam valve opens and admits steam to the inner tube *a*. Instead of a thermostatic control, a float governing the steam-regulating orifice and operating by the variation of water level may be employed in the trap.




**6819. Kaeferle, F.** April 1.

FIG. 1.


FIG. 2.

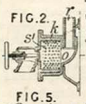



FIG. 3.

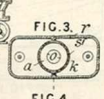



FIG. 5.

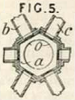
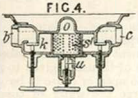



FIG. 4.



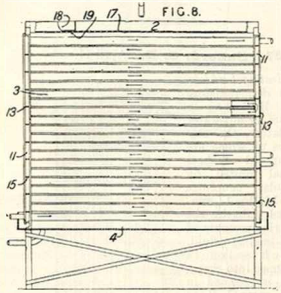

*Heating liquids.*—Relates to apparatus for mixing liquids and fluids, applicable for heating water for baths &c., by steam, for mixing different dyebaths and at the same time heating them by steam. The supply pipes *b*, *c*, *d*, Fig. 1, which open into a common mixing-chamber *a* provided with an outlet *o* are each fitted with a perforated diaphragm *s* for the purpose of obtaining a fine division and the close and uniform mixture of the

substances. Figs. 2, 3, and 4 show an arrangement specially applicable for heating water for baths, in which the diaphragm takes the form of a perforated cylinder $s^1$; a pipe $r$ leads to the rose of a shower bath and another $u$ to the bath itself. In a modification, the perforations pass through the cylinder tangentically and the pipes $b$, $c$ open upon it tangentically. Fig. 5 shows an arrangement with a polygonal chamber for mixing a number of substances. In another form, a pyramidal chamber is used.

---

**6882. Stack, T. L. F.** April 2.

FIG. 8.




*Heating liquids.*—Relates to the arrangement of plant in dairies for sterilizing and separating milk. Reference is made to Specification No. 13,273, A.D. 1900. The Specification describes several arrangements of heaters, coolers, and separators designed to diminish the amount of steam required for heating, and the amount of water required for cooling. The hot milk, as it comes from the sterilizer, and the partially-cooled milk, as it comes from the separator, are passed through or over a special apparatus to heat the cold milk, which is caused to flow over or pass through the apparatus. Fig. 8 shows the apparatus partly in section. It consists of a number of parallel pipes 3, connected at the end by boxes 11 having adjustable partitions 15 for connecting the pipes in such a way that the liquid must take a zig-zag course through the apparatus, as shown by the arrows. The boxes have removable end walls 13 so that access may be easily obtained to the inside of the pipes 3 for cleaning. The pipes 3 are enclosed in a removable casing to prevent the liquid from passing over them from splashing. The liquid is distributed over the pipes by a trough having holes 17 in its bottom. A slide 18, having a pin 19 engaging one of the holes 17, is employed when it is desired to restrict the efficient surface area of the pipes. The liquid collects in a saucer 4 at the bottom of the apparatus. The flow of liquid over the pipes 3 is automatically controlled by a throttle valve in the feed-pipe operated by suitable connections from a float placed in saucer 4.

---

**6953. Trane, J. A.** April 2.

FIG. 2.

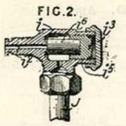
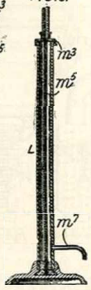



FIG. 3.

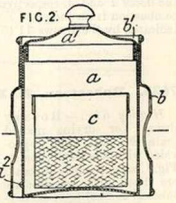



*Heating buildings &c.*—Relates to means for discharging the air, forced from the radiators used in heating systems, into the atmosphere. With a single-pipe heating system, each radiator is fitted with the automatic air valve shown in Fig. 2, in which the casing $i$ is closed by the cap $i^3$ carrying the screw plug $i^5$ and the expansible plug $i^2$, which controls the air inlet $i^4$. The discharge pipes J are connected together and to the escape sealing-device L, Fig. 3. The tube $m^5$ is supported by the cap $m^3$, and dips into mercury or other liquid. The air escape vent $m^7$ is arranged above the liquid seal.

---

**7228. Allday, H.,** [*trading as* Horton & Allday]. April 6.

FIG. 2.




*Heating liquids.*—Relates to portable appliances for heating water for shaving and other purposes and for other analogous uses, which appliances are capable of being stowed into small compass when not in use. The apparatus, shown with the parts nested together in Fig. 2, comprises the receptacle $a$ for the water, the "spiritine" or other box $c$ for heating, and the open-ended casing $b$ for enclosing the lamp or heating-box. The receptacle $a$ is fitted with a lid $a^1$, with the flange $a^2$ for resting on the flange $b^1$ of

the casing or stand *b*, and with one or two hinged and folding handles. In a modified form of apparatus, the parts fit within the water receptacle when nested together, and the receptacle may have a hollow depression which fits on to a projecting neck on the stand *b*, or it may have an annular projection for fitting on to the mouth of the stand.

---

**7329. Orvis, O. D.** April 9.

FIG.1.

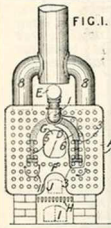
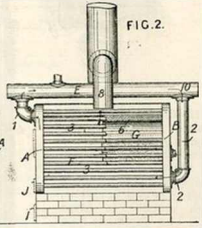


FIG.2.



*Heating water.*—Relates to a water-tube boiler having a combined down-draught and up-draught, and applicable for heating water. The water tubes 3 of the boiler connect the two headers A, B, and the top of the front header A is also in communication with the bottom of the other B through the tubes 1, 2 and drum E, along which the water circulates in the direction indicated by the arrows 10. One tier of the water tubes forms a grate F, upon which is built a firebox G consisting of walls 5 and an arc 6 extending between the headers. A charging-opening D is formed in the front header, and below the firebox is arranged a grate H to which air and fuel are supplied through the doors I and J respectively. The products of combustion from the grate F pass in the direction indicated by the arrows 11 to the uptakes 8.

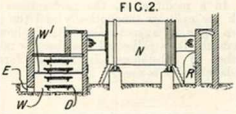
---

**7423. Robertson, R. B.** April 10.

FIG.1.

*Heating air.*—Rotary drums for drying malted grain &c. and usually provided with a central tube A, Fig. 1, and peripheral tubes C are fitted with intermediate tubes B to facilitate the drying process. The tubes are perforated, and hot air is passed into the drum through the tubes B and exhausted through the tubes A and C, or *vice versâ*. An air-heating apparatus for use with the drum consists of a chamber W, Fig. 2, divided into two compartments by a partition $W^1$ and containing steam coils D. By means of a fan R, air is drawn in at the

FIG.2.



opening E and passes through the heating-chamber and then through the drum N.

---

**7467. Safford, C. B.** April 11.

*Heating buildings &c.*, radiators for. Relates to steam or hot-water radiators, the sections of which are composed of sheet metal united by tubular couplings 14, 16, 15, 17, rendered tight by the interior pressure of the heating fluid. Each section is stamped into shape, and is formed in two parts 1, 2, as shown in Figs. 3 and 4, and has upper and lower tubular couplings which telescope into similar

FIG.2

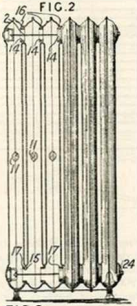


FIG.3.

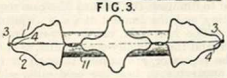
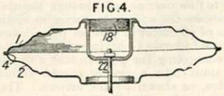


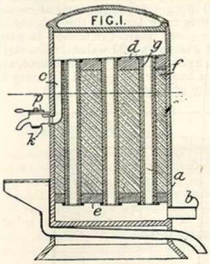
FIG.4.



couplings on the adjacent section. Tie-rods 22 pass through and secure the sections, and fasten the end sections against displacement. The outer margins 3, 4 of the parts of the sections are fastened together by bending the margins upon themselves or bending in one direction and back again in the opposite direction so as to form reinforcing folds on both sides of the seam. The

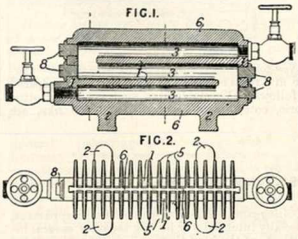
transverse tube 11 serves to strengthen the sections, as well as to connect the vertical tubes. The screwed portions 18, Fig. 4, provide for the attachment of valves or pipes or for closing-plugs 24.

**7524. Quain, J. R.** April 12.




*Heating by electricity; heating liquids.*—Electric current supplied at a moderate pressure for lighting is reduced to a lower pressure by transformers or converters for use in heating-apparatus, in order that less efficient insulation may be necessary. The current of moderate pressure may be transformed from a high-pressure supply. The heating-current may be regulated by cutting out coils of the transformers, or adjusting their cores, or varying the resistance in circuit. Cooking pots, pans, or other utensils may be heated by passing the current through them. A gridiron made by bending a continuous rod may be thus heated. Water or other fluid may be heated by direct contact with uncovered resistances in a containing vessel, such as a kettle; steam may be thus generated, or water heated for warming buildings. Ovens and water baths may be heated similarly. Or the fluid may be passed through enamelled metal tubes, which also convey the heating current; tubes for use similarly may be made by dipping conducting-helices into enamel or similar insulating-material. A heater for fluids may consist of a vessel *a*, Fig. 1, containing two perforated diaphragms *d*, *e*, between which is a perforated block *f* of cement or like material, supply and discharge pipes *b*, *c* being provided so that the fluid passes through the perforations, or through tubes therein, where it is heated by helical, tubular, or other resistances *g*. The discharge of fluid is controlled by a valve *k* connected with a switch *p* controlling the supply of current to the apparatus. A thermometric device may be used to vary the resistance in circuit. The heating-apparatus may utilize the heating effects of Foucault currents; alternating current is passed through wires insulated with enamel, asbestos, mica, or the like, surrounding tubular cores of iron or steel, which may be filled with small particles of steel, the fluid being passed through them.

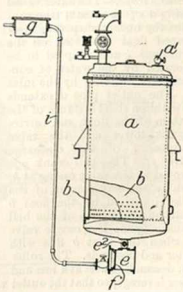
**7554. Sivewright, G. W.** April 12.




*Heating buildings*, radiators for. The heat-radiator shown in Figs. 1 and 2 comprises the metal casting 1 formed with feet 2 and with three or more horizontal passages 3 arranged one above the other and connected so as to form a zig-zag passage for the steam, hot water, or air, and surrounded by metal ribs or projections 5 integral with the body portion 1 and connected at the top and bottom by short longitudinally-arranged vertical ribs 6. The removable plugs 8 enable the hollow interior of the radiator to be examined or cleaned.

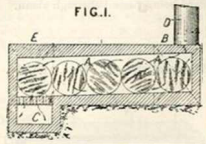
**7802. Scott, E. G.** April 16.

*Digesters.* Relates to the extraction of fats, particularly tallow. The substance to be treated is placed in the perforated cylinder *b* contained in the digester *a*. Steam is supplied through the pipe $a^1$. The liquid tallow flows through the valve $e^3$ into the filtering chamber *e*, and is forced through the perforated plate *f* up the pipe *i* into the steam trap *g*, whence it passes to a suitable clarifying-vessel.



**7902. Cooper, E. W.** April 17.

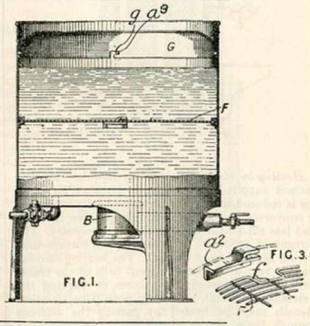
FIG.I.




*Non-conducting coverings and compositions.*—Carbon in a form suitable for this purpose is prepared as follows:—Vegetable fibre, such as cotton, cotton fabric, cotton waste, threads, and the like, are carbonized in special furnaces. The fibre is placed in metal cylinders A, preferably of copper, having each a loose cover $A^1$, and perforated, or otherwise constructed, so as to allow gases to escape. These cylinders or retorts are inserted through a door B into the top end of a heating-chamber or oven, having an inclined floor, so that the cylinder rolls down to the lower end. Other cylinders are introduced until the chamber is full. The chamber is heated by an ordinary or a gas furnace C, the gases given off during carbonization escaping to the chimney D along with the products of combustion. The cylinders are withdrawn through the door E, and the contents thereof immersed in water, and when cold washed in cold water. The carbonized product is flexible, porous, and absorbent, and does not soil the hands when touched. It may be used for a variety of purposes.

**7996. Cox, H.** April 18.

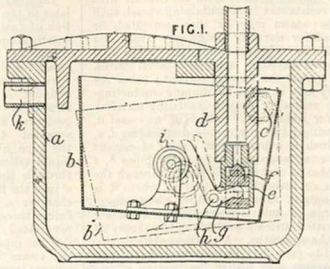
*Boiling-pans.*—A boiling-pan or similar apparatus, especially intended for boiling together several ingredients of the kind that ordinarily require to be stirred or agitated, is shown in Fig. 1. The pan is heated by a gas burner B or by an ordinary furnace, and is fitted with a perforated or reticulated plate F, readily detachable from the pan. The plate F has recesses *f*, Fig. 3, for enabling the plate to be laid on the supporting-lugs $a^2$ and kept in position. A rim or curved flange G may be fitted into the mouth of the pan, to prevent boiling over, and may be retained in place by pins $a^3$ entering into bayonet slots *g*. For jam boiling, the fruit is placed between two perforated plates F, and the usual picking or stoning may be dispensed with.




**8189. Blackmore, F. E.** April 20.

*Steam traps.*—The outer vessel casing *a* of the steam trap contains the bucket-shaped or disc-shaped float *b* pivoted on the trunnions *c* and adapted to be operated by the water of condensation entering by the inlet *k*. The outlet pipe *d* extends to within a short distance of the bottom of the float, and carries at the lower end the valve chamber *e* of the discharge valve *f*. The bell crank *g* is pivoted to the valve casing at *h*, and by the engagement of the roller *i* carried by the float *b* with the crank arm of the bell crank *g* opens the escape valve *f*, when the float *b* fills with water and descends. The roller *i* in descending acts at a less and lesser leverage, so that the outlet valve opens through gradually increasing amounts.

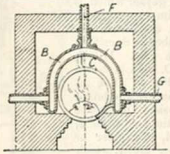
FIG.I.



**8228. Hulse, W. W.,** and **Newbold, J.** April 22.

*Heating water.*—Relates to a horizontal boiler for heating water, one form being shown in transverse section in Fig. 1. The boiler consists of an outer chamber B, preferably of arch shaped section, which partially surrounds a horizontal helically coiled tube C connected at both ends to the outer chamber. The lower parts of the coiled tube act as firebars for the furnace, and the outer chamber is provided with outlet and inlet pipes F, G.

FIG. 1.




**8238. Mare, F. de.** April 22. *Drawings to Specification.*

*Heating air* for ventilation purposes. The wings of a centrifugal fan of a convenient shape are formed hollow for the introduction and passage therethrough of steam, or are constructed of, or to carry, conductors, through which electricity is passed.

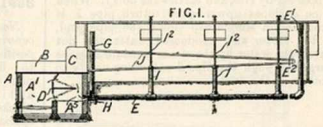
**8282. Boas, F.** April 22.

*Non-conducting coverings or compositions.*—Relates to an artificial building-material adapted to be used as a substitute for stone, bricks, tiles, slabs, roofing material, &c. The material consists of sand and lime together with magnesium silicate, which may be in the form of chrysolite or olivine, serpentine asbestos or chrysolite, horn blende asbestos, or serpentine or horn-blende rock or mineral. Colouring-agents may be added. The lime may be slaked and stored before use. The mass is rendered plastic with water, and is moulded under pressure. It is subsequently hardened by steam at either low or high pressure. Burnt magnesite or magnesium salts other than silicates, may be used in place of, or in addition to, the magnesium silicate. Articles made from this composition are refractory and frost-resisting, and are also bad conductors of sound and heat.

**8334. Jeffrey, J. M.** April 23.

*Heating buildings &c.*—Relates to apparatus for heating brooding rooms, pens, or stalls for hogs, poultry, and other animals. The gases from the furnace A are directed above to the boiler C, or below to the flue E direct by the hand-regulated damper D. The products then pass to the uptakes G or $E^1$, depending on the dampers H and $E^2$. A food-cooker B and the hot-water boiler C are arranged above the firebox $A^1$ and the dividing-chamber $A^2$. A number of branch heating-flues I rise from the main flue E. These flues are constricted in their upper parts, and are fitted with removable caps $I^2$, for opening or closing them to control the passage of the combustion products. Circulating water pipes J may pass from the boiler C, and the structure may be ventilated by ordinary devices in the roof.

FIG. 1.




**8349. Schmidt, C. G.** April 23.

*Heating-apparatus; heating buildings &c.*—Relates to radiating or heating tubes provided with separate ribs or flanges. The ribs or flanges *b* are divided or in one piece and are fixed on the smooth wrought-iron or like tube *a* by the clamps *d*. The clamps *d* are secured to the lugs *c* and act as distance-pieces for the flanges. The ribs or flanges may also be vertical, or inclined, or spiral.

FIG. 3.

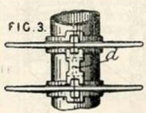
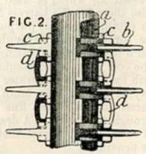



FIG. 2.



**8361. Worssam, H. J.** April 23.

FIG.1.

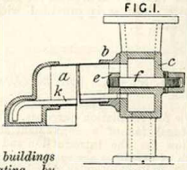
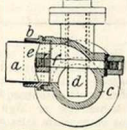



FIG.5.

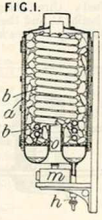



*Heating buildings &c.; heating by steam circulation.*—In ranges of pipes for heating or cooling by the circulation of steam or suitable fluids, each of the pipes *a*, Figs. 1 and 5, is fixed to the general duct *c* by a central bolt *f* projecting from the end of the pipe, passed through the duct and secured by a nut on the back of the duct to facilitate cleaning and repairing. In the apparatus shown in Fig. 1, the pipe *a* slopes downwards, and the channels for steam and condensed water are separate. The disc *b* is brazed or fixed to the tube *a*, and bears flat against the duct face or fits into it by a projecting lip as shown in Fig. 5. The boss *e* is supported by ribs, and carries the bolt *f*. When the pipe *a* slopes upwards, no return pipe *k* is required and a simple cap closes the pipe, and, when the steam and condensed water are not separated, the water by the steam pressure may be discharged through the pipe *d* extending nearly to the bottom of the duct *c*.

---

**8633. Böcker, C.** April 26.

FIG.1.



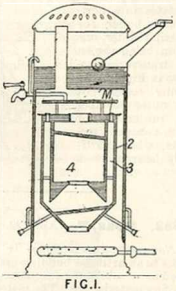

*Heating gases and liquids.*—Beverages, especially beer, are warmed or cooled by warming or cooling the compressed air which is used to raise them for the barrels &c. for retail. For this purpose, the air is passed through a coil *b* in an insulated casing *a*. The coil may be surrounded with ice or with hot water or may be heated by a lamp *m* placed under the flue *o* through the casing. A draw-off cock *h* and thermometer are provided.

---

**8586. Jackson, H.** April 27.

*Heating water.*—A water boiler or gas geyser which is an improvement on the apparatus described in Specification No. 11,927, A.D. 1894, is shown in Fig. 1. The interior of the boiler consists of three sections or parts 2, 3, 4, of copper or other metal, which fit together so as to form waterways exposing a large heating-surface, and which provide for ready renewing or cleaning. The joints are screwed or made in any other ordinary manner. A float valve controls the water inlet, the cock being arranged above and outside the apparatus. The air or escape tubes M are screwed to parts which are joined to the outer casing 2.

FIG.1.




---

**8691. Boenke, F.** April 27.

*Non-conducting coverings and compositions.*—Relates to fireproof and non-conducting artificial-stone blocks and tiles specially adapted for the construction of tropical buildings, hospitals, bath houses, &c. The blocks are moulded from any suitable heat-resisting material, and in the interior is a fabric made up of pieces of bamboo *b*, laced together by cords *c*. The composition may be as follows:—Dry sawdust, preferably fir, is sifted, impregnated with hot carbolineum (preferably antinonin carbolineum), and again dried. To this is added well burnt and finely sifted wood ash, burnt and ground magnesite, powdered heavy spar, and magnesium chloride. Soft water is added to make a fluid mass which can be poured into the moulds. The moulds are exposed to heat for two or three days, and the blocks &c. are then removed and slowly dried.

FIG.1.

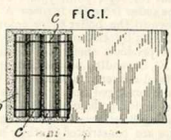
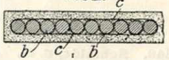
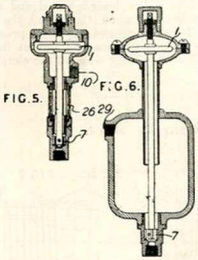



FIG.2.



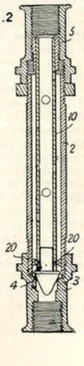
**8729. Eden, E. M.** April 27.




*Steam traps.*—A closed expansible vessel, containing a liquid and its vapour, is so arranged within a suitable casing that it is surrounded either by steam or water according to the level of water in a boiler or receiver with which the casing is connected. The expansion and contraction of the vessel under the changes of temperature thus brought about is caused to operate a valve, by which the supply of feedwater may be regulated, or the escape of water of condensation may be effected. According to the Provisional Specification, an electric circuit may be closed. Figs. 5 and 6 show two forms of steam trap. In each case, 1 is the closed expansible vessel and 7 the valve. The steam pipe or other space to be drained is connected at 10, Fig. 5, or 29, Fig. 6. 26, Fig. 5, is a glass tube through which the action of the apparatus can be observed.

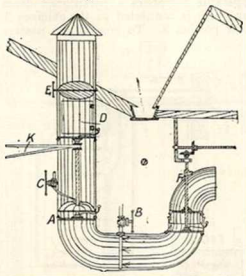
**8748. Smith, G. W.** April 29.

FIG.2




*Steam traps.*—The trap, shown in Fig. 2, comprises an outer tube 2 screwed at the ends and fitted with unions or fittings 3, 5, and an inner tubular rod 10 more expansible than the outer tube 2. The inner tube is perforated, and is fixed to the cap 5. The valve seat 4 is formed in the fitting 3. Radial screws or projections 20 keep the inner tube central. The trap may be used either way up or inclined according to circumstances.

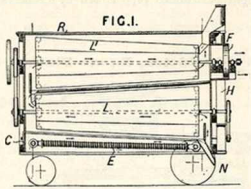
**8869. Watson, F.** April 30.




*Heating air* for spinning or weaving sheds &c. Air is drawn through the trunk A by a fan actuated by a strap K, and is moistened by steam from an annular pipe B which also serves to warm the air. The air is distributed by a revoluble nozzle F. Air from the spinning or weaving shed may be drawn through the apparatus by opening the door D and closing the valve E.

**8885. Tommasini, V.** April 30.

FIG.1.

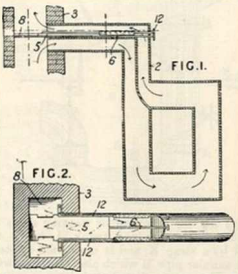



*Heating air.*—A portable apparatus for drying grain and the like is shown in Fig. 1. A wooden chamber R, lined or covered with sheet iron, is mounted on wheels and divided into three compartments. The lowest compartment contains a series of gilled heating-tubes E preferably heated by waste steam from a portable engine used for driving the apparatus, or by products of combustion. An adjustable grating C admits air which passes over the heating tubes and then through the upper compartments in turn.

**9069. Foster, J. W.,** and **Compton, E. P.** May 2.

*Heating buildings &c.*—Relates to devices for heating rooms by utilizing the heat that ordinarily

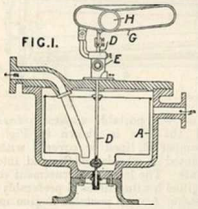
escapes from a stove or furnace to the chimney. The apparatus comprises a partitioned drum or chamber which is connected to the chimney 3 by the elbow portion 2. To control the passage of




the combustion products, the damper plate 5 is made slidable longitudinally, the dampers 8 are foldable and are hinged to the edges of the body portion 5, and the dampers are operated from outside by means of the rods 6 and 12. The drum may be rectangular, or circular, or may consist of a straight partitioned pipe closed by a removable cap.

---

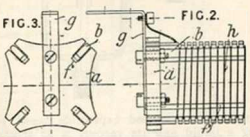
**9116. Shackleton, E.,** and **Flather, F.** May 2.




*Steam traps.*—Relates to improvements on apparatus of the kind described in Specification No. 15,406, A.D. 1900, for returning water of condensation to boilers and other steam containers, these improvements being shown also in that Specification, but not claimed. The apparatus consists of a floating bucket A into which water of condensation overflows until it sinks; it then opens a valve at E admitting live steam which expels the water. The present improvements consist in fitting to the apparatus a lever G with a rolling weight H, which makes the action of the live steam valve at E more sudden. The lever is raised and lowered with the bucket, and when it is raised, the weight rolls to the fulcrum end and exerts no pressure on the spindle D; but when the bucket falls, the weight rolls to the other end and accelerates the action.

---

**9276. Timar, I.** May 4.




*Heating by electricity.*—A heater consists of a round or flattened wire *h*, wound in slots in a number of bars *b* of slate, marble, or other incombustible non-conducting material, which rest on metal bars *f*, fitted in radial slots in end plates *a*. The end plates are supported by metal angles *g*, by which the electric connections are also made.

---

**9377. Johnson, J. Y.,** [*Genty, L.,* and *Soc. Générale des Industries Economiques Moteurs Charon*]. May 6.

*Heating air; thermostats.*—Relates to gas producers, and to apparatus for heating the air supply thereto and supplying steam to mix with it in automatically regulable quantities. The gas is withdrawn from the producer *h* by the fan *n*, which draws it through the air heater or regenerator *j* and the scrubbers *m*. Steam to mix with the air supplied to the producer is generated in a water jacket *f* round the producer, and in a ribbed tube *l* in the centre of the regenerator, which has ribbed air-heating tubes *k*. The air is drawn in at *t* and passed over the surface of the pipe *x* and the tubes of the generator, an adjustable quantity of steam from the second generator *l* being supplied to mix with it, through the pipe *y*. The amount of steam thus supplied is regulated, according to the temperature of the gas issuing from the producer, by means of a thermostatic regulator shown separately in Fig. 3. Within a casing 4, through which the gas passes on its way to the regenerator, is a closed air tube 5, the varying pressure in which is transmitted to the surface of mercury in a cup 7. A float 8 in the mercury is connected to a valve 9 by which the supply of steam is regulated.

(*For Figures see next page.*)

9377.

FIG.3.

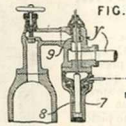
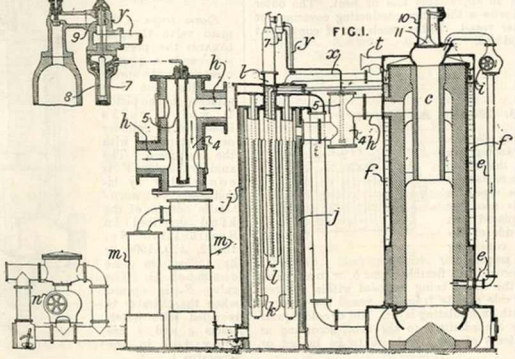


FIG.1.



**9435. Ogden, J. E. L.** May 7.

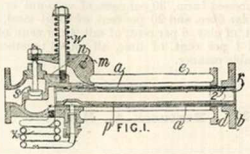


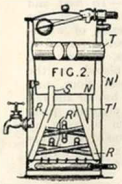
FIG.1.

*Steam traps.*—Relates to expansion steam traps of the type described in Specification No. 13,062, A.D. 1898, and consists in arranging for a greater variation in the length of the expansion tube, so that the motion need not be multiplied to so great an extent. The water of condensation passes from the inlet *r* through the lining tube *p* to the chamber and the coil *z*, where it is cooled, and finally to the annular space between the expansion tube *a* and the liner *p*. The flange *b* bears on the lever *d*, and on the contraction of the expansion tube *a* the member *e* attached to the bell-crank lever *m* transmits a thrust which overcomes the action of the spring *w* and allows the valve *s* to open. An opening 2 in the liner *p* provides for the equalization in pressure. The trap may be used vertically or horizontally. The coil *z* may be omitted and an inlet opening at the valve end of the trap be provided in the liner *p*, or a chamber and a tube may replace the coil *z*. The valve mechanism may be modified so as to move off its seat against the steam pressure instead of with the pressure.

**9624. Pickup, T.,** and **Bradley, J.** May 9.

*Heating water.*—Fig. 2 shows a section of a heater for a bath. The upper part of the boiler communicates by pipes S and T¹ with an annular conical chamber R, the inner sides of which are connected by a number of cross tubes R¹. A passage for hot air is also left between the boiler and the outer casing N¹, tubes T communicating with this space and passing through the upper boiler.

FIG.2.



**9666. Filby, E. A.** May 9. *Drawings to Specification.*

*Heat-retaining chambers.*—Two receptacles are employed, the inner of which, of metal, contains

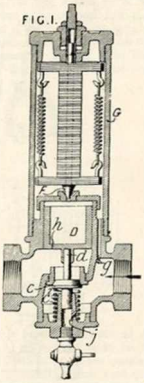
the liquid and is covered to a moderate thickness with non-conducting material. Being comparatively small, the inner vessel is easily carried without an appreciable loss of heat. The outer vessel forms a thick non-conducting covering for the inner vessel. Both vessels are of convenient form and size.

**10,006. Henke, A.** May 14.

*Heating liquids.*—In heating or cooling the liquid contents of barrels and like vessels, a device is used for being placed on the outside of the vessel, consisting of a serpentine pipe *a* secured to a flexible frame *b*, or to a flexible strip *c*, the whole being enclosed within a cover. On the side remote from the vessel the cover is fitted with an insulating-layer. Hot or cold liquids or gases are admitted to the tube, according as the contents of the vessel are to be heated or cooled.

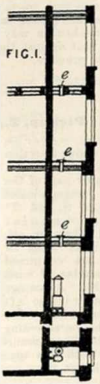

**10,196. Bickel, F. L.,** and **Weber, L.** May 16.

*Steam traps.*—The main valve C opens towards the pressure side, and is pressed upwards by the spring $c^2$. The stem *d* is attached to the piston D, which works loosely in its cylinder or is provided with the aperture *h*. The auxiliary valve F is controlled by bi-metallic 'thermo-'static' couples of the kind described in Specification No. 18,652, A.D. 1900, or by a float in the chamber G. The valve F is opened when the chamber G is filled with water. Ducts *g* and *j* are provided in the apparatus.




**10,301. Hartmann, E. E.** May 17.

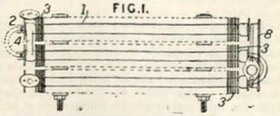
*Heating buildings &c.*—To heat and thus prevent the freezing of water-closets arranged in tiers, a stove &c. is placed on the lowest floor, and the hot air allowed to circulate from room to room by means of regulators *e* in the various floors.




**10,316. Smith, T.** May 18.

*Non-conducting coverings and compositions.*—Relates to a composition or covering for boilers, steam and hot-water pipes, tanks, and other heated surfaces. The composition consists of 35 per cent. of pressed barm, 30 per cent. of coco-nut or other similar fibre, and 20 per cent. of fossil meal, 5 per cent. of clay, 5 per cent. of salt, 4 per cent. of tar, and 1 per cent. of lime, all mixed together in a suitable manner.

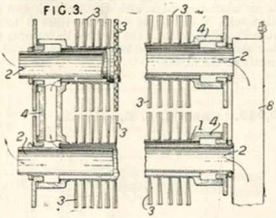
**10,326. Bertucci, A.** May 18.




*Heating liquids and gases; heating by steam circulation; heating buildings &c.*, radiators for. Relates to tubular heating or cooling apparatus for facilitating the transfer of heat between fluids, applicable for cooling water on motor cars, cooling gas engines, condensing steam for use in distilleries, breweries, ice-machines, and the like, and for domestic heating by steam. A motor car cooler is shown in Fig. 1, features of construction being shown in Fig. 3. The air tubes 2 are connected to a common box 8 at one end and are open at the

other end. Water circulates between the tubes 1, 2, and the tube 1 is fitted with discs 3 which may be of various shapes. The constructional arrangement shown in Fig. 3 is adapted to the use

FIG. 3.



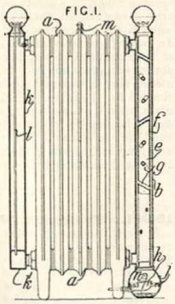
of aluminium, the box 4 being fixed to the tubes 1 by expanding the tubes and the discs 3 being fitted to the tubes 1 by hydraulic pressure. The inner tubes of the radiator or apparatus may be connected by coupling boxes with covers like the outer tubes in order to form another serpentine through which passes a refrigerating-fluid.

---

**10,341. Ewart, J. W.** May 18.

*Heating buildings &c.* — Relates to hot-water radiators or heating-stoves of the self-contained or independent type. The radiator *a*, as regards its central portion, is of any usual form having a filling-screw *m*. At one end is a boiler *b*, and at the other a water overflow receptacle *k*. The boiler consists of an outer shell *b* and an inner flue *e*, across which pass a number of spirally-arranged inclined tubes *g* opening into the annular space *f* which communicates with the radiator. At the bottom of the boiler is a heating device *h*, here shown as a gas burner, holes *j* admitting the necessary supply of air. Any moisture that condenses out may be absorbed by fireclay or the like *n*. The tube *k* is closed at the bottom $k^1$, but open to the atmosphere at the top. It is connected to the radiator by a narrow tube *l* reaching nearly to the bottom of the tube *k*. As

FIG. 1.



the water in the radiator gets hotter, it expands, and a portion of it passes to the bottom of the tube *k*; as it gets cooler, it passes back again.

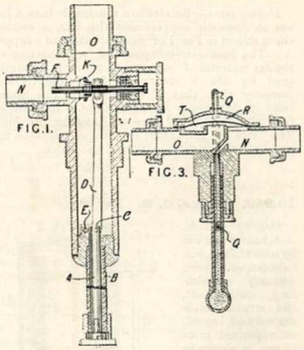
---

**10,710. Lawson, A. J.,** and **Hutchinson, G.** May 23.

*Non-conducting coverings and compositions.*—A non-conducting material or composition for covering boilers, steam pipes, refrigerators, and cold-water tanks, also applicable for the construction of fireproof walls, partitions, floors, ceilings, and like structures, is made of about 55 per cent. of the carbonate of lime mud resulting from the decomposition of alkali waste, 15 per cent. of papier mâché, 15 per cent. of asbestos or other suitable fibre, 10 per cent. of clay, and 5 per cent. of size, flour, or other adhesive substance.

---

**10,755. Sutherland, W. C.** May 25.

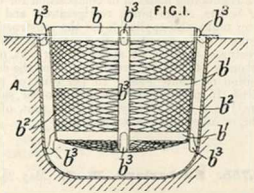



*Thermostats.* — Relates to a thermostatically-controlled valve which may be applied to water boilers, or may be used to control a gas, oil, or steam supply for heating rooms, halls, churches, buildings, and the like. Fig. 1 shows one form of thermostat in which the supply valve K mounted on the screwed spindle F is closed or opened through the lever D pivoted at *e* and E by the expansion or contraction of the rod A within the tube B. In the form of trap shown in Fig. 3, the diaphragm valve T is placed between the inlet O and the outlet N, and the bye-pass Q connects the chambers above and below the diaphragm together. Mercury on expansion, or a pointed rod, closes the opening of the bye-pass Q, and, the pressure rising in the chamber R, the

valve T shuts and cuts off the fluid supply. In another modification, the bye-pass opening is controlled by a valve mounted on a lever D worked by the expansion and contraction of a rod as in the thermostat shown in Fig. 1.

**10,862. Holford, E.** May 25.

FIG. 1.




*Boiling-pans.*—Relates to a removable basket for use in domestic coppers and the like, a section being shown in Fig. 1 of the application to a copper A. The basket is composed of wire netting or similar material of large mesh, which is strengthened by ribs $b^2$ and rings $b$ of slightly less diameter than that of the copper. The basket rests in the copper on projections $b^3$ and handles for the purposes of removal may be provided. The parts are galvanized or otherwise treated for protection against the action of the water.

**10,949. Dolge, C. B.** May 28.

*Heating liquids.*—A heater for use by undertakers, embalmers, and others, whereby embalming, disinfectant, and similar fluids are warmed, heated, or vaporized prior to use, is shown in Fig. 2. The heater is interposed between the fluid injector and the fluid receptacle, and a thermometer Q is placed in the outlet path of the fluid. The lamp or burner A has arranged, above the fluid reservoir B, the wick plate $B^1$, the perforated top C, Fig. 3, and the regulating-plate E, which is rotatable by means

FIG. 2.

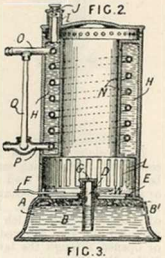
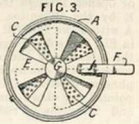


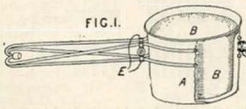

FIG. 3.




of the handle F. The cap G of the filling-tube D forms an abutment for the spring W, which forms a resistance against the movement of the plate E. The heater comprises the water jacket H with the filling-tube I and relief valve J, the air admission part with the slots L, and the coiled tube N extending from the inlet O to the outlet P. The coiled tube N may lie against the inner wall of the water jacket, or it may be exposed directly to the flames.

**10,952. Challis, C. E.** May 28.

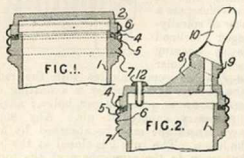
FIG. 1.




*Heating-apparatus.*—Concentrated aqueous solution of zinc chloride, or other mineral salts liquid or liquefiable above 100° C. and preferably not a hard solid on cooling, is used as the heat transmitting and distributing medium in jacketed vessels, particularly culinary utensils such as the saucepan shown in Fig. 1. Laboratory baths are mentioned. Organic media such as fats, hydrocarbons, and naphthalene derivatives are mentioned in the Provisional Specification. The inner vessel B, Fig. 1, is fixed to an outer vessel A provided with a supply opening closed by a safety-valve, which may comprise a cup-shaped portion H receiving a screwed collar K retaining a disc J of rubber, fusible metal, &c. having one or more pin holes, or may be a ball or lever retained by a spring &c., or may consist of porous substance, or may be fitted as a trap. The utensil may be cast with a double bottom and a side channel for the valve. The inner vessel may be of silver, nickel, aluminium, or enamel ware, or china, &c. The handle is connected to or formed on a band, or, as shown, wire rings, preferably two, engaging in grooves in the utensil, and secured by twisting the ends or by means of a screw clamp E.

**10,981. Thompson, W. P.,** [*Soc. Anon. le Parfait Nourricier*]. May 28.

FIG. 1.

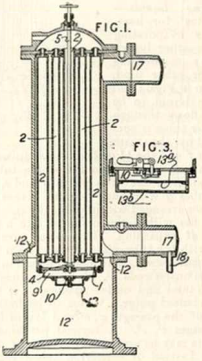



*Digesters.*—Relates to a combined feeding-bottle and sterilizing-digester for milk. The vessel 1,

Fig. 1, is made of glass, porcelain, &c., of cylindrical or rounded form, and open at both ends, to facilitate cleansing &c., the ends being closed hermetically by suitable means, such as stoppers or lids 2 seating on washers 4 set in external grooves 5, and secured in position by screw rings or collars 6 screwed on external threads on the vessel. The ends 7 of the vessel are thickened to provide for the grooves 5, and serve also to prevent the body of the vessel from coming into contact with the walls of the waterbath &c., in which it is heated. When the vessel is to be used as a feeding-bottle, one of the stoppers 2 is removed and replaced by the lid 8, Fig. 2, which is formed with a nozzle 9 for the teat 10, and provided with a rubber valve 12 for the admission of air during suction.

**11,070. Whitwell, T.** May 29.

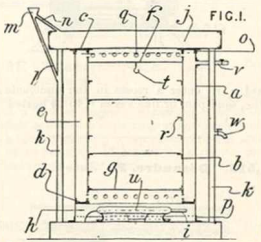
FIG.1.




*Heating water by steam; steam traps.*—Apparatus for heating water by steam and for forcing the water of condensation resulting from the steam into the water space of the apparatus is shown in Fig. 1. The apparatus shown is adapted for heating buildings by hot water. The chamber 1 and the steam piping 2 are of iron, while the valve spindle 5 is of brass or aluminium, so that the valve 4 is thermostatically operated after adjustment by its screwed spindle. The second chamber 9 receives the condensed water discharged from the chamber 1, and is provided with the spring-pressed non-return valve 10, which allows the condensed water to escape into the water chamber 12 when the pressure in the chamber 9 has risen to a suitable extent. The perforated casing 13 condenses, noiselessly, any steam which issues. The water piping 17 has a connection 18 with a displacement receptacle fixed at a suitable height. Fig. 3 shows a modified form of non-return valve 10, in this case weighted, and perforated baffles $13^a$, $13^b$ arranged as shown. According to the Provisional Specification, liquids other than water may be heated by apparatus of the above type.

**11,256. Nicholls, R.** June 1.

FIG.1.

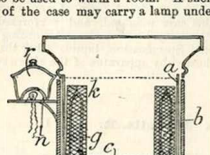



*Heating water; heating air.*—Cylinders *a*, *b* are retained by flanges *c*, *d* to leave an air-space *e*, which is completed round the ends of the cylinder *b* by providing perforations *q* beyond top and bottom plates *f*, *g*. The cylinders have doors, one or both of which may have ventilators. The cylinder *b* is fitted as an oven, with ledges *r* for plates or grids, and one or more hooks *t*. The cylinder *a* has feet *h* and a regulating-valve *e* in an outlet pipe for conducting hot air elsewhere, and is placed between flat water-receptacles *i*, *j* provided with retaining rings *p*, *o*, and connected by pipes *k*, one of which has a supply pipe *l* and funnel *m* with a safety-pipe *n*, and the other a tap *w*. The receptacle *i* also supports a gas, oil, or other heating-apparatus *u*. According to the Provisional Specification, the burners are surrounded with wire gauze, and provided with fireclay &c. deflectors.

**11,277. Boyd, R. W.** June 1.

*Heating by electricity; heating liquids.*—A case *a*, which may be square in plan, with a side door or a removable top, and having its sides covered with asbestos, slag-wool, or other non conducting material *b*, contains one or more electric incandescent lamps *g* of ordinary construction, by which it is heated. The lamps may be placed in the corners of the case, and protected by wire guards *k*. Racks or shelves *c* may be carried on side projections in the case, to support plates or like articles. The apparatus may be used for boiling water or other liquids, and the top serves as a hot-plate to warm

plates or vessels containing food. The apparatus may also be used to warm a room. A shelf on the outside of the case may carry a lamp under a wire




guard *n*, to enter a recess in the underside of a kettle, saucepan, or like vessel *r*, to be heated.

---

**11,518. Désandre, P.** June 5.


*Non-conducting coverings.*—The heat-insulating means shown in Fig. 1 applied as a pipe covering comprises the spirally-coiled asbestos cord A, the wire netting or gauze B, the asbestos board C, the packing D of carded silk or silk waste, and the outer cover E of canvas, which is coated with suitable paint for hardening it and rendering it incombustible. This paint may be a mixture of silicate of soda or potash with asbestos powder or carbonate of lime and water. The spiral asbestos cord may be replaced by a helical spring, and the wire netting may be dispensed with. The parts are held together by wires and staples.

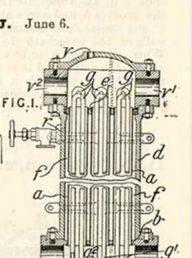
---

**11,529. Boehm, W.** June 5.

*Heating by electricity.*—Resistant bodies, applicable for heating, are made from earthy oxides or the like, and either the materials or the formed bodies or both are heated to very high temperatures in an electric furnace or arc, or an oxy-hydrogen flame, to increase their density. The materials may thus be fused, after which they are finely ground, made into paste, and formed into filaments, tubes, rods, or the like, with or without admixture of carbon or metals. The ends of the resistant bodies may be fused in an arc so as to have increased contact surfaces for metal connections; they may be enlarged by previous application of difficultly fusible material.

---

**11,594. Hallett, J.** June 6.


*Heating liquids.*—Apparatus for heating or evaporating water or other liquid, or for condensing steam or other fluid, is shown in Figs. 1 and 2. The liquid to be heated flows through the outer tubes *a* surrounded by the steam chamber *f* and the U or bent steam tubes *g*. The inner tubes *g* are fixed to the single tube plate *k* independent of the tube plates *b* and *e*, and two inner tubes *g* with their legs in planes at right-angles are arranged within one tube *a*. The tube plate *e* fits within the casing *d* like a piston, to permit of expansion. The lower cover plate *m* forms with the tube plate *k* the steam inlet and outlet chambers *n*, *o* in communication with the inlet and outlet ends $g^1$, $g^2$, of the inner tubes *g*, and also inlet and outlet passages *p*, *q* for steam and condensed water. Water to be heated enters by one of the passages $c^1$, $c^2$ and leaves by one of the passages $c^1$, $c^2$. A vertical partition forming chambers may be arranged in the head or bottom pieces. Instead of supplying steam through the inlet *r*, it may be admitted to the chamber *f* from the inlet supplying steam to the chamber *n* in the cover plate *m*. When the apparatus is used as an evaporator, one of the passages $c^1$, $c^2$, and both of the passages $v^1$, $v^2$ are closed and the vapour is led off at the top through the opening *y*.

---

**11,801. Poole, W. J.** June 10.

*Steam traps.*—Devices for regulating the wear of a valve on its seat and applicable for valves generally are shown in Figs. 1 and 2 applied to a steam trap. The floating bell B, Figs. 1 and 2, has a spindle C with a terminal valve E closing on to a seat F in the discharge pipe. Tangential ports J in the inner end of the discharge pipe

allow the ejected water to act on vanes H on the spindle so as to rotate the valve and grind it on to its seat. The vanes may be replaced by a second set of ports.

FIG. 1.

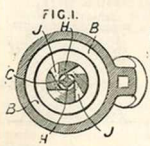
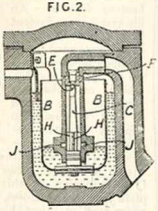



FIG. 2.




**11,813. McLay, J. C. S.** June 10.

*Non-conducting coverings and compositions.*—A non-conducting composition for boilers, steam pipes, and the like is made from the residue produced in the manufacture of tartaric acid, together with fibrous material, such as asbestos fibre, and with flour sweepings or silicate of soda or other like substances. Suitable proportions are 70 per cent. of tartaric residue, 25 per cent. of asbestos fibre, and 5 per cent. of flour sweepings.

**11,944. Miller, J. C.** June 11.

FIG. 3.

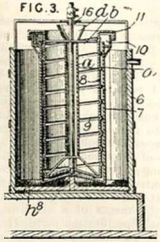



FIG. 5.


*Heating liquids.*—Apparatus for continuously sterilizing milk &c. comprises means for uniformly heating the milk, for exposing it to the air, and for rapidly cooling it. The heating-apparatus comprises a tub 6, Fig. 3, filled with water heated by a steam coil $h^8$ and containing a fixed cylinder 7 formed with a trough 10 connected to the cooling-apparatus and containing a cylinder 8 having spiral grooves 9, and a flange 11, and mounted on an axle 16 which is rotated by suitable mechanism. The hot liquid is conveyed from the tub 6 to a central tube *a* having a funnel *d* and communicating with the cylinder 8, by an injector shown in Fig. 5 and consisting of a steam pipe $h^3$ opening into the flared open end of a tube *h* leading from the tub 6 to the funnel *d*. The milk is fed through a funnel and tube to the bottom of the cylinder 7 and is forced by the grooves 9 to flow upwards between the hot cylinders to the trough 10 where it is exposed to the air, the flange 11 preventing access of steam or water. The milk next passes to a special cooling-appliance.

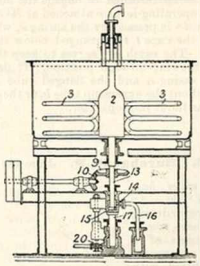
**11,981. Rosenthal, S. A.** June 12. *Drawings to Specification.*

*Non-conducting coverings and compositions.*—Above a gas or vapour burner of special construction is placed a deflecting tray, which is filled with a non-conducting composition, such as a mixture of one-quarter of infusorial earth to three-quarters of plaster of Paris.

**12,296. Hodkin, H. H.** June 17. *Drawings to Specification.*

*Heating water.*—A boiler for a bath is fitted in the end of a sink beneath which the bath is placed.

**12,314. Schaefer, J.** June 17. *Right to Patent relinquished.*




*Boiling-pans.*—A steam boiling-apparatus or copper for brewing purposes is shown in the Figure. The steam cylinder 2 and heating-tubes 3 are supported by the shaft 13 bearing on the plate 14 in the casing 15, and are raised by the piston 17, by hand or mechanical power, so as to

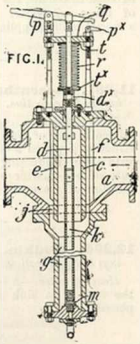
permit the entire surface of the bottom of the copper to be cleaned. For drawing off the water of condensation through the pipe 16, the rod 13 is hollow, and the apparatus is provided with the three-way cock 20 to admit air or the working fluid. The heating-cylinder is rotated by the bevel gearing 10, 9.

---

**12,377. Bolton, A.** June 18.

*Steam traps.*—Relates to a combined steam trap and separator or means for obtaining dry steam. The apparatus shown in Fig. 1 comprises the internal tube *c*, which is provided with outwardly-projecting wings or feathers *e* opposite to the steam inlet, the casing *a* also provided with projecting flanges or wings *f*, the tube *g* attached to the bottom of the casing *a*, the expansion tube *k* of copper or other metal, and the discharge valve *m* carried by the tube *k*. The radial flanges *e*, *f* baffle the water in the steam, causing it to fall down to the bottom through the openings *j*. To allow for blowing through, the central rod *d* is screw-threaded to engage the nut $d^{\times}$, and has the operating-lever *p* attached at its outer end. The nut $d^{\times}$ is pressed by the spring *r*, which abuts against the cups *t*, $t^{\times}$, arranged below the bridge-piece *q*. The catch $p^{\times}$ serves to keep the lever *p* in the blowing-through position. If desired, the flanged casing *a* and the flanged tube *c* may be used without the expansion tube *k*, or the expansion tube *k* without the separator.

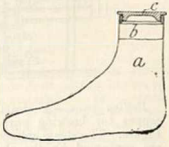
FIG. 1.




---

**12,446. Burchardt, P.** June 18.

*Hot-water bags and the like.*—An appliance for drying boots, shoes, socks, &c. consists of a flexible waterproof bag *a* fitted with a neck *b* into which a cap *c* is screwed. The bag is shaped like a last and is inserted into the article to be dried and filled with hot water or the like.

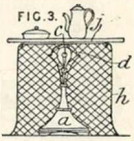



---

**12,587. Boyd, R. W.** June 20.

*Heating by electricity; heating liquids.*—An electric incandescent lamp *c*, or a group of lamps, is carried below an open metal guard *d* on an upright stand *a*, which may be extensible. The guard *d* may be used to support a kettle recessed to fit over the guard. The apparatus *a*, *c*, *d* may be placed within a wire or other open metal stand *h*, of U-form in plan, on which is placed a double hot-plate *j*, or a hot closet, for warming or keeping warm food or other things; the stand *h* may also be used to support wearing-apparel to be aired, or the lamp stand *a* for lighting.

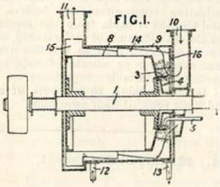
FIG. 3.




---

**12,693. Theisen, E.** June 21.

FIG. 1.




*Heating gases and liquids.*—A gas is passed in one direction through a horizontal centrifugal machine, and a liquid is passed through it in the opposite direction, for heating, cooling, washing, evaporating, and like purposes. The centrifugal drum 8, mounted upon a shaft 1 within a casing 9, is provided with helical blades 14 which cause the liquid, which enters at 12, to flow through the apparatus in a helical direction, to the outlet 13. The gas enters at 10, and is forced through the casing to the outlet 11 by means of extensions 16, 15 on the ends of the blades, acting as fans. If it is desired to moisten the gas, water is introduced through the pipe 5 to a circular rim 3 revolving with the drum, and is sprayed by means of a stationary ring 4. The Provisional Specification states that the gas may be caused to pass through the device by any external means.

---

**12,724. Hindshaw, J.** *Aug. 1.*

*Non-conducting coverings and compositions.*—Plaster of Paris is rendered porous by the addition of whiting and the use of alum or sulphuric acid

&c. in the water employed for mixing it. Bubbles or cells of carbonic-acid gas are formed in the cast or moulded plaster, which is in consequence lighter and a better non-conductor of heat and sound.

---

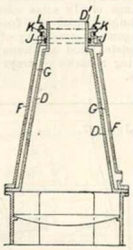
**12,737. Church, A. T.** June 22.

*Non-conducting coverings and compositions.*— A covering for boilers, steam pipes, and like purposes is made up from a composition composed of cow hair, small fibre such as chopped manilla, yellow clay, asbestos pulp, water, papier mâché, starch, and glue sizing. For 28 lb. of the composition the following are suitable proportions for the ingredients, ½ lb. each of cow hair, fibre, starch, and glue sizing, and 5, 11, 3, and 8 lb. respectively of yellow clay, asbestos pulp, water, and papier mâché.

---

**12,894. Newsum, G.** June 25.

*Heating water.*— In a conical hot-water boiler, for use in heating conservatories and other buildings, the inner and outer shell plates D and F are rigidly connected at the bottom, and have a water-tight connection at the top which allows expansion and contraction of the inner shell. A cylindrical extension $D^1$ on the inner shell is surrounded by a flexible packing-ring J, held in place by a gland K with screwed studs and nuts L. The water space G has inlet and outlet openings as shown.




---

**12,900. Diehl, J. H.** June 25.

*Heating buildings &c.*—A heating drum or radiator 5 consists of a section of stove-pipe containing a draught regulator consisting of a number of dampers 10, 16 cut-away alternately at opposite sides so as to form a circuitous path for the smoke &c. The dampers are carried by spindles 9, mounted in side bars 7, and have lugs 20 connected by rivets to lugs 18 on a shift rod 17. The central damper 10 has a corrugation 11 in which the central angular part of the spindle is held by a corrugated plate 12, riveted to the damper. The dampers are operated by a knob 13 and locked by pulling the angular part of the spindle into an angular recess in one of the side bars 7. When it is desired to remove the dampers, the central spindle is withdrawn.

FIG. 3.

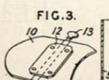
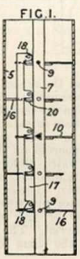



FIG. 1.




---

**13,055. Kendell, T. B.** June 26. *Drawings to Specification.*

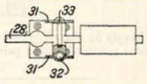
*Heating air.*—In apparatus for gumming and drying envelopes and other articles, air is drawn past a gas jet to heat it.

---

**13,091. Shakespeare, J.** June 27.

*Thermostats* for incubators heated by hot air. A ventilation hole in the corner is closed by a damper operated by a thermostat of ordinary construction. The lever 28 for operating the damper is provided with a special ball bearing shown in plan, and partly in Fig. 5. The lever 28 is provided with a cross-arm recessed at each end to form seatings for balls 32. Similar seatings are formed in vertical plates 31, 31 forming part of the bearing bracket, and connected together by a screw bolt 33.

FIG. 5.

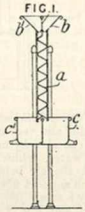



---

**13,128. Sabroe, T. T.,** and **Hansen, H. J. T.** June 27.

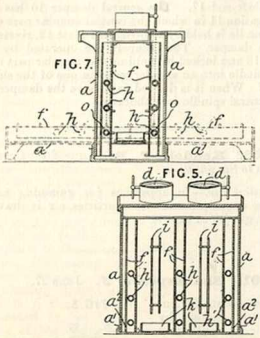
*Heating liquids.*—Relates to apparatus for simultaneously heating one liquid and cooling another so as to utilize the excess of heat in the one for warming the other. The apparatus is especially applicable for warming milk entering a pasteurizer by the aid of heat from the milk leaving it. A thin corrugated metal plate *a*, preferably of tinned copper, is arranged perpendicularly between reservoirs *b*, $b^1$ and receivers *c*, $c^1$ so that the liquids flowing down the two corrugated surfaces interchange heat without coming into contact. Horizontal perforated tubes may replace the reservoirs *b*, $b^1$.

FIG. 1.



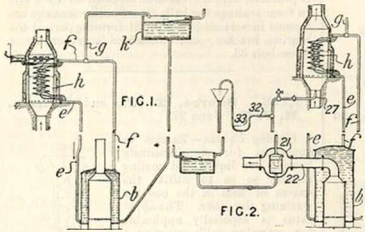

---

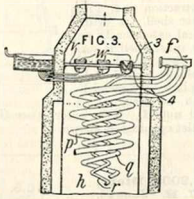
**13,145. Harris, A. E.** June 27.




*Heating by electricity.*—Grilling or cooking apparatus is provided with a pair, or series of pairs, of radiating-plates heated by gas, electricity, &c., so that meat &c. supported between the plates is cooked on both sides at once. Apparatus with two cooking-spaces is shown in vertical section in Fig. 5. Perforated radiating-plates *f* are heated by gas burners *h* and enclosed in a casing *a*. Air is supplied to the burners *h* through apertures $a^1$, $a^2$ in the casing and plates *f* respectively. The top of the casing is provided with dampers *d*, and also with apertures for thermometers, not shown. Removable front portions of the casing, not shown, are provided with air inlets at the bottoms, and are attached to wirework plates or grills *i* pivoted and clipped together. Drip trays *k* are separate from, or attached to, the removable fronts. In a modification, the burners and radiating-plates are rendered adjustable by screw-threading the gas-supply pipes and providing rotating nuts held against longitudinal movement. In another modification, shown in Fig. 7, the sides of the casing *a* and the plates *f* and burners *h* are adapted to be turned into the horizontal position to form a hot-plate for boiling &c., as shown in dotted lines, by mounting the gas-supply pipes in bearings *o*. In some cases, the cooking-chamber is elongated and the food traversed, a suitable arrangement consisting of two concentric radiating-plates and an annular rotating table for carrying a series of trays and grills between the plates.

**13,152. McDougall, I. S.,** and **Langfield, J.** June 27.



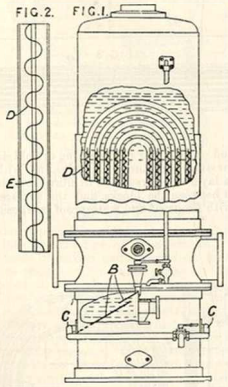

*Heating buildings; heating air.*—Relates to the heating and ventilating of buildings by air heated in a chamber by means of coils of pipes containing hot water, which flows downwards through the coils, the air being moistened by water troughs which support fibrous material that is kept moist or by a steam jet. Fig. 1 shows one form of apparatus, and Fig. 2 a modified form. Fig. 3 shows one form of air-heating chamber, comprising three helical coils *p*, *q*, *r*, connected to the pipes *f* and *e* in communication with the upper and lower water spaces of the ordinary boiler *b*. The section of each heating-coil is proportioned to its length, so that the superficial area of a coil is proportional to its capacity. Water is supplied to the heater *b* from the tank *k*, and the pipe *g* serves as a pressure release or safety pipe and for the escape of steam or air. The tanks *w* in the heating-chamber are supported on beams *v*, and are connected with a water-supply cistern. The fibrous bands 3 envelope the tanks, and pass below bars 4 in the water. These bands moisten the heated air that passes upwards through the heater. The heater may or may not be jacketed with insulating-material. The helical heating-coils may be formed of the same section of piping, there then being

three coils in the outer tier, two in the intermediate tier, and one in the inner tier. In another modification, the coils are zig-zag, their sections being proportioned to their lengths, and, in a further modification, the helices are of equal diameter and equal in length, and the air enters and leaves by horizontal passages. In the arrangement shown in Fig. 2, the air is moistened by steam supplied from the boiler 21 in the flue 22 of the heater *h* to the nozzle 27. The U-bend 33 in the branch pipe 32 regulates the steam pressure.

In a modified arrangement, the water-heater is arranged on the same floor level as the air-heater *h*, and the bottom of the heater is provided with a diaphragm which shuts off the connections of the heater coils with the pipe *e*. One water-heater may be employed with several air-heating chambers. According to the Provisional Specification, two or more heating-chambers, with one helical coil in each, may be connected at their tops and bottoms, and the air before being heated may be washed by a known method.

---

**13,192. Wright, W.** June 28.

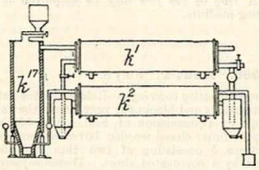



*Heating liquids and gases.*—The tubes of feed-water heaters of the "Berryman" type and other heating, cooling, or condensing apparatus for use with water, steam, air or gases, are fitted with corrugated deflectors D, with or without a central rod or tube E.

---

**13,302B. Naef, P.** Nov. 30, A.D. 1900, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

*Heating gases and liquids.*—Waste heat from furnaces, such as gas generators or blast furnaces, gas engines, and air compressors, is utilized by passing the gases through one or more rotating cylinders through which liquid is passed in the opposite direction. The hot liquid obtained may similarly be employed to heat a gas or air, and the latter may be returned to the furnace, engine, or compressor. The cooled liquid may be returned to be again heated. Several rotating cylinders may be used, through which the liquid passes successively. Liquids of different boiling points




may be used. In the example shown, a liquid is passed through the rotating cylinder $k^1$, through which the gases from the blast furnace $k^{17}$ are passed in the opposite direction. The heated liquid is then passed to $k^2$ through which air or steam passes in the opposite direction. The heated air or steam is led to the blast furnace, while the liquid is raised and again sent through $k^1$

---

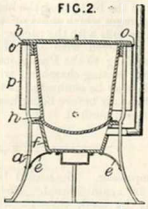
**13,381. Judah, M.** July 1.

*Non-conducting coverings and compositions.*—Relates to the use of mica for rendering hats and the like sun-proof. It may also be employed for covering the roofs of carriages, omnibuses, tramcars, and railway vehicles, and as a covering for receptacles intended to keep drinks and the like cool or warm. The article to be covered is first coated with a paste to which an antiseptive or copper sulphate is added. The mica is split to such a thickness that it may be bent to some extent without breaking. Pieces of mica of about ten to fifteen inches square are applied to the article to be covered and pressed down, until its surface is completely covered with mica. Incisions prevent creasing or folding, or portions may be cut out of the mica for this same purpose. The mica covering thus formed is coated with paste, and one or more layers of mica are successively applied, the outer layer being varnished and covered with fabric. The mica may be applied to the exterior or interior of the article or to both exterior and interior.

**13,811. Bullen, E. C.** July 6.

*Boiling-pans.*—Fig. 2 shows a vertical cross section of a portable copper, which is flanged to rest on a ring *b* secured to the upper ends of the legs *a*. Brackets *e* on the legs support a firebox *f*, beneath which is a sliding ashpan. The firebox is flanged to bear on a flange *h* on the copper. A screen *p* of asbestos, wire-work, or other material is hung on hooks *o*. A ring of gas jets may be employed as the heating-medium.

FIG.2.




**13,866. New, T.** July 8.

*Non-conducting coverings.*—Relates to insulating constructions and blocks for preventing the interchange or transmission of heat. The blocks *a* comprise outer closed wooden boxes having paper partitions *b* consisting of two thin flat sheets spaced by a corrugated sheet. Distance-pieces *c* of wood are employed. The partitions, joints, and casings are coated with a fireproof and waterproof composition, which may be silicate of soda treated with chloride of calcium. The blocks may be used in the construction of insulating walls, floors, and ceilings, for refrigerating or cold storage plants, or other structures. In building with the blocks, a layer of coarse cloth or fibrous material *d* is placed between the blocks, and the surfaces are coated with fireproof and waterproof compositions.

FIG.1.

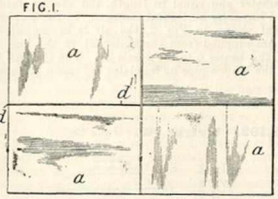
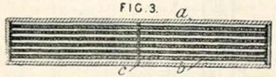



FIG.3.




**13,936. Bollé, C.,** [*Pflaum & Gerlach*]. July 9.

FIG.3.

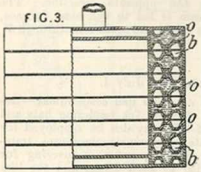



FIG.2.

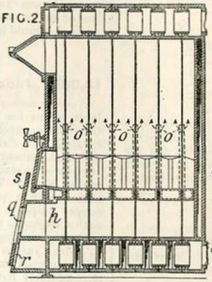
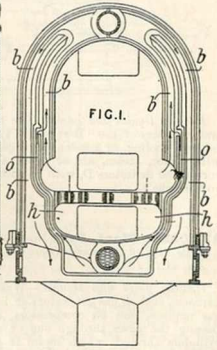


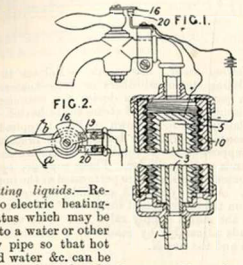

FIG.1.




*Heating water.*—Relates to the construction of sectional boilers so that small passages are provided for the supply of heated air to the flues for smoke-consuming purposes. Fig. 2 shows a longitudinal section of one form of boiler, Fig. 1 an end elevation of one section, and Fig. 3 a cross-section of one side of the boiler. In the lower part of each section, between the flues *b* is formed a groove *o* which communicates with the inner flue *b* at its upper end as shown. These grooves, when the sections are placed together, form passages for the supply of air to the inner flues *b*. Air

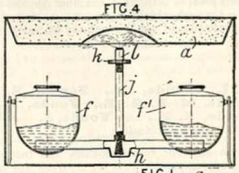
is supplied to the ashpit *h* by an opening *q*, and to the air passages by an opening *r*. These openings are controlled by a damper *s* having a single opening. Should the fire burn too fiercely, combustion can be suppressed, and the boiler cooled, by cutting-off the air from the ashpit, and supplying it in large quantities to the air passages.

**13,947. Hill, H. M.** July 9.



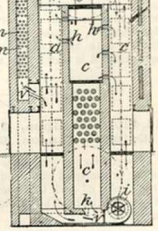

*Heating liquids.*—Relates to electric heating-apparatus which may be fitted to a water or other supply pipe so that hot or cold water &c. can be drawn off through a single tap. Fig. 1 shows a longitudinal section of one form of apparatus. The water supplied by the pipe 1 passes upon a pipe 3 into the interior of an electrode 5 preferably made of carbon and grooved on its outer surface as shown. The water passes up between this inner electrode and the similarly-grooved surface of the outer electrode 10, which is enclosed by, but insulated from, an outer metal casing. The water is drawn off by a cock which is of smaller bore than the supply pipe, so that the water in the heater is under pressure. The wetted surfaces of both electrodes are protected by some fabric which is secured by cords, or metal wires, or ribbons, in the bottoms of the grooves. The plug of the cock carries an insulated quadrant 16 which, when the handle of the cock is turned in the direction of the arrow *b*, Fig. 2, makes contact between the pieces 19 and 20 and closes the circuit through the heater. In this position of the plug, hot water is supplied by the cock. When the handle is turned in the direction of the arrow *a*, cold water is drawn off. In a modification, the water passes up round the exterior of the outer electrode before passing down between the two electrodes. It is then drawn away through the interior of the inner electrode. Any foreign matter tends to deposit itself in the grooves, owing to the eddies formed therein, and the circular movement caused by the grooving, which is preferably helical. The current, which may be of 110 volts, destroys any animal or vegetable matter contained in the water, milk, or other liquid being treated.

**14,009. Rozes, J. F.** July 9.




*Heating-apparatus; heating buildings; foot-warmers.*—Relates to warmers which store up the heat communicated to them from spirit lamps or other sources of heat, the heat-storing material consisting of ashes such as from wood and oil, burnt sand, ground earth, and calcined dust or powder in general. A warmer for apartments is shown in Fig. 1, and Fig. 4 shows a spirit warmer in which the reservoirs *f*, *f*¹ are arranged so as to prevent them from being over-heated by the ash compartment *a*. The ash receptacle *a* and the lamp *c* are supported by the frame or stand *d*. The wick of the lamp shown in Fig. 4 dips into the secondary reservoir *h*, and the upper part of the wick-tube *j* is screw-threaded so as to allow the milled edged ring *k* with the tube *l* to screw up and down to adjust the wick length. In another form of warmer, the spirit reservoir consists of a tube which may be of circular, square, triangular, elliptical, or other section. For warming railway carriages and wagons, the hot lamp gases are conveyed or steam is passed through pipes carried through the ash receptacle *a*.

**14,090. Lake, H. H.,** [*Hiorth, F.*]. July 10.




*Heating air* in apparatus for drying pulp, pasteboard, yarn, &c. The material is caused to traverse a continuous drying-chamber A, between the two vertical drying-passages *a* of which is an air-heating chamber *c*. By means of a fan *i*, the air is circulated through the drying-passages in the same direction as the material. Part of the air passes through an opening *k*

into the heating-chamber *c* and then passes through openings *h*, *g* into the drying-passages, and part escapes through a chamber *m* containing tubes *n* through which the incoming air is drawn. The circulation of air is regulated by valves *v*.

---

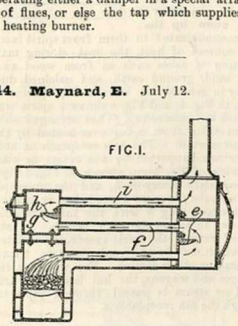
**14,122. Youde, R., Youde, S. H., Youde, M. L. G. E., Youde, M. H., Youde, S. H.,** and **Youde, J.** July 11. *Drawings to Specification.*

*Thermostats* for foster-mothers and incubators. In a special apparatus that is employed for hatching and rearing chickens and other young birds, the temperature is regulated by means of an ordinary capsule arrang 1 in the hot water tank and operating either a damper in a special arrangement of flues, or else the tap which supplies gas to the heating burner.

---

**14,244. Maynard, E.** July 12.

FIG. 1.




*Heating water.*—Steam and heating boilers of the locomotive or marine types are constructed with a second smoke-box *g* above the firebox or furnace to which return tubes *i* conduct the gases to a third smoke-box. Baffles *e* and *h* with convex lower surfaces are fitted in the first and second smoke-boxes. It is stated that more than three smoke-boxes may be used. According to the Provisional Specification, U tubes may be used to connect the firebox with the smoke-box *g*. By the use of the invention, it is stated that smoke is consumed.

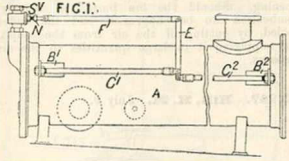
---

**14,420. Philipps, J., Lebel, H.,** and **Grimoin-Sanson, R.** July 15.

*Non-conducting coverings and compositions.* — A fabric or material produced by securing extremely thin sheets of cork to a backing of linen, or other woven fabric, may be employed as a non-conducting material.

**14,539. Hawksley, G. W.** July 17.

FIG. 1.




*Heating water; thermostats.* — Relates to self-regulating steam calorifiers or water-heaters, and more particularly to a device for automatically regulating the supply of steam to the heater. The regulating-device is shown in Fig. 1 applied to a horizontal calorifier or heater. The brackets $B^1$, $B^2$, supporting the tubular rods $C^1$, $C^2$, are fixed to the ends of the cylinder. These rods are open at the bracket ends, and are perforated at the opposite ends. As the cylinder A expands, the rods $C^1$, $C^2$ pull on the lever E, and the lever F closes or controls the steam supply valve SV. The valve rod is made adjustable by means of a detachable end piece and the nut N.

---

**14,577B. Naef, P.** Dec. 18, A.D. 1900, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*]. *Drawings to Specification.*

*Heating gases and liquids; heating apparatus.*—The heat generated by the compression of air and gases is utilized, *inter alia*, to heat the air supplied to a furnace, to dry or heat the fuel (liquid, solid, or gaseous) supplied thereto, or to heat the gas supply to a gas engine. Air or gas may be heated in tubular or other surface apparatus through which the hot compressed gas is passed. Liquid or solid material may be heated in revolving cylinders containing pipe systems through which the hot compressed gas is passed.

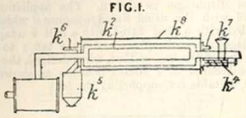
---

**14,577C. Naef, P.** Dec 18, A.D. 1900, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

*Heating air; heating buildings; heating water.*—The waste heat in the exhaust of gas engine furnaces &c. is used for drying materials, heating gases, or warming buildings. It may be used in apparatus of the type described in connection with hot compressed gases in Specification No. 14,577B, A.D. 1901. The hot gases pass through an axial chamber $k^2$ in a revolving drum $k^3$ through which liquid or material to be heated or dried passes from the intake $k^4$ to the hopper $k^5$. Gaseous

fluids may pass through the apparatus by pipes $k^6$, $k^7$. The hot gases may be used in heating-devices on different floors of a building, or they

FIG.1.




may heat air in a large surface apparatus, which air is circulated on the various floors.

---

**14,613. Hallas, J.** July 18.

FIG.1.

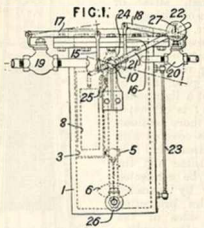
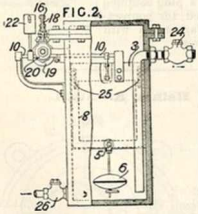



FIG.2.




*Steam traps.*—Relates to a return steam trap or boiler feeder for receiving and returning to the boiler water of condensation received from a steam-circulating system. The closed vessel 1 is provided with the steam inlet 24 and the boiler outlet 26, and has within it the internal vessel 3 with its tile float 8, and the float 6 controlling the valve 5 at the bottom of the vessel 3. The float 8 is linked to the rock-shaft 10, and is counterbalanced by the adjustable weight 22 on the lever 21. When condensed water enters the trap, it first closes the valve 5 through the float 6, and then overflows or passes by the siphon pipes 25 into the vessel 3, causing the linkage mechanism 15, 16, 17, and 18 to open the boiler steam valve 19 and close the exhaust valve 20. The boiler steam forces the condensed water through the check valve 26 to the boiler. A regulating nut and screw 27 may be employed to adjust the movement of the exhaust valve 20. A water gauge 23 is fitted to the trap.

---

**14,817. Kempchen, W.** July 20.

FIG.1.

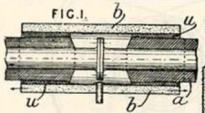
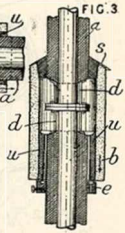



FIG.3

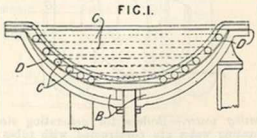



*Non-conducting coverings.* — Relates to heat-insulating or protecting coverings for steam and other pipes, and more particularly to a device for insulating or protecting the flanges of such pipes. The annular non-conducting box or tube *b* is carried on the pipe covering *a* by the sleeve *u* of felt, asbestos, or other material. To inspect the flange, the box *b* is slipped to one side or the other. The box or tube *b* may be made of segments hinged or secured together, and may be slidable in one direction only by abutting against a ring of asbestos. In the modified form of covering for pipes placed vertically, shown in Fig. 3, the upper part is covered by the sloping disc *s*, distance-pieces or stays *d* keep the coverings *a* from the flanges, and the ring *e* adjusts the position on the pipe of the flange covering.

---

**14,845. Howfield, A. J.,** and **Colliver, G. V.** July 22.

FIG.1.




*Boiling-pans; heating by steam circulation.*—A steam-heated pan for boiling fats, sugar, and other materials consists of a pan D provided with a steam pipe C connected to a steam jacket B.

**14,860. Bailey, C. J.** Jan. 3, [*date applied for under Sec. 103 of Patents &c. Act, A.D. 1883*].

FIG.1.

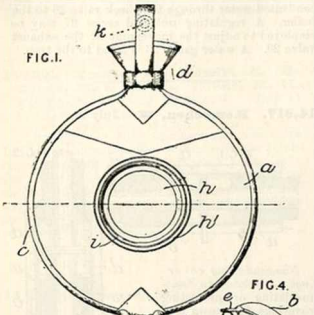
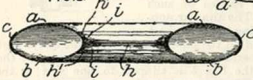



FIG.4.


FIG.2

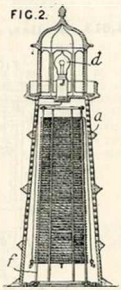



*Hot-water bags and the like.*—Water bags for surgical and other purposes consist of annular water chambers having central air spaces covered by diaphragms and adapted to receive pads &c. The appliance is formed by securing the edges of two rings *a* and *b* of rubber together by means of a strip *c* and flanges $h^1$ formed on a central diaphragm *h*. Strengthening-rings *i* are secured to the diaphragm as shown. The appliance is formed with the usual flared opening *d* which is provided with a ring fitted with a ball *k* adapted to engage in a socket *f* secured by a tab *e* to the other end of the bag, so that, when desired, the bag can be secured in a folded position, as shown in Fig. 4, suitable for supporting the feet.

**15,130. Greville, A. E.** July 25.

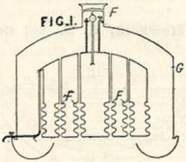
*Heating by electricity.*—An apparatus for warming a room consists of an openwork casing *a*, containing a frame *f* wound with german silver or other non-oxidizing resistant wire, and carrying an incandescent lamp *d* in a glazed lantern or globe. The casing may be hexagonal in plan, and of the form of a lighthouse. The frame *f* is of metal, in one or more sections. The wire is covered with asbestos thread, and is in sections; these and the lamp may be connected in circuit by switches with handles projecting from the sides of the base, and a plug coupling is provided for connecting the apparatus with supply wires.

FIG.2.




**15,321. Davies, L. T.** July 29.

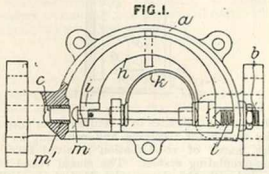
FIG.1.




*Heating water.*—Boilers for generating steam and heating water are constructed with tubes F, preferably corrugated as shown or fluted, which are contracted in diameter above the water level, and with an outer casing G enclosing a flue space around the body of the boiler.

**15,581. Heintz, A.** Aug. 1.

FIG.1.

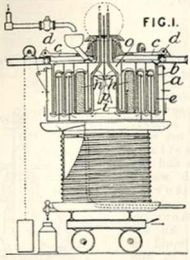



*Steam traps.*—A steam-trap valve for discharging water of condensation or the like consists of a casing *a* with an inlet *b* and an outlet *c* fitted with a cylindrical seat $m^1$, against which a spherical-shaped valve *m* is pressed by a curved tube *h*. One end of the tube is pressed against a stud *l*

in the casing by a spring *k*, and the other end *i* embraces the valve spindle and closes the valve when steam is admitted to the casing so as to expand the tube.

**15,587. Fliegel, J.** Aug. 1.

FIG.1.




*Heating liquids.*—Fig. 1 shows a vertical section of an apparatus for heating and sterilizing milk which is also applicable for heating other liquids. *a* is an open-topped cylindrical vessel, which is divided by a number of concentric annular partitions. *b* is an inner cylindrical vessel, the bottom of which is deeply grooved or corrugated to correspond with the annular partitions in the outer vessel. The inner vessel is closed above by a cover *c*, made in halves, hinged at *d*. An agitator *e*, having rings to suit the bottom of the vessel *b*, is continuously rotated by bevel gear. Within the vessel *b* is placed an annular heading-chamber *h*, to which steam is supplied, and from which it is exhausted, by pipes passing up through the neck of the agitator. The milk or other liquid is supplied to the vessel *b*, and flows, as shown by the arrows, towards a central compartment *o*, whence it flows through a small orifice into a compartment *i* opening into the cylinder *a*. From the cylinder *a* the liquid overflows into a cooling-apparatus below. In its passage through the small orifice the liquid is thoroughly mixed to equalize its temperature, which is shown by a thermometer *p*. The liquid remains in the compartment *i* long enough to be completely sterilized, while it is prevented from becoming overheated by the layer of liquid between the compartment *i* and the heater.

**15,732. Smith, C. H.,** and **Travers, W.** Aug. 3.

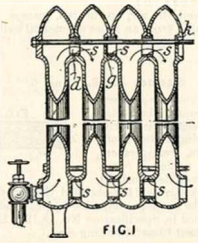
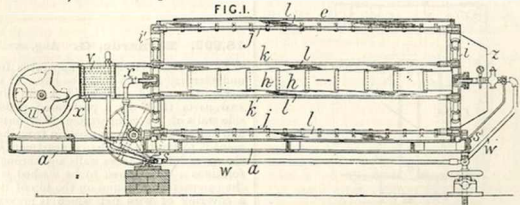



FIG.I

*Heating buildings*, radiators for. The radiator consists of sections with nipples *s* overlapping the joints, and with locking-bolts *k* passing through the ports *d* and webs *g*, which ports and webs are arranged alternately, so that the heating-fluid flows up and down the sections as indicated. The webs *g* have diminutive ports or openings. Lugs between the legs of the sections may be provided to receive the locking-bolts. The fluid inlet may be placed at the top instead of at the bottom.

**15,765. Sutton, G. W.** Aug. 3.

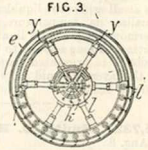
FIG.1.




*Heating air.*—A rotary apparatus for drying or withering tea or other material is shown in Figs. 1 and 3. The drying-cylinder *a* rests on, and is rotated by, two pairs of rollers *s* which are

journalled in a tilting frame *a*. The cylinder is formed with hollow wheel-shaped ends *i*, *i*¹ connected by two concentric series of heating-tubes *j*, *k* so that steam or other heating-medium can be introduced at one end through a pipe *x*, and after passing through the cylinder, emerges through a combined exhaust and draining-pipe *x*. A fan *u* drives air through a steam-heated nest of pipes *v* and the air, so heated, passes into and then escapes from an inner segmental cylinder *h*.

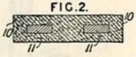
FIG. 3.




**15,802. Stone, J. H.** Aug. 6.

*Non-conducting coverings.* — Sound-deadening and non-conducting strips for covering walls, roofs, ice boxes, refrigerators, &c. are made of compressed moulded cork 10, with wood strips 11 embedded therein to receive nails. The strips are moulded by heat and pressure as described in Specification No. 18,199, A.D. 1892, [*Abridgment Class* Moulding &c.].

FIG. 2.




**15,899. Poyet, C.** Aug. 7.

FIG. 3.

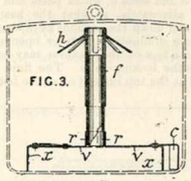
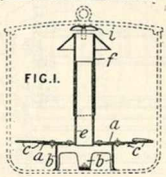



FIG. 1.

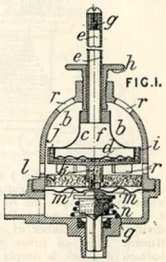



*Boiling-pans.*— Relates to a spraying-appliance adjustable for use in boilers of different sizes for washing linen &c. The disc *a*, Fig. 1, supported on legs *b*, is provided with a series of pivoted wings *c*, and a telescopic spout *e*, *f* terminating beneath the spraying-cap *i*. In the modification shown in Fig. 3, the disc and legs are replaced by a series of bent strips *r*, *v*, *x*, and the wings *c* consist of straight or bent strips. The spout terminates in a "lamp cap" *h* provided with a ring of small channels.

**15,919. Guillery, E. E.,** and **Poupart, P.** Aug. 7.

*Thermostats.* — A thermo regulator, especially applicable for use with steam heating-appliances and for use with water-heaters, stoves, fireplaces, and the like, is shown in Fig 1. An expansible liquid is contained in the tube *e*, and the chamber *c* attached to the tube by the ring *f*. The extensible membrane *d* of the chamber *c* presses on the non-conducting disc *j* in the plate *i* which holds the wooden rod *k*, so that the stem *k* and the spring-pressed valve *n* are in contact with the flexible membrane *m*. When the liquid in the tube *e* expands, the valve *n* is closed or the heating-medium is controlled. The casing *b* has apertures *r* in it, and the tube *e* is closed by the screw plug *g*. An insulating disc *l* of cork or the like is arranged in the casing. The screw *h* provides for adjustment. The thermostatic element may be a helically-coiled tube closed at one end, or a manometric semicircular tube.

FIG. 1.




**15,992. Bernarde, G.** Aug. 8.

*Boiling-pans.*—Relates to apparatus for washing and sterilizing linen and the like. It consists of a vessel provided with a lid A and divided into two parts G, E by a perforated plate F. The side walls of the compartment G are made double, and there is direct communication from the compartment E to the top of the compartment G through the space between these walls and through the perforations *c*. The linen to be washed is placed in the compartment G, and on the top of it is placed a covering of wire net which is prevented from rising by pins *b*. Lye is run into the compartment E, which is then heated, and the pressure of the linen in the compartment G causes a part of the

boiling lye to pass up the space between the walls and through the perforations *c* into the

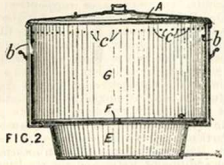
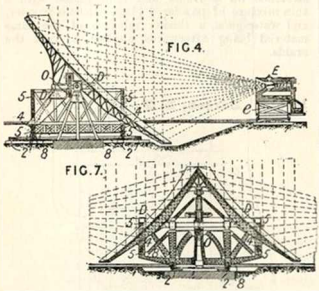


FIG. 2.

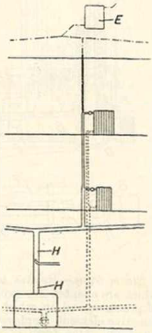
compartment G, from which it percolates through the linen back to the compartment E.

**16,181. Himalaya, M. A. G.** Aug. 12.




*Solar heat, utilizing.*—Relates to apparatus for making industrial use of the heat of the sun and obtaining high temperatures such as are required in chemical and metallurgical arts. The apparatus comprises a reflector derived from a paraboloidal or like surface mounted to move about two or three axes and to bring the sun's rays to a focus within a furnace, crucible, water-heater, or steam boiler, or a chamber for the production of nitrous acid. The reflector is made up of plane or curved silvered glass or metal elements, which may be of trapezoidal, circular, or other form, and which, when congregated, form a sector derived from the frustum of a paraboloid of revolution. Eight sectors may be mounted together with movements about a horizontal and a vertical axis, or one sector alone may be employed, as in the apparatus shown in Fig. 4, for directing the rays within a crucible E. In this apparatus, the reflector is moved about the horizontal axis D by the gearing of pinions 4 with the vertical curved racks 5, and is moved about the vertical axis O by means of the rollers 8 and rails 2. A suitable framework for the reflector and a counterbalance are provided. The trunk *e* carrying the crucible E may be wheeled upon a track concentric with the vertical axis O. In a modified form of apparatus, the arrangement for rotating the reflector about the horizontal axis D is supported upon the vertical axis O, and this form of supporting-arrangement is arranged with two reflectors to give two diametrically-opposite heating-foci as shown in Fig. 7. An oblique axis of motion may be added to the movements of the reflector, and with two motions only the horizontal axis may be arranged parallel to the chord or tangent of the normal arc of the reflecting-surface.

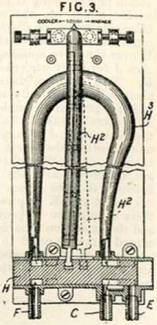
**16,198. Jorgensen, H. V.** Aug. 12.




*Heating buildings &c.*—In hot-water heating installations, circulation is aided by combining with the main pipe H a bubble or air introducing pump arranged inside the pipe to allow air to pass in and mix with the rising water. An expansion chamber E for collecting the water and conducting it to the boiler is provided.

**16,262. Armstrong, C. G.** Aug. 13.

FIG. 3.

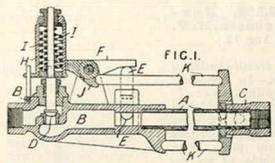



*Heating buildings &c.; thermostats.*—Relates to heat-regulating devices applicable to steam heating and other systems. The thermostat, Fig. 3, is a bimetallic rod $H^2$, which operates the air-controlling valve H. The temperature of steam radiators is controlled by regulating the admission of air from the supply pipe F to the radiator pipe C, or by controlling the passage of air to the exhaust. The pipe E

leads to the exhaust. To increase the action of the thermostat, the cold air is led through the tube $H^3$ placed immediately behind the compound bar $H^2$. The bar $H^2$ is pivoted at the top, and is adjustable by screws. In another arrangement adopted, the thermostatic bar $H^2$ makes contact with one or other of two electric contacts, so controlling one of two air valves placed on the exhaust side of a radiator. The air valve stem is surrounded by a wire coil through which a current may flow to cause the valve stem to expand and the valve to open.

---

**16,451. Fletcher, C.** Aug. 16.




*Steam traps.*—Relates to expansion steam traps which are adapted for working over a wide range of pressures and in which the expansion tube or sensitive element employed is subject to little or no strain. One form of trap is shown in Figs. 1 and 2. The sensitive tube A is connected to the steam-pipe coupling C and to the valve casing B, within which are the control valve D and the balancing piston or diaphragm E. The lever F is connected to the adjustable plunger device or cap H over the valve spindle, and is provided with the claw J for the abutment of one of the thrust rods K. Two or more helical or spiral springs I, arranged concentrically or side by side or end to end, are preferably employed, and are so arranged as to come into action to cause the movements of the lever claw J to approximate closely to the movements of the thrust rod K and the expansion tube A. In modified forms of traps, two levers F are employed, and the springs I are arranged between the two levers. In other modifications, the thrust rod K is pivoted to the lever F, and there is no piston E provided, or the trap levers and the expansion tube are arranged between two curved bars connected to heads which are pressed by the ends of the expansion tube. The valve levers are operated by the bars of the expansion frame.

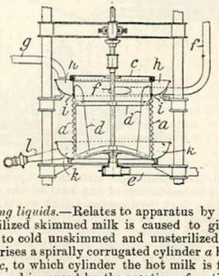
---

**16,508. Nobis, L.,** and **Wenzel, A.** Aug. 16.

*Non-conducting coverings or compositions; boiling-pans.*—Relates to compositions for the manufacture of artificial stone, facing slabs or tiles, fire and waterproof slabs, &c., and for making vessels constructed of concrete and iron, or for lining iron vessels such as cellulose boilers &c., where a watertight lining non-conductive of heat is required. Blast furnace slag is mixed with asbestic (the product obtained by grinding the rock usually found in intimate connection with fibrous asbestos), and Portland cement is mixed with asbestos powder. The two mixtures are then incorporated, with the addition of water, and the resulting composition is moulded to the required form. In order to strengthen the article produced, specially-prepared asbestos braids are introduced into the mass during the moulding process. The insertions are prepared as follows:—Asbestos braids, 2 to 5 mm. thick and 4 to 6 metres in length are stretched on a frame and impregnated with a thin mixture of powdered glass, asbestos powder, and water-glass, a thicker mixture of the same material being afterwards applied to coat the braids.

---

**16,516. Larsen, L. P.** Aug. 16.



*Heating liquids.*—Relates to apparatus by which hot sterilized skimmed milk is caused to give up its heat to cold unskimmed and unsterilized milk. It comprises a spirally corrugated cylinder *a* having a cover *c*, to which cylinder the hot milk is fed by a pipe *e* and is caused by the rotation of a stirrer *d* consisting of blades secured vertically or helically to a central shaft, to pass upwards to an exit pipe *f*. The cold milk is fed by a pipe *g* to a trough *h* and passes through perforations *i* in the bottom on to the outer surface of the cylinder *a*, down which it flows to a trough *k* connected by a pipe *l* with the sterilizing and separating devices.

---

**16,588. Herdmann, G. A.** Aug. 17.

*Non-conducting coverings and compositions.*—Relates to non-conducting coverings for steam pipes

and other surfaces and packings for walls, partitions, and other structures for preventing the transmission of heat or sound, being mainly an improvement on the invention described in Specification No. 3443, A.D. 1900. Slagwool is treated with silicate of soda or similar adhesive material to render it coherent, and is afterwards pressed in a mould by ramming about a mandrel and within a sleeve or wrapper of muslin to form it into tubes. The mass is consolidated by stoving.

**16,639. Brooke, R. G.** Aug. 19.

FIG.5.

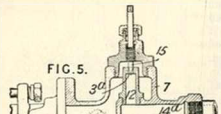
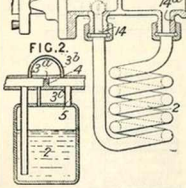



FIG.2.

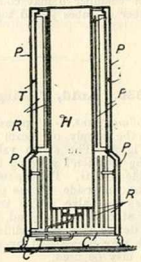



*Steam traps.*—Relates to means for increasing the rapidity of action of expansion steam traps and obviating dribbling. A bye-pass is provided between the drain pipe and the trap, whereby steam is allowed to reach the expansion element of the trap, and the water of condensation is collected preparatory to discharge, and out of contact with the steam. Reference is made to the trap described in Specification No. 14,950, A.D. 1900. The invention may be embodied in the steam trap itself, or in a separate fitting or device to be interposed between the drain pipe and the trap. In the arrangement shown in Fig. 2, the water collects in the reservoir 2, while steam passes to the trap by the bye-pass $3^a$ in the plug 4 or by one of the bye-passes $3^b$ or $3^c$. A water gauge glass may be fitted to the reservoir. In a modification, the water is collected in a coil, the bye-pass is a hole in a partition between the ends of the coil, and a screw plug permits of access to the bye-pass for cleaning &c. In another modified form, a valve casting 7 with branches 14, $14^a$, for the attachment of the collecting-coil 2, is fitted with the tube 12 having the bye-pass $3^a$ adjustable by the conical plug 15. The spindle 15 acts as a cleaning-device for the bye-pass. The outlet end of the coil or chamber may be provided with a ball non-return valve, or other light form of non-return valve.

**16,697. Roeder, R.** Aug. 20.

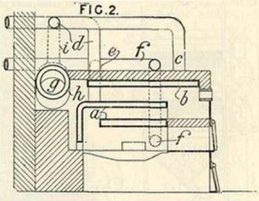
*Heating buildings,* radiators for. The heater or radiator shown in Fig. 2 comprises the double-walled chamber P, divided by partitions T and having longitudinal ribs R on its interior, the internal box H also ribbed, and an inlet for the steam or hot water and outlets C. The heating-medium flows from the lower compartment to the upper compartments, then to the inner box H and to the outlet.

FIG.2.




**16,775. Stubbs, R.** Aug. 21.

FIG.2.



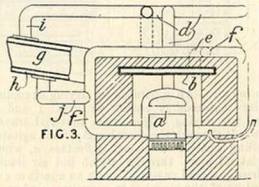
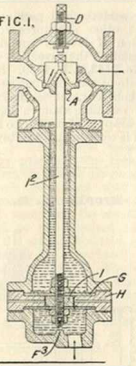




FIG.3.

*Heating water,* boilers for. Relates to boilers for heating water for hot-houses, buildings, and other purposes. The boiler is shown in longitudinal section in Fig. 2, and in transverse section in Fig. 3. Above the ordinary saddle-shaped boiler *a* is arranged the hollow water chamber *b*, which

is connected with the flow pipe *d* by the pipe *c* and with the return pipe *f* by the pipe *e*. The flue *g* has a water jacket *h*, which is connected by the pipe *i* with the flow pipe *d*, and by the pipe *j* with the return pipe *f*. The water chamber *b* may consist of a hollow flat box or of a number of tubes joined together at the ends by cross-tubes.

FIG.1.




**16,836. Auld, J.** Aug. 22.

*Boiling-pans.*—A pressure-regulating valve for regulating the supply of steam to a boiling-vessel &c. is shown in Fig. 1. The steam valve A is arranged on a spindle I² having a piston I working inside a diaphragm H and between flexible discs G. The feedwater or other pressure is admitted to the underside of the piston, and when it is too high it closes the valve. The travel of the spindle is regulated by a stud D at one end, and a stop F³ at the other end. The device may be modified by having a differential piston which may be assisted by a coiled spring and a double beat valve may be used.

**16,868. Hillig, O.** Aug. 22.

FIG.1.

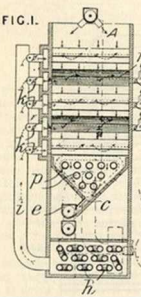



FIG.2.

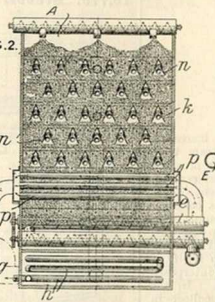
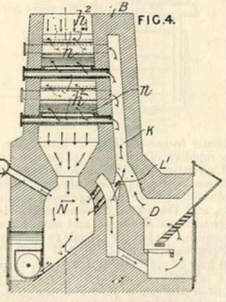
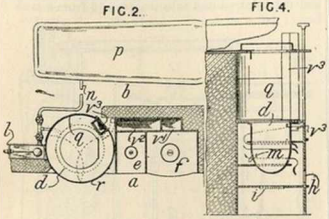



FIG.4.



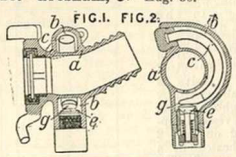

*Heating air.*—An apparatus for drying or cooling granular materials is shown in Figs. 1 and 2, adapted for drying. The moist material travels downwards through the chamber A, and is agitated by falling against V-shaped deflectors *n*, which have lateral slots through which hot air issues. The dried material passes through an aperture *c* at the bottom of the chamber to conveyers *e* where it is cooled by a fan *g* drawing air through the conveyers and then through pipes *p* in the chamber. This partially-heated air is then passed through a steam-heated chamber *h* to a pipe *i* with lateral valve-controlled branches *k* opening inside the deflectors *n* which have adjustable outlets *k*¹. In a modification, the heating-chamber is dispensed with, and steam pipes are passed through the deflectors. In another modification, a kiln B, Fig. 4, has a fireplace D, and the combustion products are mixed with air heated by passing from an inlet E through the discharge chamber N to the flue K. The gases then pass through slotted tubes *k*² inside the deflectors *n*. A damper L¹ allows the quantity of air admitted to be regulated.

**16,871. Haighton, W.,** and **Cornes, J.** Aug. 22.



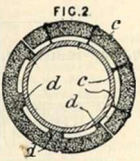

*Boiling-pans; heating water.*—On one side of a grate *c* is an oven *f* facing an apartment *a*, say a kitchen, while on the other side is a boiler *d* which faces both the compartment *a* and another compartment *b*, say a scullery or wash-house wherein is placed a bath *p*. The arrangement is intended for use in cottages, tenements, and the like. The flames may pass around both the boiler and the oven, entering the boiler casing through an opening *h*, or the boiler may be heated by a separate grate *i* placed immediately below. The boiler is filled from a water cistern *l*, and is provided with a connection *n* leading to the bath. The inlet and outlet *m* is situated some distance above the bottom of the boiler. The oven, firebox, and boiler flues are shown at $v^1$, $v^2$, and $v^3$ respectively. The hot water may be used for washing clothes. Doors *r*, *q* enable communication between the two rooms to be shut off.

**17,423. Gresham, J.** Aug. 30.



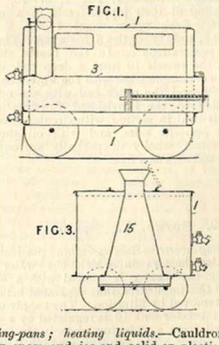

*Steam traps.*—Relates to couplings and fittings for hose and like pipe lines for warming railway carriages and vehicles and for like purposes. The couplings preferably used are those described in Specifications No. 751, A.D. 1894, and No. 7927, A.D. 1895, [*Abridgment Class* Pipes &c.], and the steam trap and valve fittings may be adapted to other pipe couplings. Upon the body *a* of a pipe coupling, Figs. 1 and 2, is arranged the supplementary steam chamber *b* within which is mounted the expansion rod, tube, or thermostatic member *c*. The spirit tube *c* or the like controls the spring-pressed valve *e* by bearing on it at the end *g*, or the tube may carry the valve at one end or be forked and connected to the valve-spindle. If desired, the supplementary chamber *b* may be screwed to a boss upon the coupling to be fitted with the trap arrangement.

**17,555. Francke, O.** Sept. 2.




*Non conducting coverings and compositions.*—A non-conducting material, which may be formed into slats and the like or may be used in an undried or soft state, is formed by mixing together natural tan bark, whitening or ashes or infusorial earth or plaster or mortar or other refractory material, and water-glass or the like. The proportions of the constituent materials are preferably one-third each. The natural bark employed may be oak, beech, pine, willow, beech, or fir. When applied to a steam pipe or the like, as shown in Fig. 2, metal pins *c* or projections *d* of the non-conducting material are arranged to prevent the direct resting of the material upon the pipe or the like.

**17,582. Thwaite, B. H.** Sept. 3.

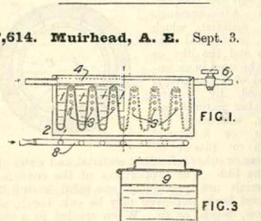



*Boiling-pans; heating liquids.*—Cauldrons for melting snow and ice and solid or plastic hydrocarbons, such as pitch, are constructed with a

cylindrical shell 1, horizontal or vertical, with a furnace flue 3, Fig. 1, or 15, Fig. 3, running through it. The draw-off cocks or openings are so arranged that, during normal working, the cauldron always retains from one-half to one-third of the melted charge. The apparatus may be mounted on wheels, as shown, or may be stationary. Solid or liquid fuel may be used, and, according to the Provisional Specification, the vapours from combustible charges, such as pitch, may be led into the furnace. Gratings to intercept stones &c. may be fitted.

---

**17,614. Muirhead, A. E.** Sept. 3.

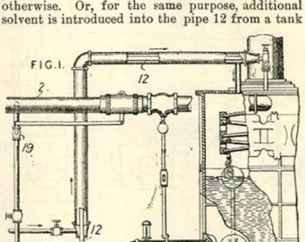



*Heating liquids.*—The liquid is heated in long and narrow vessels 1, Fig. 1, or 10, Fig. 3, terminating at their upper ends in a common space 4. Each water vessel 1 has a set of burners 8, and the outlet 6 has a tap. The casing 2 has perforations 3. In the heater shown in Fig. 3, the vessels 10 form a deep coil, one end being in communication with the water chamber or cistern 9, and the other end with the outlet 13. According to the Provisional Specification, the heater is oval in section, with circular discs placed against opposite sides, and with oil stoves the water vessel wholly or partially surrounds the burner and acts as a flue.

---

**17,649. Sorge, A.** Sept. 3.

*Heating water.*—Relates more particularly to feedwater heaters in which the water before entering the heater is treated with a chemical reagent the impurities thus separated being afterwards removed by filtration. The supply of water to the saturator tank 10 is regulated by a valve 19 operated from a swinging plate in the feedwater supply pipe 2. The solution made in the tank 10 is usually a saturated one, and, to prevent deposit in the pipe 12 which conveys it to the heater, this pipe is heated by a steam jacket, as shown, or otherwise. Or, for the same purpose, additional solvent is introduced into the pipe 12 from a tank

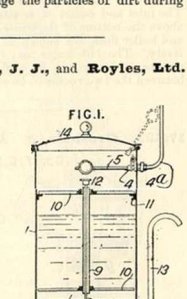



to which pressure is applied. In order that back pressure in the feedwater pipe may not choke the pipe 12, this pipe discharges either into the top of the heater, or close to the discharge of the pipe 2. The filter consists of bags 14 of crushed quartz or the like, which can be stirred about or manipulated so as to dislodge the particles of dirt during cleansing.

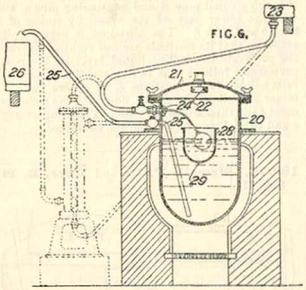
---

**17,671. Royle, J. J.,** and **Royles, Ltd.** Sept. 4.

*Thermostats.*—Relates to means for sterilizing or softening water by boiling. In the arrangement shown in Fig. 1, water is fed from a pipe 4ª fitted with a valve 4 normally closed by a weighted arm 5, into a vessel 1 supported on legs 2 and heated by a gas burner 3. The valve 4 is controlled so as only to admit water when the contents of the vessel are boiling, by an open bottomed vessel 6 formed with holes 7 to allow air to escape and carried by a rod 8 terminating in a plate 12 adapted to engage



and lift the rod 5 when the vessel 6 becomes partially full of steam. The rod 8 slides in a tube 9 loosely supported in the vessel by arms 10 and supports 11. The vessel is closed by a lid 14 and

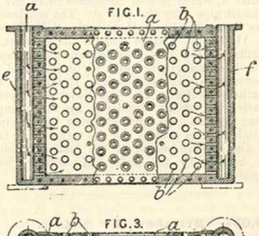



is provided with a draw-off pipe 13. The rod 8 may be permanently connected to the arm 5, but this arrangement renders it more difficult to clean the parts. In modifications, the burner 3 is replaced either by a steam coil or furnace or by a steam pipe opening into the vessel. In the latter case the valve 4 may be a float valve opening under an inverted bell, and arranged to open when the bell becomes partially full of steam. In another form shown in Fig. 6 in which the water is heated under pressure, the vessel 20 is heated by a fire, and is fitted with a steam-tight lid 21 having a safety-valve 22. The vessel is fed from a reservoir 23 through a float valve 24, the float of which is protected by an open vessel 28 having a perforated bottom 29. The vessel empties through a pipe 25 into a tank 26 placed at a level lower than the reservoir 23. These arrangements may be fitted as shown in dotted lines in Fig. 6 with heat economizers comprising inner tubes of the type described in Specification No. 15,192, A.D. 1891, through which the feedwater is fed, enclosed in outer vessels through which the hot sterilized water is led. The water supply may also be controlled by the thermostat described in Specification No. 19,416, A.D. 1893, consisting of a bowstring bar, secured to opposite ends of the vessel and arranged to press when a rise of temperature causes the vessel to increase in length, on the stem of a piston-valve in which openings formed in the sides of a hollow piston register with corresponding openings formed in the cylinder when the valve is open, so that a small movement of the valve-stem produces a large opening of the valve.

**17,726. Brophy, M. M.** Sept. 4.


*Heating water.* — Relates to an improved valve specially applicable to the hot and cold water fitting described in Specification No. 15,186, A.D. 1900, for accurately controlling the flow of water and steam to the mixing-chamber, and for preventing dirt from being carried to the seats of the draw-off valves. The valve consists of a socket *b* having flats by which it can be screwed into the casing *c*, carrying the hollow plug *g* containing the strainer *k*. A nut *i* holds the plug tightly against the shoulder *h*, and locks it after the plug has been turned by a spanner applied at *j* so that the ports in the plug and socket register more or less. To clear the strainer, the socket *b* is taken out without disturbing the adjustment of the valve. Specification No. 21,647, A.D. 1900, is also referred to.

**17,978. Heizmann, J.** Sept. 9.

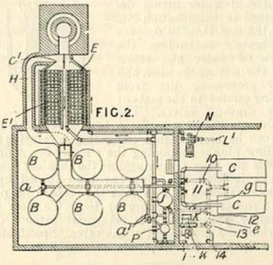



*Heating liquids and gases.*—Relates to surface apparatus for heating, drying, superheating, condensing, or cooling gases, vapours, or liquids by the flow of heating or cooling gases, vapours, steam, or liquids. Two flat metal plates *a*, Fig. 3, are arranged parallel to one another, and are connected with inlet and outlet pipes *e*, *f*, and are traversed by a number of hollow rivets or short-flanged tubes *b* arranged in rows. In a slightly-modified form, the apparatus is made mainly in one piece, and is traversed and stiffened by tubes and steel bolts in the form shown in Figs. 1 and 3.

**18,020. Evans, Q. N.** Sept. 9.

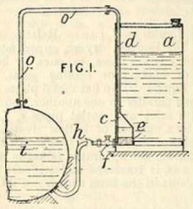
*Heating buildings &c.*—Relates to apparatus for heating buildings and the like by water heated

chiefly by exhaust steam from engines. The arrangement of the apparatus or plant is shown in Fig. 2. The boilers B supply steam to the engines C, and the furnace gases are conducted to the flue



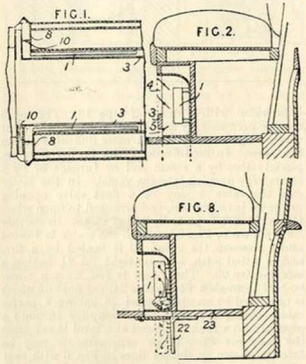

and to the economizers E, E¹, or dampers C, C¹ may cause the products to pass through the bye-pass H. The engine exhaust is passed to the heater J, which is also connected with the main exhaust pipe *e* by the pipe *g*. The condenser K may be put in circuit, if desired. Suitable valves 10, 11, 12, 13, and 14 control the exhaust. An auxiliary heater P is provided, and this is supplied with live steam by the pipe $a^1$, or is heated independently, or the economizer E may act as an auxiliary heater. The hot water employed for heating is rapidly circulated by the pump N, going by one pipe and returning by the pipe $L^1$. Suitable valves provide for the water being heated by the exhaust steam in the heater J alone, or for heating by the main and auxiliary heaters together.

**18,054. Britzkow, F.** Sept. 10.




*Boiling-pans; digesters; heating water.*—Relates to means for maintaining a level of liquids in steam and other boilers, cooking-apparatus, digesters, cauldrons, and the like. At a higher level than the boiler *i* or other vessel to be fed is placed a container *a*, of larger capacity. At one side of this container is a small compartment *c* which communicates with the container through perforations *e*, with the upper part of the vessel *i* through a small pipe *d* and continuing pipe *o*, and with the lower part of the vessel by means of a tube *h* and cock *f*. The container is hermetically sealed so that its contents are not emptied through the perforations *e*. The liquid level in the container *c* follows that in the vessel. When this falls below the perforations *e*, air enters the container and allows liquid to flow into the compartment *c* and thence into the vessel. The compartment *c* and tube *d* may be outside the container.

**18,079. Newell, F. C.,** and **Herr, E. M.** Sept. 10.




*Heating by electricity.*—Relates particularly to electric car heaters which also serve as resistance devices or rheostats for the controller of the motor and braking circuits. In the form shown in Figs. 1 and 2, the heaters 1 are located under the seats and hot air may pass to the inside of the car through the valve-controlled ports 4, 5 in the partition 3, or it may escape to the atmosphere through the conduits 8 in which valves 10 are fitted. The outlets to the atmosphere may be in the floor or roof, and these arrangements may be used for ventilating the car. Fig. 8 shows an arrangement in which the resistance boxes 1 can be affixed when desired to the vertical arm of the bracket 22 outside the car, and in a modification, the boxes 1 can be turned into a horizontal position and secured below the floor 23.