# PATENTS FOR INVENTIONS.

# ABRIDGMENTS OF SPECIFICATIONS.

## CLASS 64, HEATING,

[*Excepting* FURNACES AND KILNS; STOVES, RANGES. AND FIRE-PLACES;

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

## PERIOD—A.D. 1905-8.

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.

1911.

PRICE ONE SHILLING.

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# EXPLANATORY NOTE.

The contents of this Abridgment Class may be seen from its Subject-matter Index. This Index is in accordance with the *Abridgment-Class and Index Key* (REVISED EDITION, 1910), but owing to certain variations that have been made in the scope of the Abridgment Classes since the earlier sheets were printed, some additional Index subheadings (indicated by an asterisk) have been employed. The Italic openings prefixed to the abridgments follow the same plan as in previous periods, and do not in all cases agree with the indexing. For further information as to the classification of the subject-matter of inventions, reference should be made to the above-mentioned *Abridgment-Class and Index Key*, (price 1*s*., by post 1*s*. 6*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.



1000. Wt. 7959. 12/08. D & S. 2 12464.

**Heating by electricity**—*cont.*
regulating &c.—*cont.*
12,807. 13,948. 14,256. 14,780 [*Appx*]. 14,782 [*Appx*]. 14,797 [*Appx*]. 14,807 [*Appx*]. 16,973. 18,265. 22,314. 27,098. '*06*. 4581. 7066. 9244. 10,879 [*Appx*]. 12,333. 13,795. 15,499 [*Appx*]. 21,447. 22,716. 27,421. '*07*. 3078. 3543. 3915. 4550. 5576 [*Appx*]. 10,119. 12,871. 14,747. 15,079. 16,358. 17,094 [*Appx*]. 21,332. 23,054. 23,198. 23,801. 25,752. 26,670. '*08*. 390. 549. 1304. 2381 [*Appx*]. 3544. 5856. 7507. 8148. 8412. 9481. 10,680. 12,352. 14,121. 14,537. 14,817. 15,376. 15,377. 15,497. 16,451. 16,496. 19,333. 20,356. 21,494. 22,598. 24,038. 24,815. 25,485. 26,452. 26,680.
resistances, construction of and materials for. *See Abridgment Class* Electricity, Measuring &c.
resistances, permanent, heating by. '*05*. 403. 540. 2328. 2767. 3289. 4979. 10,611. 11,407. 12,807. 13,948. 14,167. 14,256. 16,973. 18,265. 21,431. 22,314. 23,117. 24,518 [*Appx*]. 27,098. '*06*. 1284. 2072. 2811. 3316. 4581. 7066. 9999. 10,208. 10,310. 11,657. 12,333. 13,032. 13,795. 15,490. 15,499 [*Appx*]. 15,500. 21,279. 21,447. 22,716. 25,411. 26,954. 27,128. 27,421. 28,549. 29,120. '*07*. 3078. 3226. 3543. 3915. 4550. 9921. 10,088. 10,119. 12,826. 12,871. 14,747. 15,079. 16,358. 17,079. 18,259. 18,565. 19,101. 19,875. 19,907. 21,332. 23,054. 23,198, 23,801. 25,752. 26,670. 27,171. 27,681. '*08*. 549. 1696. 2381 [*Appx*]. 2790. 3250. 3544. 4461. 5015 [*Appx*]. 5016 [*Appx*]. 7507. 8093. 8148. 8471. 8996. 9090. 9449. 9481. 10,521. 12,275. 12,352. 12,896. 14,121. 15,376. 15,377. 15,497. 15,816. 16,451. 16,496. 17,223. 17,687. 18,458. 18,653. 19,333. 20,356. 20,496. 21,493. 21,494. 21,645. 22,598. 23,194. 24,038. 24,815. 25,485. 26,452. 27,697.
special applications, [*other than* air and gases, *and* liquids, heating]. '*05*. 123 [*Appx*]. 540. 2045. 2497. 4076 [*Appx*]. 10,611. 10,655 [*Appx*]. 11,407. 13,948. 14,167. 14,256. 14,780 [*Appx*]. 14,782 [*Appx*]. 14,797 [*Appx*]. 14,807 [*Appx*]. 18,265. 22,246. 22,314. 23,117. 27,098. '*06*. 1284. 4581. 7066. 9244. 9999. 10,879 [*Appx*]. 12,333. 13,795. 15,126 [*Appx*]. 15,499 [*Appx*]. 21,447. 22,716. 23,269 [*Appx*]. 25,411. 26,954. 27,128. 27,749 [*Appx*]. '*07*. 3116. 3543. 4256. 4550. 5576. 5937. 10,088. 12,826. 12,871. 14,747. 15,079. 16,358. 16,952 [*Appx*]. 17,079. 17,094 [*Appx*]. 18,565. 19,907. 21,332. 23,054. 23,198. 25,752. 26,354 [*Appx*]. 27,095 [*Appx*]. '*08*. 324. 390. 2381 [*Appx*]. 2790. 3250. 5017. 5856. 7507. 7613. 8148. 8996. 9090. 10,518. 10,521. 12,275. 14,121. 14,537. 15,497. 17,223. 17,687. 18,458. 19,333. 22,551. 23,194. 24,815. 25,485. 26,452. 26,680.
switches. *See Abridgment Class* Electricity, Regulating &c.
thermostats. *See* Thermostats &c.

Heating by steam circulation. *See* Heating buildings &c. ; Heating systems &c.

Heating by water and other liquid circulation. *See* Heating buildings &c. ; Heating systems &c.

**Heating, Heat-storing apparatus for.** '*05*. 18,050. '*06*. 1284. 27,942. '*07*. 7970. 17,331. 28,130. '*08*. 8996. 22,222. 22,598.
*Excepting* Cold and heat retaining chambers &c., [*Abridgment Class* Cooling &c.] ;
*for which see that heading.*

**Heating systems and apparatus.** '*05*. 4148. 10,037. 10,326. '*06*. 6681. 12,523. 17,748. 20,128. 22,287. '*07*. 580. 5757. 10,185. '*08*. 1108. 2807. 8267. 9090.
*Excepting* Bed warmers &c. ; Boots and shoes, (*heating-appliances forming part of*), [*Abridgment Class* Boots &c.] ; Digesters ; Drying systems &c., [*Abridgment Class* Drying] ; Filtering &c, (*filters, heating*), [*Abridgment Class* Filtering &c.] ; Foot-warmers, Carriage &c. ; Furnaces &c., [*Abridgment Class* Furnaces &c.] ; Hatching and rearing appliances, [*Abridgment Class* Agricultural appliances, Farmyard &c.] ; Heating air &c. ; Heating and cooling appliances, Surgical &c., [*Abridgment Class* Medicine &c.] ; Heating buildings, ships, and vehicles, (*including* Systems applicable generally for heating by circulation of fluids) ; Heating by chemical action &c. ; Heating by electricity ; Heating, Heat-storing apparatus for ; Heating water &c. ; Heat, Utilizing solar and natural ; Hot-water bottles &c. ; Ironing-machines &c., (*heating*), [*Abridgment Class* Washing &c.] ; Stoves &c., [*Abridgment Class* Stoves &c.] ; Surface-apparatus for effecting transfer of heat &c., [*Abridgment Class* Cooling &c.] ; Thermostats &c. ; Washing-boilers, set-pans, &c. ;
*for which see those headings.*
bricks, blocks, slabs, and tiles for. *See Abridgment Class* Moulding &c.
coverings and compositions, non-conductors of heat. *See* Non-conducting coverings &c. ; Plastic compositions, [*Abridgment Class* India-rubber &c.].
fans. *See Abridgment Class* Rotary engines &c.
incrustation and corrosion, preventing, in pipes. *See Abridgment Class* Steam-generators.
making apparatus by cutting and working metals. *See Abridgment Class* Metals, Cutting &c.
pipe joints and couplings. *See Abridgment Class* Pipes &c.
pumps for. *See Abridgment Class* Pumps &c.
steam-generators. *See Abridgment Class* Steam-generators.
steam-superheaters. *See Abridgment Class* Steam-generators.
steam-traps. *See* Steam-traps.
thermostats. *See* Thermostats &c.
valves and cocks. *See Abridgment Class* Valves &c.

**Heating water and other liquids.**
*Heating processes and apparatus applicable solely to special purposes. See separate headings, such as* Hollow ware, [*Abridgment Class* Hollow-ware] ; Internal-combustion engines, Carburetting-apparatus, vaporizers, and heaters

# NAME INDEX.

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

## ERRATA.

The following abridgments should be *deleted*, as their subject-matter is now excluded from the contents of this Class by cross-reference :—

A.D. **1905.** Nos. 83. 163. 2830. 3026. 3261. 3273. 3779. 3845A. 4618. 5104. 5342. 6078. 7607. 7681. 7752. 7770. 7934. 9137. 9766. 10,004. 10,738. 10,749. 10,817. 10,868. 11,146. 11,629. 13,492. 14,299. 14,400. 14,599. 15,390. 16,631. 16,689. 16,811. 17,364. 17,451. 18,321. 19,724A. 20,470. 20,883. 21,237. 21,816. 22,125. 22,316. 22,452. 23,141. 23,567. 23,889. 24,186. 25,242. 25,321. 25,394. 25,443. 27,082. 27,267.

A.D. **1906.** Nos. 18. 1018. 1245. 1670. 1679. 1837. 2451. 2529. 2792. 2912. 3010. 3353. 4647. 5348. 6057. 6193. 6288. 7346. 8183. 8241. 8395. 8457. 9179. 9799. 9909. 10,201. 10,788. 10,847. 11,086. 12,737. 13,335. 13,391. 13,892. 13,895. 14,061. 14,559. 14,872. 16,119. 17,696. 18,485. 18,643. 18,745. 19,866. 19,957. 23,129. 23,988. 24,745. 25,097. 25,308. 26,464. 26,692. 28,468. 28,842. 29,349. 29,680.

A.D. **1907.** Nos. 418. 722. 2442. 3006. 4124. 4193. 4620. 5100. 5575. 6287. 6623. 7407. 7537. 7575. 7690. 8458. 8473. 8553. 9684. 10,553. 13,332. 14,505. 14,528. 14,715. 15,186. 16,291. 16,336. 16,511. 16,779. 17,240. 18,829. 19,703. 20,003. 21,071. 21,893. 22,036. 22,283. 22,771. 22,869. 23,093. 23,778. 23,993. 24,052. 24,150. 24,707. 24,898. 25,071. 25,655. 25,658. 26,109. 26,619. 27,665. 27,881. 28,117.

A.D. **1908.** Nos. 601. 2517. 2744. 2787. 3016. 3564. 3958. 4621. 4847. 5662. 6534. 7122. 8104. 9560. 9762. 9763. 10,295. 11,128. 13,311. 13,734. 13,776. 14,034. 14,162. 14,302. 15,100. 16,613. 17,340. 17,978. 18,828. 18,986. 19,637. 19,754. 20,923. 21,174. 21,756. 22,627. 24,487. 24,838. 25,232. 26,085. 26,086. 26,140.

Page 10. Abridgment No. **3268.** After date add *Grant of Patent revoked.*

# HEATING.

*Excepting* FURNACES AND KILNS; *and* STOVES, RANGES, AND FIRE-PLACES;

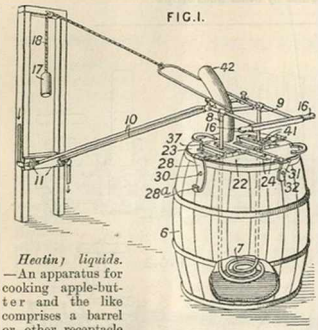
*for which see Abridgment Classes* FURNACES &c.; STOVES &c.

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. 1905.

**83. Bauman, J. W.** Jan. 2.

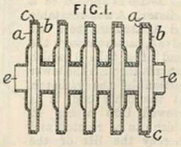
FIG. 1.




*Heating liquids.*—An apparatus for cooking apple-butter and the like comprises a barrel or other receptacle 6 within which is placed a heater consisting of a steam coil 7 connected to tubes 8, 9 and tubes 10 hinged at 11 to a supporting-frame. The heater is supported by a cord 18 and counterweight 17 and is fitted with handles 16. A cover for the receptacle is formed in two parts 22, 23 connected by detachable hinges 24. The larger part 23 is fitted with a steam-escape tube 42 and with guides 41, between which are adapted to slide pieces 37, which are formed in two parts and embrace the steam tubes 8, 9. Hinged flaps 28 are attached to the part 23 to secure the cover to the receptacle by engaging with pins 30, or to secure the cover to the heater by hooks $28^a$. The front section 22 is provided with a hasp 31 to engage a pin 32 on the receptacle.

**163. Osmond, W.** Jan. 3.

FIG. 1.




*Heating water; heating buildings.*—An apparatus primarily intended as a motor-car radiator, but applicable also to heating buildings or heating water, is constructed from complementary dished plates *a*, *b*, as shown. Each plate is formed with a projecting rim *c* on one side and a hollow boss *e* on the other. Instead of circular plates connected centrally as shown, square plates joined centrally or eccentrically may be employed.

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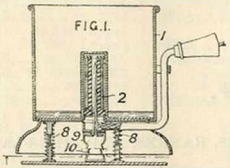
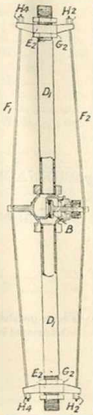
**403. British Thomson-Houston Co.,** [*General Electric Co.*]. Jan. 9.

FIG.1.




*Heating liquids.*—An electric heater comprises a fluid receptacle which is resiliently supported so that its decrease in weight due to insufficiency of liquid causes an interruption of the circuit, thus preventing overheating. As shown in Fig. 1, the vessel 1 is supported on three telescopic legs, each surrounded by a spring 8. The leads pass through the handle to the heating-coil 2, surrounded by a flanged casing, and the circuit is completed through the spring arms 9, 10 of the cut-out. When the level of liquid is too low, the arms are separated by the rising of the vessel due to the action of the springs, and the circuit is broken. The point at which this interruption occurs can be regulated by means of the springs 8 and by altering the shape and elasticity of the arms of the cut-out.

**454. Page, J.** Jan. 10.




*Steam traps.*—The valve B of the trap is kept closed against the steam pressure by flexible wires $F^1$, $F^2$ so long as there is no water in the trap. Adjustment is made by cross-pieces $E^2$ controlled by nuts $G^2$, working on brass tubes $D^1$ which form the inlet and outlet of the trap. As water accumulates, the tubes contract and slacken the wires, thus allowing the valve to open. Separate nuts $H^3$, $H^4$ are fitted for the adjustment of the wires.

**540. Maclean, J.** Jan. 11. *Drawings to Specification.*

*Heating by electricity.*—Curling-tongs are heated by resistance coils consisting of a high-resistance wire wound round strips of mica, which are notched on their edges. The coils are insulated from one another by other mica strips.

**556. Pulsford, F. C.** Jan. 11.

*Heating buildings &c.; thermostats.* — An automatic cut-off valve for use in steam heating apparatus is controlled by the expansion of a rod placed therein. Fig. 1 shows a part sectional elevation of the device as applied to a radiator. A non-rotatable rod 8, attached to a lift valve 4, passes through the head of a tube 9 which extends through the lower portion of the radiator. At the other end, it is screwed into a cap 12 which can be rotated, and thereby the lift of the valve 4 regulated, by means of a square-headed rod 13. A spring 19 prevents injurious strain on the valve or its seat. The area of the hand-controlled valve 3 bears a ratio to that of the cut-off valve 4 which is inversely as

FIG.1.

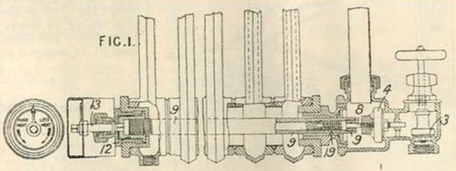
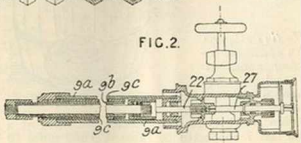



FIG.2.



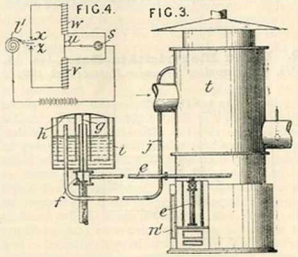
the ratio of their respective lifts. In the modification shown in Fig. 2, three concentric expansion tubes $9^a$, $9^b$, $9^c$ are employed, the intermediate one of iron and the others of copper, the result being that a greater expansion is obtained for the same range of temperature. In this case, the end of the outermost tube nearer the valves is fixed and the bar 27, regulating the lift, is attached to the valve itself, which is screwed on its controlling-rod 22. In another form in which a similar regulating-device is employed, one tube only is used, the end farther from the valves being free.

**577. Bissrich, O.** Jan. 11. *Drawings to Specification.*

*Non-conducting coverings and compositions.*—Two parts of Siberian or Canadian asbestos are triturated with two parts of finely-sifted sand, and to the product a mixture of one part of water-glass with one part of water is added. The pasty material thus obtained is then subjected to hydraulic pressure in moulds lined with gauze or similar material, and, after a stiff crust has formed thereon, the pressed material is placed in drying-rooms. The material may be worked into slabs, plates, axle bearings, and other articles, and is suitable for use as an insulating-medium. Specification No. 11,226, A.D. 1892, is referred to.

**582. Bousfield, J. E.,** [*Pintsch, J.*]. Jan. 11.

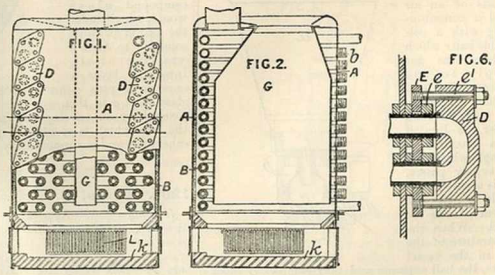
*Thermostats.*—In a stove in which air is heated by gaseous fuel, the supply of gas is regulated according to the temperature of the room and the pressure of the air in the stove. The gas-supply valve *f*, Fig. 3, is connected by a rod *g* to a bell *h* of the form shown, dipping into a tank *i*. One compartment of the bell communicates through a pipe *j*




with the air-heater, so that the gas supply depends on the pressure created by the air-forcing device. Fig. 4 shows a thermostat for controlling the supply of gas according to the temperature of the room. The gas valve *s* is connected by rods *u* to the armatures of operating electro-magnets *v*, *w*, the circuit through which is made and broken by a bi-metallic thermometer *l*, the free end of which moves between contacts *x*, *z*. A thermostatic device may be arranged in the room to be heated, to control the speed of the air-forcing device.

**594. Naylor, C. T., Naylor, J.,** and **Parkinson, R.** Jan. 12.

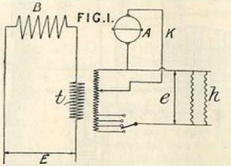
*Heating water.*—Apparatus suitable for use as a steam boiler or water-heater is shown in elevation in Fig. 1 and in central sectional elevation, at right-angles to Fig. 1, in Fig. 2. Sinuous tubes B are placed horizontally one above the other with their ends projecting slightly beyond the casing A. These ends are secured to the casing by nuts, and are connected together by junction boxes D. The central bend of each alternate tube is made of larger radius in order to break spaces with the bends of the tubes next above and below it. The furnace is formed with a solid hearth *k*,




and is fired from the top through a hopper G, passing downwards through the nest of tubes. Air is admitted through openings covered with grids L, which may be hinged to facilitate the

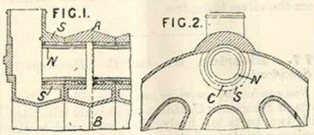
removal of ashes. Pivoted doors or dampers are fitted over the grids. Fig. 6 shows the method of connecting the boxes or bends D to the tubes. The boxes are drawn tightly against the tube-ends by four bolts $e^1$ screwed into a plate E, which is secured on the tubes by nuts *e*. Copper or other packing-rings are employed to make the joints tight.

**789. Union Elektricitäts-Ges.** Jan. 16, 1904, [*date applied for under Patents Act, 1901*].




*Heating by electricity.*—The current passing through the heaters *h* of an electric car is derived from a transformer *t* in the circuit of the windings B of the motor or motors, so that the current in the heaters increases with the fall of the current in the circuit K of the armature A, and, during braking, when the armature circuit is open, the heaters take all the energy due to the full secondary voltage *e* derived form the full line voltage E.

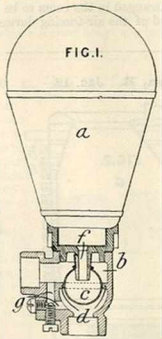
**813. Whitlock, A.,** and **Carr, E.** Jan. 16.




*Heating water.*—In boilers constructed of sections which are secured to each other, the sections, instead of having sockets cast upon them, are connected by means of nipples or thimbles which are secured in place by caulking. Fig. 1 shows the arrangement as applied to a sectional boiler and Fig. 2 a section on the line A–B, Fig. 1. The nipples, which may be tapered, are shown at N and the caulking at C.

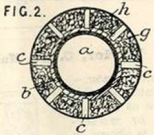
**1019. Diederich, A.** Jan. 18.

*Thermostats.*—An apparatus for automatically regulating the heat produced by gas ovens, gas warming-apparatus, and the like consists of an air vessel *a* communicating with a collapsible ball *c* which regulates the gas supply to the burners. The ball *c*, which is preferably made of Para rubber, is located in a chamber *b* through which the gas supply passes, and is secured to a nozzle *f* at the bottom of the air vessel. When the temperature of the air in the vessel *a* rises, the ball expands and may completely block the passage *d*. A by-pass *g* is provided so that the gas supply is never completely shut off. As the compartment in which the apparatus is located cools, the air in the vessel *a* contracts, causing the ball *c* to shrink and admit more gas to the burners.




**1271. Reimann, A.** Jan. 23. *No Patent granted (Sealing fee not paid).*

*Non conducting coverings.* — Hot-water reservoirs, boilers, steam pipes, &c. are coated firstly with a layer of compound glass wool *b*, which under the action of heat solidifies to form a crust-like shell. Into this layer a number of pins *c* are inserted, and a mantle of glass wool *g* is then applied. The whole is then covered by an envelope of paper, pasteboard, or the like, which is secured in position by cords or otherwise, and is supported by the pins *c*.

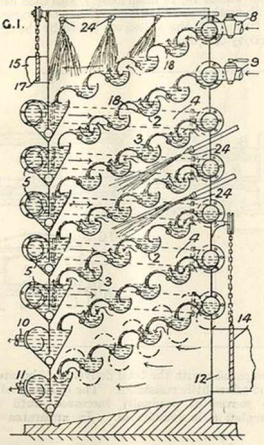



**1288. Drees, M.** Jan. 23.

*Heating water.*—Apparatus to be used for the direct reaction of gases and liquids, in which waste gases may be employed for heating or vaporizing water, comprises groups of liquid seals, arranged side by side, which are traversed by the gas in parallel streams. In a box, preferably rectangular in plan, are fixed, in planes inclined in correspondence with the desired velocity of the liquid, a series of horizontal overflow channels 2. Projections 3 from the upper channels extend below the seal level of

the lower channels. The channels are mounted on pivots 18, so that the resistance of the seal may be adjusted, and that the channels may be inverted for cleaning purposes. To economize space, two or more

FIG. 1.




separate paths for the liquid are arranged one within the other, two such paths being shown in Fig. 1. The different paths may be traversed by different liquids. At the places at which the serpentine path of the descending liquid is reversed, a separator 5 is provided to collect mud, tar, and other deposits or secretions from the liquid, cocks and mud blow-outs being provided on the separators. The liquid passes through the cocks 8, 9 into the channel, fills the liquid seal, and flows over the rounded lip of the channel to the next channel, and so on. On leaving the separator, the liquid is reconducted by pipes 4 to the other side of the apparatus and flows through the next set of channels. The liquid finally issues through pipes 10, 11. The gas enters the lower part of the casing through a conduit 12 provided with a valve 14, and, after passing through the liquid seals in the direction indicated by the arrows, leaves the upper part of the casing by an opening 15 provided with a valve 17. The gas may also follow the reverse path. The gas is driven or drawn through the apparatus, the force being preferably applied intermittently, and the liquid supply also being preferably regulated so as to send intermittent cascade waves through the apparatus. The pivots 18 may be connected so that all the channels may be adjusted simultaneously. The packing between the ends of the channels and the casing may consist of metal, rubber, felt, or cork disks, or of linen pockets. In an adjustable packing, the pivots of each series are mounted at one end in a channel-iron which slides between two angle-irons fixed on the wall of the casing. The web portion of the channel-iron is faced with suitable material for making a tight joint when the iron is pressed by set-screws against the ends of the channels. Spraying-devices 24 may be arranged in the apparatus. The channels, which may be of various shapes, may also be adjusted so that a portion of the liquid falls over the inner edge of the seal and causes a spraying action. The channels may also be adjusted so that no immersion of the gases takes place, but only a passage over succeeding surfaces and a spraying action. The immersion wall of the channel is notched and perforated so as to divide the stream of gas finely, the wall being preferably also provided with an horizontal projection at the bottom to cause the gas to remain in contact with the liquid for a longer time. This projection may also be formed by a flexible or displaceably mounted material which tends to float in the liquid. The apparatus may be constructed with a circular base and concentric rings of channels, or in the form of superposed polygons arranged as cones or pyramids.

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**1414. Winterflood, A. C. H.** Jan. 24.

FIG. 2.

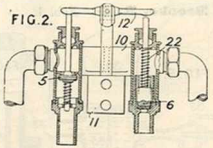
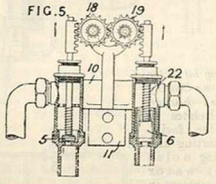



FIG. 5.

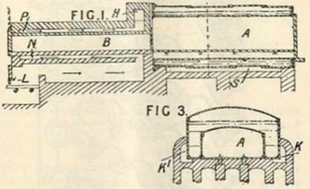



*Heating water.*—In water-heaters, geysers, and the like, lever mechanism or toothed gear is arranged between the water valve and the gas valve, so that the former is opened slightly in advance of the latter. A chamber containing the gas valve 5 is secured to a chamber containing the water valve 6, preferably by a bracket or bridge 10, which can be attached to the heater by its plates 11. As shown in Fig. 2, the free ends of the spindles of the water and gas valves are adapted to bear against the ends

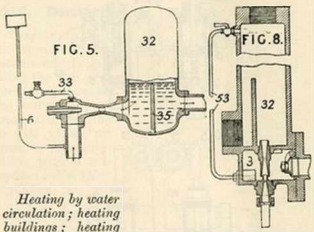
of a rocking lever 12. A space is left between the end of a valve spindle and the adjacent end of the lever so that the water valve rises slightly, on opening, before it depresses the valve 5 to allow gas to pass to the burners. In a similar arrangement in which the gas valve opens upwards, the lever 12 is replaced by two levers. The adjacent ends of these levers bear against each other, while the other ends are in proximity to the free ends of the spindles of the water valve and gas valve respectively. In another arrangement, the lever may terminate in toothed quadrants, the teeth of which mesh loosely with racks on the free ends of the valve spindles. Fig. 5 shows a further modification in which two gear-wheels 18, 19 mesh loosely with each other and with teeth on the spindles. When the water supply is turned off, the valves are closed by the action of gravity or springs 22.

**1854. Smallwood, A.** Jan. 31.

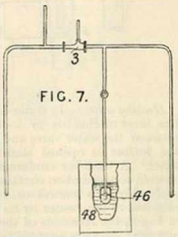
*Heating water.* — In annealing-furnaces of the kind described in Specification No. 9928, A.D. 1904, [*Abridgment Class* Furnaces &c.], the waste heat from the furnace and the heat given off from the metal during the cooling process are utilized for heating water and generating steam. One or more water-jacketed cooling-chambers A, Fig. 1, are arranged in close proximity to the annealing or other chamber B, and are in form similar to the furnace tube of a Lancashire or Cornish boiler, or, when heavy articles are accommodated, as shown in Fig. 3. The products from the grate L pass through flues N, P around the annealing-chamber, and flues N on each side of the furnace, to side flues K, K¹, and then pass through a bottom flue S to the chimney.

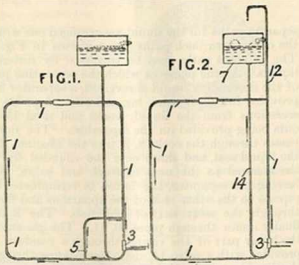



**2045. Brooke, R. G.** Feb. 1.

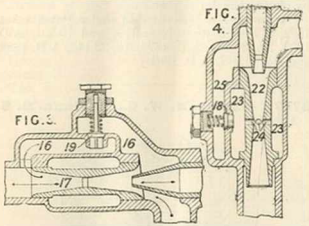



*Heating by water circulation; heating buildings; heating water.*—Relates to means for facilitating starting and preventing noise in hot water heating systems in which steam-jet circulators are employed. Two types of apparatus are described. In apparatus of the first type, when the system is starting, the liquid put into motion is small in quantity in comparison with the total delivery of the circulator, and offers little resistance. The quantity of liquid so moved is gradually increased until normal circulation is established. In apparatus of the second type, the heating-circuit is provided with one or more air vessels which are usually near to the circulator and on the delivery side thereof. Figs. 1 and 2 show diagrammatically two arrangements wherein a by-pass circuit allows liquid delivered by a circulator 3 to pass back to the main circuit. The by-pass circuit offers at starting a less resistance than the main circuit 1. When normal circulation



has been established, the by-pass offers the greater resistance, so that little liquid flows therein. For this purpose, an automatic or other valve 5 may be arranged in the by-pass circuit, as shown in Fig. 1;




or the by-pass circuit may be an open one, as shown in Fig. 2. In the latter arrangement, an outlet pipe 12 extends upwards from the main circuit and delivers liquid to a lamp 7 situated above the highest point of the main circuit. An inlet pipe 14 leads from the tank 7 to the main circuit at a point behind the circulator. In modifications, the by-pass circuit may be formed in the casing of the circulator. In one arrangement, Fig. 3, the casing of the steam-jet circulator forms a passage 16 to lead liquid from the outlet end of the combining-cone 17 to the inlet end thereof. A valve 19 may be arranged in the passage 16 to form the required resistance to the flow of liquid. Fig. 4 shows another circulator in which the combining-cone 22 communicates by means of holes 24 with an annular chamber 23 formed around the combining-cone. The chamber 23 communicates through a valved opening 18 with a passage 25 leading to the inlet end of the combining-cone. Fig. 5 shows apparatus of the second type in which one or more air vessels 32 are arranged in the circuit on the delivery side of the circulator. Liquid is supplied to the circuit by pipes 6. To prevent the air from passing forward into the circuit, the air vessel is provided with a diaphragm 35 for keeping the connexion to the further portion of the circuit covered with liquid. The diaphragm 35 also serves to prevent the propagation of vibration along the pipes. Means for supplying external air to compensate for air absorbed are provided. In the arrangement shown, air is supplied by the pipe 33; in another arrangement, the circulator may be provided with an air inlet arranged centrally with the steam nozzle. Fig. 8 shows an air chamber 32 located on the outside of the circulator 3 and connected by a pipe 53 to an inlet portion of the circulator, or to a portion of the circuit on the inlet side of the circulator. The pipe 53 may lead to a cone or passage which is located concentrically to the steam nozzle so as to be surrounded by the steam jet. Fig. 7 shows an arrangement for supplying the circuit with liquid from a tank 48. A feed-pipe arranged on the inlet side of the circulator 3 is provided at its lower end with a loaded check valve 46 which only allows liquid to enter the circuit when there is a considerable deficiency. Two circulators may be arranged in the circuit one in advance of the other; or three circulators may be employed in parallel and one or more of these may be put in or out of action. A subsidiary circulator may be arranged within an enlarged portion of the circuit, so that part only of the liquid flows through the combining-cone. The circulators may be controlled by thermo-regulators of the kind described in Specification No. 1993, A.D. 1903. Specifications No. 454, A.D. 1871, [*Abridgment Class* Injectors &c.], No. 1930, A.D 1890, and No. 14,989, A.D. 1904, are referred to.

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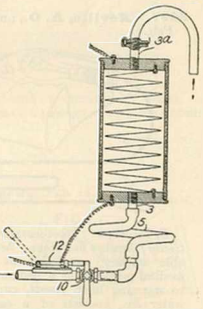
**2328. Shoenberg, M. H.** Feb. 6.

*Heating water.*—An apparatus for heating electrically a flowing stream of water is provided with means for interlocking the electric-circuit and water-circuit controllers. The water-heater consists of a chamber within which an electric resistance coil is submerged. The chamber, which is formed of porcelain, hard rubber, or other insulating-material, is fitted with metal ends through which the inlet and outlet pipes pass. The inlet pipe 3 is connected to the water-supply pipe by means of a pipe 5 of insulating-material, such as flexible rubber. The outlet pipe $3^a$ is provided with a flange which is bolted to the flange of a conducting pipe, an insulating washer 7 or the like being interposed. The heating-coil, which extends between the metal heads, is arranged in a circuit which may be broken by a knife or like switch 12. The switch 12 and the cock 10 in the water-inlet pipe are so arranged that the water cannot be turned off before the electric current is cut off. When the circuit is closed, the movable end of the switch lever stands in line with the handle, or an extension thereof, of the cock 10 so that the cock cannot be closed.

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**2441. Hunter, J. R.** Feb. 7.

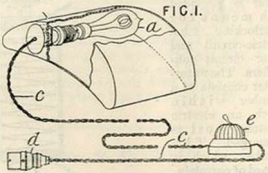
*Non-conducting compositions.* — Relates to the preparation from bone of jagged fibrous ossein suitable as a non-conductor. The bone, after being freed from flesh and fatty matter, is treated with dilute hydrochloric acid to separate mineral matter, or the two operations may be carried out simultaneously. The residue, consisting of ossein, is washed, hydrochloric acid is removed by soda carbonate, and,

if necessary, the ossein is bleached by means of bleaching-powder. It is then placed in a beating-engine and afterwards finely divided in a refining or Jordan engine.

**2455. Hunter, J. R.** Feb. 7.

*Non conducting coverings and compositions.*—Relates to the preparation from bone of compressed or recombined fibrous ossein. The fibrous ossein is prepared as described in Specification No. 2441, A.D. 1905, but the bone may be shredded without the removal of any or all of the foreign substances. The fibre may be then felted, woven, or compressed with or without agglutinants. The compressed material is a non-conductor of heat and does not burn.

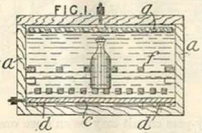
**2497. Neville, A. O.,** and **Neville, J. W.** Feb. 8.




*Bed-warmers; foot-warmers; heating by electricity; heating buildings; heating water.*—A portable warmer, applicable as a body-warmer for medical purposes, as a bed-airer or footwarmer, or to warming linen chests, cupboards, carriages, or water &c., consists of a casing, which may be provided with an inner and outer lining of felt or the like, enclosing one or more electric glow lamps *a* connected by a cable *c* to a switch *e* and union *d*. When employed as a body-warmer, the casing is shaped to fit parts of the body. Water is heated by placing the device therein.

[Reference has been directed under Patents Act, 1902, to Specifications Nos. 2161 and 10,501, A.D. 1893, No. 26,249, A.D. 1896, No. 23,143, A.D. 1898, and No. 11,277, A.D. 1901.]

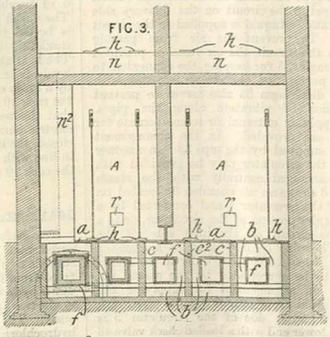
**2767. Naylor, N. W. C.,** and **Nunn, B. S.** Feb. 10.




*Heating liquids.*—In treating beer, wine, &c. in bottles, to bring them into condition for use, the bottles are immersed in a bath of water or other liquid which is heated by electric means. A vessel *a* of wood or other non-conductor, containing racks *f* to support the bottles, is fitted at the bottom with a plate *c* of copper, carbon, iron, or other conductor, supported on insulating bars *d*. A second plate *g* is attached to the cover and a current is passed between the plates. The plates may be heated by electro-magnets, through which an alternating current is passed, placed below the lower plate. Electro-magnets may be placed also above the vessel to act in conjunction with the lower magnets. Hollow plates containing electric resistances may be used to heat the liquid.

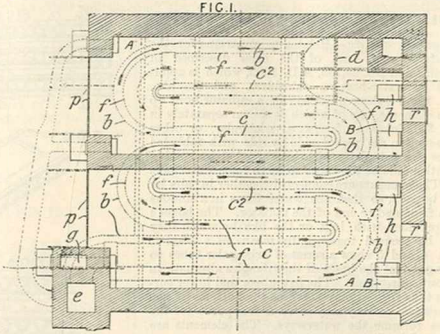
**2830. Evered & Co.,** and **Griffin, T. G.** Feb. 11.

*Heating air.*—A stove for drying japanned ware such as bedsteads and for other drying purposes consists of a series of chambers arranged in pairs one above another upon a plate iron floor, beneath which is a series of hot-air flues communicating by way of damper-controlled passages with each chamber of the "stove." A sectional plan of the drying-stove is shown in Fig. 1, and a transverse section is shown in Fig. 3. Zigzag passages *b* for heating



air are formed beneath the floor *a* by partitions *c*, *c*², and arranged axially within them is a flue *f* communicating with the furnace *d* and stack *e*. Air entering the passage *b* at *g* travels in an opposite direction to the furnace gases, and becomes highly heated. The heated air enters a receiver B, arranged at the back of the chambers A beneath the floor, and finally escapes to the chambers by means of passages controlled by dampers *h*. The fumes from the drying-chambers escape by means of pipes to the stack *e*. Each chamber is provided with a door *p* for inserting and removing articles, and a cold-air inlet *r* for regulating the temperature. The upper chambers, shown in Fig. 3, are provided with hot-air inlets controlled by dampers *h*, and communicate with a receiver *n*, which is connected by means of a passage *n*² with the hot-air receiver B.

FIG. 1.




**3026. Halladay, W. B.** Feb. 14.

FIG. 1.

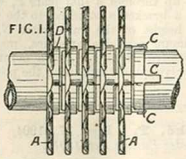
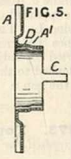



FIG. 5.




*Heating buildings.*—Gills for radiator and like tubing are constructed preferably of aluminium, and are shaped as shown in Fig. 5. The central portion of the disk A is stamped out, and a collar A¹ formed round the hole, a stop or shoulder D thereon serving for a distance-piece. Two or more projections or ribs C are formed simultaneously or attached subsequently. In building up, the first gill, constructed of copper or other suitable metal, is attached to the tube, and the next gill is pushed up to rest against the shoulder on the first, the projections of which pass through suitable slots on the second. The ends of these projections are then turned over to secure the second gill in place. The third gill is similarly secured by the projections on the second, which are arranged on a different diameter from those of the first.

**3047. Gray, G. J.** Feb. 14.

FIG. 1.

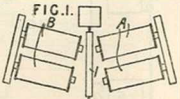
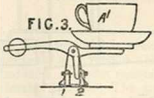



FIG. 2.

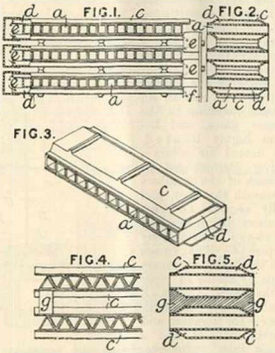

FIG. 3.



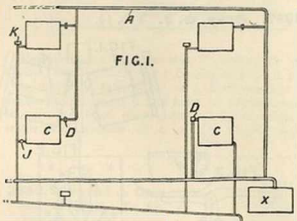

*Heating water.*—In a method of heating water, which may be used in conjunction with a time-alarm, the circuit of a magnet A, Fig. 1, is closed by a time-switch or otherwise, thereby closing the contacts 2, *c* of a two-way switch, Fig. 2, and completing the circuit of an electric kettle. When the water boils, it is forced into a cup A¹, Fig. 3, on one arm of a balance, so that when the cup is full the balance rocks, breaking the contact 2 and closing the contact 1, which cuts off current from the magnet A and transfers it to the magnet B. The switch contacts 2, *c* in the heating-current circuit are thus separated, and a bell circuit is closed by the contacts 1, *b*.

**3261. Bennett, F. E.** Feb. 16.

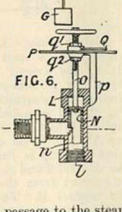
*Heating water &c.*—Relates to apparatus for the transference of heat, of the class described in Specification No. 26,795, A.D. 1903, which is applicable to water-heaters, calorifiers, and the like. Figs. 1 and 2 show a portion of a radiator built up from elements, one of which is shown separately in Fig. 3. Tubes *a* of square, triangular, or other cross-section are placed side by side with rabbeted plates *c* or flat plates with interposed strips coming on either side of the tubes so as to form waterways *d*. The elements are connected together in pairs by end boxes *e*, so that the water flows in a sinuous path from end to end of the radiator. The boxes *e* are provided with lugs or the like by which they may be secured together by means of a plate *f*. Figs. 4 and 5 show a series of triangular tubes so arranged that the bases of the triangles alternate in opposite directions. The flat upper and lower surfaces thus formed may serve as the bottoms of the waterways, or they may serve as a support for the plates forming the waterways. The elements are separated by distance pieces *g*.



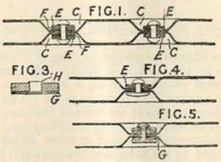

**3268. Russell, J. N.** Feb. 16.




*Heating buildings &c.*—In a system for heating buildings by steam or other vapour circulation, the radiators C are supplied from a source X through the mains A, the return pipes communicating with an exhausting-apparatus G. The return connexions from the radiator may be fitted with check valves J, consisting of a simple hinged flap which allows a free forward passage to the steam, or with vacuum-relief valves K, conveniently consisting of a ball held on to its seat by an adjustable spring. Hand-actuated valves D, of which the preferred form is shown in Fig. 6, regulate the admission of steam to the radiators. The valve proper consists of a hollow cylindrical plug N, adapted to slide and rotate in the inlet pipe *l*, a portion *u* being cut away to establish communication when in the position shown. The valve spindle *o* passes up through a dial plate P, which is supported on a bracket *p* attached to the valve casing L. The height of the valve piece N, and hence the maximum available aperture, may be varied by adjustment of nuts $q^1$, $q^2$, a pointer Q attached to the valve spindle indicating the position of the gap *n*.




**3273. Fouché, F.** Dec. 17, 1904, [*date applied for under Patents Act, 1901*].




*Heating gases and liquids.*—Relates to the method of connecting the two sheets of metal forming the walls of a hollow-plate radiator or heat interchanger. The sheets have stamped in them recesses C which are in contact with each other when the radiator is assembled. Rivets pass through holes made in the bottoms of the recesses. In order to prevent the body of the rivet from being expanded when the head is formed and so causing the metal around the rivet to swell, metallic washers E are

interposed between the heads of the rivets and the plates. Between the washer E and the metal sheet may be placed a second flexible washer F of asbestos, tin, copper, paper, &c. The washer E may be of the form shown in Fig. 3, in which two circular lips or rims G, H, respectively, project around the periphery and the central opening. Where one washer only is employed the head of the rivet is made large, and may be spherical or flat as shown in Fig. 4. Fig. 5 shows the head of the rivet formed with a circular rim G.

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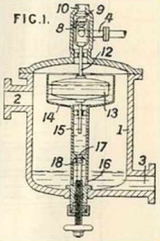
**3286. Schwaninger, V.** Feb. 16.

*Steam traps.*—Relates to valves or cocks operated by means of a float surrounded by a shell which extends into the liquid. Fig. 1 shows apparatus which may be used for conducting condensation water back to a boiler by the pressure of the boiler steam. The water flows at 2 into a chamber 1, which is connected at 4 with the steam space in the boiler and at 3 with the water space. The float 13 is contained in a shell 14, having a tubular extension 15 provided with ports 16 and with a valve seat 17 which can be more or less closed by a valve 18. The float stem 12 carries a double valve, the upper part 9 of which serves to close the air port 10 while the lower part 8 closes the steam-pipe 4. As the water flows into the chamber 1, it rises more rapidly in the chamber than in the shell owing to the retardation at the opening 17, and, as this difference of level continually increases, the speed at which the liquid rises in the pipe 15 also continually increases; it is at its maximum at the moment the water overflows into the shell 14 and the float is lifted to close the air port and open the steam inlet so that a rapid and accurate action of the valves, without idle movement, is effected. As the liquid flows away from the chamber 1, it at first, owing to the resistance at the opening 17, only passes in small quantity through the ports 16, but this rate continually increases and is at a maximum at the moment the float falls.

FIG.1.

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**3289. British Thomson-Houston Co.,** [*General Electric Co.*]. Feb. 16.

*Heating by electricity; heating water.*—Figs. 1 and 2 show two forms of an electric heater for cooking. Fig. 3 is a diagrammatic view of the circuits showing means for automatically cutting off the current when it reaches a predetermined value. A casing, jacketed by a layer of heat-insulating substance, such as asbestos, fire-clay, or mineral wool, is filled with lumps or a loose mass

FIG.1.

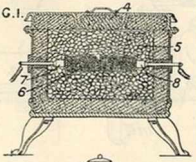



FIG.2.

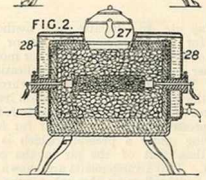
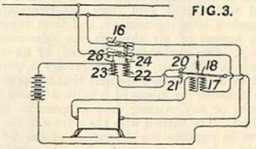
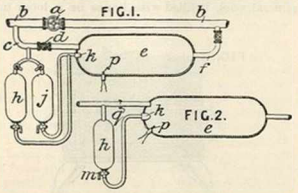



FIG.3.




of refractory material 5, such as quartz or a fire-clay composition. Within this refractory material is embedded a granular resistance material 6, which is preferably silicon. The terminals 7, 8 are adjustable so that the active length of the silicon bed may be increased or decreased. The cover of the stove casing is provided with a removable plug 4. The casing may be surrounded with a water tank 28, as shown in Fig. 2, in which case the jacket is preferably made thinner. An oven, tea-kettle, or other vessel 27 may be inserted in the opening in the lid of the stove. When the resistance material 6 is heated beyond red-heat, an electro-magnet 17, Fig. 3, arranged in the heating-circuit draws down a spring-pressed armature 18, which makes contact with a terminal 21, thereby energizing a solenoid 22 located in a battery circuit. This solenoid 22 attracts a core 24, secured to a double-pole switch 16 in the heating-circuit, so as to break this latter circuit. When the current returns to its normal condition, the armature 18 is drawn by its spring into contact with a terminal 20, thereby energizing a second solenoid 23 in the battery circuit. This solenoid 23 then closes the switch 16.

**3495. Armstrong, Whitworth, & Co., Sir W. G.,** and **Sodeau, W. H.** Feb. 20.




*Heating air &c.*—Relates to a method of and means for heating compressed air or other gas capable of supporting combustion for motive power and other purposes, and their application to torpedoes. The combustion chamber through which part or the whole of the air is led on its way from the source of supply to the engines is fed with fuel by the pressure of the air, the air for feeding the fuel being under a pressure which is markedly higher than that of the air in the combustion chamber. Two arrangements are shown. Part of the air supply flowing through a pipe *b*, Fig. 1, passes to the combustion chamber *e*, which is supplied with liquid fuel from the reservoirs *h*, *j* through a spraying-nozzle *k*, and then rejoins the main stream of air through the valve-controlled pipe *f*. The fuel may be ignited by an electric primer *p*. The air in the reservoirs *h*, *j* may be kept at a higher pressure than that in the combustion chamber by means of a valve *d* placed in the pipe *c*; or any existing drop of pressure may be utilized. The valve *d* with the valve *a* in the pipe *b* serves to regulate the proportion of the air to be heated. In an apparatus, Fig. 2, suitable for torpedo propulsion, the requisite head for spraying is caused by the insertion of a perforated plate *q* through which the whole air supply passes into the combustion chamber. In operation, when the engine has made a certain number of revolutions, the valve *m* controlling the fluid supply is opened. Then almost immediately, the primer *p* is fired.

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**3669. Henke, C.** Feb. 22.

*Non conducting coverings and compositions.*—Heat-retaining media are made from the slime which collects in the gas scrubbers of blast furnaces. This slime consists chiefly of ore, coal, and flux. It may be mixed with a binder and then moulded, or may be used alone as a powder for filling tubes of jute or asbestos for insulating-cords.

[Reference has been directed under Patents Act, 1902, to Specification No. 1526, A.D. 1891.]

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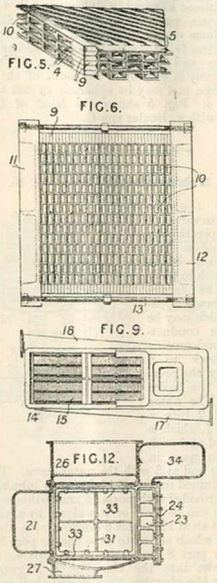
**3779. Brewtnall, A. W.** Feb. 23.



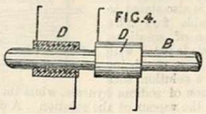

*Heating air.*—Relates to surface heating or cooling apparatus of that type which is built up from indented plates, and which may be employed as a surface condenser, air-heater, oil cooler, steam generator, or the like. The plates are formed with plain margins, the side margins 5 being in a different plane from the end margins 4, so that, when the plates are assembled as in Fig. 5, series of chambers opening alternately at the sides and ends result. Solid corner blocks 9 and skeleton distance-pieces 10 are inserted between the plates as shown. A bunch of such plates is held together by end frames 11, 12, Fig. 6, clamped by bolts 13. If necessary, suitable packing material may be inserted between the edges of the plates. A number of such bunches of plates 15 may be fitted within a casing 14 of the usual type as shown in plan in Fig. 9, which illustrates the form for a steam condenser. The pipe connexions 17, 18 serve for the passage of the cooling-water through alternate chambers, while the steam enters the remaining chambers through an inlet in the top of the casing. To facilitate the

removal of the plates, the casing employed is preferably constructed as shown in transverse vertical section in Fig. 12, in which 26 is the steam conduit, 27 the condensation-water passage, and 21 and 34 the inlet and outlet passages for the cooling-water. A chamber 23 at one side of the casing is closed by a cover 24, which can be detached to allow each bunch of plates to slide out of the casing, surfaces 33 on skeleton distance-plates 31 serving as guides.

**3845A. Horton, J.** Feb. 24.

*Heating by electricity.*—The steam-tubes B of a portable or other baker's oven are heated by electric resistances D, which are wound round each tube separately, as shown in Fig. 4, or embedded in plates or the like of insulating-material extending across the oven and under the ends of each set of tubes.

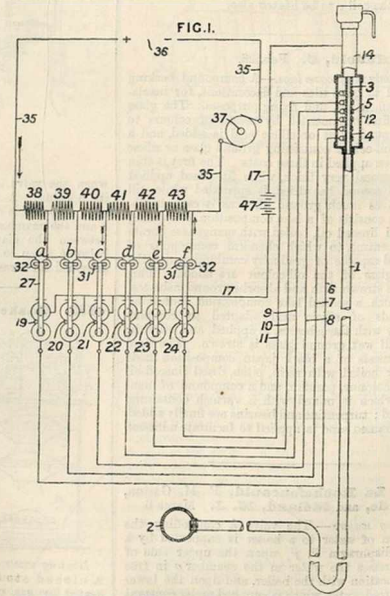
FIG.4.




**3867. Lomax, R.,** and **Tomlinson, J.** Feb. 24.

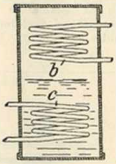
*Apparatus for automatically regulating temperature.*—The fuel supply and the draught in a steam generator furnace are controlled automatically by a column of mercury, which, as the steam pressure on it rises, brings into an electric circuit resistances controlling the speed of the motor driving the stoker or air-supply apparatus. The pressure in the steam-pipe 2, bearing on the lower end of the column of mercury in the tube 1, moves the upper end of the column into contact with contacts 5 on a tube 3 made of non-conducting material, thus completing in succession the circuits through the wires 6 . . 11, the solenoids 19 . . 24, wire 17, and tubes 14, 12. The solenoids, as they are excited by the battery 47, lift in succession from the mercury cups 32 the forks 31 of the levers 27, and break at *a* . . *f* the shunt circuits of the resistances 38 . . 43, which are thus thrown into the circuit 35 of the dynamo 36, and regulate the speed of the motor 37[1] driving the stoker. The varying current in the circuit 35 may be used to operate the damper, or, by means of electro magnets or other apparatus, the throttle valves or other controlling-devices of steam-engines on internal-combustion or other motors driving the stoker, fan, or blower &c.

FIG.1.



**4143. Kayser, H.** Feb. 28.

*Heating - apparatus.* — Relates to a method of and apparatus for the interchange of heat, applicable for the recovery of waste heat of steam-engines, gas motors, and the like. The apparatus is also stated to be applicable for the evaporation of solutions. A receptacle is fitted with two coils *b*, *c*, one being placed in a solution, such as a solution of sodium hydrate, while the other is located in the vapour of the solution. A difference of temperature exists between the vapour and the solution. If the vapour is then heated by the waste gases passing through the coil *b* and the vapour mixed with or blown into the solution, heat is imparted to the solution, causing any fluid flowing through the coil *c* to be heated also.

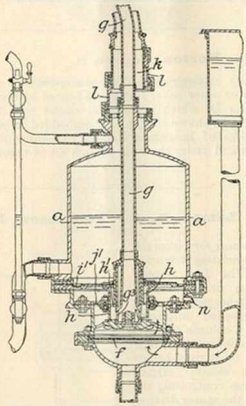



**4157. Hunold, C.** Feb. 28.

*Non-conducting coverings.*—A compound backing is applied to glass tiles and decorations, for insulating, ornamenting, and fixing purposes. The glass plate is first ornamented by means of colours to which ground glass or silicic acid is added, and a layer of oil-colour containing ground glass or silicic acid is then applied in three coats. The first is thin and the second very thick, while the third, applied after the second has dried, is sprinkled while still wet with as much ground glass as it can absorb. The next consists of a lake composition, containing resin and linseed oil, boiled with manganese borate and turpentine, to which chemical compounds of silicic acid capable of gradually combining with the ground glass of the oil colour are added. This coating is strewn with and absorbs ground asbestos, after which a second lake composition containing compounds of silicic acid adapted to combine gradually with the asbestos, is applied, and on this, while still wet, ground glass is strewn. The final layer consists of a black japan composition made from tar boiled with resin, pitch, dried linseed-oil varnish, sulphur, paraffin, and a compound of manganese, which is mixed with a varnish containing silicic acid; turpentine and benzine are finally added. Coarse-grained sand is applied to facilitate adhesion to walls.

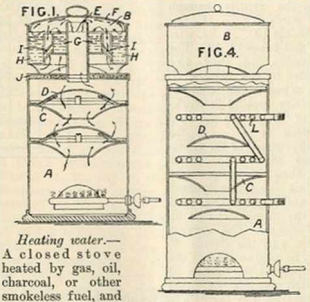
**4618. La Rochefoucauld, Duc de,** F. M. Gaston, and **Méland, M. J.** March 6.

*Heating water.* — The valve *h* controlling the admission of water to a boiler is supported by a double diaphragm $i^1$, $j^1$, upon the upper side of which presses the water in the chamber *a* in free communication with the boiler, and upon the lower side the feed-water, which is supplied under constant pressure. If the water level falls, the upper pressure preponderates, and the valve *h* is lifted, thus allowing water to pass through the apertures $g^3$ in the supply pipe *g* into the boiler. The valve *h*, which is shown open on the right-hand side of the Figure, is formed at its lower part with an annular shoulder $h^1$, on which the pressure of the feed-water operates




when the valve commences to open and accelerates its opening. A tight sliding connexion *l*, shown open on one side of the Figure, joins the steam-tube *k* and the chamber *a*. An outlet pipe *n* is placed between the diaphragms to allow water leaking between them to be run off. A gauze sheet *f* is provided for arresting impurities in the feed.

**4662. Gaskell, W. H.** March 6.



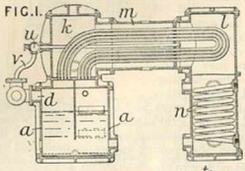

*Heating water.*— A closed stove heated by gas, oil, charcoal, or other smokeless fuel, and adapted for use

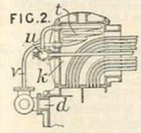
without a chimney, consists of a heating-chamber A, Fig. 1, surmounted by a chamber B in which reservoirs of water are arranged to condense the combustion products. Baffles C, D retain the heat of the rising gases, which pass through the flue E and condense on the cover F, passing thence to the outer annular vessel A, and eventually rising through inclined pipes I to the hotter inner vessel G. The vessel H cools the uncondensable gases as they pass away between it and the inner vessel G. The top of the vessel A is lined with asbestos J. In a modification, water-heating coils L, Fig. 4, are fitted between or in place of the baffles shown in Fig. 1.

**4693. Rogers, A. B. C.** March 7.

*Non-conducting coverings.*—The invention is intended chiefly for protecting corrugated iron roofs from the sun, but is applicable generally. Pure mica powder is caused to adhere to the surface to be insulated by first applying a coating of raw or boiled linseed oil. In some cases, successive coatings of oil and mica powder are applied. For boilers, steam-pipes, &c., the mica is applied directly to the surface without the addition of adhesive material, and is contained in a suitable jacket.

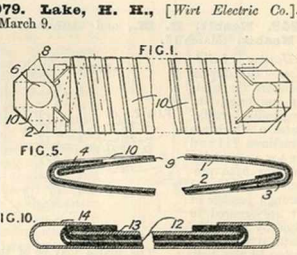
**4758. Nesbit, D. M.** March 7.



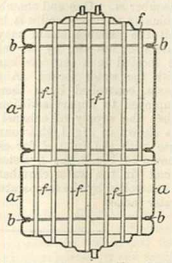

*Heating by steam circulation; heating water; thermostats.*—Relates to steam heating-systems of the kind described in Specification No. 21,020, A.D. 1897, wherein the exhaust steam is led to one side of a divided hot-well *a*, the water falling to the lower part thereof, while the steam passing through U-tubes surrounded by a water jacket, is finally condensed by a spray of water in the other side of the hot-well. When the apparatus is to be installed in a place where head-room is limited, the U-tubes are curved over so as to extend in an horizontal direction. They are enclosed in a water jacket which preferably consists of two vertical end chambers *k*, *l* and an horizontal connecting-chamber *m*. One end chamber has an extension in which an auxiliary coil *n* is located. Through this coil the exhaust steam may be passed before it enters the hot-well by the inlet *d*. The coil may be located in a separate chamber communicating with the water jacket. A connexion *v* for live steam, controlled by a thermostatic device *u*, is employed to impart additional heat to the water when the supply of exhaust steam is insufficient. As shown in Fig. 1, this connexion may communicate with the inlet *d* for exhaust steam; or, as shown in Fig. 2, the live steam may pass through a coil *t* in the water chamber *k*. The thermostat is controlled by the temperature of the water in the water jacket.

**4979. Lake, H. H.,** [*Wirt Electric Co.*]. March 9.



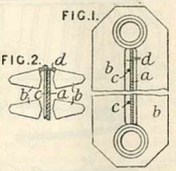

*Heating by electricity.*—A flexible resistance is carried by two flanged sheet-metal strips, which are adapted to engage one another, and are insulated from one another and from the resistance, except that each strip is connected to one end of the resistance. The resistances may be used in heaters. Two forms are described. In that shown in cross-section in Fig. 5, each metal strip 1, 2 is curved transversely, has one flanged edge 3, 4, and is covered with asbestos paper or other insulating-material 9; the resistance 10 is wound over the pair of covered strips, as shown in Fig. 1. Each end of the resistance is passed through two oblique slits 8 in one strip, and round its cut-away end, so that it lies near a hole 6 in the strip. A number of such resistance units may be held together by bolts passed through the holes 6, conducting and insulating washers being interposed, to connect all the units as required. The units may be placed upright, in order that air may flow through them. In the second form, shown in transverse section in Fig. 10, a resistant strip 12, which may be slotted from opposite sides to increase its resistance, or may vary in thickness, is enclosed between a plain metal strip 13 and a folded strip 14, with interposed insulating layers, except at the ends; flexible sheet carbon, with its ends electro-plated or otherwise reinforced, may be used as the resistant material.

**5104. Beeley, T. C.** March 11.



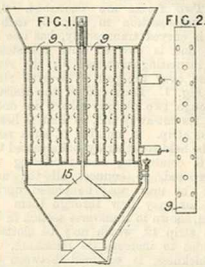
*Heating liquids.*—Tanks for petrol and other inflammable liquids have longitudinal tubes *f* secured in the ends of the tank for the circulation of steam or hot air to accelerate the discharge of the liquid.

**5248. Nesbit, D. M.,** and **Ashwell & Nesbit.** March 13.



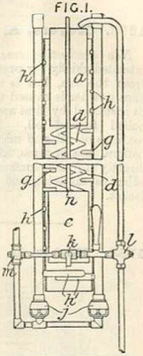
*Heating buildings.*—In duplex radiators for heating buildings, the longitudinal baffle-plates *a* which are sometimes fitted between the columns *b* to prevent the direct through passage of air are secured in place by clamping-plates *d* bolted together by stay-bolts *c*. The plates may be of the same or of less width than the radiator, and may be made of iron, brass, or other metal, or of fibrous material, such as non-inflammable wood, vulcanite, or asbestos.

**5342. Provost, P.** March 14.



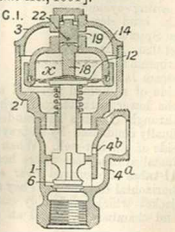
*Heating by steam circulation.*—In apparatus for heating and drying grain, the grain falls down tubes or passages 9, which are internally embossed in staggered fashion as shown in Fig. 2, so that the grain is turned over in its passage. The ends of the grain tubes are fixed in diaphragms forming the ends of steam cylinders. The embossing is effected preferably by first filling the tubes with a molten substance such as resin which afterwards hardens, after which the tubes are punched from the outside and the core melted out. A rod carrying a conical deflector 15 passes through the centre of the steam vessel and is adjustably secured at the top. The deflector tends to equalize the flow through the tubes, the grain afterwards passing through the tapering exit over another deflector adjustably secured in side brackets.

**5569. Harris, A. E.** March 16.



*Heating water.*—An instantaneous water heater, in which the accumulation of steam is prevented, consists of an upper vessel *a*, open to the atmosphere, and a lower vessel *c*, the two being connected by a zig-zag passage *d*. The jets *h*, *h*¹, *g* are supplied with gas through the cock *m*, which is operated simultaneously with the water-supply valve *l* and draw-off tap *k*. Air and gas mixing chambers *j* and a by-pass fitted to the cock *m* are also provided. Any steam generated in the chamber *c* is carried off by pipes *n*, the upper ends of which are bent over the vessel *a*. Petroleum or electricity may be employed as the heating-agent, and the relative positions of the burners and the water-pipes may be modified. The Provisional Specification states that the device may advantageously be employed in connexion with the cooking-apparatus described in Specification No. 16,999, A.D. 1903, [*Abridgment Class* Cooking &c.].

**5628. Barnes, W. E.** March 17, 1904, [*date applied for under Patents Act, 1901*].



*Steam traps.*—The valve 6 of a trap is operated by a diaphragm 12, the motion of which, according to the pressure in the thermostat chamber *x* containing a volatile liquid, opens or closes the valve. When the body of the trap is full of steam, the chamber expands and closes the valve; the

condensation water then collects in the bottom of the trap, until it seals the steam inlet $4^a$, when the trap cools and allows the valve to open. A second steam opening $4^b$ may be provided to allow steam to enter the body of the trap before all the water is expelled, thus ensuring that the valve will close before any steam can escape. Adjustment of the valve is made by a screw 19 which works in the casing-top 3, a pin 22 preventing it from turning in the top 14 of the chamber. A diaphragm-stop 18 is fitted. To blow through the valve, the upper part 2 of the casing is partly unscrewed from the lower part 1, thus lifting the valve from its seat.

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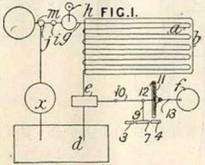
**5776. Nielsen, N. J.** March 18.




*Apparatus for automatically regulating temperature.*—In high-pressure apparatus for sterilizing fluids, especially milk, which is shown diagrammatically in Fig. 1, and in which the liquid is pumped through continuously and discharged through a loaded valve, means are provided for automatically regulating the supply of fluid and initially returning it to the feed-tank. At the outlet *g* of the sterilizing-apparatus *a* is placed a contact-thermometer *h*, which closes two different circuits at the limiting temperatures, e.g. 128° C. and 129° C. A suitable device for maintaining the temperature within these limits by controlling the supply of liquid comprises two pawls 1, 2, Fig. 2, pivoted by bolts 5, 6 upon a frame 7, independently oscillated. The pawls are actuated by electro-magnets 3, 4, operated by the two circuits closed by the thermometer *h*, and engage with a wheel 8, which on rotation adjusts, by means of a screw 9, the position of the connecting-rod 10 in a link 11, which is pivoted at 12, and through which by a rod 13 and crank *f* the pump is worked. The stroke of the pump is thus varied. The control may be effected by regulating the driving-power, as by cutting off more or less steam in an engine or by varying the resistance for a motor, or by only allowing part of the milk to enter the tubes *a*. The device shown in Fig. 2 may be replaced by two motors, inserted or cut out by relays, or mechanical thermo-regulators may be used.

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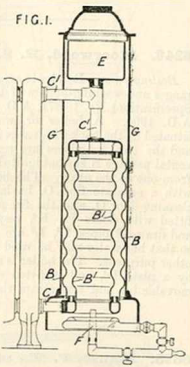
**5943. Beckett, E. H.** March 21.




*Heating water.*—A water-heater for use in connexion with hot-water heating apparatus consists of two circumferentially corrugated metal cylinders B, $B^1$, of different diameters, which are joined at the ends so as to form an annular water space with a central flue. The heater is connected by pipes C, $C^1$ to a radiator. A water vessel E communicating with the pipe $C^1$ serves to charge the apparatus and to allow for expansion in the radiator and heater. The cylinders, which are enclosed by a metal case so as to form a portable apparatus, may be heated by a gas, oil, or other fuel burner F.

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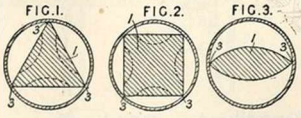
**6078. Morison, D. B.** March 22.




*Heating water.*—The tubes of surface apparatus of the kind employed for condensing steam and heating water are provided with liquid displacers consisting of laths or cores 1 of wood of triangular, square, or other section which touch the interior surface of the tube only along narrow edges 3. The lath may be varnished, covered with sheet metal, or impregnated with a suitable preservative compound.

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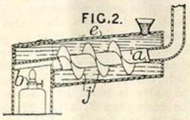
**6180. Whitmore, W. S.** March 23.

*Heating water.*—A boiler for supplying hot water for heating purposes consists of an outer cylindrical vessel *e* through which passes an inner flue-tube *a* fitted with a helical rib or projection *j*. Heat is supplied by a lamp, burner, or other heater *b*, which is placed in a chamber beneath an extension of the water container *e*.

FIG.2.




**6248. Moorwood, H. S.,** and **Moorwood, J. M.** March 24.

*Boiling-pans.*—Relates to arrangements of kitchen ranges and washing-boilers of the kind described in Specifications No. 16,871, A.D. 1901, and No. 8190, A.D. 1904. A boiler or washing-copper D is situated at the back of a range in an adjacent room, and the two fire-places are connected by an horizontal passage N so that ignited fuel may be pushed from one to the other. The boiler fire is provided with a separate flue O, having a damper P and cleaning-door Q, and the fire-place and ash-pit are fitted with doors $F^2$, $K^2$, respectively. Overflow and draw-off pipes $L^3$, $L^2$ are furnished as shown, so that hot water may be used for a bath M or for other purposes. The boiler is enclosed at the front by a plate $D^2$, and is fitted with a hinged or removable lid, and any steam rising from the boiler passes into a hood G and through a pipe I to the chimney J.

FIG.5.

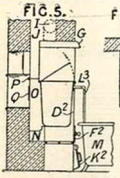
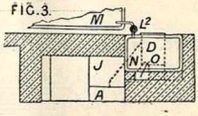



FIG.3.




**6685. Emuss, F. W.,** and **Prout, M. P.** March 29.

FIG.1.

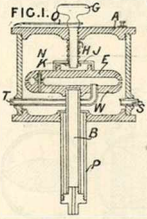
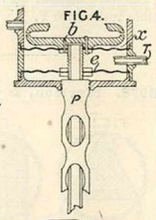
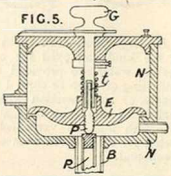



FIG.4.



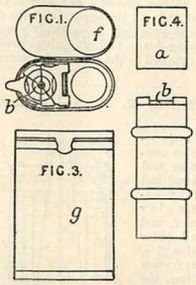

*Thermostats.*—A thermostat for regulating the supply of gaseous or liquid fuel or heating-fluid, particularly applicable to gas stoves and steam ovens, consists essentially of a valve formed by two plates or disks E, W, or their equivalent, and operated by differential expansion of, for instance, the two tubes B, P, Fig. 1. In this form, the gas enters the casing N by the pipe S, and passes to the burners through the pipe T, which communicates with the space between the plates. Adjustment is made by a thumb-screw G depressing a plate J through which it passes loosely, a pointer Q indicating the temperature of operation on a dial A. Should the temperature become excessive, the expansion of the tube B cuts off the gas supply by pressing the disks together, while further expansion lifts the disk E against the spring H, thus preventing injury to the apparatus. In a modification, Fig. 4, the pipe T is put into communication with the space between the plates by passages *b*, a flexible diaphragm *x* dividing the chamber N into two compartments. The outer tube P is here shown perforated to give greater sensibility to the apparatus, thus necessitating the provision of a second diaphragm *e* to prevent escape of gas. The expansion tubes may be replaced by a vessel containing an expansible liquid. In a further modification, Fig. 5, the disk W is dispensed with, and the chamber N is shaped to form an approximately tight closure with the disk E. In this case, the more expansible tube B is the outer one, and the adjustment arrangement consists of a screw P, the upper end of which forms a tongue *t*, thus allowing it to be turned by the head G.

FIG.5.

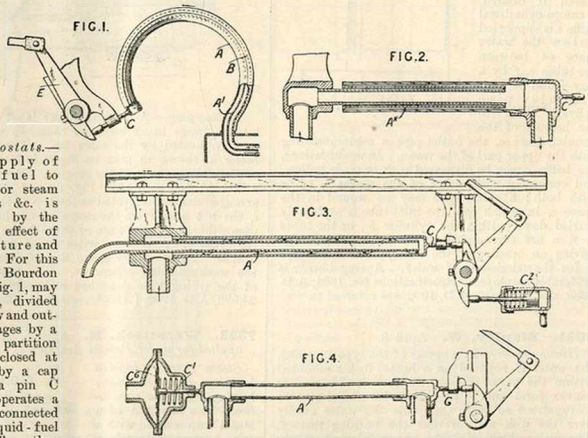


**6730. Voss, J. C.,** and **Stern, E.** March 30.

*Heating by chemical action; footwarmers; hot-water bottles.* — In cigar and cigarette lighters, footwarmers, warming-bottles, and the like, in which the heat is produced by the catalytic action of platinum sponge or the like and the vapour of certain carbon compounds, methyl alcohol or other liquid which vaporizes at a low temperature is employed, so that no preliminary heating of the liquid is necessary. Figs. 1 and 3 show a cigar or cigarette lighter. A casing *g* is divided vertically into two compartments, one of which serves as a liquid container while the other may serve as a receptacle for matches, pins, or the like. An igniting pill is mounted on a hinged frame, so that when in use it may be brought over the liquid container. When not in use, this container is closed by a disk *f* of rubber &c. attached to the lid. In the cigar lighter shown in Fig. 4, the igniting-pill is arranged at the open upper end of a tubular liquid container, which is closed when not in use by a cap *a*. In apparatus of larger size, such as a footwarmer or warming-bottle, asbestos plates or wool coated with platinum sponge are employed.




**6747. Clarkson, T.,** and **Morison, W. J.** March 30.




*Thermostats.*— The supply of liquid fuel to burners for steam generators &c. is controlled by the combined effect of temperature and pressure. For this purpose, a Bourdon tube A, Fig. 1, may be used, divided into inflow and outflow passages by a central partition A', and closed at the end by a cap carrying a pin C which operates a lever E connected to the liquid-fuel valve. The other end of the tube is open to the steam space of the boiler. A metal strip B, the coefficient of expansion of which is negligible or differs from that of the tube A, is connected to this tube as shown. Fig. 2 shows a tube which communicates with the steam space and is made up of three concentric tubes, the central one A being made of metal having a low coefficient of expansion so that the expansion is multiplied and the motion of the operating-pin C thereby increased. A single expansion tube may be used with an inner concentric outlet tube, a spiral spring A, Fig. 3, being arranged between the tubes to keep them concentric. The lever engaged by the operating-pin C also engages

an operating-pin carried by a spring-pressed piston $C^2$ exposed to the pressure of steam in the boiler. At opposite ends of the expansion-tube A, Fig. 4, pins C, $C^1$ are provided, respectively engaging the valve-operating lever and a spring-pressed diaphragm $C^6$ exposed to the pressure of steam in the boiler.

**6953. Fildes, T. S.,** and **Fildes, E. S.** April 3.

*Heating water.*—The apparatus consists of outer and inner cylindrical casings *a*, *b*, enclosing an annular water space *c*, and inner and outer internal tubes *f*, *e*, of which the former forms the flue, the latter being secured to the casing *b* by an annular plate at the top. These surfaces may be corrugated or bossed if desired. A conico-cylindrical baffle *i* is supported below the water space $e^{\times}$ between the tubes *e*, *f* by a stay *j* and bars $i^{\times}$. The inlet pipe delivers water to the bottom of the annular space *c*, the outlet pipe *n* communicating with the upper part of the vessel. In modifications, the baffle *i* may be dispensed with or made hollow, and connected with either of the spaces *c*, $e^{\times}$ or with both; a spiral wire may be wound in the space *c*, in which case the inlet tube is preferably carried down within the cylinder *b*; or the tubes *e*, *f*, *n* are surrounded by an upstanding flange having an opening on the side opposite to the pipe *n* for the admission of water. A ring burner is preferably employed. Specifications No. 1604, A.D. 1883, and No. 6986, A.D. 1902, are referred to.

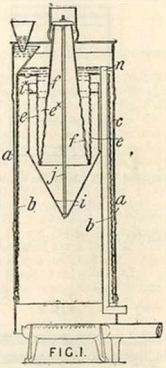


FIG.1.

**7031. Manley, W.** April 3.

*Heating water.*—In a geyser of the type in which the water is received on a heated disk *a* mounted within the geyser casing, the disk is of curved or convex form and is provided with radial ribs or corrugations so as to distribute the water evenly over the disk and prevent the burning thereof. The disk, which is shown on an enlarged scale in Fig. 2, may be fixed upon the inner casing of the cylinder *c*, or it may be freely mounted and secured by stops depending from its underside. The water after trickling down the outer surface of the inner cone *e* is collected in an annular reservoir at the bottom of the casing and discharged through the Z-shape outlet *f*.

(*For Figures see next column.*)

**7031.**

FIG.1.

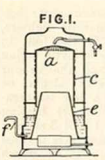
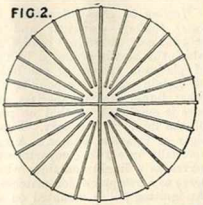



FIG.2.



**7051. Lancaster, E. W.** April 4. *No Patent granted (Sealing fee not paid).*

FIG.6

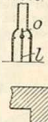



FIG.2.

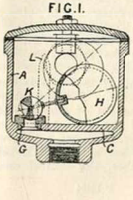



*Boiling-pans.*—A washing-boiler is set close to a kitchen range in an adjacent room, so that both may be heated by the same fire. The washing-boiler *h*, shown in plan in Fig. 2, is fitted in the scullery at the back of the range *a*. By means of a divided flue, shown in Fig. 6, and a suitably-arranged damper *o* pivoted at the top of the mid-rib *l*, the hot gases from the range fire can be made to pass either round the oven or through the casing of the boiler *h*. A pipe *q* carries the steam into the uptake. An auxiliary grate may be fitted to heat the washing-boiler separately. The bath may be of the tilting type described in Specification No. 24,582, A.D. 1902, [*Abridgment Class* Closets &c.].

**7322. Wernitsch, H.** April 6, 1904, [*date applied for under Patents Act, 1901*].

*Steam traps; heating buildings and structures; heating by steam circulation.*—The casing A of a steam trap is fitted with a false bottom C in which the seat G of the valve is formed. The valve body is formed by a ball K in which is cut a conical recess, the axis of which coincides with that of float H to which the ball is rigidly connected by a

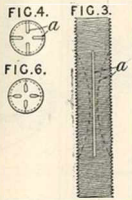
FIG.1.



rod. As water accumulates, the float rises and rotates the ball on its seating until the recess uncovers the escape passage. The valve also serves to admit air to the system when the heater is shut off, the external pressure then lifting the ball off its seat. To prevent the ball from being displaced, wire stirrups are provided to enclose it. An air-escape tube L communicates with the space below the partition C. The opening may be closed or adjusted from the outside by a screw.

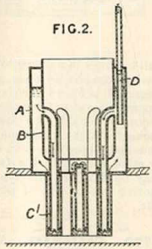
**7607. Holden, J.** April 10.

*Heating liquids.*—Boiler stays of the type shown in elevation in Fig. 3 and in cross-section in Fig. 4, in which longitudinal slots or recesses *a* are cut to give flexibility, are strengthened to resist the torsional strain of screwing in by closing up the outer ends of the slots, as shown in Fig. 6, by swaging or otherwise before the thread is cut. The stay may be pierced by a central hole.

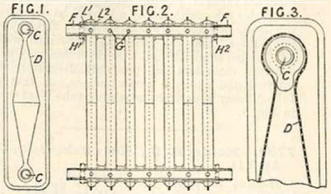


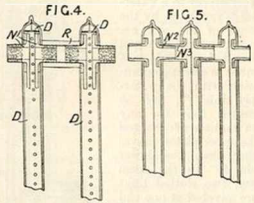

**7646. Buchanan, J.** April 11.

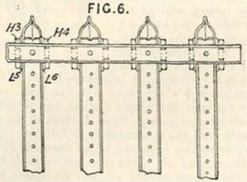
*Heating liquids; boiling-pans.* — An apparatus for heating raw or boiled linseed oil with driers is shown in Fig. 2. The mixture is placed in an inner vessel B, which is heated by a jacket A containing a boiling solution, preferably of caustic alkali; concentric tubes depend from the vessel A, of which the inner $C^1$ may be carried up through the oil-containing vessel. To maintain the temperature constant by preventing concentration of the solution, a perforated tube D which communicates with a condenser is fitted, and is continued down below the surface of the liquid. This tube D communicates beyond the condenser with a closed vessel, so that the solution may not deteriorate through continued exposure to the atmosphere. In a modification, the vapour passes to the condenser through a tube external to the vessel A, but connected to it by tubes which communicate with the vapour and liquid spaces, respectively.




**7681. Watel, H. G.** April 11.



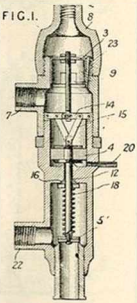

*Heating gases and liquids.*—In surface heating-apparatus, the elements, which are formed of dished plates, are provided with the specially-constructed internal strengthening-frame shown in Figs. 1 and 3. Various methods of assembling the elements are described. The strengthening or skeleton frame D may be flanged, undulated, or perforated. The elements may be assembled, as shown in Fig. 2, by passing tubes F, having externally screw-threaded surfaces at each end, through the apertures C in the upper and lower ends of the elements. Distance-pieces and washers $L^1$, $L^2$ of jointing-material are inserted between the elements, which are clamped together by means of nuts $H^1$, $H^2$ screwed on the ends of the tubes F. Apertures G in the tubes F allow the fluid to flow to and from each element. In a similar arrangement, Fig. 6, the elements with the internal skeleton frames are held in position on tubes, which are externally screw-threaded throughout their length, by nuts $H^3$, $H^4$ and washers $L^5$, $L^6$. Fig. 4 shows another method of assembling the

elements, in which flanged and externally screw-threaded tubes $N^1$ passing through the apertures in the plates are connected by a tube R having part of the inner surface provided with a right-handed screw-thread and the other part provided with a left-handed screw-thread. Or the tubes may be of different diameters and provided alternately with internal and external screw-threads, so that one tube $N^2$ may engage the adjoining tube $N^3$ as shown in Fig. 5.

**7739. Heide, H. C.,** [*Rentz Water Heater Co.*]. April 11.

*Heating water.*—Relates to a valve mechanism by means of which the full supply to a water-heater is regulated by the pressure of the water. Two approximately equal pistons 3, 4, movable in a chamber in direct communication with the water-supply inlet 7, are so connected that for any given motion of the rod 12 the upper piston moves farther than the lower piston 4. In the form shown, two slotted links 14 are pivoted at one end to the casing, and at an intermediate point to links 15, which are attached to a continuation of the rod 12. The upper piston 3 is conveniently bell-shaped, and is formed with recesses 9 which allow water to pass into the heater through the nipple 8 when the piston rises. A small by-pass passage 23 is formed in the casing. The action of the apparatus is as follows :—Before the water service is turned on, or should it suddenly fail, the spring 18 keeps the gas valve 5 closed; with the supply turned on, but no water passing through the heater, the passage 23 equalizes the pressure on the two sides of the piston 3, so that the unbalanced pressure on the piston 4 closes the gas valve. When water is being drawn from the heater, the pressure above the piston 3 falls, allowing it to use under the action of the water pressure beneath it. This motion is possible, despite the equality of area of the pistons, owing to their method of connexion. The piston 4 is thus raised, though to a smaller extent, allowing the gas to pass through the outlet 22 to the burners. A small passage 20 serves to maintain the atmospheric pressure below the piston 4, and to drain the space of any water leaking past. Suitable packing 16 is provided between the gas and water chambers of the apparatus.

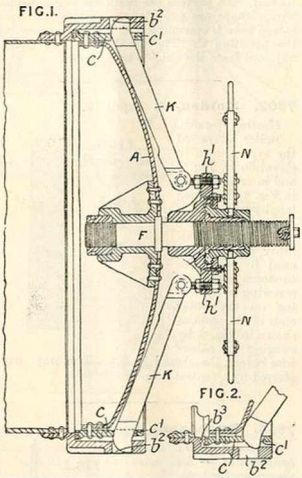
FIG.1.



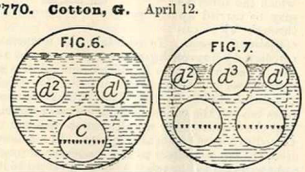

**7752. Danks, A. B. C.** April 12.

*Digesters.*—Relates to the doors or covers of cylinders and chambers employed for creosoting and vulcanizing, or as vacuum pans and brick-hardening chambers, or for other purposes. The door A is dish-shaped or slightly curved, and is provided with a central screwed spindle F carrying a hand-wheel N. The hub of the wheel revolves in ball bearings in a sleeve to which the usual arms K, having cam-shaped ends, are pivoted. These ends engage slots $b^2$ in the ends of the cylinder, and bear against slots $c^1$ in a ring $c$ carried by the door. Set-screws $h^1$ enable the arms to be adjusted. For making a tight joint, the seat is formed with a chisel-edged projection $b^3$, which enters soft metallic or other packing in the face of the ring $c$. A link may be fitted to the top of the door for use in moving into or out of position by a crane or the like.

FIG.1.




**7770. Cotton, G.** April 12.




*Heating water.*—Boilers of the Cornish, Lancashire,

and similar types are fitted with two or more supplementary flues. Fig. 6 shows a Cornish boiler with two additional flues $d^1$, $d^2$. These pass from end to end and are connected with each other and with the furnace flue $c$ by casings on the outside of the boiler. The usual external flues are dispensed with. A Lancashire boiler with three additional flues $d^1$, $d^2$, $d^3$ is shown in Fig. 7.

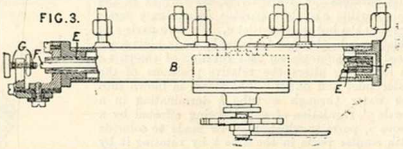
**7934. Intercontinental Railway Co.** April 18, 1904, [*date applied for under Patents Act, 1901*].

*Non-conducting coverings and compositions.*—A packing for the double walls of a refrigerator railway wagon consists of wood pulp, paper pulp, cellulose, or cork.

**8118. Simpson, W. M.** April 17.

*Thermostats.*—The circuit of an electro-magnet forming part of a boiler-feed regulator is controlled by a tubular thermostat fitted in the steam drum B. The brass or copper tube E is fixed at one end to a plug in the casing and fitted internally with a steel rod F. The free end of this rod is opposite the contact G. The thermostat may also control a second electro-magnet for regulating the fuel supply.

FIG. 3.




**8303. French, A. L.** April 18.

FIG. 5.


FIG. 3.


FIG. 4.

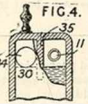
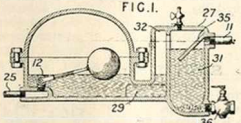
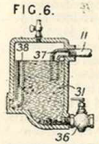



FIG. 1.




*Steam traps.*—A steam trap, in which the discharge valve 12 is operated by a float, is provided with two water seals and with a chamber 31 in which sediment is deposited. The discharge valve, shown in detail in Figs. 3 and 5, consists of a rotary cylindrical member 17, mounted in a chamber 15, which communicates with the interior of the float chamber and with a discharge outlet 25, Fig. 1. The rotary member 17 is cut away between the ends, a portion 23 just sufficient to close the passage to the outlet 25 being left.

FIG. 6.




The float chamber is connected to another portion 27 of the apparatus by a passage 29. The portion 27 of the apparatus is provided with a partition dividing off the sediment chamber 31 and having an opening at the top and a passage 32 which communicates with the passage 29. An inclined deflecting-plate 35 fixed in front of the steam inlet 11 causes the steam to deposit its sediment and to pass through the water contained in the chamber 31. The steam then passes through the water-sealed passage 29 to the float chamber. In a modification, Fig. 4, a transverse baffle-plate 35 is arranged between the steam inlet 11 and the outlet 34 to the passage 32. In another arrangement, Fig. 6, the baffle-plates in the sediment chamber and the partition are dispensed with. The steam inlet has a downwardly-inclined extension 37. Another pipe 38 connects the passage 29 with the chamber 31. Blow-off cocks 36 are also fitted to the chamber 31.

**8339. Barter, C.** April 19.

FIG. 2.

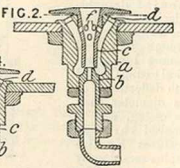
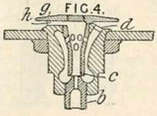



FIG. 4.



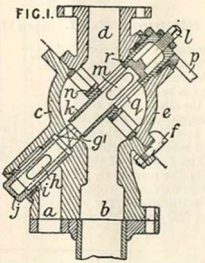

*Heating liquids.*—An apparatus for heating water or other liquids in baths, cisterns, or the like by means

of steam consists of a cylindrical body *a* to which is fitted at the lower end a steam nozzle *b*, and at the upper end a delivery pipe *c*, which to prevent noise may be formed of wire-gauze, or be perforated as at *f*. The water enters the body *a* through holes *d*, and is discharged through the tube *c* into the vessel. In the modification shown in Fig. 4, the heated water is discharged as a spreading stream or spray through a sector-shaped slit *h* below the flange *g* of the discharge tube.

**8340. Barter, C.** April 19.

*Heating liquids.*—An apparatus for heating liquids by means of a steam jet is so constructed as to allow the relative positions of the water inlet and outlet passages to be varied. The steam and water inlet passages *a*, *b*, respectively, are formed in the main portion *c* of the apparatus, an auxiliary part *e* carrying the hot-water outlet *d*. The two parts *c*, *e*, which may be clamped together by hook bolts *f*, are faced off at an angle, so that rotation of the part *e* on its facing alters the relative positions of the water inlet and outlet. The steam is blown into the water through a tube *h* terminating in a nozzle $g^1$, regulation of supply being effected by a sleeve *i*, ports in which may be made to coincide with similar ports in the tube *h* by rotating it by means of a head *j*. The hot water passes to the outlet passage by way of a delivery tube *k*, which is adjustable by its screwed end *l*, and is formed with ports *m*. A disk valve *n*, controlled by a handle *p*, allows water to pass directly from the inlet to the outlet, the sleeve *r* being formed with ports *q*, which may be circumferentially or spirally arranged to

FIG. 1.

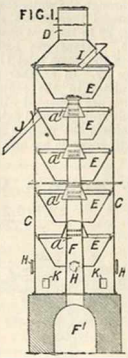



prevent closure of the ports *m*. The tube *k* forms the axis about which the part *e* is rotated.

**8814. Johnson, G. W.,** [*Matcham, C. A.*]. April 26.

*Heating air.*—In apparatus in which granular material to be cooled, e.g. cement, falls down through a series of frustro-conical deflectors arranged in a casing and is cooled by an upward current of air, arrangements are made to dispense with the use of special draught-inducing apparatus. The material enters through a valved opening I a cylindrical casing C fitted with deflectors E of less diameter than the casing, and is removed through apertures K, the surplus escaping by a shoot J. The cooling-air, which is supplied by the passage $F^1$ to a vertical pipe F closed at its upper end, escapes into the casing through holes *a*, provided with hoods $a^1$, and passes to the stack D by way of the annular spaces between the deflectors E and the casing wall. Additional supplies of air may enter the pipe F through valved pipes H. The air in the stack D may be utilized to supply boiler furnaces or calcining-kilns.

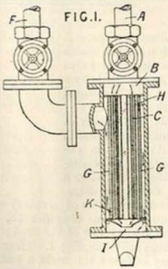
FIG. 1.



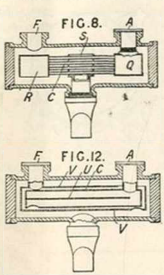

**9001. Stott, J.** April 28.

*Heating water &c.*—In apparatus such as is described in Specifications Nos. 15,395 and 15,396, A.D. 1900, for heating water by means of steam, the steam is condensed before being allowed to mix with the incoming cold water. Several constructions of apparatus are described. In the form shown in Fig. 1, the cold water from the supply pipe F passes down within a casing B, through

FIG. 1.



holes K in a wall G into the space around a nest of tubes C, and out through holes H, whence it flows into a mixing-chamber I. Longitudinal ribs formed on the casing separate the entering from the issuing water. The steam entering at A passes through the tubes C, and is condensed before mixing with the water in the chamber I. In a modification, the water enters




the space between the tubes directly, and then passes out through holes H in the partition G into the outer annular space as before. In the construction shown in Fig. 8, the condenser consists of two boxes Q, R, the latter being bottomless, which are connected by tubes C. The heated water is drawn off through an outlet S arranged as shown. This form may be modified by suppressing the tubes C, so that the steam passes into a flat box having an opening corresponding to the box R. Fig. 12 shows a further modification in which the steam is condensed in a box C having a partition U, the cold water circulating within a surrounding casing V; A, F are the steam and water inlets, respectively, in each case. Apparatus as described may be combined with a steam jet heater and circulator, which is employed to keep up the temperature of the water in a swimming-bath which has previously been filled with water heated in an apparatus as above.

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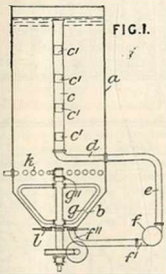
**9137. Roy, H.** May 2, 1904, [*date applied for under Patents Act, 1901*]. *Void.* [*Published under Patents Act, 1901.*]

*Heating liquids.* — Massecuite, treated in mixer-crystallizers made vertical for economy of space &c. and connected to a pump by which the material is withdrawn at various points and returned to the bottom of the apparatus, may be heated by passing through, or over, tubes fixed inside or outside the crystallizer, or forming part of the mixer, and may be concentrated by boiling-apparatus arranged in the circuit. One form of apparatus is shown in Fig. 1. The vessel *a*, *b* is provided with a mixer *g*, rotated by worm gearing and consisting of or containing tubes upon a hollow shaft, which communicates by a stuffing-box $g^{11}$ with a fixed coil *k*. Massecuite is withdrawn by a pump *f* through openings $c^1$, fitted with doors, in a central pipe *c*, and is returned through the pipe $f^1$. In a modification for utilizing existing plant, the withdrawal pipe consists of a vertical lateral conduit. In another modification, adapted for large diameters, the withdrawal pipe rotates bodily with the mixer, and projects from a central stuffing-box, being fitted with doors capable of being opened during rotation. In both these forms, only a fixed coil is used, and the mixer extends the whole length of the vessel, being interrupted only for the heating-coil.

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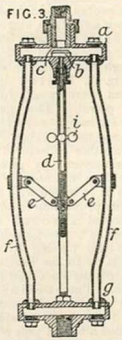
**9193. Peck, R. H.** May 2.

*Heating buildings &c.: steam traps.* — Relates to an air-escape or steam-trap valve for use in connexion with radiators, steam heating-pipes, and the like of the type operated by the lateral expansion of pipes due to the passage of the steam. Steam enters the fitting *a* at *c* and passes down the pipes *f*, driving out the air or water of condensation through the outlet *g*. The lateral expansion of the pipes *f* under the influence of the steam thereupon raises the valve *b* against its seat *c* through the connecting links *e*. The permanent lift of the valve can be adjusted by rotation of the screwed valve spindle *d* by means of the handle *i*.

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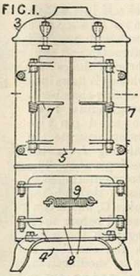
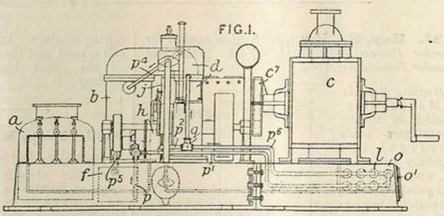
**9421. Ruud, E.** May 4.

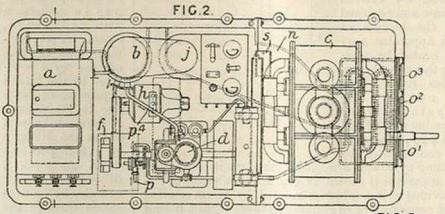
*Heating water.* — A casing for water heaters is provided with doors which are held closed in a yielding manner so that they may open automatically to relieve undue pressure in the casing. Front and back portions of the casing are bolted together, as shown in Fig. 2, and provided with a top 3 and base pan 4. Two doors 5 are preferably arranged in the upper part of the heater, and are normally held closed by springs 7. A pair of doors 8 may also be fitted in the lower part of the casing, and may be held closed by a single spring 9 removably hooked to a lug on each door. The doors may be mounted and provided with weighted levers to remain open instead of closing automatically. The doors also afford access for inspection or cleaning purposes.

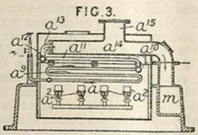



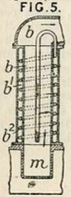

**9536. Marot, R.** May 5.

*Heating gases.* — Relates to improvements in the apparatus described in Specification No. 14,372, A.D. 1904, [*Abridgment Class* Medicine &c.], for producing and distributing a gaseous mixture of sulphurous anhydride and air serving for extinguishing fires and killing insects and microbes. Liquid sulphurous anhydride, stored in bottles, escapes on opening cocks and passes through serpentine tubes $a^9$, Fig. 3, heated by Bunsen burners $a^7$ fed with petrol. The gas passes into a collector $a^{10}$ connected by tubes $a^{11}$ with another collector $a^{12}$ communicating by pipes $a^{13}$ with a chamber $a^{14}$, where it is mixed with a suitable proportion of air introduced through a damper $a^{15}$, the gaseous mixture passing by a conduit $m$ to the central space of the air cooler $b$, Fig. 5. The cooling-water of the motor working the apparatus circulates through an annular chamber $b^1$, in which is coiled a helical pipe $b^2$ connected at its lower end directly to one of the bottles containing liquid sulphur dioxide, which on escaping passes through the coil, cooling the water in the chamber. The pipe $b^2$ passes down the middle of the chamber $b$ and terminates in a perforated nozzle, from which the gaseous sulphur dioxide issues, meeting the warmed mixture of sulphur dioxide and air entering by the conduit $m$. From the chamber $b$, the mixture passes to a cylindrical glass chamber $j$, Figs. 1 and 2, where it is subjected to the action



of silent electric discharges and electric sparks, passing thence through a conduit *n* to a fan or blower *c*, by which it is delivered through pipes to the places where required. A further quantity of air can be introduced through a damper *s*. The electric supply is obtained from a dynamo *h* driven by the motor *d*, which also drives the fan *c* through a reducing train of wheels enclosed in a casing $c^1$. Below the fan *c* is a space *o* fitted with three orifices to which are adapted pipes when it is desired to reaspirate the gaseous mixture, these orifices being normally closed by covers $o^1$, $o^2$, $o^3$. In the space *o* is arranged the radiator *l*, which is composed of serpentine ribbed pipes through which the cooling-water of the motor circulates when the reaspirating action takes place, the water being cooled by the current of cold gas drawn in by the fan. The cooling-water of the motor *d* is drawn from a reservoir *f* through a pipe *p* by a pump operated by the motor, and is forced through a pipe $p^1$ fitted with a branch $p^3$ connected to a three-way cock *q*, by means of which the water can be sent directly to the motor, then through a pipe $p^4$ to the cooler *b*, and back to the reservoir by a pipe $p^5$. This action takes place when the apparatus is being used to generate a mixture of air and sulphur dioxide. When the mixture is being reaspirated, the cock *q* is turned to close the passage leading to the motor, so that the water has first to pass through the pipe $p^1$, radiator *l*, and pipe $p^6$, and thence to the motor as before.

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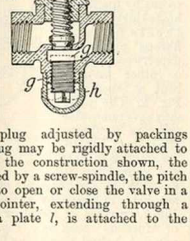
**9566. Harlow, H. S.** May 6.

*Heating by steam circulation.*—In valves for steam heating-apparatus, the maximum amount of steam passing through is controlled by a subsidiary screw plug *g*. To prevent leakage, the outer end of the plug is enclosed in a screw cap *h*. The screw plug may be replaced by a cylindrical plug adjusted by packings behind it, or the plug may be rigidly attached to the screw cap. In the construction shown, the main valve is operated by a screw-spindle, the pitch being great enough to open or close the valve in a quarter-turn. A pointer, extending through a quadrant slot in a plate *l*, is attached to the operating-handle.

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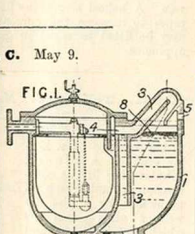
**9727. Geddes, C.** May 9.

*Steam traps.*—Oily drainage water from steam-engine cylinders and valve casings is purified before passage into the feed-water by fitting the steam traps with a decanting-chamber which retains the oil, and allows the water above to pass through the trap. Fig. 1 shows the arrangement in connexion with a trap of the open-float type, but the improvements may also be fitted to traps of the closed-float or expansion types. The oil-retaining chamber 1 is formed with an equilibrium passage 3, the upper end of which is above the highest water level, and the lower end, which is preferably expanded, below the lowest water level, at which point a pipe 4 communicates with the float chamber of the trap proper. The oil entering with the water at 5 forms a layer 8 on its surface which remains in the chamber 1, and can be drawn off when required. The collector 1 may be formed independently of the body of the trap, which is then placed in communication with the outlet pipe 4.

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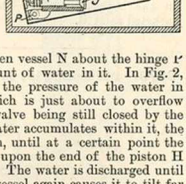
**9754. Cracknell, R. J.** May 9.

*Steam traps.*—The outlet passage E of the trap is controlled by the valve J, the spindle of which terminates in a piston H of an area somewhat less than that of the valve itself. The trap is actuated by the motion of the open vessel N about the hinge t according to the amount of water in it. In Fig. 2, it is shown tilted by the pressure of the water in the outer casing, which is just about to overflow into the vessel, the valve being still closed by the spring L. As the water accumulates within it, the vessel N settles down, until at a certain point the projection Q presses upon the end of the piston H and opens the valve. The water is discharged until the buoyancy of the vessel again causes it to tilt far enough to allow the valve to close. An increase of steam pressure will tend to close the valve more tightly, by reason of the smaller area of the piston H, so that the trap will not discharge so far. By suitable adjustment, the valve may be arranged to be always under water.

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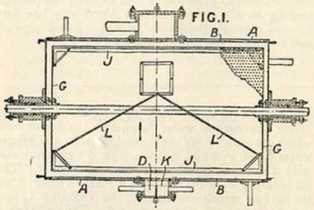
**9766. Teyn, H.** May 9.

*Non-conducting compositions.*—A cement, consisting chiefly of litharge, Paris white, and boiled

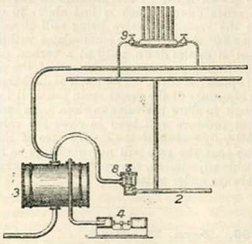
linseed oil, is used for jointing steam joints or the like, or for heat non-conducting in the form of bricks or slabs. The proportions preferred are: litharge 50 parts, Paris white 20 parts, linseed oil 25 parts, and ochre 4·5 parts, with the addition of 0·5 part of a binder such as slagwool, asbestos, or hemp dust.

**9779. Harger, J.** May 9.



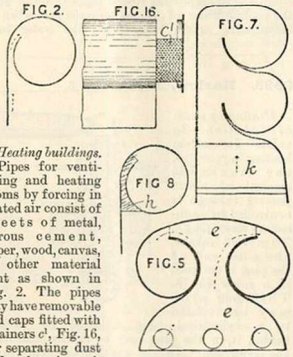

*Digesters.*—An apparatus is provided wherein bones, skins, &c. may be successively treated for the extraction of grease by means of boiling benzene, the removal of the solvent, the cleaning and polishing of the degreased substances, the extraction of glue, and the final drying under vacuum and grinding of the residue to obtain manure. The apparatus consists of an outer air-tight vessel A, and an inner reticulate vessel G, arranged so as to be capable of relative motion. The inner vessel G is provided interiorly with flanges J which act as agitators, and exteriorly with brushes L which sweep the bone-meal which passes through the perforations into the discharge hopper D. A strainer K is placed in the hopper D. The outer cylinder may be jacketed as at B.

**9878. McGonagle, A.** May 10.



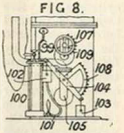

*Heating by steam circulation; heating buildings &c.*—The exhaust steam from a condensing engine is utilized for heating purposes. The steam heating-apparatus 9 is connected up as a by-pass on the exhaust pipe 2 between the engine and the condenser. A valve 8 loaded by a spring allows the steam to pass directly to the condenser when the heating-system is shut off, or when its resistance to the passage of the steam becomes abnormally high. The condenser 3 is provided with the usual exhausting-apparatus 4.

**10,004. Sellars, J. C.** May 12.




*Heating buildings.*—Pipes for ventilating and heating rooms by forcing in heated air consist of sheets of metal, fibrous cement, paper, wood, canvas, or other material bent as shown in Fig. 2. The pipes may have removable end caps fitted with strainers $c^1$, Fig. 16, for separating dust and other impurities. When the pipes are made of paper &c., they are kept in shape by strips, such as *h*, Fig. 8, *k*, Fig. 7, or rings of metal or cement. Baffle-plates or "formers" such as *e*, Fig. 5, are placed at intervals. A helical screw may be employed within the pipes to increase the current of air, and wings may be fitted to assist in guiding the air to the appliance.

**10,021. Tellier, C.** May 12.




*Thermostats.*—Fig. 8 shows the lower portion of the furnace of a hot-air engine. A closed tubular ring in the combustion chamber communicates by a pipe 99 with a glass vessel 100 which contains liquid and which serves also as a thermometer. When heated, the air expands and forces some of the liquid through a flexible tube 101 into a small bucket 102 on one end of a lever 104, at the other end of which is a counterweight 103, the amount of which is such that when the temperature of the

furnace has reached its maximum value, the liquid in the bucket 102 is sufficient to tilt the lever and close a valve 105 which controls the air supply to the furnace ; at the same time, a quadrant 108 on the lever 104 rotates a toothed pinion 109 and opens a valve 107, which admits cold air above the furnace to cool it. As the temperature falls, liquid flows back into the vessel 100 and the action described above is reversed.

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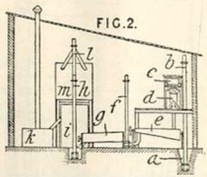
**10,037. Caudrelier, M. A. L.** May 12.

FIG.2.




*Heating-apparatus.*—In the treatment of grain or seed, which has been damaged by sea-water &c., the grain, after being separated from foreign matter, washed, and dried, is heated to about 90° C., and finally cooled to 0° C. in order to pasteurize it, destroy insects and germs, and restore it to a good condition. It is shot into a receiver *a* and then passed through an elevator *b*, a separating-apparatus *c*, a washer *d*, rinser *e*, a drainer and elevator *f*, a drier *g*, an elevator *h*, thence into the hot-air chamber *i*, and a cooling-chamber *m*. In the chambers *i*, *m*, the material may be agitated while passing through series of inclined cylinders. The chamber *i* is heated by a hot-air stove *k*, and the chamber *m* is cooled by an air-exhauster or by other means.

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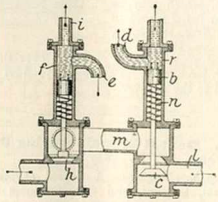
**10,048. Bier, J. M., Bier, G.,** and **Sensenschmidt, M.** May 12.




*Heating water.*—Consists in an arrangement by which the water supply automatically controls the gas valve of geysers and like heating-apparatus, and includes means for cutting off the gas supply should the water service fail. The latter part of the apparatus consists of a piston *b*, movable in a casing *r* in connexion with the water service pipe, and controlling the gas valve *c*. So long as the water pressure is maintained, the piston *b* is depressed against the weak spring *n*, and allows the water to pass through the pipe *d* to the heater, and the gas through the pipe *m* to the control valve *h*. Failure of water supply closes the valve *c* and the entrance to the pipe *d*. A similar piston in a casing *f* is fitted in the exit pipe *e* from the heater. While the draw-off cock (not shown) in the pipe *i* remains closed, the water pressure keeps the valve *h* closed also. On the tap being opened, the fall of pressure allows the piston in the casing *f*, *g* to rise, thus opening the valve *h* and admitting gas to the burners.

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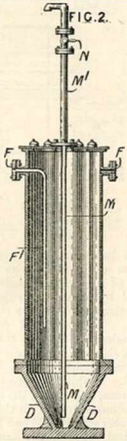
**10,117. Grau, R. Z. de.** June 11, 1904, [*date applied for under Patents Act, 1901*].

*Heating water.*—An apparatus for heating boiler feed-water and for other purposes consists of a chamber with corrugated or fluted sides, which rests upon an inverted conical bottom D, and has, at its upper part, inlet and outlet apertures F. A tube $F^1$ extends downwards from the inlet aperture. Another tube M passes through the centre of the chamber, and is continued outside in a tube $M^1$ provided with a cock N, which, when open, allows sediment to pass away from the bottom D. The bolts securing the cover are protected by caps. A number of the chambers are connected in series and placed in the path of escaping furnace gases.

FIG.2.

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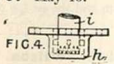
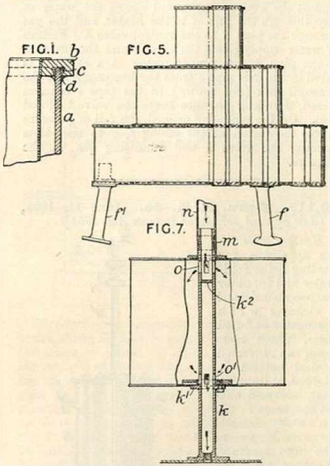
**10,193. Worssam, H. J.** May 15.

*Heating liquids; boiling-pans.*—Apparatus for heating brewers' wort or other liquids consists of a steam drum suitably supported in the containing vessel, and traversed by vertical tubes through which the liquid circulates. To prevent the lodgment of solid matter, the drum is constructed with

FIG.4.



a continuous shell *a*, the edges of which are inserted in grooves *c*, Fig. 1, in the end plates *b*, preferably undercut as shown. A soft-metal filling *d* is then run in, the excess being filleted away. The edges




of the tubes are bent over outwardly against the surface of the end plates as shown. The simplest form of apparatus consists of a single drum traversed by tubes and supported on suitable feet. The steam-inlet pipe is situated at the top of the drum. The water of condensation collects in a depression *h*, Fig. 4, in the bottom plate, whence it passes through the tube *i* to a steam trap. A modification consisting of a triple drum is shown in Fig. 5. In this case, one of the feet $f^1$ projects into the drum, and forms the steam inlet, while another *f* terminates flush with the lower surface, and forms the water outlet. When the drum is supported on a central support, the arrangement of Fig. 7 may be employed. The central support *k* is fixed to the bottom plate by the flange $k^1$, is continued through the drum, and is connected to the steam-pipe *n* by an expansion joint *m*. Apertures *o*, $o^1$ above and below a cross-partition $k^2$ allow of the entrance of steam and the escape of water, respectively.

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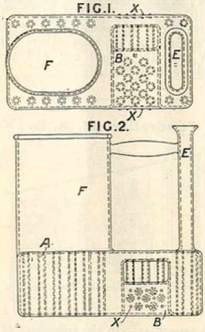
**10,255. Wilson, G.,** and **Tuer, W. W.** May 16.

*Heating water.*—A gas-heated submersible water-heater for baths and the like consists of a casing in the form of a Wellington boot having a water passage B extending from the base to the side of the casing partly around the burners. This angular fitting B has cross and vertical flues. Vertical water-tubes A extending through the casing lessen




the buoyancy of the apparatus, and furnish additional heating-surface. Copper rivets X are fitted at the points of contact of the flame with the sides of the casing. The air is supplied to the burners down the shaft F, and the products of combustion escape by the shaft E.

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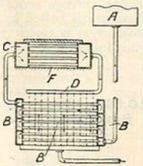
**10,326. Buchanan, J.** May 17.

*Heating liquids.* — An apparatus for rapidly heating linseed oil without driers, and subsequently cooling the product, is shown in the Figure. The liquid flows from a tank A through a heat-interchanger B to a heater C of any suitable construction, which may be heated by being placed in a flue F. From the heater, the oil passes through the perforated pipe D, which sprays it over the tubes of the interchanger. The cooled product is then conveyed to the receiver.

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**10,611. Dental Manufacturing Co.,** and **Pearson, W. T.** May 20.

*Heating by electricity.*—A heated aseptic table for dental, surgical, and like purposes is constructed of a substance easy to cleanse, preferably non-oxidizable metal, and is heated by means of an electric current. An upper tray A is surrounded by a metal rim B and rests on the frame C which supports heating-arrangements D of any suitable

type. Two current supplies are employed, one to raise the temperature rapidly to above blood heat and the other to maintain it at about 100° F.

FIG. 2.

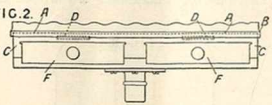


FIG. 3.


For this purpose, the heaters may either be connected in series or parallel by means of a four-terminal connexion E and ordinary plugs on the ends of the current supply conductor. Drawers F may be provided as additional receptacles.

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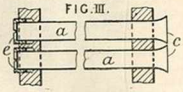
**10,738. Day, C.,** and **Yerbury, F. A.** May 23.

*Heating water.*—The tubes *a* of surface heating-apparatus are formed with a bell-mouth *c* at one or both ends to facilitate the flow of water through them. Such tubes may be expanded into position, or one end may be secured by an ordinary packing-ferrule *e*.

FIG. III.

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**10,749. Suzuki, T.** May 23.

*Heating water.*—The passage of the hot gases through the combustion chambers and smoke-tubes of a water-heater can be prevented by two dampers acting in unison, which cause the products to proceed directly to the chimney, thus permitting the inspection and cleaning of the boiler without drawing the fires. In the arrangement shown in Fig. 1, the combustion products, as shown by the arrows, pass through the flue 7 in the boiler 1 into the chamber 10, which is provided with oppositely placed apertures 12, 13. Pivoted at 20, 21 are the dampers 18, 19, which by means of the cranks 22, 23 and the link 24 can be moved simultaneously by the handle 25. In the position of the dampers shown, the gases pass into the inspection chamber 9, then through the smoke-tubes 8 to the trunk 11, and thence to the uptake 6 by the opening 14. When the handle is thrown over to the left, the dampers take up the position shown in dotted lines, and the gases pass from the flue 7 through the opening 12 direct to the chimney. In the modified form, represented in sectional elevation in Fig. 4, the internal flue is dispensed with, and the products traverse the smoke-tubes 8 to the chamber 29, thence proceeding through the trunk 11 to the uptake 30. When

FIG. 1.

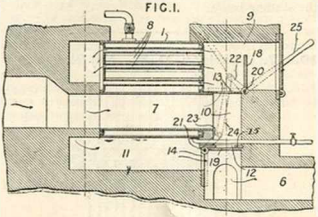
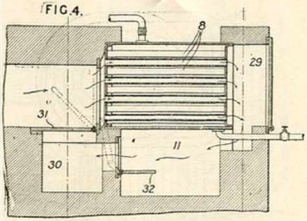



FIG. 4.




the dampers 31, 32 are operated, the gases are caused to pass directly to the chimney through the opening at present covered by the damper 31.

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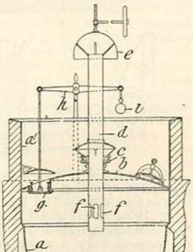
**10,783. Hyde, C. F.** May 23.

*Boiling pans.*—For boiling and aerating at a high temperature brewers' worts, a boiling-pan *a* is fitted with a dome or deck *b* through which passes an adjustable tube *d*. The tube is depressed until holes *f* near its end are submerged in the wort. The boiling liquid is forced by steam up the tube, and is directed by a cowl *e* into the part $a^1$ of the copper above the dome. The liquid is returned to the copper through a float



valve *g*, which may be connected to a lever *h* and counterpoise *i*. For use as an ordinary boiling-pan, the tube is raised until the holes *f* are exposed above the stuffing-box *c*.

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**10,817. Morison, D. B.** May 24.

FIG. 1.

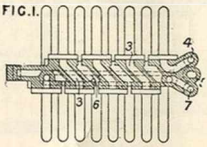



FIG. 2.

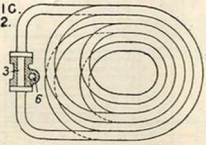
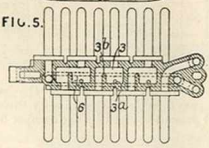



FIG. 5.




3a FIG. 6. 6 3a


FIG. 3.

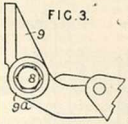
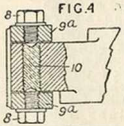



FIG. 4




*Heating liquids.*—Relates to apparatus for heating and evaporating liquids by means of steam, such as that described in Specification No. 13,775, A.D. 1900, [*Abridgment Class* Distilling &c.]. The coils through which the steam flows in series are connected by a series of diagonal passages in the header. In a modified arrangement, the water condensed in the coils is intermediately trapped and led to a common discharge passage. A special form of hinge for the header in which the binding effect of accumulated scale is minimized is also described in the Specification. Figs. 1 and 2 show one form of swivelling header in which the end of one coil is connected to the inlet of the next coil by diagonal passages 3. Steam enters the first coil through the upper portion 4 of the palm joint 5. The water of condensation is conveyed from

FIG. 7.

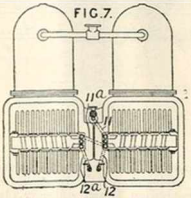
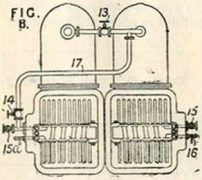
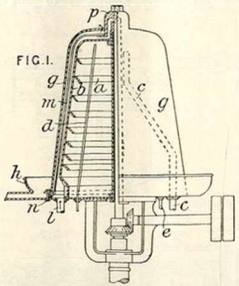



FIG. 8.



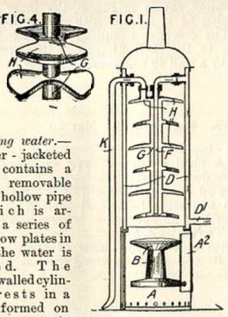

the last coil through the passage 6 to the outlet 7 of the palm joint. Figs. 5 and 6 show a modified arrangement in which the water of condensation is trapped intermediately and discharged into the outlet passage 6 through the orifices $3^a$. The steam from each coil passes into the upper part of its passage 3, the connexion with the next coil being at the bottom of the passage. Water of condensation is prevented from entering the coil by a wall $3^b$. Figs. 3 and 4 show the end of the header attached to the supporting-bracket 9 by brass pivot pins 8, which are screwed through lugs $9^a$ of the bracket and are adjusted so that they have small surface contact with the brass liner 10, which is recessed into the end of the header. Fig. 7 shows an evaporating-vessel of the twin type provided with two headers through which the steam passes in series by the ports 11, $11^a$. The water of condensation is discharged through ports 12, $12^a$. Fig. 8 shows an apparatus of the twin type which may be worked either as a single-effect or as a double-effect apparatus. The lower containing vessel is divided centrally. When the apparatus is working as a single-effect, the valve 13 is opened and the valve 14 closed, so that steam entering at the valves 15, $15^a$ passes through each system of coils independently. When it is working as a double-effect, the valve 14 is opened and the valves 13, $15^a$ closed. Steam is admitted through the valve 15 and the water of condensation discharged through the outlet 16. The steam generated in the right-hand portion passes by the pipe 17 to the coils in the left-hand portion.

**10,868. Christiansen, A. C.**, and **Aktieselskabet P. J. Buaas' Fabrikker.** May 24.



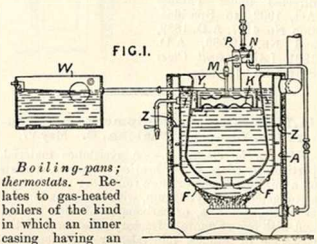

*Heating liquids.*—In apparatus of the kind described in Specifications Nos. 11,756 and 11,757, A.D. 1904, for warming liquids for pasteurizing and other purposes, for use in dairies or elsewhere, the liquid flows upwards over a heated surface and then downwards outside the shell containing the upwardly-flowing liquid. The internal dome *b* is heated by steam supplied near the top through the pipe *c*, and is provided with an air-inlet pipe *d*, and with a series of drip rings *a* to cause the condensation moisture to flow off quickly and pass to the outlet *e*. The liquid to be heated is supplied through the pipe *l* and flows up between the domes *b*, *g*, being stirred by arms *m* attached to the ring *n* and cap *p*. From the top, the heated liquid flows down outside the dome *g* to the channel *h*.

**11,042. Jackson, J. D.** May 26.




*Heating water.*—A water-jacketed geyser contains a central removable vertical hollow pipe on which is arranged a series of flat hollow plates in which the water is heated. The double-walled cylinder D rests in a groove formed on the lower part A. The water enters the jacket D by the pipe D¹, passes down the central tube F, and ascends the hollow pipe G, on which is arranged, as shown in Fig. 4, a series of flat vessels H, preferably of copper, and finally escapes by the pipe K. The burner B, preferably of the construction described in Specification No. 11,041, A.D. 1905, [*Abridgment Class* Stoves &c.], is attached to the door A² by the supply pipe through a suitable union joint. Any water condensed on the outside of the cylinder D escapes by means of a pipe shown.

**11,071. Glover, T.** May 26.




*Boiling-pans; thermostats.* — Relates to gas-heated boilers of the kind in which an inner casing having an open bottom and holes around its upper part is placed in an outer casing, or provided with a pipe connecting its upper and lower parts. The gas supply is regulated by a thermostat placed in the boiler. The outer casing of the boiler, which is provided with depressions F, is suspended within an insulated shell A provided with baffles Z. The inner boiler casing encloses a box K containing a thermostat of the aneroid type which operates through a rod M a valve N arranged in a box P. A gas-supply pipe leads to the box P, and another pipe leads from the box P to the burners under the outer boiler casing. The box K also receives the water supply from a tank W placed at the level of the upper part of the boiler, the inlet pipe Y delivering the water on to the thermostat. The boiler casing may be replaced by a coil of piping, one end of which is connected to the inner casing at its upper part and the other to the hole in its bottom.

**11,132. Amendt, H. C. T.** May 27.

*Heating water.*—A shallow, circulating-water boiler A is fitted to replace the usual hot-plate of a gas cooking-stove, openings B being left above the gas burners for heating cooking-utensils. The boiler is connected in the usual way to a hot-water tank F and supply cistern J, and a tap K may be fitted either to a pipe from the tank or to the return pipe. The boiler is preferably constructed in two parts, a

bottom section M, with walls N formed round the edge and round the holes, being covered by a flat

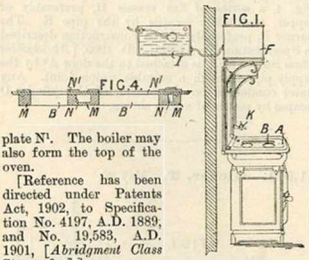



plate N¹. The boiler may also form the top of the oven.

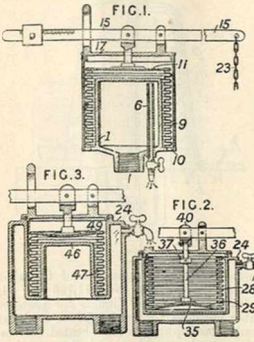
[Reference has been directed under Patents Act, 1902, to Specification No. 4197, A.D. 1889; and No. 19,583, A.D. 1901, [*Abridgment Class* Stoves &c.].]

### 11,146. Electric Equipment and Securities, Ltd., and Ruzicka, C. May 27.

*Heating by electricity.*—A resistance material, particularly adapted for heating purposes, consists of a mixture of one or more refractory metals, such as tungsten or molybdenum, with compounds such as oxides, chlorides, or carbonates of such metals, and with one or more refractory substances of the character of stones, minerals, or clays such as alumina or magnesite, rare earths such as monazite, or certain metallic oxides. The powdered mixture is worked into a paste, which is moulded or squirted into the required form, and dried. It is then heated in presence of a reducing-agent until the metallic constituents are partly or entirely reduced, and may be afterwards baked. A composition suitable for a radiator consists of nickel 38 parts, nickel oxide 20 parts, feldspar 4 parts, and fire-clay 16 parts.

### 11,272. Marks, G. C., [*Fulton Co.*]. May 30.

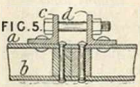
*Thermostats.*—Relates to heat regulators especially adapted for use in connexion with furnaces for raising high-pressure steam or for heating water for hot-water systems. In a regulator in which a chamber containing a fluid is provided with a collapsible and expansible corrugated metal wall, a rigid heat-conducting wall is interposed between the corrugated wall and the heated fluid under pressure, so as to protect the latter wall from fluid pressure. Fig. 1 shows one arrangement in which a corrugated wall 9 surrounds a dome 1 connected to a boiler. The wall 9 is closed at its upper end by a plate 11 which is arranged to transmit movements of the wall to a pivoted lever 15. The lower end of the wall 9 is secured between a flange on the outside of the dome 1 and a ring 10. The acting fluid, such as turpentine, is enclosed between the wall 9 and the dome 1. An air-escape pipe 6 is also provided. The range of movement of the plate 11 is limited by the top wall 17 of the casing and the top of the dome 1. A sliding weight on the lever 15 allows the apparatus to be adjusted to act at different temperatures. Fig. 2 shows a regulator particularly applicable to hot water



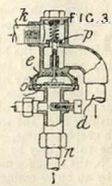

systems. The hot water is admitted to the space between the inner and outer parallel walls of the casing 24. The corrugated sheet-metal wall 28 is secured at its upper end to a ledge on the top of the shell 24. At its lower end, the wall 28 is provided with an end-plate 29, to which is attached a plate 35 carrying a rod 36. The rod 36, which is connected to a pivoted lever, is limited in its movements by an adjustable stop 37 and the cap 40, in which is formed a standard for carrying the lever. The acting fluid, which is preferably carbon tetrachloride, is contained between the corrugated wall 28 and the inner wall of the casing 24. In the modification shown in Fig. 3, the inner wall of the casing 24 is formed with an indented portion 46. The corrugated wall 47 is attached at the bottom to the shell 24, and at its upper end is closed by a wall 49 connected to the pivoted lever.

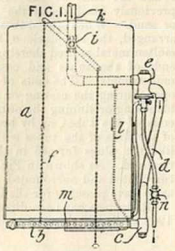
### 11,289. Queipo, E. May 30.

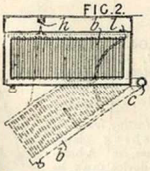
*Non-conducting coverings.*—A shell consisting of thin double plates is arranged concentrically around a marine boiler, thus forming an external flue. The plates *a*, *b* are connected together by means of angle-irons *c*, *d* and bolts, and the intervening space is filled with a non-conducting material.



**11,350. Fürstenheim, F.,** and **Hirschhorn, C.** May 30.



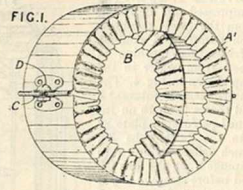



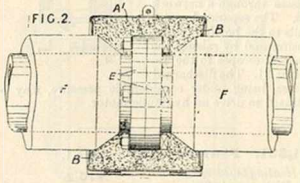



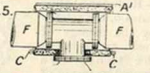

*Heating water.*—The supply of gas to a geyser for heating water for baths is turned on by the rotation of the burner, and is controlled by the supply of water to the boiler. The boiler *a*, containing ribbed or other water tubes, is heated by the burner *b*, which is pivoted at *c* and connected by pipe *d* and valve casing *e* with the supply pipe *k*. As shown in Fig. 3, the spring-controlled valve *p* is lifted from its seat when water is admitted by the cock *n*, Fig. 1, to the lower side of the membrane *o*. A small pipe *l* keeps the pilot-burner *m* supplied with gas, the movement of the burner *b* about the pivot *c* being permitted by the telescopic tube *l*, Fig. 2. To set the boiler in operation, the burner *b* is pulled outwards, thus opening the cock *i* through the connexion *f* passing around the pulley *h*. The pilot-burner *m* is then lit, the cock *n* turned, and water admitted to the boiler, the full supply of gas being then available by the lifting of the valve *p*. Instead of the pipe *l*, a hole may be bored in the valve seat.

**11,380. Sutcliffe, W. I.** May 31.

*Non-conducting coverings.*—Relates to a covering for steam-pipe flanges, joints, &c. for preventing radiation of heat. Each half of the outer casing $A^1$, Fig. 1, is made from a single piece of sheet metal by curving it to semicylindrical form and turning in and crimping the ends B. The two portions are hinged or otherwise secured at one edge, and fastened in position on the pipe by a bolt D passing through brackets C. The casing may be used with or without a liner for enclosing non-conducting material. In Fig. 2 is shown the application of the invention to cover the flanges E of a steam-pipe which is protected by the usual composition covering F, no liner being fitted. Fig. 5 illustrates the covering applied to a T-joint, a liner in this case being shown. The longitudinal edges of the cover

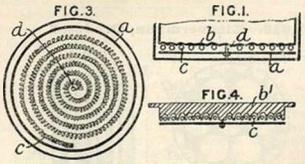



are recessed to admit the branch pipe, the halves being bolted together at each end.

**11,407. Teuber, G.** May 31.

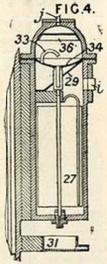



*Heating by electricity.*—Domestic utensils, sad-irons, and the like are heated by means of a coil spirally wound and attached to the surface to be heated. As illustrated in Figs. 1 and 3, the closely-wound bare coil *c* is secured to the vessel *b*, which may be suitably corrugated or ribbed to receive it. The surface of the vessel is provided with insulating-material, such as enamel or a layer of mica, or it may be coated with shellac to which the wire adheres. The plate *a* may be either plain or ribbed, and is attached to the vessel by a pin *d*. Fig. 4 shows a plate $b^1$ which is deeply indented to receive the coil, and which may be used for heating vessels placed thereon.

**11,511. Tellier, C.** June 1.

*Steam traps.*—The compressed air delivered from the (wet) compression pump of a cold-air refrigerating-machine is freed from water in the trap shown in Fig. 4. The water-laden air enters at *i*, and passes through an inclined perforated plate 29 into the bent tube 33, which deflects it down to impinge upon the dish 34, and before escaping at *j* it passes through a network 36. The separated water falls to the bottom of the casing and by raising the float 27 escapes to the receiver 31. The discharged water, being under considerable pressure, may be utilized to drive an hydraulic motor.

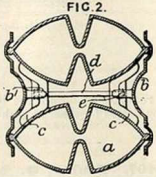
FIG.4.




**11,531. Pearson, L. F.** June 1.

*Heating buildings.*—Radiator baffle-plates *b*, for retarding the passage of fresh air between the tubes, are secured by means of hooked projections $b^1$, which fit on to brackets *c*, clamped to the radiator tubes *a* by a bolt *d* and nut *e*.

FIG.2.




**11,629. Zimmermann, O.** June 2.

FIG.3.

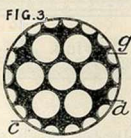
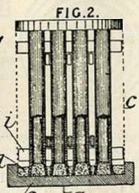



FIG.2.



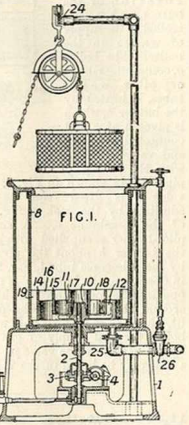

*Heating water.*—Stacks of tubes applicable to water-heating apparatus and the like are provided with cast-on end pieces or tube-plates. Corrugated or the like casings surrounding the tubes may also be cast to the end pieces so as to increase the effective surface of the apparatus and to prevent injury by undue expansion or contraction. According to one method, the tubes, preferably held in position by cross-pieces or laths *i*, are placed in a shallow receptacle *a* together with the casing *c*. The receptacle *a* is then heated and molten metal *d* poured in so as to surround the ends of the tubes, which have been previously filled up at the bottom with stoppers or sand. When the tubes are small or closely arranged, the receptacle *a* is first heated and the molten metal poured therein, after which the heated ends of the tubes and casing are placed in the molten metal. The ends of the tubes may be left open during the casting on of the end piece. By blanching or tinning the outer surfaces only of the ends of the tubes, or by brushing over the insides of the ends of the tubes with graphite, lime, or the like, the plugs formed in the tubes may be easily removed. As shown in Fig. 3, the casing *g* may be corrugated and surrounded by an outer casing *c*, so as to leave passages for the liquid or gases.

[Reference has been directed under Patents Act, 1902, to Specification No. 666, A.D. 1857.]

**12,043. Lips, J.** June 8, 1904, [*date applied for under Patents Act, 1904*].

*Heating water* in washing plates, dishes, &c. A heating-device may be disposed under the double-walled washing-vessel 8, into which a cage containing crockery is lowered, or this vessel may be set side by side with a boiler into which the basket is afterwards lowered. A rotating nozzle, connected to hot and cold water pipes provided with cocks, serves in this case to fill the vessel 8 and the boiler.

FIG.1.

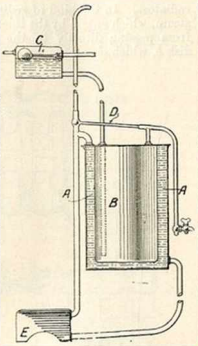



**12,321. Goold, E.** June 13. *No Patent granted* (*Sealing fee not paid*).

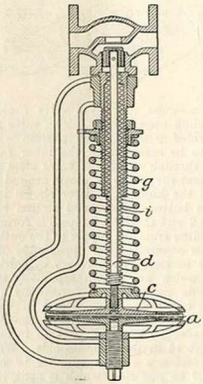
*Heating water; heating buildings.*—Relates to that system of heating water for domestic and warming purposes in which a primary tank or coil in circuit with the boiler is employed to heat a secondary tank and consists in an arrangement by which the amount of solid matter deposited in the boiler is minimized. The primary tank A is in series with the boiler E, and together with the secondary tank B is supplied in the first instance from the cistern C. A continuous circulation results in the primary system, and any

wastage of water is made up by communication with the upper part of the tank B through a pipe D. The solids contained in the water supplied to the secondary system sink to the bottom of the tank, and thus the water withdrawn to supply the primary system is practically free from deposit.

[Reference has been directed under Patents Act, 1902, to Specifications No. 15,201, A.D. 1892, and No. 20,076, A.D. 1903.]



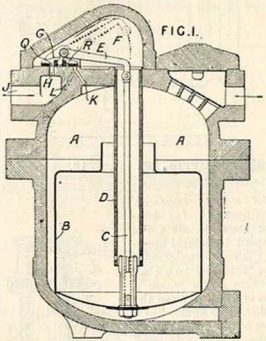

**12,383. Hübner, J.,** and **Mayer, I.** June 14.




*Thermostats.*—In thermostats employed for regulating the temperature of buildings, the valve spindle *d*, connected to the capsule *a*, is enclosed by a corrugated tube *i*, which acts as a stuffing-box and also as a spring. The adjustment of the temperature at which the valve closes may be effected by altering the tension of a spring *g*, by varying the stroke of the valve, or by varying the diameter of the pressure disks *c*.

**12,411. Hargreaves, F.,** and **Hudson, J. G.** June 15.

FIG. 1.



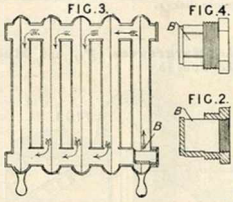

*Steam traps.*—The outlet of a floating-bucket trap is controlled by a slide valve G which is actuated by the motion of an open-topped float B communicated to it by a rod C and a bell-crank lever E. In the position shown, the vessel B has been sunk by water from the casing overflowing into it, thus moving the slide valve so that a port Q communicates with a port H leading to the outlet passage J. The water in the vessel is blown out by the steam pressure through the pipe D into the chamber F, and then past the valve. The float is thus lightened, and rising to its highest position closes the outlet, at the same time putting the chamber A in communication with the chamber F by ports K, R, to permit of the escape of any air present. Other ports L in the casing communicating with the outlet passages are always covered by the slide valve. The vessel B may be shaped as shown, or an annular recess may be formed in the casing to ensure sufficient water remaining to raise the float after discharge. A grating is fitted to prevent the entrance and accumulation of solid matter.

**12,617. Naylor, S.** June 19.

*Heating buildings.*—A hollow plug is inserted in the inlet opening of a radiator for the purpose of producing a circulation of liquid in the radiator. The plug, shown detached in Figs. 2 and 4, has one or more openings B, and is so arranged that water is prevented from passing into the other loops before it has passed up the first.

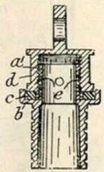
(*For Figures see next page.*)

**12,617.**



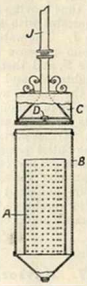

**12,622. Currie, W.** June 19.

*Hot-water bags.*—A filling-nozzle for hot-water bags has air vents *e* formed by lateral openings in an externally screw-threaded tubular extension $a^1$ on which a cap *d* is fitted to close the nozzle. The nozzle has a flange *b* in which a rubber or like washer *c* is sunk or fixed.



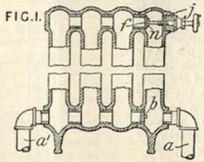

**12,784. Perez y Garcia, F.** June 20.

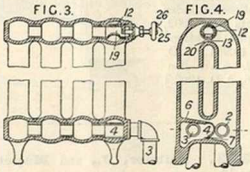
*Heating liquids; boiling-pans.*—Apparatus for heating oils and fats consists of an inner perforated cylinder A, which is charged with a mixture, termed "Sosca," consisting of equal quantities of lime and soda, and an outer cylinder B which is placed in the vessel containing the material to be heated. The heating is effected by the chemical action upon the charge of water which is run in through a faucet D from the reservoir C, which screws on to the outer cylinder and is shaped as shown. A tubular extension J carries off any vapours arising.

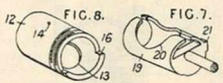



**12,790. Paddon, J. E. H.** June 20.

*Heating buildings.*—Relates to means for controlling and directing the flow of steam through radiators. In the kind of radiator shown in Fig. 1, steam, which enters by the inlet pipe *a*, is prevented from passing directly to the outlet pipe $a^1$ by a disk *b*, which closes the lower nipple connecting the



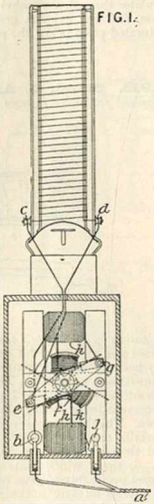




two first sections, and by a valve *f* closing the corresponding upper nipple. The valve *f* has one face provided with a raised portion *n* which is adapted to be seated upon the inner face of the bushing *j* through which the valve stem passes, so as to prevent the escape of steam around the valve stem. In the kind of radiator shown in Figs. 3 and 4, the bottom of the end section having the inlet pipe 2 and the outlet pipe 3 is formed with a duct 4 leading from the nipple to the outlet pipe 3. The nipple connecting the upper ends of the sections may be closed by a rotary cylindrical valve, parts of which are shown separately in Figs. 7 and 8. The passage 4 is formed by a resilient plate held between a flange 6 cast in the section and a recessed rib 7. The valve consists of an outer cylinder 12 having a port 13 in one side of an air vent 14 in the opposite side. Within this cylinder rotates a second cylinder 19 having an opening 20 on one side, which is split, to register with the opening 13. A projection 21 on the inner cylinder fits in the cut-away portion 16 of the outer cylinder. The temperature of the radiator is ascertained by touching a rib 25, or a button 26 carried by the rib, which is secured to the handle of the valve.

**12,807. Taylor, W.** June 21.

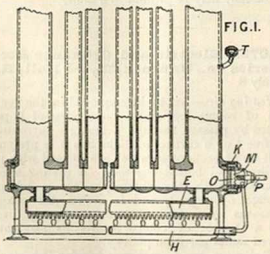
*Heating by electricity.*—Relates to improvements in the apparatus described in Specification No. 5928, A.D. 1897, for heating air by electricity for therapeutic and other purposes. The fan *k*, by means of which the air is forced over the heated coil, is driven by an electromotor arranged in series in the heating-circuit instead of by clock-work as previously described. The current is led from a wall-plug through flexible wires *a* to terminals *b*, *j*, which are connected by way of the terminal *c*, heating-solenoid, terminal *d*, brush *e*, armature *f*, brush *g*, and the field coils *h*. The fan is mounted on the armature spindle.

FIG.1.




**12,897. Watson, M.** June 22.

FIG.1.




*Heating buildings; heating water; thermostats.*—A radiator from which air has been exhausted is heated by the vapour generated from water in the lower portion of the radiator or in a separate vessel. For heating the water, gas burners are employed, the supply of gas being regulated by a thermostat. As shown in Fig. 1, the water is heated in the chamber E below the radiator by the row of atmospheric gas jets H, to which the gas is supplied by the thermostat K. The expansion of the liquid in the chamber O bulges the diaphragm M, and partially closes the aperture at the end of the gas-supply pipe P. A drop-valve T may be attached for extracting the air from the radiator by a pump.

**13,175. Marks, G. C.,** [*Davis, C. Z.*]. June 26.

FIG.2.

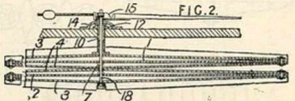
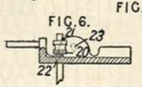



FIG.5.


FIG.6.

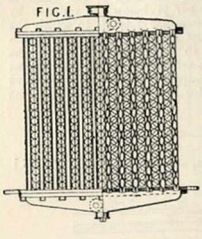


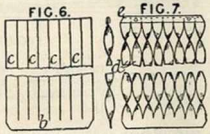

*Thermostats.*—Relates to thermostats, suitable for incubators and the like, in which steel channel-plates or angle-irons 1, 2 are nested between inner and outer channel plates or angles 3, 4 of aluminium. Special means for employing the movements due to the differential expansion of the two metals are also described. The aluminium plates have their flanges cut away between their ends, as shown at 7, so as to permit of their bending. The iron and aluminium plates are nested, as shown in Fig 5, and secured together at their ends. The aluminium plates 4 are also secured together at their middle points. A connecting-rod 18 having a cone-shaped nut on its lower end, passes upwards centrally through all the thermostatic plates, and through a connecting-tube 10 to a pivot casting 15 which carries the arm governing the exhaust of the incubator. The connecting-tube 10 is threaded to a hollow nipple secured to the plate 3, and is also threaded to a base casting 12 secured to the wall of the incubator. Upon the upper end of the connecting-rod 18 is a washer 20 and nut 21, as shown in Fig. 6, provided with diamond-shaped wings (not shown) by which it is adjusted. Underneath the washer 20 and upon the pivot casting 15 are knife-edges 22 on which the washer 20 rests. The pivot casting is provided with knife-edges 23 which rest in grooves formed in posts on the supporting-casting 14.

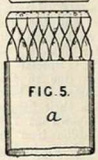
**13,401. Shackleton, J.** June 29. *Drawings to Specification. No Patent granted (Sealing fee not paid).*

*Non-conducting coverings.*—In ice-cream freezers, flock is employed as a heat-insulator.

**13,492. Brewtnall, A. W.** July 1.




*Heating liquids and gases.*—In tubular or plate apparatus for heating or cooling liquids, vapours, and the like, all spaces through which the material passes are fitted with strips of metal twisted into helical forms. Figs. 5, 6, and 7 show the application of the invention to apparatus in which flat tubes are employed. A sheet *b* of metal, Fig. 6, is cut into longitudinal or transverse strips *c*, which are then twisted into helices *d*, Fig. 7, the free ends being secured by a bar *e*. The whole arrangement is then slipped into the tube *a*, Fig. 5, and soldered or otherwise secured if necessary. Fig. 1 illustrates a radiator so built up, but having in addition surface-plates formed of twisted strips between the tubes. A similar form applicable to motor-cars is described in the Specification. For circular tubes of large diameter, such as are employed in condensers or boilers, sheets consisting of four twisted strips bent into square form, as shown in Fig. 16, may be inserted. The spaces between the tubes are filled, as before, by the insertion of surface plates. Specification No. 20,972, A.D. 1901, is referred to.

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**13,607. Thwaite, B. H.** July 1. *Drawings to Specification.*

*Heating buildings.*—Glass-houses are heated by water from the cylinder jacket of a gas engine, and by the exhaust gases from the engine. The water circulates through the jacket and pipes in the glass-house, and the exhaust gases are passed through perforated pipes below the plant supports.

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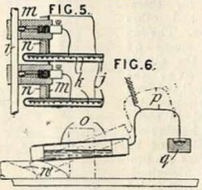
**13,948. Morel, L. A.** July 6, 1904, [*date applied for under Patents Act, 1901*].




*Heating by electricity; thermostats.*—Relates to a process and apparatus for drying gluten on electrically-heated plates in a vacuum, the temperature being automatically regulated. The plates are heated on both surfaces by wires *k*, Fig. 5, embedded therein, the current being led to them from the rods *l* as shown. The thermostatic regulator consists of a split bimetallic expansible ring *n* placed outside the rim *m* of the plate and formed with a bevelled end $n^1$, Fig. 6, upon which rests a tube *o*. This tube formed preferably of glass contains a little mercury, and carries an arm *p* the end of which normally dips into the mercury cup *q*. Expansion of the ring allows the end of the tube to fall, thus raising the arm *p* and breaking the circuit. The cakes of gluten after treatment may be salted or sweetened and slightly baked by a current of dry superheated air, or they may be ground to a flour.

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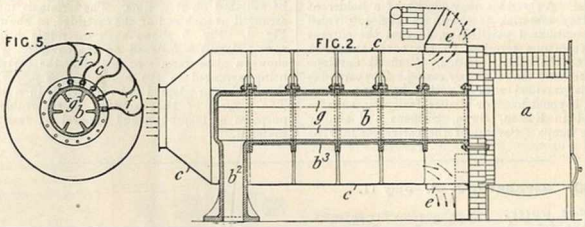
**14,079. Electric and Ordnance Accessories Co., Hancock, R.,** and **Hall, R. F.** July 8.

*Heating air.*—Air to be employed in the ventilation of rooms &c., or in the drying of hops, is heated by passage through a casing *c* surrounding the flue *b* of a furnace *a*. The flue *b* is preferably built up of sections $b^3$ which are formed with webs or ribs *g*, and bolted together. A casting $b^2$ communicates with the chimney. Air is admitted through openings *e*, and is drawn through the apparatus by a fan. The air-passage is divided into a number of compartments by straight or curved radial partition-plates *f*.

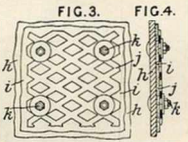
[Reference has been directed under Patents Act, 1902, to Specifications No. 846, A.D. 1875, No. 4602, A.D. 1888, Nos. 10,141 and 21,103, A.D. 1893, and No. 24,423, A.D. 1897, [*Abridgment Class* Furnaces &c.].]

(*For Figures see next page.*)

**14,079.**

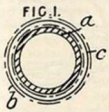



**14,117. Berner, E.** July 8, 1904, [*date applied for under Patents Act, 1901*].



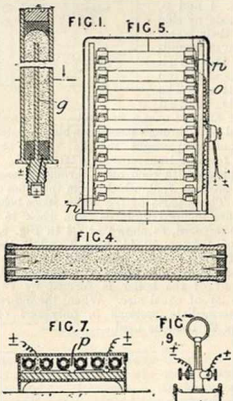

*Non-conducting coverings.* — Fire-proof doors are constructed by applying to the metal plate *h* a layer *i* of asbestos, which is protected by covering with a performed metal plate or netting *j*, the whole being secured together by bolts *k*. The Specification as originally published under the Act of 1901 describes a heat-insulating covering for girders, beams, and the like, consisting of a double casing of thin sheet metal packed with asbestos; for pipes, consisting of a layer of asbestos protected by a surrounding seamless tube; and for plates and the like, comprising an asbestos layer and an outer continuous or perforated metallic sheet or network. This subject-matter does not appear in the Complete Specification as accepted.

**14,167. Maclean, J.** July 10.




*Heating by electricity.* —Resistance coils for use in curling-tongs consist of successive layers of asbestos paper *b*, silk-covered resistance wire *c*, and shellac varnish. The coil is first formed on a brass tube or rod *a*. When the required thickness is obtained, the coil is removed from the tube *a* and placed in one of the hollow limbs of curling-tongs and thoroughly baked. The limb is then hermetically sealed. If the coil is for use in a limb of half-round section, it is heated and then pressed to the required shape before being inserted in the limb.

**14,256. Voelker, A.** July 11.




*Heating by electricity.* — Electric heating-cartridges are made so as to possess or represent a determined unit of resistance in the same manner as electric lamps are constructed for determined conditions of current. The resistance is preferably formed of granular material in the manner described in Specification No. 10,873, A.D. 1904. The resistance is regulated by varying (1) the length and cross-section of the interior of the cartridge, (2) the composition and size of the

grains, and (3) the density of the resistance material. A cartridge may consist of a holder of refractory material, as shown in Fig. 1, divided by a longitudinal partition *g*, so that the current flows from one terminal to the cover and back again to the other terminal. A metal envelope may surround the refractory casing. The cartridge may be provided with a socket having a screw, clamp, bayonet-joint, or similar fastening, such as is used in Edison, Swan, Siemens, and similar electric lamps. Several of the cartridges may be arranged on a bed-plate so that one or more may be switched on at a time. The terminals may be arranged at each end of the cartridge, as shown in Fig. 4. Fig. 5 shows such cartridges held by spring clamps *n* fastened on the cover *o*. Fig. 7 shows a plate-warmer or the like, the cartridges being arranged in the heating space *p*. Fig. 9 shows a heater adapted to be immersed in a liquid. The cover *c* of the cartridge is removable for purposes of inspection and renewal of resistance material.

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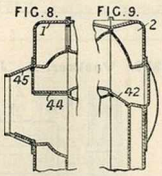
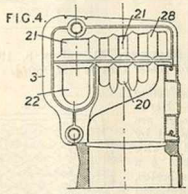
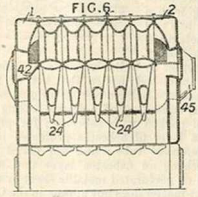
**14,299. Bernhard, J. B.** July 11.

*Heating water*, boilers for. A boiler adapted for generating steam or heating water is built up of sections 3, Figs. 4 and 6, placed side by side with their water spaces in communication through openings at the top and bottom. The whole is bolted together and set over a fire-grate. Each section is provided with through passages which register with corresponding passages in the other sections, thereby forming transverse flues 20, 21, 22. These communicate with each other through passages in the end sections 1, 2, which form the sides of the boiler. Those parts of the water space below the flue 20 are inclined upwards from back to front, and are tapered, as shown at 24 in Fig. 6. By means of dampers 42, 44, Figs. 8 and 9, the outlet 45 for the furnace gases may be attached to that side of the boiler which is nearest the chimney. The front of the boiler is formed by two flat sections 28 of equal size. When there are only two intermediate sections 3, only one of the chambers 28 need be used.

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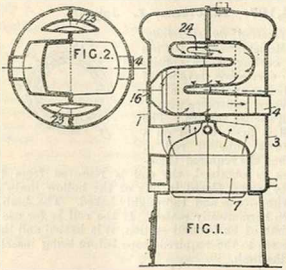
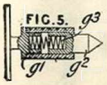
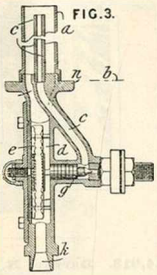
**14,300. Bernhard, J. B.** July 11.

*Heating water*, boilers for. A vertical cylindrical boiler adapted for heating buildings by hot water or steam is shown in sectional elevation and plan in Figs. 1 and 2, respectively. It consists of two semicylindrical sections 1, 3 with their water spaces in communication through openings at the top and bottom. Each section is formed with flue spaces which register with corresponding spaces in the other section. The gases from the fire-box 7 pass upwards through the side flues 23 and thence downwards through the central zigzag flue to the outlet 4. Doors 24, 16 give access for cleaning the flues.



**14,395. Park, C. A.,** and **Mason, C. L.** July 12.




*Heating water; thermostats.*—Water for washing, heating, and other purposes, and more particularly on railway trains, is heated by steam supplied through a valve which is actuated by a thermostat located in the cold-water inlet pipe, and controlled by the temperature of the water. The apparatus is secured by a flange joint *n* to the bottom of the water container *b*. The steam inlet pipe *c* is carried up within a surrounding pipe *a* which forms the cold-water passage from the inlet *k*, and which may be extended and coiled up within the vessel *b*. Circulation is maintained by the steam jet through the pipe *a*, the chamber *d*, in which a capsule *e* is placed, and passages in the sides of the casing which communicate with the bottom of the vessel. The valve-piece *g* is formed in two parts $g^1$, $g^2$, Fig. 5, separated by a spring $g^3$, which latter closes the valve against escape of water when steam is shut off. The entrance of cold water from the pipe *k* cools the capsule and allows the steam valve to open, but when the temperature of the water circulating through the chamber *d* reaches a predetermined point, the expansion of the capsule closes it again.

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**14,400. Ruzicka, C.** July 12.

*Heating by electricity.*—A resistance material for use in heating-apparatus consists of a composition in which pieces or grains of a highly-conducting substance are distributed throughout a mass of material of comparatively low conductivity. The material of higher conductivity may consist of one or more of the residual products from the distillation of coal, wood, or heavy hydrocarbons, or of plumbago, graphite, carbon, or a metallic carbide, or a mixture of these. If in a soft or powdery condition, or if a mixture is used, the materials are powdered and mixed with a binder such as coal-tar, and are moulded, pressed, baked to effect vitrification, and granulated to the required size. The material of lower conductivity consists of a mixture of one or more substances of the plumbago, graphite, or metallic-carbide class with substances of the clay or stone class, or with a mineral substance such as cryolite or glazing sand. The ingredients are ground, and one or more metallic salts such as barium carbonate are added, unless already present. A binding-agent, such as coal-tar or wood-tar, gum solution, or a plastic paste such as clay mixed with water, is added, and the mixture is worked into a paste through which the grains or pieces are distributed. The compound is moulded and baked until vitrified and hardened. A suitable composition consists of plumbago 7 parts, clay 26 parts, feldspar 2 parts, and silicon carbide 10 parts, the latter being distributed, in granules of such a size as to pass a sieve of 17 meshes to the inch, through a matrix composed of the other three substances.

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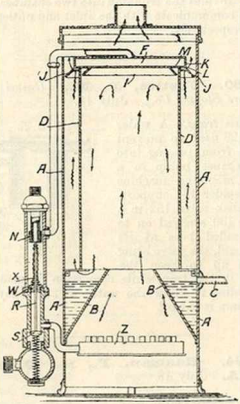
**14,482. Fenlon, H. T.** July 13.




*Heating water.*—The heater consists of a double casing A, D, down which the water trickles, flowing through perforations K, L, M, in an upper reservoir F, and collecting in a pocket B above the burners Z. Rings I, J direct the water on to the two surfaces of the inner casing D, and the inner surface of the outer casing A. The outflow pipe C is kept permanently open. The water valve N is of the "thimble" type, and rests upon the rod R of the gas valve S, so that both open simultaneously. A stuffing-box W and a rubber tube X prevent leakage of water into the gas chamber.

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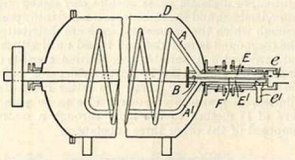
**14,599. Chambers, M. F.,** and **Archibald, D. S. L.** July 15.

*Heating liquids.*—In beer-cooling and like apparatus of the type in which a coil, through which the cooling or heating medium passes, is rotated

within a containing vessel D, the ends A, $A^1$ of the coil terminating at one end of the apparatus in




communication with a hollow trunnion B, a partition F divides the trunnion into two chamber E, $E^1$, which communicate with the inlet and outlet pipes $e$, $e^1$, respectively.

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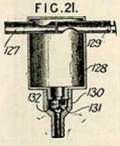
**14,760. Justice, P. M.,** [*United States Fibre Stopper Co.*]. July 18.

*Steam traps.*—A water trap 128 used to prevent water from passing into an exhaust pump in a pulp-moulding machine has a spider 131 supporting a disk valve 132 in a nipple 130 screwed on to a threaded boss at its lower end, the valve being drawn up to keep the water in the trap while connexion is made, but descending to allow the water to run away when the pump is cut off.

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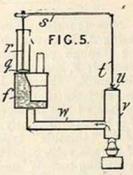
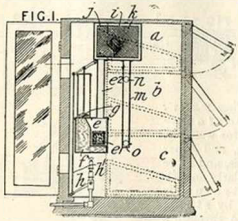
**14,794. Haaman, F.,** and **Diamant, L. A.** July 18.

*Thermostats* for use with cabinets for disinfecting hair-dressing, dental, surgical, &c. instruments. A float $g$ is lifted by steam pressure when the temperature of the water in the casing $f$ is raised to a boiling-point. The movements of the float $g$ actuate a lever, which is connected by a rod $h^1$ to the gas tap $h$. Fig. 5 shows a modified form of apparatus for use when the temperature to be maintained is not that of boiling water. Material which evaporates at the required temperature is enclosed between two very thin elastic plates forming a sealed chamber $q$, which is capable of bulging or contraction and is connected by rods $r$, $s$, $t$ to a damper $u$ adapted to cover a chimney $v$ above the lamp, so that the heating-gases are wholly or partly caused to pass through the passage $w$ to heat the vessel $f$.

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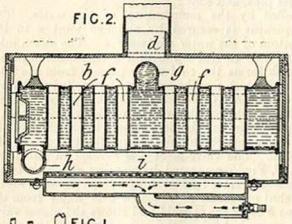
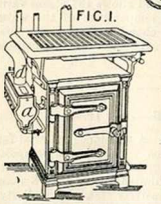
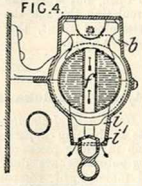
**14,913. Darwin, H.** July 20.



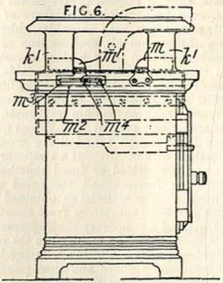




*Heating water.*—A water-heating attachment $a$ for gas stoves and cookers consists of an outer casing within which are located a boiler connected with a water-circulating system and an atmospheric gas burner. Fig. 1 shows the water-heater attached to a gas cooking-stove, Figs. 2 and 4 show on an enlarged scale the water-heater detached, and Fig. 6 shows one method of detachably mounting the water-heater. The boiler may be cylindrical and provided with cross flues $f$, as shown, or it may be of other form, such as an arrangement of water-tubes. The boiler is connected with the out-flow and return pipes $g^1$ $h$ of a hot-water circulating

system. The burner is longitudinally disposed in a chamber *i* in the lower part of the casing and supplied with air by inlets $i^1$. The products of combustion rise to a top flue *b* from which they escape

FIG. 6.




by a shaft *d*. The gas supply may be connected to the main gas-supply pipe of the cooker or to an independent supply. One side of the water-heater may be provided with cranked hooks *m*, $m^1$, Fig. 6, which engage supports $k^1$ fixed to the stove. One hook *m* is rigidly connected to the heater and the other hook $m^1$ is arranged to slide laterally so that it may be disengaged from one of the supports $k^1$. For this purpose, the attachment plate $m^2$ is formed with a longitudinal slot $m^3$ through which pass connecting bolts $m^4$. When the bolts are loosened the sliding hook $m^1$ may be disengaged.

**15,112. Helas, C.** July 22.

*Heating water.*—The spindle of the gas valve of a water-heater is connected to the spindle of the water supply valve, which is operated by the pressure of incoming water. Cold water enters a bend *m* fitted to the casing *b* of the water-supply valve, raises a piston $b^1$, and passes to the heater by way of perforations $b^2$, $b^3$ in a cylinder $b^3$ in which the piston works. The spindle *c* of the water-supply valve passes through the bend *m* and is connected to the spindle *d* of the gas valve, so that, when the piston of the water-supply valve is raised, the plug $a^1$ of the gas valve, which is

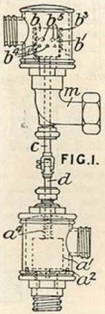


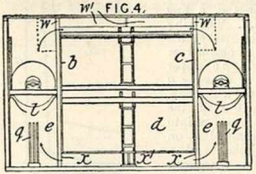

FIG. 1.

provided with a leather washer $a^2$ and is normally held closed by a spring $a^4$, is also raised.

[Reference has been directed under Patents Act, 1902, to Specifications Nos. 23,491 and 25,515, A.D. 1897.]

**15,133. Marr, A. N.** July 24.

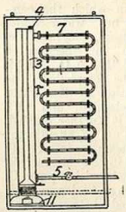
FIG. 4.




*Heating air.*—The casing of a machine for drying and conditioning yarns and textile materials is divided longitudinally into two or three compartments through one of which endless chains carrying hanks of yarn pass, while the others serve to heat and circulate air. The air-circulating chambers are open, while the remaining chamber *d* is closed at each end. In the compartments *e*, which supply the drying portion of the chamber *d*, air is drawn over the radiators *q* and is directed through openings *w* in the partitions *b*, *c* into the air space $w^1$ at the top of the compartment. Similar openings *x* at the bottom of the partitions connect the bottom air chamber $x^1$ and complete the circulation through the chamber *d*.

**15,234. Gibbs, W.** July 25.

*Heating water for baths.*—A perforated coil 7 is supplied with water from a columnar reservoir 3, from which the liquid is expelled by the pressure in the inlet pipe 5. Scent, disinfectant, salt, or the like may be added to the water on removal of the screw cap 4. Either hot or cold water may be supplied by the pipe 5; in the latter case, the reservoir may be annular and may be provided with a heater 11.

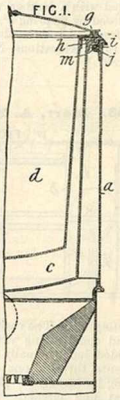



**15,275. Russell, J. E.** July 25.

*Boiling-pans.*—In portable hot-water or steam-jacketed apparatus for cooking cattle food &c.

the food pan and its jacket are made separable. The upper edges of the food pan *d* and the jacket *c* are fitted with flanges having annular channels *g*, *h* and ribs *i*, *j*. The rib *j* of the jacket fits into a channel *m* round the upper edge of a casing *a* above a fire-box. The rib *i* of the food pan fits into the channel *h* on the jacket, and a rib on the cover into the channel *g* on the food pan. When the pan *d* is removed, the jacket *c* may be used as a boiler.

FIG.1.




**15,390. Buzicka, C.** July 26.

*Heating by electricity.*—An electric resistance material for use in heating and cooking appliances consists of a mixture of substances selected from the following classes, namely, (1) metals having a melting-point above 1500° C., including chromium, iridium, molybdenum, palladium, platinum, ruthenium, silicon, boron, titanium, and tungsten, and carbides of such metals; (2) clays, such as plastic fire-clay, oxides or other difficultly reducible metal compounds, such as magnesia, rare earths such as monazite, or a preparation or mixture of any of these; (3) compounds such as oxides, chlorides, or carbonates of heavy metals, such as iron carbonate or the residue obtained after heating a metal such as nickel in presence of carbon monoxide, mixed with stones or mineral substances such as flint; and (4) metallic salts capable of acting as permanent binding-agents, such as sodium carbonate, unless such salts are already present in sufficient quantity. Substances from classes 1 and 2 are ground and mixed together, with or without a temporary binding-agent, and are welded or fused together in an electric or other furnace, and the fused mass is finely powdered. The material so obtained is then mixed with powdered substances from classes 3 and 4, with or without a temporary binding-agent. The material is then pressed or moulded to the required form and subsequently heated in a reducing-furnace, or is first fused and reduced and then poured into moulds. The reducing-gas may be forced through the molten material. The heating of the finished article is continued in a reducing-atmosphere until vitrification is effected. In some cases, the substances from class 3 may be submitted to a reducing process and ground before being mixed with the other materials. A suitable composition consists of tungsten 10 parts, silicon carbide 20 parts, feldspar 35 parts, nickel oxide 523 parts, fire-clay 160 parts, and gum solution 24 parts. The articles may be glazed or plated.

**15,570. Westwood, J. W., Barter, C.,** and **Taylor, T.** July 29. *Right to Patent relinquished.*

*Heating buildings; heating water.*—In a system for heating buildings, in which the combined hot water boiler and steam generator described in Specification No 23,310, A.D. 1904, may be employed, the circulation of the water is accelerated, and the water is further heated, by the use of an injector or "steam mixer" G which injects steam into the main rising-pipe C. The heated water is delivered between two inclined plates $B^1$ in the expansion chamber B, which is also fitted with a float valve H, which closes when the expanding water reaches a predetermined level, a safety-valve I, and a valve J which is arranged partly to close the steam-pipe valve L when the pressure of the air-cushion in the vessel B exceeds a certain limit, such closure indirectly actuating the damper. An extension V is arranged to retain any water that may leak past

FIG.2.

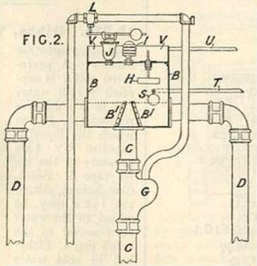
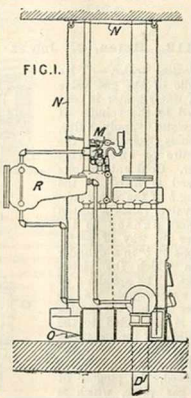



FIG.1.



the valves H, I, any great excess being carried off by the overflow pipe U and the remainder returning to the tank when the apparatus cools. The tank is also fitted with a cold-water supply pipe T and float valve S to make good any wastage, and with connecting-pipes D which convey the hot water to the radiators. The increase in steam pressure resulting from the partial closure of the cock L is communicated to the space below the diaphragm of an ordinary form of draught-controlling mechanism M, thus actuating the damper O by means of a chain N. A feed-supplying arrangement R of the usual construction makes up from the return pipe $D^1$ the loss of water in the steam generator due to evaporation, the boiler pressure being kept below that due to the difference in level of the water in the tank B and in the generator. The method described in the Specification above cited for converting the combined boiler into a hot-water boiler simply may be employed.

**15,651. Russell, J. N.** July 31.

*Heating buildings.*—To maintain a constant pressure difference between the mains of a steam or vapour heating-system, the supply and return mains C, E, respectively, are put in communication with chambers *j*, *h*, above and below a diaphragm *g*, which is also under the influence of an adjustable spring *k*, and controls a regulator F. Any variation in the difference of pressure between the two sides moves the diaphragm *g*, and hence controls the regulator, which may be a stop valve in the flow main C, as shown in Fig. 1, or in the pipe supplying motive-power to an exhausting-apparatus in the return main. If the latter is driven electrically, the diaphragm may control a rheostat in the motor circuit.

FIG. 3.

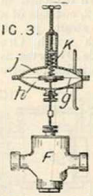
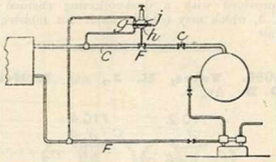


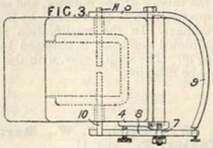

FIG 1




**15,809. Taylor, W.,** and **Mudford, F. J.** Aug. 2.

*Thermostats.*—An apparatus for use in annealing and tempering, in which the temperature to which steel should be heated is determined by the change produced in its magnetic properties, is arranged so as to control the heating means. The steel mass is placed between two iron rods 10, 11 in a muffle, and completes one path in a divided magnetic circuit or field due to a magnet. The rod 10 is also in contact with one end of a bar 8 which is adapted to oscillate about a fulcrum 7 formed on one pole-piece 4, while the other end of the bar is separated from a yoked end 9 of the other pole-piece 5 by an air-gap. While the steel retains its magnetic properties, the reluctance of the magnetic circuit through it is less than the reluctance of the circuit containing the air-gap, and consequently the lever 8 does not connect with the yoke 9. The critical temperature is indicated by the rocking of the lever, and this movement may control the gas supply or other heating means of the muffle.

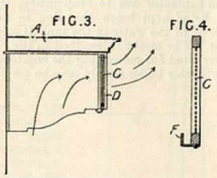
FIG. 3.




**15,926. Barker, C. R.** Aug. 3.

*Heating buildings.*—To prevent discolorization of the wall by the air rising from the radiators, detachable

filtering-panels C, of gauze, canvas, or the like, are fitted to the radiator hoods A, which are secured to the wall by means of lugs, or screwed directly on to the radiators, a felt or other pad being fitted




between the hood and the wall. The panel C is secured in guides D, preferably by set-screws, and is provided with a dust-collecting channel F, Fig. 4, which may contain water for moistening the air.

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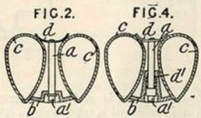
**16,086. Yates, H. J.,** and **McNeill, D. R.** Aug. 5.




*Heating buildings.*—Relates to the attachment of baffles or air-deflectors to radiators. Figs. 2 and 4 are cross-sections of two arrangements. The plate *b* is suitably recessed to receive the head $a^1$ of a stem *a*, to the other end of which a spring clamping-strip *d* is rigidly secured. The part *d* is passed between the tubes *c* of the radiator, and secured by giving a quarter-turn to the head $a^1$ by means of a key or spanner. In the modification shown in Fig. 4, additional resiliency is obtained by the use of a spring $d^1$. The strip *d* may, with this form, be made rigid or inflexible.

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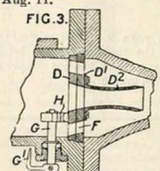
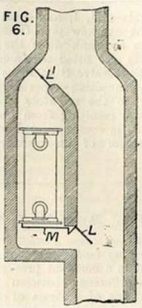
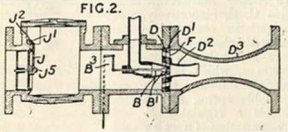
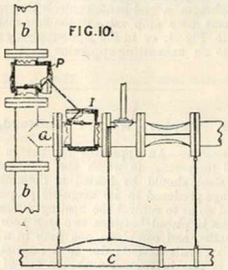
**16,343. Westwood, J. W., Barter, C.,** and **Taylor, T.** Aug. 11.




*Heating by steam circulation; heating water; heating air; heating buildings &c.*—Relates to apparatus for utilizing exhaust steam, particularly from condensing or non-condensing engines, for heating, drying, and ventilating purposes, and for boiling or similar processes. Fig. 10 shows a general arrangement in which steam from the exhaust-steam pipe *b* is led through a valve casing I to an accelerator controlled by the temperature of a range of heading-pipes *c* or the like. The accelerator, which is shown detached in Fig. 2, consists of a live-steam jet B, which with the nozzle $D^2$ serves as an injector to force




the exhaust steam entering through a valve J into the cone-shaped chambers $D^3$. The nozzle $D^2$ is attached to one of two perforated disks D, $D^1$ which rotate upon each other. The disks may be rotated through a spindle G and a worm thread or teeth H, Fig. 3, so as to close more or less the openings F. An indicator $G^1$ shows the extent to which the ports F are opened. The plunger $B^1$, controlling the supply of live steam, may be actuated thermostatically through levers $B^3$ connected to the apparatus heated. The disk $D^1$ may be similarly actuated. If the supply of exhaust steam is limited, or if the ports F are closed, the nozzle B may serve as a reducing-valve. Water may be

introduced into the casing to obtain a more perfect vacuum. The accelerator is connected by a flange to apparatus for heating air or liquids, such as radiators or coils Where a vacuum exists in the exhaust pipe *a*, a back-pressure valve, which may be balanced by levers and counterweights and may work automatically, closes the exhaust-steam inlet to the accelerator. One form of valve consists of a plunger or flap J which works in a vertical seating, and is fixed to an arm $J^3$ having pivoted bearings at $J^1$, so that the valve on operating swings away from its seat. The plunger may be held to its seat by springs, and the ends of the arms $J^3$ may be fitted into sleeve rollers $J^2$ running on a flat surface formed on each side of the interior of the valve casing. A similar valve P, Fig. 10, may be fitted in the exhaust pipe *b* on the outlet side of the branch *a* leading to the accelerator. The valves I, P may be connected by levers so that when one opens the other closes. The exhaust steam may be passed through a superheater shown in Fig. 6, which may be located in a by-pass to a main flue, such as a boiler or steam-generator flue. The dampers L, $L^1$, controlling the admission of the heated gases to the superheater, may be controlled by hand or thermostatically by an expansion rod M. An additional accelerator may be attached to the steam outlet of the superheater.

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**16,439. Geipel, W.** Aug. 12.

*Steam traps.*—In steam traps of the kind described in Specifications No. 21,571, A.D. 1894, and No. 12,131, A.D. 1896, means are provided whereby the water-discharge valve may close in a steam-tight manner. Uniform wear is ensured by utilizing the motion of the valve case *a*, produced on the opening and closing of the trap, to rotate the discharge valve *e*. The discharge valve and its spindle *f* are arranged with their common axis inclined to the centre line between the expansion tubes and to the length of the trap frame. The common axis of the valve *e* and its spindle are normal to the spring-controlled hand-lever *g*, against which the outer end of the valve spindle bears. The inclination of the said axis, which in practice is about sixty-four degrees, is such that when the trap opens and closes there is practically no motion at the point of contact between the valve spindle and the hand-lever; and the pressure between the lever and the spindle when the trap closes is exerted practically in the direction of the axis of the spindle and valve. In order that movement of the valve casing *a* may rotate the discharge valve *e*, the casing *a* carries a pivoted bell-crank lever, as shown in Figs. 3 and 4. One arm *m* of the lever engages a pin on the stationary trap frame *d*, while the other arm *n* carries a spring pawl *p* which engages a ratchet-wheel *q* on the valve and spindle *f*.

FIG.2.

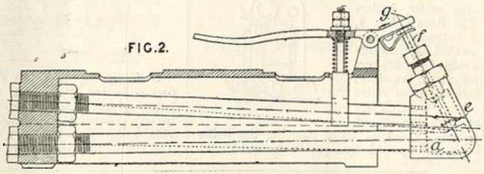



FIG.3.

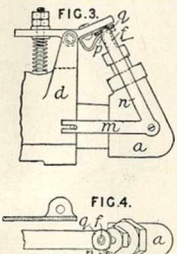
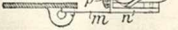



FIG.4.

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**16,631. Ruzicka, C.** Aug. 16.

*Heating by electricity.*—Resistance bodies of moulded and baked composition are formed in alternate layers or sections of material of higher and lower conductivity. The low resistance or "contact" material consists of one or more substances of the metalloid class, such as carbon, metal, such as iron, metallic carbides, such as silicon carbide, or a mixture or alloy of these, ground to powder with the addition of binding-agents such as feldspar or coal-tar. The resistance material consists of one or more of the above substances, with non-conductive substances, such as fire-clay, flint, stone, quartz, monazite sand of the clay, stone, or mineral glass, ground to powder, with the addition of a binding-agent. A suitable composition for the "contact" material consists of silicon carbide 5 parts, tar carbon 5 parts, and coal-tar 1 part; for the resistance material powdered quartz 49 parts, sodium borate 6 parts, tar carbon 2 parts, and coal-tar 4 parts. The rod built up in this manner preferably terminates at each end in a body of the "contact" material. The external contacts may be of any ordinary kind.

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**16,689. Mertens, S.** Aug. 17.

FIG. 1.

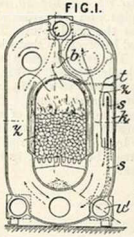



FIG. 5

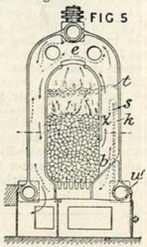
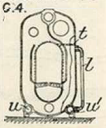


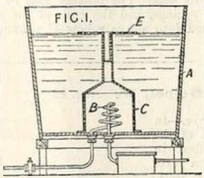

FIG. 4.




*Heating water*, boilers for. The flues *z*, Fig. 1, formed between the sections extend downwards on one side of the fire-box and upwards on the other. The furnace gases enter these flues through an opening *b* in the top of the fire-box. The cold water entering the boiler at $u^1$ is directed upwards by a partition *s* and thence downwards by another partition *t*, finally circulating in a direction opposite to that of the furnace gases. In a modification, the passage *k* formed by the partition *s* is replaced by a pipe *l*, Fig. 4. In another modification, shown in Fig. 5, the fire-box has outlet openings *e*, *b* at the top and side respectively. In this form of boiler, the whole of the water circulates through the grate.

**16,741. Kirby, W. T.** Aug. 18.

FIG. 1.




*Boiling-pans.*—A vat A for preserving fruit or peel is heated by means of a steam coil B. Circulation of the liquid is promoted by means of an inverted funnel C perforated at the base and provided at its upper portion with a deflecting-flange E. The funnel may be made of conical form.

**16,756. Prött, C. H.** Aug. 18.

*Heating air.*—In centrifugal apparatus for moistening air and spraying liquids, consisting of a number of distributing-disks with their circular edges running in water, fans are attached to the same spindle as the disks and the whole of the air and liquid is made to pass through a tubular grating containing steam or hot water. Fig. 2 shows a longitudinal and Fig. 3 a transverse section of one form of the apparatus. The disks 8 are connected to the hubs 10 on the shaft 4 by the spokes 9, and are arranged in the casing 1. At the central opening of the casing a fan 11 is provided to force the air through the apparatus. The disks are surrounded by an arch or ring of baffle-plates 13. Instead of the baffle-plates being made of sheet or bar iron, they may be made hollow, as shown in Fig. 11, and in this case the framing 24 supporting the oval baffle-pipes 23 is also made

FIG. 2.

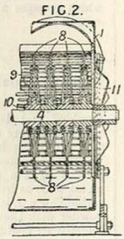



FIG. 3.

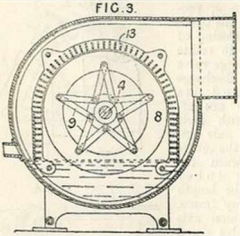



FIG. 11