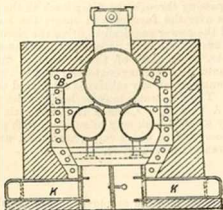
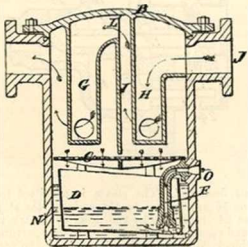


being open and the inner ends opening into an air chamber at the back of the furnace, from which the air may be drawn as required or be led by pipes K to the furnace to support combustion. The



air chamber communicates by means of a register with the combustion chamber, through which air may be drawn when the furnace is not in full combustion.

6144. Picking, G. G., and Hopkins, W.  
April 27.

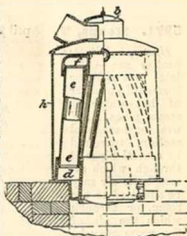


*Steam traps combined with steam separators.* The steam is directed against the walls of the separating-vessel, and against a horizontal perforated partition to remove the suspended water, which collects in the lower part and is removed at intervals. A vertical section of a separator and trap combined is shown. The steam enters at J, and is directed downwards by the internal closed-end pipe H, which is formed in one with the cover B. The moisture which adheres to the walls of the trap falls through the partition or diaphragm C, while the steam escapes through an opening L at the top of a vertical dividing-plate I

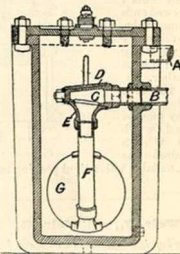
into a second pipe G, which again directs it downwards. This plate I and pipe G are also cast in one with the cover B. The steam is thus entirely freed from water and escapes through the branch opposite J. When the lower part of the trap N is nearly full the water flows over into the vessel D, which is mounted on trunnions. This vessel then sinks and uncovers the end of the outlet pipe F, so that the steam pressure forces the contents of the vessel D out at O. The vessel D then rises, and the discharge valve remains closed until water has again accumulated sufficiently to flow over into D.

6416. Whitehead, W., and Emley, A.  
May 2.

*Heating water.*—In boilers having triangular water tubes, the tubes are twisted into a helical form in such a manner that one angle of each pipe is always directed towards the axis of the fire space or flue. The Figure shows top and bottom water boxes *f, d* united by the twisted tubes *e*, the whole being surrounded by a casing *h*; *b* is the fuel feed.

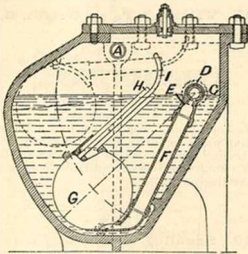


6835. Edmeston, C., and Edmeston, A.  
May 10.



*Steam traps.*—These are of a type in which a float rotates a conical casing or a plug to regulate

the discharge of water. Two sections of one are shown, taken at right-angles. The vessel or pipe to be drained communicates with the traps by a pipe A. On the end of the discharge pipe B is a

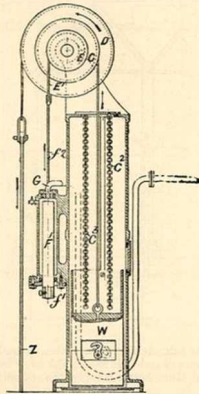


hollow cone C, on which is ground a conical casing D. On one side of the casing D is a branch E into which is screwed a pipe F, the other end of the pipe being secured to the hollow ball G. Into this ball is also screwed a pipe H of about the same diameter as F, and another smaller one I to allow air to escape from the ball when water enters. As water accumulates in the bottom of the vessel the float rises into its highest position as shown in dotted lines. The water level continues to rise until it reaches the mouth of the pipe H, whereupon the ball is filled and sinks, turning the casing D on the cone C and allowing the water to escape until the level sinks below the mouth of the pipe H. As water again accumulates the above action is repeated. In some cases a solid float and arm are used, the latter not being under these circumstances screwed into the branch E, but into some other part of the casing D. The float may be a ball of wood covered with copper or india-rubber, or of ground cork mixed with india-rubber, or of sheet copper filled with india-rubber or of other buoyant and solid material.

**6889. White, T., and Carson, W.** May 11.

*Thermostats.*—Relates to arrangements for automatically actuating the dampers of steam-boiler furnaces by the variations of steam pressure within the boilers. The three-stepped pulley D, C, E carries upon its peripheries the damper Z, counterbalance weight W, and actuating-ram F<sup>1</sup> in such a manner that a lowering of the ram will cause a corresponding movement of the damper. The upper portion of the ram cylinder is open to the steam generator by means of the pipe G. The ram is connected to the pulley cord or chain E<sup>1</sup> by side rods f<sup>2</sup> attached to a crosshead f<sup>1</sup>. The counterbalance W is formed hollow to receive weights, while its lower portion is made detachable

in order to lighten it when necessary. To compensate for the increasing steam pressure on the ram, the counterbalance, as it rises, is made to take up a corresponding amount of weight, represented

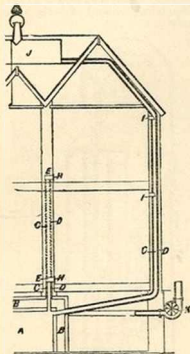


in this instance by the suspended chains C<sup>2</sup> and C<sup>3</sup>. In place of this device, the circumference of the pulley C may be formed scroll-shaped to increase the leverage on one side as it partially rotates, or, as an alternative, the ascent of the counterbalance may be checked by spring pressure.

**7113. Horne, J., and Hollyman, S.** May 16.

*Heating air* for warming, ventilating, and drying purposes. Air is heated by any suitable means in a chamber A and the hot air is led by pipes C through the building &c. in which it is to be used. The chamber A is surrounded by a second chamber B, and the pipes C by other pipes D, so that the air in B and D becomes warm by the escape of heat from A and C. Instead of air, water or steam may be used. The hot and the warm air are conducted by unions and concentric pipes to valve boxes H, in which they are mixed in the proportions required and from which they enter the room, drying-chamber, &c. Fans K, blowers, or punkabs are used for regulating the air supply. A special form of brick is described made in two halves with depressions &c. for mortar; the two halves when placed together form an inner passage for hot air and an outer concentric passage for warm air. Hot gases can be drawn off from a dome built

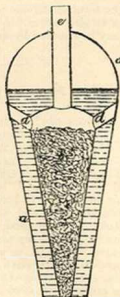
on the top of any kiln by fans &c., and used for heating the air used in this system. The hot gases



from the kiln are filtered and then passed through a pipe in a chamber in which the air is heated, this chamber being surrounded by the second one.

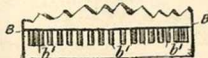
**7230. Barwick, J. E.** May 18.

*Heating water.*—The main object of the invention is to utilize the heat generated in a calcining operation such as the production of lime, but the same construction of boiler may be used with ordinary fuel, the kiln space forming the fire-box. The boiler, which, it is stated, may be used in conservatories &c., is pear shaped as shown. The passages *d, d* are provided for the introduction of the fuel and chalk, while the gases escape by way of the chimney *e*. The products of calcination or the ashes are removed from the lower aperture. To increase the heating-surface a water chamber may be constructed across the upper portion of the furnace *b*, and in addition flues may convey the combustion products down and around the



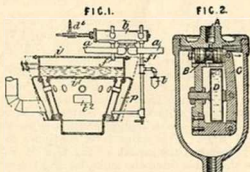
water space to a suitable chimney. Large boilers may be constructed with several fire-chambers in each.

**7421. Wright, J. F., and Wright, G. E.** May 21.



*Heating liquids.*—The bottom *B* of a boiler for heating water for baths, hot-water supply, &c., or for heating beverages &c., is perforated and fitted with a number of short stopped tubes *b'* to increase the heating-surface.

**7510. Sewall, J. H.** May 25.

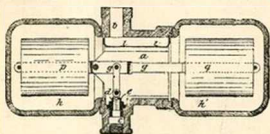


*Heating water; steam traps.*—Railway vehicles, which are heated by steam from the locomotive or other source in pipes *a* running the whole length of the train, are provided with an auxiliary boiler to be used if the vehicle happens to be disconnected from the main steam source. The boiler consists of a water tank *i* above a conical firebox *j*, surrounded by a water space and by a combustion chamber *p*, fuel being introduced through a door *f*. This boiler is fed by water of condensation from the valves *b* through drip pipes *f, f'*, in the latter of which there is provided a steam trap *t* shown in detail in Fig. 2. Below the inlet opening *A* is a valve *B* operated by a lever *C* attached to some expansible substance *D*, which, when the temperature rises sufficiently, expands and closes the inlet, but which allows the water in the boiler to escape when it tends to rise above the normal level.

**7817. Kroog, J.** May 28.

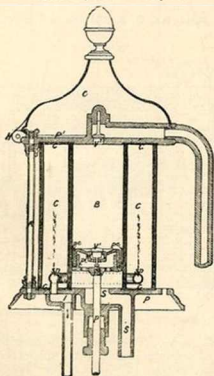
*Steam traps.*—The discharge valve for the water of condensation is connected to a lever having unequal arms, which carry weights of equal volumes but of different specific gravities. These weights are adjusted on the arms so that in air or

steam the lever is in equilibrium, but in the event of water entering the apparatus the equilibrium is destroyed and the discharge valve opened. A vertical longitudinal section of one is shown. The



water to be discharged enters the valve chamber *a* at *b* and is discharged at the branch *c*, this discharge being controlled by a valve *d* and seating *e*. The valve is linked to a pivoted lever *g* having arms the lengths of which are in inverse ratio to the specific gravities of the weights *p* and *q*, which are of equal volume, so that the lever is balanced when no water is present. The weights are contained within the caps *h*, *h'*, which are bolted on the ends of the valve chamber *a*. A perforated plate *l*, held between the caps and the ends of the central chamber, prevents dirt from reaching the valve. A slightly-modified form of the above may be used to control the escape of air from water pipes and similar purposes. In this case the arms are so proportioned that the lever is balanced when the weights are submerged, the equilibrium being destroyed and the discharge valve opened when any air is present.

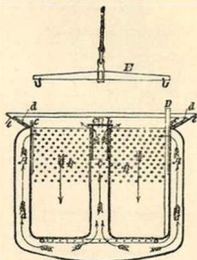
7904. Bigelow, J. A. May 31.



Heating liquids.—The barrel B of a beer engine

is surrounded by an annular space C in which are placed heating or cooling substances, or spray is injected from the perforated pipes *sp* or inlet *I*.

7911. Brierley, W., [Perzina, R.]. June 1.

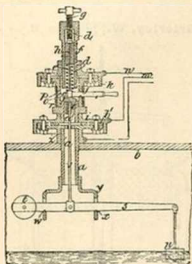


*Boiling-pans.*—Relates to a dyeing copper or vat in which the circulation of the dye liquor is automatically maintained, and thereby moving or burning of the materials under treatment is dispensed with. Upon the flange *e* of an outer vessel *A*, which may be any ordinary vat, is supported by its flange *d* an inner vessel *B*, which is perforated in the bottom and in the upper part, and contains a central tube *C*, also perforated in the upper part and provided with an adjustable cover *b*. The materials are placed in the inner vessel, and the dye liquor in the outer is heated by the steam pipe *D*, whereby it is caused to rise in the space *a* between the two vessels and in the central tubes, whence it falls upon and penetrates the materials in the inner vessel, and returns through the bottom of the latter to the outer vessel. The inner vessel is removed for emptying by the cross-bar *E*, carrying hooks which engage with the eyes *c*.

7986. Bailey, M. June 2.

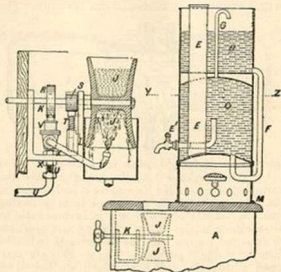
*Heating water.*—Relates to pressure, vacuum, or water-level alarms for use with any apparatus working under pressure, such as steam or other boilers. When the pressure exceeds a given limit a weighted piston or valve is raised so as to complete an electric alarm circuit, and at the same time to admit steam or other fluid under pressure to a chamber from which it escapes to give an alarm, by breaking a disc of fragile material which covers a hole in the side of the chamber. An alarm is also given in a similar way when the water level is too high or too low, by a float which raises the above-mentioned piston or valve. In place of this latter

alarm a test cock may be placed in the side of the chamber, so that by opening it the emission of water or steam determines the liquid level. A vertical section of a convenient form of the apparatus, as



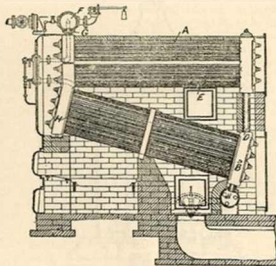
applied to a steam boiler, is shown in the Figure. An open tube *a* has screwed on its upper end a flange *z* to which is bolted a flange *i* in such a way that it is electrically insulated from it. Into this second flange *i* is screwed a length of tube *a* on the upper end of which is seated a valve *c* loaded by a spring *e* which abuts against a piston *f*, the position of which in a tube *d* can be altered by a screw *g* to determine the pressure on the valve. The tube *d* is screwed into a flange *k* bolted to, but insulated from, a flanged tube *j* screwed into the length of tube *a*. In the side of the tube *j* is an opening *q* closed by the cylinder of fragile material *r*. This is surrounded by an outer cylinder *o* in which is a hole *p* which is placed opposite *q* when it is desired that a warning of over pressure or abnormal water level be given by the escape of steam. Should the pressure become excessive the valve *c* is lifted and comes against a rod *h* to complete an electric circuit through the conductors *m*, *n*, leading to a generator and an alarm. At the same time steam is admitted to the chamber above the valve, so that the cylinder *r* over the opening *q* is destroyed and the escaping steam gives audible and visible warning. The water-level alarm apparatus is shown in the lower part of the Figure. A float *u* depends from a lever *s* which normally rests on the knife edges *w*, *x* and carries a balance weight *t*. When the water level is too high or too low the lever *s* swings about one of the fulcra *w*, *x* and by means of the rod *v* lifts the valve *c* and sounds the alarm as described above with reference to the high-pressure apparatus. A lever is provided to test the working of the apparatus, and dead weights or weighted levers may be employed to load the valve *c* in place of springs. In some cases the tube *a* descends below the working level, so that on opening a cock the emission of water or steam determines the water level. A pointer working over a scale on the tube *d* may be fitted to the piston *f* to show the load on the valve *c*.

8115. Lumb, T., Claughton, F., and Claughton, W. June 6.



*Heating water for shaving and other purposes.* Consists in apparatus for heating and supplying water and special soap. Water is supplied to a boiler C from a cistern D by a pipe F, an air escape pipe being provided as at G. Within the boiler is a tube E for keeping liquid the soap mixture, which is discharged as required by the tap E' situated between the hot-water taps.

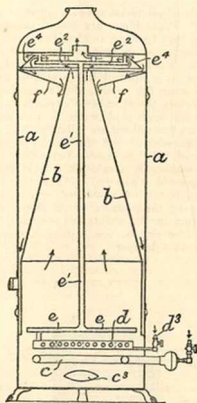
8228. Knight, C. A., [Babcock & Wilcox Co.]. June 8.



*Heating water.*—The invention is described with reference to steam boilers, but is applicable also to hot-water boilers. In boilers of the "Babcock and "Wilcox" type, the usual overhead steam and water drum is dispensed with, and its place taken by a

series of steam tubes A arranged under the furnace crown. By this means transportation of the boiler to places difficult of access is facilitated. The rear headers B communicate by connections D with those above, which in their turn are connected to headers in front by the return water tubes E. Steam is taken from a small transverse cylinder F secured to the front headers by expanded nipples G. The tubes are arranged in staggered groups of three or four. A handhole is provided opposite each group. The seat round the handhole for the cover is either pressed out in the operation of punching the handhole, or is formed of a short flanged ring. In a modification, the return water tubes E and the steam tubes A are connected in front to headers, which are united by expanded nipples to those carrying the tubes H below. When used as a hot-water boiler the horizontal tubes and the staggered arrangement are dispensed with.

8707. Darby, H. June 16.



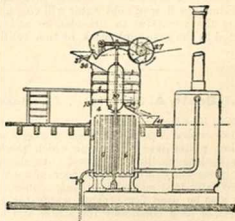
Heating water for baths, greenhouses, &c. Water passes in through the cock  $d^3$  and circulates in the pipes  $d$ , of which there may be one or more series over the gas burners  $c$ . The water then passes into the shallow circular chamber  $e$  and up the pipe  $e^1$  into a second circular chamber  $e^2$ , whence it escapes by the pipes shown leading to the conical plate  $e^3$ , over which it flows on to a second plate  $f$  and thence into the chamber between the casings  $a$  and  $b$ . The passages for hot air and water are shown by

the arrows. The gas is lighted at the burners  $e$  by an auxiliary movable burner introduced through the opening  $e^4$ .

8817. Simpson, H. J., Mackirdy, G. de M., and Taylor, A. June 18.

*Non-conducting coverings.*—Cellulose or wood pulp for paper-making and various other purposes is made from the bark and wood of the Californian "redwood" tree (*Sequoia sempervirens*). The rough outer bark is applicable for making coarse pulp for brown paper, felt for non-conducting coverings, &c., and the main bark is applicable for making other kinds of paper and for vases, bats, railway wheels, and other articles requiring a long-fibred material. Beneath the outer bark is a fine bast fibre of great length, which may be used as a textile material. In making cellulose from the main bark and wood, the outer bark and bast fibre are removed by suitable mechanical or chemical means. The remainder is steeped in hot water and then treated with a caustic alkali. The liquor is removed, and the material treated with dilute sulphuric or hydrochloric acid, after which it may be treated by the ordinary methods. The outer bark, the bast fibre, or the whole bark may be treated wholly or partially by this process. For making felt, the acid treatment is dispensed with, and the material is again treated with alkali to which is added sulphate of alumina &c. After this it may be passed through a mashing-machine, and it may also be mixed with hair or other fibres.

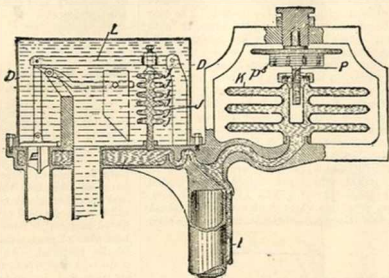
8875. Sharpe, A. H. B. June 22.



Heating air for drying tea &c. Steam from a boiler passes into a dome 3 inside the drying-chamber 4 and containing tubes 6 through which the air passes. The tubes may be arranged in a furnace.

8986. Davenport, W. W. June 24.

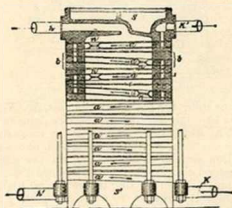
*Thermostats* for regulating the temperature of fermenting liquids or greenhouses, or for operating furnace dampers, ventilators, &c. The apparatus as applied to fermenting liquids consists of a thermometer bulb immersed in the fermenting liquid, which bulb may consist of a tube of brass having within it a smaller tube or rod so as to leave an annular space between them. This bulb is connected by a smaller tube I to an expansion chamber J, which is preferably in the form



of a series of disc expansion boxes *j*, each consisting of two thin sheet-metal concave discs connected together at their outer edges so as to form a box between them. These boxes are placed side by side, preferably in the water tank D, and connected together centrally, thus forming an elastic chamber, which will be lengthened by an increase of internal pressure and will shorten when that pressure is decreased. That end of the expansion chamber which is connected to the tube I is fixed in position, while the other or closed end is free to expand and is connected either directly or by a multiplying-lever L or levers, or by other means, to the tap or valve E by which the flow of cold water for cooling the fermenting liquid is regulated, so that, if the temperature of the fermenting liquid rises, the chamber J expands and forces up the lever L, thereby opening the valve E further and allowing more cold water to pass until the temperature is reduced to the required extent. The bulb tube and chambers are filled with alcohol or some other expansive fluid. In order that the expansion of the chamber J and the normal temperature of the fermenting liquid may be altered and set as may be required, there is provided at any convenient part and in connection with the expansion chamber J a second chamber K similar to J but larger, and provided with a screw P or other means by which it can be compressed or allowed to expand, so that the point where the flow of cold water remains constant or ceases can be varied as desired. In connection with the screw P is a scale *p* divided into degrees, and showing by the position of the finger at what temperature the flow of cold water will commence and that temperature be maintained constant. When applying the apparatus to greenhouses and other places, the free end of the expansion chamber is connected to the gas-supply cock, or to a ventilator, or to the furnace damper.

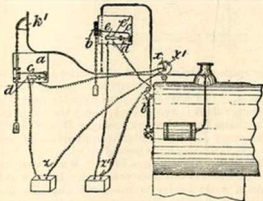
9199. Boulton, A. J., [Fischer, J.]. June 28.

*Heating liquids or gases.*—The liquid or gas to be heated or cooled is passed through or over a series of hollow plates over or through which the heating or cooling medium is passed. An elevation, partly in section, of a convenient form of apparatus for feedwater heating and purifying is shown, but it may also be used for heating water for other purposes, or as a condenser for steam and other vapours. A number of superposed hollow plates *a*, *a'* are bolted to top and bottom pieces S and S' respectively, to which are attached a steam pipe K, a feedwater supply pipe *h*, an exhaust steam pipe K', and a water delivery pipe *h'*. The feedwater flows over each plate and through an opening *n* on to the one below, finally leaving by the pipe *h'* at the bottom. The steam flows upward as shown by the arrows, flowing from one plate to another through passages in the frames *d*, *b*. If desired, short



thimbles are fitted to the openings *n, n* to maintain a sheet of water on each plate. In place of exhaust or live steam, hot air or furnace gases may be used to heat the feedwater. Various modifications of the form shown are described in the Specification, in some of which tubes or corrugated plates are employed in place of the flat plates shown.

9645. **Martenot, F.** July 8.

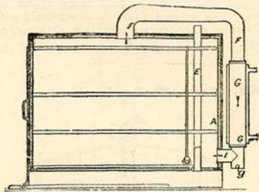


*Heating water.*—Relates to safety arrangements for supplying boilers with feedwater and for relieving excessive pressure. When the water has fallen to a predetermined level, a float in the gauge-glass completes an electromagnetic circuit to release a weighted wheel on the stop-cock of the feed pipe; and the finger of the pressure gauge, when the pressure reaches the limit of safety, comes against a stop by which a second circuit is made and a weight allowed to drop and open a relief valve. A steam boiler fitted with the apparatus is shown in the Figure. In the gauge glass is a float *t* carrying a light rod with two depending prongs at the top which, at a certain water level, dip into annular mercury cups connected up to the poles of a battery *z'* through an electromagnet *e, e'*. When a current passes, the lever *d* is moved to release another *c* which holds the weighted wheel *b*, keyed on the feed-cock spindle. The wheel makes a quarter revolution and opens the cock so that feedwater flows to the boiler from the reservoir. When the required amount has been supplied the cock is shut by hand, and the apparatus replaced ready for action. The pointer *x* of the pressure gauge is connected up to one pole of the battery *z*, and an adjustable stop *x'*, through a magnet forming part of the apparatus *a*, to the other. When contact is made a similar action takes place to that described above, and a weighted rod, secured to the lever of a relief valve *k'*, is allowed to drop.

9762. **Dinsmore, J. H. R.** July 12.

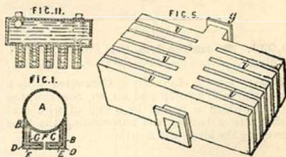
*Heating air for drying &c.* An automatic circulation of the air in drying-closets, Turkish baths,

chambers for drying timber, &c. is produced by admitting the hot air from the top of the chamber A by a tube F to a cooling-device G in which part of the moisture is condensed and from which the



partially cooled and dried air is returned to the bottom of the chamber A by the passage I. The air used is heated by contact with surfaces heated by gas at the lower portion of the chamber, *e.g.* by contact with the heated bottom of the chamber. In some cases fresh air may be admitted through a chamber surrounding the gas burner or other heating-device. The condensed moisture is drawn off from the chamber by a valve &c. *g*.

9896. **Wadsworth, J.** July 14.



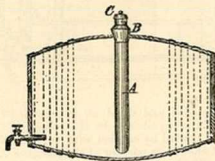
*Heating liquids or gases; heating buildings.*—Relates to arrangements for increasing the heating-surface of boilers or other heating-apparatus. In the case of boilers for kitchen ranges or baths &c., as shown in Fig. 11, hallow depending

arms with internal partitions for promoting circulation are provided. Fig. 1 shows another form of boiler, in which depending water legs enclose the furnace. Fig. 5 is a perspective view of another



form, suitable for heating liquids, in which the feed enters at *g* and traverses the hollow partitioned chambers *i*. The apparatus may be employed for heating air. Fig. 6 shows a radiator for heating buildings by steam or hot water, the course of the circulating-fluid being shown by arrows. This apparatus may be constructed with double arms extending on each side of a central passage.

10,002. Hogg, W. S. July 16.



*Heating liquids.*—Relates to means for heating or cooling liquids in casks &c. A tube A, filled with a cooling or warming substance, is passed into the liquid through the bung hole. The tube, which is closed at one end, is fitted at the other end with a cap C, and has an enlargement B to fit the bung hole. Instead of being passed through the bung hole, it may be inserted through a hole in the end of the vessel.

10,032. Bromhead, S. S., [Parsons, H. W.].  
July 18. Drawings to Specification.

*Heating air* by electricity. Connected with a dental engine is a pump and an air reservoir, the air from which is heated by a coil of wire connected with a battery and surrounding the tube conveying the air to the mouth.

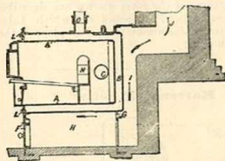
10,035. Thompson, H. July 18. Drawings to Specification.

*Heating air.*—Air for drying tea in a specially-constructed drying-chamber is heated by passing down an annular casing surrounding the chimney of an air-heating furnace, a spiral division plate causing the air to take a spiral course round the chimney.

10,061. Warner, R., and Goslin, S. B.  
July 18.

*Heating water; heating air.*—Relates to water and air heating apparatus for baths, laundries,

lavatories, glasshouses, &c. The boiler B is oval or circular with one or more cross circulating-tubes in the main furnace flue A which has a terminal

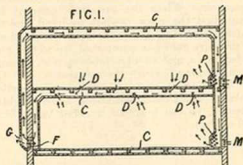


water space at the inner end. The outer shell is provided with angle-iron seatings to form the walls of the flues. The hot gases pass over the firebridge N through flues C at the back, along the sides, and down at the front through passages H and I into the chimney J. The boiler is supported by cast-iron standards G, and is provided with mud doors L and with soot &c. doors F, L. Water entrance and exit tubes O are also provided. In a modification, a water bridge is used, and the side flues are dispensed with. For heating air the boiler is contained in an outer casing or chamber, and the side flues are formed as passages through the lower parts of saddle gill plates. Suitable passages for ingress and egress are provided in the chamber for the air to be heated.

10,101. La Sauce, E. de, Kloss, H., and Cohn, L., [trading as E. de la Sauce & Kloss]. July 19. Drawings to Specification.

*Heating buildings.*—Relates to the use of special interlocking U-shaped metal plates for use in building. The hollow walls thus formed are stated to be used for heating the building.

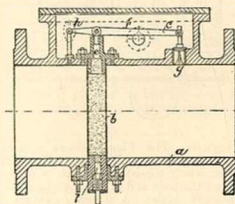
10,286. Wing, L. J., and Young, J.  
July 23.



*Heating buildings; heating apparatus.*—Air is drawn through the rooms of a building by a fan or other exhaust apparatus F, entering at M, and

passing through apertures D in the floors and ceiling and along flues C to the outlet G, the total area of the apertures D being equal to the area of the exhaust apparatus. At P are heaters, coolers, purifiers, &c. over which the air passes before entering the rooms. If the apertures G and M are left open the air passes but once through the rooms, but if these apertures are partially or wholly closed, the air will circulate continuously, as indicated by the arrows. In another arrangement, the apparatus consists of a chamber for heating, cooling, or drying articles. The chamber is divided by a vertical partition into two portions communicating at the ends and centre by sliding doors; the chamber is also provided at the sides with sliding doors, which are fitted with sliding glass panels for inspection purposes. At the end of one division is a heater &c., and at the corresponding end of the other division is a fan &c. for exhausting or circulating air through the apparatus. Diffusers are suspended from the roof of the chamber to direct the air current on to the goods, and each division contains a V-shaped expandible screen for diffusing the air, consisting of a number of vertical slots with intervening spaces, which have a total area equal to that of the exhaust apparatus.

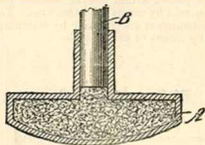
10,350. **Gehre, M.** July 25.



*Thermostats.*—Relates to means for automatically regulating the temperature of superheated steam by the introduction of a cooling-liquid. In the arrangement shown, a vessel *b*, containing an expandible fluid, is placed in the conduit *a* through which the superheated steam passes. On an expansion of the fluid contained by the vessel *b*, owing to an abnormal temperature of the superheated steam, the plug valve *e* is raised. This movement is transmitted to the valve *g* by the lever *f*, by which means the cooling-liquid is admitted to the conduit *a*. If the superheated steam is raised from water, the chamber *c* is preferably connected to the boiler and provided with a non-return valve. A plug *l* at the bottom of the tube *b* permits adjustment of the temperature at which the liquid is to be admitted to the steam. A small steam pump may be used for pumping

water into the conduit, until the pressure or temperature is sufficiently reduced. In this case the steam valve of the pump is operated by the movement of the lever *f*.

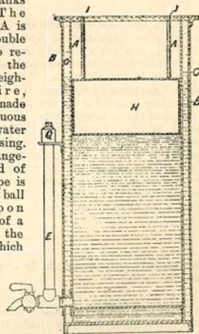
10,402. **Boult, A. J.,** [Shaffer, W. C.] July 26.



*Thermostats.*—Some easily-fusible solid is confined in the case A in which the piston B fits; on heating, the piston rises and may be made to open a ventilator &c.

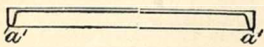
10,512. **Stewart, J., and Charlton, T.** July 28.

*Thermostats for keeping oil tanks &c. cool.* The storage tank A is made with a double casing B. To reduce risk in the event of a neighbouring fire, provision is made for a continuous circulation of water through the casing. In one arrangement, the end of the service pipe is closed by a ball valve fixed upon the upper end of a spiral spring, the lower end of which



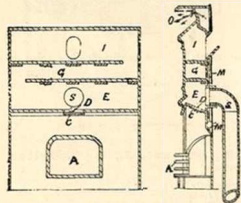
is fixed to the bottom of the casing. As the temperature of the water jacket rises, the elasticity of the spring is decreased until the water pressure in the service pipe is enabled to overcome it and open the valve. In another arrangement, the valve is opened by the expansion of a liquid in a cylinder with a corrugated end.

10,557. McLaren, W. July 29.



*Footwarmers.*—The ends are formed with a U-shaped flange, or channelled piece *a'* round the edges. The extremity of the body of the footwarmer is placed within the channelled part, and secured therein by rivets or otherwise. The ends of the footwarmers are formed by stamping or by pressure by means of suitable dies.

10,620. Pickup, T. Aug. 2.



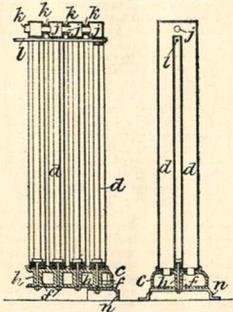
*Heating buildings.*—Relates more particularly to the invention described in Specification No. 518, A.D. 1885, in which a "stove" or receiver is heated by the waste products of combustion from a range or fireplace in another room. The receiver E, G, I, which is supplied by the pipe S, is provided with an auxiliary heater for use when the distant range or fireplace is not in operation. This consists of a grate A, or a set of gas burners, situated below the receiving-chamber. The bottom of the latter has an aperture D which may be opened or closed by a door C. At the back of the receiver is a space M for heating air, which communicates with the room through openings O above, and either with the room or the external air by side openings.

10,628. Mackenzie, A. D., and Moncur, G. G. Aug. 2.

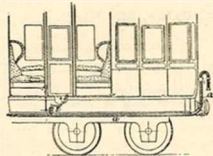
*Heating buildings.*—The return tubes *d* of a radiator are fixed to the hollow base *c* by a bolt *f* passing through a sleeve *h* inside the box. This prevents the contact of steam or water with the bolt. The joint is made with leather, asbestos, &c. The top of the tubes *d* are connected by a spigot joint *j, k*. The tubes are braced together at the top by a long bolt *l* which passes between the legs of *d*. The feet *n* may also be secured by the bolts *f*.

(For Drawing see next column.)

10,628.



10,943. Cornes, H. Aug. 10.

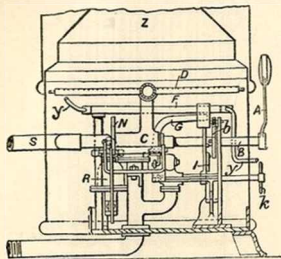


*Footwarmers.*—The Figure shows a sectional elevation of a railway carriage with heating-apparatus, which consists of a pipe *a* extending throughout the train and conveying steam or hot water from the boiler. A branch *e* extends from this pipe into each compartment and terminates in a casing *f*, the top of which is flush with the floor and is flat to act as a footwarmer. Suitable regulating, blow-off, and drip cocks are provided. In the case of a tramcar &c. a special boiler or stove is fitted on the conductor's platform and the heating-pipe extends round the roof of the car and then down to and around the floor, the part on the floor being made with a flat upper surface to act as a footwarmer if desired.

10,949. Brey, G., and Willame, E. Aug. 10.

*Heating water for baths &c.* In gas-heated apparatus the gas and water are turned on or off simultaneously by operating a single tap or key. To start the apparatus, the tap *k* is turned and the

pilot jet G is lighted. The latter is situated immediately beneath a metal plate F which, expanding, operates a catch which holds the disc *b* carried by the shaft B. This shaft, being liberated,

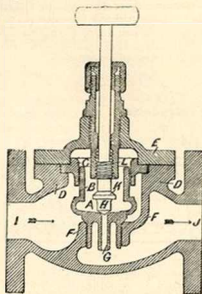


is operated by the weighted arm A, turning on at C the gas supply to the main burner D, and, by means of a cam N and a series of levers, the water supply at R, and also rotating the pilot burner G into a position suitable for lighting the main burner D. To stop the apparatus, the weighted arm A is raised, when a weighted arm upon the shaft of the tap *k* is caused to fall through the action of a catch or pawl upon the disc *b* and a pivoted catch I. The water arrives by the pipe S and enters the geyser through a rose mouthpiece, and flowing over a conical surface Z passes to the bath &c. A branch *y* from the water pipe may pass through the bar F in order to keep it cool when the apparatus is in full operation.

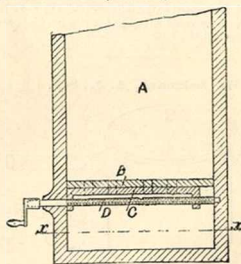
**10,978. Bennett, S., and Brooke, R. G.**  
Aug. 11.

*Steam traps.*—Relates to stop valves which may be modified to serve as steam traps. A is a valve attached to a cylinder B which slides loosely in a ring C held between the casing D and cover E. The valve A has its seating on the diaphragm F and is bored with a central opening G, which may be closed by a screw-down valve H. The cylinder B being loose in the ring C, fluid enters it from the inlet I, but cannot pass to the outlet J while the valve H is seated. On raising the valve H the passage G is opened, and the pressure within the cylinder being thus reduced, the valve A is raised by the fluid in the inlet, to which a passage is afforded through the diaphragm F. The ring C acts as a stop to limit the upward movement of the valve A. The valve H has a second seating K which bears against the lower end of the gland L when the valve H is raised, thus cutting off pressure from the interior of the gland. The spindle of the valve H may be actuated by an inverted bell float, and the apparatus thus fitted and placed

within an appropriate casing may be used as a steam trap.



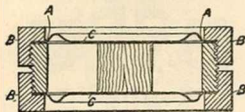
**11,201. Tennent, J.** Aug. 16.



*Heating liquids or gases.*—The fluid to be heated is contained in the upper part of a vessel at the lower part of which are one or more fluids of greater density, arranged in the order of their specific gravities, the denser fluid being at the bottom. The vessel is heated from below by means of a lamp &c., the heat being transmitted through the fluids of greater to that of less specific gravity. The process when air and water are the fluids used is particularly described. A is a vessel containing air and water; B is a perforated diaphragm at the surface of the water, to which is fitted a perforated slide C operated by a screw D, allowing communication between the water and air to be made and broken at pleasure. When the air has attained the required temperature, communication with the water may be broken before releasing it from the superincumbent air pressure, in

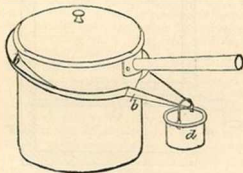
order to prevent the sudden conversion of the water into steam. The air may be taken directly from the chamber A or through an intermediate air chamber. It is utilized for motive power or other purposes. When more than two fluids are treated conjointly, the number of divisional diaphragms is increased accordingly.

11,632. Bradshaw, A. Aug. 27.



*Steam traps.*—Relates to expansion vessels such as are described in Specification No. 2097, A.D. 1873. All soldered and brazed joints are dispensed with, the vessel being formed of a pair of diaphragms held on the ends of a screwed ring by nuts. In the Figure, which shows a section, the ring A is screwed externally to take the nuts B, B, which are provided with lips to press the diaphragms C, C against the ring.

11,847. Lehmann, A. J. Sept. 1.

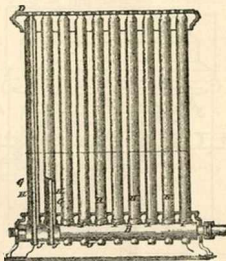


*Boiling-pans.*—Consists in applying a channel or gutter *b* a little beneath the top of a saucepan, boiling-pan, or like vessel, and preferably in an inclined direction, which serves to catch any liquid boiling over, and from which such liquid may be collected in any suitable receptacle such as *d*.

12,038. Doran, J. S., [Reilly, J.]. Sept. 6.

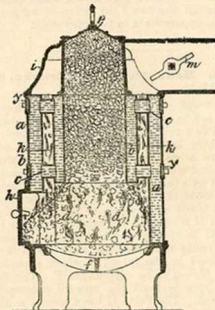
*Heating buildings; heating air.*—Relates to a steam or hot-water heated radiator the various pipes of which are made of thin copper and are connected together by brazing. The pipes are made double; the inner one G is open at both ends so that air can rise through it, and the steam

or hot water circulates in the annular space between the tubes G, H. The outer tube H is brazed to a flange I on the top of the base tube B, and the inner tube G to a flange J on the lower



side of B. The flanges are flared for convenience in brazing, and the flaring part is afterwards cut off to make a neat joint. The outer tube H is contracted on to and brazed to the inner G at the top and held by a cross-piece D. The Provisional Specification also describes tubes extending upwards in the annular space between G and H for extracting the air therefrom.

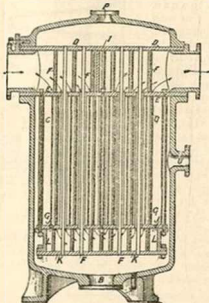
12,117. Lee, J. Sept. 7.



*Heating water for greenhouses &c.* Two hollow cylindrical water vessels *a, b* are connected by screwed tubes *c* which are inserted through holes closed by screw plugs *y*. The inner vessel *b* is

shorter than the outer *a*, to make room for the fireplace *d*, and the space between them serves as a flue *k*, leading under the cover *i* to the chimney, in which is a damper *m*. Fuel is fed through the inner vessel *b*, which is covered by a lid *p*. The fireplace *d* is provided with firebars *f* and a door *h*. One or more flow and return pipes are used, and, in order to increase the circulation, a return pipe or a branch therefrom is led through the outer to the inner vessel.

12,180. Seagrave, G. Sept. 8.



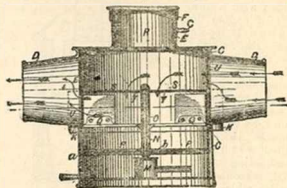
*Heating gases.*—Relates to heating or cooling air, gas, or other fluids, and improvements on the inventions described in Specifications No. 4685, A.D. 1879, and No. 773, A.D. 1881. The tubes *F, G* are supported from two partition plates *D, E*, which form an air chamber. They are connected at their lower ends to two hanging plates *K, J*, which, together with the ring *L*, form a second air chamber. The upper chamber is divided by the partition *I* to cause circulation of air &c. Steam or other heating-medium passes into and out of the casing by the connections *P, B, U*, and circulates outside the outer pipe *G* and through the pipes *F*. The air spaces may be provided with an archimedein screw &c. for increasing the length of travel of the air.

12,474. Herdman, G. A. Sept. 14.

*Non-conducting coverings.*—Consists in a non-conducting fabric composed of hair and vegetable fibre for covering boilers, pipes, &c. A length of backing is woven from hemp, jute, cotton, or other fibre, and a quantity of hair is then laid thereon and fixed in position by the warp thread. Or the hair may be stitched to a backing or foundation of vegetable fibre. Strips for nailing over pipes

&c. may be formed of any desired length and breadth, and having a border or flange on each side which is not covered with hair.

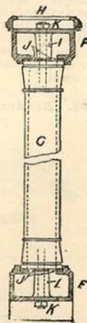
12,488. McConnell, J. Sept. 14.



*Heating air for ventilation or heating buildings &c.* The apparatus consists of a suitable fan *Q* mounted upon a sleeve *O*, and driven by means of water, steam, compressed air, &c. When the fan is rotated, the air is drawn through the branch *D* connected with the upper side opening *U* downwards through the diaphragm *D* and driven through the branch connected with the lower opening *U*. The current may be reversed by turning the casing *E* through two right-angles. *K* is a jacket which may be supplied with heating-agents.

12,619. Jeffreys, J. Sept. 17.

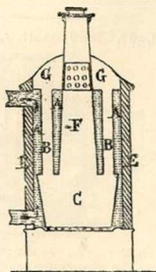
*Heating buildings.*—Relates to radiators for heating by steam or hot water. The radiator consists of top and bottom boxes *F*, connected by one or more series of pipes *G* in pairs, the members of each pair being joined together at the ends. The joints are made water tight by sheets of india-rubber *J*, which also fit tightly against the ends of hollow pillars *I*, which project from the inner side of the box and through which pass bolts secured by nuts *K* on the outside, the india-rubber packing having a central aperture for the passage of the bolt and irregular side apertures for the passage of water to the pipes. The whole is covered with an ornamental grating *H*. To allow the pairs of pipes to expand unequally in steam radiators, each is provided with a cast-iron cap covered with an ornamental grating.



**12,701. Redfern, G. F., [Brasseur, V.]**

Sept. 19.

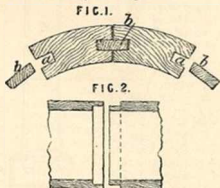
*Heating water for heating green-houses &c.* The boiler A is provided with a number of copper flue tubes B leading from the firebox C to the smoke-box G, which has a removable cover. Fuel is supplied by the conical fuel-holder F. A double jacket E, filled with non-conducting material, surrounds the boiler, which is also provided with fire-door, asphit, flow pipes, &c. A conical perforated tube moving over another similar one in the smoke-box G, forming a continuation of the fuel-holder F, controls the draught.



**12,878. Marshall, A. D.** Sept. 22. *Drawings to Specification.*

*Steam traps.*—The water from the vessel to be drained flows into a receiver, which is supported on springs so that, when full, it sinks and opens the discharge valve, which may be of the equilibrium type, either inside or outside the vessel, or may be a valve or cock so connected to the receiver that it is opened and closed by its downward and upward movements respectively. The inlet and outlet pipes are spiral, or are otherwise arranged to give sufficient elasticity to allow free movement to the vessel.

**12,994. Brader, C.** Sept. 26.



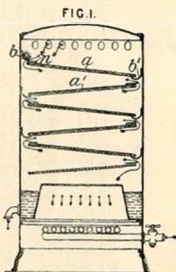
*Non-conducting coverings.*—Relates to improvements in the invention described in Specification No. 5292, A.D. 1886, which consists in covering pipes, boilers, &c. with dried peat. The ends and sides of the pieces of peat, as previously applied, were made plain to form butt joints which opened slightly as the peat dried. To prevent radiation,

grooves *a* are formed in the edges of the pieces of peat and strips *b* are fitted therein, or a tongue may be formed along one edge and a groove along the other; or the pieces may be fitted together by rabbeting the edges. The ends are jointed as shown in Fig. 2, or by means of tongues and grooves.

**13,017. Newton, P. A., [Theisen & Langen].**

Sept. 26.

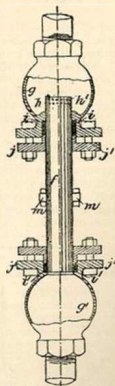
*Heating liquids or gases.*—Liquid flows down over perforated plates or wire gauze, which may or may not be corrugated, and is acted on by or acts on a current of air travelling in the opposite direction. One form is shown in the Figure; liquid drops from a supply tube *b* on to a plate *m*, and then flows over the perforated sheet in a thin stream to the trough *b'*, which sends it on to the next sheet *a'*, and so on. The liquid flows in a thin sheet, so that it does not drip through, but yet exposes both sides to the gas. In another form the sheet *a* is arranged spirally.



**13,105. Butterworth, J.** Sept.

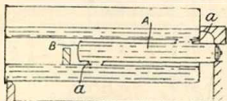
28.

*Steam traps.*—Relates to a tubular valve, applicable, according to the Provisional Specification, to steam traps, for discharging condensed steam from pipes. The chambers *g*, *g'* are attached to the inlet and outlet pipes respectively, and are united together by suitable bolts or other means. A tube *f*, the upper end *h* of which is closed and provided with lateral perforations *h'*, slides in stuffing-boxes attached to the chambers *g*, *g'*, provided with glands *j*, *j'* which compress packing *i*, *i'*. On moving the tube downwards by a



forked lever *m* or other means, the perforations *h* are covered by the packing *i* and the flow through interrupted.

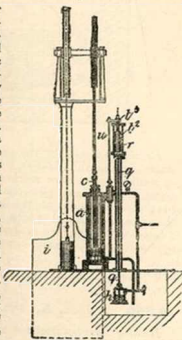
**13,257. York, T. A., and Edwards, J. C.**  
 Sept. 30.



*Heating water.*—Auxiliary water-heating chambers are fitted to the internal flues and fireboxes of boilers of various types. The Figure shows an arrangement as applied to a boiler of the "Cornish" or "Lancashire" type for heating water for baths and laundries. The auxiliary "water tube" or chamber A is concentrically secured within the internal flue B, and suitably connected to the water space of the boiler by convenient tubes *a*. The chamber may be traversed by one or more longitudinal smoke-tubes, and formed with its outer extremity in a line with the end of the boiler. When the chamber is of small dimensions it may be extended and brought round to open direct into the boiler water space. The Specification also illustrates the chamber as applied to boilers of the vertical and locomotive type.

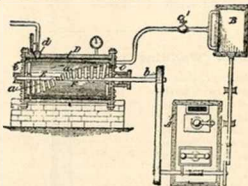
**13,289. Parsons, D., Parsons, D. J.,  
 Parsons, J. H., and Parsons, S. J.,**  
 [trading as D. Parsons & Sons]. Oct. 1.

*Thermostats for steam boiler furnaces.* Arrangements are provided for the automatic actuation of furnace dampers by variations of the steam pressure within the boilers. For this purpose a single or double acting cylinder *a* is employed to which steam is supplied by means of a balanced valve, preferably of the piston type. The valve is operated by means of the rise and fall of a mercurial column *g*, correspondingly moving a float *f* which by suitable connections *t', u*



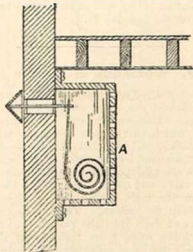
moves the steam-distributing valve in a similar manner. The mercury is operated by the pressure of boiler steam acting upon its surface within the trough *h*. The piston-rod *c* is connected to the damper *i* by any suitable arrangement. Several dampers corresponding to a battery of boilers may be actuated by one apparatus, while in the place of steam from the boilers the compressed air supplied to the furnaces may be utilized. A mercury overflow pipe from the float cylinder *r* is also provided. In addition, spring cushions of convenient form and material are fitted to the steam cylinder.

**13,734. Kilbourn, K. R.** Oct. 11.



*Heating air.*—Air under pressure is heated by rapidly-moving frictional appliances. Air is compressed in the compressor B by a suitable motor A, and driven through suitable valves *c', e* into the heating-cylinder D, which contains a smaller opened cylinder E, and a shaft F with spirally-arranged beaters *a* also driven by the motor A. When the air is sufficiently heated the expansion of a rod *e* opens a valve *d* and allows the air to pass to a reservoir or elsewhere.

**14,023. Willway, A. B., and Moon, E.**  
 Oct. 15.



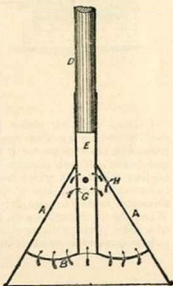
*Thermostats for ventilation, controlling flow of*



liquids, regulating gas supply to heaters, &c. Consists in arranging within a suitable box or casing two coiled strips formed of metals having different co-efficients of expansion. The strips may be brazed together, so as to form a single compound strip, or be connected independently to an outlet valve of the box, or be joined at the ends and bent into an S-shape; the outlet valve of the box may have an adjustable seating. The Figure shows the invention applied to operate a ventilator, the box A being perforated. The invention may be used for regulating the flow of gases or liquids according to the temperature thereof, and for regulating the gas supply to water-heating and like apparatus. In the latter case steam from the water-heater enters the box by a pipe passing through the centre of the coil.

14,060. Waddington, J. Oct. 17.

*Boiling-pans.*—Relates to a washing-dolly applicable as a water circulator for set-pans or boilers. The dolly is conical and is made of metal, wood, or other material, in which is fixed a perforated plate B of the form shown, or plane, convex, or concave, and a tube E, the upper end of which receives the handle D. The tube E is perforated at G and the cone itself at H, whereby suction effect due to a vacuum is avoided.

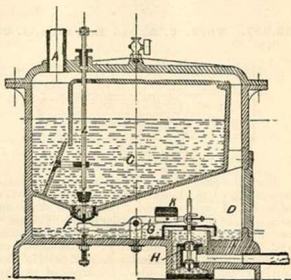


The dolly may be used as a water circulator when placed in the boiler, and in this case a tube may be fitted over the opening H.

14,197. Woffindin, H. Oct. 19.

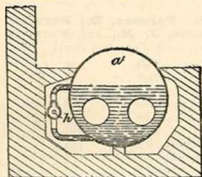
*Steam traps.*—The water to be discharged collects in a pocket in the outer casing, at the bottom of which is a valve on the end of a lever the other end of which carries the discharge valve in the outer casing, and which is held closed by steam pressure assisted by a weight until the column of water in the said pocket is sufficient to open the pocket valve and at the same time the discharge valve in the main casing. The Figure shows a steam trap in section. The water enters by a pipe A and falls into the pocket C at the bottom of which is a valve F on the end of the lever G. This lever carries at its other end a valve H, which in this case is an equilibrium valve. A weight K

keeps the valves closed until a sufficient quantity of water has collected in the pocket. In place of having the valve F movable, the receiver C



may be supported on one end of the lever G, the valve being fixed. A spindle L to open the valve by hand is provided.

14,359. Knap, C. C. S. Oct. 22.

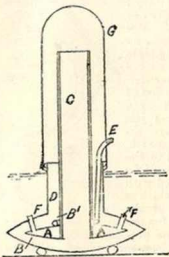


*Heating water.*—For the purpose of promoting water circulation in boilers, a fan, pump, injector, or similar contrivance mechanically displaces the water in an external pipe connected at both ends to the water space of the boiler. The Figure shows a centrifugal pump h applied to the "Lancashire" boiler a, but the invention is applicable to other water-circulating boilers.

14,360. Sweet, A. Oct. 22.

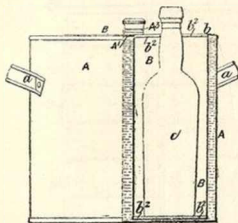
*Heating liquids.*—Relates to portable apparatus for heating water in a bath, or for heating

liquids in general. The heater is placed in the water &c. to be heated. Gas is supplied to the burner B' by the pipe E. Air is supplied by



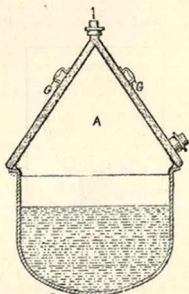
the outer tube D, and the inner tube C forms the flue and also acts as a sinking weight. A chamber A is connected with the exterior by flow and return pipes F. G is the handle.

14,592. **Ritchie, W. C.** Oct. 26.



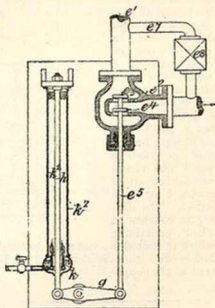
*Heating liquids.*—Bottles of wine or liqueurs are placed in water-tight chambers B, of which one or more are arranged in an outer vessel A for hot water. The vessel A is supplied by means of a funnel to be screwed on the neck A'. On the bottom and at the top of the chamber B is a disc of felt &c. B'. The outer vessel A may be of circular, rectangular, or other form, and is provided with handles a for carrying it.

14,877. **Gray, O. P., and Gray, W.**  
Nov. 1.



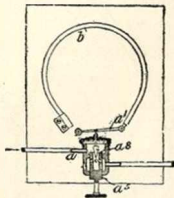
*Boiling-pans.*—The steam arising from coppers, vats, and the like is condensed upon the inner surface of a conical or dome-shaped hollow cover A through which water circulates. The cover may be provided with handles G or, if very heavy, with pulleys over which pass cords passing over other pulleys attached to the ceiling. The circulating water may be used as boiler feed.

14,943. **Grouvelle, P. J.** Nov. 2.



*Thermostats.*—A valve which controls the supply of steam or other heating-medium is operated by the expansion of a rod heated by a burner, the

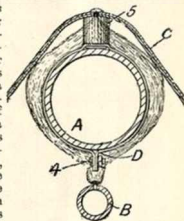
supply of gas &c. to which is controlled by a thermostat. The gas supply to the burner *k* is regulated by the expansion and contraction of the "Bourdon" tube *b* acting through a lever *a'* on a



valve *a'* with an adjustable seating *a''*. The burner *k* is placed at the bottom of the tube *k* surrounding the rod *h*, which, by its expansion, operates the valve *e*, *e'*, through the lever *g* and rod *e'*. A bye-pass *e'* and reducing-valve *e''* admit a small quantity of steam &c. to the room when the steam valve is closed.

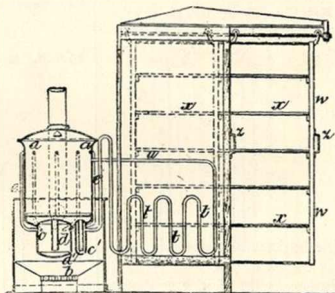
15,138. Allison, H. J., [Brown, W. M., and Whitmore, S. W.]. Nov. 7.

*Heating buildings &c.; heating water; heating air.*—Systems of hot-water, steam, or other heating-pipes are heated over a coiled or otherwise-arranged portion of their length by a series of gas jets B which are arranged beneath, and parallel to, the pipes, each pipe being covered with a hood C, which is perforated at the upper part for the escape of the products of combustion, and which may be made of sheet metal lined with asbestos &c., or of other suitable material. The hood is secured to the pipe by means of clamps D formed of loops which are attached at the top to sockets 5 and secured below by screw bolts 4.



15,156. Gamage, J. Nov. 7.

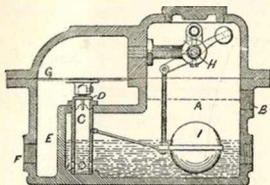
*Boiling-pans* for use in combined washing, wringing, and drying apparatus for clothes and other fabrics. The washing portion consists of apparatus for circulating boiling liquids through the materials, viz., a copper *a* with one or more closed chambers *c* below, which are supplied from the copper by descending tubes *d*, *d*, and are provided with exit tubes *e* which discharge steam and heated water upon the goods in the copper. The chambers *c* are heated either by a furnace *b* or by a steam jacket. The drying-apparatus consists of a chamber, containing horses, which is heated by steam or hot water circulating through the coil *t* from a chamber *c* fixed below the copper *a* and supplied from the latter by descending tubes *d'*. The discharge pipe from the coil returns to the copper.



15,345. Fyfe, P. Nov. 10.

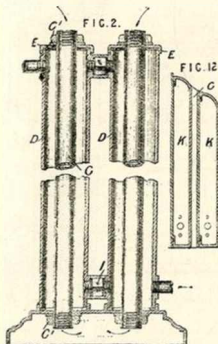
*Steam traps.* The steam and water from the vessel to be drained enter the compartment A through the opening B, and are discharged through the tube C, which can be closed by a valve D, into

the compartment E, from which they escape through an opening F. The valve D is secured to a diaphragm G to the upper side of which steam is admitted and exhausted by a cock H operated



by a float I. When in the position shown, the cock puts the space above the diaphragm in communication with the chamber A, so that the valve is held closed by steam pressure, but when the water in B has risen to the level shown by the dotted line, the cock is turned to cut off and exhaust the steam, so that the valve is lifted and the water blown into E, from which it escapes into the waste pipe.

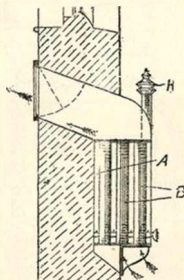
**15,476. Lofts, E. Nov. 12.**



*Heating air; heating buildings &c.*—Air for ventilation, as it is introduced into the building &c., is heated. One form of the apparatus is shown in Fig. 2, and the application to a skirting board or dado is shown in Fig. 12. Air is admitted from a suitable source through the inner tubes C into the building. These

tubes are surrounded by outer tubes D, and the space between the tubes is supplied with hot water or steam, or is heated by a lamp, gas, &c. The joints between the outer tubes are made by screw nipple-pieces I, with right and left hand threads on their opposite ends. The inner tubes are screwed at their ends and nuts *c'* thereon draw the caps E tight. When applied to skirtings or dados, steam &c. is supplied to the two outer casings K, and air is admitted by the inner division C.

**15,509. Oakley, R. Nov. 12.**



*Heating air for heating buildings.* The incoming air passes through the tubes B, which are contained in a casing A placed outside the building and heated by gas. The products of combustion are led away by a flue to a cowl H.

**15,794. Southon, C. J. Nov. 17.**

*Hot-water bottles; warming-pans.*—Warming bottles or pans are made convex on one side and concave on the other, and bent in such a way as to fit any part of the body. They may be made of tin or other metal, china, or earthenware, in two or more pieces, and are provided with handles and an aperture for filling.

**15,821. Craven, F., Craven, A., Pinder, W., and Stansfield, P. H. Nov. 18.**  
*Drawings to Specification.*

*Heating air; heating by steam circulation.*—Relates to means for obtaining a current of heated air and steam for heating buildings, spinning-machines, drying-apparatus, &c. Air is forced by an injector through a range of pipes, placed in a heating-chamber, which is preferably in the bottom

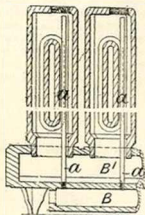
1887]

ABRIDGMENT CLASS HEATING.

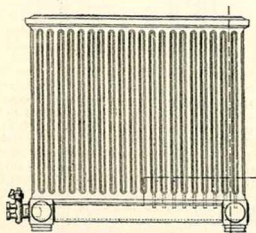
[1887

17,213. Russell, J. Dec. 14.

*Heating buildings.*—Relates to radiators. A small pipe *a* leads from the passage *B* to the top of each loop of the radiator and serves as an air-vent if hot water is used. If steam be employed it is admitted through the pipes *B* and *a* and the air and condensed water escape by the passage *B'*. The pipe *a* may be applied to various forms of loops.



17,389. Boulton, A. J., [Waters, F., and Mignot, A. J.] Dec. 17.

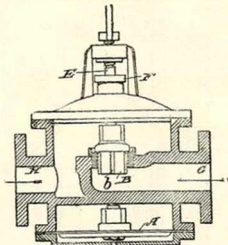


*Heating buildings.*—Relates to radiators cast in one piece. Suitable openings are left for the withdrawal of the cores, and are afterwards closed. A duplex cock *D* is attached to the lower chamber, one passage being for steam and the other for water.

17,390. Wilson, M. Dec. 17.

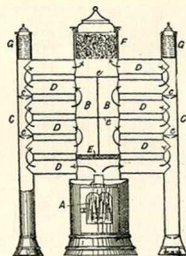
*Heating by steam circulation.*—Relates to valves for reducing steam or other fluid pressure. The inlet *G* and outlet *H* are preferably co-axial. Between them is the valve *B* guided in its seating by feathers *b*. The diaphragm *A* is in a chamber below the valve which opens into the chamber above it. The valve and diaphragm are connected by vertical rods. *E* is a screwed spindle passing through a stuffing-box *F* and serving to regulate the opening of the valve or to close it altogether. In a modification specially applicable for heating

purposes, where small quantities of reduced steam are required, the diaphragm is of small area and is made of a copper or other metallic disc slightly



dished. The movement of the valve is controlled directly by a stud projecting from the diaphragm, the spindle *E* being dispensed with.

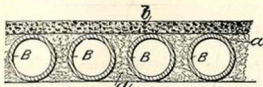
17,413. Toope, C. Dec. 17.



*Heating buildings &c.*—Relates to heat radiators for heating conservatories &c. The oil or gas burner *A*, which serves as the source of heat, is placed inside a cylindrical chamber *B*, divided horizontally by one or more partitions *E*, *e*, *e*, the lowest of which is formed of two metal plates with an asbestos packing between. The cylinder *B* is connected by one or more series of horizontal tubes *D* with one or more cylinders *C*, the latter having partitions *c* alternating with those in the cylinder *B* so that a continuous circulation of the products of combustion is provided for. The

escaping gases pass through a chamber F packed with vegetable charcoal or other purifying-agent. Water vessels G are placed in the top of the cylinders C for the purpose of moistening the air.

17,858. Loudon, G. S. Dec. 28.

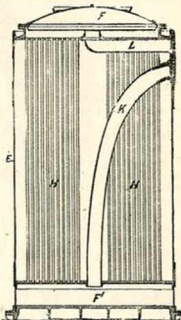


*Heating buildings.*—Relates to the utilization of exhaust steam from stationary engines for drying and heating. The invention is applicable for heating greenhouses, poultry houses, and buildings. The exhaust steam is passed through a series of pipes B, arranged to form a large radiating surface; the spaces between the pipes are filled in with broken bricks &c. a, and upon the filling is laid a bed b of concrete, forming the floor of the building to be heated.

17,929. Carter, H., and Carter, T. A. Dec. 30. Drawings to Specification.

*Heating buildings.*—Relates to ventilating and heating apparatus for railway carriages, halls, and rooms. Air is forced by a fan or bellows driven by clockwork or other suitable motive power over water, and through a coiled pipe, where it is heated. It may also be perfumed and disinfected by passing it over a saturated sponge or by other means.

17,986. Keith, J. Dec. 31.



*Heating water for swimming baths or ponds.* Water from the street main &c., at suitable pressure, is passed through a heating-tank and into the bath by a number of pipes, preferably near the bottom, and at the end opposite to that at which the discharge takes place. The heating-device is shown in the Figure. Cold water is admitted through the pipe K to the chamber F', whence it rises through tubes H to the chamber F, and then is passed to the bath by the pipe L. Hot water from a boiler is rapidly circulated in the casing E.

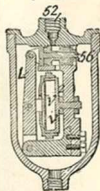
A.D. 1888.

35. Sewall, J. H. Jan. 2.

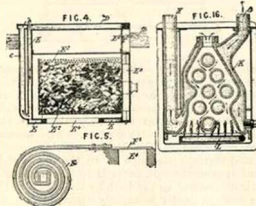
*Steam traps for use in steam heating-apparatus for railway trains.* Relates to improvements on the invention described in Specification No. 7510, A.D. 1887, for heating railway cars by steam, and

comprises, amongst other features, a steam trap for attachment to the controlling-valve to allow of the escape of water of condensation. The trap is shown in section in Fig. 10. The inlet opening 52 is closed by a piston valve 56 attached to a lever L which is also connected to a diaphragm *v* closing the thermostatic vessel *v* filled with some expansible substance as usual. As the diaphragm expands or contracts, the lever is moved to close or open the valve.

FIG. 10.



206. Bourdon, C., and Morel, L. A. G. Jan. 5.



*Footwarmers; heating water; thermostats.*—Railway or other vehicles are heated by removable footwarmers, each of which, as shown in section in Fig. 4, consists of a shallow vessel D of tinned iron &c., and extends across the whole width of the carriage, passages E, *c* and a pipe *b* being provided to allow circulation of the hot water. The vessel D is preferably divided lengthwise into two compartments by a central vertical partition, each compartment being heated by a firebox inserted through an opening E<sup>2</sup> into a casing projecting below the floor B at each side of the carriage. The firebox E<sup>2</sup> is suitable for burning solid fuel, preferably peat. The air for combustion enters through an opening E<sup>1</sup>, and the products of combustion escape at E<sup>3</sup>. Fig. 14 shows a section of a firebox for burning oil or gas. The water is contained in two thin parallel vertical vessels connected by cross-tubes and provided with the circulating-passages K, H, G as shown. The burners are shown at L. An automatic regulator of the temperature is fitted to the apparatus so as to act either by controlling the fuel supply or the draught or by interfering with the circulation of the water. It is shown in detail in Fig. 5, and consists of a coil F of two differently expansible metals, the inner end of the coil being fixed and

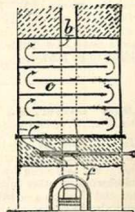
the outer end attached to a damper F<sup>1</sup> for the draught, or to a valve for controlling the circulation of the water. When the water is heated by oil or gas, the outer end of the coil may control the supply of fuel. The regulator is shown in place in Fig. 4 at F<sup>1</sup>. One or more india-rubber bags are fitted to each footwarmer to allow for expansion of the water.

511. Howorth, J. Jan. 12. Drawings to Specification.

*Heating air.*—A ventilating fan of special construction is provided with arrangements for moistening or warming the air by means of steam or a spray of water.

605. Brunnschweiler, K. A. Jan. 14.

*Heating buildings.*—One or more flue chambers *c*, provided interiorly with baffles and communicating above and below with the chimney *b* (of an open firegrate), are built into the chimney breast. When the fire has burnt up, the products are directed through this chamber by opening a damper *f*. The chamber is covered in front by tiles, terra-cotta slabs, &c. to radiate the heat into the room, in the Figure, shown in a floor above the fireplace.

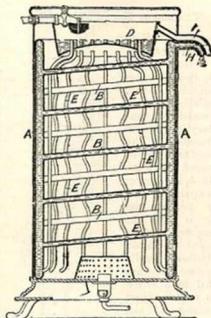


640. Sinclair, J. Jan. 14. Drawings to Specification.

*Thermostats for incubators and foster-mothers.* Three forms of thermostat are described. In one case the valve gear is actuated by means of an electric current, the circuit of which is closed by the expanding column of mercury of an ordinary thermometer connecting two wires fused, the one into the bulb and the other into the tube of the thermometer, at a given point. In the other cases a bent tube is employed filled with mercury, and a small quantity of a volatile substance. The tube may be fixed, in which case the valve gear is actuated by the pressure due to the expansion of its contents, or the tube may be balanced and so arranged that as the mercury is expelled from one limb into the other the tube turns on its pivot and actuates the valve gear.

**761. Rayner, T. J.** Jan. 18.*Heating liquids.*

—Relates to surface apparatus consisting of lengths of tube A containing one or a group of tubes C held in place by stuffing-boxes and glands d, the whole being connected together at the ends by boxes as shown. Screw caps or doors b for cleaning are provided.

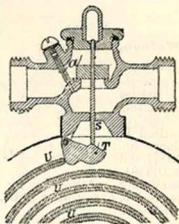
**817. Verity, B.** Jan. 18.

*Heating water for baths, heating buildings, &c.* The annular water space A is provided with inclined cross water-ways B, as shown, of a flattened tubular section. Waved tubes E conduct the cold water from the reservoir D to the bottom of the casing A. The overflow I and outlet H are made in one nozzle. In a modification, the tubes E are dispensed with and cold water is introduced at the bottom. The burner may be provided with a reflector to reflect heat and light.

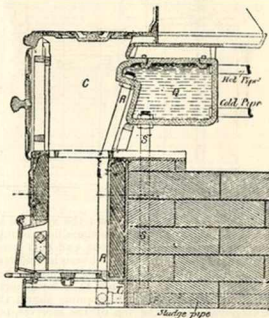
**1125. Carter, J. E.,** [Böhm, O.] Jan. 25.

*Thermostats for regulating the temperature of rooms &c. heated by gas.* The coiled spring U, composed of two metals of different coefficients of expansion, presses on the pivoted lever T, which rests against the spindle S of the gas valve. An adjustable bye-pass a is provided. The spring is mounted on a central spindle, to

which is attached a pointer moving over graduations indicating the temperature. By adjusting



the pointer by set-screws, the tension of the spring, and thus the gas supply, is regulated.

**1613. Foulis, W.** Feb. 3.

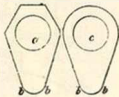
*Heating water.*—A V or similarly-shaped pipe R, T, S is connected at its two ends to the boiler Q. The leg R, which is connected to the top of the boiler, is led through the fire C, while the other leg S is partly protected from the heat by being led through the brickwork. One or more of these tubes may be applied to the stove described in Specification No. 1612, A.D. 1888, or to other forms. In another form a central pipe, passing up a slow-combustion stove, is provided with a central core so as to expose the water in a thin annular stream to be heated. The pipes may be



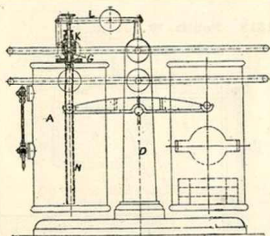
connected directly to the circulating system employed for heating purposes, without the intervention of a boiler.

**2047. Watson, J.** Feb. 10.

*Heating water for heating conservatories &c.* Relates to improvements on the form of boiler described in Specifications No. 4629, A.D.1877, and No. 156, A.D. 1884. The Figures show end elevations, *c* being the central flue and *b, b* the bottom plates, which are preferably of steel.



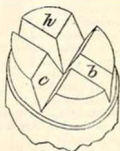
**2105. Springuel, B. J., and Bollinckx, A.** Feb. 11.



*Steam traps.*—The water from the vessel to be drained flows through a flexible metallic tube into a receiver which hangs from one end of a lever, the other end of which carries a weight sufficient to balance the receiver when nearly full. When the receiver is full it sinks, and in so doing opens the discharge valve. In the example shown the discharge valve is in the top of the receiver, but when the apparatus is working under low pressure it is preferably in the bottom. The valve stem *K* passes through a fork in the lever *L*, one end of which is linked to the receiver, while the other end rests on a projection on the standard *D*. When the receiver *A* sinks the valve *G* is lifted, and the water is blown up the discharge pipe *N*, which reaches nearly to the bottom. When the valve is in the bottom it is opened by its spindle striking a fixed stop as the receiver descends, and its spindle in all cases is provided with a hand-wheel by which the valve can be rotated to remove any obstruction.

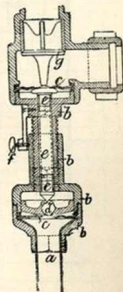
**2113. Lane, J.** Feb. 11.

*Heating liquids; digesters.*—The bottoms of vessels for heating liquids are provided with intersecting channels to increase the heating surface. The Figure is an isometric view of the flat bottom *h* of an inverted vessel with two intersecting channels *b, c*. The invention may be applied to open pans, airtight vessels, &c.



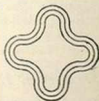
**2497. Thomas, G., [Fischer, P.]** Feb. 20.

*Thermostats.*—Relates to improvements on the invention described in Specification No. 2969, A.D. 1886. The diaphragms *c* are strengthened by supplementary rings and are corrugated. The edges are turned over and secured between the parts *b* as shown. The expansion of mercury &c. in the chamber *a* operates the steam &c. valve *g* by means of the piston *d* and hollow spindle *e*. The two parts are connected by a screw joint so as to adjust the opening of the valve, and are secured by a set-screw *f*. The spindle *e* may be hollow and exhausted of air to diminish transmission of heat.



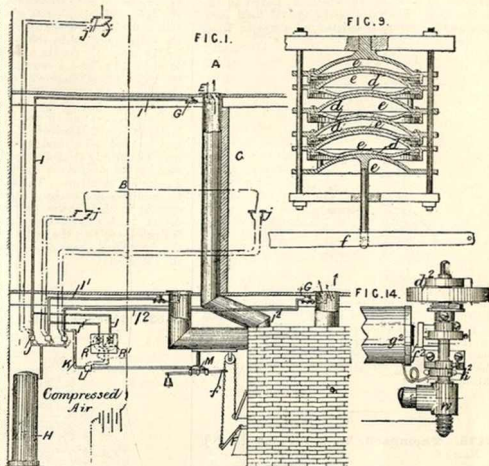
**2568. Thomas, F. S.** Feb. 21.

*Heating buildings; heating water.*—Relates to pipes for radiating apparatus or for heating boilers. The pipes are made of the section shown, to give large heating-surface and to throw off or convey water according to the position in which they are placed. The radiating-surface may be increased by lugs or ribs.



2575. **Thompson, W. P.**, [Johnson, W. S.]. Feb. 21.

*Thermostats for controlling the temperature of a series of apartments heated by a single furnace. The apparatus is so arranged that the hot air &c. supply to each room is automatically cut off as soon as the desired temperature is reached, and the heater is also stopped as soon as all the rooms reach the required point. Or the furnace is automatically damped proportionately as each room is cut off from the supply Fig. 1 shows the first of these forms. A thermostat *j* in each room electrically actuates a valve *J* which admits fluid under pressure to an expansible chamber *G* controlling the register *E*, through which heated air enters the room. The furnace doors*

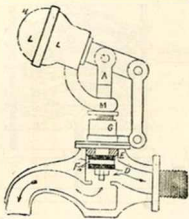


*Fare also controlled by an expansible chamber *M*, admission of fluid to which is controlled by the joint indirect action of the thermostats. The tubes *I* conveying fluid under pressure are branched; one part goes to *G* as above mentioned, and the other part leads to expansible chambers *R* except in the case of the tube leading to the room *C*. In this latter case the branch leads through the valve *L* to the chamber *M*. The valve *L* is only opened when the chambers *R* have completed an electric circuit through it, that is when rooms *A* and *B* are at the proper temperature, and even then fluid can only be admitted through it provided that it is also admitted into the room *C*. The furnace doors are thus only closed when all the rooms are at the proper temperature. In the modification, in which the activity of the furnace is decreased in proportion as the rooms are cut off from the heater, the same devices are used in each room, but a branch from each tube *I* is connected by a flexible tube with a separate expansible chamber. The chambers *e* are placed one above the other so as to have a cumulative effect as shown in Fig. 9. When fluid under pressure is admitted to the chamber *G* in any one room, it is also admitted to the corresponding chamber *e* and serves partly to close the furnace doors. The valves *J*, shown in detail in Fig. 14, consist of two-way cocks *w* and are turned by a coiled spring *d'* when an attached ratchet is released by a detent *f'* on the armature of an electromagnet *g'*. At the same time a cam *h'* on the valve spindle breaks the circuit on one side of the thermostat and makes it on the other, so that when the temperature changes the metal strip of the thermostat curls over and makes contact on the other side. The two-way cock either admits fluid under pressure to the chamber or allows the chamber to contract and open the register. The construction of the chambers *e* is shown in Fig. 9. They have one flexible wall *d* which operates a lever *f* &c. which operates the register &c. or which may complete an electric circuit. Any other suitable form of chamber or valve may be used.*

2732. **Birch, W.** Feb. 23.

*Heating water.*—Relates to a self-closing tap or cock also applicable as a safety-valve for boilers for baths &c. The valve spindle *A* passes through a stuffing-box *G* screwed into the valve casing and

carries on its end a disc F, which is packed at both sides and forms a valve. The valve spindle is actuated by a lever H, which is linked to the stuffing-box. The valve opens against fluid pressure, and its closure is assisted by a weight L on



the lever H. When raised the washer E bears against the cover of the casing and helps to pack the spindle. The weight L may be made to slide on the lever H, and carries a fork M, which rests on the cover of the casing and holds the valve open. The apparatus may be enclosed in a box, the lever H being actuated by a handle projecting through the box.

**3438. Thompson, W. P., [Johnson, W. S.]**  
March 6.

*Thermostats.*—Relates to apparatus for heating buildings, several apartments being heated from single furnace. The system used is similar to that described in Specification No. 2575, A. D. 1888, in so far as it relates to controlling the temperature in the rooms &c. The compressed air supply is obtained from any suitable pump driven by the ordinary water supply of the building.

The mechanism for controlling the air supply to the expansible chamber operating the steam valves of the radiator &c. is shown in Fig. 4. The three-way valve *j* is mounted on a spindle and is locked in its open or closed position by the armature *r* of an electromagnet *u*, the circuit through which is made by the thermostat. On this spindle is also a device *u* for changing the circuit from one side of the thermostat to the other, so that the next change in the temperature will cause the

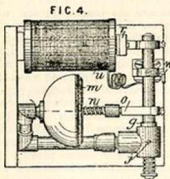
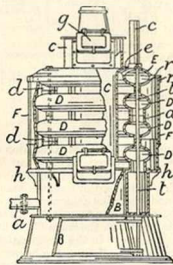


FIG. 4.

thermostat to complete the circuit on the other side. The valve *j*, when opened, admits air to the expansible chamber controlling the radiator and to the expansible chamber *m*, which closes it by the rack and pinion *o* when released by the magnet *u*; the valve is opened by the spring *n* when released by the magnet. On the same system the radiators can be used to heat a current of air passing into the room in combination or not with a radiator in the room. Also a ventilating valve or window can be placed in the wall &c. In all cases the valves of the radiators and air passages are controlled by methods herein described. Other forms of valves may be used and several are described. The valve may be entirely electromagnetic and may be actuated by two magnets or by one electromagnet and a polarized armature. The valve may be actuated by fluid pressure or by a spring &c., the electric current in these cases only serving to release a detent. Other means are also described, the main feature being that the motion of the valve breaks the circuit and opens a circuit to the other side of the thermostat.

**3452. Catchpole, A.** March 6.

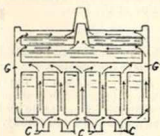


*Heating water.*—A series of superimposed rings D, D, E are arranged above and communicate with an annular water ring surrounding the fire-pot B. The rings communicate with each other through cast hollow projections *d* prepared in such a way that water-tight joints are formed between them when the rings are bound together by vertical ties *t*. The upper ring E is formed with the flanges *e, r, r'* to hold the casing in position, the latter being supported on the flange *h*. The central fuel magazine C is fed through the door *g*. The upper portion of the magazine opens into the uptake, the latter also opening to the casing F lower down. The inlet to the boiler is at *a*, and the outlet for steam or water at C. A door and passage direct to the fire-pot is also provided. In a modification, a second concentric series of water

cylinders D is provided. In this case, the circulating water rises through the inner set and returns through the outer set.

**3596. Sizer, J. W.** March 8.

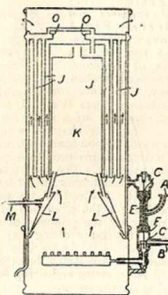
*Heating water for baths &c.* A number of flues, as shown in the Figure, are inserted in a tank, and the products of combustion circulate as shown by the arrows. Oil burners are placed under the flues C or a single flue and gas flame may be used instead. The edge of the top of the flue G is raised to hold water to prevent burning. The tank is fitted with a supply ball-cock at the top and a discharge tap near the bottom, the water being heated while passing from the one to the other.



**3785. Winterlood, J.** March 12. *Amended.*

*Heating water.*—

A number of concentric double cylinders J are connected by hollow stays O, the heated air circulating through the interspaces. The inner cylinder K is closed at each end and used as a boiling chamber. The hot water is drawn off through the hollow cone L and pipe M. The gas and the water inlet valves are connected by a spindle E passing through a fixed diaphragm F. The gas and the water supply through A and B are thus proportioned to each other.



**3787. Pearce, T. J., and Beardsley, M. W.** March 12.

*Non-conducting coverings.*—Paper or strawboard

**3939. Matthews, W., and Yates, J.** March 14.

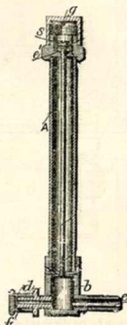
*Steam traps.*—The discharge valve consists of a perforated disc which is rotated upon a similarly-perforated seating by a hollow float. A sectional elevation and plan are shown. A is a perforated

is coated or saturated with maltha (petroleum distillation residue), and used as a non-conducting lining for refrigerators, cold-air rooms, &c.

**3901. Lake, H. H., [Waggoner, E. P.]** March 13.

*Heating plugs.*

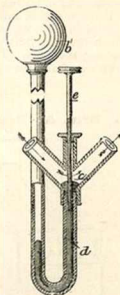
—Relates to vent plugs for steam radiators. The plug contains positive and automatic vents for securing the circulation of steam in the radiator. Steam is admitted through the passage e to the chamber b, whence it can pass to the automatic vent g or to the other vent f. The opening of the valve e' is adjusted by the screw S and the action is controlled by the expansion of the tube A. The other vent f is operated by turning the screw cap d.



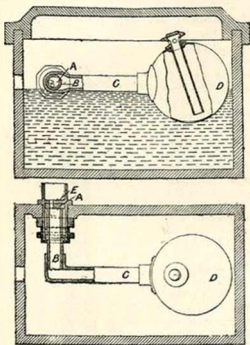
**3911. Kinnell, C. P., and Rothnie, G.** March 13.

*Thermostats.*—

The expansion of air or liquid in the bulb b' acts through a column of mercury in the U tube d to close the passage c through which gas or liquid fuel is supplied. The temperature at which the fuel supply is cut off may be adjusted by a screw e or plunger dipping into the mercury column d.

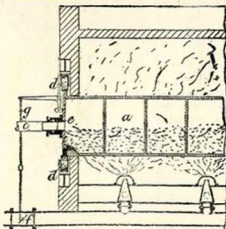


disc closing the short tube B, which is screwed into an elbow on the arm C of the hollow float D. The disc is held on a seating E which is similarly perforated, and closes the end of the tube containing



the water to be discharged. After a discharge the water in the chest condenses the steam in the ball D, and entering it causes it to sink and rotate the disc A, so that the perforations in it and the seat E coincide. The water behind E is then discharged, by the steam pressure, through the arm C and up the dip-pipe in the float. After all the water has been discharged the float is filled with steam and rises, closing the valve. The steam in the float is again condensed and the cycle repeated.

3967. **Brin, A.** March 14.



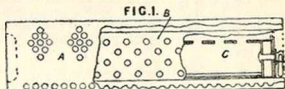
*Thermostats.*—Relates to rotary retort furnaces to be used in the extraction of oxygen and nitrogen

from atmospheric air by means of baryta. The retort *a* is heated by gaseous fuel supplied through the pipe *f*. In order to automatically regulate the temperature, the valve *f* in the gas-supply pipe is operated by a lever *g* the other end of which bears against the head of the retort, and is operated by the latter as it expands or contracts under the action of the heat.

4517. **Rushworth, S. P.** March 24. *Drawings to Specification.*

*Heating buildings.*—The invention consists in making steam and hot water heating-pipes flat or oval in section so as to radiate the heat of the steam or water more readily.

4527. **Morris, J.** March 24.



*Footwarmers; bed warmers and airers.*—Fig. 1

shows a side elevation and Fig. 2 a plan of the apparatus partly broken away. The stove consists preferably of two perforated chambers B and A, one within the other and separated by a space for the circulation of air. The inner chamber C is provided with guides for a combustion chamber C which is in the form of a drawer introduced through an opening in the outer chamber. The combustion chamber is provided with sliding or hinged dampers for regulating the heat. Instead of the perforations a single opening for the admission of air and a flue for carrying off the products of combustion may be used. The inner casing may be dispensed with, the chamber C being then fitted in the outer casing A. It is stated that the apparatus may be used for warming and airing beds and apartments, and as a footwarmer.

4602. **Tilden, H.** March 26.

*Heating air; heating buildings.*

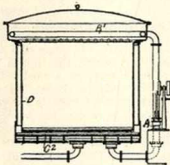
—Relates to tubes for heating air in hot-air stoves, furnaces, and the like, also applicable as steam heat and other radiators. The tubes are built up of sections A grooved at one end *a*. Wings or radial plates *a* project internally and externally to conduct the heat. The end sections are provided with internal lugs for the attachment



of tie-rods, and in these sections the plates *a* are dispersed with. The sections are built together so that the plates *a* break joints.

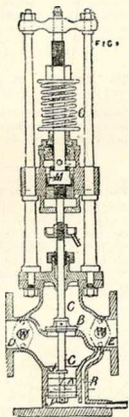
**4931. Turnbull, J.** April 3.

*Boiling-pans* for esparto grass and other fibrous materials. The liquid is circulated by a pump *A* which draws it off from below the false bottom *C* and distributes it through the pipe *B*. The material to be treated may be contained in a removable open cage or basket *D*.



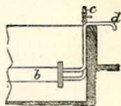
**5072. Knowles, E.** April 5.

*Steam traps.* — Relates to a valve admitting steam automatically to a steam pump, which supplies water to fire-extinguishing sprinklers, the valve being applicable also for steam traps. The reduction of pressure in the water supply pipes, when the sprinklers start, opens a balanced stop valve of a Worthington or other steam pump. The steam from the boiler enters the valve casing at *D*, passes through the valve *B*, when open, and passes out to the engine at *E*. The valve *B* is balanced by the pressure of the steam on the top of the piston which works in a cylinder *J*. A by-pass *R* admits the steam to the underside of this piston when the valve *B* is open, and thereby ensures that it shall remain open. On the same spindle *C* with the valve *B* is fixed a piston *M*, which is pressed down by the pressure in the sprinkler supply pipes; a spring *O* lifts the valve *B*, when the water pressure above *M* is reduced. A by-pass *W*, with a stop valve is used to test at suitable intervals the working of the steam pump.



**5088. Walker, T. J.** April 5.

*Heating liquids.* — The heat of fermenting materials, such as manure, is utilized for heating fluids. The fluid to be heated is supplied by the tube *c* to a U-shaped tube *b* buried in the material and is drawn off through *d*. Or the tube *b* may form part of a circulating system for heating a building, hot-bed, greenhouse, incubator, or other structure.

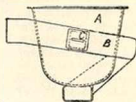


**5259. Gapek, J. V.** April 9. *Drawings to Specification.*

*Heating buildings &c.; heating by electricity.* — The walls, or parts thereof, of the room, chamber, &c. to be heated are covered with a thin conducting-coating which forms part of an electric circuit. The resistance to the current causes this coating to heat and so warms the room. The coating is preferably made of paper &c. covered with graphite, over which varnish &c. can be placed to protect it. The coating may be laid on the walls or on screens &c.

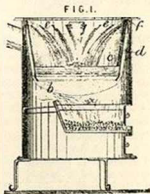
**5292. Clifford, A.** April 10.

*Boiling-pans.* — The flue *B* is cast with the copper *A* or otherwise suitably attached. A cleaning-door *C* is formed in the flue. The copper may be surrounded by a casing.

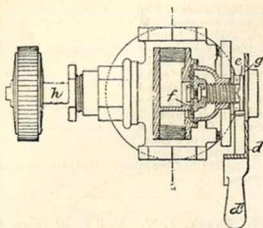


**5330. Gamgee, J.** April 10.

*Boiling-pans,* maintaining liquid circulation in. Consists in providing boiling vessels with a bottomless lining which is perforated near the top in order to direct the rising currents of boiling liquid upon the materials under treatment, which are carried upon suitable openwork supports within the lining. The application of such a lining to a washing-copper is shown in Fig. 1, the lining being supported by a deflecting curtain or ring *f*.



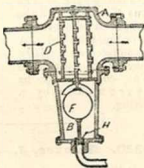
5465. Pass, E. A. de. April 12.



*Heating water.*—Relates to cocks for geysers and other water-heaters. The plug of the water cock is operated by a plate *d* which only permits the gas valve *f* to be opened after the water has been turned on. The gas valve is preferably actuated by a screw, so that the spindle head *e* projects through the opening *g* in the plate *d* and prevents the water from being turned off before the gas. The gas valve may be actuated by a spring. The water plug may be hollow, and a second spindle and plug *h* working inside it serve to adjust the water supply.

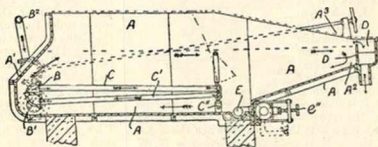
5735. Lake, H. H., [Lowden, J. J.]. April 17.

*Steam traps.*—Relates to means for separating grease, grit, and water from steam. The Figure shows the apparatus as applied to a horizontal line of pipes. Beneath a chamber *A* forming an enlargement in the pipe is a receiver *B*, in which the grease, grit, and water are allowed to collect, and



6030. Harvey, R., [Cornish, T. S.]. April 23.

*Heating liquids.*—Relates to apparatus for heating and purifying saccharine and other liquids. The liquid is heated by steam, hot air, or water in a pan *A* by means of a series of pipes or by means of a jacket at the bottom or sides of the pan. The vegetable and other impurities are



which is separated from the chamber *A* by a perforated plate. The chamber is divided transversely to the direction of the pipe by a series of perforated plates *D*, arranged so that the perforations are nowhere in line. The perforations are each, on the side nearer the engine, surrounded by a small lip or flange to prevent foreign substances that run down the plate from being drawn through. In the receiver is a float valve *H*, whereby the accumulated grease &c. is enabled to be automatically expelled. The float is protected from any possible inrush of steam by a hooded plate above it. In place of a float valve a floating vessel into which the liquids to be expelled are conducted may, as a modification, be employed. This is made to operate an independent valve. An arrangement suitable for vertical pipes is also described, in which the baffle-plates are situated horizontally, and are depressed at the centre to collect the grease and condensed steam, the lowest one communicating by a pipe with an otherwise independent receiver.

5750. Gardner, J. April 18.

*Heating buildings.* Consists in ornamenting steam heating-apparatus and the like, or the recesses for receiving the same, with enamelled metal plates instead of with tiles.

5926. Preston, E. J., and Atkinson, T. April 20. Drawings to Specification. Amended.

*Footwarmers.*—Cases for footwarmers are formed of corrugated or otherwise indented sheets of copper, Muntz metal, &c.

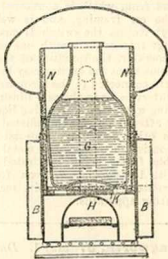
5932. Henderson, C. J. April 21.

*Heating buildings.*—Air from the apartment to be heated is admitted to a chamber in which it is heated, and is then re-admitted to the apartment by an aperture about eight feet from the floor. Fresh outside air can be admitted to the heating-chamber, and ventilating-pipes may be used to carry off the foul air.

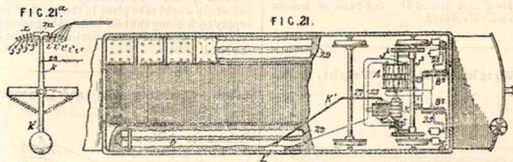
separated and drawn off as a scum from the surface, and the clear liquid is drawn off by a pipe which is automatically maintained near the surface. In the arrangement shown, the heating-pipes C, C<sup>1</sup> are connected with a double tube B, B<sup>1</sup>; steam is supplied to the upper portion B from the tube B<sup>2</sup>, and returns through the lower portion B<sup>1</sup>. The double tube is mounted on trunnions, and the pipes C, C<sup>1</sup> rest on a support C<sup>2</sup> at the forward end of the pan, so that the whole system turns on the trunnions and can be raised for cleaning. The shape of the rear portion A<sup>1</sup> and front A<sup>2</sup>, A<sup>3</sup>, as shown in the Figure, produces a surface current of the liquid towards the front D, where there is a skimming-trough D<sup>1</sup>. The exit tube E is closed by a valve consisting of a disc with an annular rubber band pressed on a sharp-edged tube by the screw e<sup>1</sup>. It is pivoted at its end, and is attached to a counterweighted lever connected to a float in such a manner that the end of the tube E remains a few inches below the surface during the whole of the drawing-off process.

6047. Imray, O., [*Aries*, P. P.]. April 23.

*Heating liquids.*—Relates to apparatus specially intended for heating milk in feeding-bottles, but which may be used for heating other liquids and maintaining them at a uniform temperature. Air is heated in the combustion chamber H, which has a grating or receptacle for solid or liquid fuel, and is admitted through an adjustable perforated plate K into chamber N, lined with felt or other non-conductor of heat, which contains the bottle &c. The chamber N may be left open; or it may have one or more hinged covers with adjustable openings for regulating the heat. Chambers B may be added for heating water or other liquid; these may be fitted with cocks.



6075. Ries, E. E. April 24.



*Heating buildings; heating by electricity; thermostats.*—Consists in heating buildings by induced currents of small electromotive force and large quantity, the primary or induced currents being also used for lighting &c. The low-tension currents are produced by inductual transformers, the primary circuits of which receive alternating or intermittent high-tension currents from any suitable source, the secondary coils being of very large wire. Heat-radiating devices are connected in parallel between the secondary conductors. The high-tension current may be continuous, in which case branch circuits supplied with pole-changers are provided for distributing the current to the induction coils. Automatic regulation of the temperature of the heating-devices takes place continually, for, on account of their very low resistance, if one becomes overheated the increase in its resistance is sufficiently great to divert the low-tension current to those heaters which are less heated. For additional security thermostatic cut-outs may be provided for automatically breaking the main circuit or the circuit of any particular heater in case of excess of currents. These consist of spring contacts of coiled or folded metal, which when heated excessively expand and break the circuits. In some cases a central station may be provided with high-tension generators having a main circuit extending throughout the district to be supplied, branch leads being run to the buildings along the line and connected to the primary coils of the transformers in the said buildings. In other cases isolated plants may be used. The heaters

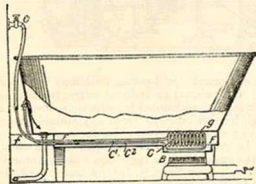


connected to the secondary coils of the transformers may consist of the ordinary steam pipes previously used for heating by steam, or any other suitable heat-radiating devices. In heating railway carriages they may, before starting on a journey, be warmed by currents produced by transformers, the primary coils of which receive their supply from generators which may form part of a stationary plant or may be fitted on the locomotive and driven by steam. While the train is running the heating-currents may be produced either from a steam-driven dynamo of the continuous or alternating current type on the engine or from a generator driven from one or more of the axles, in which case, the currents are, preferably, produced at intervals when the train is running down an incline or being stopped. In either case a storage battery may be included in the circuit, as well as ordinary switches and pole-changers where necessary. Fig. 21 shows a plan of a car provided with a generator A and a current-exciter K geared to one of the axles J<sup>2</sup>. The circuit 23, 24 of the generator includes the primary coils of the transformers B<sup>2</sup>. The field-magnet coils of the exciter, wound in sections, have their terminals at one side connected to a switch L, and at the other side to the negative commutator brush, the positive brush being connected by a wire 27 with the field magnets of the generator A, the return wire 28 from which is connected to a switch lever, shown in Fig. 21<sup>a</sup>, at k. This lever is pivoted at the car framing, and is weighted at k', its upper end being adapted to move over terminals j', j'', &c. on the switch L connected with the exciter K. When the car is on an incline the lever swings into contact with one or more of the terminals, thus making the circuit between the exciter and generator, the quantity of the current passing being proportional to the steepness of the incline. In some cases the exciter may be driven frictionally from the periphery of one of the wheels. The heaters are connected to the secondary coils 25, 26 of the transformers. When the currents are produced at intervals, as in the case illustrated, the heaters consist of conductors 29 enclosed in metallic tubes containing water or non-freezing liquid, the object being to enable them to receive a large amount of heat to be afterwards slowly radiated. Instead of liquids, solid substances such as plaster of Paris, terra-cotta, or other refractory material may be used. When the currents are produced constantly the heaters consist of corrugated metal plates or strips in the form of wall pockets or otherwise, several suitable forms being illustrated in the Specification. When a storage battery is used in connection with the generator driven from the axles, it may, besides supplying the heating-circuit, distribute currents to separate circuits including incandescent lamps for lighting, brakes, and signalling or communicating apparatus.

**6442. Illingworth, J.** May 1. *Drawings to Specification.*

*Boiling-pans.*—An earthenware shell, thoroughly dried and glazed or unglazed, is placed in a mould, where it occupies the position of the core, and metal is then cast round it. Set-pans or boilers may be so manufactured.

**6659. Wright, J. F., and Wright, G. E.** May 4.

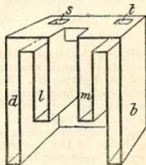


*Heating water for baths.* In a chamber F fixed below the bath a tubular coil C is placed, which communicates with the foot of the bath by a pipe C', and with the supply cock e by a pipe C''. Immediately under the coil an atmospheric gas burner B is fixed, the floor of the chamber F being

cut away at this place. By this arrangement a double heating effect is obtained, the incoming water is heated in the coil, and the bottom of the bath is heated by the hot air in the chamber F, which is provided with a flue f to carry off the noxious fumes. To prevent the burning of the coil which would take place in the event of the water supply cock being shut off before the gas supply, the coil C is placed in communication with the bath by the small tube g.

**6698. Forster, W., and Dawson, G.** May 4.

*Heating water.*—Relates to boilers for heating green-houses, conservatories, and the like by hot water. The boiler is built up of wrought-iron plates, preferably welded together in the form shown in section. The plates d, b form the outer casing. Fuel is fed into the space between the mid feathers l, m through a door. The flues s, t are covered with a cast-iron casing leading to a chimney. The whole is placed on a cast-iron stand with suitable ash doors.



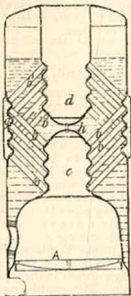
6888. **Bowring, M., and Lyon, R. B.**  
May 9.

*Non-conducting compositions.*—A composition for covering steam boilers and pipes consists of a mixture of 20 parts of marl, 15 parts of clay, and 28 parts of slake, a sediment deposited by tidal streams.

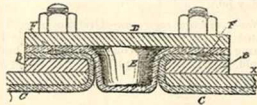
6987. **Ellis, O. J.** May 10.

*Heating water.*—

Relates to a vertical steam boiler or water heater. A combustion chamber *c*, preferably corrugated, is formed in the upper portion of the firebox *A* and connected to the annular chamber *g* by the inclined smoke-tubes *b, b*. From the latter chamber the combustion products are led into the central space *d* by the tubes *b', b'*. In a modification, the combustion chamber *c* is dispensed with, the smoke-tubes opening out from the inclined sides of the firebox crown. The feed-water may be heated in a coil contained by the annular external combustion chamber, or in a coil forming the casing of the combustion chamber itself. In the latter instance the coil is slid up or down to obtain access to the smoke-tubes.



7061. **McDougall, I. S., McDougall, J. T., Hartley, R. K., and Sugden, T.**  
May 11.



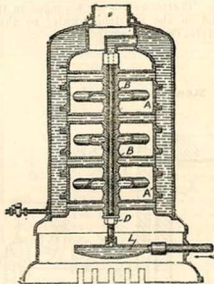
*Heating liquids.*—Relates to boilers or other vessels lined with lead or other acid-resisting metal or alloy. The lead or other acid-resisting lining *C* is secured to the external shell *X* by bringing it through and causing it to overlap on the outside. A plug made of, or covered with, lead or other acid-resisting material *E* is secured in the opening by a cover *D* held by bolts. A strengthening-ring *B* and packing *F* may be used. In other forms, a

lead &c. coated plug secured by a nut and washer, or a bolt, may be used. In another form, an undercut cap is secured to the shell and filled with lead &c., secured by burning or otherwise to the lining.

7092. **Kidman, J.** May 12. *Drawings to Specification.*

*Heating water.*—The waste heat from the furnace gases of a baking-oven is utilized to heat a water tank situated above the flues, so that the gases are in direct contact with its bottom. The hot water from the tank is conveyed to the bakehouse by a pipe, where it is utilized as required.

7287. **Davis, H. J., and Turner, H. C.**  
May 16.

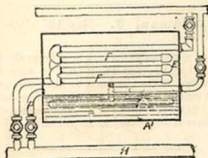


*Heating water.*—Relates to a simple construction of gas-heated boiler for generating steam or heating water. To give extended heating-surface and facility for cleansing, the "firebox" is formed of a series of superposed wheel-shaped segments *A*, the central bosses *B* forming when placed together a central vertical water passage. The segments are held together by a tubular stay secured by the nut *D*. Immediately above the burners is located the water chamber *L*, communicating with the central stay. As shown, the boiler is filled with water for heating purposes.

7361. **Lofthouse, R.** May 18.

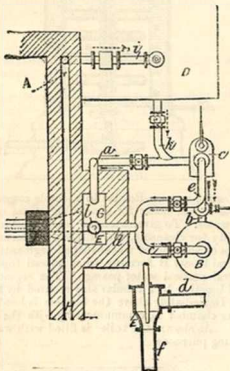
*Heating air for ventilation &c.* The air is forced by a fan or fans into the box *E*, where it is heated or cooled by steam or water circulating in the pipes *F*, and where it takes up moisture from the trough *A*. The connections of the coils *F* are so arranged that steam can be passed through the whole coil or simply into the part in the water in *A*, where the condensed steam may accumulate.

Overflow and exhaust pipes P are provided. The warming, drying, or cooling chamber E may be separated from the moistening-arrangements and the air may be forced into the water by one fan



and drawn off by another. Passages are arranged so that air can be drawn from inside or outside the building. Thermometers are arranged in the air ways and in the moistening-water so that the temperatures can be observed.

7426. Roshor, C. H. May 19.

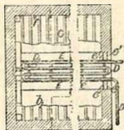


*Heating water.*—Relates to the arrangement of apparatus for circulating, heating, filtering, and aerating water for swimming baths. The Figure shows a sectional plan. The bath A is provided with an inlet pipe, an overflow H, and near its deep end a well G with which it communicates. The suction pipe of the circulating-pump C is put into communication by a pipe k with a filter D, and by the pipe a with the well G. The delivery pipe communicates directly with the bath inlet by

a pipe e and indirectly through the water-heater B by the pipes b and c. The filter D communicates with the bath overflow by a pipe i. The water may be drawn from the bath directly by the pipe a, or indirectly (through the filter D) by the pipe k; also the water may be returned directly by the pipe e or indirectly (through the water-heater B) by the pipes b and c. An aerating-device is fixed at E which consists, as shown, of a casing E to which the water is admitted by the pipe d and air by the pipe l. The filter D, heater B, and aerator E are, by the manipulation of the proper cocks, placed in circuit as required. The heater is constructed to have a large surface heated by hot water or steam.

7594. Eland, G. H. May 23.

*Heating air for use in drying timber &c. or ventilating buildings, ships, &c.* The timber &c. to be dried is stored in chambers, to which is admitted air heated by pipes D. The air enters through gratings e'



to air trunks E, whence it escapes by perforations under the pipes D. Air escapes from the chamber through orifices in the pipes F leading to a chimney or fan. For ventilating ships' cabins or other structures a similar arrangement for heating the air is employed.

7635. Wilson, G. R., [trading as Wilson & Blessley]. May 24. Drawings to Specification.

*Heating liquids.*—Vessels of circular form in horizontal section, such as urns, kettles, mullers, &c., are made of longitudinally-corrugated sheet metal.

7933. Imray, O., [Grünzweig & Hartmann]. May 30.

*Non-conducting coverings.*—Granules of cork are coated with a mixture of asphalt and resin in a mixing-machine, and compressed in a heated mould. Or peat, bark, pith, wood, or paper may be used instead of cork.

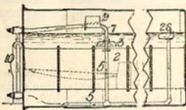
8078. Watt, J. June 4.

*Heating liquids.*—Relates to apparatus for promoting circulation in water or other liquids during ebullition, and for removing sediment therefrom. The arrangement, being specially applicable to steam generators, is shown in connection with a Lancashire boiler. Above the crowns of the furnace flues 2 and wholly or partially immersed in the water is situated the vapour collector 3.

1888]

ABRIDGMENT GLASS HEATING.

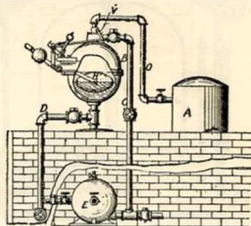
The steam accumulating here escapes through nozzles, provided for that purpose, into the rising pipe 7, and in doing so induces an upward flow of low-lying water through the pipe 5.



The steam, separated from the water by louvres 5, passes into the steam-space of the boiler, while the water travels onward to a sediment chamber 10 of usual form located within or externally to the boiler. The cleared water re-enters the boiler at a low point, to be again acted upon. A scum pan 26 is also provided at the rear of the boiler near the water level and connected, as shown, to the collecting-pipe 5. In some cases, the scum-catcher 26 forms the upper portion of the vapour collector 3, while in addition the steam jet nozzles of the latter are modified by making them removable and also by making their areas adjustable.

and bulb filled with mercury and secured to and operating a pivoted lever.

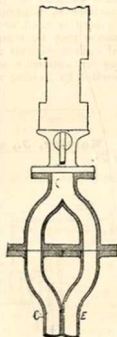
8571. Pitt, S., [Kieley, T J.]. June 11.



Steam traps for use in apparatus for supplying water to boilers. The water of condensation from heating or other apparatus flows to a vessel communicating with the boiler above and below the water level, and in which there is a float operating a valve on the steam pipe to admit steam to blow the contents into the boiler when the vessel is full. An elevation of the apparatus is shown, in which A is the steam drum communicating with the feed-vessel or automatic steam trap B by a pipe O. The vessel B is also in communication with the water space through a pipe D and with a vessel E, into which the water of condensation first flows by a pipe C. A float H moves the valve stem V through gear as shown, in which play is allowed so that the valve stem is not rotated until the vessel B is nearly full. When the valve admitting steam is closed another is opened to exhaust the vessel B ready for another charge of water.

8124. Du Sautoy, C. S.  
June 4.

Steam traps. — The invention is shown as applied to a steam whistle. The steam pipe C is bifurcated at the top, one branch leading into a waste pipe E. Any water accumulated in the steam pipe falls down this waste pipe, which may lead into the boiler.

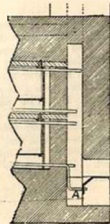


8271. Riley, W. J. June 6. Drawings to Specification.

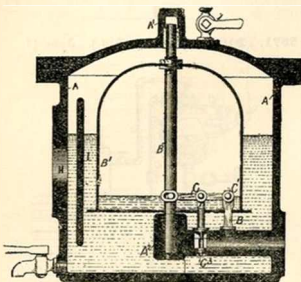
Thermostats for incubators. The temperature of the incubator may be regulated either by operating a valve placed over the lamp chimney, or else by operating an extinguisher placed over the lamp flame. Any form of thermostat may be employed, the form described consisting of a coil

8663. Johnston, J. June 13.

Heating air.—In ovens or other apparatus for heating air for warming buildings &c., which are heated by Perkins' tubes, the ends of the tubes are bent downwards before they are continued to form the fire-bars, as shown at A, in order to increase the heating effect.

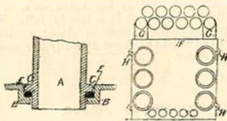


8883. Vavasour, Sir W. June 18.



*Steam traps.*—The discharge valve  $C^3$  is opened by a bell  $B'$  secured to a shaft  $B$ , moving in bearings  $A^1, A^2$ . A lever  $C$  pivoted at  $C'$  lifts the valve. In place of a valve a cock may be employed. Air and drain cocks are fitted to the casing  $A$  as shown, and a baffle-plate  $I$  prevents the steam and water from striking the bell on entering at  $H$ .

9090. White, L., Baker, W. Y., [trading as Thames Bank Iron Co.], and Watts, C. J. June 21.



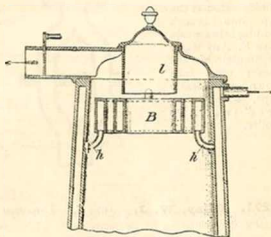
*Heating water.*—Relates to cast-iron tubular boilers for heating greenhouses &c. To allow expansion and contraction the tube joints are made by an elastic packing  $E$  placed in a recess in the end plates  $B$  under a collar  $C$  on the tube  $A$ . The plates are drawn together by bolts passing through lugs  $H$ . The packing is composed of good india-rubber or asbestos, or both. The depression on the upper side of the return waterway is dispensed with, and the casting  $F$  is made higher than usual. The upper tubes of the boiler are sloped. The outside pipes are carried by brackets  $G$ .

9303. Johns, H. W. June 26.



*Non-conducting coverings and compositions.*—Relates to a non-conducting composition and covering for steam pipes, boilers, &c., which may also be used for lining or filling safes, refrigerators, partitions, &c., and for other purposes. A composition is formed of fibrous asbestos and small pieces or shreds of sponge, preferably in about equal proportions, with or without a small percentage of other material. This composition can be used for filling or lining purposes, or it may be formed into sheets, rolls, blocks, &c. Sheets may also be formed from alternate layers of asbestos and sponge, or the materials may be made into a pulp and the sheets formed by paper-making appliances. The surfaces of the sheets may be treated with a sizing or binding material, and they may be indented, corrugated, or otherwise formed with an uneven surface. The sheets may be strengthened by embedded wire netting or other sheeting, as shown in Fig. 3, and the covering may be made in cylindrical sections for pipes, boilers, &c., these being secured in position by hooks  $D$  through which a cord is laced, or by wrapping or sewing. The sponge may be treated with a fireproofing-material such as silicate of soda, or with a disinfecting or antiseptic substance, or it may be waterproofed by treating with oil.

9416. Hartley, J., and Aspinall, J. E. June 28.



*Heating water.*—A mid-feather or tube box  $B$  is placed in the upper part of heating-apparatus of the vertical circular type. One or more flow and return pipes  $h$  are used. The firing-door may be placed above or below the mid-feather. In the

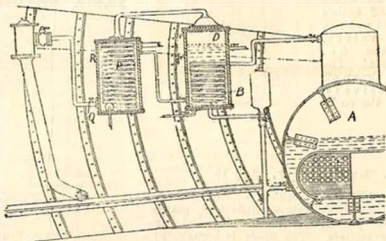
form shown the mid-feather is annular, and an extension on the cover *l* controls the draught through the central aperture.

**9431. Williamson, J.** June 28.

*Boiling-pans* for washing clothes and the like. Relates to that class of apparatus in which a central tube with an enlarged perforated base serves to circulate boiling liquid by discharging it over the goods, while cooler water is drawn in below. Consists in making the tube of earthenware, porcelain, glass, china, or other pottery-ware. It is preferred also to make the upper end of the tube large, closed at the end, and perforated at the sides.

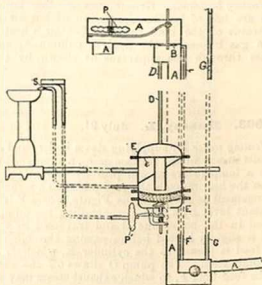
**9548. Howe, C., and Beckwith, J. H.** June 30.

*Heating liquids.*—The invention is shown as applied to distilling sea-water for use as feed-water on board ship is shown. The sea-water flows into a tank R, in which is a coil P, through which flows steam generated in the tank D, to which the sea water passes from the first tank R. In D the water is evaporated by a coil B, through which steam from the boiler A flows. The steam in the coil P is condensed and flows through Q to the feed-pumps, which supply it, as required, to the boiler. Water, brewers' wort, or other liquids may be heated in a tank by a steam coil, similarly arranged to that shown in D.



**9598. Braithwaite, C. L., and Braithwaite, I.** July 2.

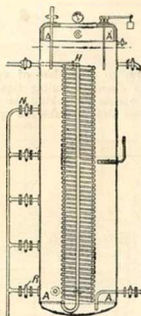
*Heating water; thermostats.*—Relates to gas water heaters. A pressure reducing valve B with a small bye-pass is placed in the discharge pipe A of the heater some distance above the discharge nozzle. A pipe D opens into A just under the valve B, and communicates with a chamber E containing a flexible diaphragm which controls the gas supply. Thus the reduction of pressure below the valve B, when the water is flowing, opens the gas valve. Air-escape pipes F, G are provided. In case the water from the heater boils, a chamber P, partly filled with water, expands and holds open the pressure-reducing valve B, thereby increasing the pressure in E and cutting off the gas. If the pilot light S goes out at any time, the gas supply is also cut off by the contraction of the chamber P<sup>1</sup>, which is connected to a chamber over the pilot light and filled with some volatile liquid.



**9807. Teller, C.** July 5.

*Heating liquids.*

—Relates to apparatus for heating beverages, as described in Specification No. 5777, A.D. 1887. Natural or artificial mineral waters or other beverages are heated, cooled, and aerated in the vessel A, which is provided with a coil H and cocks for admitting steam or cold water. Inlets and outlets for liquid and gas, safety-valves, manometers, &c. are provided. The liquid is drawn off successively through the cocks N, R.



**10,292. Langford, W.** July 16.

*Non-conducting compositions.*—Consists of a mixture of oil, manganese, nitric acid, gas tar, turpentine, gold size, Prussian blue, and other colouring-matters. The whole is brought to a proper consistency by boiling.

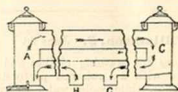
**10,321. Lee, G.** July 17.

*Heating buildings.*—Greenhouses or other buildings are heated by the circulation of hot air in apparatus of the kind shown. The air is heated by a gas burner in the upright column A, and passes through the apparatus as shown by the

**10,603. Hussey, L.** July 21.

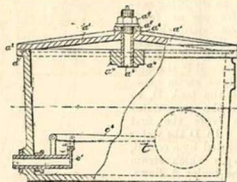
*Heating water for supplying steam boilers and other large tanks of any kind.* Where the feed is heated in coils in way of the furnace gases, a supplementary tank is provided in which the feed is first heated to such a temperature as will prevent "sweating" in the coils and their consequent rapid deterioration. From the heating-coils the feed passes to a second tank from which it is drawn by the feed-pumps. The arrangement is shown in the Figure, where F is the feed-tank, in which the water is maintained at a constant level by a float G controlling the pump H. From the tank F the water falls into a cylinder C placed in the boiler flue B and traversed by tubes through which the furnace gases pass. In C the feed is slightly heated before passing through the main heating-coils J. After traversing the coils J the feed is passed to the cylinder K, which is also fitted with tubes for the passage of the products of combustion. The pump O draws off the water by a pipe N, while the vapour passes by a pipe P to the feed-tank F, to which exhaust steam may also be led.

arrows. H and G are the inlet and outlet to the outside respectively. Removable covers and



peep-holes are provided on the columns A, C. One or more burners and columns A may be used.

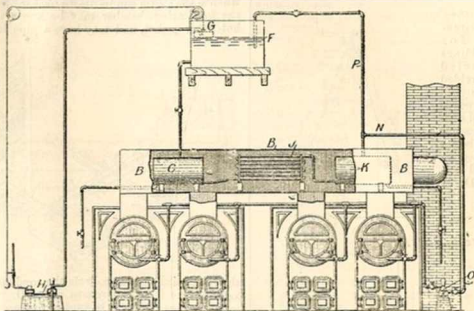
**10,509. Briddick, J. T.** July 20.



*Steam traps.*—The water is discharged periodically by the movement of a slide valve operated by a float. A part section is shown. The cover  $a^1$  has a beading  $a^2$  fitting an india-rubber-filled groove  $a^3$  to make a water-tight joint, and is held in place by a nut  $a^4$  screwed on a tube  $a^4$ , let into a cross-bar  $a^4$ . On the upper end of this tube is screwed a second hollow nut  $a^5$ , in which is a small weighted air valve. The discharge valve  $c^1$  is lifted by the float on the lever  $c^2$ . The steam escape opening may be protected by a box, the lower side of which is perforated in order to dry the steam.

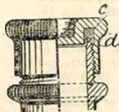
(For Drawing see next page.)

10,603.



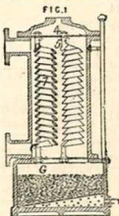
10,863. Harris, I. B. July 27.

*Hot water bottles, stoppers for.* The stopper is a screw plug or cap, and has a recess *c*, in which a washer *d* wider than the lip of the neck is held.



10,935. Newton, J., and Quiggin, D. A. July 28.

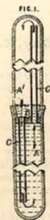
*Heating liquids or gases.*—Relates to apparatus described for condensing steam, but applicable for heating fluids. The Figure shows a fresh-water condenser. Steam is admitted to the chamber 4, whence it passes through tubes 7, and is condensed by liquid circulating in the chamber 5. The condensed water is aerated or filtered in the third chamber G. The tubes are coiled, and are of elliptical or similar section, with the main axis of the section at an angle to the axis of the



coil to permit easy circulation around the tubes. The coils may be tapered and the section of the tube may be of varying size. In the Provisional Specification it is stated that the tubes may be bent into a zig-zag form instead of being coiled. The end of the tube is brazed &c. into a socket piece secured by a flange and nut into the partition plate.

11,078. Gamgee, J. July 31.

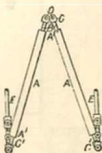
*Heating buildings; heating water.*—Relates to apparatus for heating and circulating liquids, applicable also for use as heat-radiators. The vessel A, A', Fig. 1, has a partition midway, in which two open tubes C, C' are inserted as shown. The portion A is heated in a any suitable manner. The liquid is then stated to circulate in the manner indicated by the arrows, falling down the cover A', which acts as a radiator. When used as a circulating-apparatus, the pipes C, C' are continued through the walls of A, A' and joined by intermediate connections.



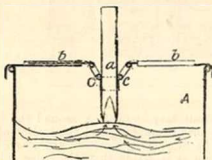


**11,175. Rundle, R.** Aug. 2.

*Heating water.*—Relates to a circulating boiler for heating buildings &c. constructed with tubes A welded solid at each end A' and afterwards bored out and connected by smaller tubes B with boxes C, C' connected to the flow and return pipes D, E respectively.



**11,282. Wolf, A.** Aug. 4.

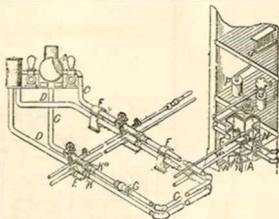


*Boiling-pans.*—The object is to prevent such materials as tar, glue, varnish, soap, &c. from boiling over. The apparatus consists of a tube *a* mounted on the pan *A* by arms *b* and links *c* &c., the lower end of the tube *a* being provided with pointed blades which break the scum formed on the surface of the material. An apparatus is constructed with several funnel-shaped tubes with blades, for use on a larger scale.

**11,389. Day, C. A.,** [National Heating Co.] Aug. 7.

*Heating buildings &c.; heating by water &c. circulation.*—Highly-heated water or other circulating-agent for cooking, warming buildings, &c., and power purposes is circulated through the main C by a force-pump &c. The condensed steam &c. after use is collected in the reservoirs P, and returned by mains D and force-pumps to the central station. The mains are carried in culverts or the like by rollers supported in brackets F to allow for expansion, and are provided with expansion joints E. The joint consists of a brass sliding piece K sliding through a stuffing-box with brass gland K' forming part of a supporting-bracket, or placed in a suitable position. A ball valve is placed in the mains, and the ball rests on inclined ribs, so that water can circulate and clear out dirt. The ends of the house-supply pipes are carried by slides N, n in a box A to allow for expansion. The heated water is fed through a

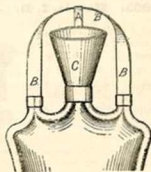
reducing-valve to the steam-generating chamber, whence the steam can be drawn off for heating &c.; the generating-chamber may be surrounded by a hot-water jacket, and may have a pipe leading to



the reservoir P, which collects the condensed steam and returns it to the return mains D. An automatic arrangement may be applied to the generating-chamber for cutting off the supply of hot water when the steam has attained the requisite pressure.

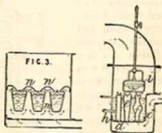
**11,637. Harris, I. B.** Aug. 13.

*Hot-water bottles.*—The mouth or filler *c* is attached by a band A to the suspension band or handle B, so as to be held up during the filling of the bottle.



**11,696. Cooper, J., and Newell, R.** Aug. 14.

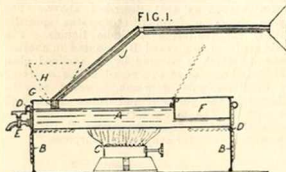
*Heating air for ventilation &c.* Air is passed by tubes *d, e, f* of suitable shape through a vessel *c* containing water which may be heated by a steam pipe *h*; or the air may be passed between troughs *m* and over the surface of the water by baffle-plates *n*, as in Fig. 3.



**11,816. Deane, C. J.,** [known as Sister Rona] Aug. 16.

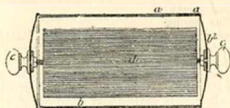
*Heating water.*—Relates to portable hospital or nursery apparatus for supplying hot water, for use

as a bronchitis kettle, for giving vapour baths, and keeping poultices, fomentations, and food warm or moist. The apparatus consists of a shallow vessel or boiler A standing on two side



supports B hinged thereto and kept in position by wires D passing through sheaths attached to A and B. The vessel is heated by a lamp C, and has a cock E for drawing off hot water. Within it is a compartment F, with hinged lid, for keeping food and other articles warm. In the top is a tubular socket G for receiving a filling-funnel H, or a pipe J for supplying vapour for a bath or inhalation. The apparatus may be combined with a medicine or surgical chest, being made so as to fit into the top thereof, the sides and front of the chest having hinged flaps which are let down when the stove is in use.

12,102. Morgan, W. Aug. 22.



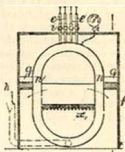
*Footwarmers; bed-warmers.*—Relates to improvements in carriage footwarmers, bed footwarmers, warming-pans, &c. The figure shows a footwarmer in longitudinal section. The inner cylinder *b* slides telescopically within the outer cylinder *a*, and contains a heated earthen or other block *d* of square section. Each cylinder or casing has a dome-shaped cover *b'*, and a wood or other knob *c*. In a modification, the outer cylinder has a flattened underside. The shape of the cylinders or casings in cross-section may be varied as required. In other forms the heating-block is supported in the centre of the inner casing by a hollow hub or sleeve and radial arms, or by a corrugated shell fitting within the inner cylinder. When applied as a warming-pan, the outer, or the outer and inner, casing are perforated. A carriage footwarmer is constructed with inner and outer trough-shaped boxes or casings, fitting upon or within each other, and a heating-block supported

by a corrugated frame fitted within the foot-warmer. The heating-block may be provided with feet or longitudinally-projecting ribs.

12,183. Peake, E. Aug. 23.

*Heating buildings; heating water.*

—Each room is heated by water or steam circulated through a coil of pipes which are connected by separate flow pipes *e* to the boiler, and all communicate with a common return pipe *h*. Cocks *i* are placed in the flow pipes. The boiler is of elliptical annular shape *n*; a partition *g* in the chamber *f*, which encloses the boiler, causes the draught to circulate over the outside.



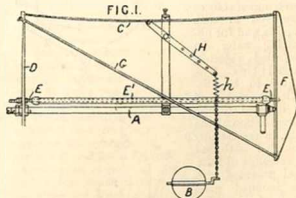
12,358. Brierley, W., [Leuchs, G., and Meiser, F.]. Aug. 28.

*Hot-water bottles; bed-warmers.*—

Metal water bottles, warming-pans, &c. are formed without seams from a blank of sheet metal. The blank is drawn or stamped into a cylinder and spun to the required shape. The body is filled with sand and a maudrel is inserted in the mouth, which is pressed by dies to form the neck; the ears of superfluous metal are punched at *a* for a strap &c. The bottles may be flattened by dies and indented at the bottom.



12,384. Rutzler, E., and Blake, G. W. Aug. 28.



*Thermostats for steam or hot-water apparatus for heating buildings.* A damper B, or regulating-valve &c., is operated by the flexure of the spring C,

which is increased by the expansion of the steam &c. pipe A acting through the lever F. The spring C is attached at one end to a standard adjustably fixed on the pipe A, and at the other end to the lever F, which is pivoted to a bar E adjustably fixed to the standard D. The bar E is protected by a casing E' from the heating effect of the pipe A. A link G connects the lower end of the lever to the standard D, which is slightly flexible, so as to increase the bending of the spring. Instead of actuating the damper by a lever H, as shown, a chain or pulley may be used. A spring *h* is inserted to prevent strain. Two springs C may be used, the lever H being then pivoted on one and connected by a link to the other. Or two rods, pivoted together at the centre, and to D and F at their ends, may replace the spring C.

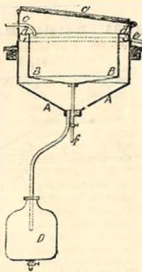
**12,400. Moore, A. M.** Aug. 28.

*Heating water.*—Water to be heated for baths and domestic purposes flows over the domed surface E and down over the wire-gauze cylinder X, which is surrounded by an air jacket K. Heat is supplied from a suitable source placed below the cone which serves to form the hot-water reservoir G.



**12,402. Ziem, T.** Aug. 28.

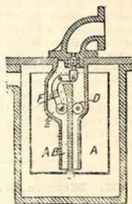
*Solar heat, utilizing.*—Relates to means for utilizing solar heat for the distillation of volatile liquids, for recovering substances dissolved in such liquids, and for obtaining water in so-called waterless localities. The liquid to be distilled or evaporated is exposed to the direct action of the sun, in vessels surrounded with bad conductors of heat, and provided with an inclined glass roof, on which the vapours condense and pass away to the exterior by a system of gutters or conduits.



To obtain water in so-called waterless localities, strongly-hygroscopic salts, such as a concentrated solution of calcium chloride, are allowed to absorb water from the atmosphere, chiefly during the night, and the resulting liquid is then distilled in apparatus such as that described above. The Figure shows a form of apparatus specially adapted for rectifying alcoholic liquids. The liquid is placed in a vessel B, mounted in another vessel A, which is covered by an inclined glass roof C, and connected to a vessel D, for receiving the distillate, part of which, however, may be collected in the gutter *d* and drawn off through the pipe *e*. The pipe *f* serves to withdraw concentrated residues from the vessel B when the apparatus is used for evaporating purposes.

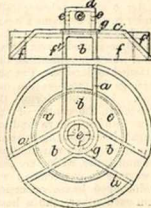
**12,637. Körting, E.** Sept. 1.

*Steam traps.*—Relates to the operation of valves such as are employed in steam traps. A is the float which opens the discharge valve when the water overflows its edge. A rod B is attached to the float and is wedge shaped at the top, the wedge being of increasing slope, so that it acts with diminishing mechanical advantage. The wedge lies between two rollers D and E, the latter of which is pivoted on a lever F which opens the valve slowly at first but with considerable force, and afterwards more rapidly. After the discharge of the water the valve is closed by fluid pressure. Various alternative devices may be provided, all of which are combinations of a wedge and linkwork.



**12,775. Becker, M. I.** Sept. 4.

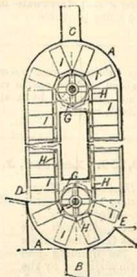
*Boiling-pans.*—Relates to apparatus to be placed in a boiler or copper for causing automatic circulation of the boiling liquid, and consists in constructing the apparatus so that the circulation may be stopped at will for removing the clothes &c. The apparatus comprises two pieces:



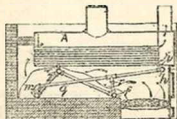
one *c* with three channels *b* formed by vertical ribs *a*, which are cut off obliquely at their ends; another *f*, forming a fixed circular cover with three openings *f*<sup>1</sup> and a hole *g* in the top through which passes a short tube *d*, with perforations *e*, from the top of *c*. The cover *f* is fixed, and the piece *c*, when the copper is charged, is turned so that the channels *b* coincide with the holes *f*<sup>1</sup>. Circulation is thus directed, the liquid entering the channels *b* and discharging through the holes *e* in the tube *d*. By turning the piece *c* until the channels come opposite the closed sides of the cover *f*, circulation is prevented.

12,784. Newlands, B. E. R. Sept. 4.

*Heating - apparatus.*—The Figure shows a sectional view of apparatus specially adapted for drying slabs or sticks of sugar, and applicable for heating other substances or articles, or for subjecting them to the action of gases. Carriers or boxes *I* are secured to the chain *H*, which travels within the casing *A*, and is carried by sprocket-wheels *G*. The hot air &c. is introduced into the casing *B*, and leaves the latter at *C*. The articles to be treated are introduced at *D*, and discharged at *E*. The sprocket-wheels may be rotated continuously or intermittently, and the openings *D*, *E* may have flaps opening under the action of the articles as the latter pass into or from the carriers *I*.



12,800. Nilsson, G. F. Sept. 4.

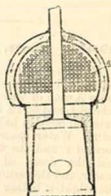


*Heating water.*—Arrangements are provided for effecting the more ready heating and circulation of

the water in boilers, more especially those used for heating by steam or hot water. In the flues of the externally-fired boiler *A*, gratings of pipes *g* and pipes *r* are respectively connected to horizontal pipes *m*, *f*, and *h* as shown. The pipes *m*, *f* pass through each side of the boiler setting and join a common horizontal pipe *z* which opens, about the middle of its length, to the lowest portion of the boiler. The pipe *h* traverses the setting in a similar manner and by an upward extension *i*, at each end, connects with the boiler water at a higher level. By opening at the ends of the pipes *m* and *h*, controlled by stop-cocks, the tubes of water-heating systems are easily attached and the circulation therein readily maintained.

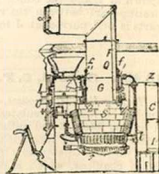
12,989. Littler, F., Haslam, T., and Moorcroft, J. Sept. 5.

*Heating air.*—Air is heated by passing it through stacks of tubes arranged in a chamber which is connected to a vertical or other steam generator, and may act as a dome. The form of the chamber is cylindrical, or a cylinder with part cut off parallel to the axis as shown. There is an outer casing *14*, through which the air circulates before it passes to the tubes *10*, which are arranged in two or more groups, and communicate with end chambers divided into two or more parts, so as to cause the air to pass backwards and forwards. The air to be heated may pass through a casing surrounding the flue.



13,026. Farquhar, F., Farquhar, M. J., and Farquhar, H. B. Sept. 8.

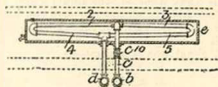
*Heating air and water.*—Relates to heating - apparatus for buildings combining a warm-air furnace and a hot-water heater. The air for combustion is heated in a flue *t* surrounding the fire-pot *S*, and then passes to the annular tuyère *f* surrounding the fuel magazine *G*. An annular water chamber *2*, with flow and return pipes *I*, *O*, surrounds the lower end of the tuyère. The water



is circulated through a system of radiators for heating a building; or the same apparatus may be used for heating feedwater for a steam boiler or for other purposes. The products of combustion pass through the flue C or the flues C and D, which are placed in an air space Z to heat air. By the use of this apparatus buildings may be heated by water or hot-air, or by both, at will.

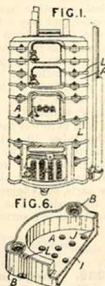
**13,068. Sewall, D. D.** Sept. 10.

*Heating water for heating railway cars &c.* Hot-water tanks under the seats are heated by steam circulating pipes or by steam jets. The Figure shows one arrangement, in which a main steam pipe *b* from the boiler or other source is provided at intervals with branches *c* fitted with valves *c*<sup>10</sup> and communicating with circulating pipes 2, 3, 4, 5 in the tank *e* which is filled with water or other liquid. The water of condensation from the circulating pipes collects in a pipe *d* which slopes downwards from each end of the car towards the centre, where it is furnished with a steam trap. Different arrangements of pipes may be used to suit particular cases. In place of these arrangements, the steam pipe *c* may terminate inside the tank in nozzles from which jets of steam are discharged, an overflow pipe being provided.



**13,131. Boulton, A. J., [Gurney, E.]** Sept. 11.

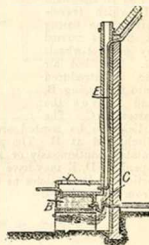
*Heating water.*—A heater is built up of sections A each of which has a bead L cast on its lower external edge to hide the joint. Water spaces are formed round the ashpit and the doors of the heater, and the bottom of the ashpit is hollow so as to form a water space. The return pipe is led into the water space surrounding the ashpit, and all water spaces are connected as at B, to afford a free flow. A chamber is also provided extending from the main body of the boiler, into the crown of which the return pipe may lead. The upper sections are dished as shown at I, and the connecting part between the vertical and horizontal parts is well curved at J to prevent friction. On



one section a disc valve, operated by a rod, is pivoted, and serves to control the draught. The joints are made by a strip of asbestos or other suitable material.

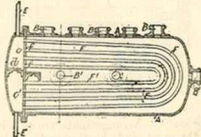
**13,158. Lawson, J.** Sept. 12.

*Heating buildings; heating water; heating air.*—Hot water circulates through the pipes C at the bottom of the building and warm air is led by the pipes E to the roof, where it may be distributed in any suitable manner for heating and ventilating. Water is heated in the boiler B, in connection with which are air-heating chambers arranged in suitable position.



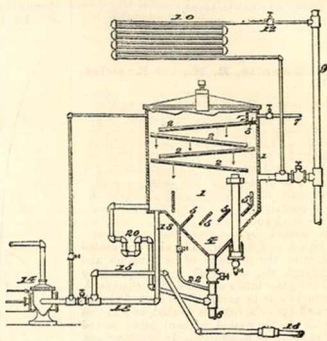
**13,485. Seward, C. F., and Walton, H. G.** Sept. 18.

*Heating liquids or gases.*—Water, air, or other fluid to be heated circulates through the chamber A having inlets B and outlets B'. It is heated by steam circulating through the pipes F, which are fixed into the tube-plate *f* forming one end of the steam chamber, which is divided into two parts *c, c'* by a partition *d*. Steam is admitted by the pipe E, and exhausts through E'. The Specification mentions the use of the apparatus for heating water for warming buildings.

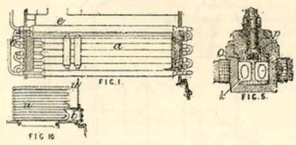


13,851. Webster, W. Sept. 25.

*Heating water.*—The water is passed over a series of trays in a chamber to which exhaust steam is supplied. A section of an apparatus with the necessary connections is shown. The water enters the distributing-box 3 by the pipe 7, and passes over the perforated trays 2, 2, during which process it is heated by contact with steam supplied from the exhaust pipe 9 of a steam engine, or from heating-coils 10. The sediment collects in the bottom 4 of the heater 1, being protected from disturbance by plates 5, 5, and is discharged at intervals through the pipe 6. The oil is removed by a pipe 22. The purified water flows away through the pipe 13 to the pump 14, or by the pipe 15 to a storage tank. The pump also removes the air &c. from the heater, so that a partial vacuum is formed. The feed may be passed through a series of coils in the heater before its discharge on to the trays, so that it condenses any vapour rising from the trays, and is itself heated in the process.



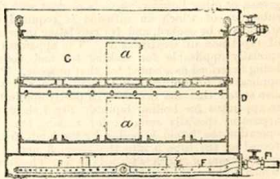
13,963. Saunders, S. Sept. 28.



*Heating water.*—The tubes *a* of a tubular boiler, Fig. 1, are arranged close together so as to permit of the formation of outside flues *e*. The ends of the tubes may be contracted to allow the flame to pass, or the ends of the boiler may be open. Valves for cutting off any part of the heating-apparatus may be formed as shown in Fig. 5. The valve spindle is connected to the valve body *k* by a square *o*, and is provided with a conical seating *p* in place of packing. In some forms the valve is fixed to the spindle. A three-way valve may be similarly constructed. A four-way pumping-valve is used for expelling air when filling the boiler. This valve is placed at the junction of four pipes, and is formed with a transverse partition which can be placed in either of two positions. In coiled-tube boilers the coils *u* are bent back, as in Fig. 10, to form an entrance to the interior at the

door *t*. To allow for excessive pressure &c., a safety-valve and an inlet valve are attached to the air chamber.

14,113. Hallett, W. C., [Dahl, K. G.]. Oct. 1.

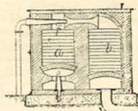


*Heating liquids.* Consists of apparatus for carrying out the process of sterilizing milk described in Specification No. 10,903, A.D. 1886. The milk is contained in a number of hermetically-sealed cans *a* which are held in an open rack or frame *C* resting on a perforated false bottom *E* and adapted to be lifted in and out of a tank *H* by a hydraulic lift or other means. Alternate heating

and cooling is effected by a steam pipe F and by cold water admitted through the inlet *m*, but other suitable means may be employed.

**14,363. Thwaite, B. H., and Kuowles, S.** Oct. 6.

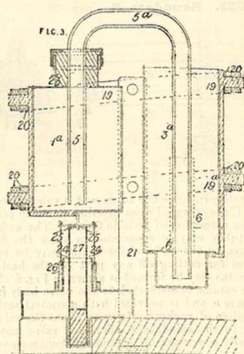
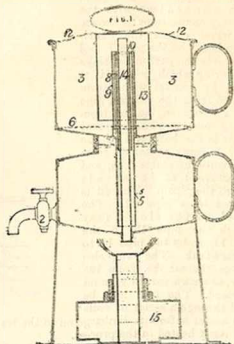
*Heating gases; heating water.*—Air, steam, and other fluids are heated for drying fabrics &c. or for heating buildings, heating water, &c. The apparatus consists of a chamber *a* containing a nest of brickwork which is heated by gaseous, liquid, or solid fuel. The air to be heated is mixed with the products of combustion and passed through the brickwork. An aspirator *f* may lead the gases into a second similar chamber *b*. The apparatus may be arranged so that first one chamber and then the other is heated, and in this case the air &c. is heated without being mixed with the products of combustion. In modifications, air may also be heated before it enters by passing through a jacket surrounding the chamber. The heated air may be used to heat water; the aspirator forces the air into an annular chamber whence it escapes through the water in a vat or other vessel. Or the heated air may be led round the tubes of a tubular boiler or air-heating vessel through the tubes of which air &c. flows.



**14,893. Wynne, F.** Oct. 17.

*Heating liquids.*—Relates to apparatus for regulating the time during which water, syrup, melted grease, or other liquid remains in contact with the substance of which an infusion is required, or which is to be cooked, and for regulating intervals of repetition of treatment &c. The apparatus is specially applicable for making tea and coffee, being described as adapted for that purpose. The application for boiling eggs is mentioned, and it is also stated that the invention is partly applicable to apparatus for boiling liquids. Fig. 1 shows an apparatus specially suitable for making tea. In operation the liquid is boiled by the lamp 15 and forced up the tube 5 into the vessel 3, upon the false bottom of which is placed the tea. The steam which follows the liquid passes down the tube 14 and extinguishes the lamp, so that the pressure falls and the infusion in the vessel 3 siphons back. Fig. 3 shows a form of the apparatus specially adapted for making coffee. In operation the water in 1<sup>a</sup> is boiled in a spirit lamp, which is preferably one constructed to burn with two flames, and thereby driven over into the vessel 3<sup>a</sup>, causing the latter to increase in weight and descend. As the vessel 1<sup>a</sup> ascends it lifts the sleeve 26 of the lamp, thereby extinguishing the outer flame at 24 and

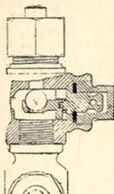
reducing the larger flame at 25. The vessel 1<sup>a</sup> therefore cools, a partial vacuum is produced therein, and the infusion returns from the vessel 3<sup>a</sup>. On re-lighting the lamp the process may be



repeated. The wick-tube 27 may also be raised from the spirit by the vessel 1<sup>a</sup>, so that the flame burns out in a definite time and thereby regulates the time of infusion.

- 14,952. Dewrance, J., and Wall, G. H.  
Oct. 18.

*Heating water.*—Relates to gauge glass fittings for "steam and "other boilers." Valves, arranged to close automatically on fracture of the gauge glass, are supported in the lower arm so as to be easily withdrawn for cleansing purposes, inspection, &c. The valve support E is secured to a disc which is admitted through a central opening in the gauge-cock fitting, a suitable joint being provided.



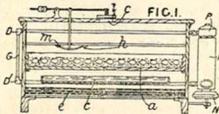
- 15,058. Lönholdt, W. Oct. 19. *Drawings to Specification.*

*Heating air.*—In order to increase the action of a wall ventilator of special construction, and to heat the air, a Bunsen burner is employed having its head arranged parallel to the casing of the ventilator and covered by a heating-plate.

- 15,229. Newton, J., and Quiggin, D. A.  
Oct. 23. *Drawings to Specification.*

*Heating liquids and gases.*—In apparatus for heating fluids spiral coils of crescent-section metallic tubing are employed. The tubes may be made taper.

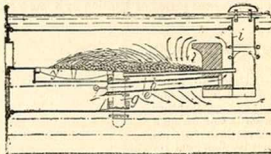
- 15,368. Field, J. P. F. Oct. 25.



*Heating water; thermostats.*—Relates to incubators and fostermothers heated by a series of circulating pipes D, G, D' connected at the side of the apparatus to a boiler of special construction heated by the adjustably-supported lamp N. The boiler consists of a lower portion I, with a central conical flue, and of an upper part P, without a flue, connected to the lower part by tubes. The products of combustion pass up the centre of the part I, and, impinging against the bottom of the part P, escape into the air. The temperature inside the apparatus is regulated by means of a thermostat which operates either a damper l placed over a hole C in the cover, or mechanism for varying

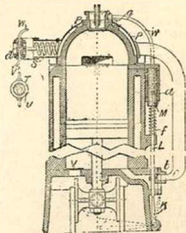
the flame of the lamp. The thermostat consists of a metallic vessel formed with curved sides and filled with liquid, which, when expanded through heat, causes the vessel to become flatter. The thermostat is supported rigidly at m, and by a pin and slot at h.

- 15,495. Hilton, J., Jackson, E., and Hilton, G. C. Oct. 27.



*Heating water.*—The arrangement shown in connection with a Lancashire boiler is also applicable to hot-water boilers. A down-draught furnace is employed with heated air supplied to the combustion products. The grate consists of two portions y, e, the rear of which is composed of tubular bars opening into the chambers g, i connected to the boiler water-space or to water tanks. Pipes b, conveying air to the rear of the bridge for smoke-consuming purposes, pass through the back portion of the ashpit. Water circulation is effected by connecting the tubular firebars e to different portions of the boiler water-space.

- 15,845. Boulton, A. J., [Capitaine, E.].  
Nov. 2.



*Thermostats.*—For automatically controlling the temperature of the combustion chamber of a gas engine and minimizing the effect of premature ignition, the arrangements shown are employed. The combustion chamber is surrounded by an air jacket P containing a metal differential thermometer S which actuates a valve T in the pipe V, W



through which water is supplied to the combustion chamber. If the pressure in the cylinder is unduly increased owing to the excessive temperature or a premature ignition, it will force the piston valve *M* downwards against the spring *f* and open communication between the water pipes *V* and *W* through the port *d*. The rod *L* will also communicate the motion of the valve *M* to a small valve *t* for admitting air from the lower end of the cylinder through the pipe *Q* and combustion chamber jacket *P*. The valves *M* and *t* may be held up during the period of ignition by a finger *k*

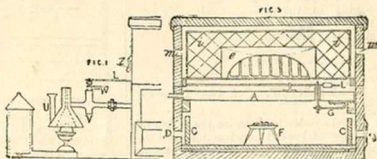
actuated by an eccentric on the crank shaft. Water may be admitted by a small pipe *q* into the combustion chamber casing *P*.

**15,980. Albert, H., Fellner, C., and Ziegler, C.** Nov. 5. *Drawings to Specification.*

*Heating air; heating liquids.*—Air or liquid is passed through pipes contained in a chamber for cooling the hot gases from pyrites burners, and used as a source of heat for drying, evaporating, or heating.

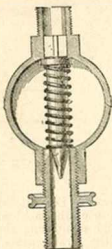
**16,097. Gabb, J.** Nov. 7.

*Heating water; thermostats.*—Relates to apparatus for hatching and rearing chickens and other young birds, comprising a tank *A*, which is furnished with flow and return pipes connecting it with a small boiler of special construction, and means for regulating the temperature. The boiler is shown in Fig. 1. The lower part is conical and is formed with a central flue which passes up through the boiler. The boiler is furnished with a funnel-shaped pipe *U* for filling and with pipes which connect the upper and lower parts with the flow and return pipes of the tank respectively. The temperature is regulated by controlling the flow of hot water from the boiler to the tank. This is accomplished by means of a valve operated either by hand or automatically and consisting of a plug *W* working freely in a closed cylindrical seat *V* inserted in the supply pipe. The plug *W* is formed with two orifices of different size placed at right-angles to each other and arranged so that by turning the handle *Z* a large or a small free way for the hot water is formed. In addition to this movement the plug *W* can be raised to diminish or to close the water way by means of a lever *L* pivoted, as shown in Fig. 3, over the tank *A* and operated either by the thermostat *G*, which consists of a compound bar of suitable metals, or by a special electromagnetic device.



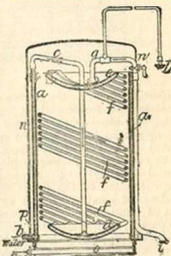
**16,160. Baird, E.** Nov. 8.

*Steam traps.*—A spindle constructed so as to form a beat valve at each end works between two seatings in a lock-chamber. It is acted on in one direction by a spring, and in the other by the alternating pressure in the engine cylinder or steam pipe &c. to be drained. The lower seating may be screwed up to stop the action of the apparatus.



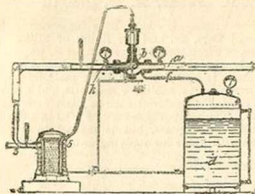
**16,540. Wise, W. L.,** [Eschebach, C., (trading as Eschebach & Hausmer)]. Nov. 14.

*Heating water for baths.* The casing consists of a double-walled cylinder *a*, covered by a bell *n*. The water enters the hollow wall of the cylinder *a* by a pipe *b*, and passing upwards escapes by a pipe *c* downwards to a hollow-walled cup-shaped vessel *d*, which communicates with a similar vessel *e* by a series of spiral tubes *f*. A pipe *g* leads from this vessel to the bath at *i*, or a spray at *l*. The



heated vapours from a ring burner *o* pass upwards through the cylinder *a*, and then downwards through the annular passage formed between the outer bell *n* and cylinder *a* to outlets such as *p*.

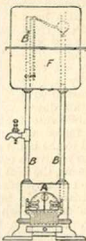
**17,006. Popp, V.** Nov. 22.



*Heating air.*—The apparatus is for moistening and heating the compressed air supplied to houses for the production of motive-power. The air supplied from some source by the pipe *a* passes through the valve *b* into an annular chamber in a heater *5* containing baffle-plates, and escapes by the pipe *3*. The air is moistened by spraying liquid into it at *k*. The liquid is supplied from a reservoir *d*, and is kept under pressure by air supplied from the pipe *a* by the pipe *f*; it is heated by passing through a coil around the air chamber in the heater, and its flow is regulated by a cock *r* which is controlled by the valve *b*.

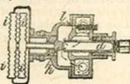
**17,302. Jenkins, W. H.** Nov. 28.

*Heating water.*—Relates to apparatus for the supply of hot and cold water. A tank *F* is supported above a boiler *A* by four pipes *B*, two of which serve for flow and return pipes, one for cold water feed, and one for a waste pipe. Draw off cocks are placed on the hot and cold water pipes.



**17,362. Summerskill, C. W.** Nov. 29.

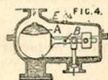
*Thermostats.*—This thermostat is used for controlling the supply of gas or liquid fuel, or for regulating air or steam supplied for



heating buildings or for adjusting the temperature of lacquering and japanning stoves. The form shown is applicable for controlling gas supply, the path of which is shown by arrows. A valve *h*, attached to one or more chambers *i*, opens or closes the passage through the adjustable tube *d* as the temperature falls or rises. A bye-pass *l* is provided. The valve *h* may be carried by a spring to prevent damage to the chambers *i*. The chambers *i* are preferably corrugated and filled with gas or liquid, or partly filled with volatile liquid.

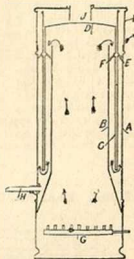
**17,424. Murrie, J.** Nov. 29.

*Steam traps.*—An alarm float arrangement for steam boilers may serve as a steam trap. An example is shown in Fig. 4. In this, the accumulation of condensed water within the chamber *E* raises the float *A* around the fulcrum *B*, opens the valve, and allows the contents to be ejected.



**17,455. Winterhood, J.** Nov. 30.

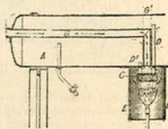
*Heating water.*—Between the cylinders *A*, *B* is placed the hollow cylinder *C* as shown. Water is introduced into *C* through the opening *J* in the cover *I*, and falls as spray from the perforations *E*, *F*, flowing away through *H*. The products of combustion from the burner *G* pass as shown by arrows, and escape through the perforated cover *I*.



**17,607. Fenlon, H. T.** Dec. 3.

*Heating buildings; heating water.*

—The large heating-receptacle *A* filled with water is connected to the smaller receptacle *C* by flow and return pipes *D*, *D'*. Water is heated in *C* by gas &c. A shield *E* and flues *G* may be provided,



17,643. Winter, T. Dec. 4.

*Heating liquids.*—

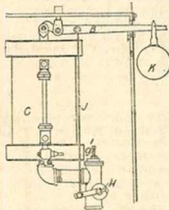
Relates to apparatus for heating and boiling sizing, dye liquor, water, or other liquors by steam. Exit nozzles for steam are screwed into holes tapped in the steam pipes. The hole through the nozzle is preferably of the shape shown. To prevent the steam pipes from becoming filled with liquor when steam is turned off, the steam cock is connected to a second cock which opens an air supply.



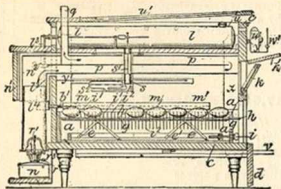
17,744. Brierley, W., [Wilson, W., and Sparrow, J.] Dec. 5.

*Steam traps.*—

The water chamber C is suspended from the shorter end of a counterpoised lever B. The escape valve is operated by a tappet on a rock shaft H, which is oscillated from the lever B through the link J. The positions of the shaft H and counterweight K are adjustable, so that the water can escape at any desired rate when its weight tilts the lever B. The rise of the escape valve is limited by a set-screw  $g^1$ .



17,903. Charlan, T. Dec. 7.



*Thermostats for incubators.* The temperature within the incubator is regulated by means of an extinguishing roller or cap  $r^1$ , which is connected by a series of links to a thermostat composed of a vessel  $s^1$  containing mercury and air, and connected

to a vertical chamber  $s^1$  in which works a float which, as the temperature rises, is forced upwards and acting through the said links operates the cap  $r^1$  partially to extinguish the flame of the lamp.

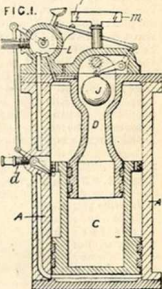
18,031. Johns, H. W. Dec. 11.

*Non-conducting compositions* for covering steam pipes, boilers, &c. and for lining or filling walls, safes, refrigerators, refrigerating-cars, wagons, &c. Finely-divided sponge, with or without asbestos or hair, is mixed with a body material such as infusorial earth, kaolin, or magnesia, and a cementing or binding material such as plaster of Paris or lime. The composition may be used in a dry state for filling purposes, but is made into a plastic mass with water for applying to boilers &c.

18,053. Tongue, J. G., [Mitchell, J. M.] Dec. 11.

*Steam traps.*—

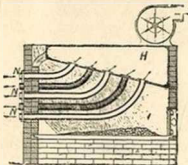
Relates to a steam trap provided with means for forcing the water of condensation back into the boiler, and capable also of acting as a pump. The main parts of the apparatus are a pair of cylinders, one C fitting and sliding within the other A over a piston formed at the end of a neck D depending from the cover of the outer one. The drainings are conducted by a pipe  $m, r$  furnished with inlet and outlet check valves into the inner cylinder, which, when full, is forced upwards by steam automatically admitted to the underside. The steam is admitted by a rotary valve L operated by a float and weight arrangement, the float J being situated in the neck D. The inner cylinder when nearing its upward limit actuates by a tappet arrangement the valve L so as to establish equilibrium in the outer cylinder, whereupon the inner one sinks to its original position. The exhaust during the upward movement of the cylinder passes out by a pipe  $d$ . When the apparatus is required to force water in addition to the drainings, one of the steam passages is altered by means of a movable plug, and a suction and discharge pipe furnished with valves is substituted for the exhaust pipe  $d$ .



1898]

ABRIDGMENT CLASS HEATING.

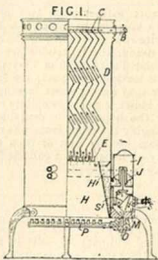
18,139. **Walworth, J.** Dec. 12.



*Heating air.*—For drying grain, tea, straw, hay, &c., air is heated in the tubes N and chamber H, through which it is drawn by a fan or blower. The chamber H may be arranged at the top or the side of the furnace, or it may be dispensed with.

18,692. **Righton, W. J.** Dec. 21.

*Heating water for baths &c.* Relates to instantaneous water-heaters or geysers. The water flows from the inlet pipe B and branch pipes C over zig-zag corrugated plates D to the troughs E and cistern H'. The products of combustion pass from the gas burner P (which can revolve on a conical plug O) through the conical chimney H, and between the plates D. The supply of gas is regulated by a float valve J in a small cistern I, connected to the cistern H', and a swing flap S,

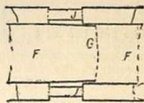


acting in conjunction with a partition plate S' in the gas-box M. The water may descend, and the combustion products ascend, over screw or other surfaces between concentric corrugated cylinders, separate from or surrounding the zig-zag plates D.

18,729. **Rees, E.** Dec. 22.

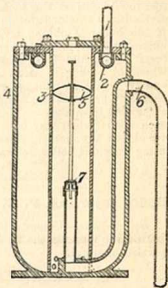
*Heating buildings*

& c. — Water-jacketed flues F are carried through the greenhouse or other building to be heated, the lengths being formed with a projecting part G at one end to fit into the next length, and the water jackets being connected by short pipes J, soldered, screwed, or otherwise fastened.



19,026. **Williams, J., and Williams, W.** Dec. 31.

*Steam traps.*—A section of one is shown in which the pipe 1 connects it with the vessel to be drained. The water is delivered into the outer cylinder 2, and enters the inner cylinder 3 through the holes in the bottom. When water has sufficiently accumulated, the float 5 rises and lifts the discharge valve 7 in the siphon-outlet pipe 6.



## APPENDIX.

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The first two of the following abridgments should be added to those appearing in the volume for A.D. 1877-83.

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### A.D. 1883.

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**2294. Boulton, A. J.,** [*Deinhardt, I.*]. May 5. *Drawings to Specification.*

*Boiling-pans.*—Relates to apparatus for boiling wort with hops in two or three stages so as to thoroughly extract the hops without losing the more volatile principles. A boiling-vessel or copper divided into two or three or more compartments by wirework partitions, or the equivalent, may be used. If the boiler is oblong it is divided crosswise; if round, the partitions are vertical and radial, or horizontal. Hops that have been previously partly boiled are placed in that part of the boiler that is most heated, and fresh hops are introduced into the least heated part; the fresh hops may be added when the boiling is partly done. The oblong boiler may have a shaft passing through it from end to end, by means of which a screw near each end of the boiler is made to agitate the hops. The divisions used may be movable, sliding between angle-irons; or the hops may be contained in suitable receptacles suspended from above. To avoid the trouble of changing the hops from one compartment to another, each compartment may have an exit pipe at its bottom leading to a division of a straining-apparatus which has a collecting-vessel below it. Each quality of hops is thus collected separately. Instead of using a divided boiler, several independent coppers may be employed.

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**2660. Bjorling, P. R.** May 29. [*Provisional protection only.*]

*Boiling-pans.*—Consists in making brewing-pans and culinary utensils in general with corrugated bottoms to increase the heating-surface. The corrugations may be in concentric shapes, or they may be parallel or spiral.

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### A.D. 1884.

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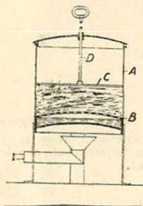
**2824. Hunt, J.** Feb. 6.

*Boiling-pans* for washing clothes. The vessel A has a perforated false bottom B, having a downward flange so that a space is left beneath it to contain water. The clothes are placed upon this false bottom and are cleansed entirely by the action of the generated steam. The steam rises through the perforations, and is confined by a cover C which, by means of the stem D, can also be

1884]

APPENDIX TO ABRIDGMENT CLASS HEATING.

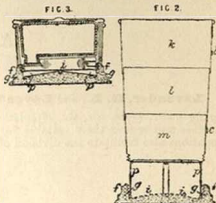
used as a presser. When the apparatus is large, steam may be admitted into the space between the bottoms direct from a boiler.



3146. **Dann, J. T.**, [*Bergmann, T.*]. Feb. 12.

*Heating liquids.*—Relates to a telescopic drinking-vessel with an appliance for heating it. The vessel is made in a number of parts *k, l, m*, fitting one into the other and kept in the drawn-out position when required for use by the application of a handle. The lowest division *m* screws into a

bare part *f*, and when it is required to have the contents of the vessel heated, this stand is formed as in Fig. 1. It is hollow and filled with cotton slag or similar material *g*, for the purpose of absorbing spirits or other liquid fuel; *i* is a sheet



of gauze or perforated metal through which the fuel burns. Legs or supports *p* unfold from within the stand, and upon the upper ends of these legs the vessel rests. Fig. 2 shows the vessel in its folded up condition, and enclosing a vessel containing a supply of tea, cocoa, or other alimentary substance, or of the fuel used.

A.D. 1885.

6938. **Lindsay, T. S.** June 8. *Drawings to Specification.*

*Heating air.*—Relates to retorts for gas manufacture, which can also be used as steam superheaters or for superheating air for hot blasts &c. The retorts, preferably of iron and cylindrical, are each fitted internally with a series of deflecting-cones which direct the current of steam or air against the sides of the retort in thin streams. The bases of the cones are perforated to allow of the passage of the steam or air.

A.D. 1886.

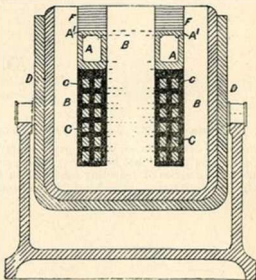
11,045. **Lavender, G. L., and Lavender, H. F.** Aug. 30. *Drawings to Specification.*

*Heating by water, steam, air, &c. circulation.*—Pipes are formed with corrugations to give them a greater surface and render them suitable for heating by means of water, steam, air, or other medium. The corrugations also facilitate the division of the pipes when required.

A.D. 1887.

700. **Ferranti, S. Z. de.** Jan. 15.

*Heating by electricity.*—Relates to electric furnaces and heating-apparatus so formed that the current which circulates in the chamber or crucible is induced therein by a magnetic field of varying intensity, no electrodes being used. The Figure shows a section of one form of furnace. A is an annular oblong crucible, A' the lid, and B, B a mass of soft iron formed of a number of plates cut to the proper shape, with connecting iron plates F above the lid A'. C, C is a conductor embedded in insulating-material and passing round the central limb of the soft iron mass. The framework D is mounted on trunnions so that liquids may be easily poured from the crucible. The ends of the crucible project beyond the plates in order that access may be easily obtained to the contents. For boiling or heating liquids a brass or copper pot may be used instead of the crucible. The invention may be applied for heating water in a pipe or vessel forming part of a hot-water circulating system.



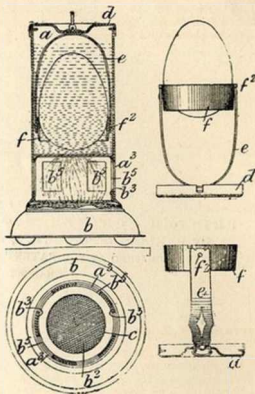
10,281. **Backus, Q. S.** July 22. *Drawings to Specification.*

*Heating buildings.*—Gas fires are arranged to heat water-circulating or steam-generating boilers which are connected to heat-radiators in the mantelpiece or in the chimney apertures of other rooms. Circulating-pipes may also be arranged in connection with the hearth and fender.

A.D. 1888.

5417. **Brookes, T., Adam, T., and Brookes, F. T.**  
 April 12.

*Heating water.*—Relates to shaving-cups and other like water heaters, applicable for boiling eggs. The heater consists of a spirit-containing base *b* with a burner *b<sup>1</sup>*, around which rises a cylinder *b<sup>2</sup>* with slots *b<sup>3</sup>* in its sides, and of a water container *a*, the sides of which are extended below the bottom and provided with slots *a<sup>3</sup>* corresponding with the slots *b<sup>3</sup>*, so that by turning the container round the air passages are cut off and the lamp extinguished.







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1897

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