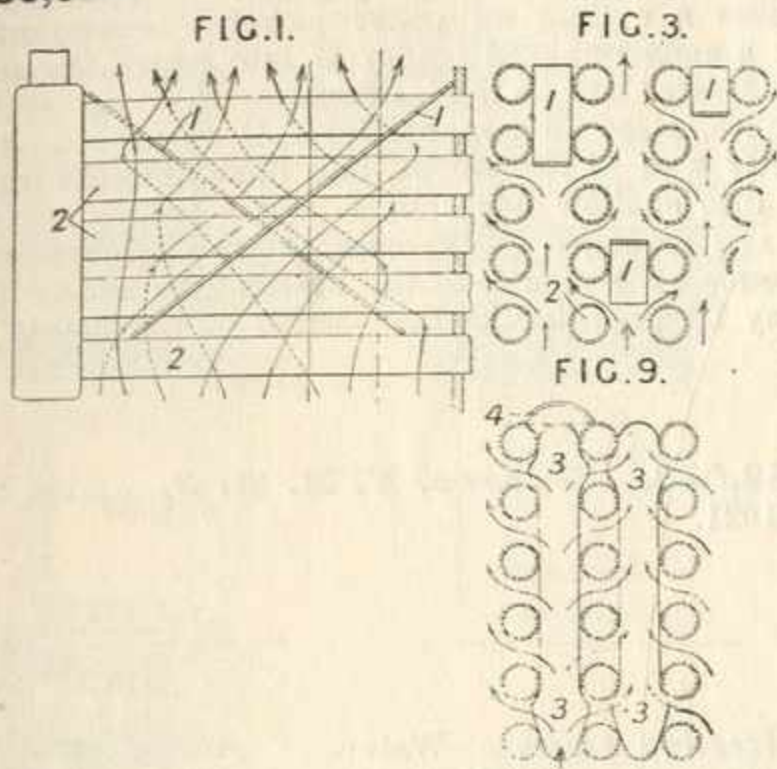
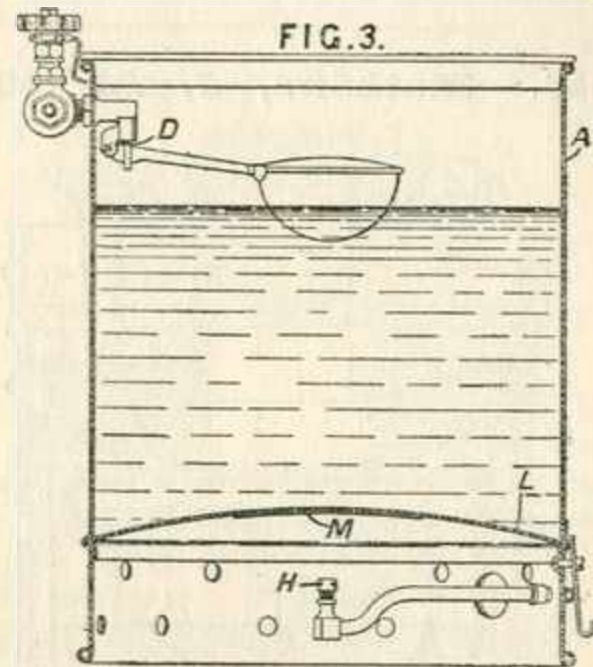




180,512.



A heated continuously by a burner H and having a sheet M of non-corrodible metal, such as nickel chromium alloy, fixed in, upon, or just below its copper bottom L in the region of the flame, and means such as a ball cock D for allowing water



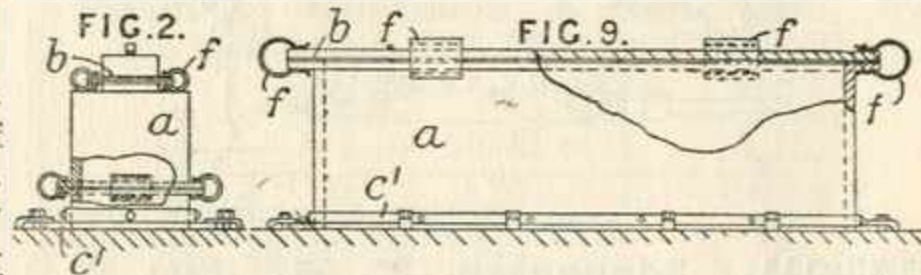
180,710. Bastian, C. O., and Haward, T. G. Dec. 3, 1920.

Heating water.—A boiler for providing a supply of hot water at constant temperature below boiling-point consists of a water-containing vessel

to flow slowly into the vessel at a fixed predetermined rate. The size of the flame is so fixed that the temperature of the water can never rise above say 150° F. Water flows in at such a rate that the vessel is filled in about 20 hours. Specification 152,721 is referred to.

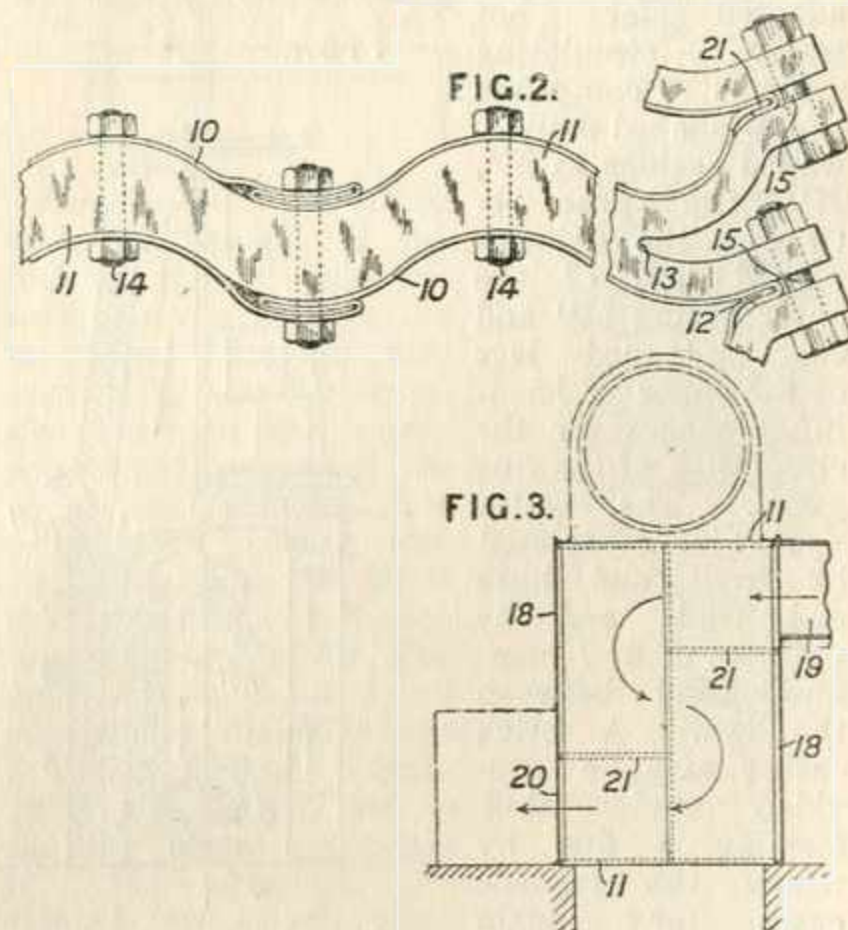
181,066. Ogden, W. J. Feb. 24, 1921.

Feed-water, heating.—A casing a for preventing admission of air through the chain-holes of economizers encloses the wheel of the gearing. It is secured to the top of the economizer by flanges c', and it is provided with fixed or detachable tops b which may be held by spring clips f or may be in the form of sliding doors.



181,501. Merz & McLellan, Weeks, E. G., and Baker, H. H. March 16, 1921.

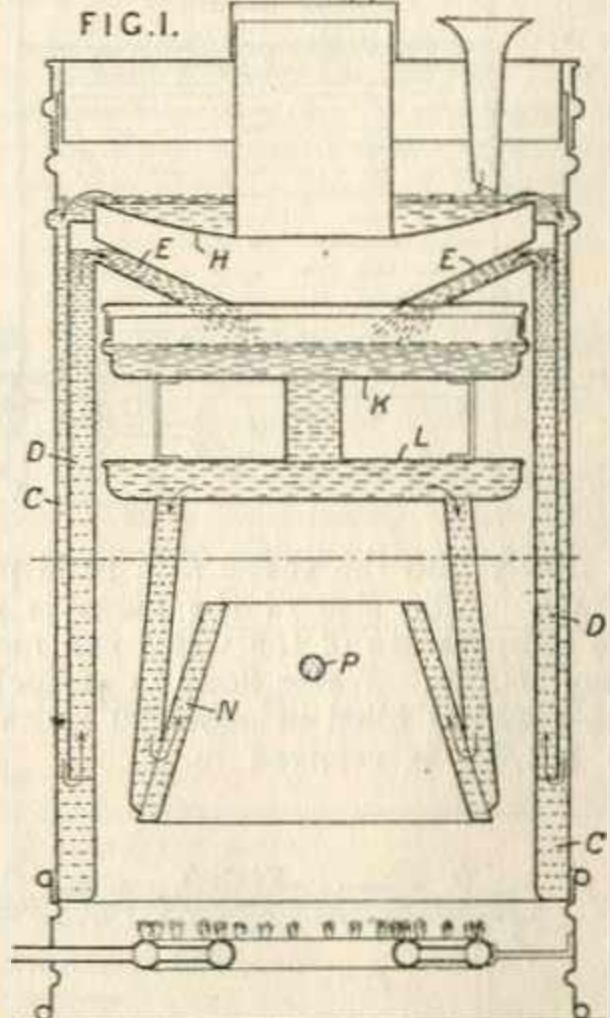
Heating gases.—In a heat-exchanger comprising a plurality of corrugated sheets spaced apart with the corrugations parallel to one another, with means at the margins of the sheets to close the spaces between alternate pairs, thus providing two sets of through-passages at right-angles to each other, the spaces are closed on two sides by placing the edges parallel to the lengths of the corrugations of each pair in contact and securing them, preferably by rolling one edge over the other and gripping them between the ends of spacing bars which lie between each pair of sheets along their transverse margins. The rectangular spacing bars 11 are rolled to fit the corrugations and constitute means for closing the other set of spaces, are bifurcated at their ends 13, and are secured together by bolts 15, the adjacent portions of the bars gripping the rolled edges 12 of the sheets 10. Bolts 14 secure the sheets to the bars and joints are made by rolling the meeting edges one over the other and bolting through the rolled portions and spacing bars. Fig. 3 shows the heater arranged for heating air supplied to a furnace by means of



waste gases, with the length of the corrugations vertical. The flow of the flue gases is vertical

The air is given the direction shown by the arrows by baffles 21. The vertical sides of the heater are closed by flat plates, and the front and back partly closed by plates 18, leaving openings 19 and 20 for the exit and entrance of the air.

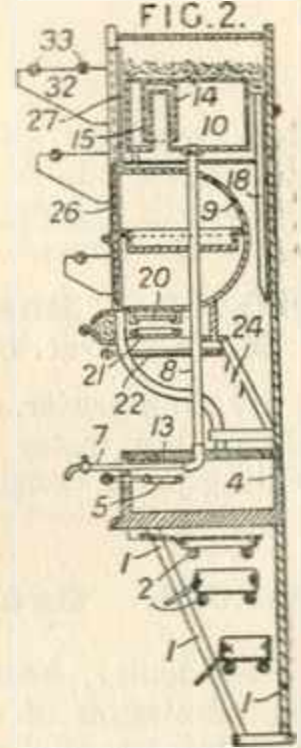
181,843. Mathews, J. A. March 23, 1921.



Internally-fired boilers; geysers.—A geyser comprises a cylindrical water jacket C surmounted by a saucer-shaped holder H into which the supply water enters and overflows into the water jacket, rises in two conduits D secured to the inner wall of the jacket, and flows through pipes E into shallow boxes K, L and a hollow conical box N arranged in the combustion chamber, and thence by a pipe P to the outlet. An escape tap may be provided at the bottom of the jacket C.

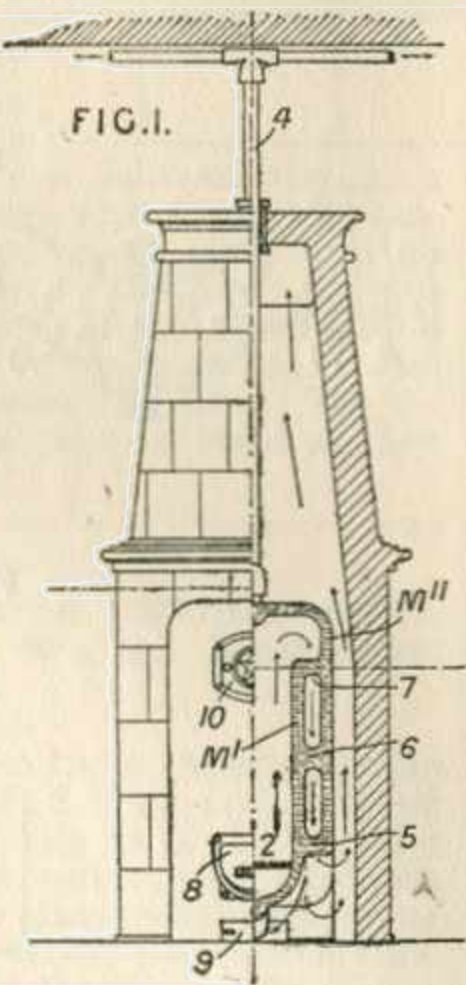
182,028. Pearce, F. R. R. J. Aug. 23, 1921.

Heating water.—Water-heating pipes 7 above the burners 5 of a cooking-stove are connected by circulating pipes to a tank 10 which is provided internally with eccentric "bells" 14, 15, into the inner of which hot gases pass to assist in heating the water in the space between the bells.



182,041. Ljunggren, H. K. Sept. 23, 1921.

Internally-fired boilers.—A boiler adapted for hot water circulating systems comprises two U-shaped double-walled casings as M¹, M¹¹, the space between the downturned legs of the outer casing M¹¹ and the up-turned legs of the inner M forming passages for the circulation of the flue gases. The water space is completed by front and back end walls and by pipes as 5, 6, 7 communicating between the legs. A brick casing may be provided outside, thus forming a flue by which the furnace gases may again traverse the heating-surface of the boiler. Water enters at the bottom of the inner casing at the



middle, circulating to the outflow pipe 4 at the middle of the outer casing, and the heating-gases circulate in the direction of the arrows from the fuel, which is inserted through a fire-door 8 to the flue. The end walls of the boiler act as supporting-legs, doors 9, 10 being provided for regulating draught and removing ashes and for cleaning purposes respectively.

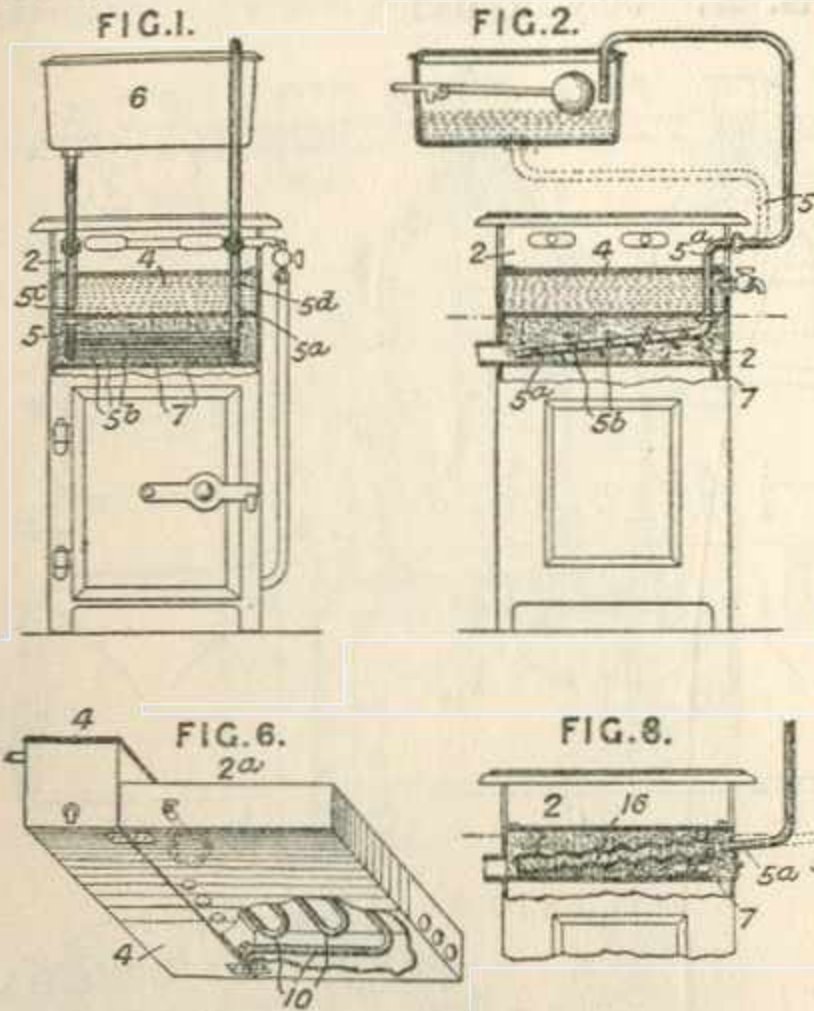
182,637. Bohar, V. May 24, 1921.

Slab-form boilers; water-tube boilers.—A water-heater is arranged in a chamber packed with heat-absorbing material and situated above the oven of a gas-stove. Figs. 1 and 2 show one form, in which header tubes 5, 5^a and cross tubes 5^b are arranged in the space 2, which is packed with wire, gauze, metal shavings, or like heat-conducting material. The tubes 5, 5^a pass through a tank 4 and communicate with it by openings 5^c, 5^d; a supply cistern 6 is connected as shown. In a modification, the tank 4 is arranged at one side of the stove; Fig. 6 shows an apparatus of this type for adapting to existing stoves, in which the water-heating tube 10 is arranged in a compartment 2^a which may be hinged to the tank 4. In small stoves the tank 4 may be omitted. Fig. 8 shows another form of heater consisting of a shallow vessel 16, the sides of which may be corrugated.

(For Figs. see next page.)

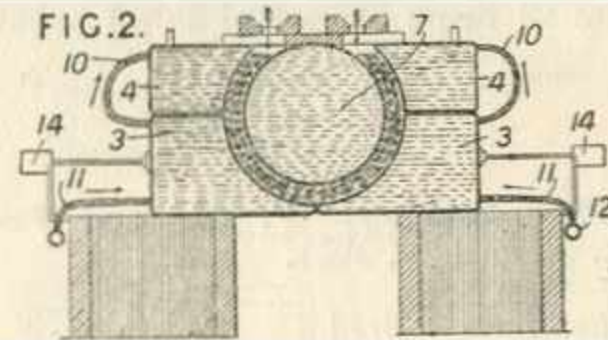


182,637.



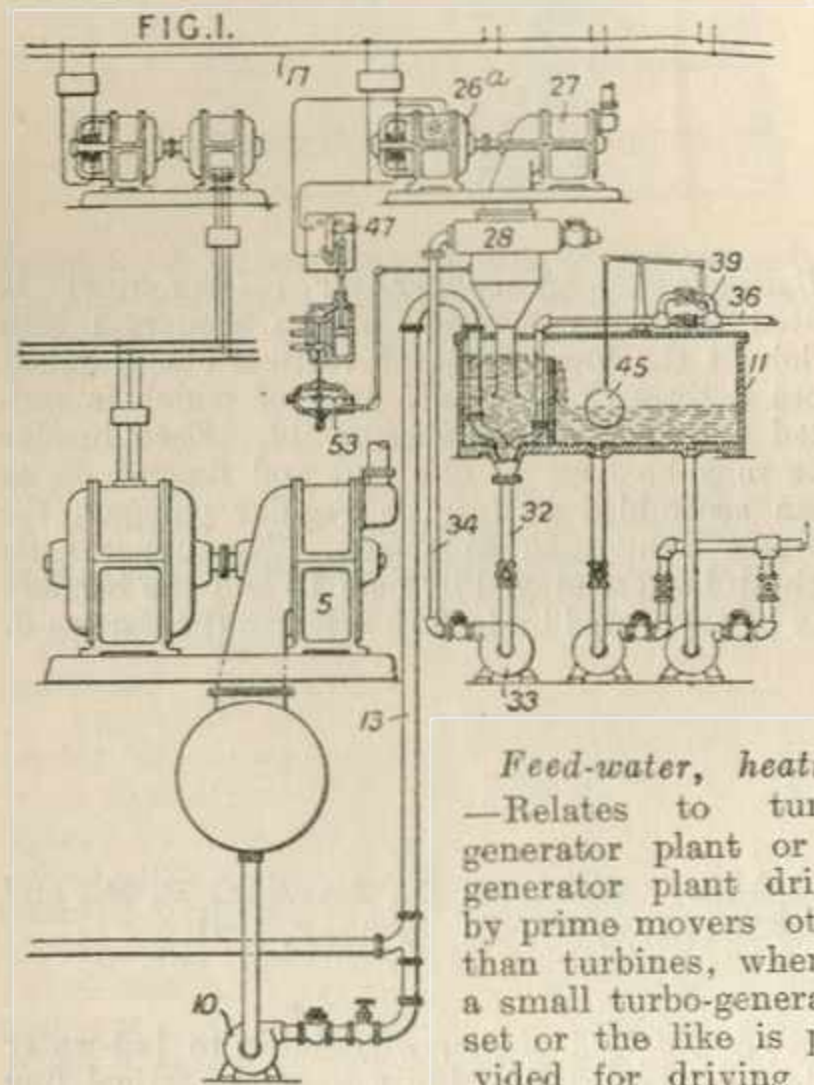
of the auxiliary turbine 27, and the exhaust pressure is maintained substantially constant by a pressure-responsive device 53 which moves a contact arm 47 to cut resistance in and out of the generator field 26^a.

182,689. James, E. E. July 12, 1921.



Heating water.—A boiler for heating water or generating steam is heated by hot slag confined between the walls of the body of the boiler and removable sections. Sections 3 having curved inner walls forming the bottom of an annular slag receiving space around a boiler drum 7 are adapted to be slid away from the drum, in order to discharge the slag, by steam pressure acting on pistons in cylinders 14. The sections are connected to the fixed upper sections 4 and to the outlet pipes 12 by flexible tubes 10, 11. The drum may be connected to the outlet pipes 12.

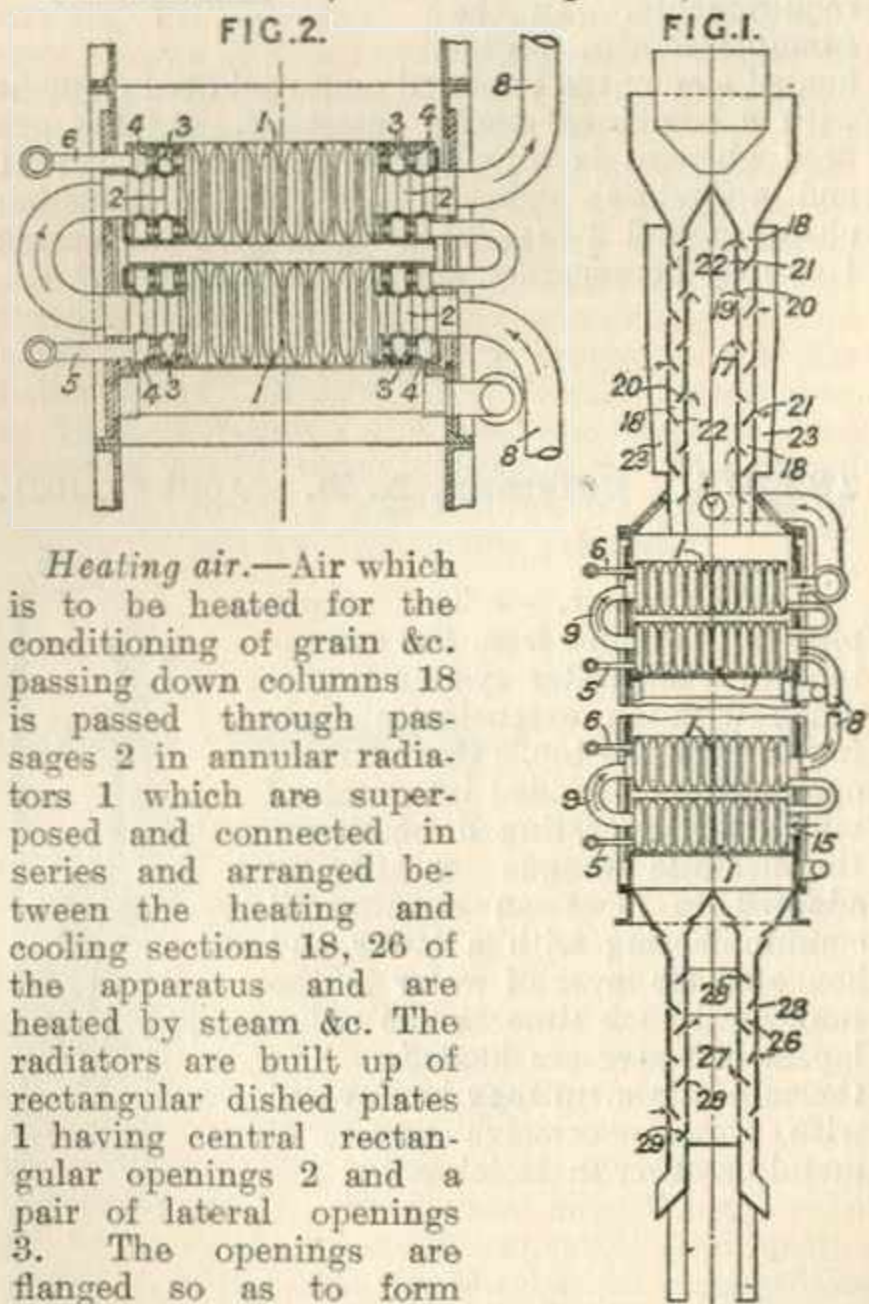
182,655. British Thomson - Houston Co., Ltd., (General Electric Co.). June 7, 1921.



Feed-water, heating.—Relates to turbo-generator plant or to generator plant driven by prime movers other than turbines, wherein a small turbo-generator set or the like is provided for driving the

auxiliary devices, the exhaust from such auxiliary turbine being used to heat the feed-water. According to the invention, the load on the auxiliary turbine 27 is automatically regulated so that its exhaust always heats the feed-water to a predetermined temperature. The hot-well 11 has a pipe 32 leading to a pump 33 which delivers through a pipe 34 to the cooling-water inlet of a jet condenser 28 connected with the exhaust end

182,904. Robinson & Son, Ltd., T., and Robinson, W. N. April 11, 1921.



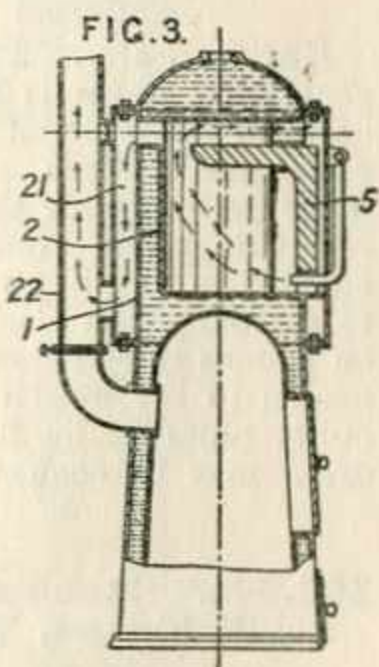
Heating air.—Air which is to be heated for the conditioning of grain &c. passing down columns 18 is passed through passages 2 in annular radiators 1 which are superposed and connected in series and arranged between the heating and cooling sections 18, 26 of the apparatus and are heated by steam &c. The radiators are built up of rectangular dished plates 1 having central rectangular openings 2 and a pair of lateral openings 3. The openings are flanged so as to form passages when the plates are fitted together and



lateral openings may be connected by ferrules 4. The heating fluid is supplied by pipes 5 and passes successively through the radiators of one section to outlets 6. The air enters by an inlet 15 and passes through pipes 8, 9 to all the radiators emerging into the central trunk 17 and passing through orifices 19, 21 arranged beneath deflectors 20, 22 in the grain columns 18, the outer chambers 23 being connected to an exhaust fan.

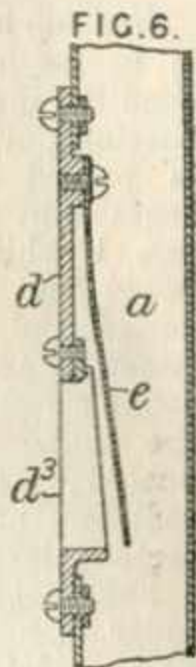
182,967. Bailey, W. M., and Preston, J. R. April 26, 1921.

Internally - fired boilers.—A boiler comprises a plurality of heating-elements, each with a combustion chamber and a water space and each so constructed that two or more can be connected together to form a single unit with a continuous water space common to the elements, so that one or more combustion chambers can be used according to the heating requirements. In the example shown, a gas-heated element is mounted on a coal fired element with a combined smoke outlet 22, and the gas fired element is provided with a flue jacket 21 and a firebrick deflector 5. The combustion chamber wall 2 may be integral with the casing 1 or may be separate and attached thereto.

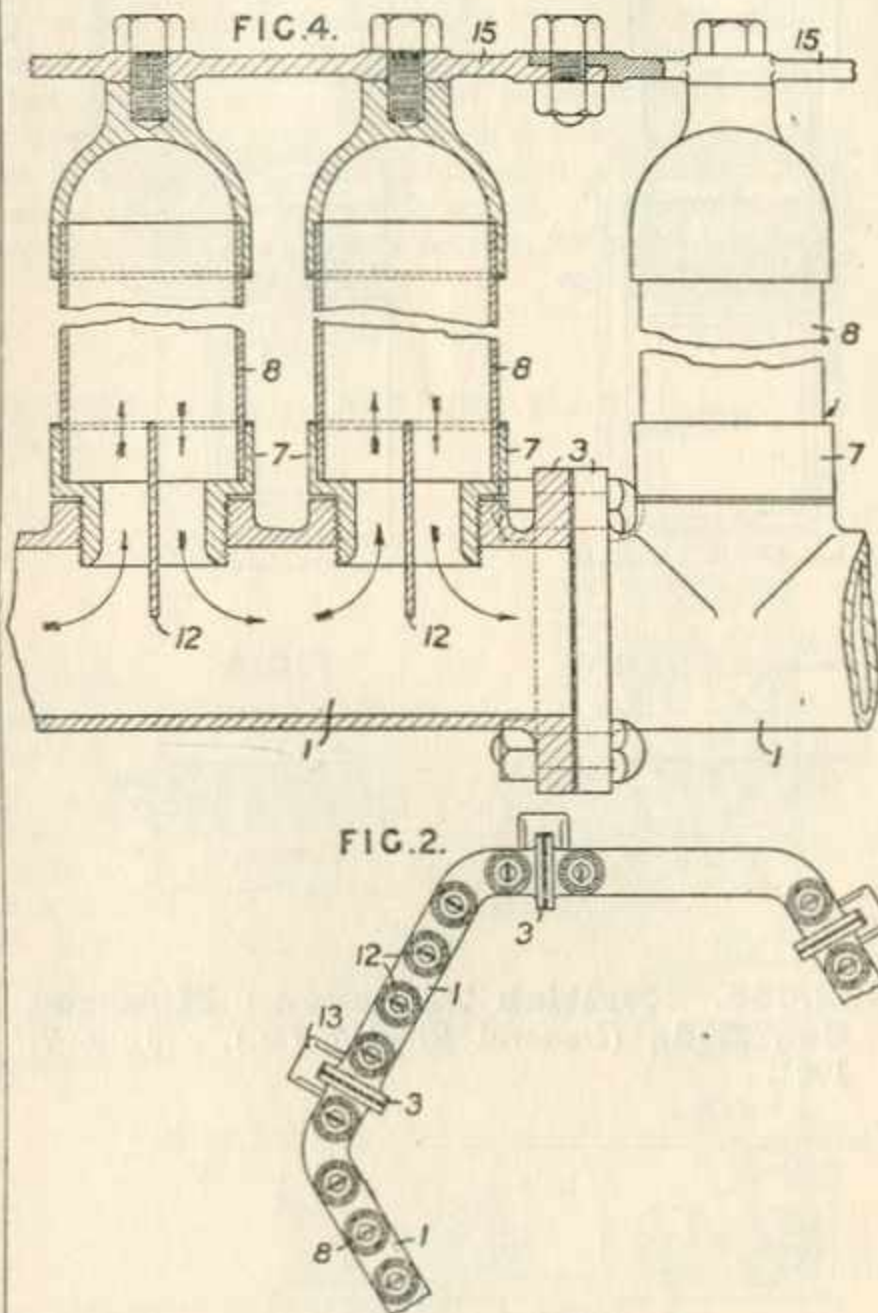


182,973. Coleman, A. B. April 29, 1921.

Heating water. — The return pipe to the boiler from the storage tank in a hot-water system is provided with an extension *a* leading to near the top. One or more openings are provided into each of which fits a casting *d* bearing a thermostatic tongue or flap *e* adapted to close an opening *d*³ communicating with a lower and hence colder layer of water in the tank until such time as the upper layers of water are heated. The thermostatic strip may be covered with a non-corrosive layer of metal or other material.



183,039. Briggs, W. B., and Buxton, S. H. July 19, 1921.



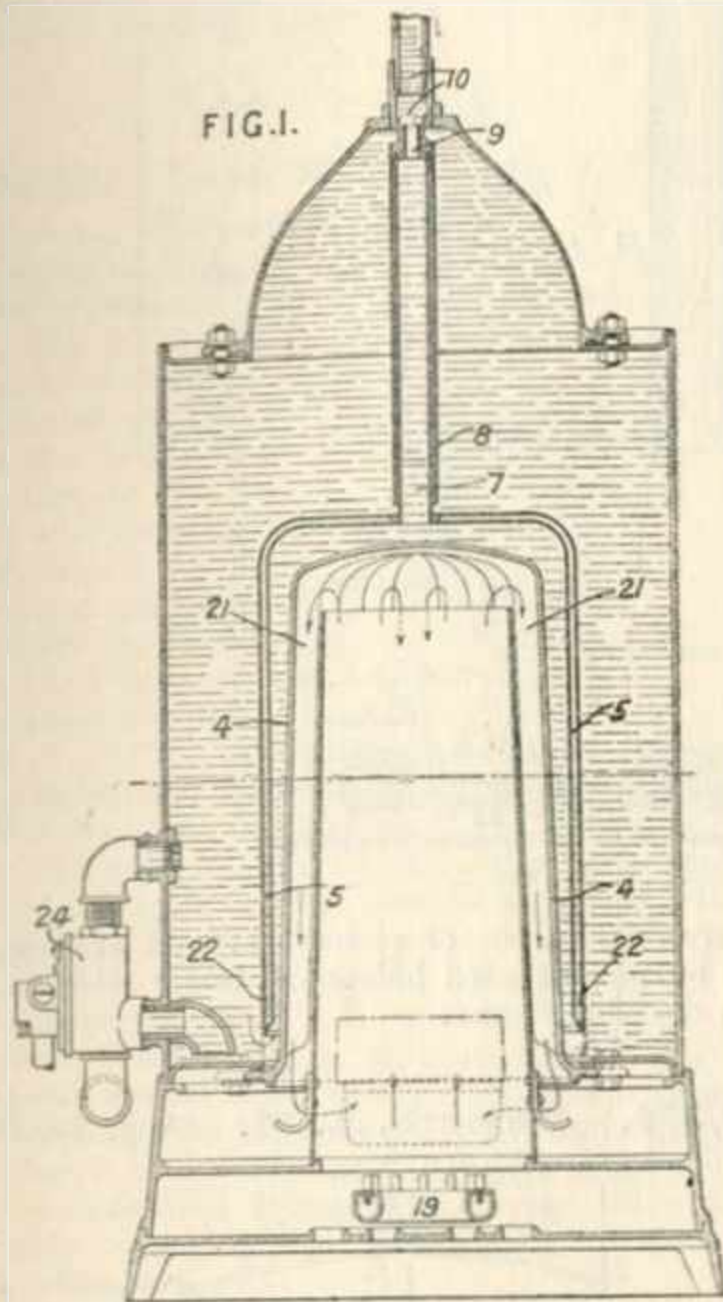
Boiling-pans.—A copper for boiling wort is heated by steam passing through headers 1 into which fit the lower ends of vertical closed-ended tubes 8 through sockets 7 each of which is provided with a short diaphragm 12. Each header tube may be bent at one end and flanged so as when assembled to form a regular polygon, for example a hexagon as shown. The upper ends of the tubes are stayed by bars 15 and the headers may be supported by feet 13 fitted to the flanges 3.

183,048. Holt, E. C., Larkin, F. S., and Galbraith, W. L. Aug. 2, 1921.

Internally-fired boilers.—Relates to hot-water boilers of the type having a central vertical flue arranged above a burner, the hot gases passing up the flue and thence downwards in the annular space between the flue and a dome-shaped member to the outlet. The member 4 has ribs 21 and is surrounded by a hollow jacket 5 which is partly filled with air and has holes 22 at the bottom. A tube 7 communicating with the space between the jacket and the dome 4 extends from the top of the jacket, has a restricted outlet 9 imme-



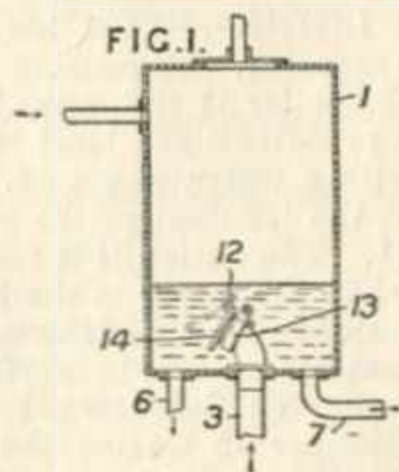
diately beneath the outlet 10 of the boiler, and has a jacket 8 closed at the top and open at the



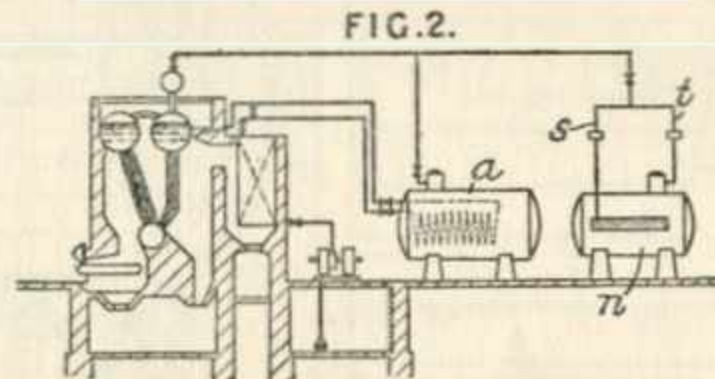
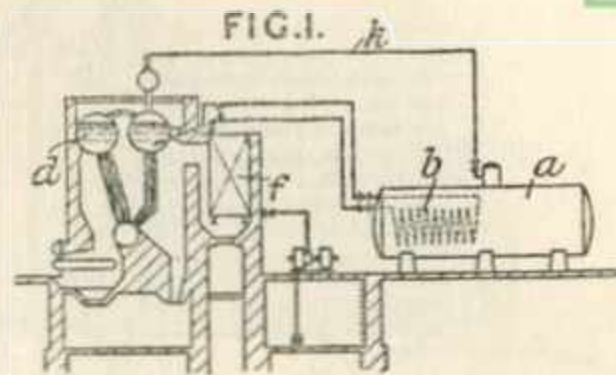
bottom. A thermostat 24 is arranged to reduce the supply of gas to the burner 19 when the boiler becomes filled with hot water.

183,065. Dawson, W. Sept. 1, 1921.

Heating water. — A hot-water installation is provided with a tank 1 into which water from the boiler is delivered by the pipe 3, before entering the circulating pipes 6, 7. The top of the pipe 3 is raked and a clamp 13 supports a hook 12 over which a hole in a plate 14 is passed. The flow of water is thus controlled according to the weight of the plate.



183,128. Marguerre, F., and Hausmann, M. July 12, 1921, [Convention date].

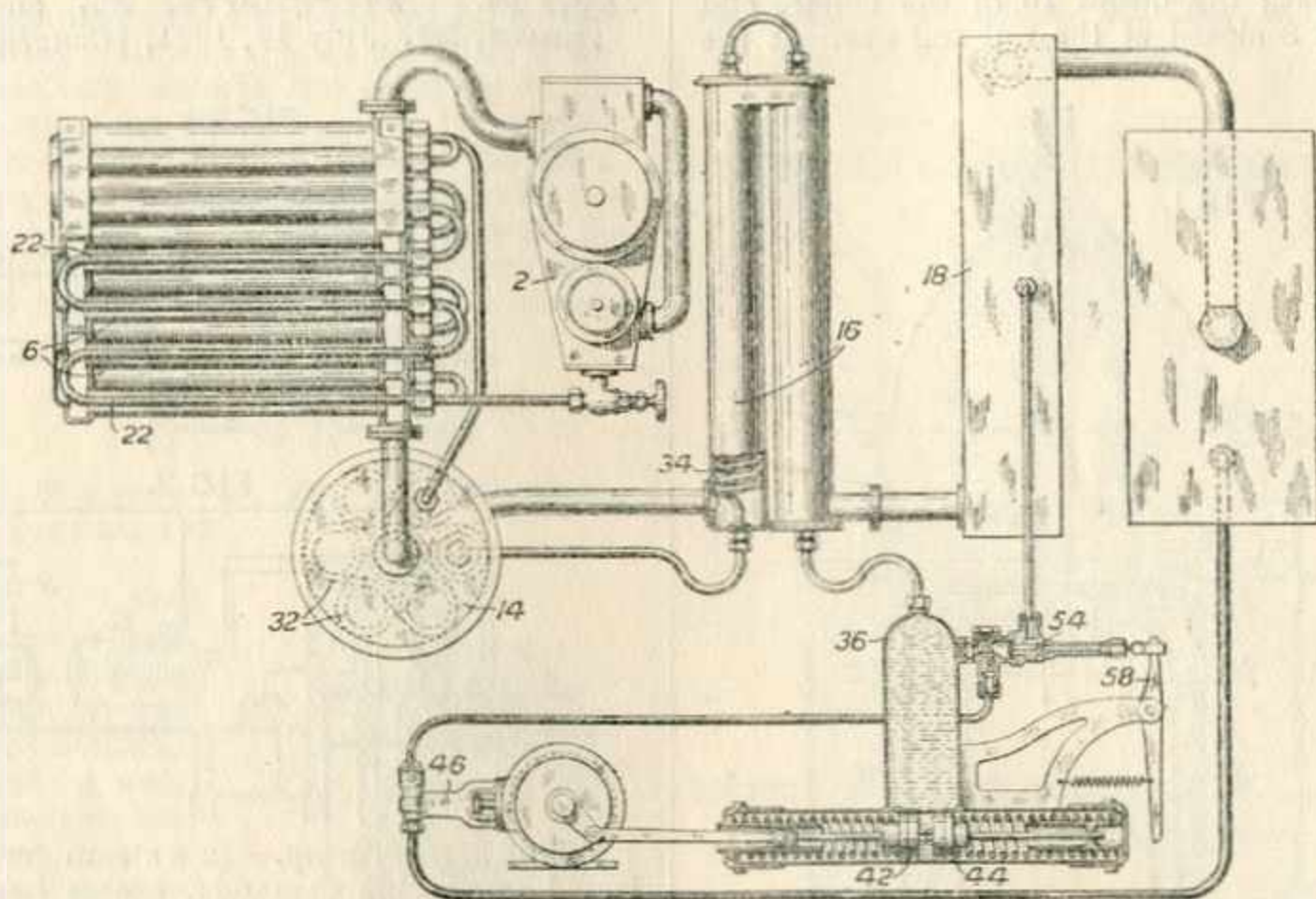


Feed-water, heating. — In a steam-generator subjected to varying demands, excess heat is taken when the demand is low to a storage vessel by means of a steam pipe or a water-circulating pipe, and the stored heat is used when the demand is high to heat the feed-water. The heat-storage vessel *a*, Fig. 1, is charged by excess steam led from the generator *d* by a pipe *k*. The vessel contains a pipe coil *b* through which the water from the economizer *f* may be passed before entering the generator. The steam pipe may also open into an ordinary heat-storage water container *n*, Fig. 2, the two branches *s*, *t* of the pipe being fitted with non-return valves or the like, the branch *s* serving to introduce the steam into the container and the pipe *t* serving to withdraw it. The valves controlling the charging of the storers and the valves controlling the passage of water through the pipe coil may be operated by devices acted upon by the pressure or temperature of the boiler steam. Other types of storage vessels such as those containing salt solutions may be used in place of the water container *n*. The stored heat may be partly used for heating purposes instead of being returned to the generator.

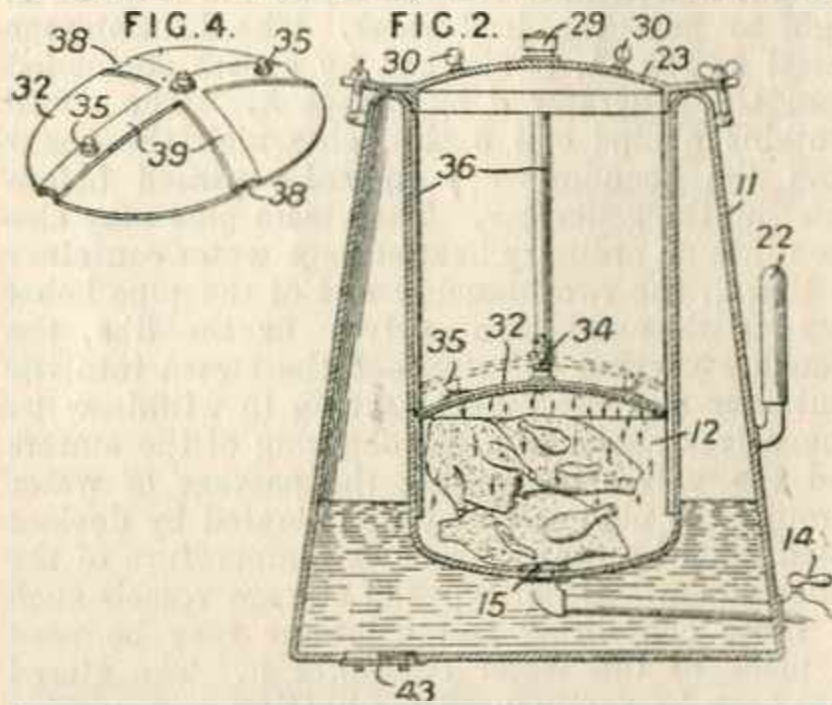
183,261. Lamplough, F. April 21, 1921.

Feed-water, heating. — Steam is generated by the heat of exhaust steam heated by furnace gases, and the steam generated is superheated in tubes placed inside the tube in which the exhaust is heated. The feed-water is preheated by the heated exhaust, and means are provided to relieve excess pressure at the feed-inlet. Exhaust from an engine 2 is passed in turn through a number of parallel furnace-heated tubes 6, and then through drums 14, 16 opening into the condenser 18. Feed-water flows through coils 34, 32 in the drum and is converted into steam, which is superheated in U-tubes 22 arranged in the heated tubes 6.

(For Fig. see next page.)



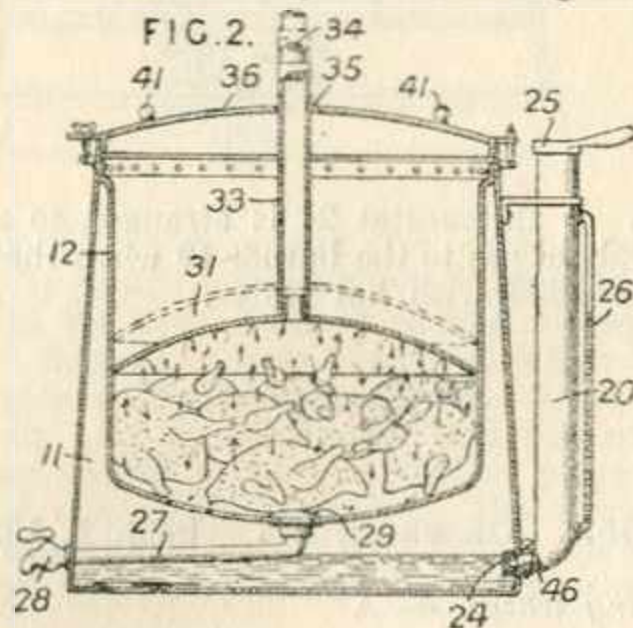
183,378. Demuth, A. M. Aug. 29, 1921.



Digesters.—In a hot-water or steam cooking-apparatus, the cooking chamber 12 projects into the boiler 11, the intervening space being totally enclosed and provided with a safety valve, cleaning-door 43, filling opening, thermometer 22, water-gauge, open-cock, drain cock and pressure gauge. The chamber 12 is provided with a cover 23, which is secured by hinged bolts and wing nuts, and a drain cock 14 which may be cut off from the chamber 12 by a plug 15 which is used to retain the juices in the chamber 12. Guides 36 are provided on the wall of the chamber 12 which engages recesses 38 in a curved deflector 32 which slides vertically upwards, if the vapour pressure in the lower part of the chamber becomes excessive, and serves to deflect the rising vapours back on to the cooking articles. The deflector 32 is strengthened by straps 39 and is provided with handles 35 and a safety valve 34. The cover 23 is provided with handles 30, pressure gauge, safety valve 29, and an indicator which is set at the time when the articles must be removed. The chamber 12 and boiler 11 are

preferably oval in cross-section, and are heated by a burner situated below the boiler which rests on a suitable frame.

183,379. Demuth, A. M. Aug. 29, 1921.



Digesters.—In a hot-water or steam cooking-apparatus, the cooking chamber 12 projects into the boiler 11 the water in which is maintained at a predetermined level by a reservoir 20, provided with a water gauge 26, a cock 46 being provided at the junction of the reservoir 20 and the boiler 11. The outlet 24 is restricted and is thus sealed when the water in the boiler covers it and allows water to flow into the boiler when the opening becomes uncovered. A filling cap 25 is provided. A curved deflector 31 slidably arranged in the chamber 12 retains the vapour from the articles in the cooking space, the rising vapour being deflected downwards. The edge of the deflector rests on the articles. An increase of pressure in the cooking space causes the deflector to rise and a further increase actuates a relief valve 34 situated at the extremity of a tube 33 which slides through a hole 35 in the cover 36. Liquids may be drained from the cooking space by a cock 28

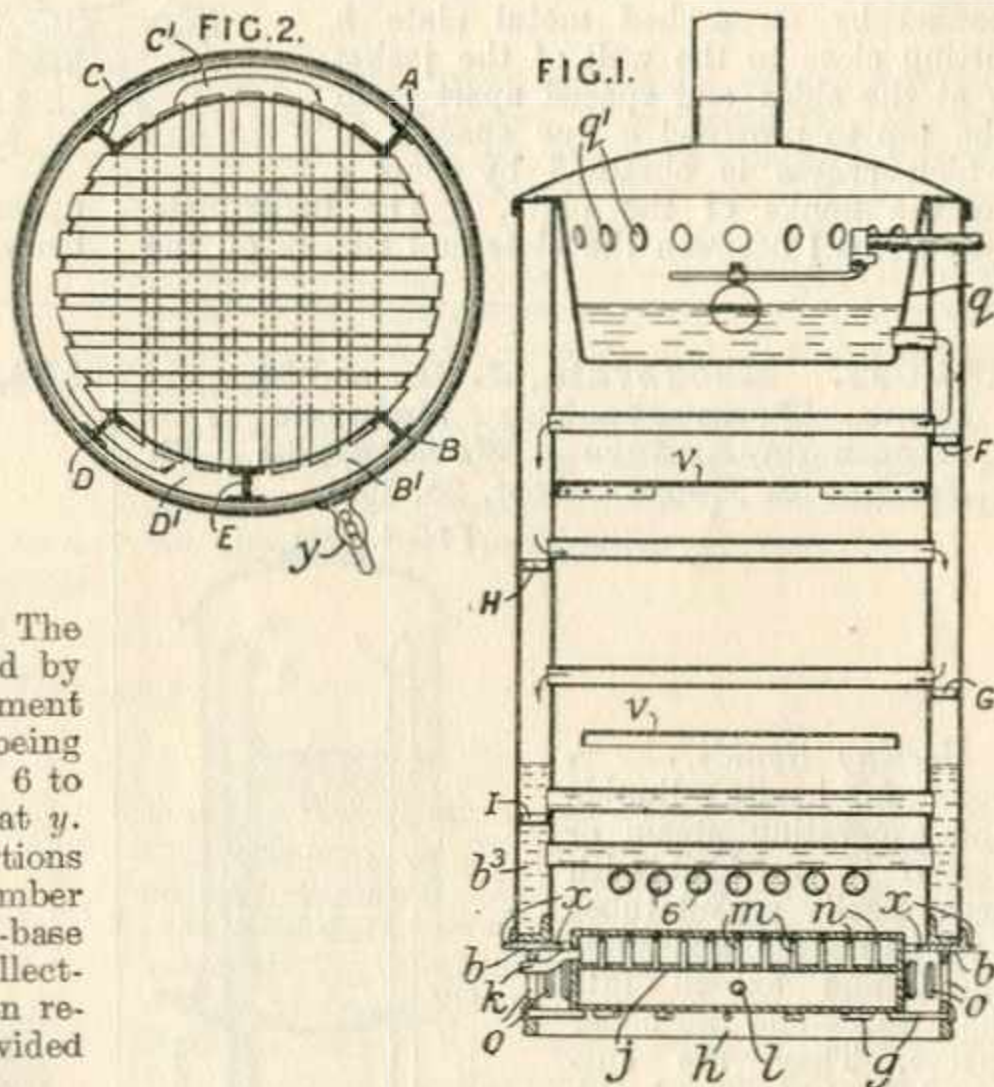


and pipe 27, or the opening may be closed by a plug 29. The cover 36 is provided with handles 41 and the boiler with a thermometer, drain cock, pet cock, pressure gauge and relief valve. The

cooking chamber and boiler are preferably oval in section, rest on a suitable stand and are heated from below by a burner.

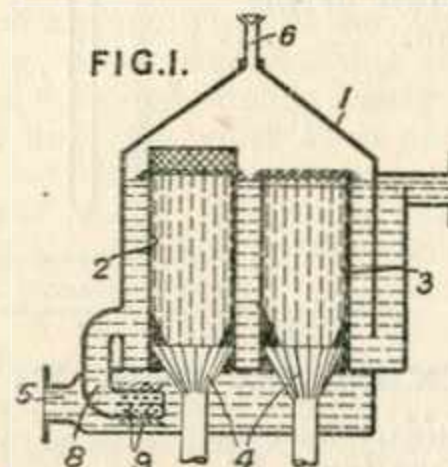
183,381. Love, H. M. Sept. 2, 1921.

Geysers; internally-fired boilers.—A hot-water boiler comprises a cylindrical jacket surrounding a combustion chamber, the jacket being divided into a number of compartments connected by horizontal cross-tubes in such a way that the water flows by gravity from the inlet to the outlet. The partitions are made by vertical members of **H**-section A - - E and two horizontal **U**-section members F, G between the members A, B and two similar members H, I between the members C, D. The water supply is controlled by a ball cock in a cistern *q* suspended within the combustion chamber and provided with holes *q'* for the escape of the hot gases. The flow of water follows the direction indicated by arrows in Fig. 1 until it reaches the compartment *b³*, whence it flows to *D¹*, the member D being cut short at I and thence by the cross-tubes 6 to the compartments *C¹*, *B¹* and is drawn off at *y*. Circular baffle-plates *v* with segmental portions cut away are arranged in the combustion chamber and they may be perforated. The supporting-base member *b* is provided with grooves *x* for collecting condensation drips. The burner rests on removable bolts *g* in the base *h* which is provided with slots *o*.



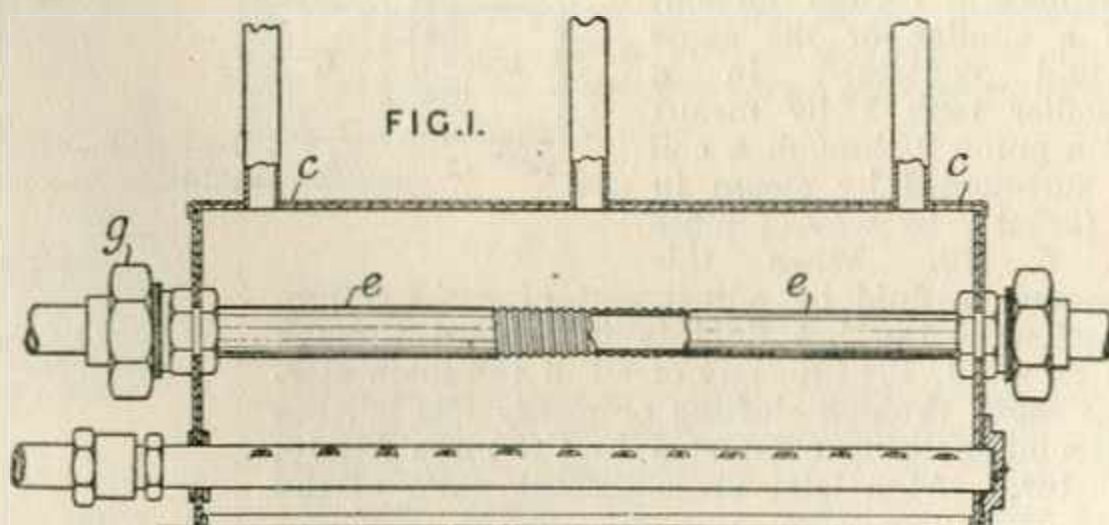
183,534. Morison, D. B. April 15, 1921.

Feed-water, heating; heating liquids.—In the heating and de-aerating of liquids such as feed-water for steam generators by means of steam jets 4 arranged at the base of pipe-like structures 2, 3, a portion of the heated and treated water is returned through a pipe 8 and mixed with the cold and untreated water entering through the inlet-pipe 5. Specification 173,534 is referred to.



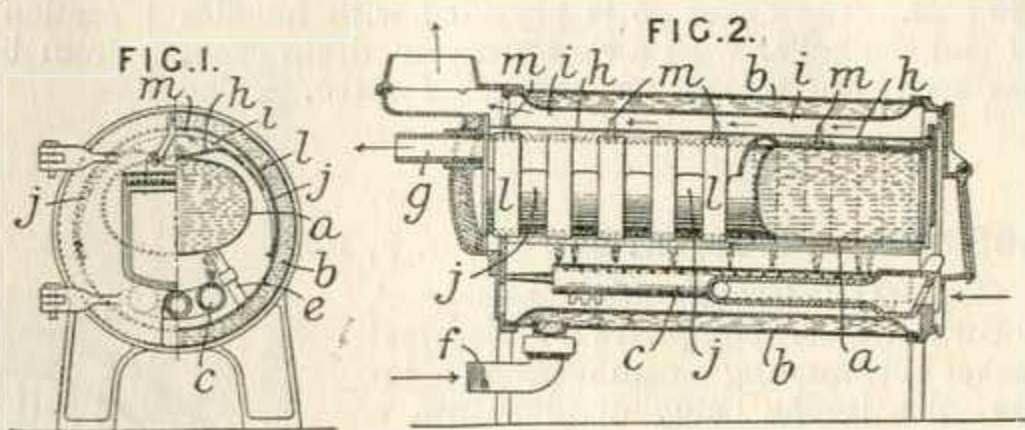
183,918. Cooke, J., and Croxon, W. C. April 29, 1921.

Water-tube boilers.—Apparatus for heating liquids consists of a longitudinal box or casing *c* enclosing one or more straight lengths of piping *e* and a gas burner or the like arranged beneath or around the piping, unions *g* being provided outside the casing for connecting the apparatus to the supply and delivery pipes. The casing has an arch-shaped top, is open at the bottom, and is lined with asbestos sheeting.



184,056. **Stimson, E. F.** Aug. 3, 1921.

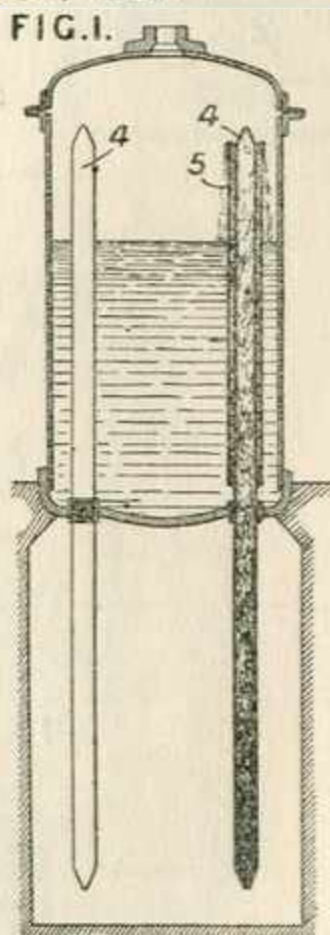
Internally-fired boilers.— A water-heater has an horizontal approximately cylindrical part *a* which may be a helical tube surrounded by a cylindrical jacket *b* inter-connected as at *e*. The gases from a burner *c* pass around the inner vessel *a* and are baffled by an arched metal plate *h* fitting close to the wall of the jacket *b* at the sides and spaced apart from the top to provided a flue space *i* to which access is obtained by slots *j* in the flanks of the plate. The baffle-plate bears ribs *l* between the slots and ribs *m* on the



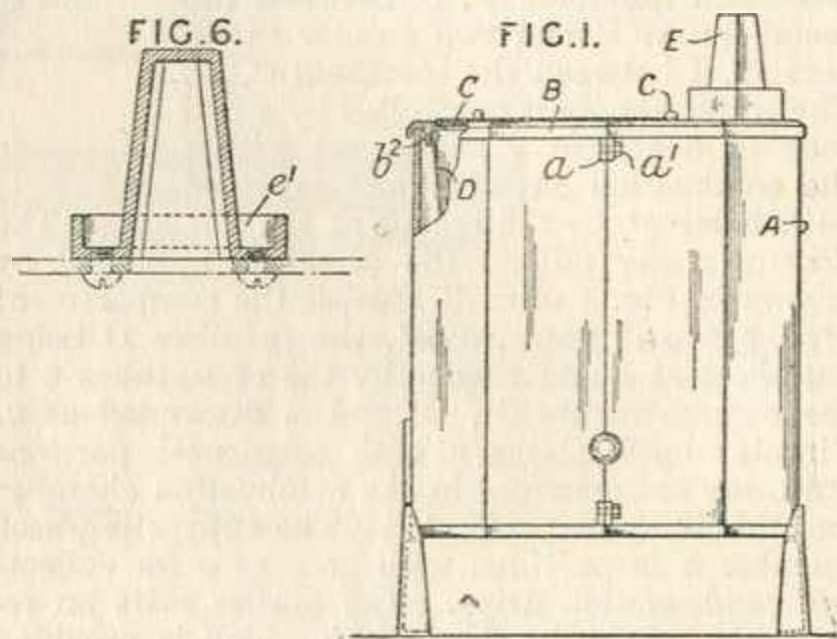
upper surface in the flue space *i*. Water to be heated enters at *f* and is delivered at *g*.

184,092. **Hoogbruin, J. H., and Naamlooze Vennootschap Fabriek van Stoom-en-Andere Werktuigen H. Jonker & Zoon.** Sept. 28, 1921.

Heating liquids. — A boiler for heating liquids and generating steam or vapour is provided with hermetically sealed tubes *4* which contain a suitable liquid and extend into the furnace and the boiler spaces. They are surrounded within the boiler by metal tubes or jackets *5* which are open at the top and bottom.



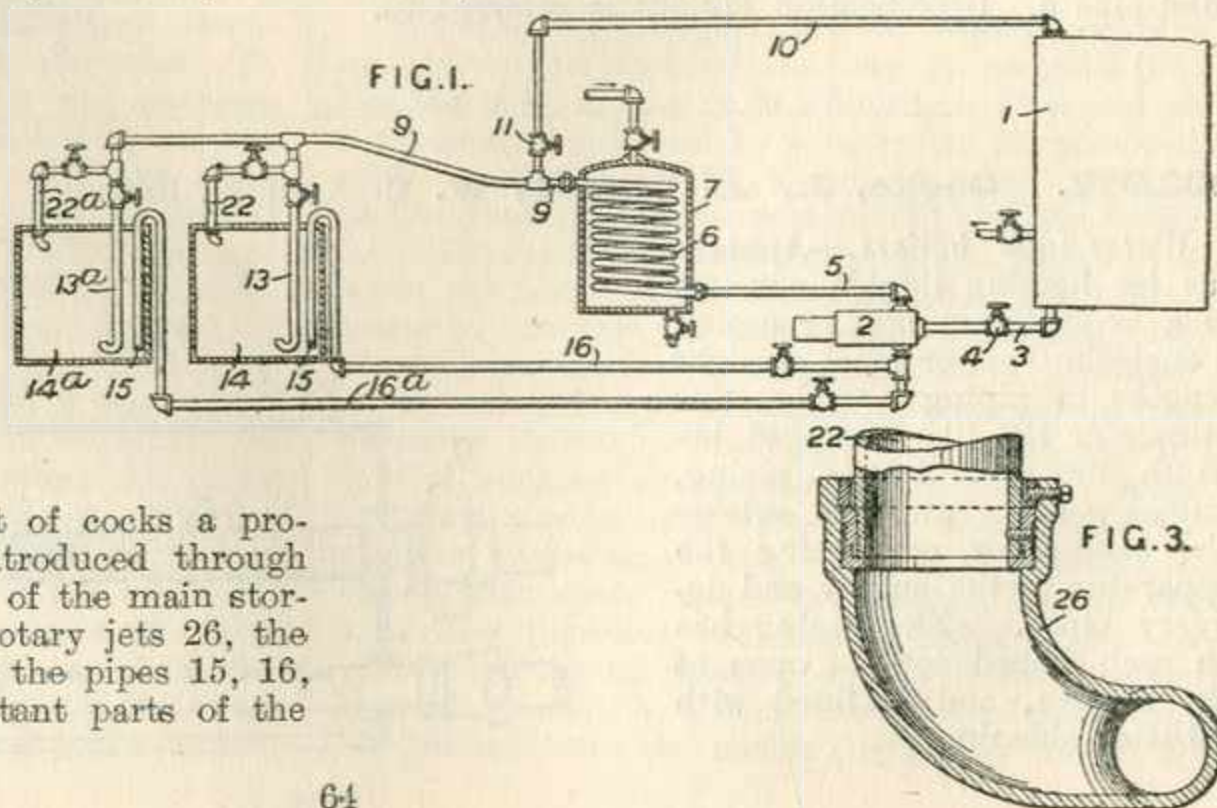
184,124. **Starkie, R. E.** Feb. 3, 1922.



Washing-boilers.—The aluminium casing *A* of a portable gas-heated washing-boiler is cast in halves with lugs *a* secured by screws *a*¹. The pan *D* is secured to four lugs *b*² on the top *B* of the casing and may be of two different sizes, the rim being either outside or inside the lugs. The condenser *E*, comprising a steam dome surrounded by a water space *e*¹ the top *B*, the lid *C* and the hinges *c*, one of which is detachable, are cast in aluminium.

184,198. **Mills, B., Row, R. R., and Davis, H. C.** Feb. 1, 1921.

Heating liquids.—Viscous liquids in storage tanks *14*, *14*^a are heated so as to render them more mobile by circulating, in the first instance a certain amount of a similar or the same liquid contained in a smaller tank *1* by means of a pump *2* through a coil *6* surrounded by steam in a jacket *7* by way of pipes *3*, *5*, *10*. When this amount is fluid by adjustment of cocks a proportion of the hot fluid is introduced through pipes *9*, *13*, *13*^a into any or all of the main storage tanks through shifting or rotary jets *26*, the circulation being completed by the pipes *15*, *16*, or *16*^a. At a later stage distant parts of the

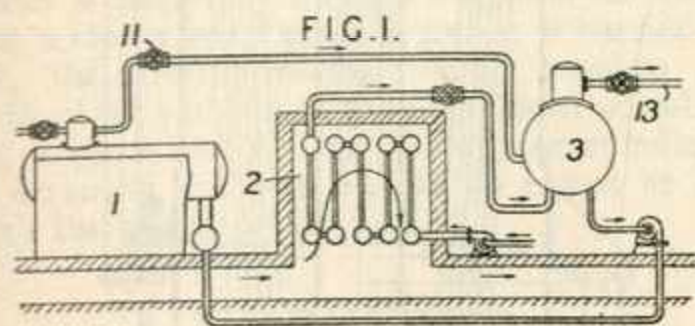


tanks 14, 14^a may be heated by introduction of hot fluid through pipes 22, 22^a and rotating nozzles 26. Fluid for use is taken from the tank 1, which is kept warm when the installation is fully working by a small proportion of circulating

liquid controlled by the cocks 4, 11. The pipe 9 may be disposed within or around the pipe 16 or in proximity thereto.

Reference has been directed by the Comptroller to Specification 169,961.

184,469. Aktiebolaget Vaporackumulator, (Assignees of Josse, E.). Aug. 9, 1921, [Convention date].

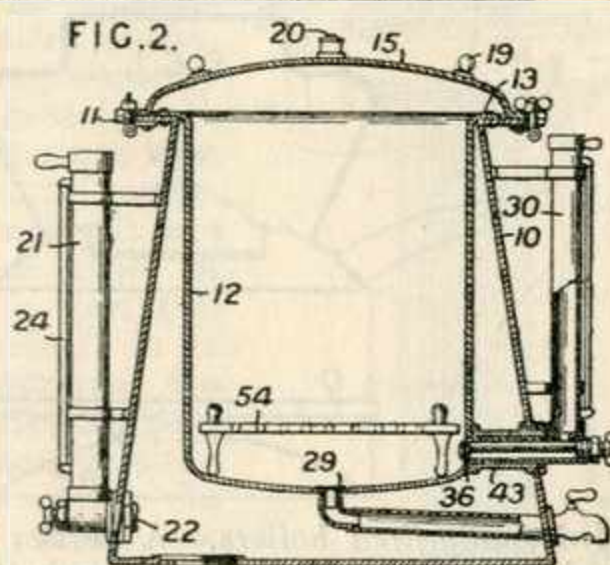
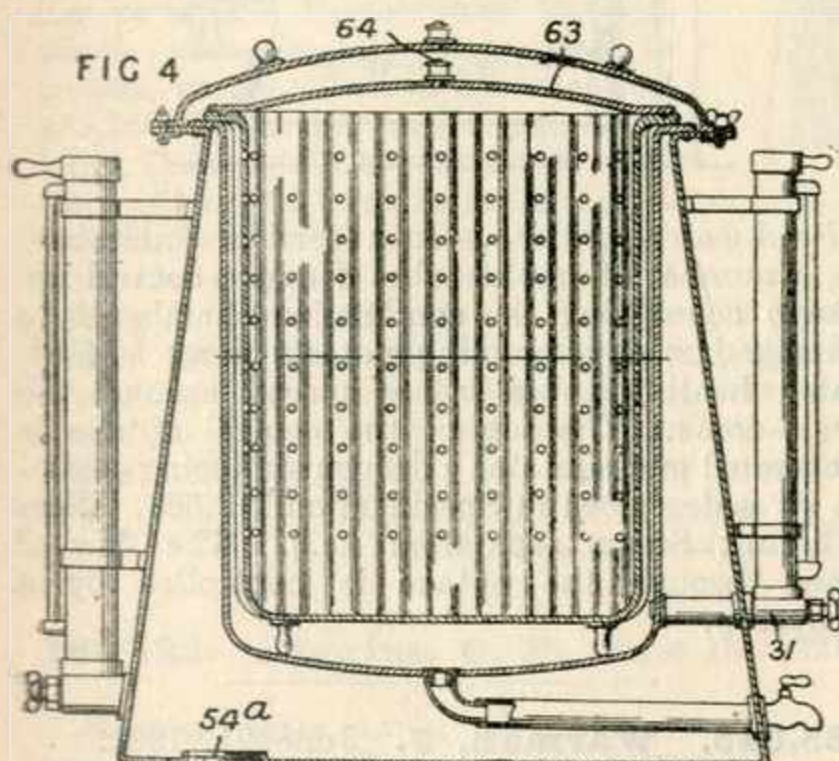


Feed-water, heating. — The feed supply to a generator 1 is passed under pressure first through

a heater 2 and then through a vessel 3, from which steam generated by reducing the pressure in the vessel is led off through a pipe 13 for heating purposes, or for use in an intermediate stage of an engine. The water in the vessel may be circulated through pipes in the path of the furnace gases, or through the water in the main generator. The vessel may be covered with non-conducting material.

According to the Specification as open to inspection under Sect. 91 (3) (a) the vessel may be heated by flue gases. This subject-matter does not appear in the Specification as accepted.

184,704. Demuth, A. M. Aug. 29, 1921.



Digesters.—A steam or hot-water cooking or treating apparatus comprises a closed boiler 10

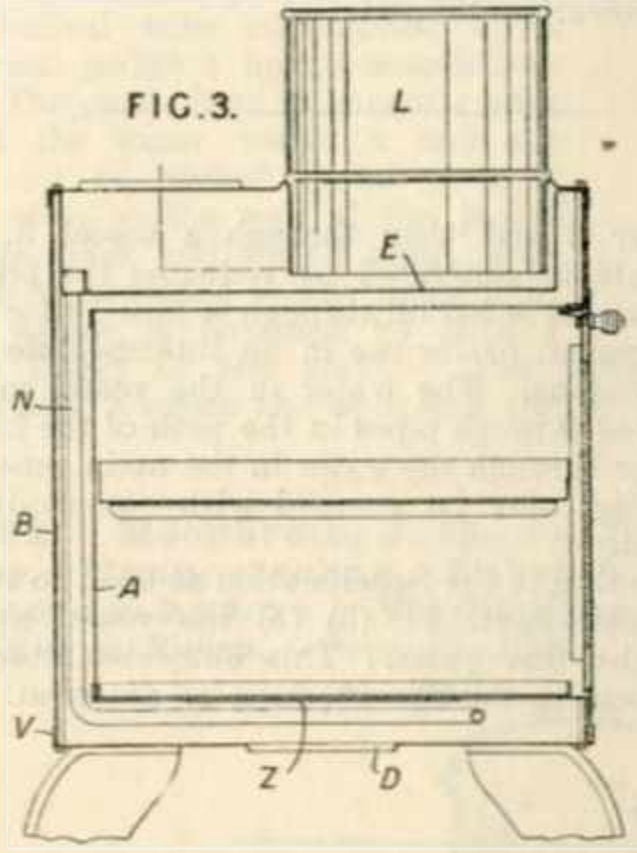
and a cooking chamber 12 projecting therein, the upper flanges 11, 13 being riveted or otherwise secured together. The liquid level in the boiler is maintained at a predetermined level by a supply reservoir 21, provided with a water gauge 24, the orifice 22 being valve controlled and allowing the liquid to issue only when the opening is not sealed by the liquid in the boiler. A similar reservoir 30, controlled by a screw-operated valve 36, supplies liquid to the cooking chamber 12, the sleeve 43 surrounding the pipe 31 serving as a spacer between the boiler and cooking chamber. The cover 15 is provided with a safety valve 20 and handles 19 and the boiler 11 is provided with a pet cock, which is opened to produce a drier heating medium in the boiler to brown more effectively the articles in the cooking chamber, and also a pressure gauge, safety valve and thermometer. A perforated stand 54 is used in the cooking chamber and the drain pipe opening is provided with a strainer 29, or if it is desired to retain the juices in the cooking chamber, a plug is inserted in the opening. In a modification, Fig. 4, a perforated vertically corrugated container is inserted in the chamber 12, the container having a cover 63 with a safety valve 64. The lower portion of the container is not perforated. A cleaning door 54^a is provided and the apparatus is supported on a suitable stand and heated from below by a burner.

185,207. Cleary, E. May 30, 1921.

Water-tube boilers.—A water-bath or bain-marie E arranged in the top of a cooking-stove is provided with a circulating-pipe N which extends into the bottom space between the inner and

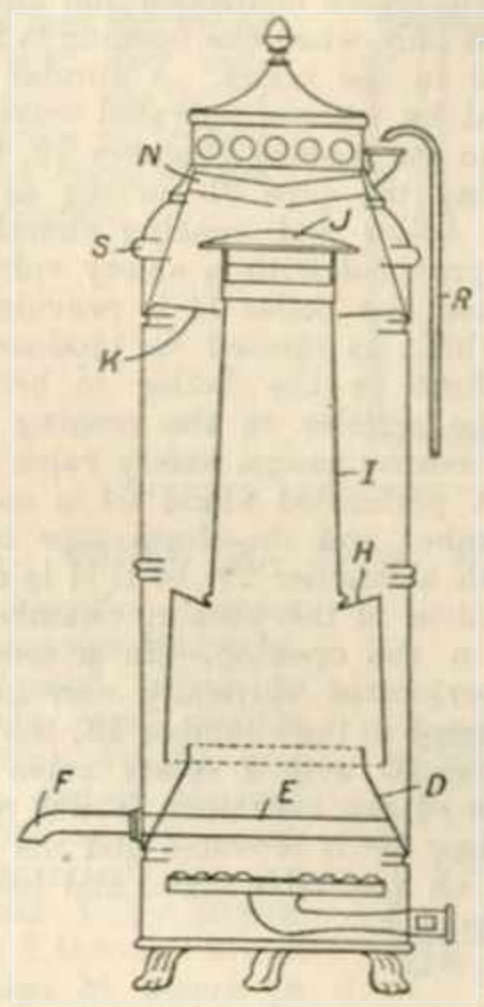


casings A, B and preferably forms a loop round the opening D in the bottom plate, beneath which a burner is placed. To promote circulation,



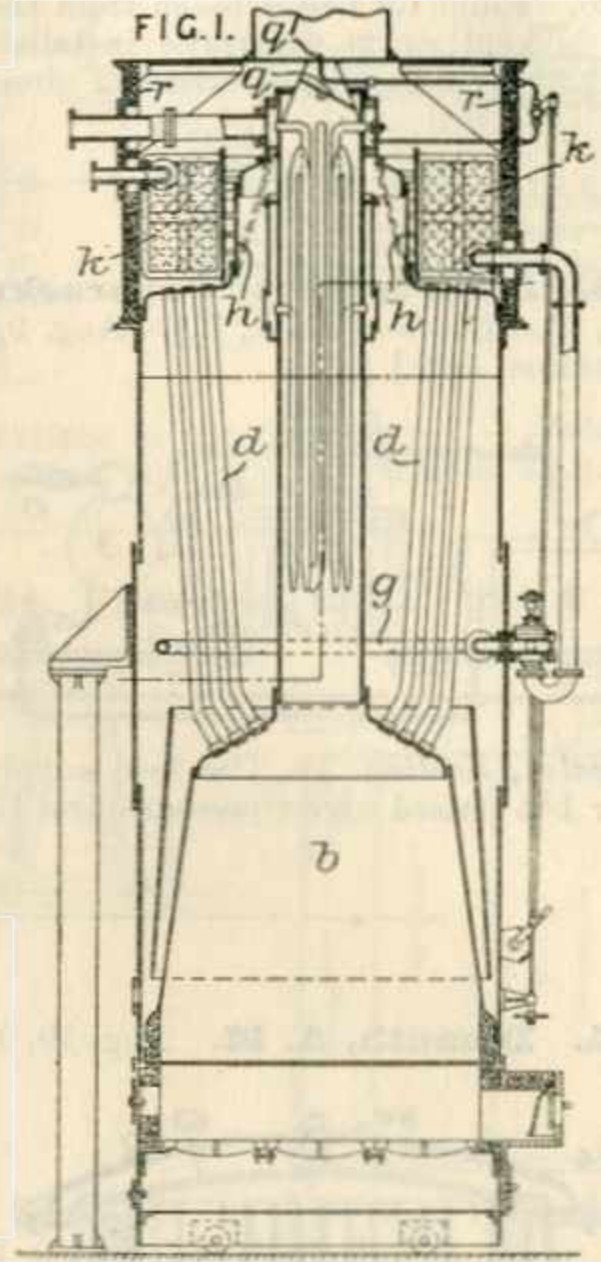
one of the vertical limbs of the pipe N is preferably made of greater diameter than the other.

185,288. Parram, R. W., and Conway, J. K. July 19, 1921.



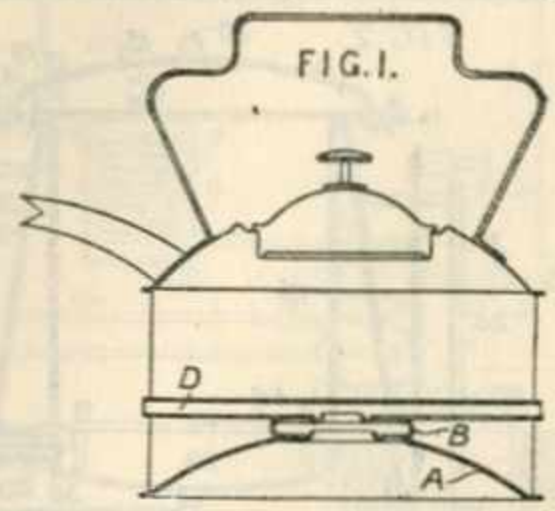
Geysers.—Water entering from a pipe R flows through a chamber S and a trough N over a dished plate J to a ring-plate K directing it on to the outside of a conical wall I down which it flows, over a shoulder H to a collecting trough D, from which it passes by a pipe E extending from one side over the burner through the opposite wall to the outlet F.

185,377. Cruse, H. Feb. 12, 1921.



Feed-water, heating.—In a vertical boiler having a number of smoke tubes *d* and a central uptake *g* connecting the combustion chamber *b* to a smoke-box *r* surrounding a steam dome *h*, feed-water heating tubes *k* are placed around the steam-dome. The top of the central uptake is contracted and contains a draught-inducing steam-jet *q'* as described in Specification 172,568, [Class 123 (iii), Steam separators &c.]. The flow of gases through the uptake is controlled by a damper *q*.

185,545. Warman, J. June 21, 1921.

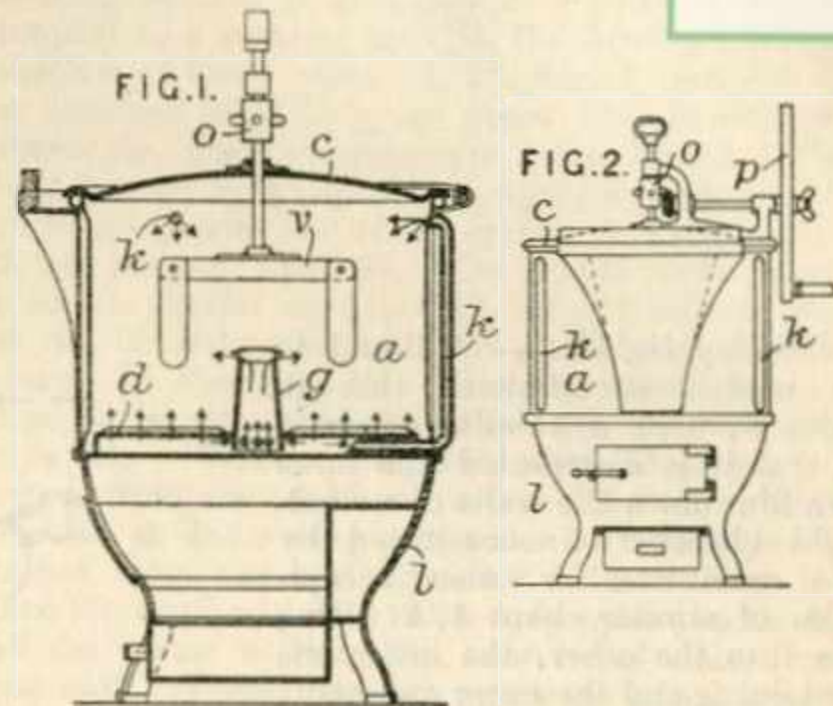


Internally-fired boilers.—A kettle, urn, or geyser is provided with a concave bottom A communicating at the top with two or more superposed flat tubes B, D which cross at right-angles and open through the side walls of the container.



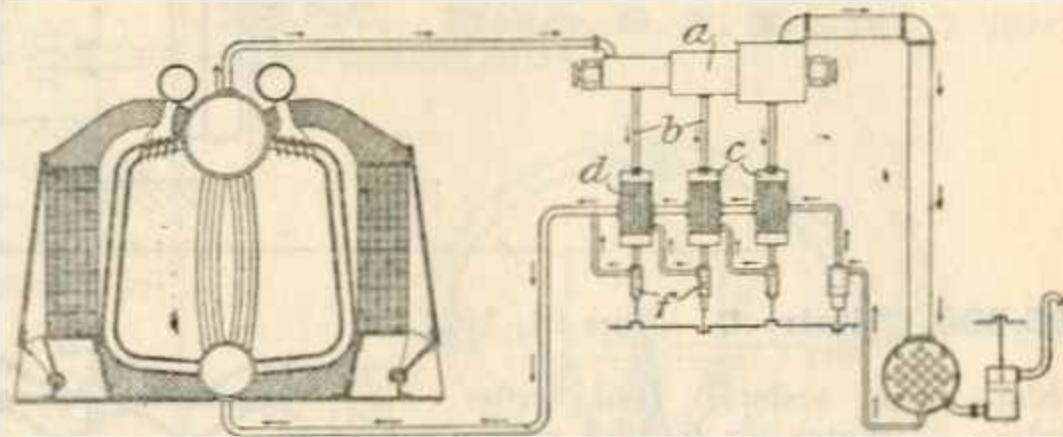
185,619. Westermann, L. Aug. 22, 1921.

Washing-boilers. — A washing-machine with mechanical stirrer and external heating-means producing thermal circulation of the liquid consists of a sheet-iron container *a*, galvanized and internally ribbed, provided with a hinged lid *c*. A ribbed and perforated false bottom *d* within the container carries a central funnel *g*, open at both ends to aid the circulation of the water, for which purpose also external pipes *k*, leading from top to bottom of the container *a*, are fitted. The water is heated by a furnace *l* below the container and a rotary oscillating stirrer *v* is carried by the lid, the driving-means, which consists in one form of a hand-wheel *p* and a bevel wheel engaging a pin-wheel *o* upon the stirrer spindle, being so arranged that the lid can be raised or lowered with the stirrer in motion.



185,765. Ferranti, S. Z. de. June 4, 1919.

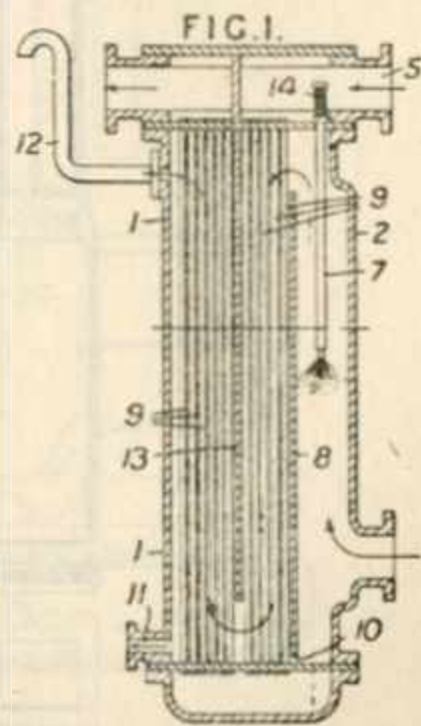
Feed-water, heating.—In a power plant using steam or other suitable working fluid, the furnace gases after leaving the steam or other fluid generator are utilized for heating reversible regenerators through which the air for combustion is passed, as described in Specification 185,763, [Class 51 (i), Furnaces and kilns, Combustion apparatus of], and the working fluid while in its liquid form is heated by vapour abstracted from the engines or turbines after having done work therein, as described in Specification 14692/06. The Figure shows a gas-fired reversible water-tube boiler furnace, the steam from the boiler being led to a turbine *a* from which exhaust steam is taken progressively



through pipes *b* to feed-water heaters *c*. Pumps *f* return the condensed water from the heaters *c* to the feed-water main at points in advance of the heaters from which it is drawn off.

186,122. Higgins, C. F. June 15, 1921.

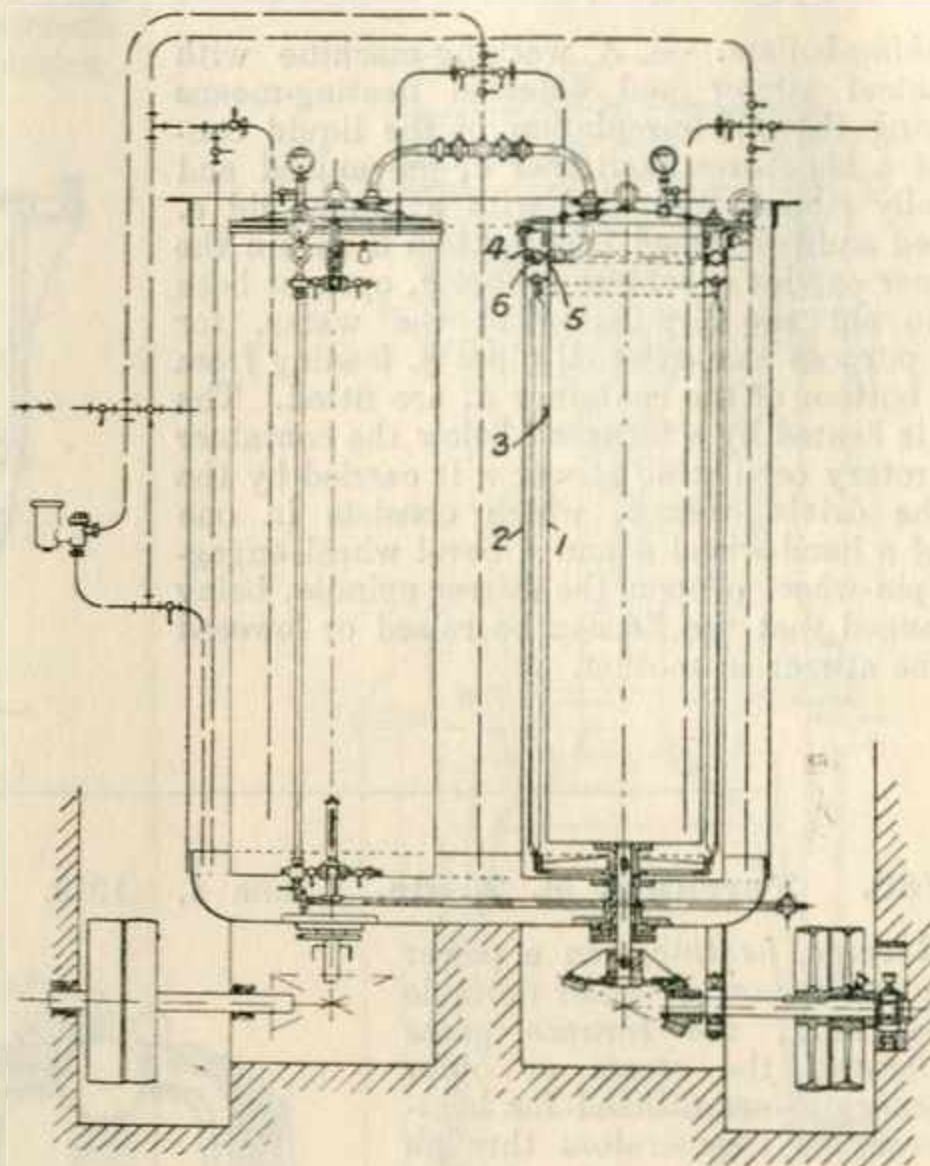
Heating water. — In apparatus for condensing superheated steam, or for heating water by means thereof, in which the steam is first deprived of its superheat by bringing it into contact with a jet of water and is then further condensed in a surface apparatus, the jet and the surface-apparatus are contained in a single casing. In the form shown, the steam is guided by baffles *8*, *13* in the casing *1*, first through a chamber *2* where it



meets a jet *7* of water and then over pipes *9* through which water is passed. The water for the jet *7* may be taken from the inlet *5* to the pipes *9*, passing on its way through a strainer *14*. Water deposited in the chamber *2* escapes through an opening *10* in the baffle *8*, and is discharged along with the condensate through an outlet *11*. An air outlet *12* is also provided. A modification is described provided with two jets.

186,918. **Lebeau, G. L.** Aug. 5, 1921.

Heating liquids. — A liquid to be heated is admitted through holes 5, 6 in a tubular crown 4 so that it is distributed and flows in a film down the walls of a fluid-tight chamber 3 constituted by two cylindrical or other receptacles of similar shape 1, 2 fitting one into the other, the inner one containing and the outer one being immersed in gaseous, liquid or solid substance at a temperature higher than that of the liquid being treated.



186,396. **Weir, C.** June 21, 1921.

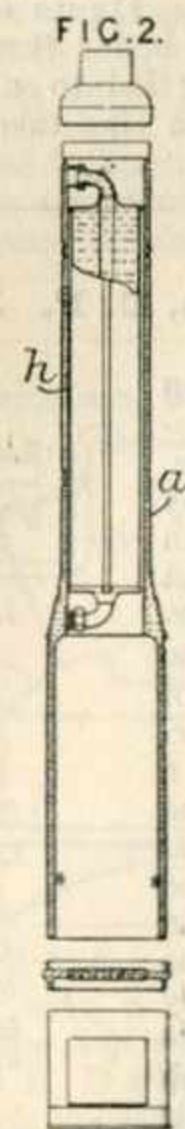
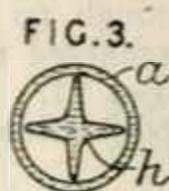
Slab-form boilers; feed-water heating. — Water for feeding steam generators or for other purposes is heated in containers built up of corrugated metal plates in sections, with joints D. Each section may be made of two separate sheets bolted together. For high pressures the corrugated sides may be reinforced by longitudinal ribs or thickened parts, joined through the section by bolts.

Reference has been directed by the Comptroller to Specifications 23664/95, 18893/96, 20557/04, 21597/13, and 135,262.

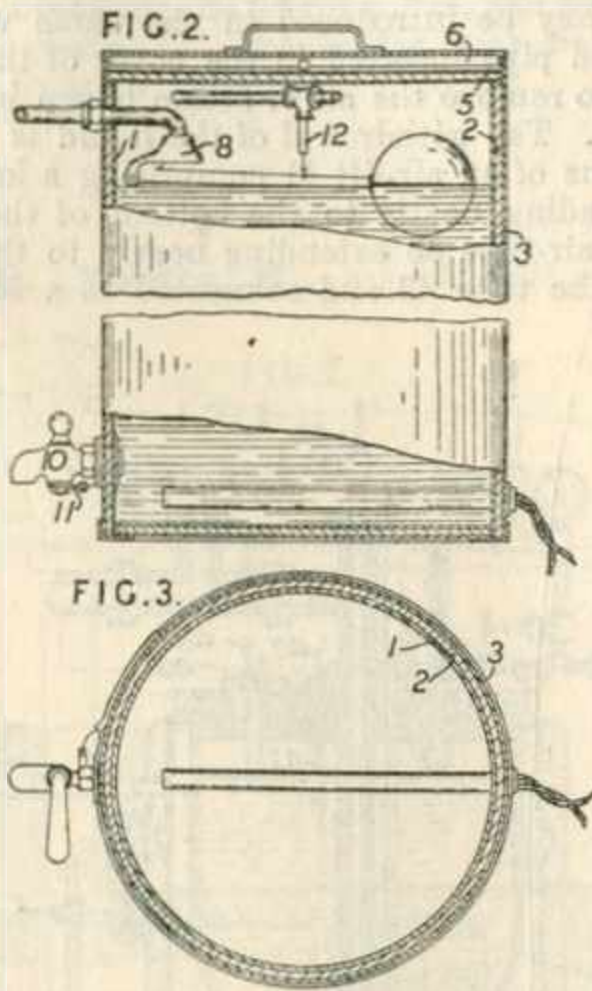


186,553. **Tapp, P. J. R., and Lee, R. S.** Jan. 23, 1922.

Internally-fired boilers. — A water-heating stove comprises a tubular double-walled casing a the lower part forming a fire-box for the reception of combustible refuse, while the upper has within and communicating with it a water element h of star or cruciform section.

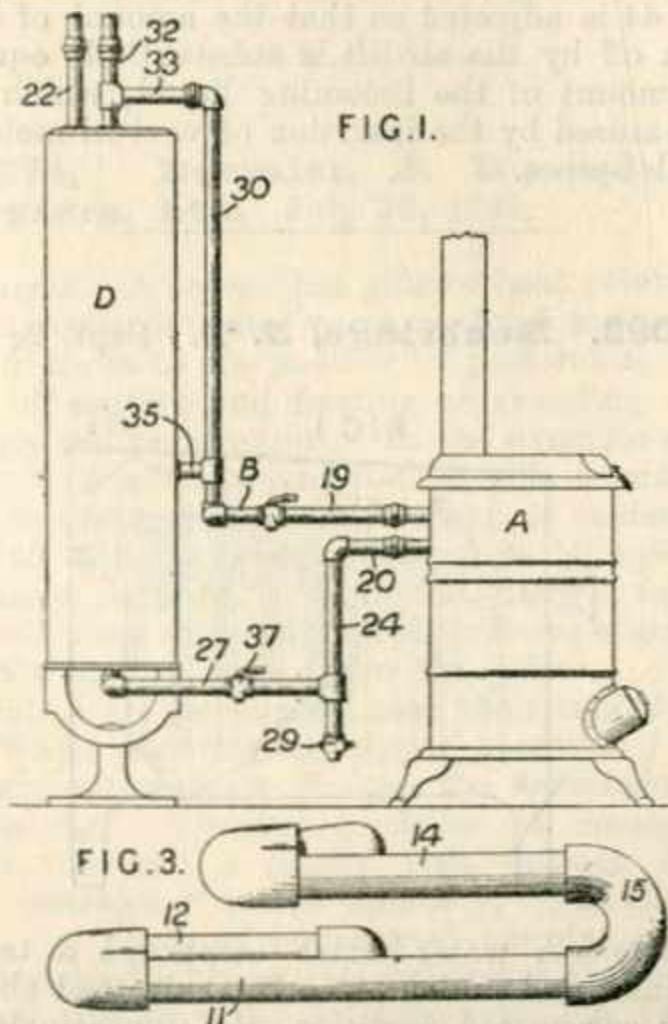


186,703. Russell, E. S. July 4, 1921.



Water supply and delivery.—The draw-off cock 10 of a water heater is fitted with an arm 11 connected to the lever of a ball-cock 8 by a flexible sheathed cable 12 so arranged that the cock 8 is closed while water is being drawn off.

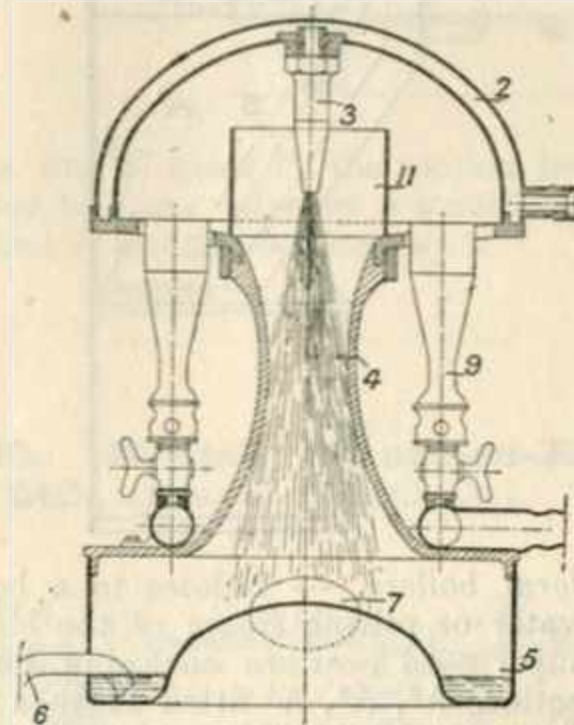
186,714. Roberts, A. N. July 6, 1921.



Heating water. — In water-heaters where the

heating-element is arranged in a stove A and is coupled to a vertical tank D, the heating-element consists of lower pipes 11, 12, Fig. 3, coupled by an inclined bend 15 to an upper pipe 14 situated above the space between the pipes 11, 12. The tank has an inlet pipe 22, a supply system 27, 24, 20 to the heater, in which system is a drain unit 29 and shut-off valve 37. The heated water passes from the heater by pipes 19, 30, which connects at 33, 35 with the tank. A shut-down valve is placed in the pipe 19. The hot-water draw-off pipe 32 is connected with the tank and with the pipe 33. When water is drawn off slowly, it comes from the tank, and as the draw-off valve is opened an increasing proportion of water is obtained from the heating-element direct from the pipe 30, until with the valve fully open practically all the water is from the heater and none from the tank. These proportions are governed by the degree of resistance to flow in the pipe system.

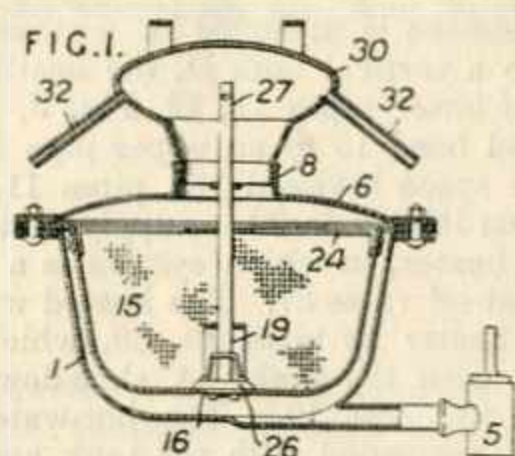
186,897. Meker, G. A. H. Oct. 7, 1921, [Convention date].



Heating water.—Water from a shallow hemispherical chamber 2 passes through an atomizing jet 3 and cone 4 to a collecting chamber 5 entraining with it the products of combustion from circularly-arranged gas burners 9 protected from the jet by the cylinder 11. Hot water flows away at 6 and cooled gases at 7.

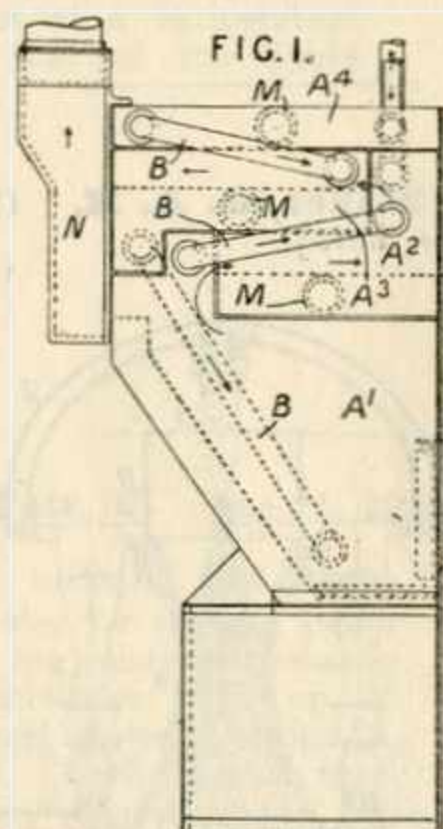
187,007. Bologna, N. July 9, 1921.

Boiling-pans and the like.—A still, for use particularly in preparing brandy &c. from fruit mashes, consists of an outer vessel 1 with drainage outlet 5, and an inner foraminous vessel 15 having a discharge opening 16 closed by a valve 26, the stem 27 of which is supported by a detachable loop 19 and cross-bar 24. A cover 6



has a flange 8 which receives the lower end of a dome 30 with vapour outlet pipes 32 which are cooled to produce condensation.

187,044. **Hope, J. A.** July 22, 1921.

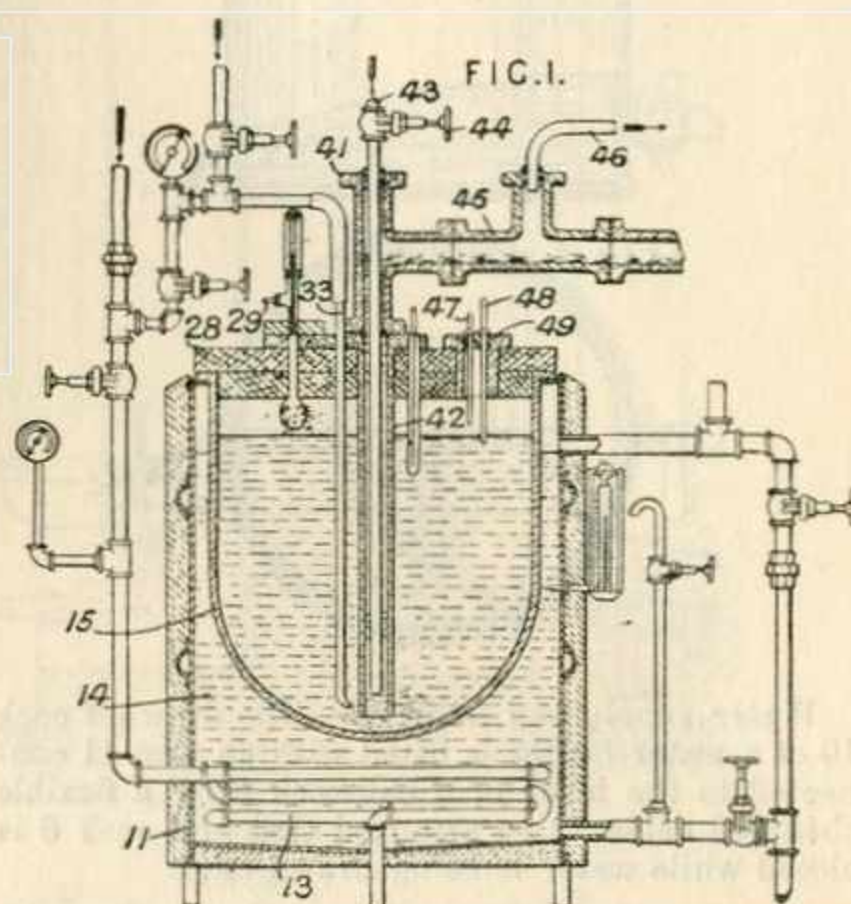


Block-form boilers. — Relates to a boiler for heating water or raising steam of the kind comprising superposed sections enclosing horizontal flues. Sections A², A³, A⁴ fitted above a fire-box section A¹ are so shaped as to enclose flues directing the furnace gases forwards and backwards between the sections. Dampers between the sections and the smoke-box N may cut off the outlet from the flues and allow the gases to pass directly into the smoke-box. The sections are connected together by external pipes B. Cold water enters at the top section and hot water or steam is taken off from the section immediately over the fire-box. Sediment is removed through doors M. Doors are provided at the front of the boiler to give access to the flues.

187,090. **British Thomson-Houston Co., Ltd.**, (General Electric Co.). Aug. 29, 1921.

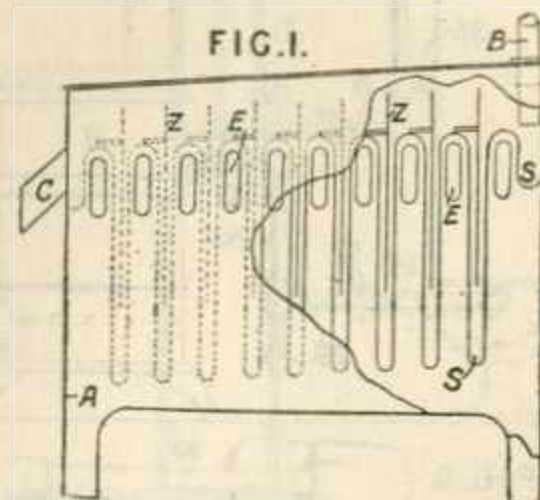
Digesters.—A stoneware kettle 15 is supported in a heat-insulated container 11 containing a liquid 14 heated by the steam-coil 13. The kettle 15 is closed by a wooden cover 28 and the liquids

are introduced through spray pipes as at 29. Air is blown in through the pipe 33 and if necessary steam may be introduced in the same way. A T-shaped pipe inserted in the cover of the kettle serves to remove the air or steam blown in by the agitator. The withdrawal of the liquid is effected by means of an air-lift 41 comprising a long tube 42 extending nearly to the bottom of the vessel and an air-tube 43 extending nearly to the lower end of the tube 42 and connected to a source of



high-pressure air controlled by the valve 44. The liquid carried up the tube 42 around the air-tube 43 is conveyed away by the tube 45 fitted with an air-vent 46. Gauges 47, 48 are used to check the level of the liquid in the kettle. In operation, the valve 44 is adjusted so that the amount of liquid drawn off by the air-lift is substantially equal to the amount of the incoming liquid, which may be measured by the insertion of venturi-meters in the inlet-pipes.

187,092. **Benbridge, J. T.** Sept. 2, 1921.

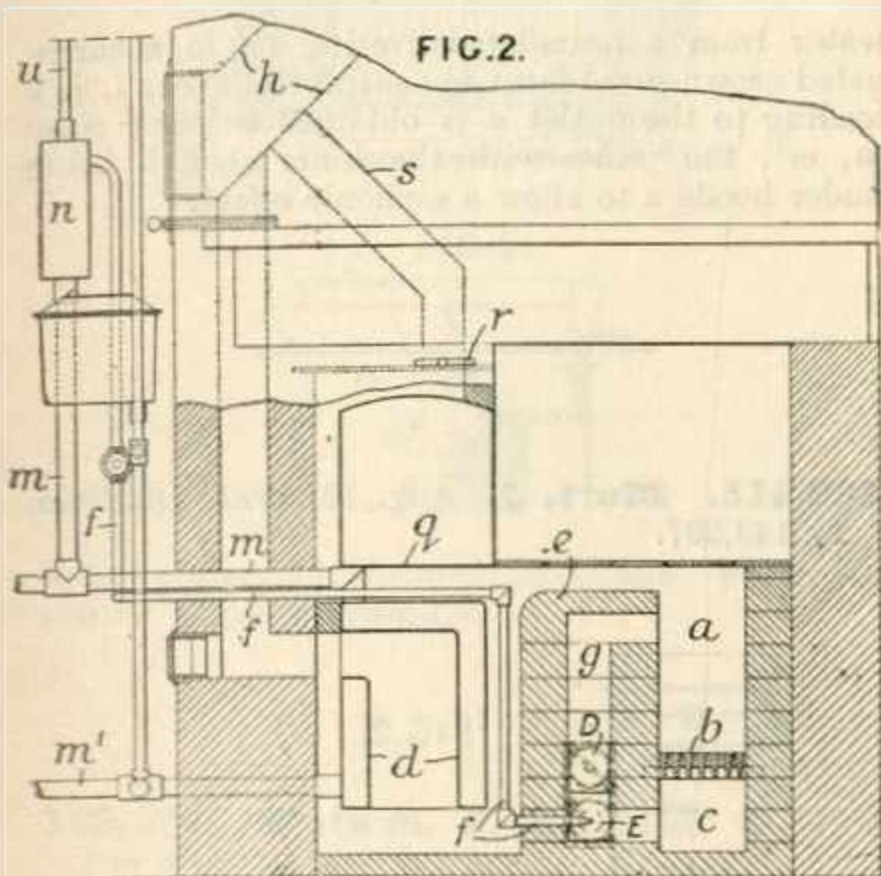


Boilers.—A water-heater comprises a tank A with inlet and outlet pipes B, C situated above a deeply corrugated partition, the upper surface of which is slightly inclined. The corrugations S



extend across the tank, and each has a baffle plate Z which divides the flow. Heat is applied beneath and between the corrugations, and the outer shell has vents E. The baffles may be joined together by metal rods.

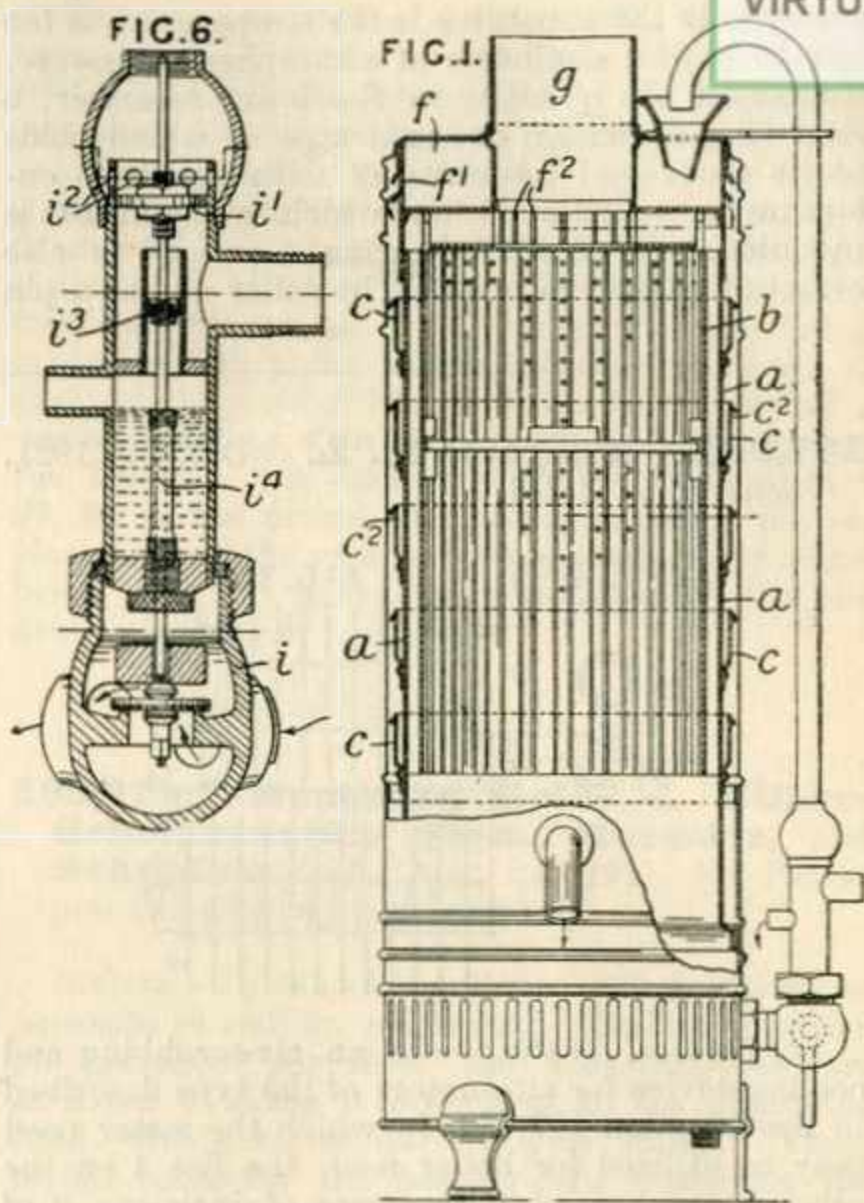
187,359. Foster, H. Aug. 5, 1921.



Heating water.—The water-heating apparatus of a kitchen range comprises a boiler *d* which supplies steam to a receiver *n* from which a pipe *u* may lead to a heating coil arranged in a water cistern. Radiators may be supplied from pipes *m*, *m'* connected to the boiler.

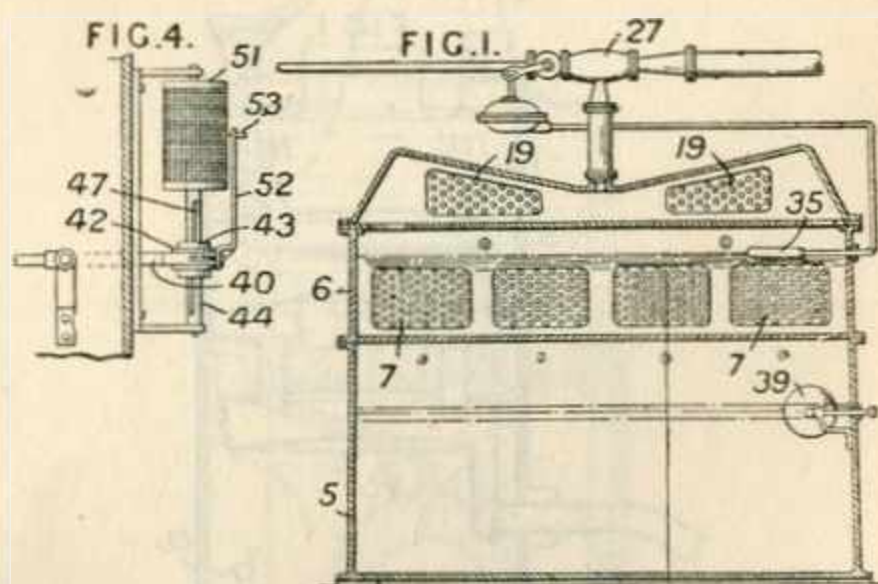
187,674. Barralet, J. H., and New Geysers, Ltd. July 16, 1921.

Geysers.—A geyser has gills or heat conductors and channels or water passages fixed to the heating surface or to one another by perforating at the point of contact and floating or sweating solder through the perforations. In the example shown in Fig. 1, a series of longitudinal gills *b* formed of a single corrugated sheet of metal is soldered to the wall *a* of the heating chamber. Single bent ribs may be used. Annular flanges forming channels *c* are soldered near their lower edges outside the wall *a* one above the other. These channels *c* are perforated near their top edges at *c²*. Water entering an upper chamber *f* flows through perforations *f¹* into the channels *c* in succession. Uprising products of combustion within the wall *a* finally pass through hollow radial passages *f²* to the uptake *g*. The chamber *a* may be made in superposed annular sections each provided with an external water channel and internal ribs or gills. An automatic gas valve *i*, Fig. 6, may be used, water pushing up a plunger



i¹ past a ring of holes *i²*, the motion being communicated to a gas valve by a spindle carrying a cup leather *i³* and rubber sleeve *i⁴*.

187,700. British Thomson-Houston Co., Ltd., (General Electric Co.). July 22, 1921.



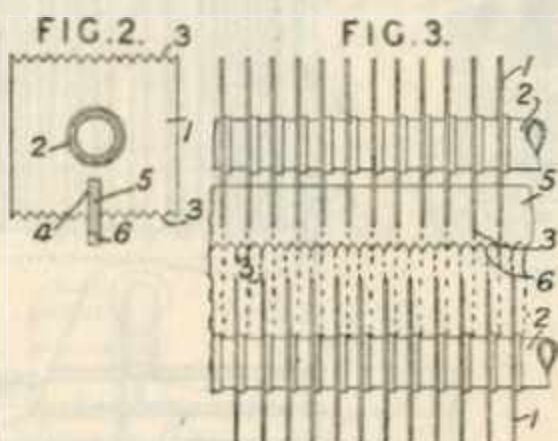
Feed-water, heating.—Feed-water is heated to ebullition to remove contained gases in a chamber 6 above a storage vessel 5 for heated water. Steam for heating passes through tubes 7. Feed-water passes first to condenser tubes 19 to condense vapours rising from the chamber 6, then to the same chamber for boiling and thence to the reservoir 5. A pressure responsive element 35 controls the supply of steam to an ejector 27 to lower the



pressure in the apparatus is the temperature is too low to permit ebullition at atmospheric pressure. To record the quantity in the lower reservoir, a float 39 operates an external arm 40 which holds at its outer end a sleeve 42 with collar 43 encircling a spindle 44 on which a drum 51 is mounted. An arm 52 bearing a pen 53 is also attached to the sleeve 42. The collar 43 has a pin

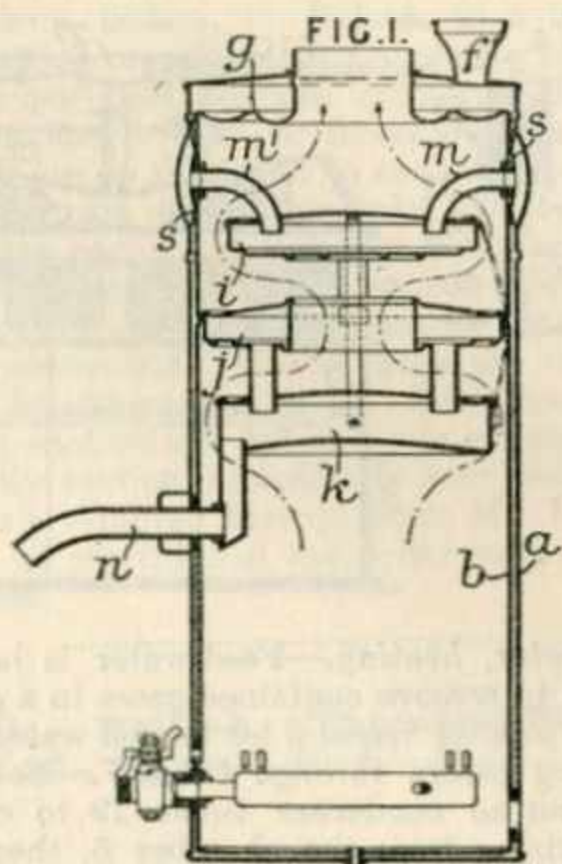
which works in a diagonal slot 47 in the spindle 44 and is itself mounted in the collar 42 in such a way as to rotate in one direction only. On the level in the tank 5 falling, the arm 40 rises and the pen 53 marks a vertical line on the stationary cylinder 51. When the level rises the arm 40 falls and the drum rotates with the spindle 44.

187,963. Pourcel, M. L. Oct. 29, 1921, [Convention date].



Feed-water, heating.—In an air-scrubbing and cooling device for alternators of the type described in Specification 167,750, in which the water used may be utilized for boiler feed, the fins 1 on the pipes 2 are formed with series of incisions 3 of saw-tooth form along their upper and lower edges so that the water drops shall fall from points along the whole of the lower edges. An additional strip 5 with a serrated lower edge 6 is fitted into recesses 4 at the underside of the fins 1 to give a further distribution of the drops over the range of fins below.

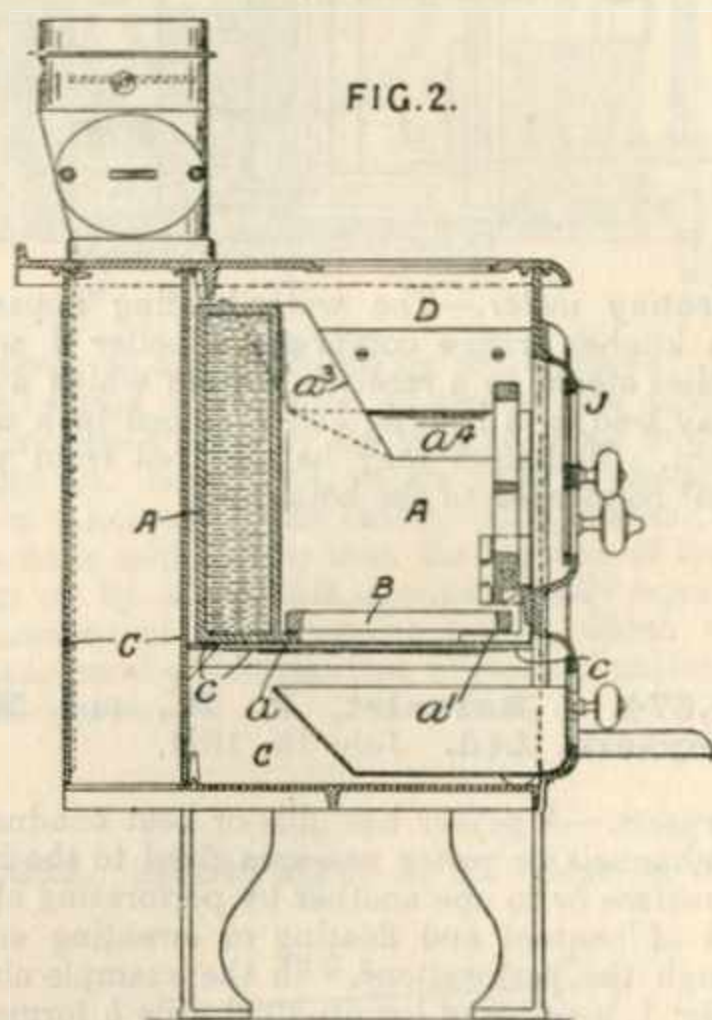
188,381. Ewart, J. W. Aug. 5, 1921.



Internally-fired boilers.—A water heater comprises an outer water-holding shell a, b fed with

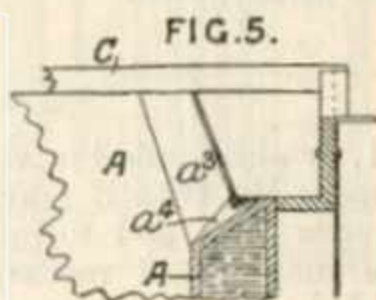
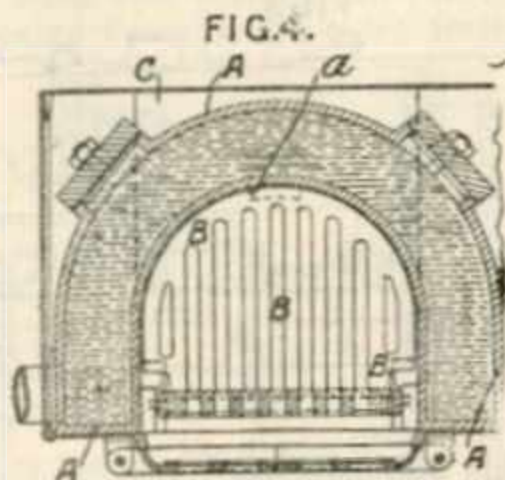
water from a funnel f delivering on to a corrugated crown g. Access to central chambers i, j, k leading to the outlet n is obtained through pipes m, m', the joints with the inner shell b being under hoods s to allow a siphonic effect.

188,415. Mort, J. Aug. 19, 1921. Addition to 143,337.



Block-form boilers.—The sectional boiler of the stove described in the parent Specification is replaced by a readily-removable one-piece boiler of horse-shoe or like shape, having pipe connections to a storage tank for domestic supply and also to heating pipes or radiators. In the stove shown, the boiler A is supported on flanges c in the stove casing C and carries on an internal flange a the grate B, which is also supported on plates a' attached to the casing. The front plate of the casing carrying the fire-doors J is bolted to the remainder so as to be readily removable to allow the boiler to be withdrawn. The side of the boiler

next to the oven is reduced in height to form an outlet D for the gases, the top a^4 of the opening

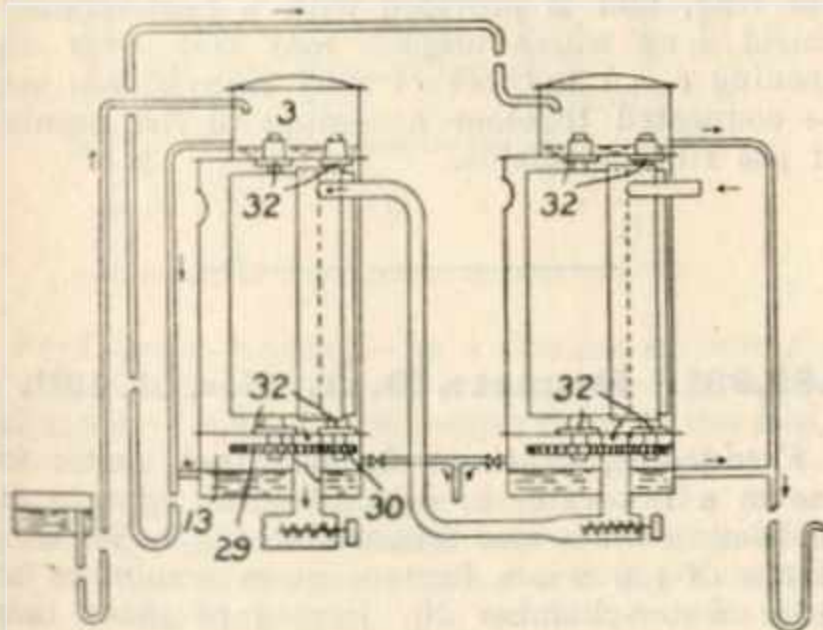


being preferably inclined as shown, whilst the side a^2 slopes rearwardly.

188,572. Watson, J. H. Dec. 22, 1921.
Drawings to Specification.

Washing-boilers.—A gas-heated boiler is provided with an external casing of aluminium. The lid and the legs of the boiler may also be made of aluminium.

188,623. Rigby, T. May 10, 1921.



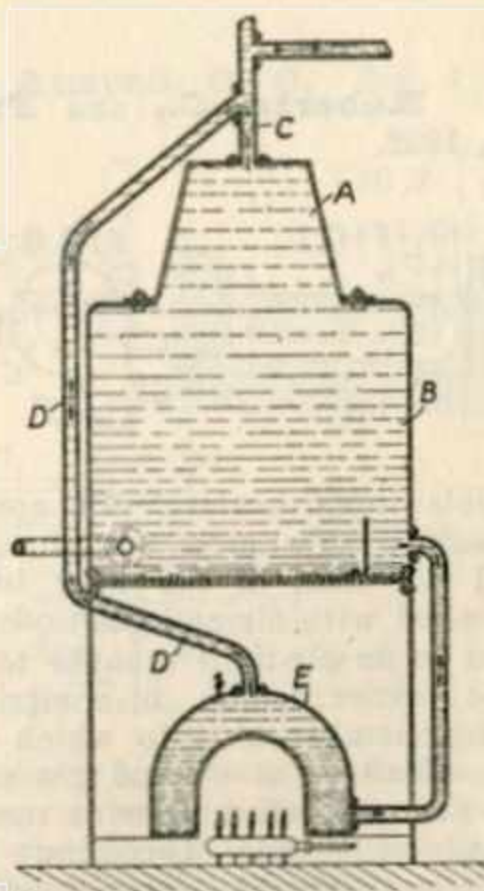
Heating liquids. — Liquids, or admixtures of solids and liquids, to be evaporated by exposure in a film on surfaces heated by vapour generated by film-exposure of another portion in a different part of the apparatus, are preheated by spreading in a film over a surface heated by vapour flashed off from hot liquid leaving a similar drying concen-

trating or evaporating plant. The preheating may be effected in stages. Specification 180,963, [Class 32, Distilling &c.], is referred to and the following features set forth therein may be incorporated in a preheater: the pouring of the liquid down the outer surface of an upright drum rotating in contact with a scraper: the provision of a partition closing off the drum space from vapour spaces 3, 13, communication being made through hollow drum spindles, mounted at each end in a gland 32, for example comprising a washer rotating with the spindle pressed against the bearing: the enclosing of the driving gears 29, 30 of the drums in a vapour space: the replacement of the scraper by a second rotary member of different peripheral speed from that of the drum with which it coacts.

188,811. Deutsche Gold- & Silber-Scheideanstalt vorm. Roessler, and Schaidhauf, A. Aug. 24, 1921. *No Patent granted (Scaling fee not paid).*

Boilers.—In bleaching fibres with solutions of peroxide of sodium or strongly alkaline solutions of hydrogen peroxide, the bleaching-lyes are arranged to come into contact, in the apparatus used, with surfaces only of pure nickel. Thus, nickel tubes for the heating-coils conveying the liquid, and nickel-plated iron receptacles may be used; or the whole apparatus may be made of nickel.

188,986. Aird, K. Dec. 9, 1921.



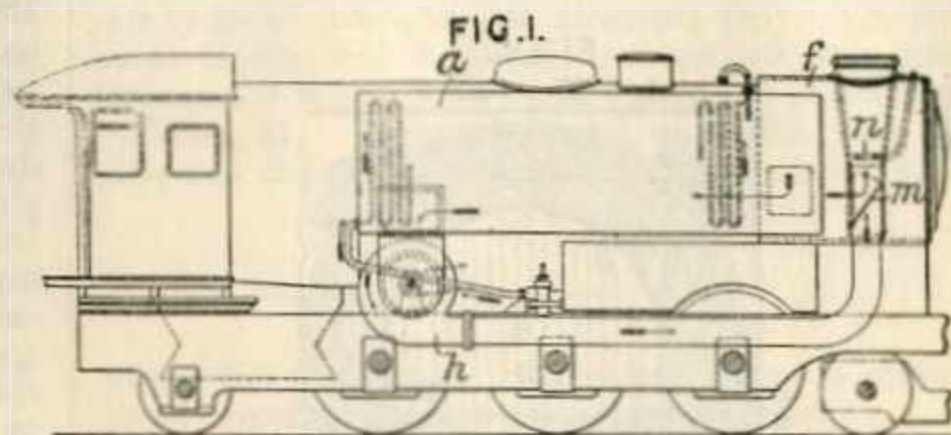
Heating water.—A hot-water circulating tank B is provided with a dome A, smaller in diameter than the tank B, from the upper end of which the delivery pipe C leads, the outflow D from the boiler E communicating with the pipe C near the top of the dome.



189,119. **Leidenroth, G.** Nov. 15, 1921, [Convention date].

Feed-water, heating.—A condensing steam-locomotive has a blower *h* to draw flue gases from the smoke-box *f* through tubulous feed-heaters *a* arranged at the sides of the boiler, in series or in parallel, before forcing them into the smoke stack. A damper *m* is provided to cut out the feed-heater when an auxiliary blast pipe *n* is in use. The blower is driven independently of the main engine.

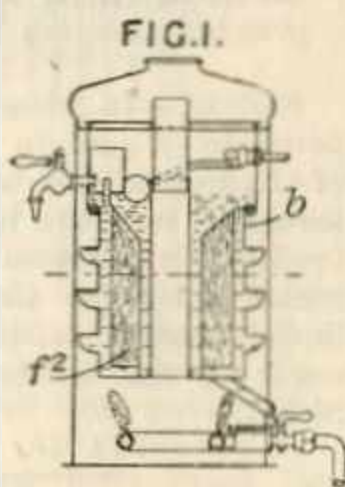
According to the Specification as open to inspection under Sect. 91 (3) (a) the blower may be arranged to deliver air to the grate instead of operating in the way



shown. This subject-matter does not appear in the Specification as accepted.

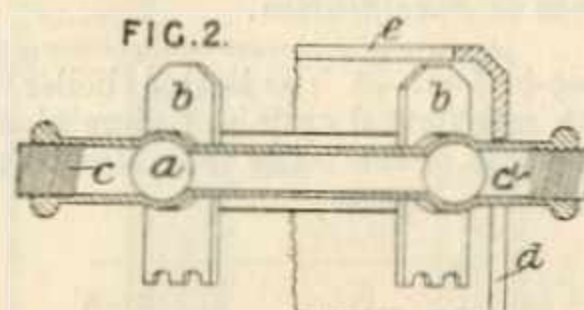
189,312. **Rees, T. L. H., and Billington, W. J.** Oct. 19, 1921.

Block-form boilers; annular boilers. — A water heater comprises a single container *b* within which is disposed a displacer *f* so as to form three intercommunicating compartments, inner and outer annular chambers, each of which is heated by the combustion products, and an upper storage compartment.



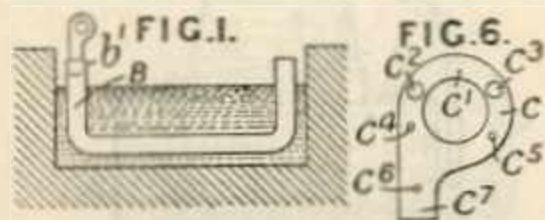
shown in Fig. 1, or surrounds the vessel containing the substance. The tube *B* may be arranged in coiled or sinuous form and to present a large heating surface may be of rectangular cross-section or provided with one or more box-shaped extensions.

189,713. **Pearce, F. R. R. J.** March 31, 1922.



Boilers.—A circulating boiler ring *a* with inlet and outlet *c, c'* is supported by uprights *b* over a gas ring, and is provided with a heat-retaining shield *d* on which utensils may rest over the opening *e*. A number of such ring boilers may be connected together according to the number of gas rings available.

189,633. **Roberts, C., and Fuller, H.** March 9, 1922.

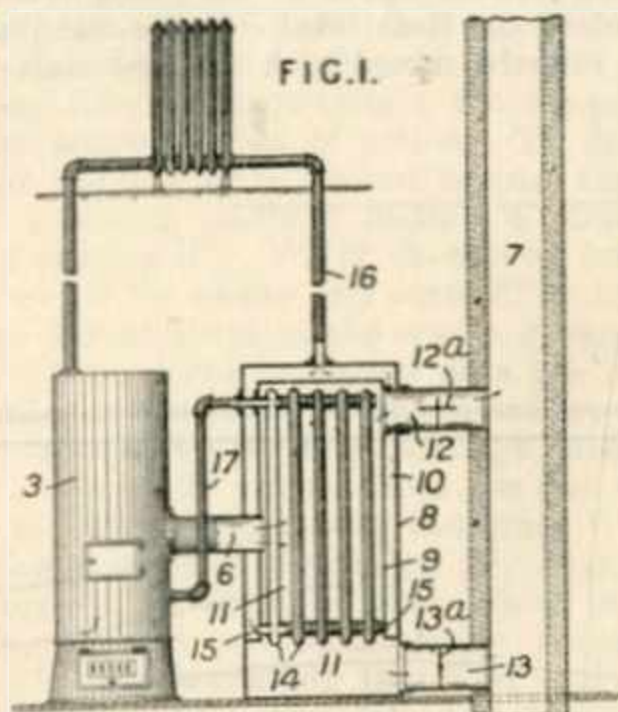


Submersible liquid-heaters.—In apparatus for applying heat to substances contained in baths, boilers and the like, of the kind in which a burner, supplied with air and gas under pressure, is connected in an air-tight manner to a heating conduit, the burner *c*, Fig. 6, comprises an annular mixing-chamber *c*¹ into which air under pressure is admitted at *c*² and gas under pressure at *c*³, the respective streams meeting each other "head on" and becoming thoroughly mixed before entering the burner mouth *c*⁷. The air and gas are preferably supplied at a pressure only just exceeding that of the atmosphere. *c*⁴, *c*⁵, *c*⁶ are lighting holes, either *c*⁴ or *c*⁵, located in rear of the mixing point, being preferably used. The burner mouth *c*⁷ is screwed into one end *b*¹ of an open-ended tube *B* which is either immersed in the substance to be heated, as

189,981. **Brunett, D. A.** Nov. 21, 1921.

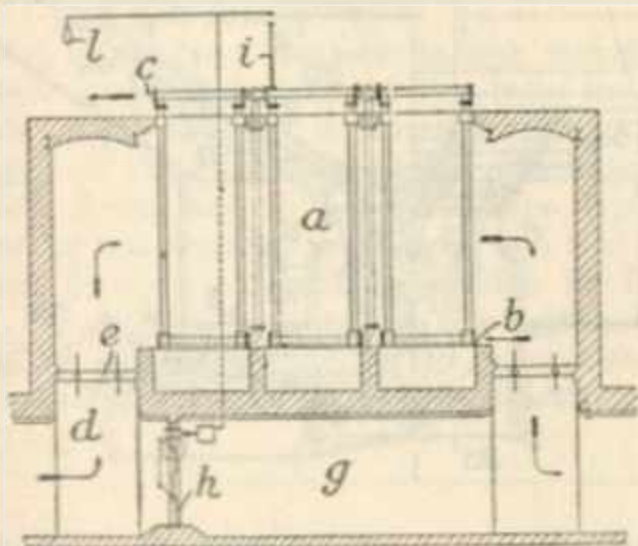
Feed-water, heating.—An auxiliary heater for use in a hot-water or steam-heating system for preheating the water returned to the boiler 3 by means of the waste furnace gases comprises an outer water-chamber 10, formed of inner and outer shells 9, 8 and having an inlet pipe 16 connected to the radiator system, and an inner water-chamber 14 disposed within the inner shell 9 and connected at its lower end 15 to the outer chamber 10 and at its upper end to the boiler 3 by a pipe 17 passing through the outer chamber 10. The hot gases are admitted to the heating-space 11 through a smoke-pipe 6 passing through

the outer water-chamber 10, and pass to the flue 7 through upper and lower outlet pipes 12, 13 preferably fitted with dampers 12^a, 13^a, the upper pipe 12 passing through the outer water-chamber



10 and the lower pipe 13 being disposed below this water-chamber. The inner water-chamber 14 preferably consists of a number of independent sections connected at the top and bottom after the manner of a radiator.

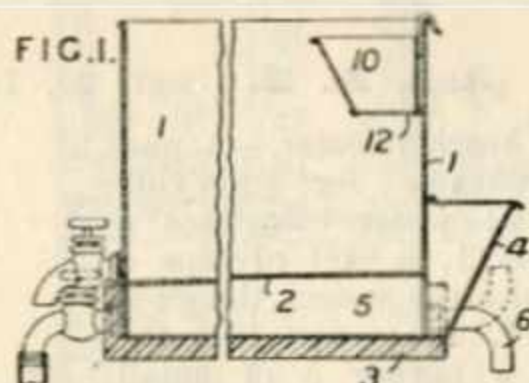
190,395. Babcock & Wilcox, Ltd.,
(Deutsche Babcock & Wilcox Dampfkesselwerke Akt.-Ges.). March 11, 1922.



Feed-water, heating.—In a flue-gas economizer of the kind provided with a thermometric device *i* adapted to indicate the temperature of the feed-water and also automatically to control the temperature by actuating flue dampers, the thermometric device is located between the inlet *b* and outlet *c* of the economizer *a* at a point one-third of the way from the outlet *c*. In the arrangement shown the gases from the flue *d*, which normally flow past dampers *e* across the tubes of the economizer, may be wholly or partially by-passed through a flue *g* by the opening of a motor-controlled damper *h* when the temperature reaches a predetermined maximum. A lamp *l* connected in the circuit may give a visual indication when this temperature has been attained,

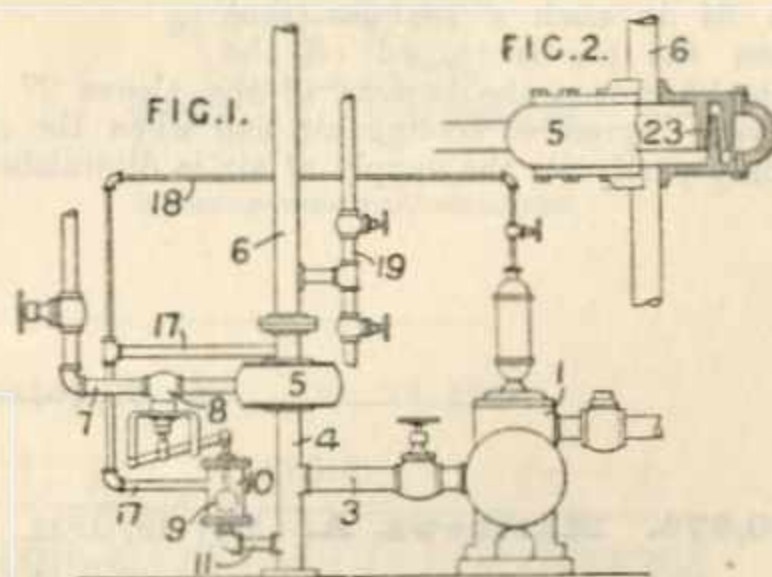
and the dampers *e* may be closed simultaneously with the opening of the damper *h*. A series of contacts may be provided on the thermometric device *i* for effecting a gradual opening of the damper *h*.

190,528. Turpin, E.B. Sept. 20, 1921.



Portable liquid heaters comprise a container 1, the sides and bottom of which are made of heat non-conducting material, divided by a partition 2, made of heat-conducting material, into upper and lower portions, the upper portion receiving the milk &c. and the lower one containing the heating or cooling fluid. Hot water may be fed into the chamber 5 through a hopper 4, or cold water may be fed in through a cock and discharged by a pipe 6. The milk may be fed into the container slowly through perforations 12 in the bottom of a trough 10, and the lower chamber 5 may be insulated as at 3.

190,660. Austad, O. C. Feb. 1, 1922.



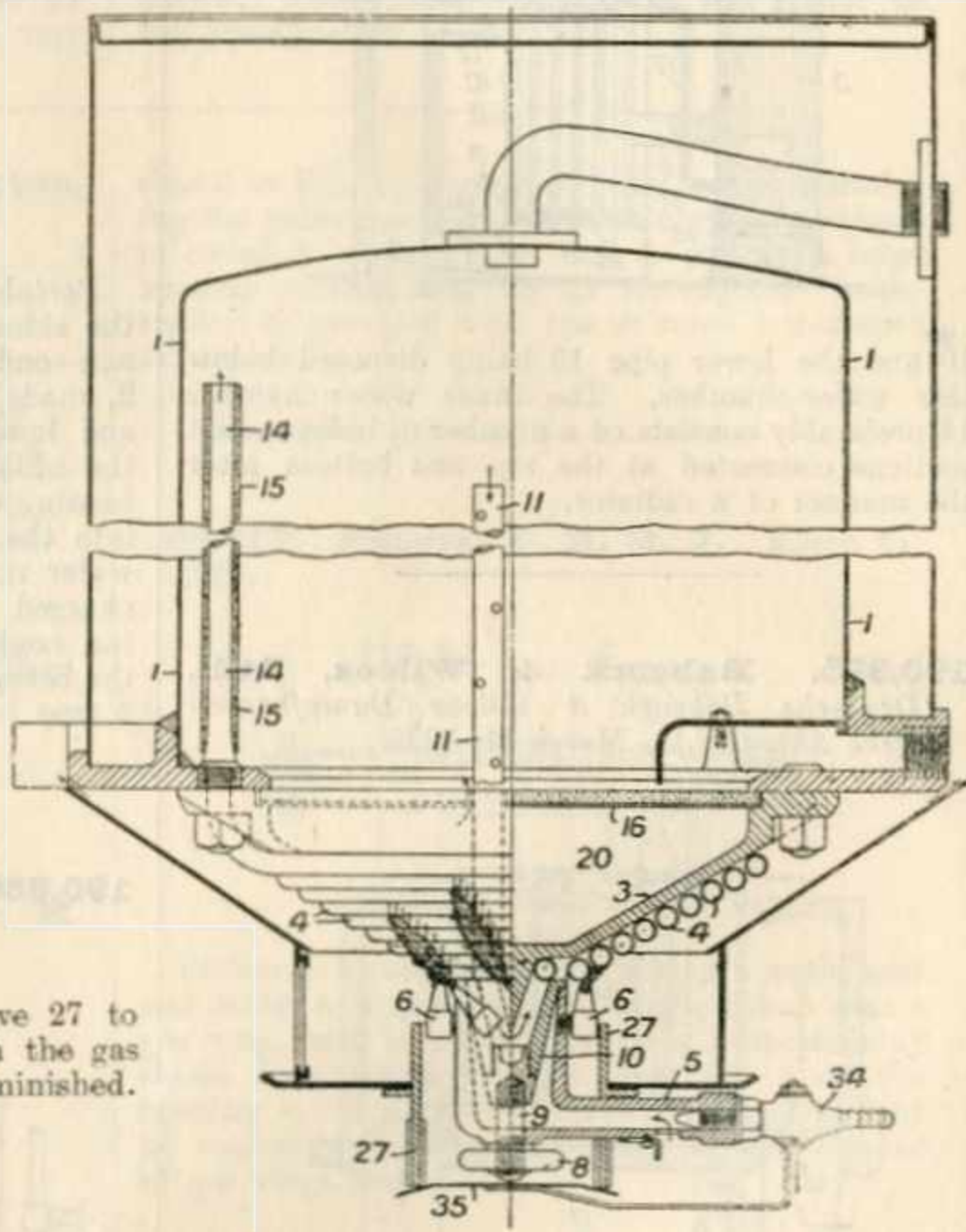
Heating water; feed-water, heating.—Relates to apparatus for heating water by direct contact with steam wherein the water supply is controlled by a float device and consists in arranging the mixing-chamber on a stand pipe and in providing means for carrying off surplus water from the float chamber and surplus steam from the steam pipe and for preventing the formation of a vacuum therein. The mixer 5 is mounted on a stand pipe 4. 6, Fig. 1, exhaust steam being supplied through the pipe 6, and cold water through the

pipe 7, whilst the heated water is drawn off through the pipe 3 by a pump 1. A valve 8 in the pipe 7 is controlled by a float 9 in the chamber 10 which is connected to the pipe 4 by a connection 11. Pipes 17, 18 connect the chamber 10 with the pipe 6 and pump 1 for drainage and vacuum prevention. Live steam may be supplied to the pipe 6 through the pipe 19. The mixer 5,

Fig. 2, has baffle plates 23 which form a tortuous horizontal passage for the water. The hot water may be used as feed water, or for cleaning boilers and filling before firing. The temperature is controlled by the speed of the pump and by adjustment of the float level. Boiler-cleaning compounds may be mixed with the cold water.

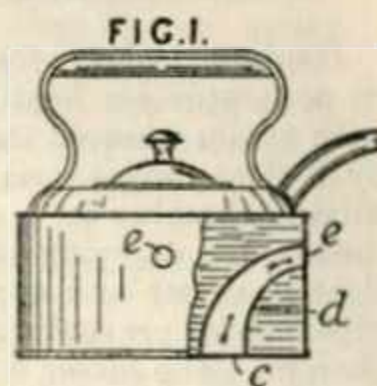
190,770. Ash, A. E. Sept. 20, 1921.

Boilers; heating water.—A gas-heated apparatus for supplying domestic hot water comprises a storage tank 1, a coil of pipe 4 in a conical arrangement the ends of which 11, 14 project into the tank and a burner 5 of small capacity, adapted to be alight continuously, the flames of which heat the water in the conical coil. The tank 1 has a conical bottom 3 and an insulated plate 16 cuts off the chamber 20 thus formed from the main body of water in the tank 1 except for an annular space around the return pipe 11. The flow pipe 14 is insulated with a jacket 15 and the tank 1 is surrounded by an insulated casing. The burner 5 bearing inclined jets 6 is clamped to the conical end 10 of the bottom 3 of the tank by a hand wheel nut 8 on a threaded pin 9. Secondary air for combustion enters below the sleeve 27 and a plate 35 is connected to the gas tap 34 in such a manner that when the gas is turned off the plate 35 covers the bottom of the sleeve 27 to prevent ingress of cooling air and when the gas is only partly on the supply of air is diminished.



190,974. Matthews, A. May 19, 1922.

Block-form boilers or like vessels are provided with a number of curved conical flues such as *d* in the Figure, which illustrates the invention as applied to a kettle, leading from spaced apertures *c* in the base to orifices *e* in the periphery of the vessel.

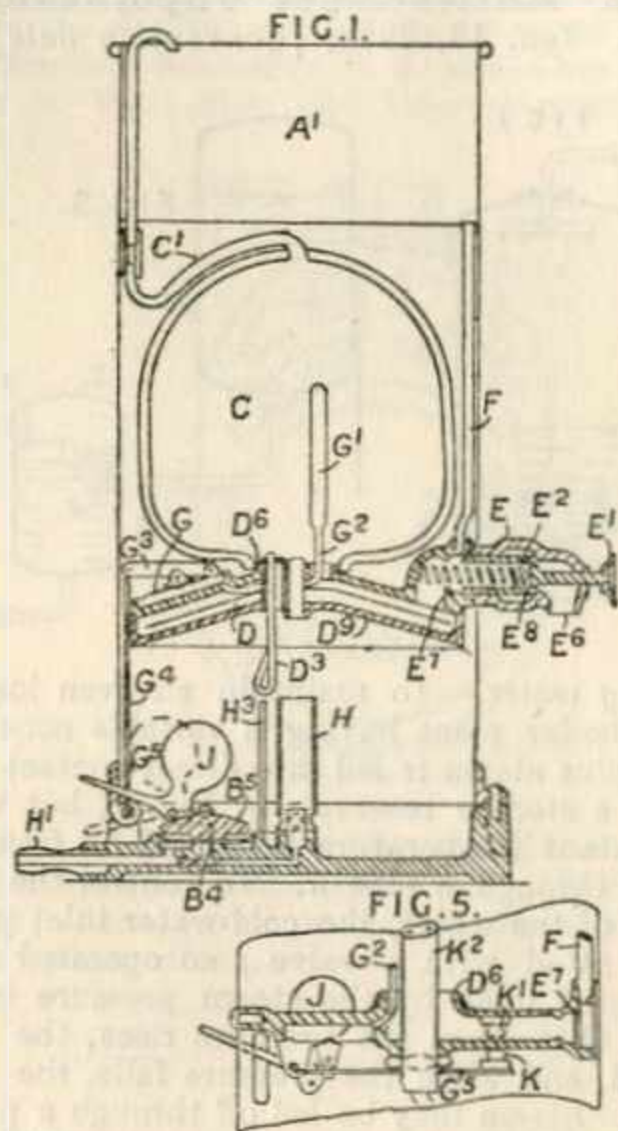


191,187. Harris, A. C. Oct. 13, 1921.
No Patent granted (Sealing fee not paid).

Heating water; water supply and delivery; block-form boilers.—A self-contained hot-water apparatus comprising supply tank, hot-water tank, boiler, and heating means, shown as a burner H, utilizes a vacuum jacketed container C for storing the hot water, a vent C' being provided at the top of the container. Cold water from the supply tank A' is admitted to the boiler D through a pipe F and apertures in the valve casing E which are open until the actual drawing off of hot water. A cone-shaped baffle D'



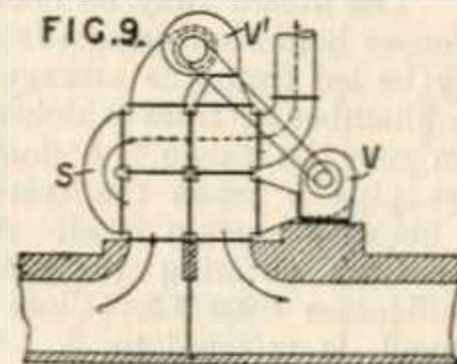
acts as a spreader inside the boiler, the apex of the cone communicating with the hot-water tank C through tubes (not shown). During normal working, water circulates downward into the boiler above the cone D⁹ through the open neck D⁶ of the container C. A pilot tube H³ allows a small flame always to play on a small water-circulating tube D³ to maintain the temperature when the burner is out of action. To draw off hot water the nob E¹ is pushed against the pressure of a spring thereby sliding a sleeve E² against a seating E⁷. Water then flows from the boiler through the sleeve and ports E⁸ to the exit E⁶. The temperature of the water governs the heating means, which is shown as a gas burner, by means of a container G¹ connected by a tube G² to a capsule G operating, through levers G³, G⁴, G⁵, a weight B⁴ which drops, on the expansion of the liquid within the container G¹, and compresses a leather diaphragm B⁵, cutting off the gas supply. A weighted lever J is in unstable equilibrium. The weight normally assists the weight B⁴. On depressing the outer end of the lever J, the weight is transferred to tend to lift the weight B⁴ and thus cause the gas to be cut off at a higher temperature. Or the thermostat may be cut out of action by continued depression of the outer end of the lever J. If an oil lamp is used, the thermostat operates on an extinguisher which leaves a small portion of wick uncovered to act as a pilot flame. If the heating is electrical, the thermostat lever G⁵, Fig. 5, forms with the contacts K, K¹ a switch con-



trolling the current to resistances K² inside the container C.

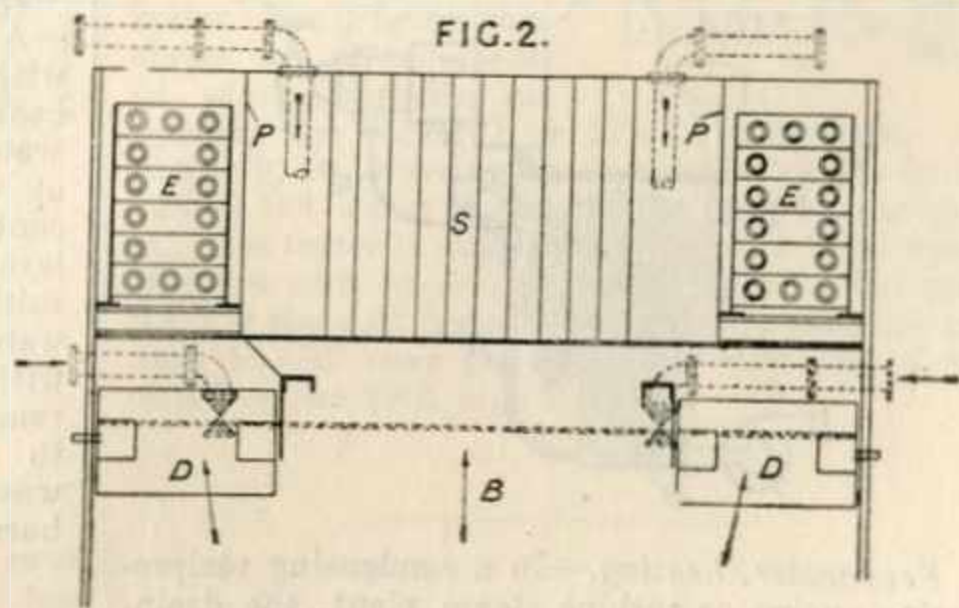
191,614. Haber, E. Jan. 13, 1922.

Heating air.—In a heat-exchanger working on the cross-current principle of the type in which the plates have angular incisions at the corners, the edges of the plates are bent alternately upward and downward at some distance from the base line of the angular incisions. An air heater composed of such elements is shown in Fig. 9, fans V, V¹ being provided in the paths of the air and hot gases respectively to compensate for loss of speed due to the change in direction.



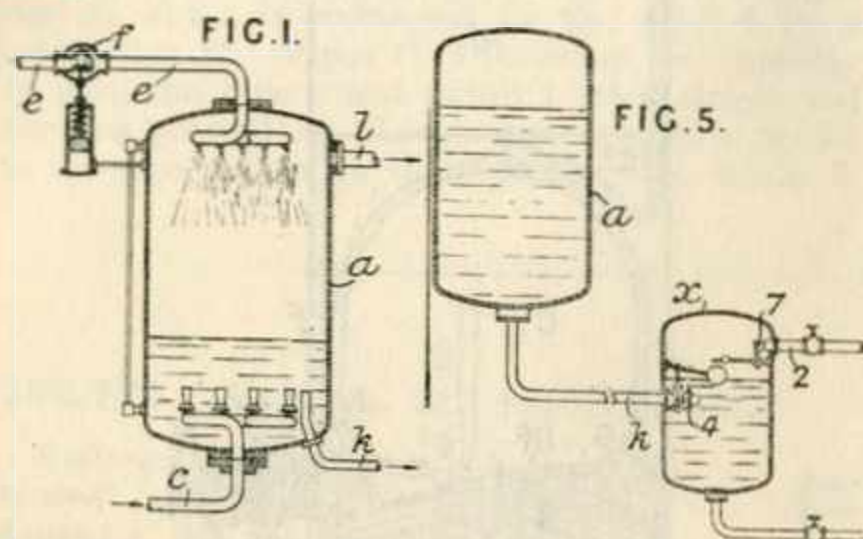
191,641. Green & Son, Ltd., E., and Tansley, G. E. Feb. 23, 1922.

Feed-water, heating.—A combined feed-water and air heater using waste furnace gases in steam boilers is positioned in a casing having partitions between the units and dampers for isolating the feed-water heater. In a casing on top of the boiler B are two feed-water heaters E separated by partitions P from the air heater S. Dampers D are provided so that the heaters E can be cut out. The heaters E may be of the kind set out in Specification 155,388.



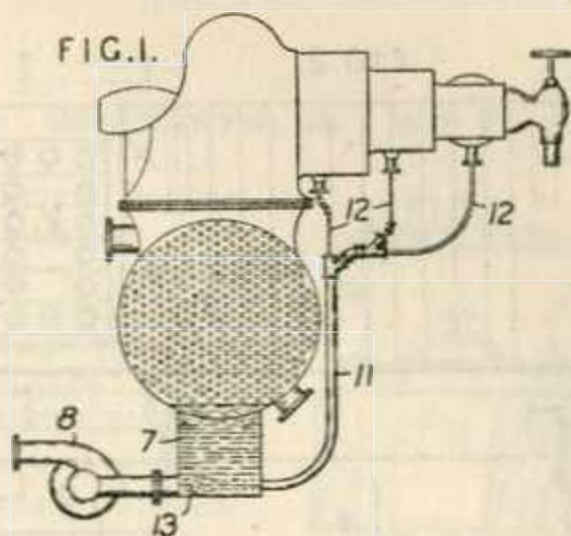


191,746. **Aktiebolaget Vaporackumulator.** Jan. 13, 1922, [Convention date].



Heating water.—To maintain an even load on a steam-boiler plant having a variable consumption, surplus steam is led into direct contact with water in a storage reservoir *a*, Fig. 1, hot water at a constant temperature being led off from the reservoir through a pipe *k*. To control the temperature of the water, the cold-water inlet pipe *e* may be fitted with a valve *f* so operated by a piston acted upon by the steam pressure in the reservoir that when the pressure rises, the valve is opened, and when the pressure falls, the valve is closed. Steam may be led off through a pipe *l*. The operation of the valve *f* may be controlled by a thermostatic capsule in the hot water, the pressure on the capsule acting on a diaphragm connected to the valve. In modifications, the temperature in the container is maintained constant by automatically controlling a valve in the steam supply pipe *c*, the cold-water supply being kept constant. The steam may be condensed in a surface condenser before entering the reservoir. Hot water may be led from the storage reservoir *a*, Fig. 5, to a chamber *x*, from which either hot water or steam may be taken. A float valve *4* closes the inlet pipe *k* when the water in the chamber rises above a certain level. A valve *7* prevents water from entering the steam-outlet pipe *2*. Specification 6894/14, [Class 123 (ii), Steam generators], is referred to.

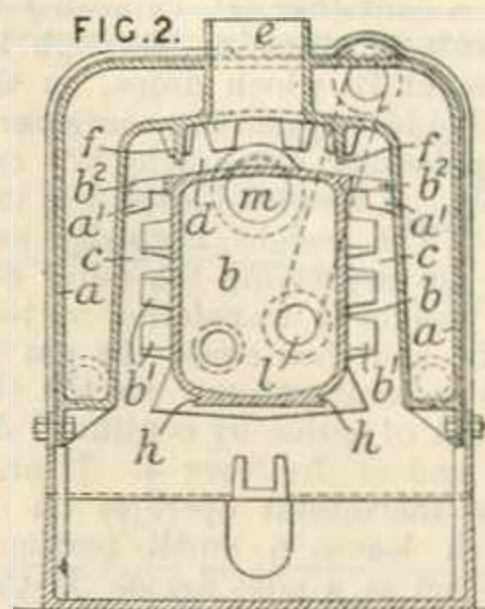
191,874. **Drysdale, W. D., and Dow, A.** Nov. 1, 1921.



Feed-water, heating.—In a condensing reciprocating engine or turbine steam plant, the drain-

age from the cylinders or stages is led by pipes 12, 11 to a chamber or hot well 7 below the condenser to give up its heat to the condensate therein. The fluid may operate an ejector 13 immersed below the surface of the condensate or leading into the pipe connection between the hot well 7 and pump 8. The resulting liquid is used as boiler feed. In a modification, a chamber is arranged between and connected to two hot wells and two pumps. The drip discharge enters the side of the chamber and produces a vortex flow.

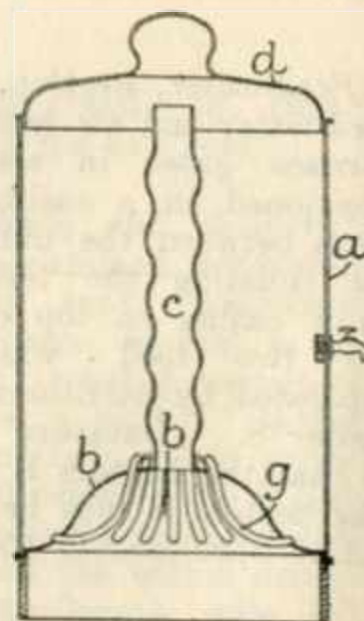
191,946. **Potterton, T.** Dec. 30, 1921.



Internally-fired boilers.—A gas-heated boiler of the type employing a saddle-shaped outer boiler *a* with a water-holding chamber *b* within, is provided with side flues *c* which are coterminous in width with the top flue *d*, and the flue *d* is provided with a central exit *e* for waste gases, guarded by longitudinal baffles *f*. Heat-absorbing lugs *b*¹ project from the inner section *b* and supporting lugs *b*² resting on ledges *a*¹. Ridges *h* divert condensation products from falling on the burner. Water enters at the top of the outer section *a* and passes by an external pipe connection to the inner section *b* at *l* and emerges at the connection *m*.

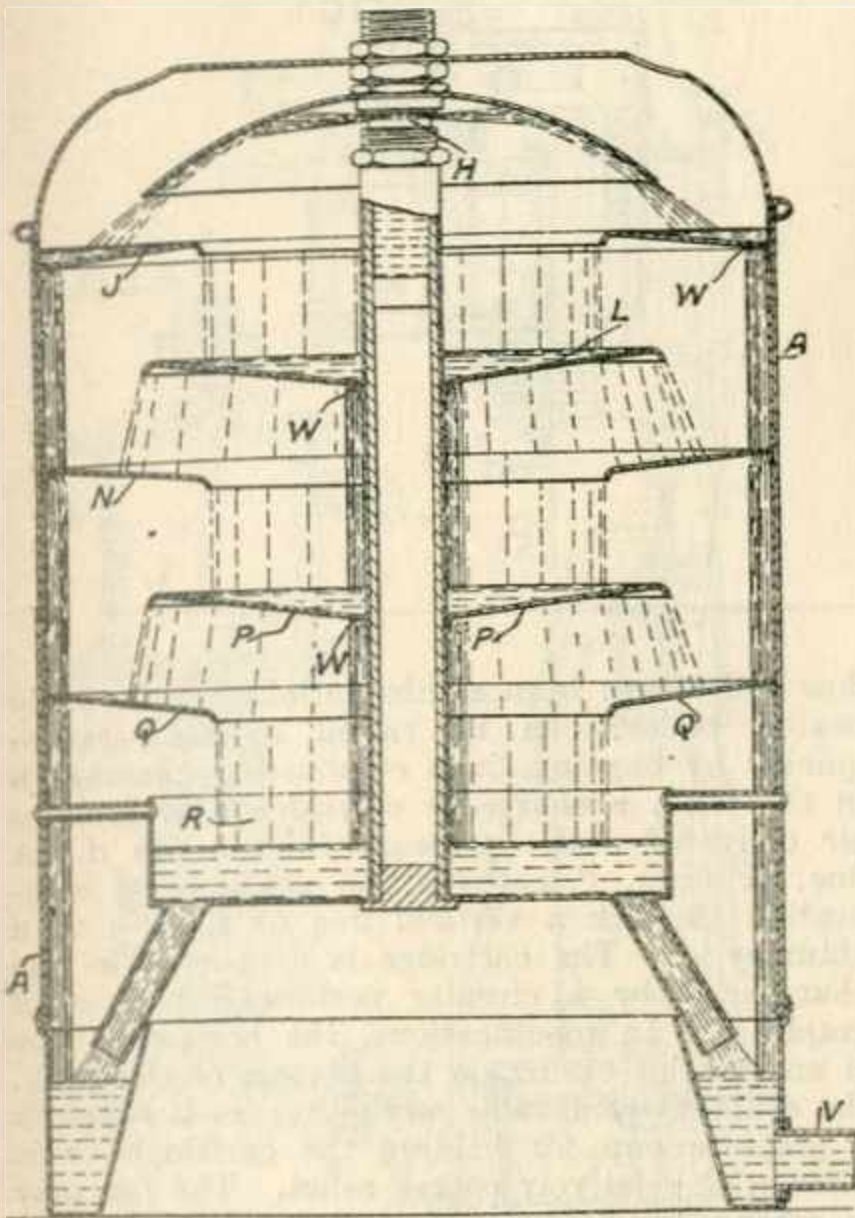
191,957. **Jones, W. S., and Sterry, N.** Jan. 7, 1922.

Internally-fired boilers.—A boiler *a* is provided with a central flue *c*, heating chamber *b* and water-tubes *g* connected at their ends with the container *a* at different levels, the upper extremities being turned inwards towards the flue within the waterspace. A removable lid *d* is adapted to allow the escape of waste gases from the burner.



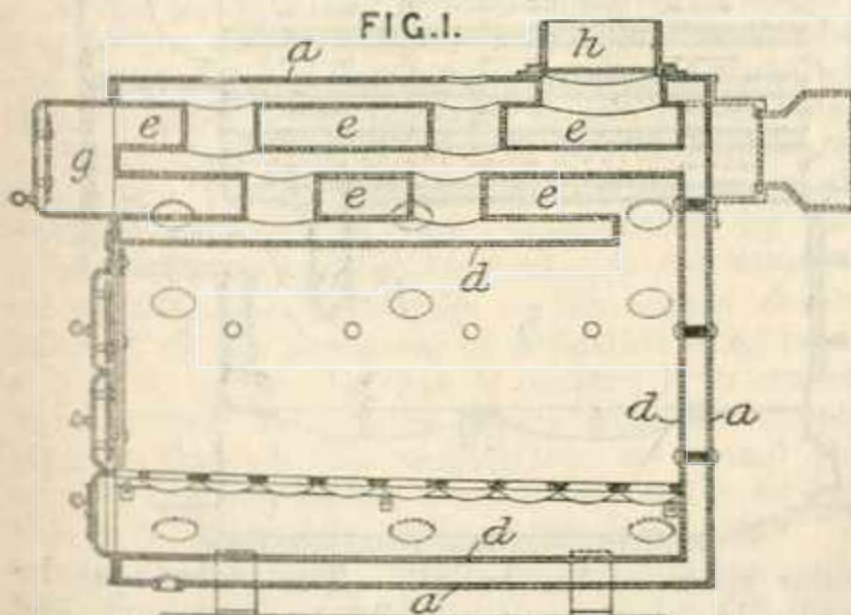


192,120. Cleary, E. Sept. 24, 1921.



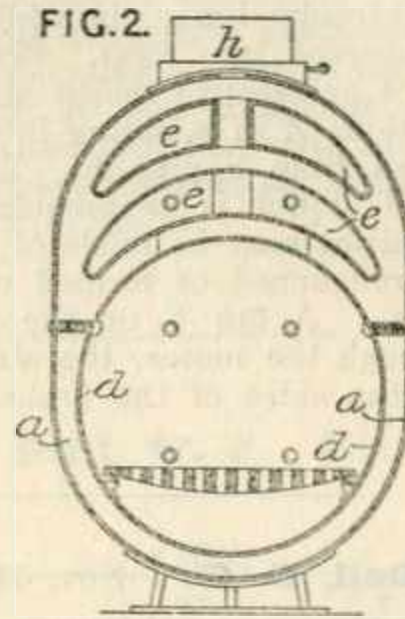
Heating water.—A water-heater comprises a shell A containing alternate disc and annular baffles J, L, N, P, Q over which water, sprayed in at H, flows in counter current to uprising gases from a burner below, passing finally from a collector R to an outlet V. The parts of the concave baffles next the supports are perforated at W to allow water to flow over these supports; thus the annular baffles are perforated at the outer edge and the disc baffles near the centre.

192,159. Marshall, L. Oct. 27, 1921.



Internally-fired boilers.—A boiler has an oval shell a, a fire-box d with an arched or curved top

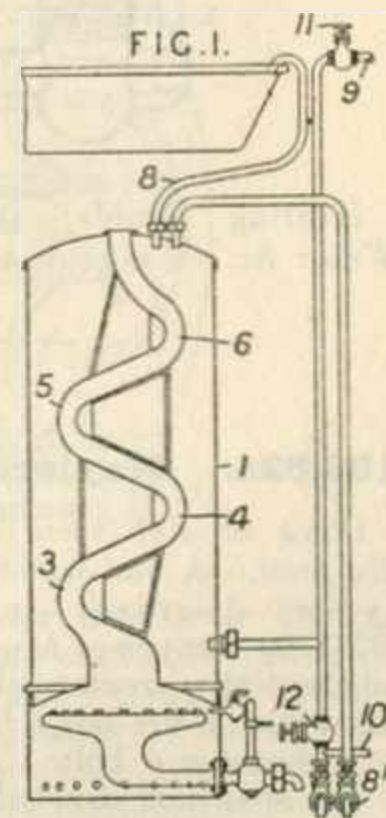
and longitudinal arched or saddle-shaped flues e above the fire-box. The furnace gases pass from the fire-box forwardly to a smoke-box g at the front of the boiler, and then rearwardly to an



outlet h. The boiler may be formed in two longitudinal sections, which are joined along a central plane, or it may be formed in several transverse sections.

192,432. Letheren, T. W., and Letheren, W. R. March 3, 1922.

Internally - fired boilers; feed - water, heating; water supply and delivery; block-form boilers.—A boiler 1 for heating water is provided with a serpentine flue which is restricted at one or more points such as at the bends 3 - - 6, returning to its normal cross-section between the bends. A similarly flued container can be used as a preheater for a boiler in which case the flue gases traverse the sinuous flue after passing through the boiler. The Figure also shows an arrangement of pipes whereby on

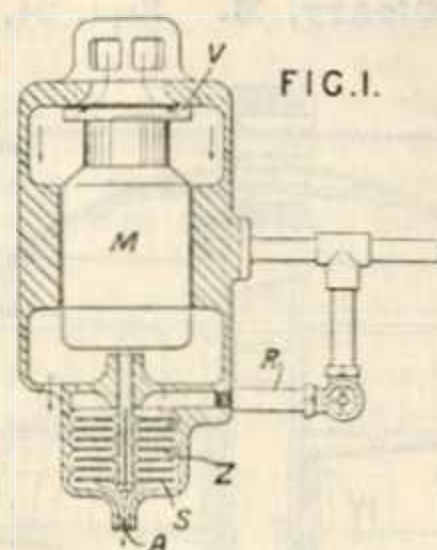


opening the cocks 11 or 12 cold water from the mains 9, 10, entering the lower part of the boiler causes hot water to pass to the bath by the pipe 8. Hot water is supplied by the cock 8' by opening this cock and subsequently opening the cock 12. If the cold water is under a low pressure the taps 11, 12 may be dispensed with and a tap fitted to the bath pipe 8.

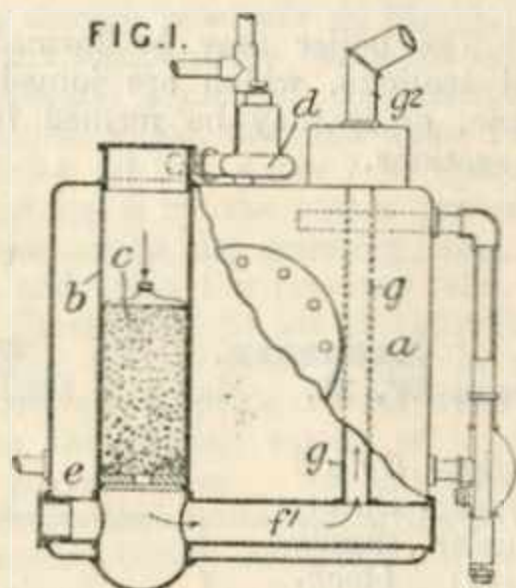


ULTIMHEAT® 192,705. Bruman, O. F. Feb. 1, 1922,
VIRTUAL MUSEUM [Convention date].

Heating liquids.—A liquid is heated by conveying it under pressure through an apparatus, such as an hydraulic brake, in which frictional energy is converted into heat. Brake discs S on the shaft of an electric motor M are rotated between partitions Z in a casing into which the liquid is forced from a pipe R. The outlet A for the heated liquid is rectangular in cross-section. The discs may be made of rubber, and they may be roughened or formed with grooves or perforations. A fan V on the motor shaft forces air through the motor, the air being then directed over the sides of the brake.



192,792. Bell, G. G. Nov. 11, 1921.

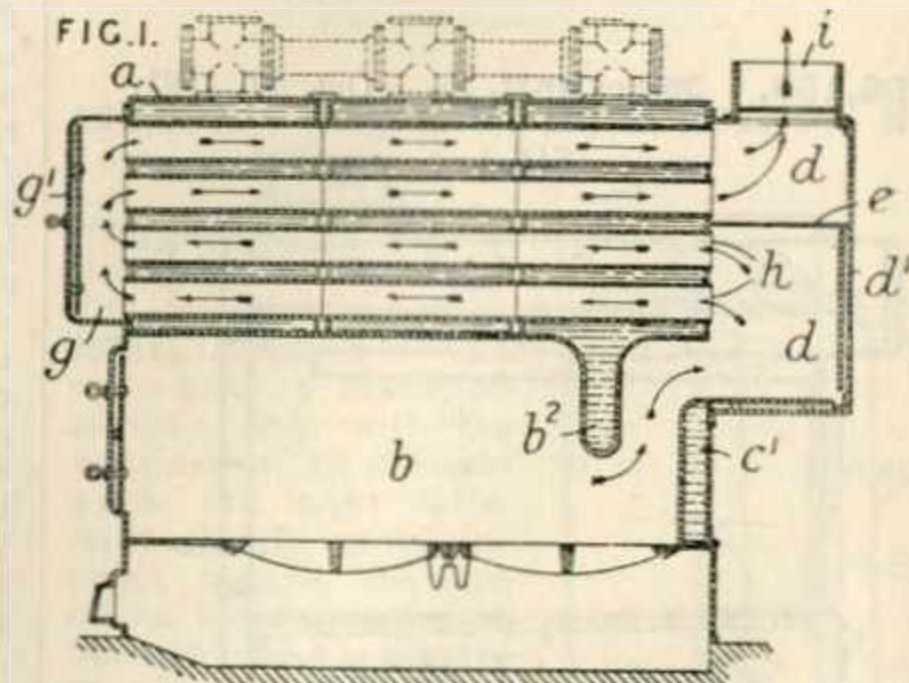


Heating liquids; internally-fired boilers. — Water &c. in a tank a gradually heated through

flow and return from a substantially continuously heated boiler, can be raised in temperature quickly by burning, in a combustion chamber *b* in the tank, a charge or cartridge *c* of fuel, in air delivered under pressure from a fan *d*. A flue, or flues, *f'* conveys the products of combustion through a vertical flue or flues *g* to a chimney *g'*. The cartridge is supported in the chamber *b* by a circular perforated plug *e* of graphite. In modifications, the horizontal flue is an exterior casing on the bottom of the tank, the ashpit is removable and either itself supports a graphite cup for holding the cartridge or is filled with relatively coarse ashes. The fan may be arranged to deliver a blast of air to the chimney *g'* and thus induce a draught. The method of gradual heating of a body of water by electricity as described in Specification 167,238 may be used, in conjunction with the tank, instead of a gas or coal fired boiler.

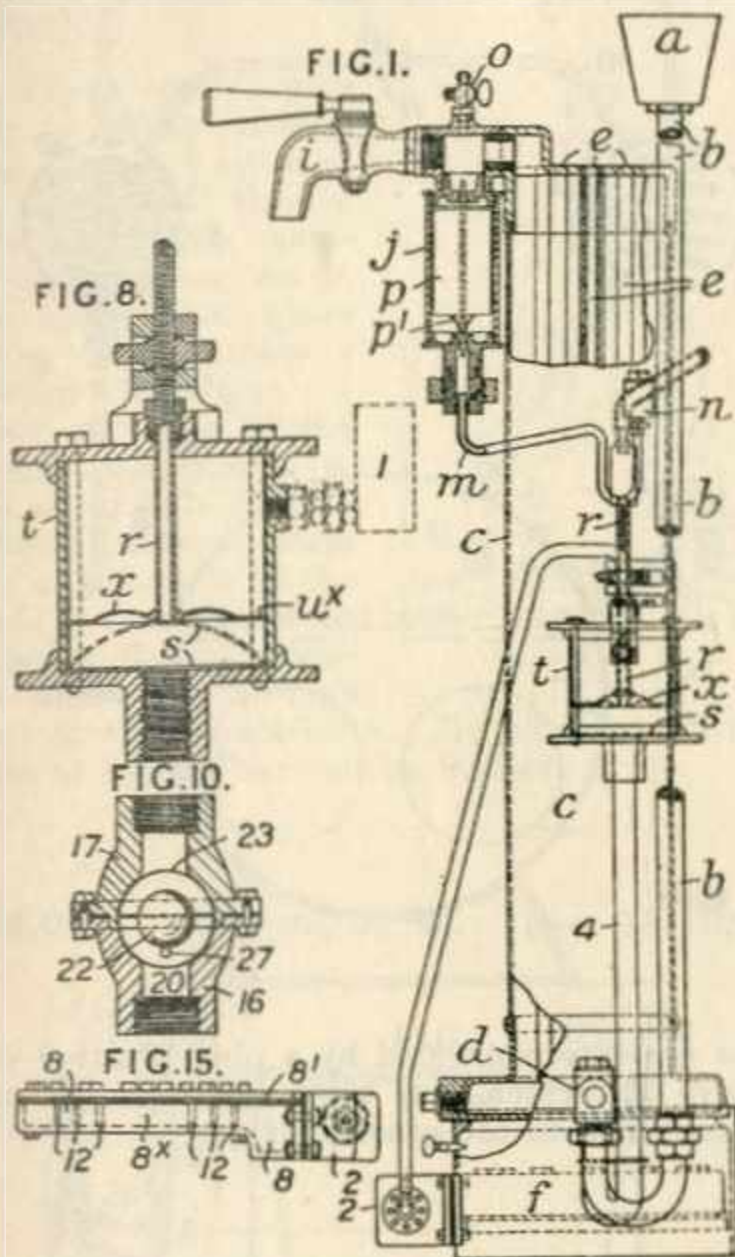
192,824. Naylor, S. Nov. 21, 1921.

Block or slab form boilers; internally-fired.—A hot-water boiler of the type described in Specification 16771/99 comprises a welded shell *a* of substantially rectangular form provided with a fire-box *b* having an outlet to a chamber *d* bolted to the rear end of the shell and divided into two compartments by a horizontal plate *e*, a waterway above the fire-box fitted with horizontal smoke-tubes *h* connecting the chamber *d* to a smoke-box *g* bolted to the front end of the shell and water legs *c'* at the sides and rear end of the fire-box. The water legs *c'* may be continued to completely surround the fire-box and the latter may be provided with depending water pockets *b'* or cross tubes. The upper compartment of the chamber *d* has a damper-controlled outlet *i*. The chambers are provided with suitable doors or cover-plates *d'*, *g'* and may be water jacketed, the jackets being connected to the



water space of the boiler. The boiler may be made in sections to facilitate transport and erection.

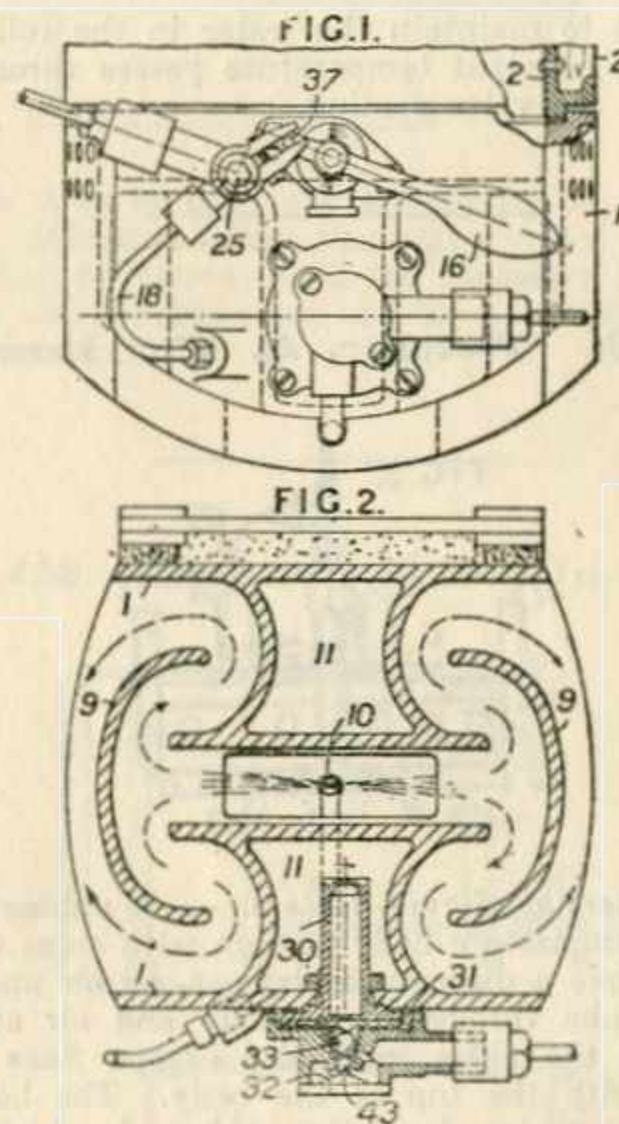
193,140. **Brown, J. A.** Nov. 17, 1921.



Heating water.—A water heater for delivering boiling water is provided with means whereby, after the boiling point is reached, check valves on the pipes communicating with the water supply close and any further pressure owing to the development of steam acts to cut off the supply of gas to the heating means until the pressure is relieved by opening the outflow. At starting water flows from an overhead cistern *a* by the supply pipe *b* and check-valve *d* to the bottom of the boiler *c*, filling it and the chamber *j* completely, the outflow cock *i* and air vent *o* being then closed. The burner *f* being lighted the water is heated by the passage of the combustion products through the tubular flues *e*. Pressure due to the expansion of water is relieved past the raised float-operated valve *p*¹ in the metal or glass chamber *j*, by the tube *m* and check valve *n* to the supply pipe *b*. On the generation of steam the float *p* falls and closes the valve *p*¹. Further pressure is then transmitted by the column of water in the trapped pipe *4* communicating with the boiler side of the supply check-valve *d*, to the underside of a flexible diaphragm *s*, Fig. 8, in the chamber *t*, causing it to cut off more or less the passage of gas from the supply pipe *1*, through the perforations *u*^x round the edge of the check-plate *x* mounted on the adjustable tube *r* communicating with the burner. A balance of pressure thus obtained remains until boiling water is drawn from the cock *i* when, with the rising of the float *p* and consequent opening of the valve *p*¹ the operations begin again. The

gas burner, Fig. 15, comprises a mixing chamber *2* communicating with a chamber *8* between the upper side of which and the burner plate *8*¹ is clamped a sheet of wire gauze and asbestos packing along the edges. Within the shallower part *8*^x are fitted baffles *12* circular in plan alternately open to the gas mixture at diametrically opposite sides. A check-valve for use in the apparatus is shown in Fig. 10 and comprises hemispherical parts *16*, *17* fixed together, with a ball *22* within adapted to engage the seat *23*, but kept from the opening *20* by a pin *27*.

193,429. **Still, W. J.** Nov. 21, 1921.

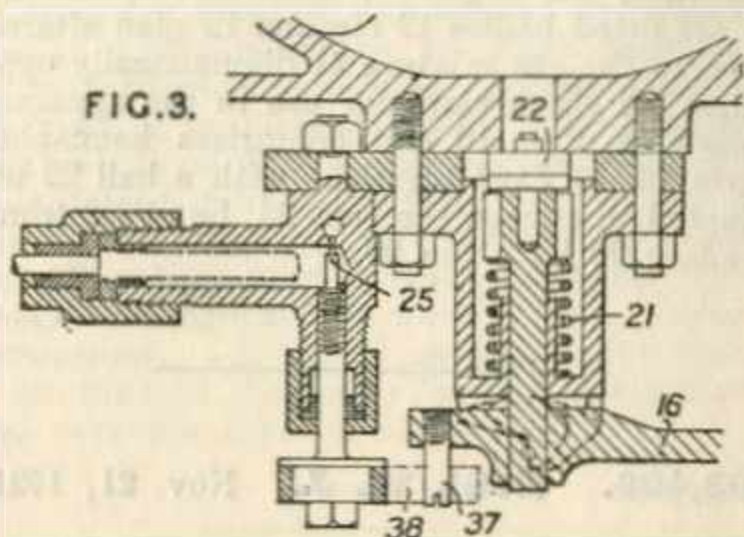


Heating water.—A water boiling or heating apparatus comprises a closed container having an inlet through which the water flows at a fixed rate, heating means so regulated as to raise the water to the desired temperature upon admission, and automatic means for so controlling the supply of fuel to the burner that the water in the container is maintained at a constant temperature. The copper or iron container *2* has a detachable base *1* preferably made of cast aluminium and formed with water pockets *11* and baffles *9*. The burner *10* is placed between the water pockets. Water enters one of the water pockets through a pipe *18*, the entrance to which is controlled by a needle valve *25* so set as to give the desired constant flow of water. The outlet valve *22*, which is pressed against its seating by a spring *21*, is opened by a cam upon rotation of a handle *16*. A pin *37* engages an adjustable arm *38* on the spindle of the needle valve *25*, the valve



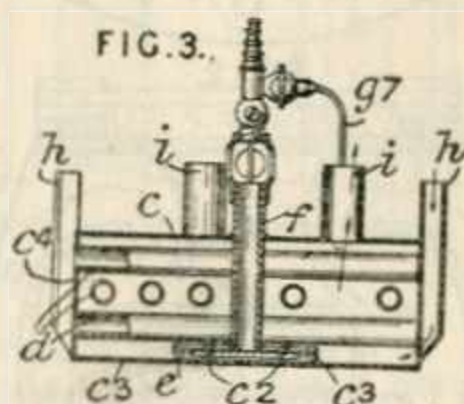
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VIRTUAL MUSEUM

being thus forced against its seating and instructions removed when water is withdrawn. The gas supply to the burner is controlled by a thermostatic valve device. A gas supply



sufficient to maintain the water in the full container at constant temperature passes through a notch in the valve seating.

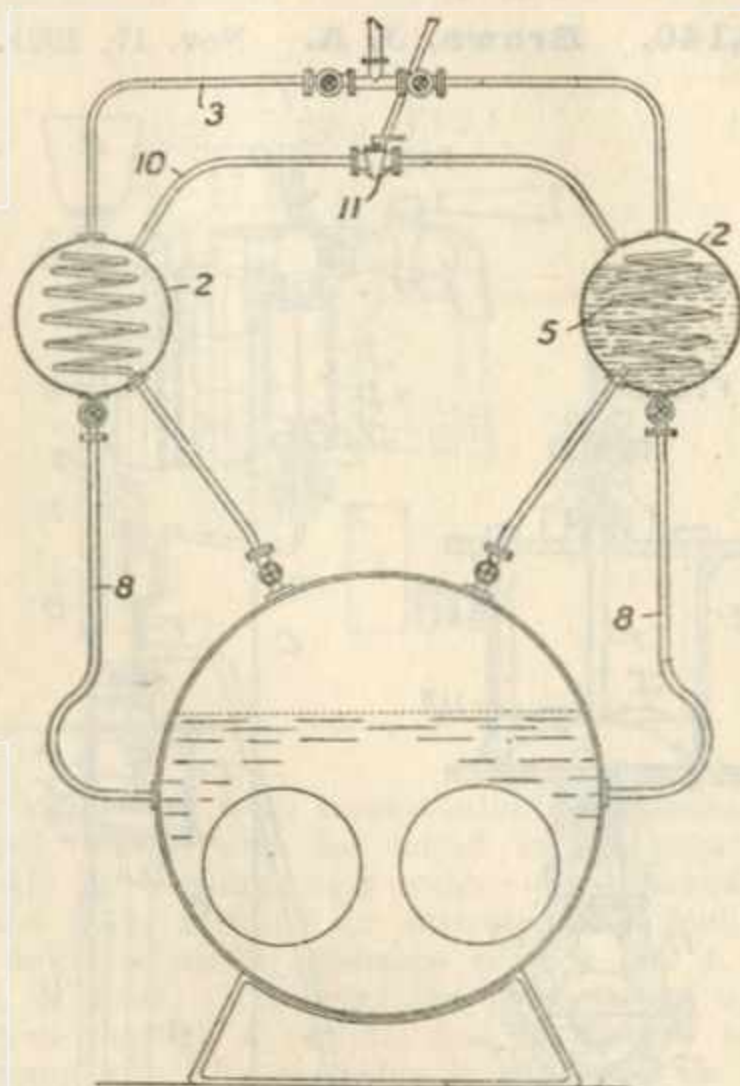
193,726. Fletcher, A. W. March 28, 1922.



Submersible liquid-heaters.—A submersible heater comprises a body portion with cross water tubes above a disc-shaped burner, an air and gas supply tube through the centre and air supply tubes at the sides, and also escape flues connected with the top of the body. The body *c* has cross water-circulating tubes *d* which are fixed to the sides *c*⁴. A gas and air supply tube *f* passes down to a disc burner *e* which rests on the bottom *c*³, extra air being supplied by the side tubes *h*. Vents *i* are carried by the top *c*². The tops of the tubes and vents are at a sufficient height to be above the surface of the water when the heater is submerged. A pilot burner is supplied by the branch pipe *g*⁷.

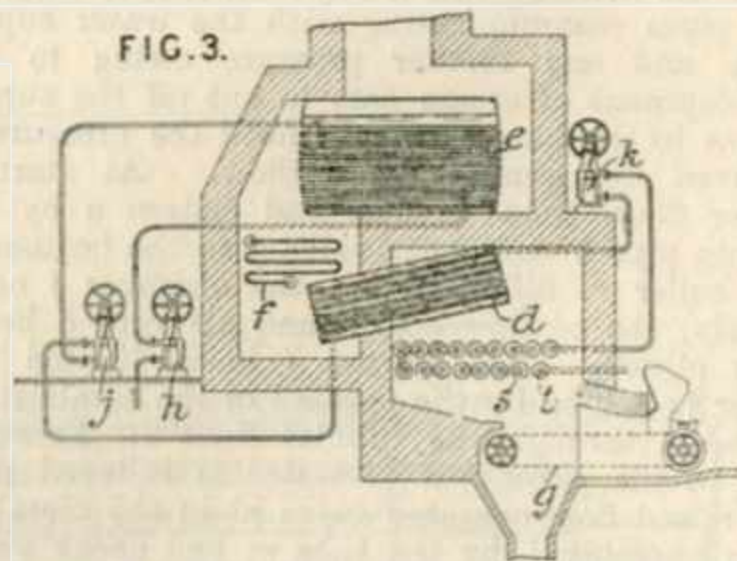
193,778. Dickie, C. July 12, 1922.

Feed-water, heating.—Feed-water is heated in elevated tanks 2 by tubular coils 5 connected to boiler steam space, and the heated water is fed to the boiler by gravity through pipes 8. Cold water enters the tanks through pipes 3. The



tanks are interconnected by a pipe 10 fitted with a valve 11, which may place the tanks in communication with the atmosphere.

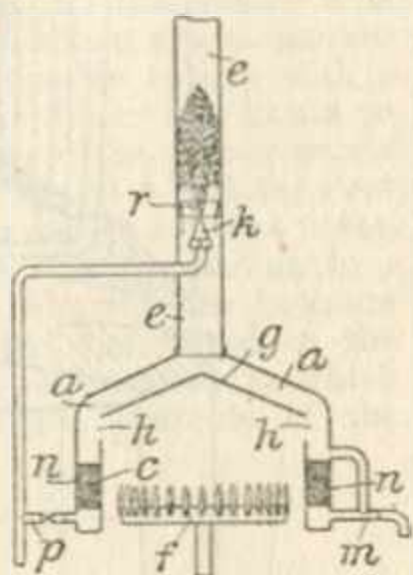
193,847. Aktiebolaget Vaporackumulator. Feb. 22, 1922, [Convention date].



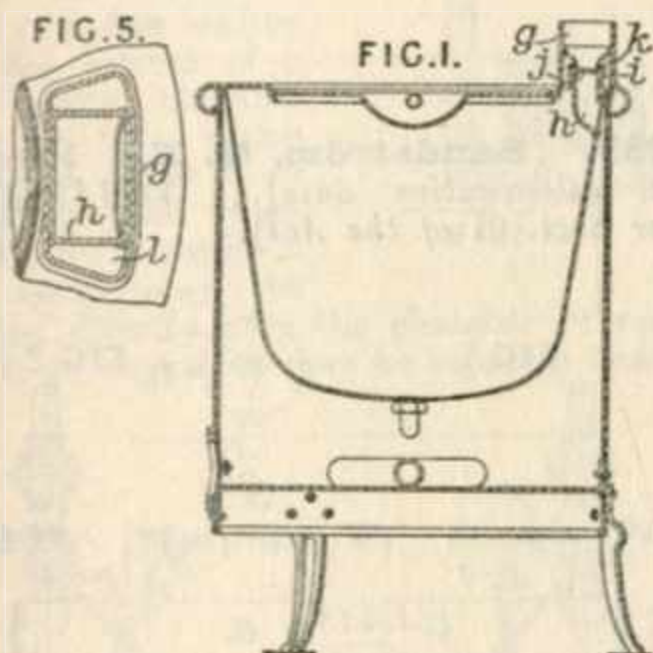
Feed-water, heating.—In a high-pressure boiler, feed-water is passed through heaters arranged one behind the other in the path of the furnace gases, and the pressure of the water in successive heaters is progressively increased towards the entrance to the steam-generating elements, which are placed in the path of the hottest gases. Water is forced through tubulous feed-heaters *e, d* by pumps *h, j*. The water is pumped into the generating tubes from the last heater by a pump *k*. The heaters may communicate with large hot-water storage chambers. The heaters may consist of pipe coils. A superheater *f* may be placed between the heaters.

193,854. **Technisches Bureau A. Schückher.** Feb. 22, 1922, [Convention date].

Heating water; geysers. — Water issuing from a spray *k* situated in a vertical flue *e* above a mixing chamber creates a suction on the combustion gases rising from burners *f* through apertures *h* above an inner casing *c* and the space *a*. The water falls back in a finely divided state over a baffle *r* on to the shield *g* and thence to outlet *m* through loose filtering material *n*. By allowing water to enter at *p* the filter can be flushed.



194,037. **Ewart, J. W.** Dec. 28, 1921.

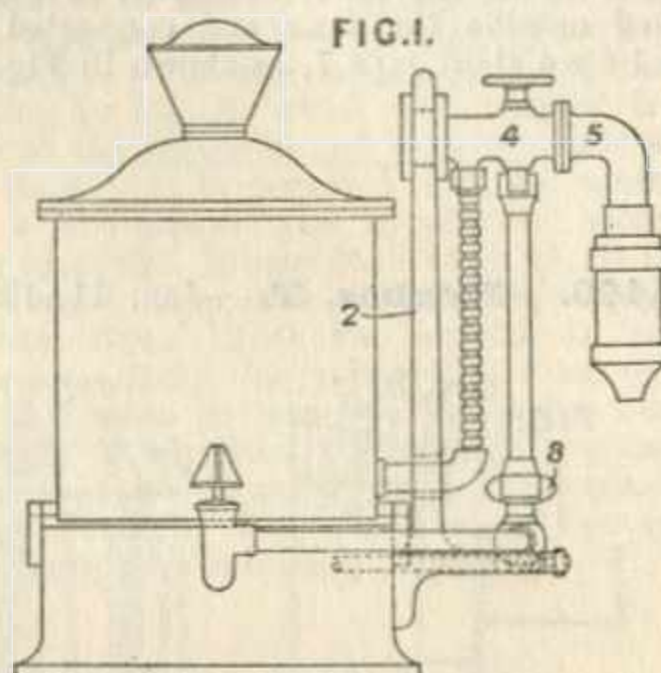


Washing-boilers.—A gas copper is furnished with an outlet pipe *h* for the products of combustion from the casing, which extends into the flue *g* at the top of the copper in such a manner that spaces *i* are provided between it and the flue *h* communication with the interior of the pan for the escape of steam being established by way of perforations *j* surrounded by a lip *k* for water of condensation. The same end is achieved by the arrangement shown in plan in Fig. 5, in which the flue *h* enters the flue *j* leaving detached spaces *l* on either side. The top of the copper is secured by a bayonet catch.

194,088. **Schofield, L.** Jan. 28, 1922.

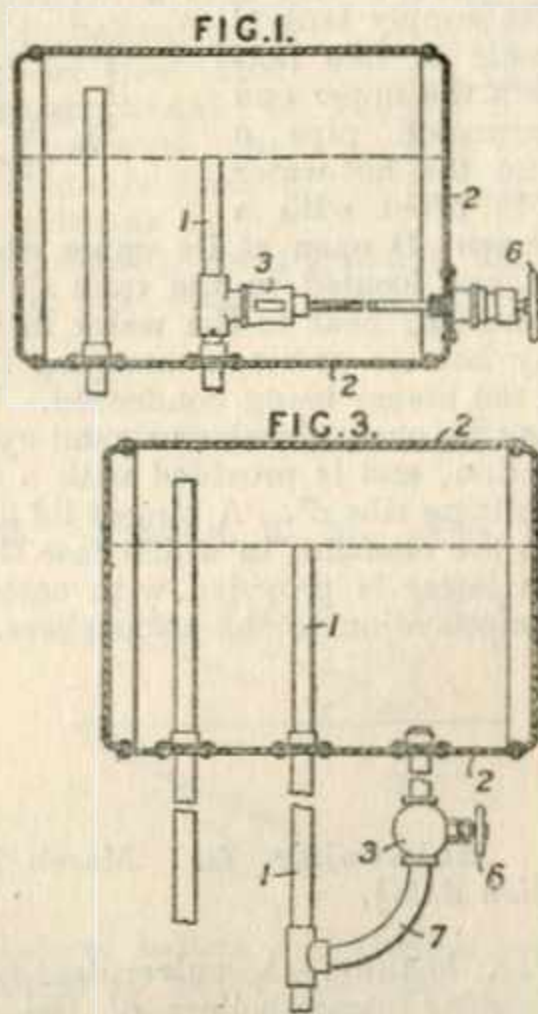
Heating water. — Apparatus as described in Specification 172,207 is modified by the provision of a support 2 bearing the discharge pipe 5 and a valve 4 operated simultaneously with a gas valve

8. With the tilting container full and both valves open water on boiling will begin to be ejected from the nozzle 5. When the desired amount, short of the full capacity, has been delivered the



valves may be shut and subsequent small quantities delivered when the water again boils on opening the valves, until the container is empty, when tilting takes place and the gas is shut off by this movement.

194,453. **Smither, W. H.** Jan. 6, 1922.



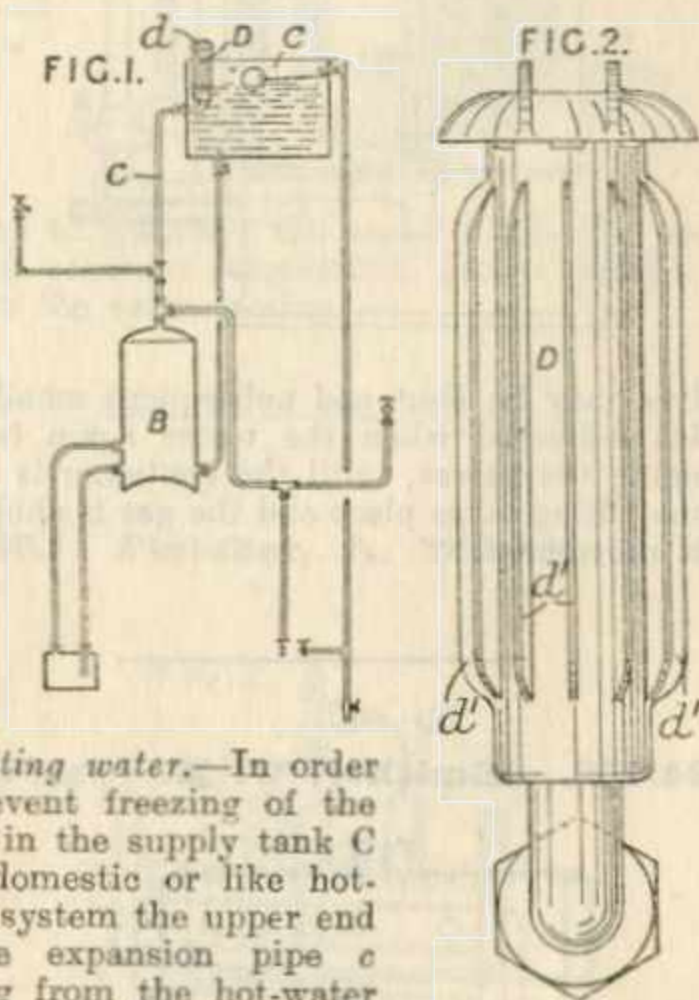
Heating water.—In a domestic hot-water system of the kind in which the return pipe 1 to the boiler from the storage tank 2 projects to a high level within the tank so that normally only a small quantity of water is in circulation and means are provided for bringing the remaining



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quantity into circulation when desired, the control of the latter quantity of water is effected by a single hand-controlled valve 3 operated from the exterior of the tank by a handle 6 and either located within the tank, as shown in Fig. 1, or located outside the tank and connected to the pipe 1 by a short pipe 7, as shown in Fig. 3.

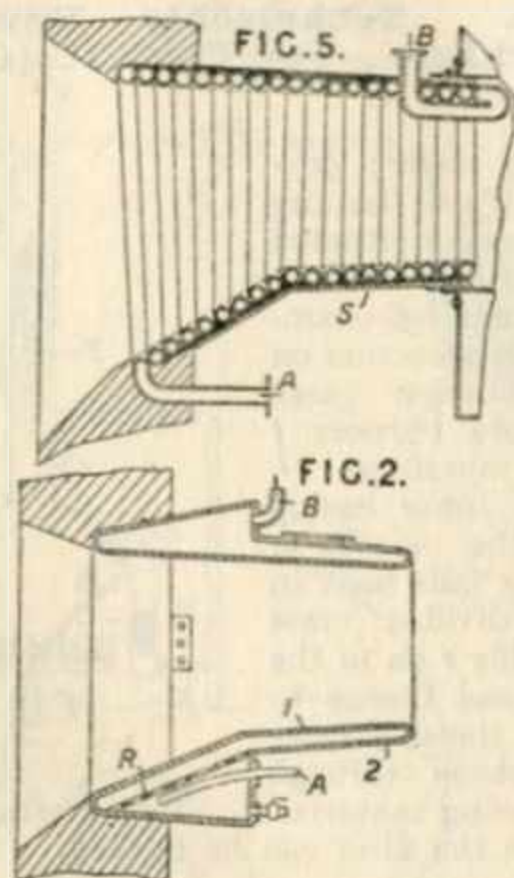
194,460. Hughes, T. Jan. 11, 1922.



Heating water.—In order to prevent freezing of the water in the supply tank C of a domestic or like hot-water system the upper end of the expansion pipe c leading from the hot-water cistern B is fitted with a tubular element D open at its upper end to the atmosphere and located in the tank C, the element transmitting heat to the water in the tank C from any hot air or steam escaping from the cistern B, the steam being condensed. The element D may be oval, circular or semi-cylindrical in cross-section, and is provided with a series of heat-transmitting ribs d' . A hinged lid d may be mounted on the element, in which case the upper edge of the latter is provided with castellations giving communication to the atmosphere.

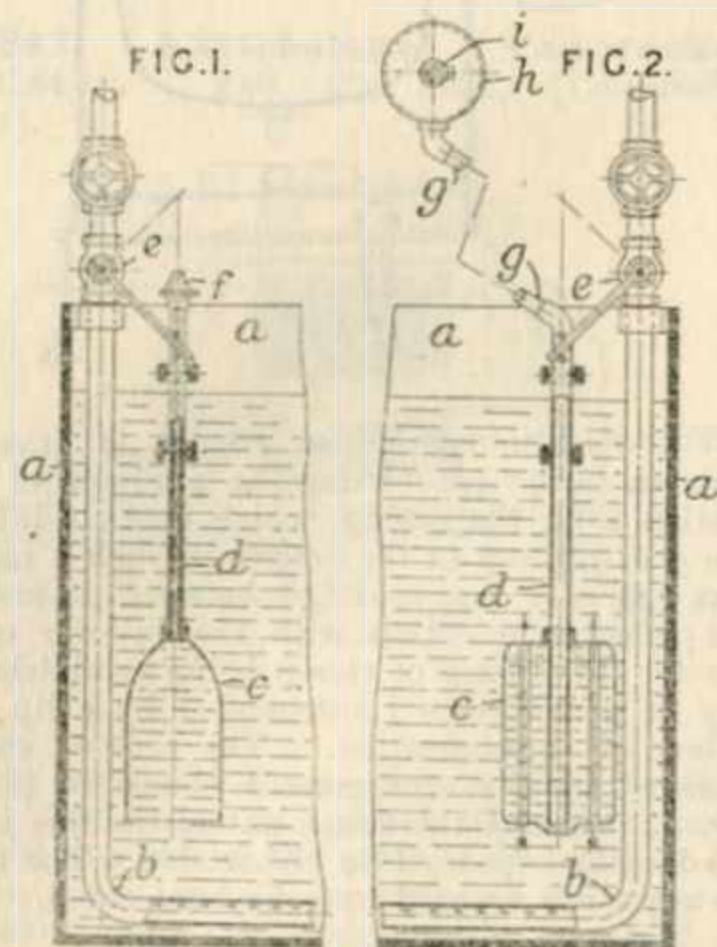
194,684. Belavoine, L. March 7, 1922, [Convention date].

Feed-water, heating.—A pulverulent-fuel furnace for heating steam-boilers of the Cornish type is connected to the internal flue of the boiler by a flue which is cooled by water to prevent the adhesion of fused particles of ash &c. The flue comprises inner and outer walls 1, 2, Fig. 2, forming a jacket through which feed-water for the boiler circulates. The water enters at A, passes through a distributing-plate R and



escapes at B. In the modification shown in Fig. 5, the flue is cooled by a coil S, feed-water entering at A and escaping at B.

195,039. Sandström, G. E. March 15, 1922, [Convention date]. Void [Published under Sect. 91 of the Act].



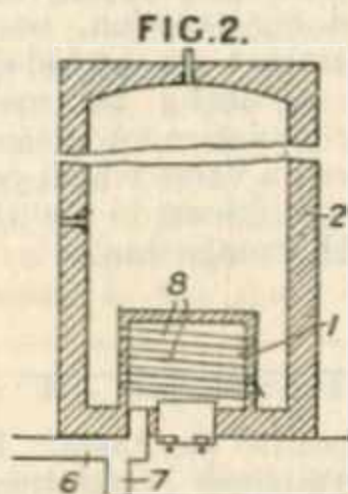
Heating liquids.—An apparatus for regulating the supply of steam, electricity or other heating-medium for heating a liquid contained in a receptacle a, Fig. 1, comprises a vertically-movable bell-shaped vessel c which, when the liquid boils, is lifted by the accumulation of vapour therein and operates the valve e of the heating-pipe b or an electric switch or other



member for reducing the supply of heat. Any air initially collecting under the bell may be discharged through the hollow stem *d* by an air cock *f*. In a modification, Fig. 2, the vessel *c* is closed at the bottom to form a float and communicates by the stem *d* and flexible tube *g* with a vessel *h* at a higher level. When the liquid in the float *c* boils the pressure of the vapour expels some of the liquid into the vessel *h* and the float rises to operate the valve or switch *e*. The vessel *h* is provided with a valve *i* for connection to a pressure or suction pump whereby the pressure therein can be adjusted and the liquid in the float caused to boil at the temperature at which it is desired to maintain the contents of the receptacle *a*.

195,148. Cox, J. B. Dec. 22, 1921.

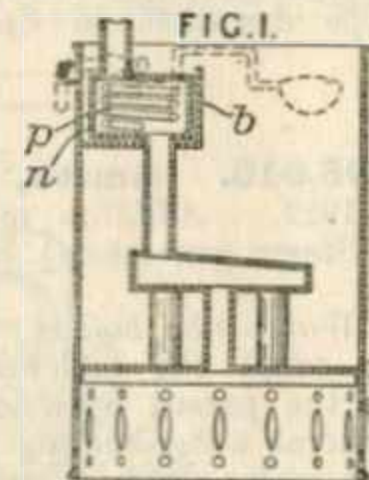
Internally - fired boilers; water - tube boilers. — A vertical tube or conduit 7 is employed for admitting air to the horizontal part 6 of a flue leading from the bottom of a closed heating chamber 1 of the type which encloses a boiler 8 or circulating coil connected to a tank 2. The tank may be mounted directly over the chamber or may enclose it as shown, or may be separate from it.



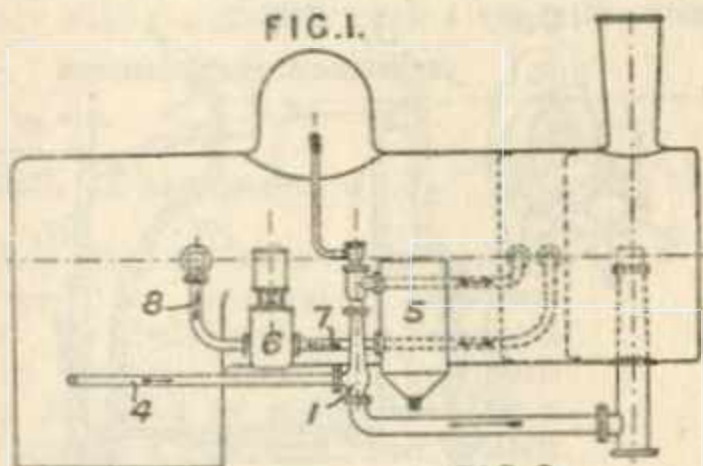
fied form through the pipe 7 by a feed pump 6 and passed to the boiler feed pipe 8. The pressure in the drum is regulated by the pump and the injector jointly and automatically, and is maintained at about 70 lbs. whilst the temperature is kept above 130° C. so that impurities are precipitated. For regulating the temperature, the casing 9, Fig. 2, which is connected to the injector at the flange 10 and with the mud drum at the flange 11, is provided with an extension having a live steam inlet 13 with an outlet of injector form 22. A combined valve 17, 21 under spring control 20 governs the injector supply and live steam flow. When the injector is feeding more or less freely, the valves 21, 17 are opened up so that more or less live steam for heating this supply is admitted. When the engines are not working, the temperature is maintained in the mud drum by the admission of live steam thereto through a reducing valve.

195,325. Gardiner, W. A. Aug. 23, 1922.

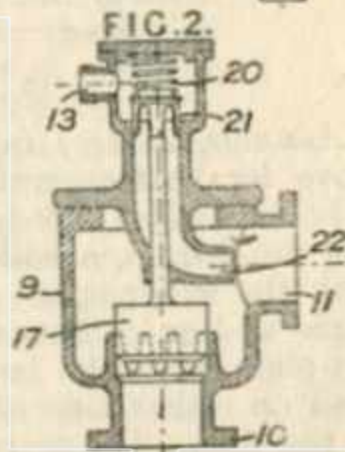
Block - form boilers; heating water; water supply and delivery. — In a gas-heated water boiler in which the feed is controlled by a ball-cock, the feed-water is passed through a coil *p* in the flue-chamber *n* arranged in the feed-water compartment *b*, and is discharged into and near the bottom of the compartment *b*. A cock (not shown), for regulating the supply is arranged in the boiler in advance of the ball-cock.



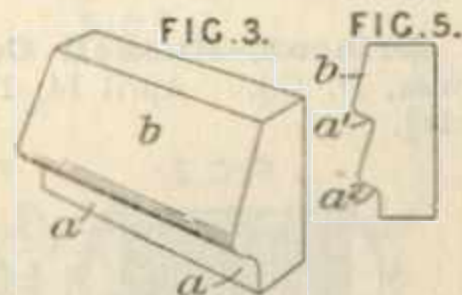
195,303. Meineke, F. June 1, 1922.



Feed-water, heating. — Feed-water is delivered by an exhaust steam injector to a mud drum in which the pressure and temperature are automatically regulated under the combined action of the injector and boiler feed pump, and whereby scale is precipitated. The injector 1 delivers water from the pipe 4 to the mud drum 5 from which it is drawn in puri-



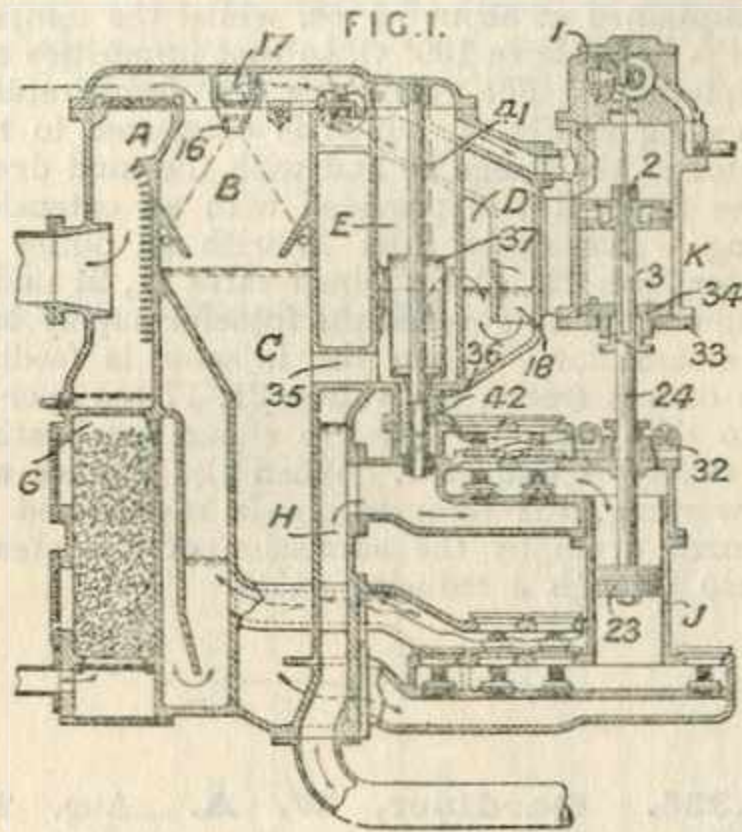
195,706. Fildes, T. S. Dec. 24, 1921.



Block-form boilers. — A kitchen range or like boiler stated to be of the usual proportions in height and width is provided with a recess *a* along its lower front face, the upper part *b* being inclined backwards. In the modification shown in Fig. 5, two longitudinal recesses *a*¹, *a*² are used.

Reference has been directed by the Comptroller to Specifications 1812/03, [Class 126, Stoves &c.], and 159,234.

195,883. **Marks, E. C. R.**, (Worthington Pump & Machinery Corporation). May 10, 1922.



Feed-water, heating. — A feed-heater of the type described in Specifications 13444/03 and

135,232 in which excess water is compensated or under the control of a float, has a float chamber, separate from and at the side of the storage tank, which receives only a part of the heater water. Steam enters an oil separating chamber A and passes to the chamber B in which water is sprayed from a nozzle 16. The water collects in a chamber C from which it is drawn by the lower side of the pump J and delivered through the filter G to the boiler. Cold feed is drawn from the chamber H by the upper side of the pump and delivered to the chamber D whence it passes by the passages 18, 17, to the nozzle 16. The float chamber E is connected to the cold storage tank C by a passage 35. The bucket float 37 is maintained full of water by a stream from a port 41 in the passage 18 and is partly supported by a spring 42. A rise in the level of the water in the chambers C, E causes the float to rise and allow the passage of excess water to the suction side of the pump by the passages 36. In a modified construction, no oil separation or filtering chambers are provided and the float is replaced by a tilting balanced bucket which rises on accumulation of excess water and through a rod opens a valve which permits a portion of the cold water drawn in by the pump to return to the cold storage tank.

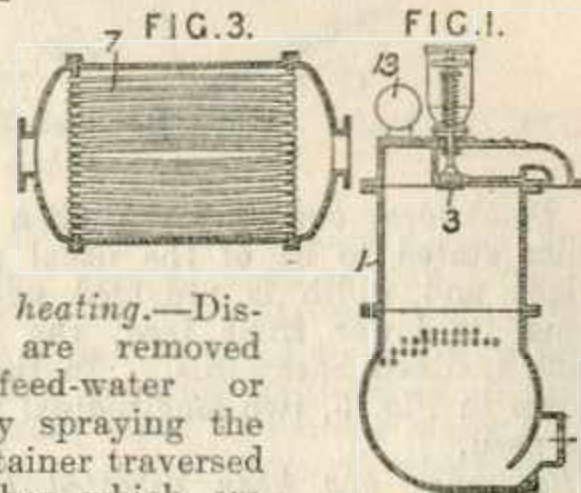
195,918. **Smith, D. V. H.** Nov. 10, 1922. Addition to 182,143, [Class 123 (ii), Steam generators].

Water-tube boilers.—In order to adapt the boiler described in the parent Specification for general water-heating purposes, the water drum is replaced by a small tubular header 2 connected by short pipes 3 to the tubulous sections of the boiler, and the feed-water device, the cleaning-covers for the cross-tubes and the downcomers leading from the drum to the lower headers are dispensed with.



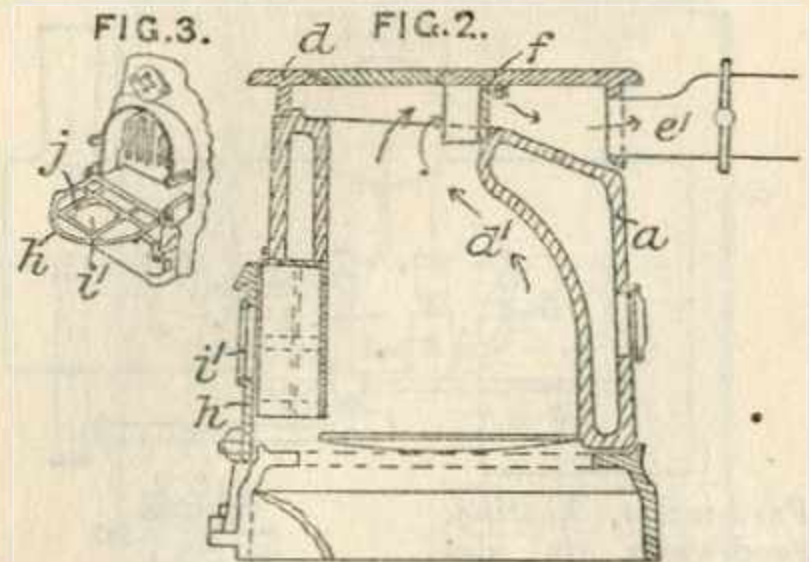
deposited on them. Feed-water is sprayed into a container 1 maintained under reduced pressure through a valve 3 and falls upon bowed steam-heating tubes 7. The tubes may be coiled, or they may be of oval section and bent to a U-shape. The reduced pressure is maintained by a steam-jet air ejector 13.

196,238. **Griscom-Russell Co.**, (Assignees of Jones, R. C.). April 14, 1922, [Convention date].



Feed-water, heating.—Dissolved gases are removed from boiler feed-water or other liquid by spraying the liquid in a container traversed by heating tubes which are so formed that they are bent or deformed by changes of temperature, thus loosening the scale

196,310. **Eruster, O.** Oct. 20, 1921.



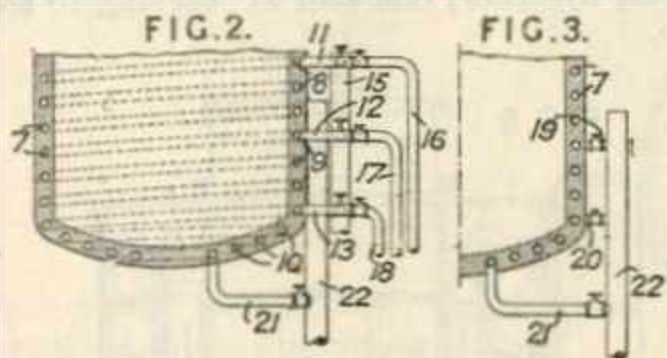
Annular boilers; internally-fired boilers.—In a stove for heating water and cooking comprising a hollow-walled fire-box a, hot-plate d, flue e, and fire-door h, a hollow baffle d' communicating with the water space and extending over the fire space and an extension or plate f reaching to the hot-plate cause the hot gases to pass forward and then on either side of the plate f before passing to the flue. The chimney may open through the hot-plate instead of through the back as shown. The fire-door is adapted to rest in a horizontal position to act as a trivet and is provided with a



mica-covered opening protected from damage by vessels placed on the door by ribs *j* which do not

cross the mica *i*¹. Specifications 9086/09 and 9756/12 are referred to.

196,412. Lehman, J. G. Feb. 1, 1922.



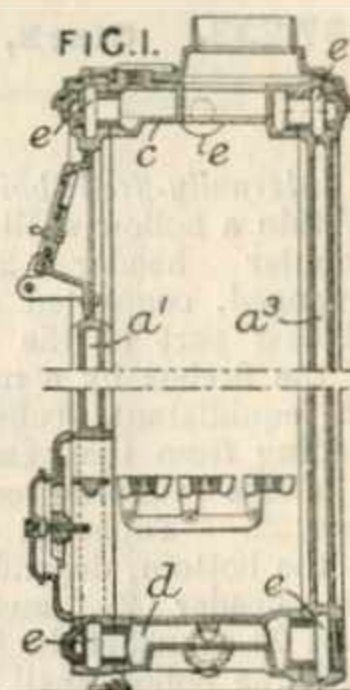
Heating liquids; digesters; boiling-pans.—Heat treatment of liquids is effected by transmitting selectively heating or cooling fluids through passages or channels in the well of the container such passages or channels constituting different belts, layers or zones thus offering differential temperatures in the several parts of the container. Fig. 2 shows several channels 7, arranged in zones 8, 9, 10, and having valve controlled separate inlets 11, 12, 13. One general source 15 of supply is available for any of the three inlets; the other sources 16, 17, 18 are separate and valve controlled. In this form, there are three separate valve-controlled outlets 19, 20, 21, Fig. 3, connected to the main dis-

charge pipe 22. In a modification, the channel 7 is continuous; there are three general sources of fluid supply and only one outlet.

196,896. Courtot, L. April 27, 1922, [Convention date].

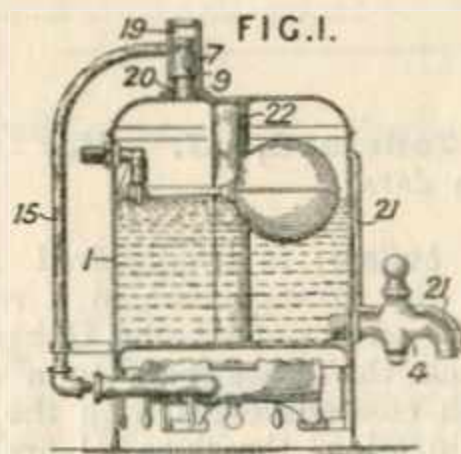
Internally-fired boilers.

—A low-pressure boiler is constructed of flat panels *a*¹, *a*³ connected by unions *e* to top and bottom members *c*, *d*, the upper forming the roof of the firebox and the lower either the bottom of the ash pit, as shown, or, in the form of a grid, the fire-bars. The sides may be constructed of one or more panels and, by providing an additional spaced panel at the rear, a down-draught flue may be constructed.



197,071. Goad, G. A., and Procter, W. F. Feb. 16, 1922.

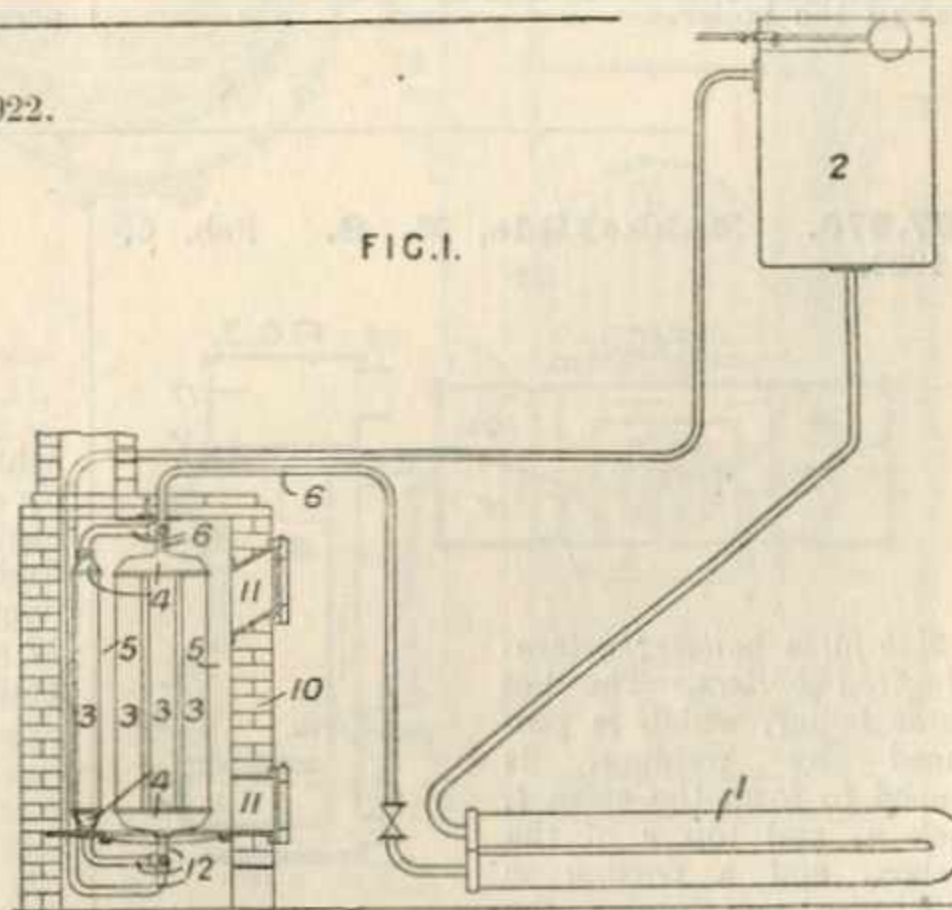
Block-form boilers.—At the top of a gas heated boiler 1 having a flue 22 is mounted a cylinder 7 open at the bottom to the steam space and fitted with a grooved piston 9 adapted to control the passage of gas across the piston from the supply pipe to the pipe 15 leading to the burner. The piston is returned either by a spring or compressed air in the space 19. At abnormal pressures of steam, a port 20 in the wall of the cylinder 7 allows steam to escape. A pipe 21 opened simultaneously with the outflow cock 4 vents the steam space.



197,228. Ferguson, J. J. June 28, 1922.

Heating liquids; water-tube boilers.

—Relates to hot-water heating-systems for buildings, such systems being of the type described in Specification 22594/12 in which there is a downward flow through the boiler. According to the invention, the boiler is constituted by a number of vertical stacks of tubes 3 connected between headers 4, of which the upper headers are connected by pipes 6 to the return side of the system including the radiators 1, while the lower headers are connected by pipes 12 to a tank 2. Preferably the tubes 3 are disposed adjacent to three walls of the fire magazine 5, the fourth wall 10 being fitted with fuel-supply and inspection openings 11. In operation, air is entrapped in the tubes 3 when the system is filled and, on being heated,



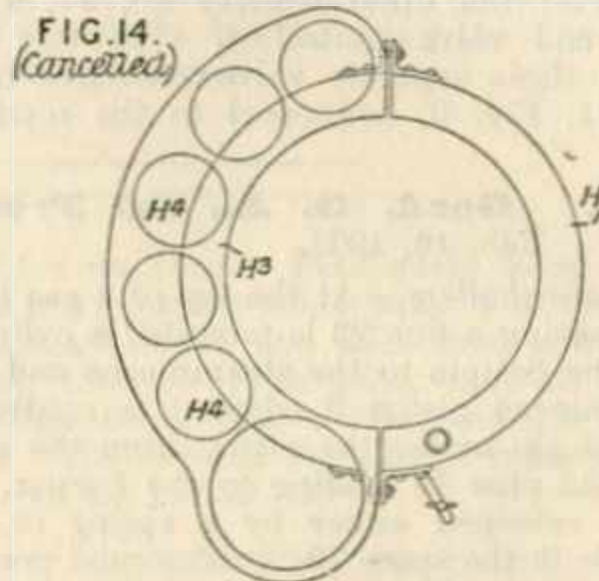
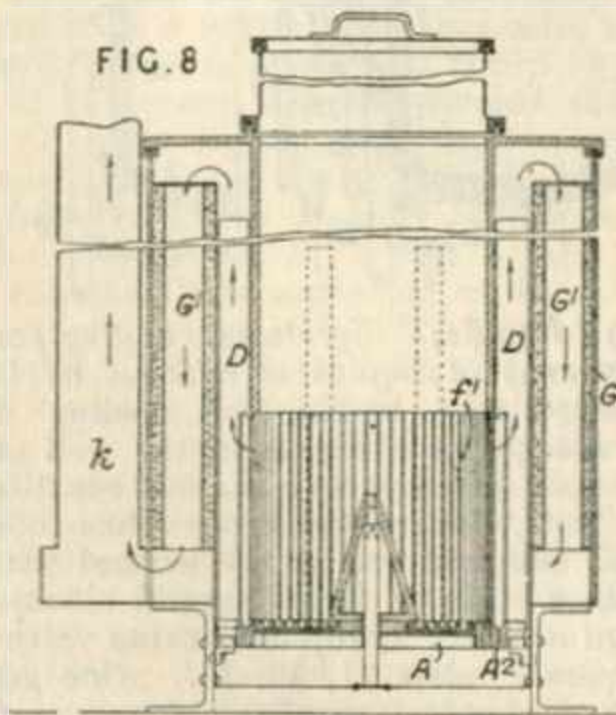
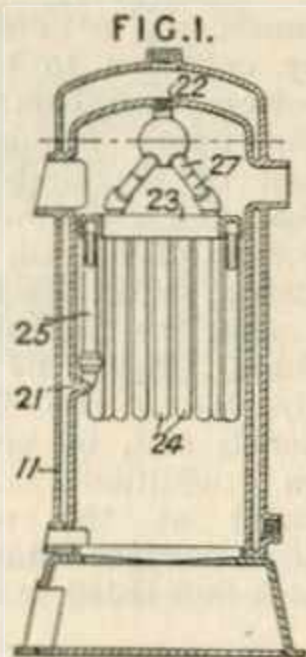


force the heated water through the pipes 12 into the tank 2, more water flowing in from the pipes 6 which, by effecting a slight contraction in the air, causes more water to be drawn in. This water is heated in the tubes 3, and the series of operations is repeated.

The Specification as open to inspection under Sect. 91 (3) (a) comprises also an annular water jacket, Fig. 14 (*Cancelled*), which may surround the stove, the jacket being made in halves which are bolted together, one half H' serving to supply

197,233. Clark, W. July 5, 1922.

Internally-fired boilers.— Within a hollow shell 11 an annular header 23 is arranged, connected to the highest part of the crown of the firebox by a number of equidistant tubes 27 leading from the header to a single tubular connection 22. Tubes 24 closed at the bottom, depend from the header 23, and one tube 25 connects the header with the hollow shell at 21.

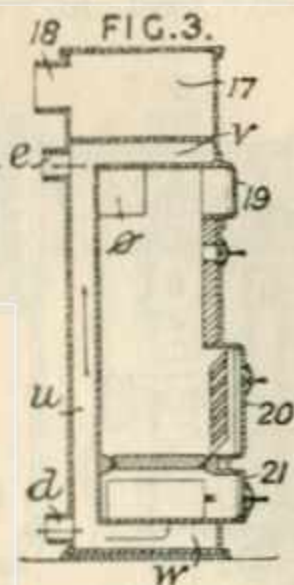
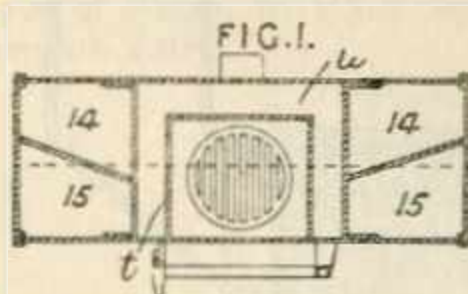


197,325. Jouclard, J. May 2, 1922, [Convention date].

Block-form boilers; internally-fired boilers.— Fig. 8 shows the arrangement in a refuse-consuming stove of an annular boiler G having flues G' down which the gases pass to a collecting chamber which communicates with the exit flue k. In a modification, the flues G' are omitted, and the gases pass downwardly over the outer face of the boiler.

hot water whilst the other H³ serves to heat utensils placed in apertures H⁴. This subject-matter does not appear in the Specification as accepted.

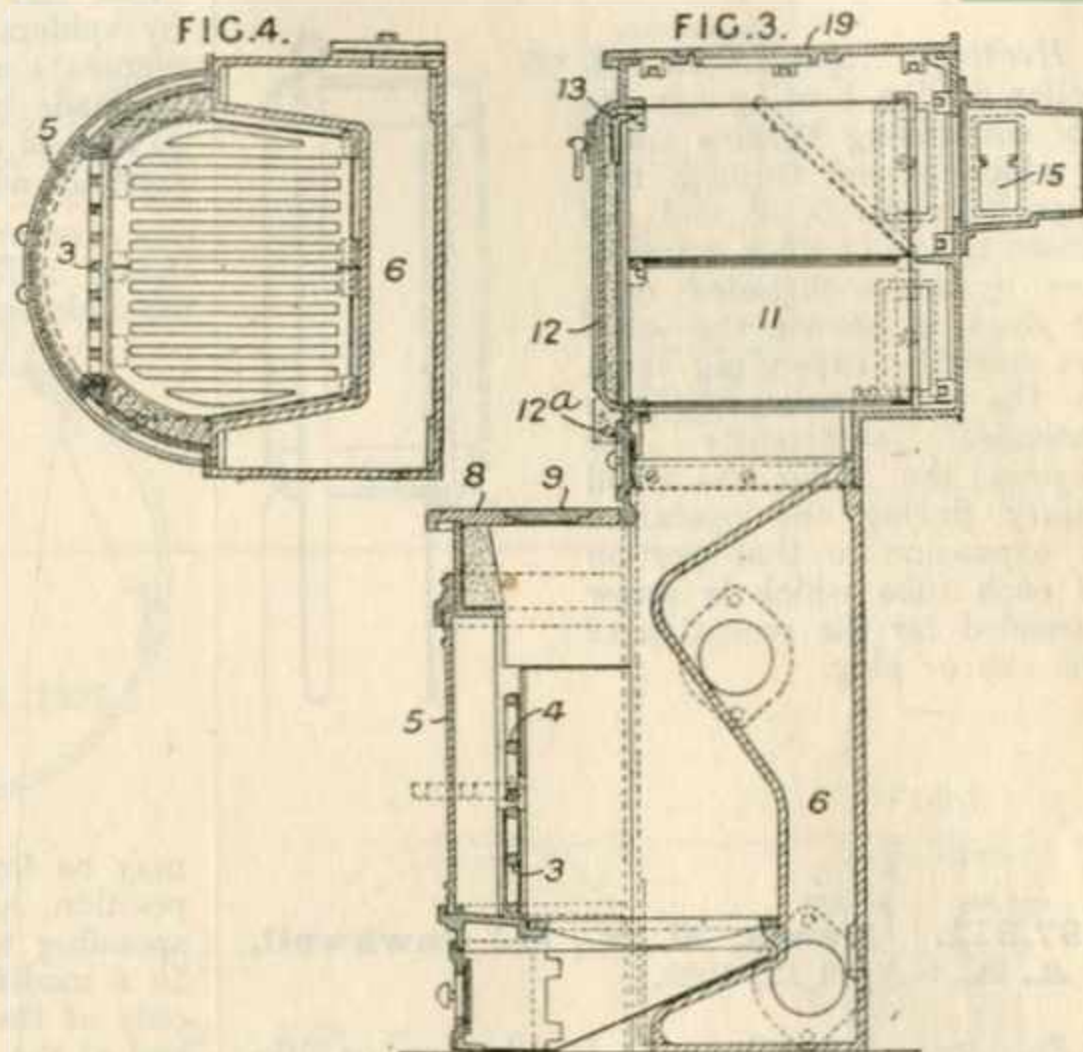
197,373. Bakkekilde, R. S. Feb. 6, 1922.



Slab-form boilers; internally-fired boilers.—The hot water boiler, which is produced by welding, is shaped to form the sides t, back n, and top v of the firebox, and a portion w may also run under the

ashtray and grate. Inlet and outlet branches d, e are provided. Vertical flues are located at each side of the boiler. The gases pass from the firebox through lateral openings ϕ into down flues 14 and return by up flues 15 to the space 17 and exit 18. A feed door 19, a door 20 to the grate, and a door 21 to the ashpit are provided.

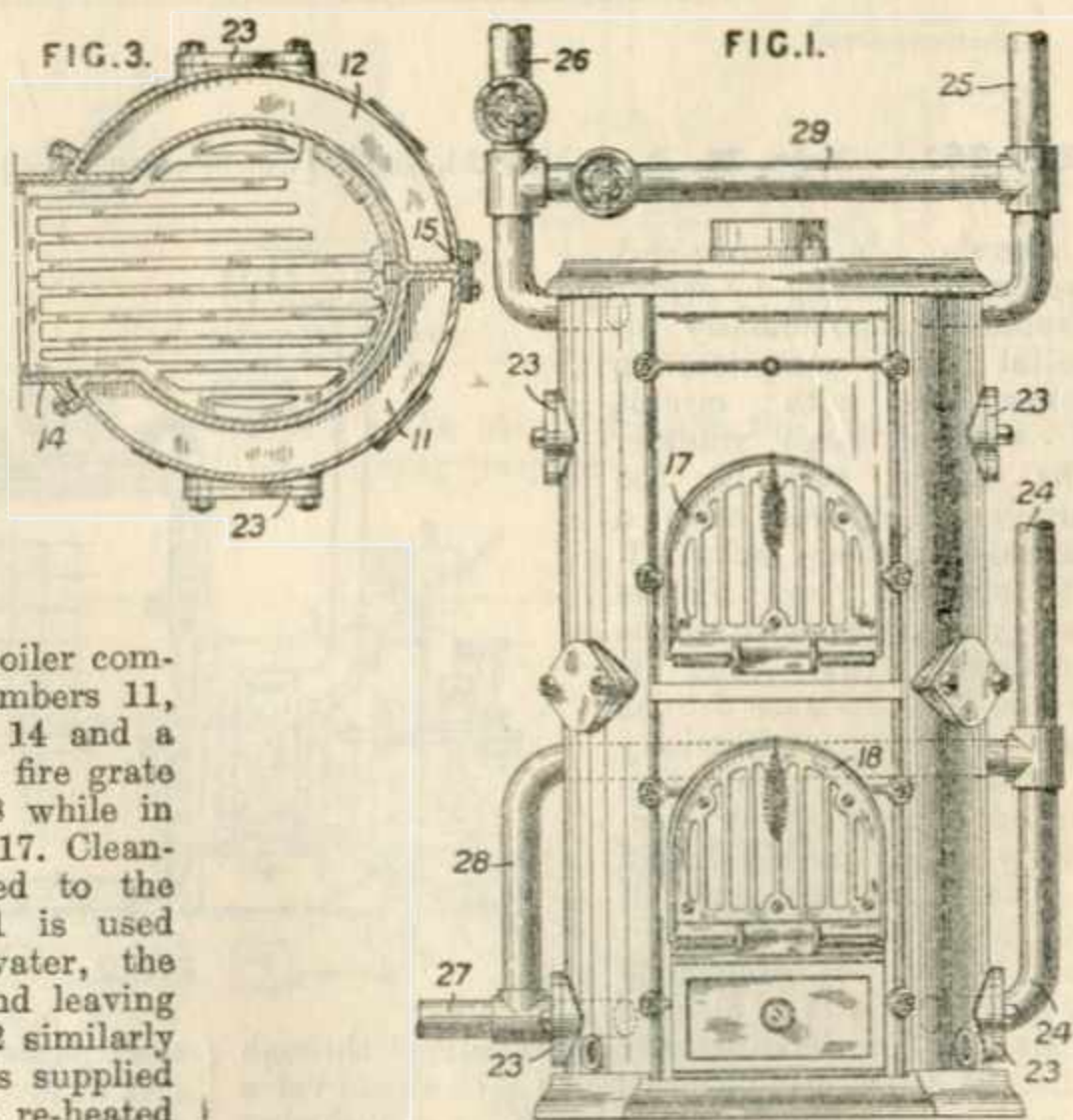
197,441. Hartley & Sugden, Ltd., Fox, S., and Culpan, S. Feb. 22, 1922.



Block-form boilers.—A heating and cooking stove comprises a bow-shaped front portion arranged to project in front of a boiler 6 which has side wings forming continuations of the walls of the front portion and the front of which is inclined forwardly to direct heat beneath a hot-plate 8 which covers the projecting front portion of the stove.

197,530. Wood, P. N., and Russell, G. D., (trading as Wood, Russell & Co.). May 5, 1922.

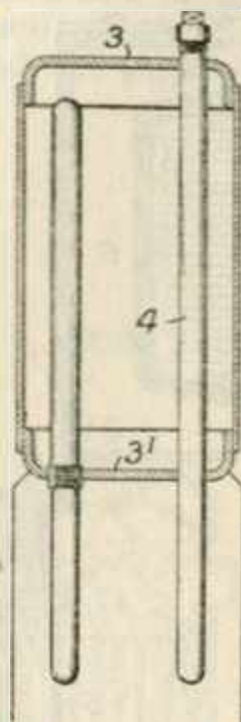
Heating water; annular boilers.—In a boiler of the kind in which the fire space with its grate is surrounded by a casing having hollow walls, the interior of which comprises two distinct compartments, each constituting a water space, of which compartments one is intended in certain circumstances for the "heating supply" or radiator water, and the other for the "domestic supply" or bath water, the said compartments are each provided with a cleaning aperture and both extend below the hottest zone of the fire space, whereby both compartments are adapted for heating "domestic supply" water. The boiler comprises two upright part-cylindrical members 11, 12 secured together by a front cover 14 and a back strip 15. For winter service, the fire grate is set low opposite the lower door 18 while in the summer it is set opposite the door 17. Cleaning apertures and doors 23 are fitted to the chambers 11, 12. The chamber 11 is used normally for "domestic supply" water, the water entering through the pipe 24 and leaving through the pipe 25. The chamber 12 similarly is for "heating supply" water and is supplied through the pipe 26 and returns to be re-heated through the pipe 27. A pipe 28 connects the pipes 24 and 27, while a valve-controlled pipe 29 connects the pipes 25, 26. Specifications 178,955



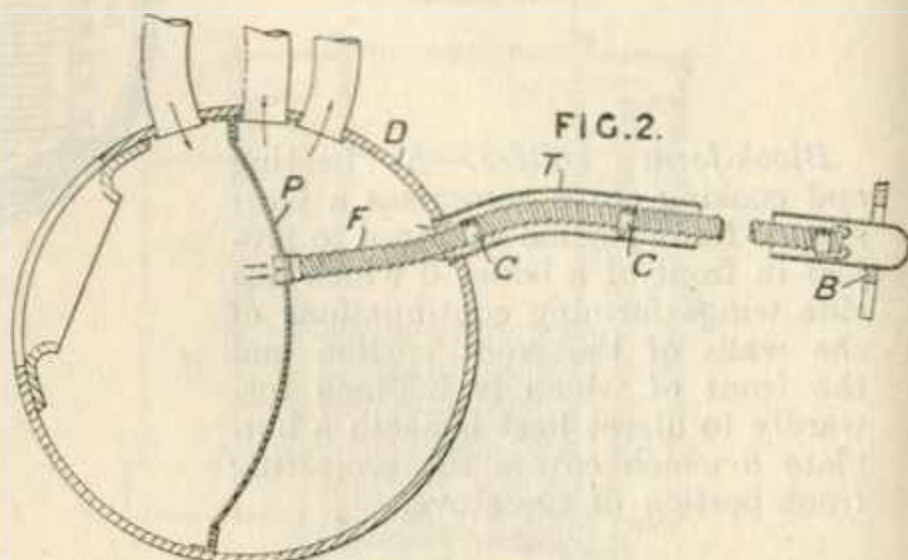
and 179,121, [Class 126, Stoves &c.], are referred to.

197,769. **Haag, J.** March 3, 1922.

Heating liquids.—In a boiler or like heating apparatus comprising Perkins tubes 4 which extend through two opposite walls 3, 3' and are closed at one of their extremities by screw-threaded caps or plugs, as shown, the tubes are fixed by expanding them in the said walls and are extended sufficiently far beyond the latter to avoid injury during the operation of expansion to that portion of each tube which is screw threaded for the reception of the cap or plug.



drum D is connected to a division plate P in the drum and is supported within the outer tube T by spiders C. The free ends of a number of elements are supported by a plate B, which may be made in segments and formed with openings so shaped as that each opening receives two horizontally adjacent elements. The division plate



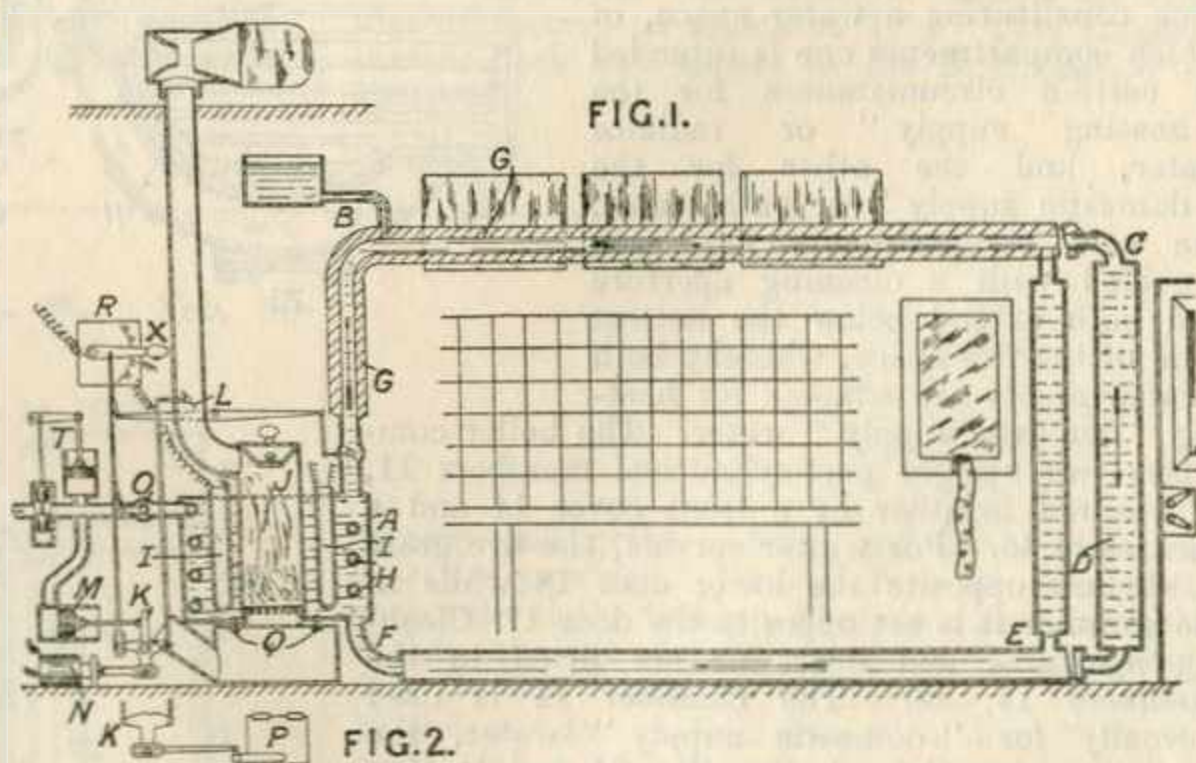
197,811. **Lewis, W. Y., and Cawkwell, A. A.** April 13, 1922.

Feed-water, heating.—A feed-heater or like apparatus has curved Field tubes with flexible inner tubes. The flexible metallic inner tube F of a Field tube element connected to a boiler

may be formed in sections to facilitate fixing in position, and it may be curved to a form corresponding to that of the curvature of the drum. In a modification, an inner tube is made flexible only at the part surrounded by the curved inner end of the outer tube. The rigid part of such an inner tube may be made in detachable sections. The outer end of an outer tube may be closed by a screwed cap.

197,961. **Irle, R. A.** May 20, 1922, [Convention date].

Annular &c. boilers.—A system of heating by water circulation, particularly for postal cars comprises a boiler A with circuit B - - F of large volume. The upper part of the circuit is covered with a partial-insulating jacket G. At starting and before energy is available from the locomotive the boiler is heated by a furnace J. As soon as steam or electricity is available the steam acting on a piston M or electricity acting on a solenoid N causes an air door K and a damper L to shut and heating is continued by steam pipes H or electric heaters I. The heating may be regulated through a handle X operating a resistance R or steam valve O and the air door and damper L. A reducing valve arrangement T adjusts the steam supply pressure. The ashpit door P, Fig. 2, is locked as shown except when the dampers K, L are closed

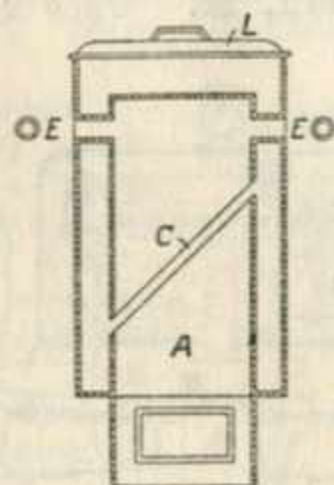


and the fire shut down. To minimize further the risk of fire the boiler is held to the ashpit by bolts Q which, in the event of an accident, will tear the walls of the boiler and thus extinguish the fire.



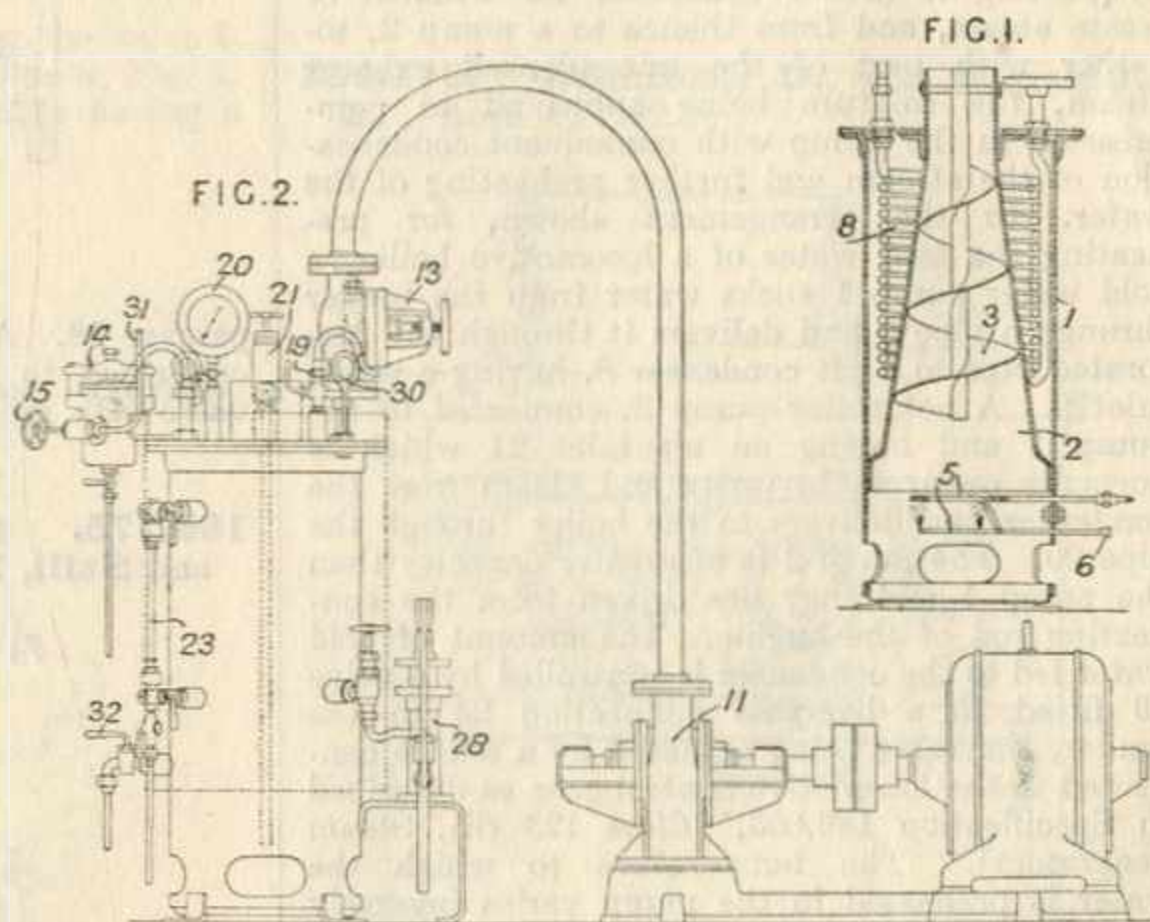
198,470. Griffin, R. H. March 16, 1922.

Internally-fired boilers.—For supplying small quantities of hot water or steam for cooking purposes, a boiler has an internal flue chamber A traversed by a water tube C and exits E for hot gases. The lid L can be replaced by vessels containing food to be steamed. The boiler stands on an extension of the walls of the flue chamber A.



198,480. Laing, A. March 20, 1922.

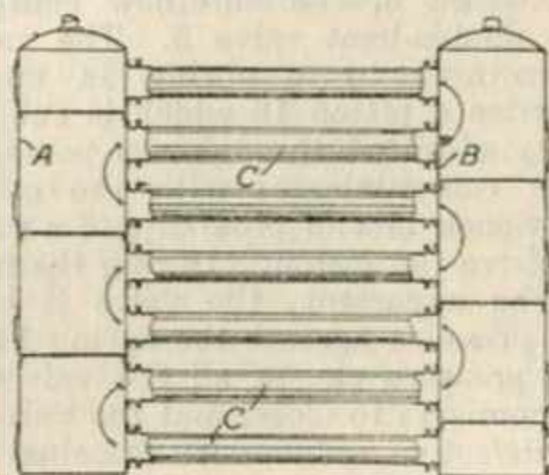
Heating liquids.—Liquid fuel for combustion in furnaces is heated by passage through a coiled tube 8 arranged between the shell 1 and combustion chamber 2 of a water boiler. The boiler is heated by a paraffin vapour, gas, or other burner 5 and the flames therefrom are caused to sweep the combustion chamber by a helical baffle 3. Fig. 2 shows a general arrangement of the heating apparatus in which an electrically or otherwise driven pump 11 supplies fuel through a valve 13 to the heater and the fuel on leaving the heater passes to the burners through a strainer 14, a shut-off valve 15, and a pipe 31. The boiler is fitted with a pressure gauge 20, safety valve 21, blow-down cock 32, and water gauge 23, and is also provided with eye-bolts 30 to facilitate movement. Feed water is supplied to the boiler by means of a pump 28. After use a cock 19 on the heater may be opened to allow



steam to be blown through the fuel heating coil for cleaning purposes.

198,484. Addyman, W. P. March 21, 1922.

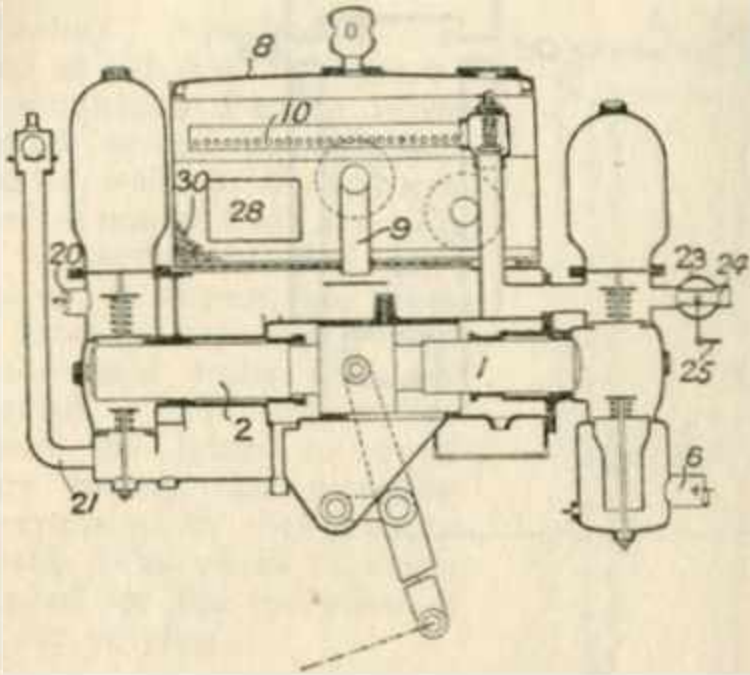
Feed-water, heating.—The headers A, B of a fuel economizer are cylindrical and divided into compartments, the top of each compartment in the header A being connected by a single tube C with the bottom of a compartment in the header B, and vice versa. Specifications 4270/08, 167,140, and 169,679 are referred to.





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198,651. **Reik, H.** June 2, 1922, [Con-
vention date].



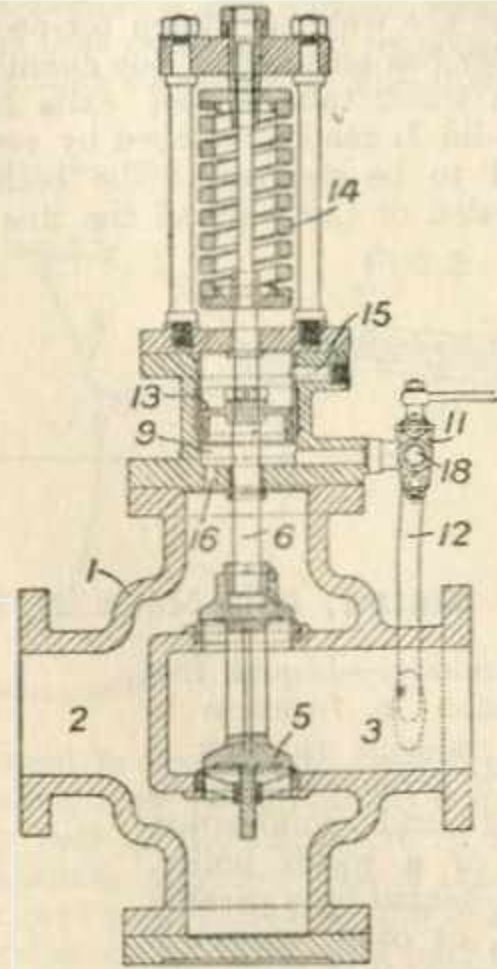
Feed-water, heating.—Feed-water is preheated by passing it into a condenser for exhaust or waste steam, and from thence to a pump 2, together with part of the uncondensed exhaust steam, the mixture being subjected to compression in the pump with consequent condensation of the stream and further preheating of the water. In the arrangement shown, for preheating the feed water of a locomotive boiler, a cold water pump 1 sucks water from the tender through a pipe 6 and delivers it through the perforated pipe to a jet condenser 8, having a waste inlet 9. A hot water pump 2, connected to the pump 1 and having an air inlet 21 which is normally open, sucks water and steam from the condenser and delivers to the boiler through the pipe 20. The pump 2 is of greater capacity than the pump 1 and they are driven from the connecting rod of the engine. The amount of cold water fed to the condenser is controlled by a valve 23 fitted to a by-pass connection 24 to the tender, the valve being actuated by a rod 25 connected to the locomotive control gear as described in Specification 189,093, [Class 123 (ii), Steam generators]. The temperature to which the water is preheated in the pump varies inversely with the amount fed to the condenser. Heat interchanging bodies 30, such as "Raschig rings" may be introduced into the condenser through a door 28.

198,723. **Baxter, A.** Jan. 11, 1922.

Feed-water, heating.—A valve for use with a feed-water heater or economizer is adapted to close automatically in the event of leakage in the economizer. The casing 1 is provided with an inlet 2 and outlet 3, the fluid-flow being controlled by a double-bent valve 5. The valve is pressed downwards by a spring 14 and the spindle 6 carries a piston 13 which is subject to fluid pressure admitted through the passage 16. The space 9 communicates with the outlet 3 through a try-cock 11 and pipe 12 and a vent 15 is provided above the piston. During the normal working of the apparatus, the valve is opened by the fluid pressure against the spring 14. A reduction of pressure causes all the valves of a group of economizers to close, and the valve controlling the defective economizer remains closed

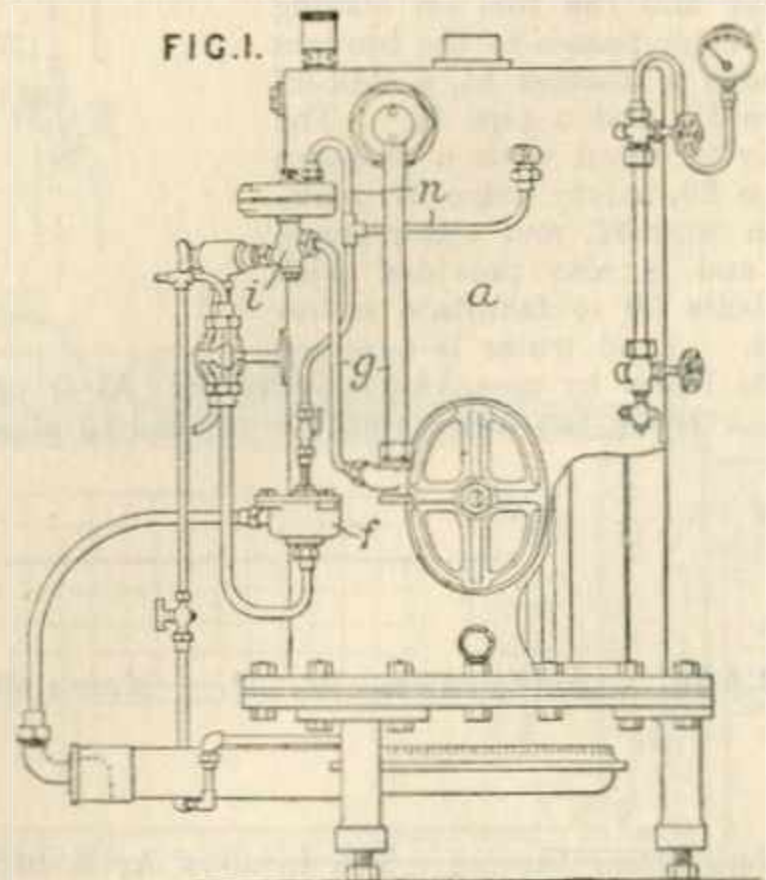
CLASS 64 (i), HEATING LIQUIDS &c.

due to leakage of fluid from the space 9. The restoration of pressure on the pressure side of the other valves of the group then causes them to re-open. The cock 11 also controls a drain



passage 18. An audible or visible signal may be connected to the valve stem to indicate which valve of a group is closed.

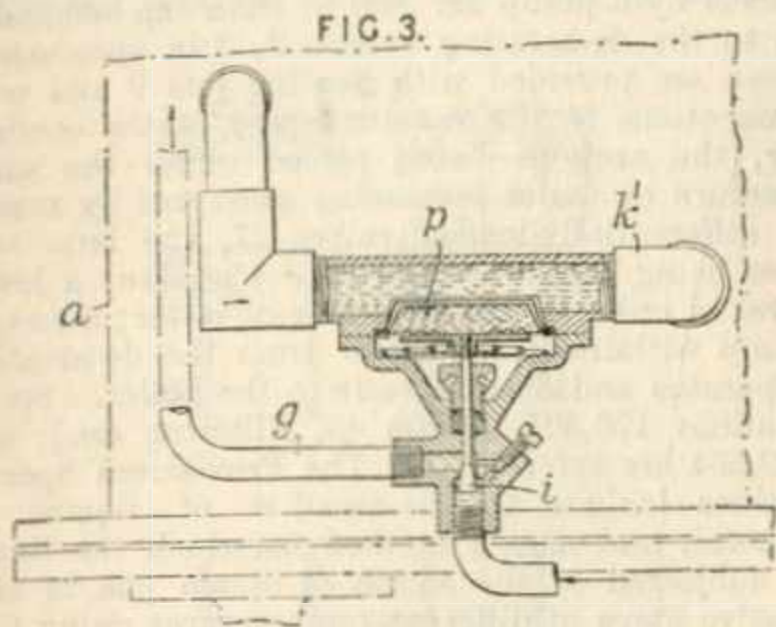
198,775. **Still & Sons, Ltd., W. M.,**
and **Still, E. H.** March 8, 1922.



Water supply and delivery.—In a boiler a for heating water the inlet water pipe *g* leading to a float controlled valve within the boiler is provided with a valve *i* arranged to open when the pressure or temperature of the water in the boiler rises and to close when it falls. A valve *f* may be arranged so as to cut off the supply of gas on a rise in pressure. A suitable valve for

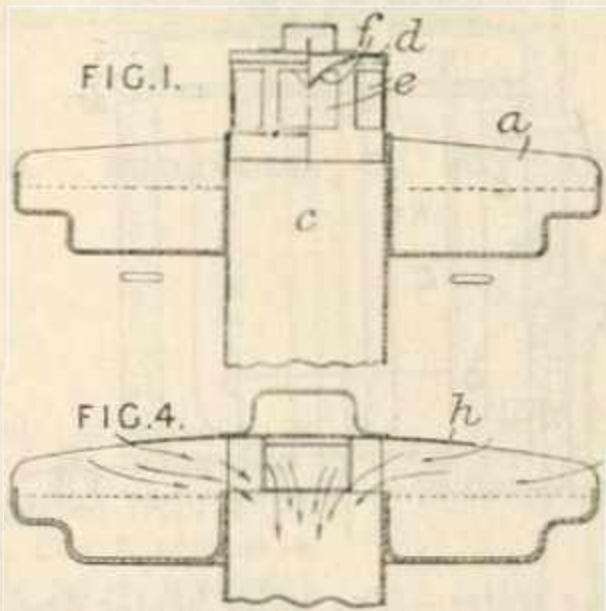


use in the water supply is shown in Fig. 3; this valve is controlled by the temperature of water in a loop k^1 connected to the boiler and comprises a diaphragm subject to the pressure of a



volatile liquid in the cap p actuating the valve i . If pressure control is used a steam pipe n , Fig. 1, communicates directly with a chamber having a similar diaphragm.

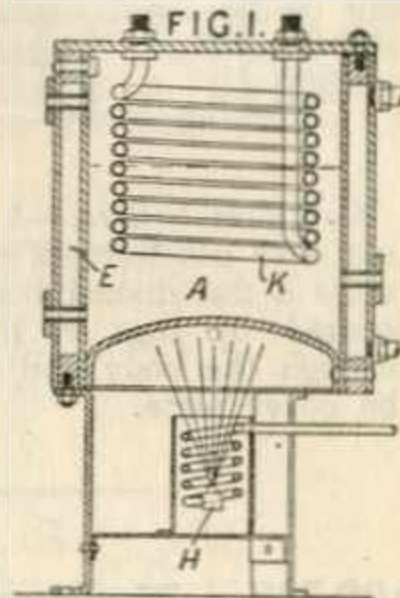
198,880. Haden, W. N., and Haden, C. I. May 9, 1922.



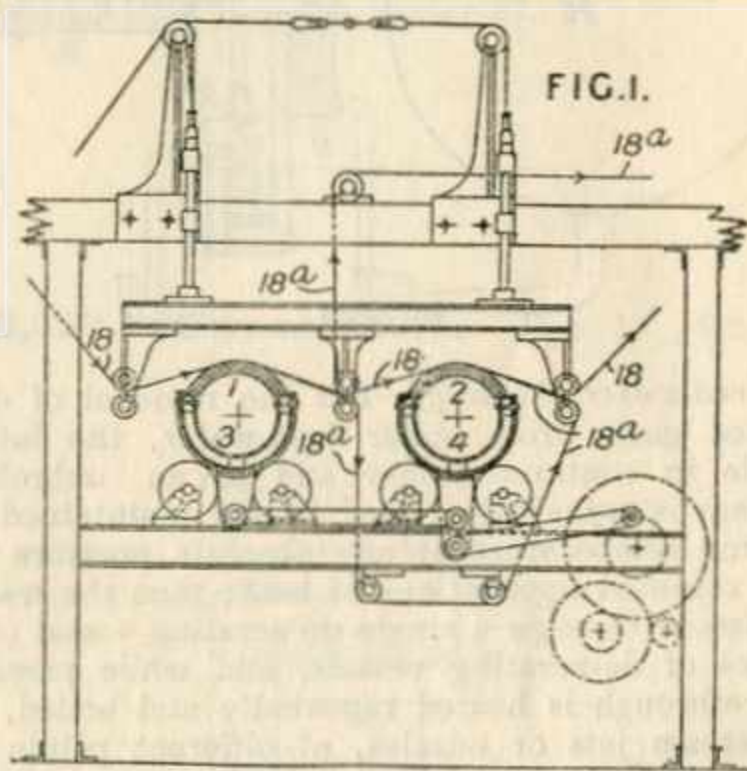
Set-pans.—An open melting-pan a , applicable for example, to melting pitch, is of annular form and surrounds a downwardly-directed flue c which is fitted with a removable cap d having openings e , a fan or the like being provided in the flue for drawing off the fumes. A conical direction baffle f is provided on the under surface of the cap. In the modification shown in Fig. 4 the cap is extended to form a hood h over the pan. In a further modification the top of the flue c is located beneath the pan and the inlets for the fumes are provided by tubes which extend upwardly through the pan and open into the space above the contents.

199,173. Ferguson, J. J., and son, F. M. March 28, 1922.

Heating liquids.—Oil on its way to the burners of a steam generator passes through a coil K in a tank A containing water or steam heated by a lamp H . Additional means for heating or maintaining the temperature is provided either by means of a steam jacket E or by means of a second coil in the tank A through which steam is circulated.



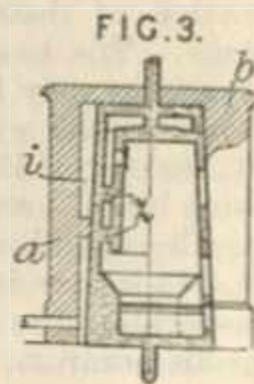
199,178. Bamford, D., and Henshall, A. April 4, 1922.



Feed-water, heating.—The supports $3, 4$ for heated fabric-singeing plates $1, 2$ are made hollow for the circulation of water, the heated water being used in the dye house or for boiler feed.

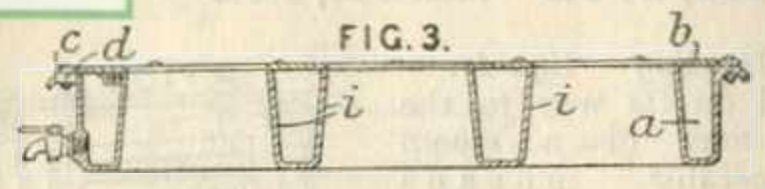
199,295. Capietto, A. Aug. 28, 1922.

Internally-fired boilers.—A boiler for central-heating installations comprises a water-holding annulus a enclosed by a casing b and a curved chamber within the fire space connected to the outer annulus at its sides and by short tubes z to form a flue space between them leading to the flue space i and the chimney.



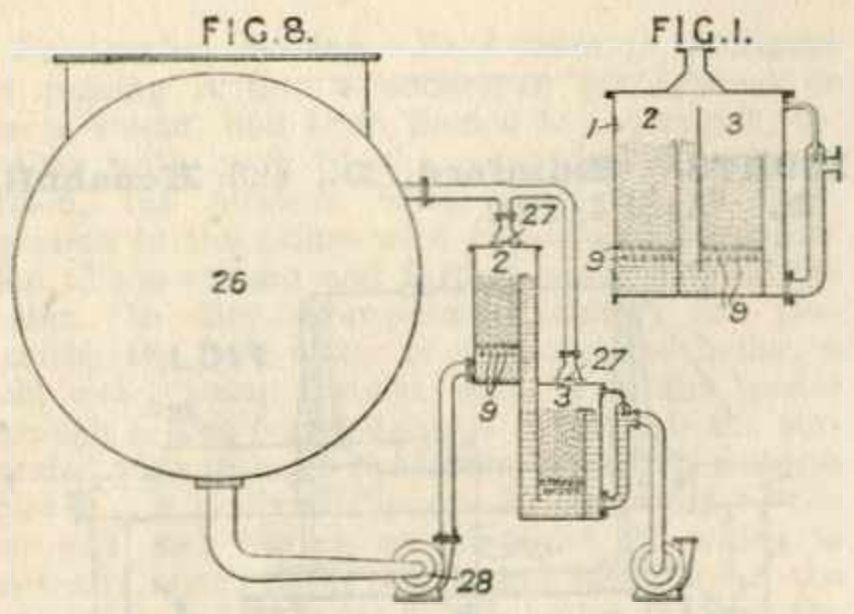


199,433. **Taft, F. W. R.** Jan. 15, 1923.



Slab-form boilers.—A boiler or hotplate for fitting over gas burners on an existing stove comprises a flat dished body *a* closed by a cover *b* secured by lugs *c, d*. Conical flues *i* pass through the body and register with openings in the cover plate.

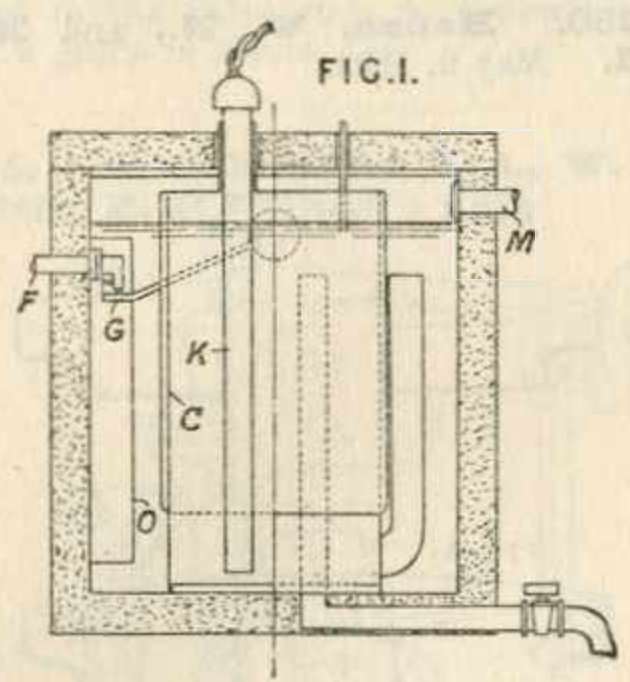
199,748. **Morison, D. B.** Dec. 23, 1921.



Feed-water, heating.—For the removal of dissolved gases from boiler feed-water, the latter while in continuous flow and as an unbroken stream is repeatedly raised to and maintained at boiling temperature at any absolute pressure by the repeated applications of heat; thus the water is passed through a single de-aerating vessel or a series of de-aerating vessels, and while passing therethrough is heated repeatedly and boiled, as by steam jets or nozzles, at different points in the line of flow. The boiling at the several stages may be at atmospheric pressure, or at pressures above or below atmospheric, and the pressure may vary from stage to stage. Between each of the stages there is necessarily a fall in temperature, and this effect may be enhanced by introducing cooling coils into the circuit. As shown in Fig. 1, the water passes in succession through the sections 2, 3 of the de-aerating vessel 1, and in each section it is raised to boiling point by steam introduced through jets 9. In some cases it is convenient to return, as by a by-pass pipe, a portion of the water from a later to an earlier stage. The heated water leaving the de-aerating apparatus may be passed through an interchanger receiving the water to be treated, which is thereby heated, while the discharged de-aerated water being at a lower temperature can more economically absorb waste or low-grade heat. When an evaporator is employed for making up loss of feed-water, the steam so generated may be used for de-aeration, the absolute pressure in the de-

aerator being adjusted so that the amount of steam available is sufficient to effect the boiling. The de-aerating apparatus may be combined with the condenser system, in which case the condensate flows by gravity through a water seal or is passed by a pump 28, Fig. 8, from the condenser 26 to the de-aerating vessels 2, 3 in succession; these are provided with heating jets 9 and with connections to the vacuum space of the condenser, the sections being placed under the same pressure or under increasing pressures by means of differentially-loaded valves 27, the later section being in the second case placed at a lower level in order to ensure a flow of water; a second pump withdraws the water from the de-aerating apparatus and discharges it to the boiler. Specifications 173,301, [Class 46, Filtering &c.], and 183,534 are referred to. The Provisional Specifications include the de-aeration of liquids in general, and also a method in which the liquid is subjected to the action of steam jets in successive steps at different temperatures rising to a temperature which may be within the boiling temperature, and modifications of the various methods and arrangements described above in which the de-aeration is effected by heating but not necessarily by a process involving repeated boiling.

199,855. **Cooper, W. R.** April 10, 1922.

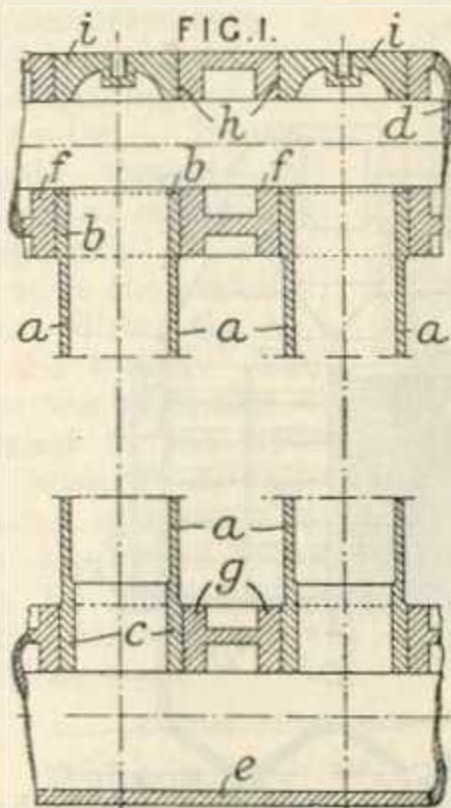


Heating water.—The water heater described in Specification 7936/11 is modified so as to be relieved of the pressure of a head of water by combining with it the features of a feed tank. As shown, a ball valve *G* which delivers beneath a shield *O* controls the inlet of water at *F* and an overflow *M* is provided from the outer container. The electric heater *K* passes into the inner container *C* from the top.

199,907. **Descy, A., Simon, L., and Soc. Anon. des Fonderies et Distributions d'Eau à Ciney.** May 18, 1922.

Feed-water, heating.—In an economizer or like tubular apparatus of the type in which upper

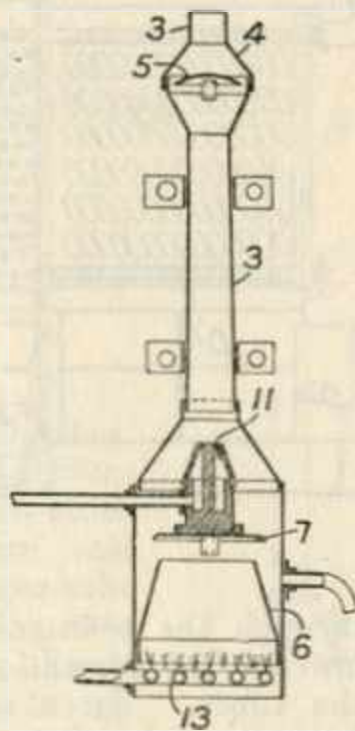
and lower headers *d, e* are connected by a series of tubes *a* having turned cylindrical ends *b, c* of somewhat different diameter, the headers are provided with corresponding series of sockets *f, g* which have diameters slightly smaller than those of the end portions *b, c* of the tubes so that, in



erecting the apparatus, the tubes are forced into the sockets to give metal-to-metal fluid-tight joints. Openings *h* normally closed by plugs *i* are provided in the upper headers for facilitating the removal of a faulty tube and its replacement, under conditions identical with those of the initial construction, by a new tube.

199,978. Ringbom, O. A. Aug. 11, 1922.

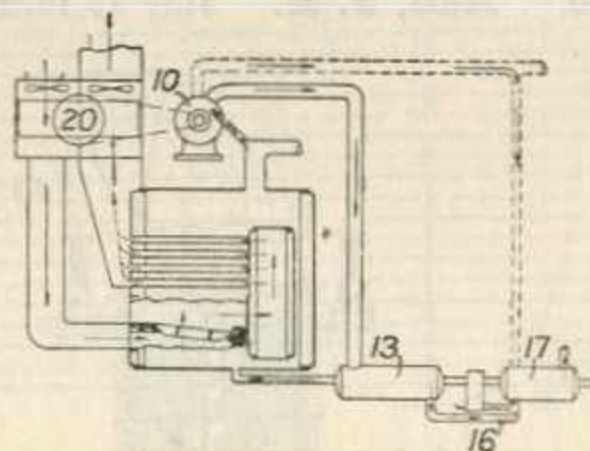
Heating water.—In a direct contact heater, water sprayed from a jet 11 up a flue 3 strikes a baffle 5 in an enlargement 4 and falls over a baffle 7 into a collecting ring 6, being heated by the up-rising products of combustion from a burner 13.



199,991. Aktiebolaget Ljungströms Angturbin. June 30, 1922, [Convention date].

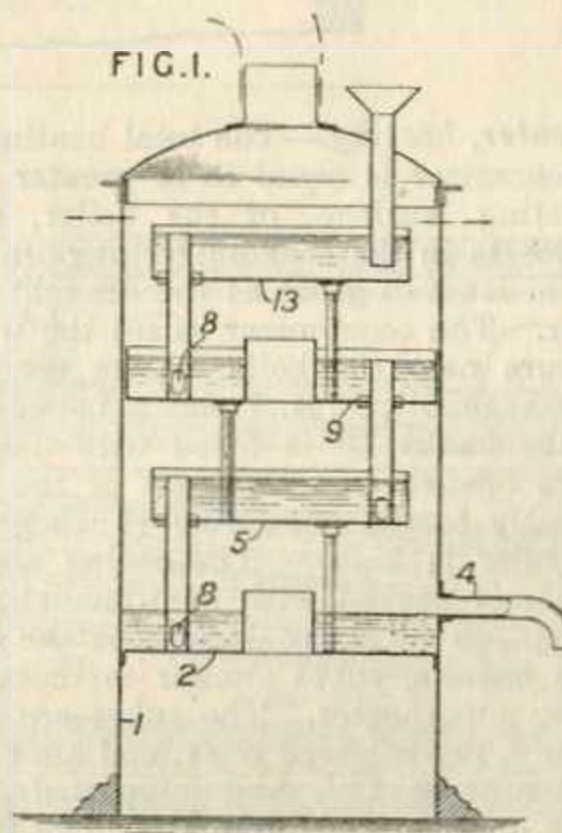
Feed-water, heating.—In a steam-boiler plant, the exhaust steam from the motor driving the

rotary regenerative air-preheater is used to heat the boiler feed-water. The exhaust from a turbine 10 rotating the air-preheater 20 heats the boiler feed-water in a heater 13 placed on the pressure side of the feed-pump. Condensate and uncondensed steam are taken from the heater through a pipe 16 to a second feed heater 17



placed on the suction side of the feed-pump. The heater 17 is supplied with exhaust steam from other auxiliary machinery. The exhaust from the turbine 10 may be led, wholly or partly, into the heater 17. Steam from an intermediate stage of the turbine may be led into the heater 13 and the exhaust led into the heater 17.

200,028. Owens, C. W. Dec. 15, 1922.



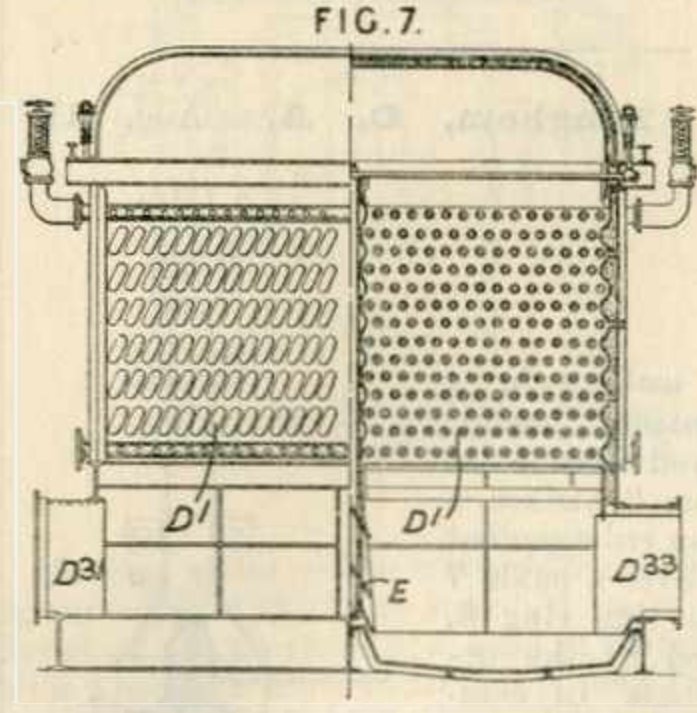
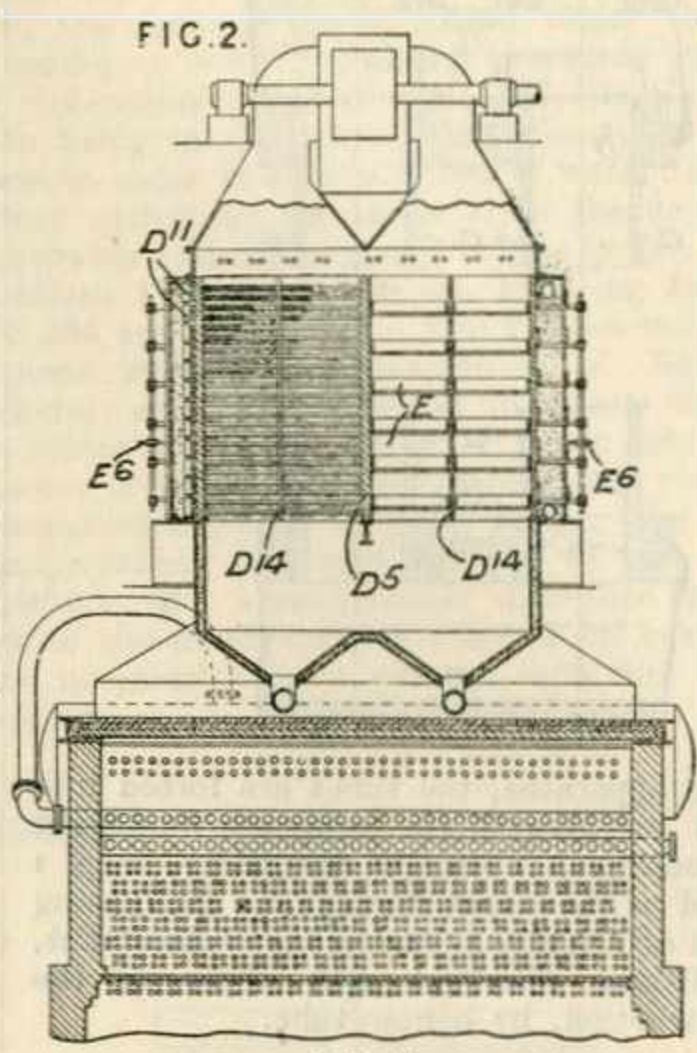
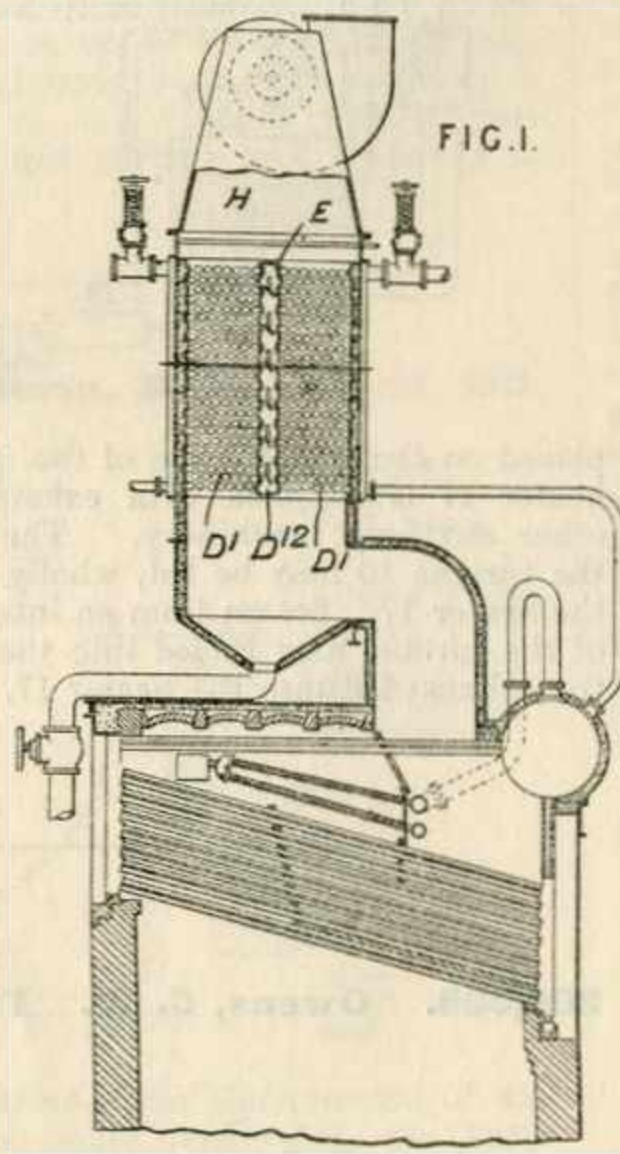
Geysers.—Alternate annular and circular trays are supported upon the lowermost tray 2 which is secured to the sides of the casing 1 and provided with an outlet 4. Each of the other trays 5, 9, 13 has legs, resting on the floor of the tray beneath, one or more of which legs being hollow, and extending to receive water from the surface



in the higher tray and having apertures 8 at or near the lower end to deliver on to the lower tray. The circular trays 5, 13, are held

centrally in the casing by means of projecting loops on their sides which rest against the wall of the casing 1.

200,060. Bell, J. E. July 1, 1922, [Convention date].



Feed-water, heating.—The total heating surface of an economizer is equal to or greater than the total heating surface of the boiler, and the draught losses in the economizer at normal boiler load are at least as great as the draught losses in the boiler. The economizer raises the water to a temperature near the boiler steam temperature. A flue passage D^{12} , Figs. 1 and 2, between economizer tube banks D^1 is fitted with dampers E , which are opened to allow part of the gases to pass directly to the fan-casing H when the load on the boiler is high. The casing around the economizer is packed with heat-insulating material. Cast-iron rings are shrunk on the economizer tubes forming tubes similar to those used in the Foster superheater. The tubes are arranged horizontally, in staggered rows, and are connected to junction-boxes D^{11} , and supported at their centre by a perforated plate D^5 . The flue passage D^{12} is divided by the plate D^5 and plates D^{14} into four paths, each path being fitted with rows of dampers E , which are operated in horizontal pairs by hand wheels E^6 on vertical bars connected to the damper spindles. Water is forced

through the economizer at a speed sufficient to prevent the formation of convection currents in the tubes. In a modification, the gases pass from the inlet D^{31} , Fig. 7, of the economizer casing to the outlet D^{33} through each of two banks of tubes D^1 in turn, part of the gases being allowed to pass direct to the outlet at high loads by opening dampers E .

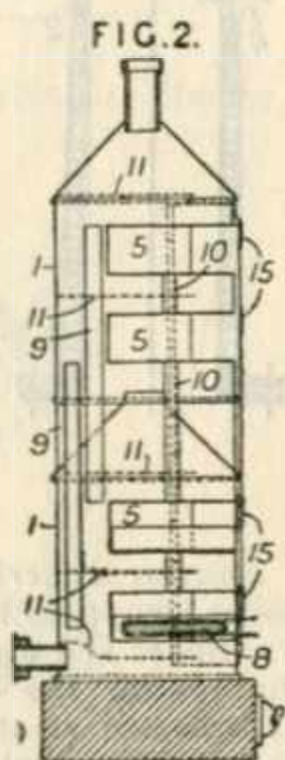


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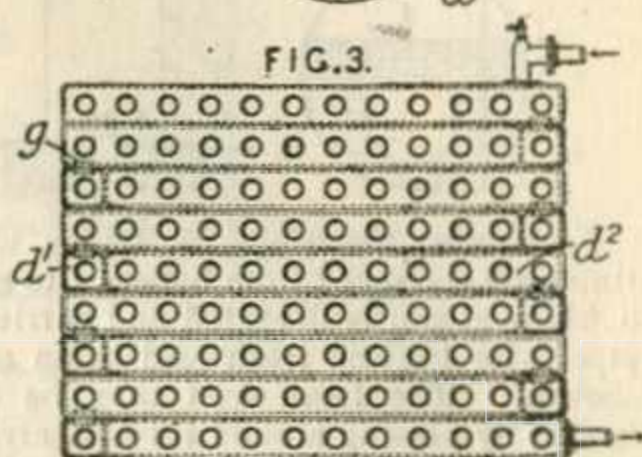
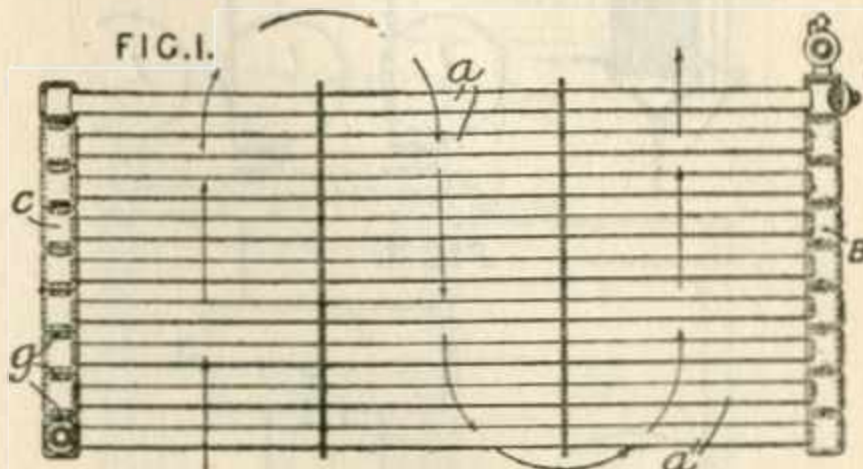
VIRTUAL MUSEUM

200,174. Morris, A. A., and Hinton, E. W. April 4, 1922. *No Patent granted (Sealing fee not paid).*

Internally-fired boilers.—A boiler 1 is heated by electric resistances 8 or gas burners placed in compartments 5 preferably staggered and extending from openings in the side of the boiler. Tubular flues 10 extend through the water space either connecting the compartments or communicating with the outside. Baffles 11 may direct the circulation of the water. The covers 15 for the chambers 5 may be formed in one with drawer-like holders for the electric heating elements. In the example shown, the boiler is made in two superposed sections and circulation pipes 9 connect the sections.



The partitioned headers form a bank C connected by horizontal tubes a to a bank of headers B which are not partitioned. The headers in the bank C are connected alternately at opposite ends by nipples g. The heater may be fitted with baffles as shown, and may be heated by the pro-



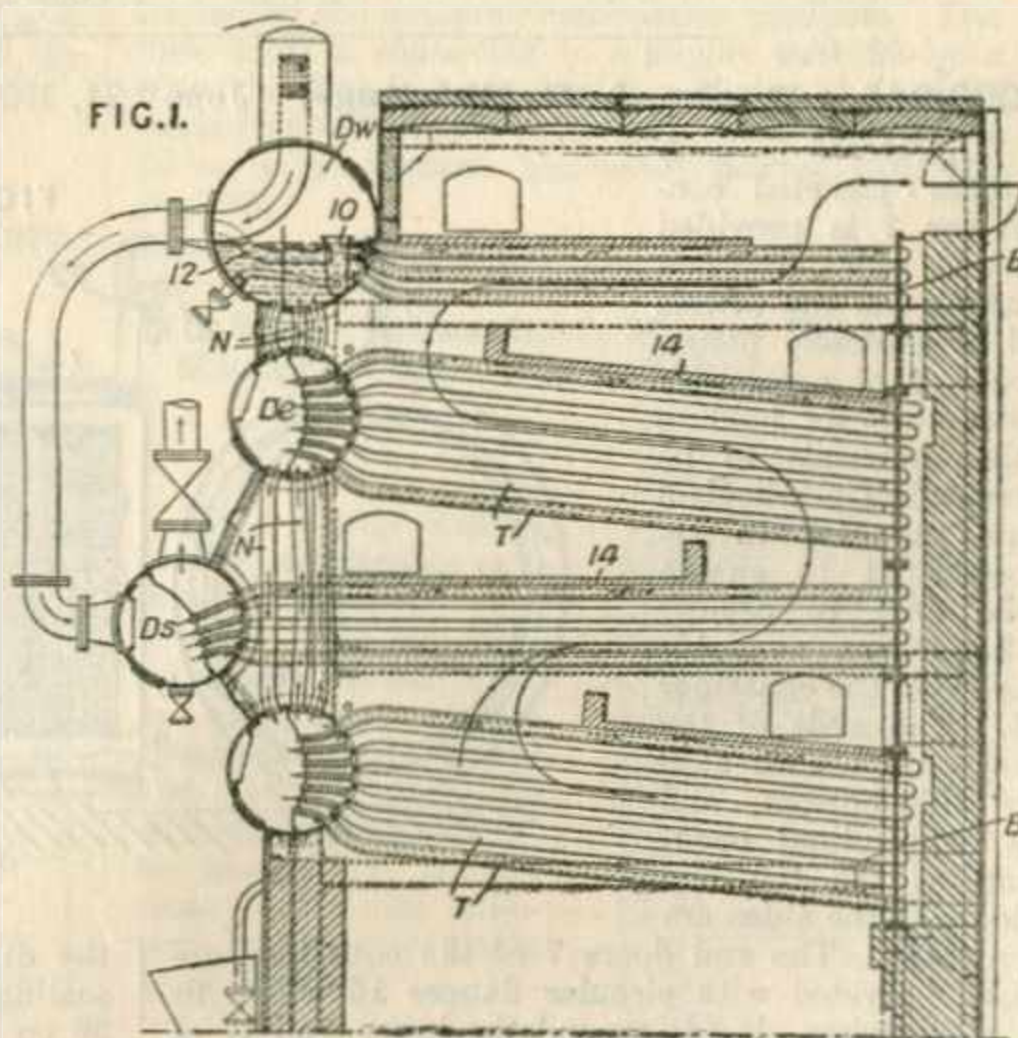
200,229. Robson, P. W., McGregor, R., and Clayton & Shuttleworth, Ltd. April 12, 1922.

Feed-water, heating.—Feed-water heaters are provided with headers divided into two compartments d^1 , d^2 , the compartment d^1 receiving the flow of water directly from an adjacent header and guiding it through a certain number of tubes, and the other compartment d^2 receiving the water through a different number of tubes and guiding it directly into an adjacent header.

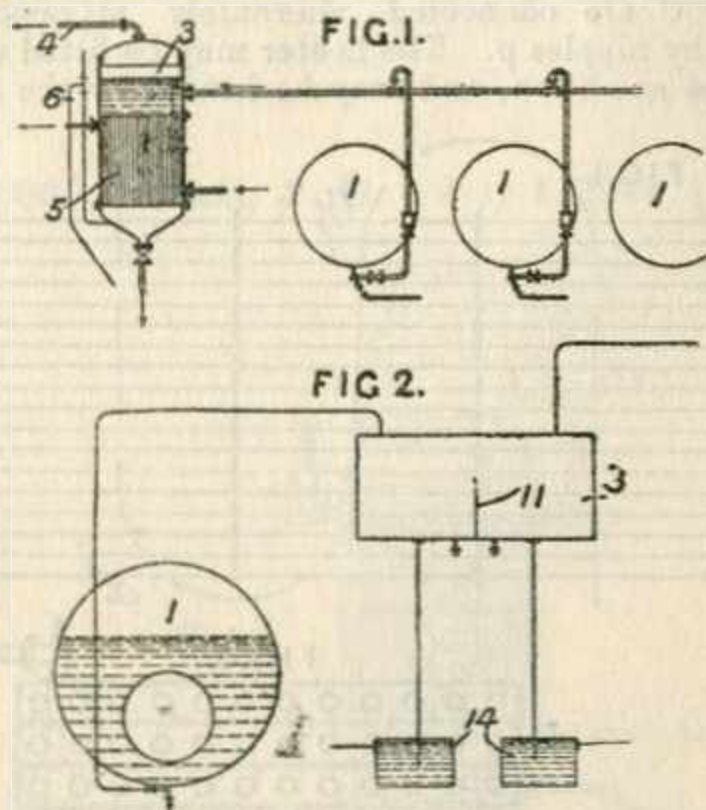
ducts of combustion, or may be fitted with an external casing having exhaust steam connections. The tubes a may be inclined or arranged vertically, or may be arranged in zig-zag formation instead of straight vertical rows. Specification 8634/98, [Class 123, Steam generators], is referred to.

200,234. Lewis, W. Y., and Cawkwell, A. A. April 13, 1922.

Feed-water, heating.—Field tubes, of the kind referred to in Specification 197,811, for heating feed-water are connected to the steam and water drum D^w of a water-tube boiler, the inner tubes opening into a trough 10 in the drum. Feed-water is delivered into the trough through a pipe 12.



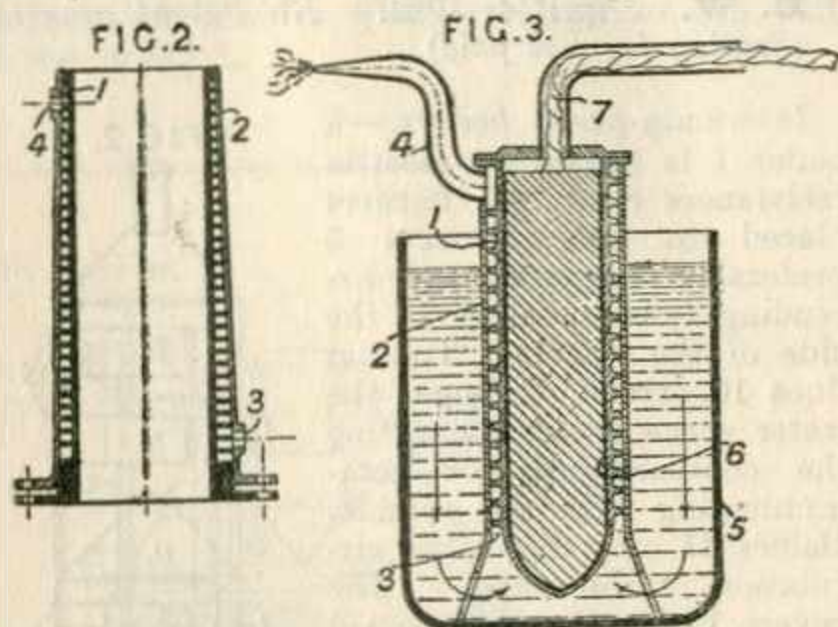
200,263. Müller Ges., P., and Oster-tag, J. April 27, 1922.



Feed-water, heating. — Boiler water is continuously conveyed from boilers 1 to an evaporator 3 where steam is liberated and carried away by a pipe 4 for heating fresh feed in an apparatus not shown. The fresh feed may be preliminarily heated by passing around tubes 5, arranged, in the example shown, in the lower part of the evaporator, through which passes the boiler water on its way to the overflow 6. In a modification, Fig. 2, blow-down water and fresh feed are sprayed on either side of a partition 11 in a vacuum evaporator 3. Steam liberated by the reduction in pressure of the boiler water passes over the partition to heat the feed and the cooled boiler water and heated feed collect in tanks 14.

Reference has been directed by the Comptroller to Specifications 21127/09 and 167,142.

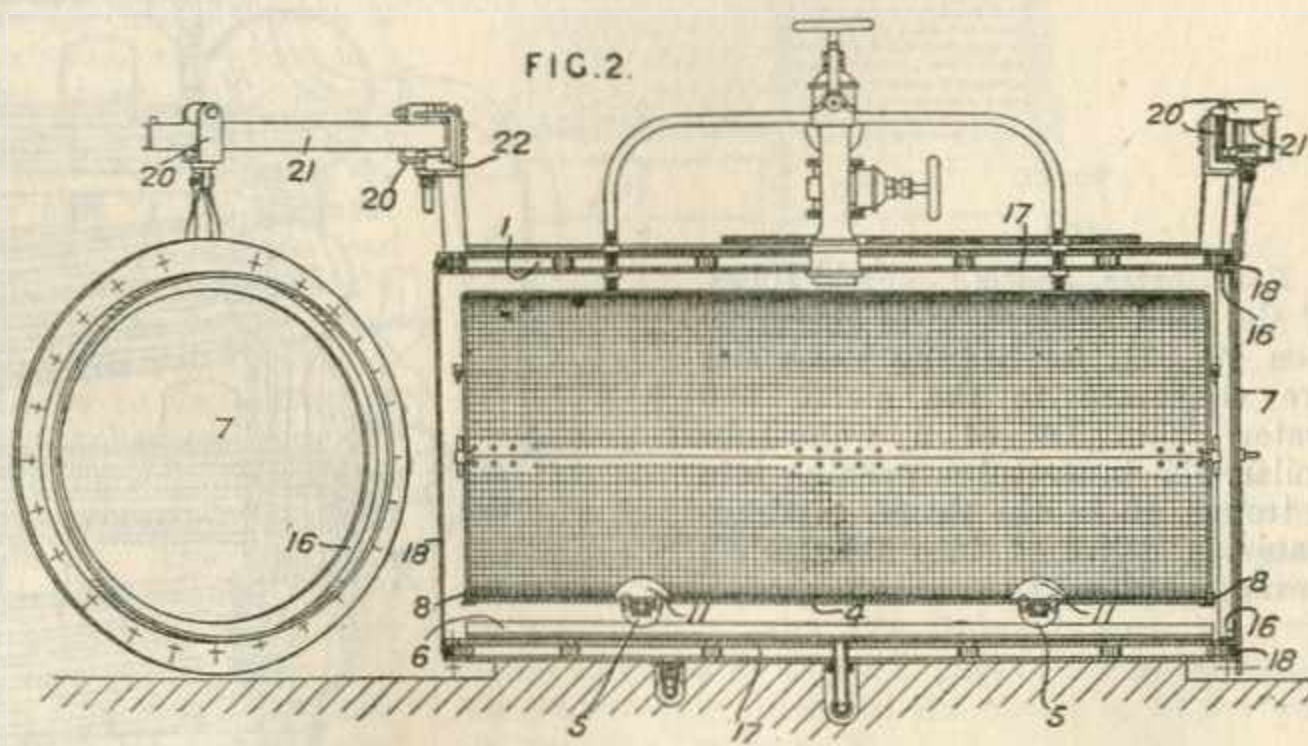
200,265. Ellyson, F. W. April 28, 1922.



Annular boilers; internally-fired boilers. — A boiler comprises a narrow helical passage between a cylinder and a cone, the space between narrowing toward the exit end. Hot water, wet or superheated steam is produced according to the design. The water may be heated by electricity or otherwise, and the heater may be immersed in a water container. A hollow cylinder 1, Fig. 2, of pressed or cast metal has external fins rolled or cut thereon to form a thread the fins being of graduated length to form a truncated cone upon which an external cone 2 is placed, the parts 1 and 2 having flanges which are bolted together. The outer part 2 has an inlet 3 and outlet 4. When heated electrically a cable 7 passes to the heater 6, Fig. 3, in the shell 1 the bottom being closed by a paraboloidal surface. The outer shell 2 is continued down to form legs 3 so that the apparatus can be immersed in a container 5. When used for producing steam the outlet 4 is in the form of a steam supply pipe, but for merely heating the water in the container 5 the outlets are open and beneath the water level so as to give a continuous circulating flow.

200,345. Rooke, A. G. Shirling-. June 24, 1922.

Digesters. — A steam-jacketed container 1 is provided with rails 6 upon which run the wheels 5 of a closely fitting cage 4 of open-work structure for holding the materials to be treated. The wheels 5 are mounted in recesses 11 to enable the cage to occupy the entire available space in the container 1. The ends of the cage are hinged at 8 to the bottom, and a longitudinal opening at the top and doors at the sides are provided. The end doors 7 of the container are each provided with circular flanges 16 which fit tightly, when closed, around the inner wall 17 of

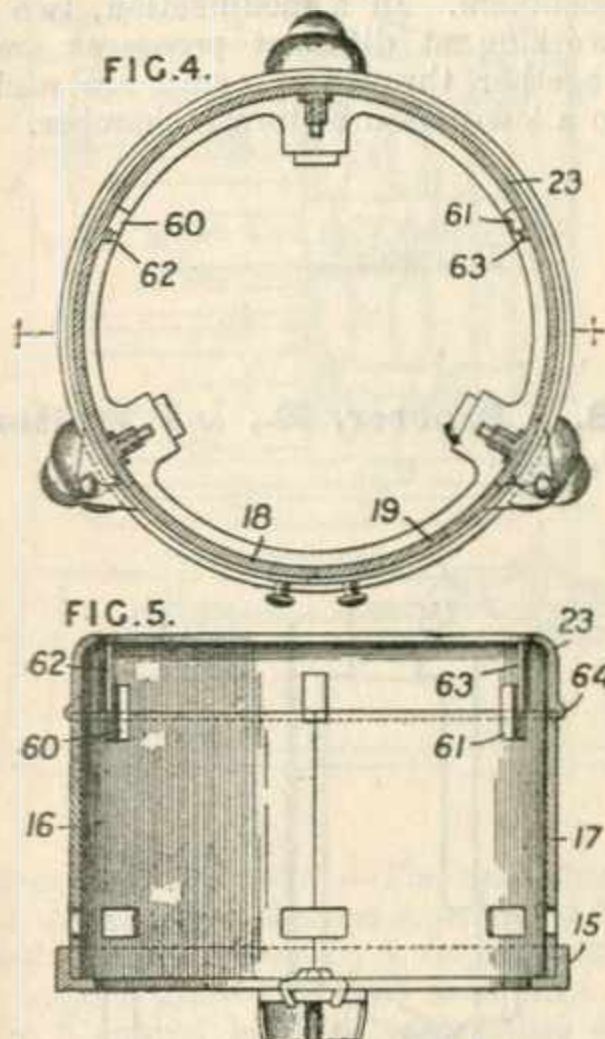


the digester and packing rings 18 complete the sealing. The doors are hung on runner carriages 20 on pivoted beams 21 on a bracket 22 and are



held in the closed position by swivel catches. Specification 200,344, [Class 91, Oils &c.], is referred to.

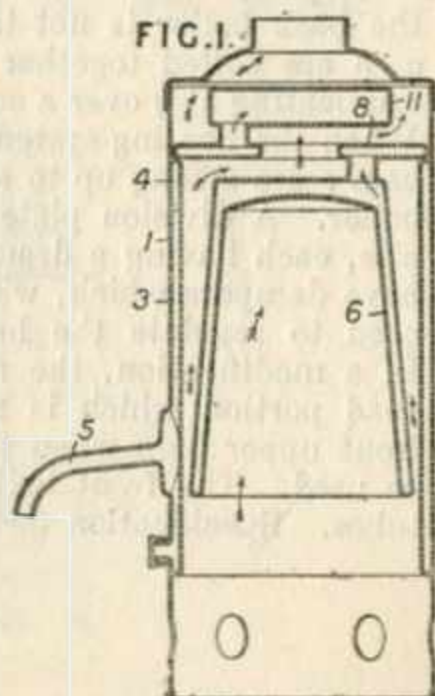
200,392. Withers, J. S., (Bastian-Morley Co.). Aug. 14, 1922.



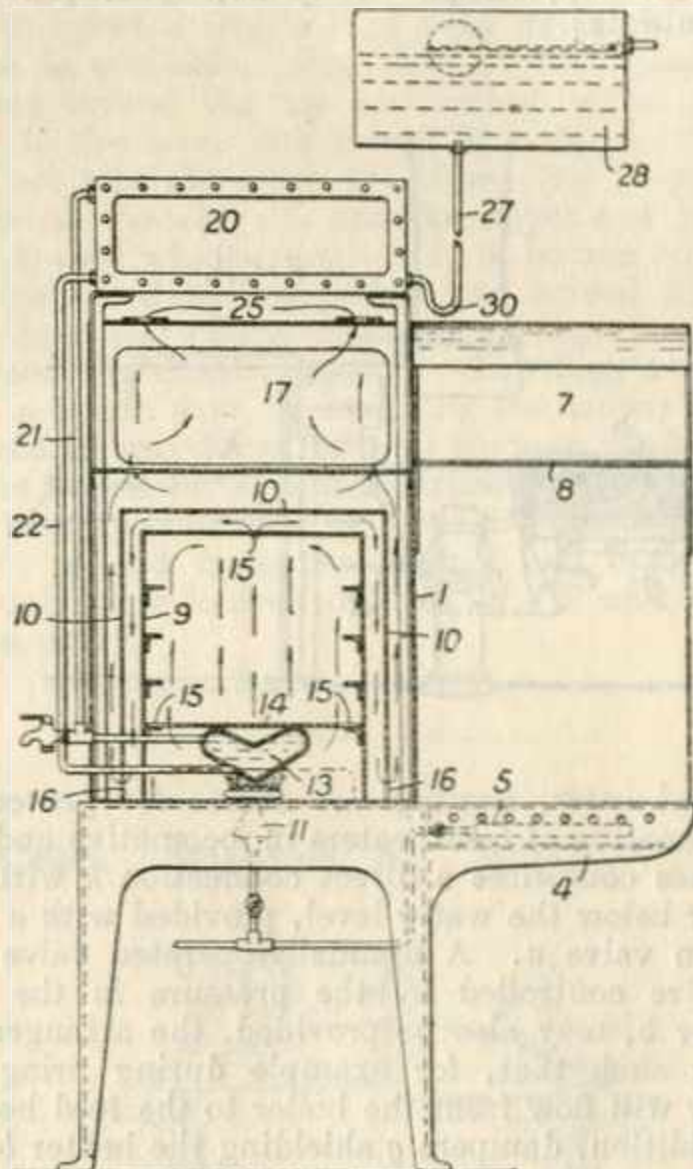
Boilers are supported by burner chambers made of interlocking sections. The upper collar 23 of such a chamber is provided with lugs 62, 63 against which abut lugs 60, 61 on the segments 16, 17 of the wall and a bead 64 which retains the upper edges. The lower edges are held in a flanged ring 15 to which the feet are attached and within which the drip pan is held. Doors 18, 19 complete the front of the chamber.

200,403. Wheeler, H. J. Sept. 5, 1922.

Internally - fired boilers. — Water is admitted direct by a descending pipe (not shown) to one side of the bottom of an inverted cup-shaped chamber 6 and rises through shallow chambers 8, 11 to a jacketed casing 1 round which it passes before reaching a channel 2 formed in the jacket and open to it at the top at 4, down which it passes to the outlet 5. The water inlet pipe and the interior chambers may be formed as one unit for ease in detaching.



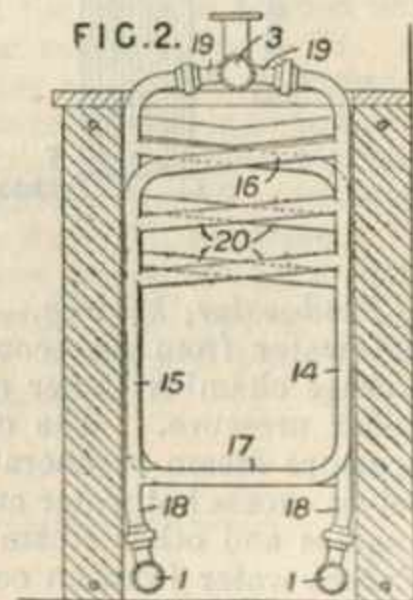
200,999. Haggart, E. C. C. June 15, 1922.



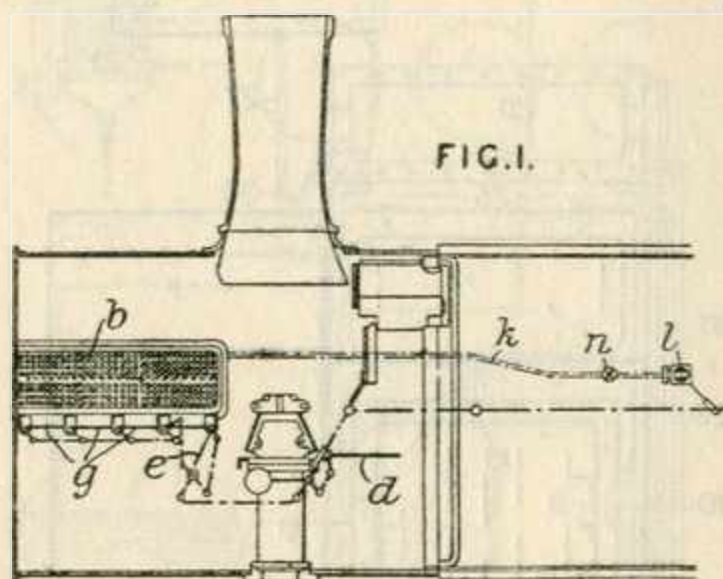
Block-form boilers.—In a combined gas cooking-stove and water heater the boiler 13, which is disposed between the burner 11 and the oven bottom 14, is V-shaped and has flow and return pipes 21, 22, communicating with a hot-water cistern 20 which is secured to the top of the stove and heated by the escaping combustion products. The cistern 20 is connected to a supply tank 28 by a pipe 27 which is formed with a U-shaped bend 30 extending below the connection with the cistern 20 so as to prevent hot water flowing into the tank 28.

201,345. Russell, J. N., and Rosser & Russell, Ltd. June 15, 1922.

Water-tube boilers having replaceable sections formed of wrought iron or steel tubes are constructed so that each section constitutes a closed loop 14, 17, 15, 16 with connections 18, 19 to headers 1, 3 and cross tubes 20 adjacent to the upper side 16 of the loop.

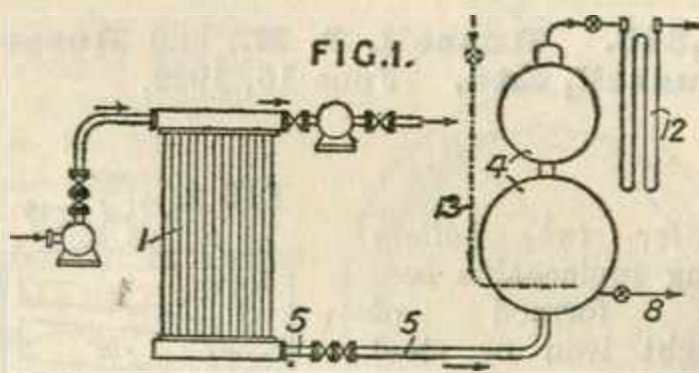


1,536. Marine & Locomotive Superheaters, Ltd., (Assignees of *Schmidt'sche Heissdampf-Ges.*). July 26, 1922, [Convention date].



Feed-water, heating.—A device for preventing over-heating of feed-heaters in locomotive and like engines comprises a direct connection *k* with the boiler below the water level, provided with a non-return valve *n*. A manually-operated valve *l* or a valve controlled by the pressure in the feed heater *b*, may also be provided, the arrangement being such that, for example during firing up, water will flow from the boiler to the feed heater. In addition, dampers *g* shielding the heater *b* and *d*, *e*, opening a direct passage for the hot gases, may be operated simultaneously with the valve *l*. The feed-heater is arranged so as to be wholly below the water level in the boiler.

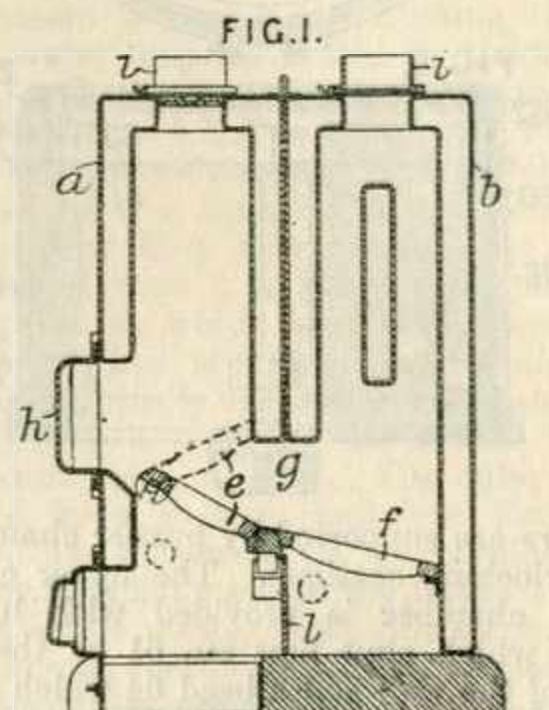
201,888. Erste Brüner Maschinen-Fabriks-Ges. Aug. 5, 1922, [Convention date].



Feed-water, heating.—The whole or part of the hot water from an economizer is collected in a storage chamber under a pressure lower than the boiler pressure. The chamber serves as a low-pressure steam regenerative accumulator and receives excess hot water and steam from the boilers, engines and other steam consumers in the plant. Excess water from an economizer *1* passes into a storage chamber *4* consisting of two intercon-

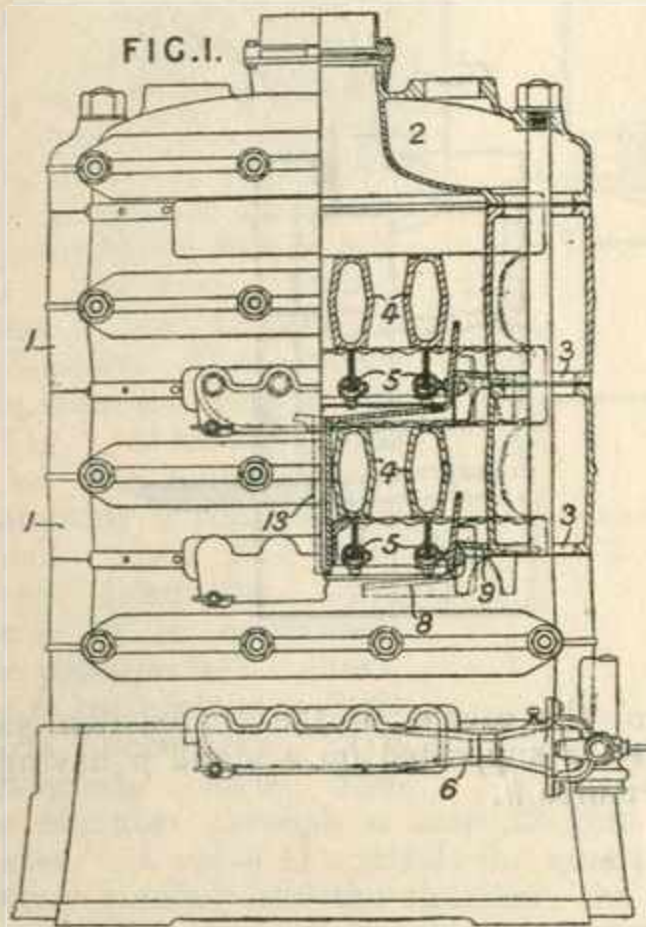
nected drums through a pipe *5*. Hot water or steam from the other parts of the plant enters the chamber through a pipe *13*. Low-pressure steam taken from the chamber is passed through a dryer *12*. Hot water withdrawn from the chamber through a pipe *8* is supplied either directly or through the economizer to the boilers or other hot-water consumers. In a modification, two economizers working at different pressures and connected together through a pump are each connected to a low-pressure storage chamber.

202,018. Procter, E., and Walton, H. May 8, 1922.



Compound boilers.—Relates to combined tandem boilers for domestic hot-water and low-pressure heating systems, and comprises a pair of boilers bolted together with the furnaces in direct connection and having a common firegrate, the front portion serving the front boiler only when the back boiler is not in use. A pair of boilers *a*, *b* are bolted together and have fireboxes communicating at *g* over a common set of firebars *e*, *f*. When the heating-system boiler is not in use, the bars *e* are swung up to act for the front hot-water boiler. A division plate *l* separates the two ash-pits, each having a draught inlet. The uptakes *i* have dampers which, with the draught doors, are used to regulate the heating in the two units. In a modification, the main grate *e* has a front dead portion which is removed and replaced by front upper bars when the front boiler only is to be used. The front boiler may have cross water tubes. Specification 3947/00 is referred to.

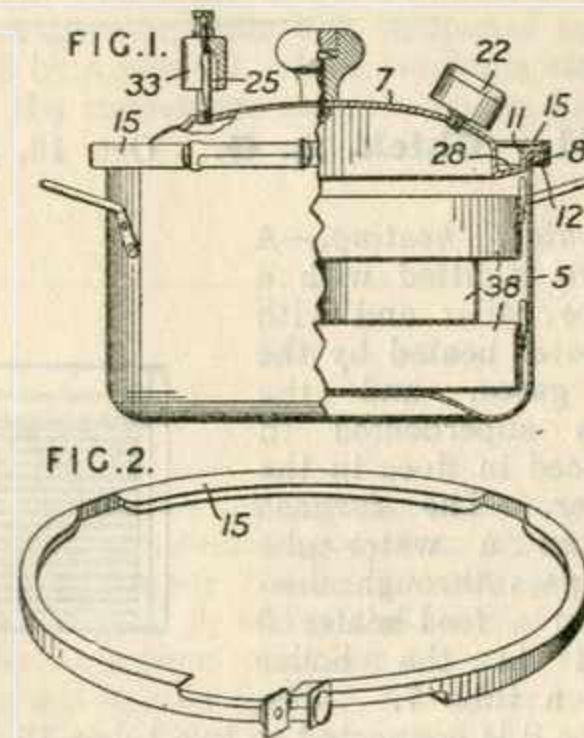
202,095. **Keith & Blackman Co., Ltd., J., and Keith, G.** June 2, 1922.



and surrounding a cylinder 2, through which water and cylinder steam is passed during the normal working of the apparatus, the cylinder 2 having doors 13 at top and bottom so that a blow lamp can be inserted within it to heat the oil when no steam is available. The ends of the cylinder 2 project beyond the top and bottom walls of the tank 1, the lower end having a collar 3, which, with an oil-tight joint 17, closes the lower end of the oil chamber 15, and the upper end having lugs 4, over which collars 7, 6, 5, having recesses to pass the lugs, are passed and turned so that the upper end of the chamber 15 may be closed by screwing down screws 8. The lugs 4 are of such a length that, on loosening the screws 8, the cylinder 2 may be withdrawn through the bottom of the tank 1 for cleaning purposes. Oil is led to and from the chamber 15 through pipes 9, 10 and steam to and from the tank 1 and cylinder 2 respectively valve-controlled pipes 11, 12 and 14, 19 respectively.

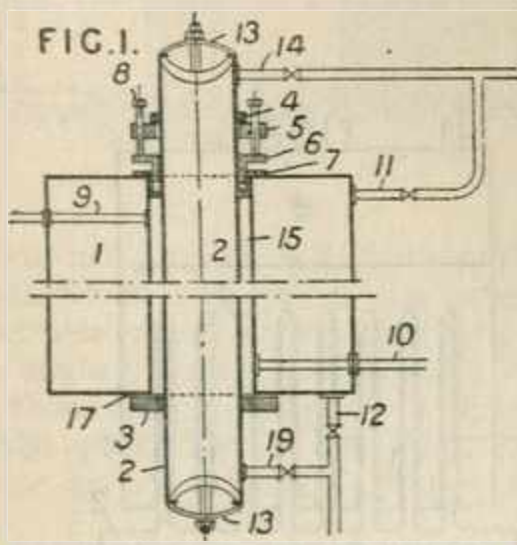
Internally-fired boilers.—The main heating-surface of the boiler comprises superposed horizontal sections 1, surmounted by a dome 2 and having water ways 3 jointed at each side only. Tubular burners 5 extend beneath cross-tubes 4. Below each set of burners 5 a tray 8 with turned-up ends is arranged to fit the casing tightly at its ends, to divert products of combustion rising from the burner below. At the sides adjustable plates 9 control the draught and the amount of secondary air admitted to the burners. Drain tubes 13 pass out any condensate from each tray.

202,348. **Vischer, A.** March 20, 1922.



Digesters have the body and cover formed of metals having different coefficients of expansion so that a sealing contact is formed at super-normal temperatures. The body 5 may be of steel and the cover 7 of aluminium. The body has a bead 12 and rolled edge 8 and the cover is formed with an annular recess 28 and outward flange 11. At normal temperatures the cover can be readily placed in position or removed but at high temperatures a sealing contact is made between the head 12 and flange 11. A resilient ring 15 is normally placed around the flanges 8 and 11, as shown. The lid is fitted with a pressure gauge 22 and a safety valve consisting of a weight 33 resting on the open end of a tube 25. Staggered pans 38 are placed within the container.

202,340. **Siciliano, A.** Feb. 25, 1922.



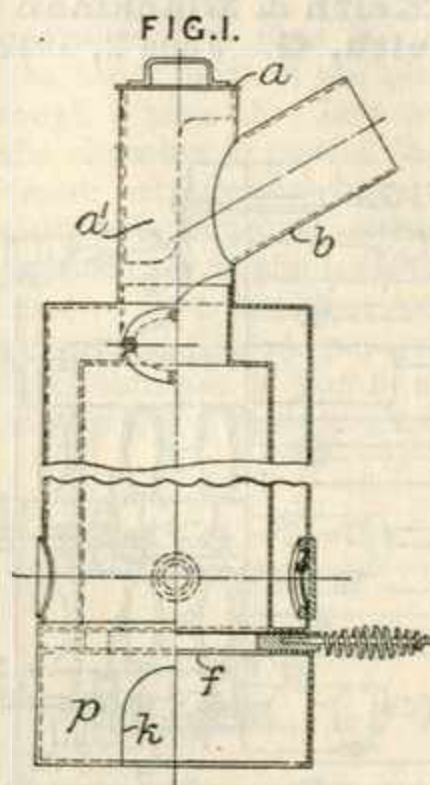
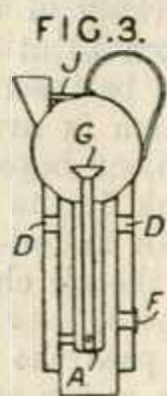
Heating liquids.—An oil heater comprises an annular oil chamber 15 surrounded by a tank 1



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202,375. **Ford, R. M.** May 10, 1922.

Portable liquid - heaters. — A kettle or water-heating vessel is formed in one with a water-jacketed sheet-metal lamp chimney provided with flues D for egress of the flame gases and with a mica-covered aperture F for inspection purposes. The vessel may have a connection tube G disposed as shown, within the depending part and a tube J connecting the spout to the body.



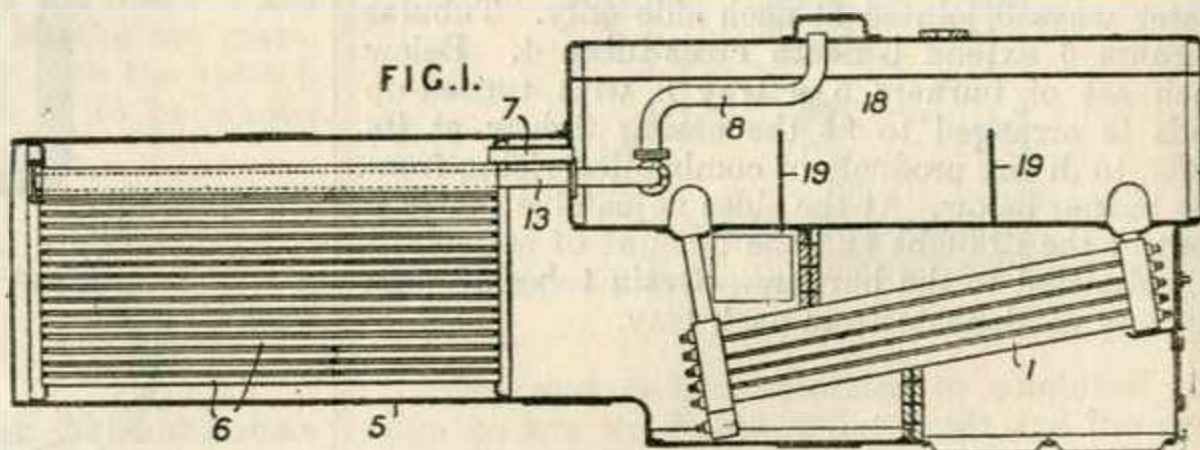
202,396. **Carter, E.** April 21, 1922.

Internally-fired boilers.—An annular vertical boiler has a removable sliding grate f, and the cover a closing the fuel-feed opening at the top of the boiler is made with an extension a¹ which may be slid in front of the entrance to the flue b

to control the escape of the combustion gases. The boiler is supported on a stand p having air inlet apertures k.

202,551. **Chick, A. G.** Oct. 16, 1922.

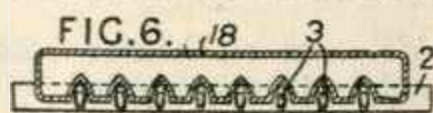
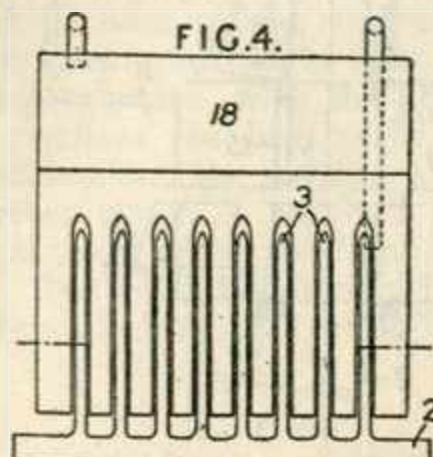
Feed-water, heating.—A locomotive is fitted with a water-tube boiler and with a feed-heater heated by the furnace gases, and the steam is superheated in tubes placed in flues in the feed-heater. The furnace gases from a water-tube boiler 1 pass through flue-tubes 6 in a feed-heater 5 connected to the boiler drum by a tube 7. The steam pipe 8 is connected to two tubes 13 extending through flue tubes in the feed-heater.



Block-form boilers.—A boiler 18 for use at the back of an incandescent gas fire may be provided with vertical recesses in which lie the laterally-perforated tubular burners 3.

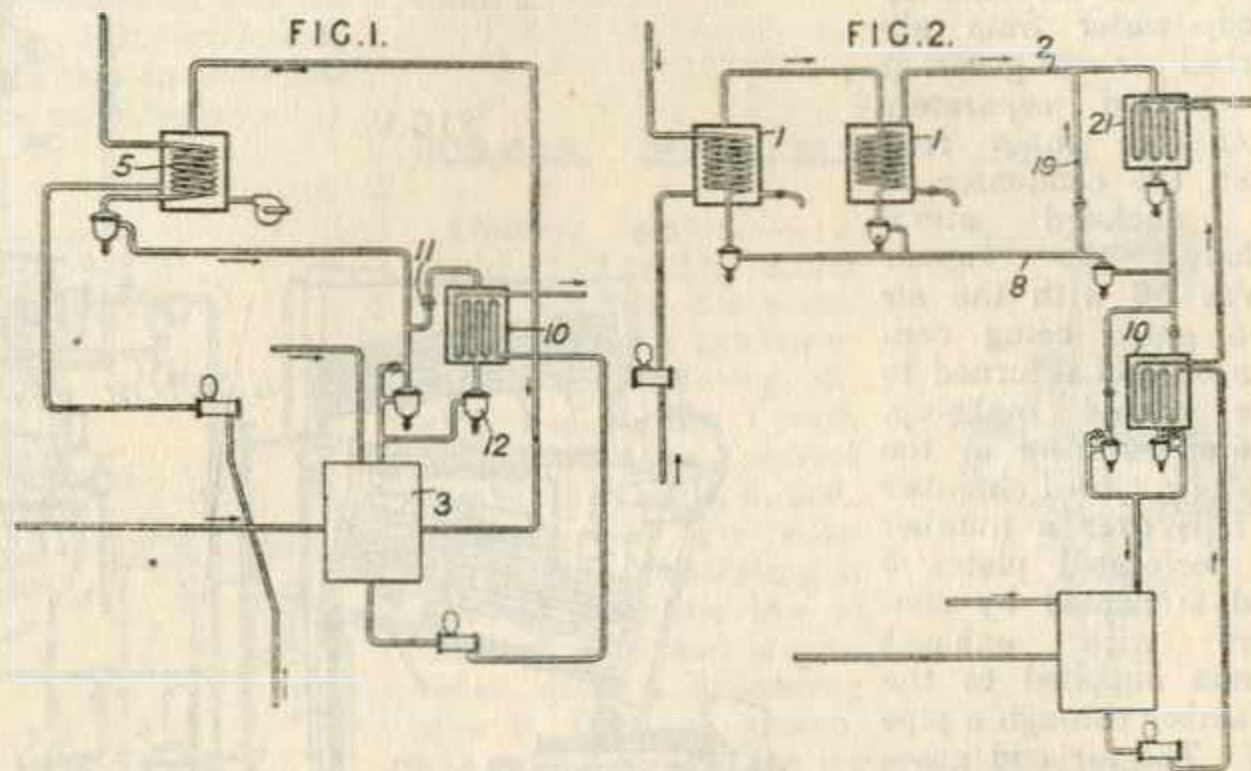
202,716. **Mill, A. G.** May 23, 1922.

Block-form boilers.—A boiler 18 for use at the back of an incandescent gas fire may be provided with vertical recesses in which lie the laterally-perforated tubular burners 3.



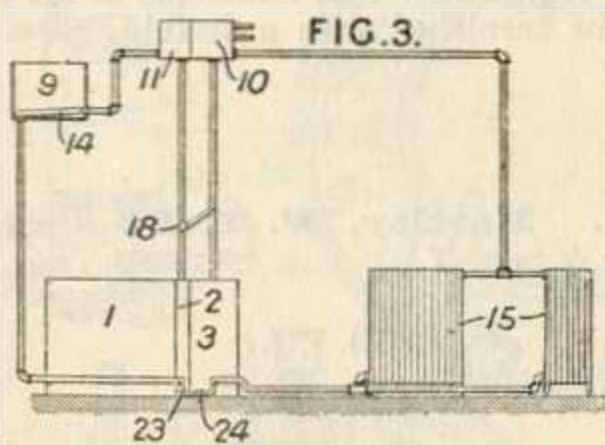
202,944. **Griscom-Russell Co.**, (Assignees of *Sebald, L. E.*). Aug. 24, 1922, [Convention date].

Feed-water, heating. — In a combined evaporator and feed-heating system, the condensate from the evaporator is conducted into a chamber under relatively low pressure and the resulting flashed steam is used to heat the feed-water. The condensate from the heating coil 5, Fig. 1, of an evaporator is led into a chamber 10 containing a coil through which the feed-water taken from an open heater 3 is conducted. The pressure in the chamber is maintained a little above atmospheric. The condensate passes from the chamber through a trap 12 into the open heater. A valve 11 controls the quantity of condensate passing into the chamber, the remainder passing directly into the open heater. Vapour from the last element of a multiple-effect evaporator 1, Fig. 2, passes through a chamber 21 con-



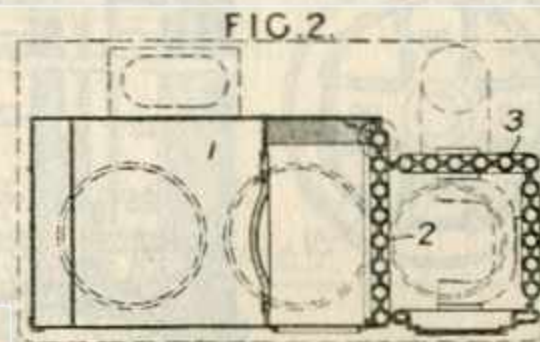
taining a feed-heating coil, the condensate passing from the chamber into the low-pressure chamber 10, into which the evaporator condensate is led. The evaporator drain 8 is connected to the steam pipe 2 by a pipe 19, which conducts steam flashed from the condensate into the steam pipe.

202,965. **Courtot, L.** Aug. 23, 1922, [Convention date].



Heating water; boilers.—In a combined kitchen range and boiler, one side of the range 1 is formed by a tubular panel 2 for providing a hot-water supply, against which is disposed a boiler 3 comprising three tubular panels in horse-shoe disposition. The panel 2 may thus be heated either by the range or by the boiler fire, or by both to-

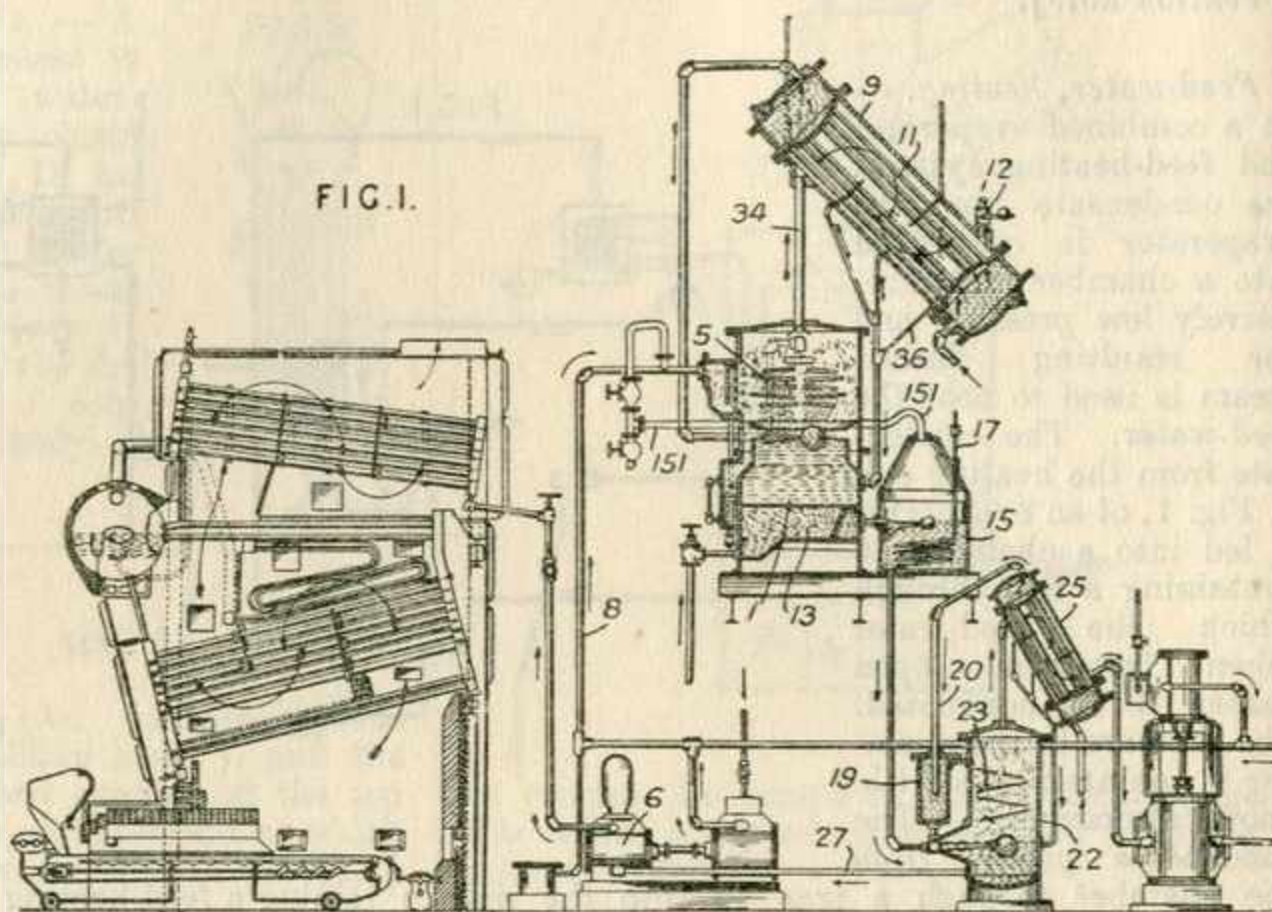
gether. In the arrangement shown, it is connected to a circulating system including an expansion chamber 11 and a heating-coil 14 in a hot-water tank 9, whilst the boiler 3 is connected to the expansion chamber 10 and radiators 15. By means of a by-pass 18, the water heated in the



panel 2 may be wholly or partly circulated through the radiators 15, returning through a pipe 23, which connects the return flow orifices of the boiler and panel. A non-return valve 24 may be provided in this pipe to prevent back-flow from the panel to the boiler.

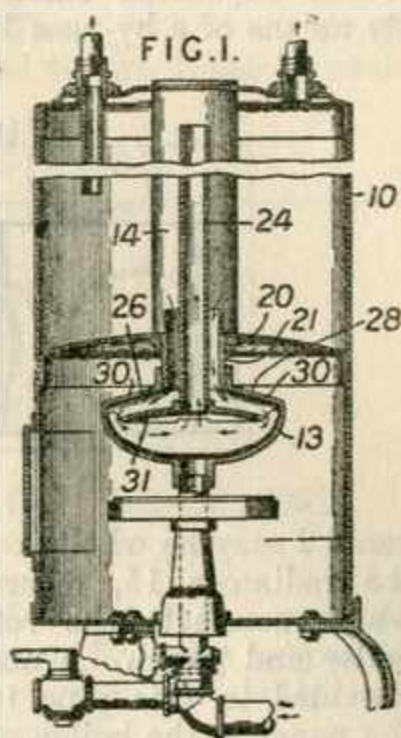
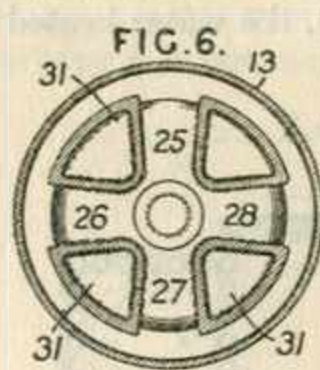
Feed-water, heating.

— To free make-up feed-water from absorbed air and gases, it is heated separately from the main feed from the condenser in an enclosed atmosphere, the vapour given off with the air and gases being condensed and returned to the heated make-up. Water entering at the top of a closed chamber 1 falls over a number of perforated plates 5 and is heated by contact with exhaust steam supplied to the chamber through a pipe 8. The air and gases liberated from the water together with steam flow through a pipe 34 to a condenser 9 traversed by tubes 11, through which the make-up water is passed before entering the heating chamber. The air and gases pass off through a valve 12, and the condensed steam returns to the heating-chamber through tubes 36. The water passes through a filter 13 to a vessel 15, in which the water is further heated by live steam admitted through a pipe 17. Vapour is led off from the vessel 15 through a pipe 151 connected to the exhaust steam supply pipe 8. The make-up flows from the vessel 15 into a tank 19, in which it is mixed with the main feed enter-



ing the tank through a pipe 20. The mingled water enters a chamber 22 under reduced pressure and flows over a number of perforated plates 23. The vapour together with the air and gases drawn off from the chamber 22 pass into a condenser 25 traversed by tubes, through which the main feed flows before entering the mixing tank. Water passes from the bottom of the chamber 20 to the feed pump 6 through a pipe 27. The condenser 9 may be arranged vertically above the chamber 1. The water may be taken to the feed-pump directly from the mixing-tank.

203,159. Withers, J. S., (Bastian-Morley Co.). Aug. 14, 1922.

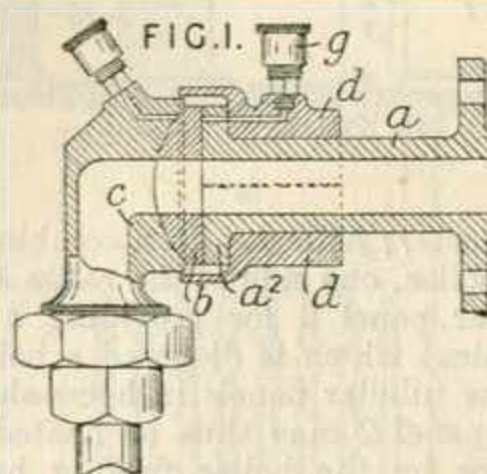


Block-form boilers.

—A tank 10 through which a flue 14 extends is provided with a depending chamber 13 connected to the tank by a wide pipe 21. The chamber 13 is fitted with a spreader 31 between which and the upper surface 30 of the chamber are formed a number of separate radially extending water inlet passages 25 - - 28. The lower part of the chamber

communicates with the upper part of the tank 10 by an outlet pipe 24. The underside of the chamber may be furnished with a draining pipe.

203,181. Hartley, W. T. D., (trading as Hartley & Son, T.). Aug. 29, 1922.



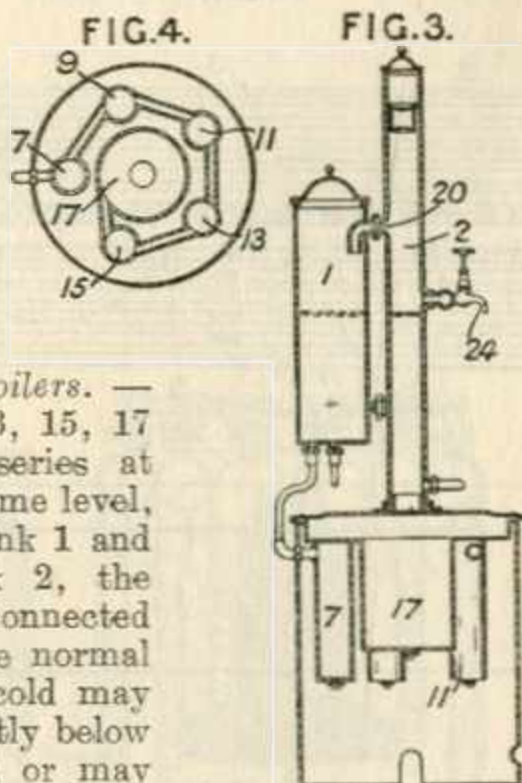
Set pans.—The trunnion or trunnion fitting *a* of a steam-heated pan has an end flange *a²* seating upon a ring *b* which may have, as shown, a single ground spherical face or may have both



faces spherical. The steam supply fitting *c* has a corresponding seating and the whole is held together by spring-pressed bolts passing through a split sleeve *d*, mounted on the trunnion, and the fitting *c*. For additional security, bolts are loosely fitted to lugs on the fitting *c* and lugs on the edges of the sleeve *d*. Greasers *g* are provided to lubricate the abutting surfaces.

secured in the lugs or in the back wall of the header. Radial partitions 17 in the header direct the water backwards and forwards through the tubes 2.

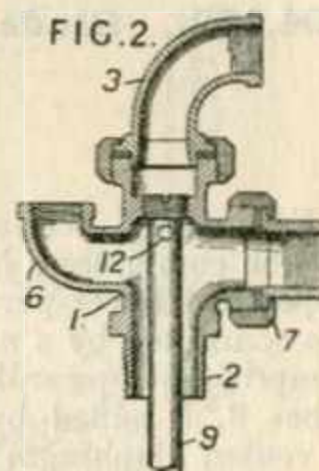
203,211. **Darby, E.** Oct. 9, 1922.



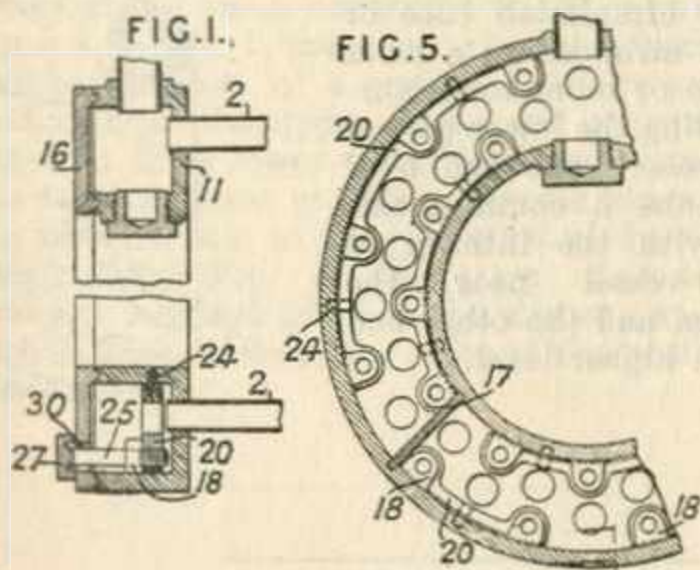
Block - form boilers. — Tanks 7, 9, 11, 13, 15, 17 are arranged in series at substantially the same level, fed by a supply tank 1 and deliver to a tank 2, the vessels 1, 2 being connected by a pipe 20. The normal water level when cold may be, as shown, slightly below the outlet cock 24 or may be above it.

203,613. **Heim, H. E.** Jan. 11, 1923.

Heating water. — A fitting for mixing cooler water with the hot water at the top of a hot-water tank when drawing off, comprises a body 1 with connections for service pipe 3, relief valve 6, and, in some cases, for boiler flow pipe 7. The fitting is screwed into the top of the tank at 2 and is provided with a depending pipe 9, fixed as shown, and extending into the water a short distance. In operation, the water drawn off through the pipe 3 consists of cooler water from the body of the tank drawn through the pipe 9, mixed with some of the hottest water which passes through a hole 12. The pipe 9 may be smooth or spirally corrugated.

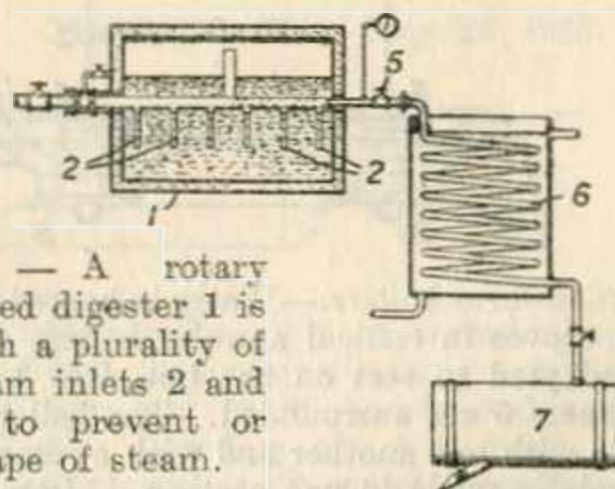


203,398. **Perlowski, B.** June 7, 1922.



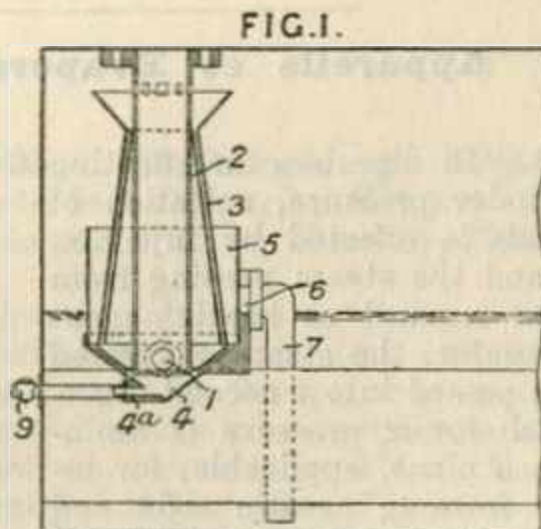
Feed-water, heating. — To prevent the bolts securing the cover to a header of a feed-water heater from becoming fast by burning, water is allowed to pass through passages in the cover and enter recesses or grooves in the bolt heads. The cover 16 is secured to the annular header 11 by bolts 25 having annular grooves 27 into which water may flow from the header through openings 30 in the cover. The bolts pass through lugs 18 on the header walls and engage in screwed holes in segmental members 20. These members are preferably made of copper, and are held in position by small screws 24. Alternatively, the bolts may engage in screwed copper or brass bushes

203,691. **Quaker Oats Co.,** (Assignees of Miner, C. S., and Brownlee, H. J.). Sept. 7, 1922, [Convention date].



Digesters. — A rotary steam jacketed digester 1 is provided with a plurality of pipes or steam inlets 2 and a valve 5 to prevent or regulate escape of steam.

204,103. **Todd, I.** April 18, 1923.



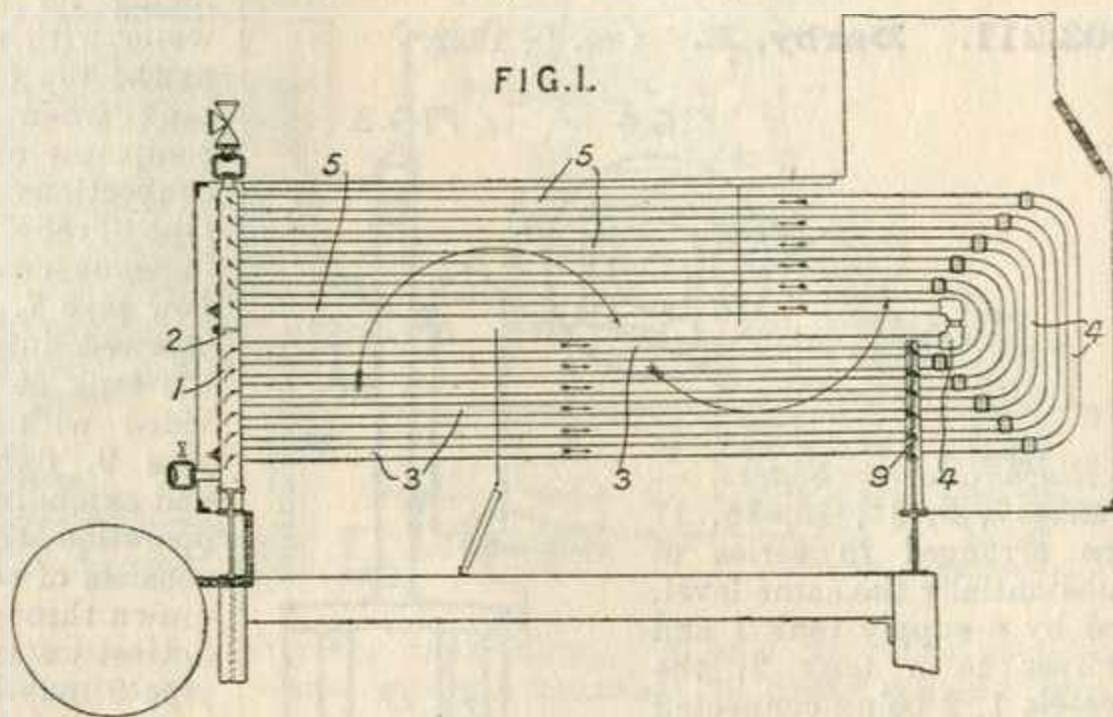
Feed-water, heating.—Apparatus inside a boiler

separating scale-forming matter from the feed-water comprises a feed pipe 1 discharging into a pipe 2 of larger bore, or a chamber, wherein the rate of flow is reduced and scale-forming matter separated by the heating of the water, the water and separated matter passing from the pipe 2, or chamber, into a jacket 3 formed round same at

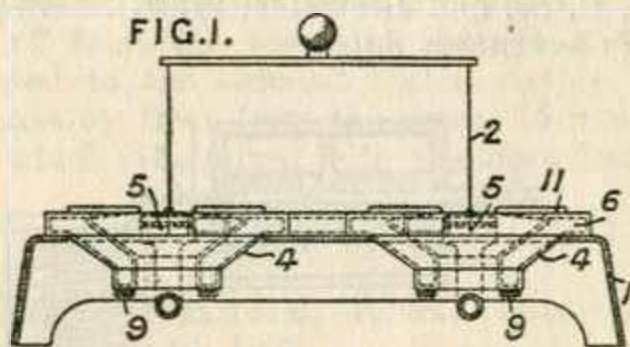
the bottom of which a collecting pan 4 is provided having an outlet 4^a connected to a blow-off valve 9 outside the boiler. The collecting pan is extended upwardly at 5 and is provided with a discharge opening 6 leading directly, or by a passage 7, to the water space of the boiler.

204,162. Slade, H., and Green & Son, Ltd., E. July 15, 1922.

Feed-water, heating. — Each section comprises a header 1 the upper and lower parts of which are connected by a nest of tubes comprising upwardly inclined tubes 3, 5 joined by elbows 4. A vented diaphragm 2 separates the parts in each header. Supports 9 for the rear ends of the tubes are provided.



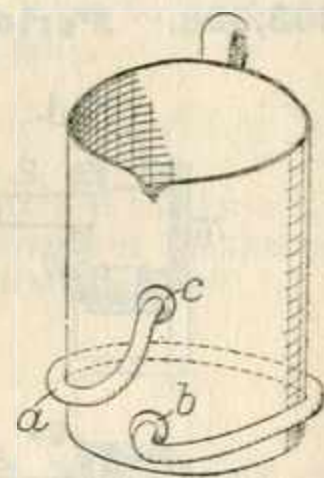
204,334. Ulli, A. Sept. 25, 1922, [Convention date].



Slab-form boilers. — Water is heated in gas cooking-stoves in conical annular boilers 4 with edges 6 adapted to rest on the hot-plate 1 so that the burners 5 are surrounded. The boilers communicate with one another and with a reservoir 2. The whole is made in one casting. Bars 11 for supporting cooking vessels above them and drain plugs 9 at the lowest parts of the boilers are provided.

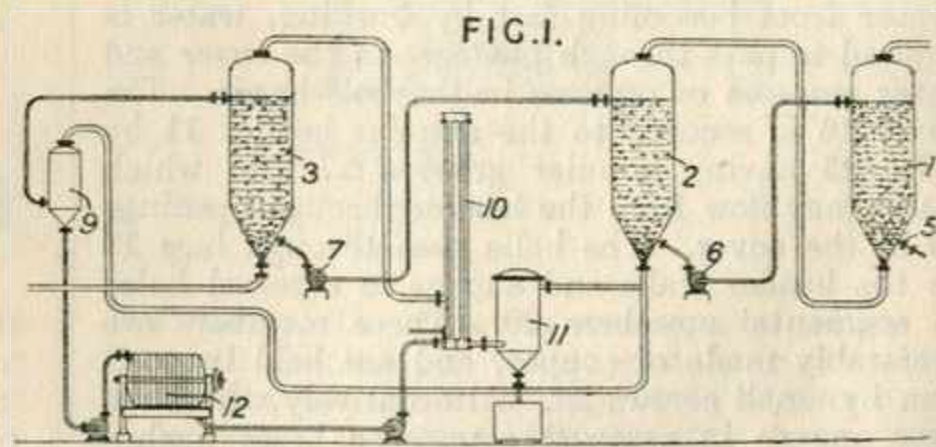
204,655. Whitaker, H. April 27, 1923.

Boilers. — A water-heating vessel has an external water circulation tube or tubes arranged as a helix of one or more turns surrounding the lower part of the vessel, one end *b* of the tube *a* communicating with the interior of the vessel near the bottom and the other end *c* at a higher level.



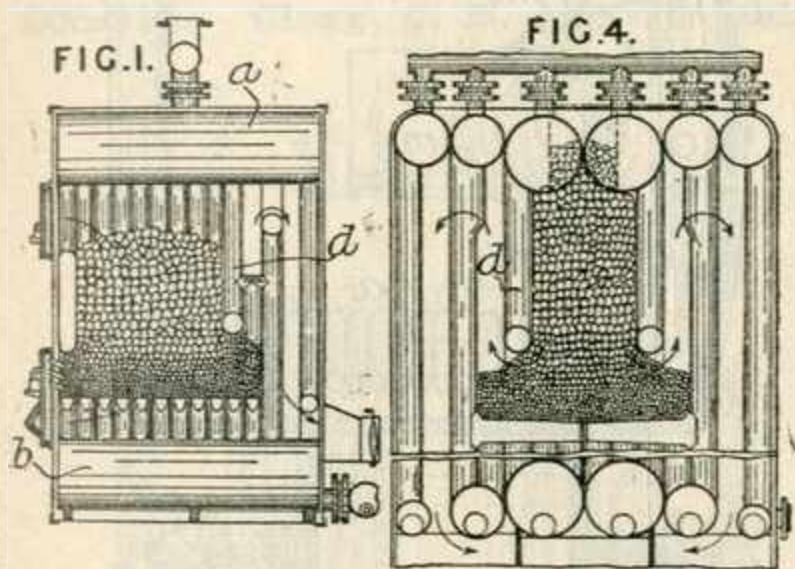
204,670. Appareils et Evaporateurs Kestner. Sept. 28, 1922, [Convention date].

Digesters. — In digesters for effecting reactions under pressure, agitation of the materials is effected by injection of steam, and the steam passing from the digester is used as heating-agent in an evaporator, the steam generated in which is passed into a second digester in which lower pressure is maintained. In a plant, applicable, for instance, for forming caustic soda and evaporating the solution obtained, liquid is fed in succession through



digesters 1, 2, 3, from an inlet 5 by pumps 6, 7 between the digesters, and thence to an expansion chamber 9, a filter 12 and an evaporator comprising a tubular heater 10 and a vapour-separator 11. Steam is injected into the lower end of digester 3, and passes from its upper end into the evaporator. The steam generated in the evaporator passes from the separator 11, together with steam from the expansion chamber 9, into the base of digester 2, and from the top of this digester into the base of digester 1. The steam from the digester 3 may be compressed by a rotary or a jet compressor before use in the evaporator.

204,700. Rheinische Stahlwerke Abt. Röhrenwerke. Sept. 30, 1922, [Convention date].

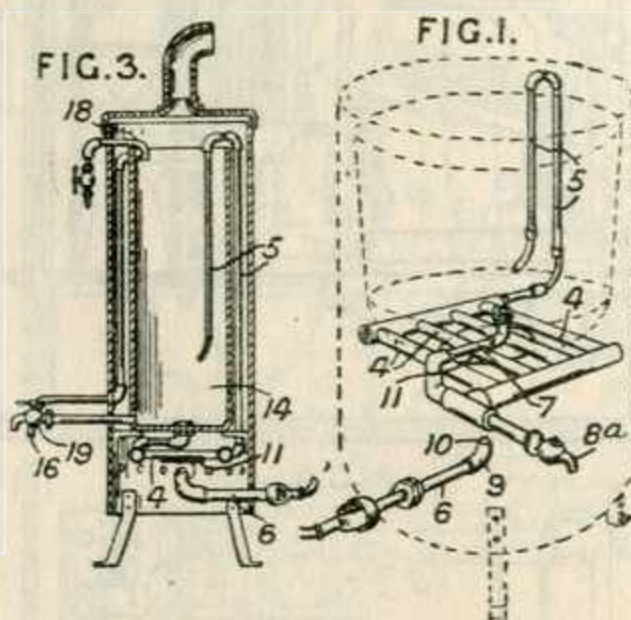


Water-tube boilers.—In a boiler having rows of closely placed tubes connected to upper and lower drums *a, b*, Fig. 1, the rear wall of the combustion chamber consists of a row of short tubes *d* depending from the upper drums and connected together at their lower ends by a horizontal tube. The furnace gases are thus directed downwardly into the entrance to the rear vertical flues. In a modification, Fig. 4, the rows of tubes are arranged longitudinally of the drums, and walls of short tubes *d* form the sides of the combustion chamber.

204,736. Ginger, H. April 5, 1922.

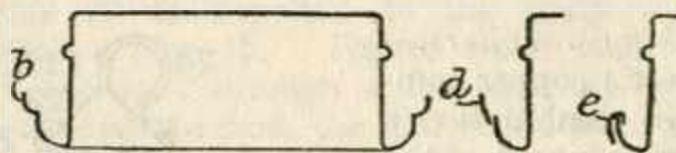
Portable and small liquid-heaters; water-tube boilers.—In a domestic copper or other water-heating appliance, an arrangement of tubes or piping having a water-outlet pipe connected to the central portion of the bottom of the water chamber and a water-discharge pipe passing up an annular space between the water chamber and an outer casing for the whole appliance and downwardly within the water chamber, is provided beneath the water-containing chamber and above the gas or other burner. The auxiliary tubular heater 4 which may be of spiral formation is connected by a pipe 7, bent to prevent back flow,

to the central portion of the bottom of the copper, and has a discharge pipe 5 passing upwardly between the exterior casing and the copper. The tubes are heated by a burner 6 having an air-mixing chamber 9, the flame being spread by a plate 11. A cock 8^a is provided for drawing off hot water. In Fig. 3, the auxiliary heater is



shown applied to a water heater or radiator, the boiler 14 being fed by a pipe 18 and hot water drawn off through the cock 19. An overflow pipe 16 is also provided. The steam generated in the auxiliary heater is passed below the surface of the water in the boiler by the pipe 5 and is condensed prior to the water in the boiler reaching the boiling point.

204,846. Davis, A. R. Aug. 25, 1922.



Heating water.—The cups of cascade heaters are provided with means for directing water away from the casing and on to the heated surface below. When a secondary rim *b* is fitted, holes are formed at intervals with metal pressed out as at *d* to form shields. Where no secondary rim is present the upper edge of the rim is serrated and an annular rim *e* is placed over the serrations.

204,985. Babcock & Wilcox, Ltd., (Deutsche Babcock-&Wilcox Dampfkessel-Werke Akt.-Ges.). Dec. 28, 1922.

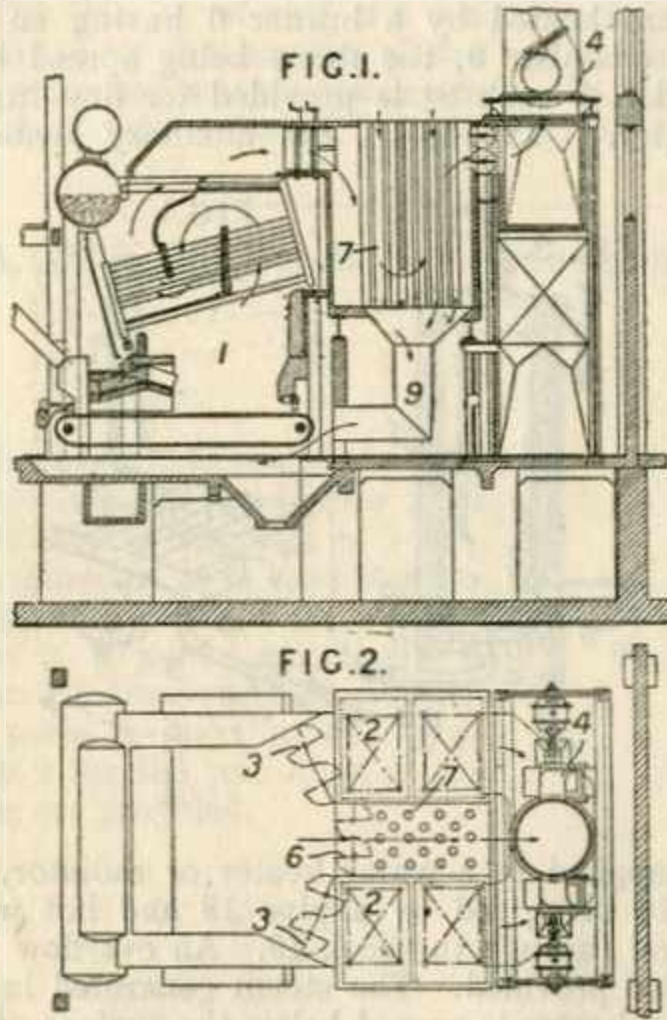
Feed-water, heating.—A steam boiler is provided with two feed heaters and an air heater, and the flow of the flue gases is so controlled that they may be directed through the heaters either alternately or simultaneously. Feed heaters 2 are arranged at the sides of a tubulous air heater 7 in the path of the gases from a water-tube boiler 1. Separately operated sets of dampers 3, 6 con-



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control the passage of the gases through the heaters. When the feed is stopped, the dampers 3 are

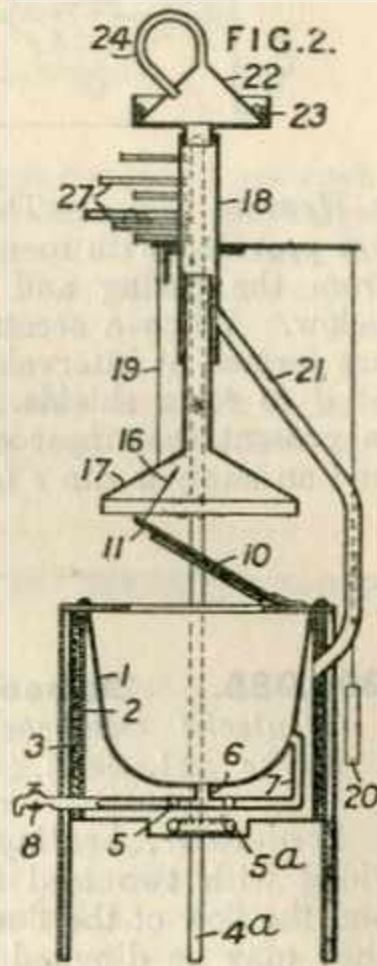


closed and the gases are drawn by the fan 4 through the air heater alone.

204,997. Pearce, F. R. R. J. Jan. 17, 1923.

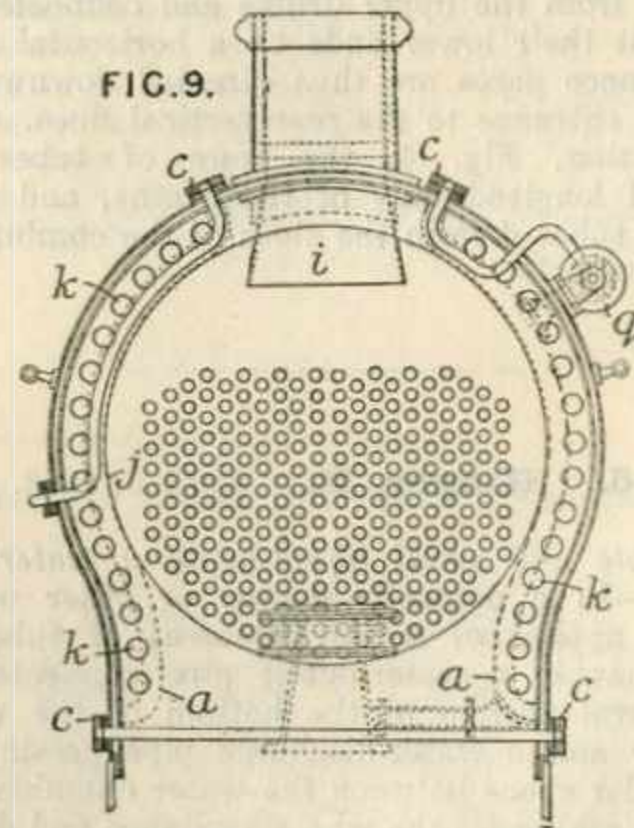
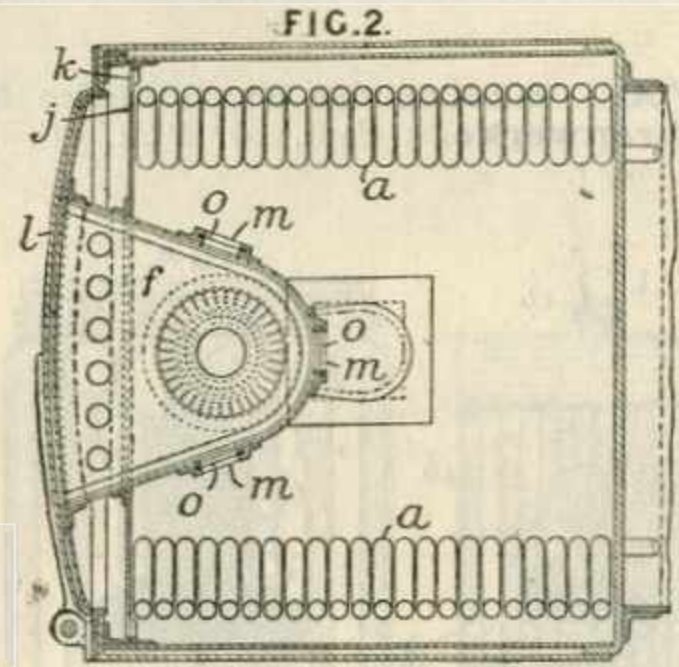
Washing - boilers.—

A domestic copper comprises in combination a circulating ring 5 of the kind described in Specification 189,713 heated by a gas ring 5^a and connected to the copper 1 by pipes 6, 7, a draw-off tap 8 on the water circulation, a casing 3 supporting the copper lined with asbestos, reinforced cement or like insulating material 2, a hinged lid 10 connected to a funnel-shaped exhaust 17 for the steam, an extension 18 of the exhaust having a conduit 21 leading back to the casing and carrying a vapour-condensing appliance 22, a framework fitted with clothes racks 27, and means, such as hooks, for carrying a scrubbing-board. The lid 10 is preferably lined with asbestos and connected to the exhaust 17 by



a cord 16, the whole being counterbalanced by a weight 20 connected to a cord 19 passing over pulleys. The vapour-condensing appliance consists of a cone 22, which is supported in a tray 23 containing charcoal or like absorbent material and ends in a tubular passage 24 leading back to the tray 23. The rods 27 are carried by extensions of the legs 4^a supporting the casing 3, such extensions also serving as guides for a transverse bar attached to the exhaust 17 and guiding its movements.

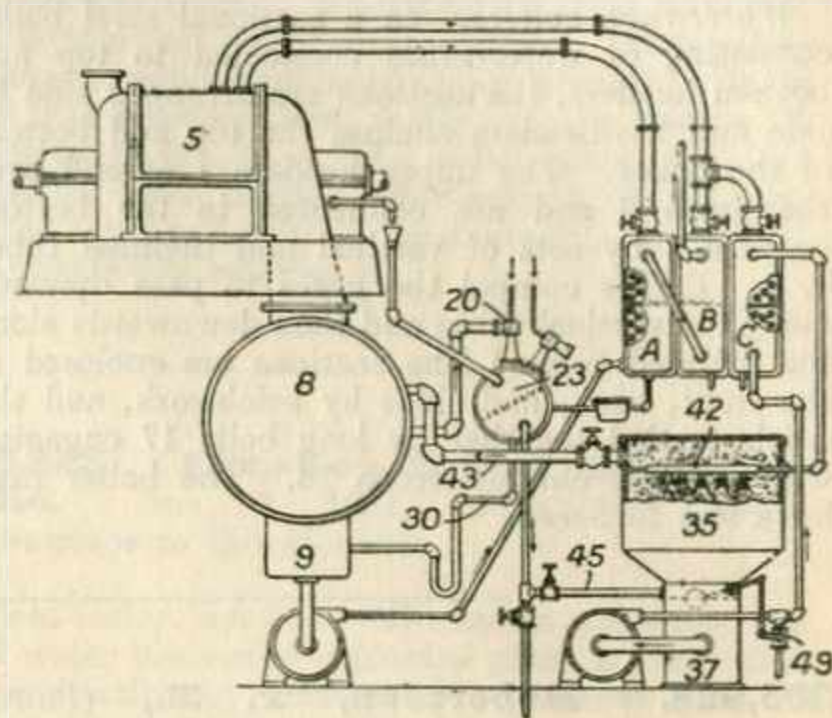
205,175. Trevithick, F. H. July 10, 1922.



Feed-water, heating.— In locomotive and like boilers feed-heating tubes *a* at either or each side of the smokebox are connected to inlet and outlet headers such as *c*, Fig. 5, external to the smoke-

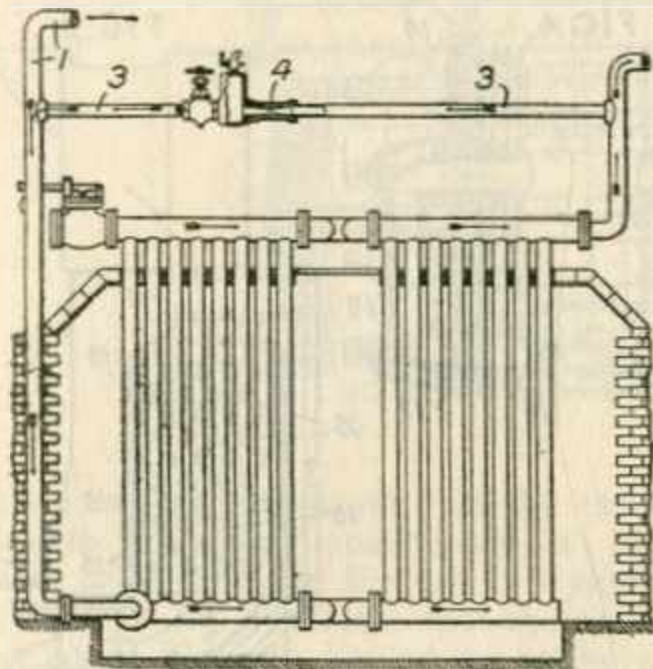
box shell. The tubes *a* are joined to the headers *c* by tubes of reduced diameter which deliver through smaller holes *e* in a plate *d* to distribute the feed-water equally. In the example shown, flue gases pass from the fire tubes, between the tubes *a* and forward between them and the smokebox shell, through apertures *k* in a plate *j* to the interior of a chamber *f* mounted on the smokebox door *l*. When the door is closed the chamber connects the blast pipe with the chimney *i*. During firing-up, direct access to the chimney is provided for the hot gases through holes *m* in the chamber wall, covered ordinarily by plates *o*. The water can be preliminarily heated in an exhaust steam heater *q* of tubular form supported on the boiler shell, supplied with steam from the blast pipe by one of the tubes *a* suitably connected.

205,409. British Thomson-Houston Co., Ltd., (General Electric Co.). Jan. 2, 1923.



Feed-water, heating.—In a steam power plant, the steam space of the evaporator for the supply of make-up feed-water is connected to the main condenser, and the make-up is heated before entering the evaporator by steam taken from a point of intermediate pressure in the prime mover. Water is drawn from the well 37 of an evaporator 35 and passed through the tubes of a heater C supplied with steam taken from a turbine 5. The heated water is sprayed into the evaporator through a perforated pipe 42, and is flashed into steam, which passes into the main condenser 8 through a pipe 43. The water used for cooling the turbine bearings and as the cooling water in the condenser 23 of a two-stage steam-operated air ejector 20 is supplied to the evaporator well through a pipe 45. Excess water is discharged from the well through a flat-operated valve 49. The condensate from the main condenser is forced through tubulous heaters A, B supplied with steam taken from the turbine. Condensate from the condenser 23 is led through a pipe 30 into well 9 of the main condenser.

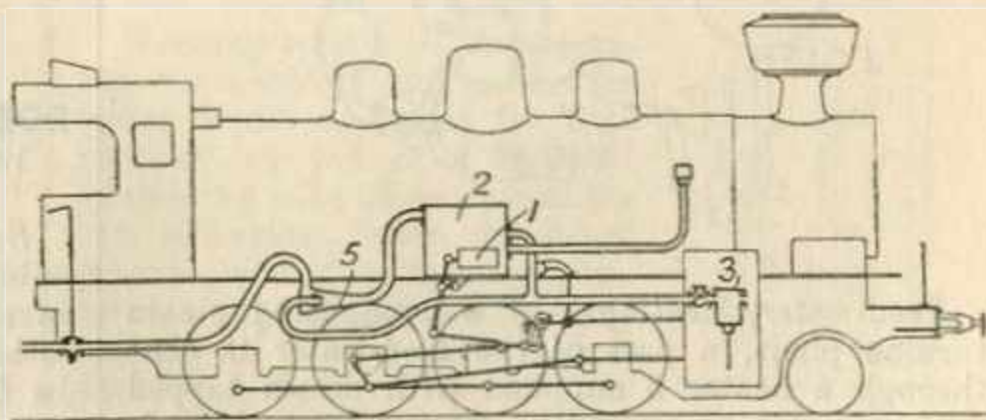
205,315. Clegg, C. H. Sept. 30, 1922.



Feed-water, heating.—In means for supplying a part of the hot outflow water from an economizer to the cold-feed inlet 1 a cone or nozzle 4 is inserted in the branch pipe 3 at a distance from the junction with the cold-feed pipe.

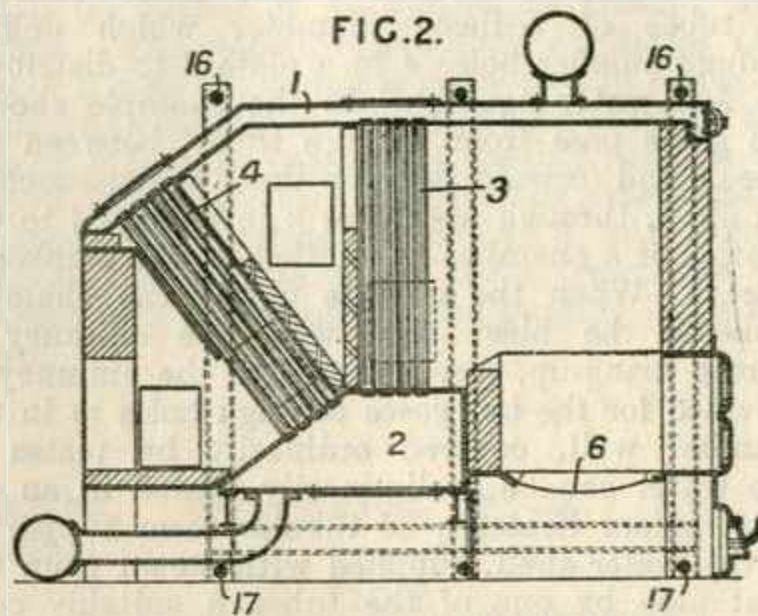
205,468. Muchka, J. Oct. 10, 1922, [Convention date]. Void [Published under Sect. 91 of the Act].

Feed-water, heating.—Feed-water is delivered into a direct-contact heater 2 by an injector 5 operated by the engine exhaust, which is taken through an oil separator 3 and supplied partly to the injector and partly to the heater. The hot-water pump 1 is driven from the engine. The injector may be operated by live steam the supply of which is regulated by a valve connected to the engine valve gear.



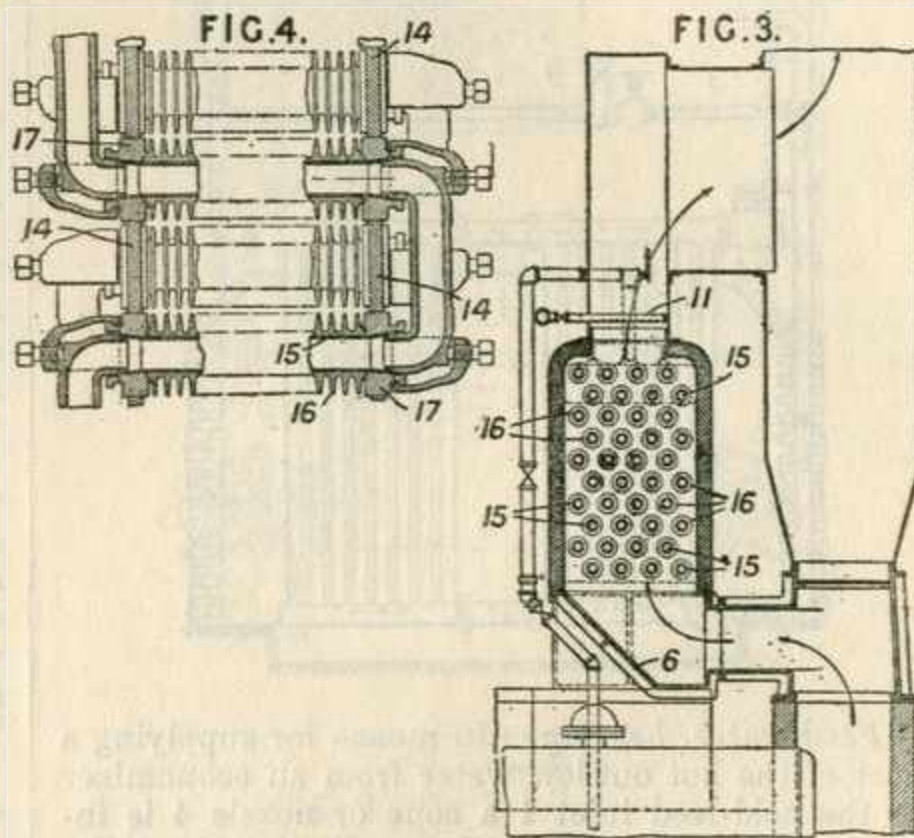
Hartley & Sugden, Ltd.,
Fox, S., and Waterworth, H. Sept. 6,
1922.

Water-tube boilers.—In a sectional steel boiler consisting of water-tubes connected to top and bottom headers, the sections are arranged side by side and the headers enclose the top and bottom of the boiler. The upper headers 1 extend over the grate 6 and are connected to the bottom headers 2 by sets of vertical and inclined tubes 3, 4. Baffles compel the gases to pass upwards along the vertical tubes and then downwards along the inclined tubes. The sections are enclosed at the front, back, and sides by brickwork, and the whole is tied together by long bolts 17 engaging with vertical channel irons 16. The boiler may have two furnaces.

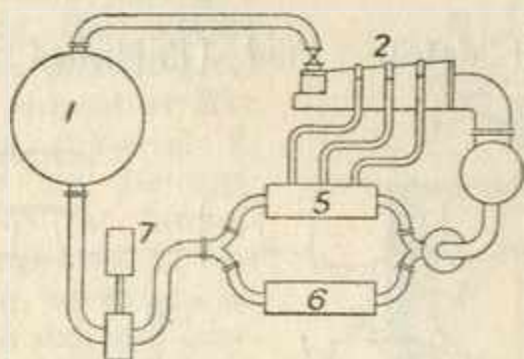


205,923. Robertson, T. E., (*Power Specialty Co.*) Aug. 5, 1922.

Feed-water, heating. — A bank of heating tubes 15 in corrugated protective casings 16 has mounted above it a system of water spray pipes 11 for washing the exterior of the pipes by sections; a pan 6 is arranged below for the used water. The side walls of the economizer may be corrugated to conform with the outline of the bank of tubes. The ends of the tubes 15 fit in cast-iron discs 17 which slide in holes in the tube sheet 14. Specification 200,060 is referred to.



206,211. Swinburne, J. July 28, 1922.



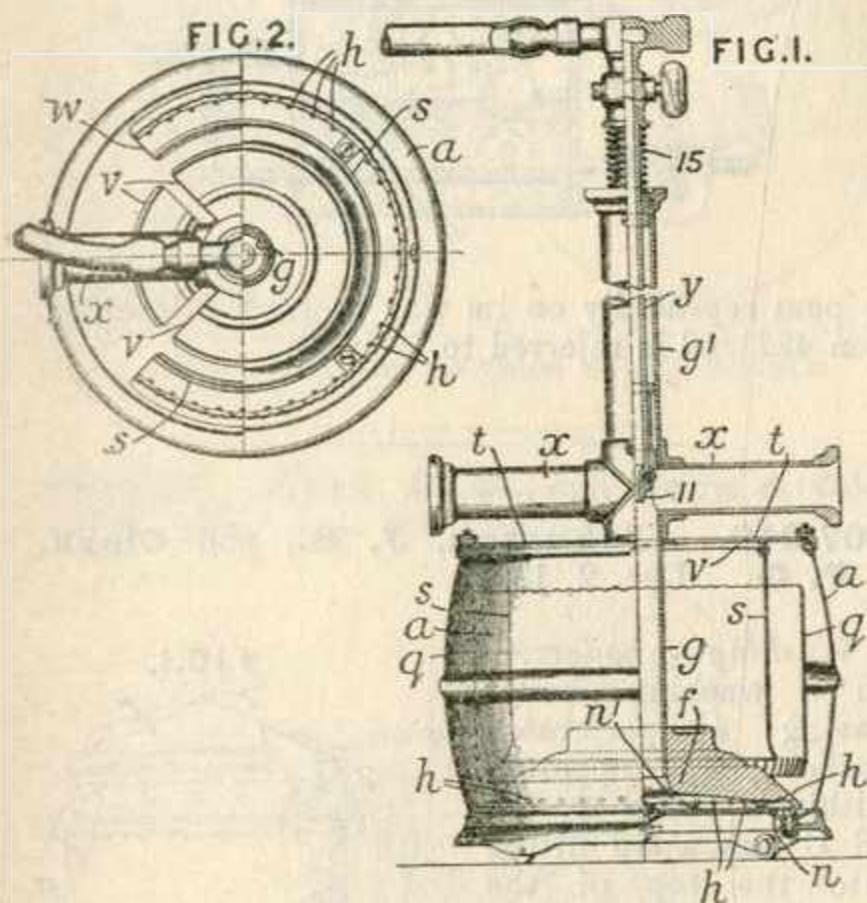
Feed-water, heating.—In a condensing steam turbine plant, a part of the feed-water is sent through a heater 5 supplied with steam tapped from one or more operative stages of a turbine 2, and the other part through a heater 6 heated by flue gases, the whole passing by the pump 7 to the boiler 1. The quantity passing through the

economizer may be regulated to ensure that its rise in temperature is approximately equal to the fall in temperature of the flue gases, and that the latter is constant for all conditions of working.

206,303. Boardman, E. E. Sept. 19,
1922.

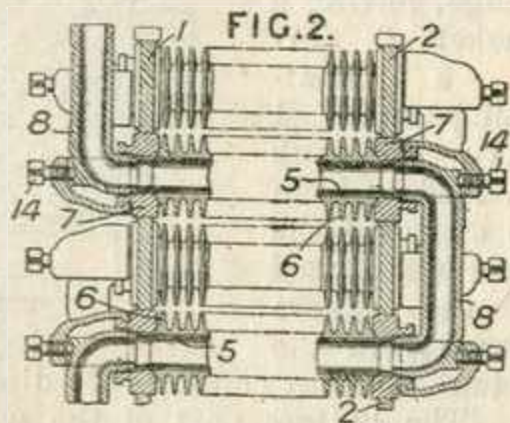
Submersible liquid-heaters. — In a gas-heated submersible liquid-heater having the burner arranged coaxially in the bottom of a casing *a* the latter is made substantially barrel-shaped and may be fitted with exterior and interior fins to facilitate heat transference. The burner is in the form of a frusto-conical casting *f* having a series of burner apertures *h* which direct the flames outwardly and upwardly against the slightly conver-

gent upper portion of the casing *a*. The lower portion of the casting *f* is fitted with a base plate or disc *n* forming a mixing-chamber *n*¹ with which the pipe *g* admitting gas and air communicates. Gas is led to the pipe *g* through an extension pipe *y* capable of sliding movement in a sleeve *g*¹ and of being depressed against the action of a spring 15. When the pipe *y* is depressed a conical nozzle 11 at its lower end enters into the pipe *g* and prevents admission thereto of air from the horizontal air-inlet branches *x*, thus facilitating initial light-



ing of the burners. The cover *t* of the casing is provided with two sets of apertures *v*, *w*, Fig. 2, the former admitting air through a cylindrical guide tube *s* past the burners *h* into the casing *a*, while the latter allow the heated air to leave the casing either directly on rising from the burners *h* or after circulating around a flame guard *q* which directs the flames and hot air against the casing *a*. The apertures *w* are located at the sides of the air-inlet branches *x*, whereby the latter are protected from the direct heat of the burner flames.

206,445. Robertson, T. E., (*Power Specialty Co.*). Aug. 5, 1922.



Feed-water, heating.—In heat exchange apparatus steel tubes 5 encased in cast-iron corrugated envelopes 6 and disposed across a passage for one

fluid carry plate-like members or discs 7 which fit into corresponding holes in one or both walls 1, 2 of the passage so that the tubes are axially displaceable and can be removed with their envelopes through the holes. Intermediate plate-members and supporting walls may be fitted. Removable headers or connecting beads 8 are pressed at their ends into tapering parts of the tubes by clamps 14 anchored in the discs. An outer casing may enclose the whole and the intervening space may be packed with non-conducting material. Specification 200,060 is referred to.

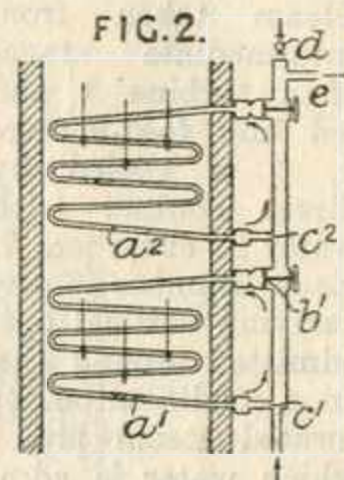
206,523. Akt.-Ges. Brown, Boveri, et Cie. Nov. 6, 1922, [Convention date].
Drawings to Specification.

Feed-water, heating.—The steam supply to the feed-water heaters of a turbine plant is controlled automatically by changes in pressure due to changes in the load on the plant.

206,525. Hartmann, M. & E. Nov. 6, 1922, [Convention date].

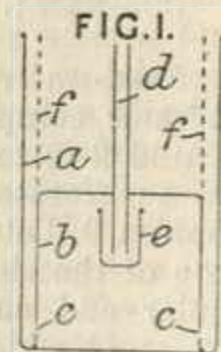
Feed-water, heating.

—In an economizer, a part of the water is circulated continuously through heating coils *a*¹, *a*² by a pump *b*¹ in such quantity in a given time that only a small rise in temperature occurs in the heating coils *a*¹, *a*², the main rise in temperature of the cold feed taking place in the vertical mixing pipe by contact with the already heated water. For this reason gases are liberated only outside the heating coils and escape by the vent *d*. Specifications 27311/06 and 1026/14 are referred to.



206,600. Burn, L. Aug. 11, 1922.

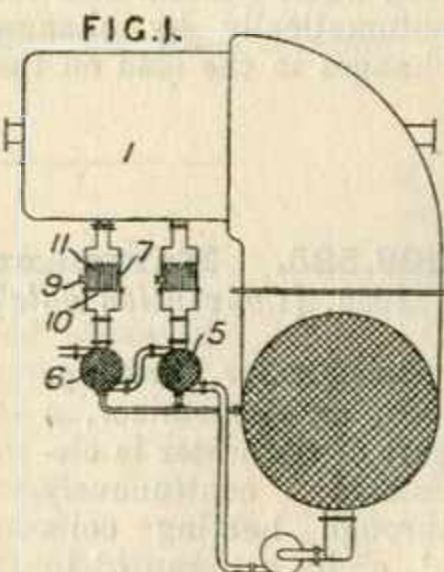
Washing-boilers.—In apparatus for washing clothes &c. in which liquid is forced by fluid pressure up out of a chamber containing a liquid seal until the seal is broken, when the liquid returns and the cycle recommences, the liquid seal is contained in an open-bottomed dome or bell, in which the fluid pressure is generated, or into which it is introduced, contained within the treatment chamber of the apparatus. The liquid seal is formed by a pipe *d* dipping into a vessel *e* in a



...or bell *b*, around the bottom of which are perforations *c*, through which, as well as through the pipe *d*, the liquid is forced out of the bell *b* into an outer chamber *a* on the vessel being heated. A cage *f* on the bell *b* contains the materials to be treated. Heating coils &c. may be placed within the bell, and cooling and condensing devices arranged on the cover of the apparatus. A modification is described in which the pressure is produced by steam generated in an external boiler to which the condensed liquid is returned. Other constructions applicable to clothes-washing apparatus are also described.

206,651. Baumann, K., and Metropolitan-Vickers Electrical Co., Ltd.
Sept. 29, 1922.

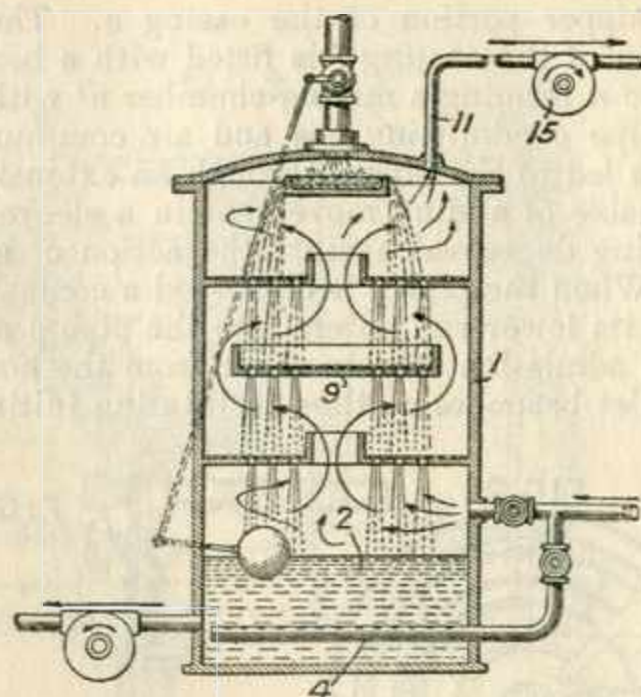
Feed-water, heating. — Superheated steam tapped from one or more points of an engine for heating feed-water is reduced in temperature in its passage from the engine to the heaters. Steam taken from intermediate stages of a turbine 1 and led into feed-heaters 5, 6 is cooled by direct contact with water in chambers 7.



Each chamber is divided by a horizontal plate 10 carrying vertical open-ended tubes 11. Water is admitted around the tubes through a branch 9. In a modification, each cooler consists of a perforated steam pipe surrounded by a jacket to which water is admitted. The steam may be cooled in surface coolers. The feed-water used as the cooling medium in the surface coolers is discharged into the feed-heaters or into the water pipes leading from the feed-heaters.

206,804. Griscom-Russell Co., (Assignees of Price, J.). Nov. 10, 1922, [Convention date].

Feed-water, heating. — A counter-current de-aerator comprises a shell 1 in which a body of liquid 2 is maintained, means for heating shown as a perforated steam pipe 4, a series of perforated baffles 9 distributing fresh liquid entering at the top of the shell, the baffles being alternately circular and annular, and an escape for liberated gases 11 which may be connected with a suction device 15. Steam may be admitted above the liquid 2 for starting. The baffles are so arranged as to distribute the liquid in a closed ring of finely-divided drops through which the steam is caused

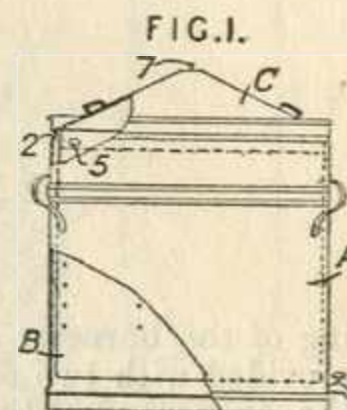


to pass repeatedly on its way upward. Specification 4221/03 is referred to.

207,049. Johnston, J. S., and Clark, P. G. Dec. 2, 1922.

Washing - boilers. —

In a washing - boiler having a perforated basket B supported within a vessel A, the lid C has a lip fitting into the top of the basket and having ports 5 to correspond with ports in the basket. The rim of the basket rests on a ledge 2

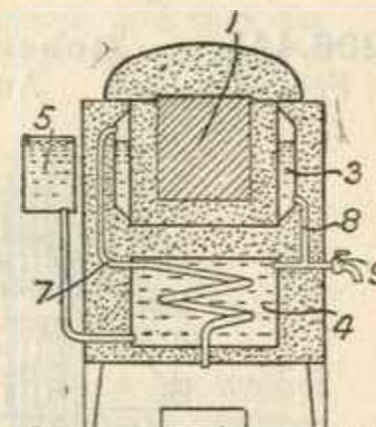


formed below the top of the shell A; the perforated base of the basket may be removable, and a steam-escape valve 7 may be provided.

207,168. Widström, A. D. Nov. 17, 1922, [Convention date].

Heating water; heat-storing apparatus. — In

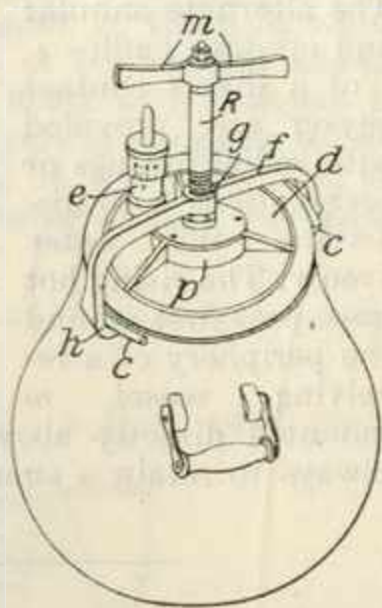
a heat - accumulating electric range, having a water - jacket 3 surrounding a heat-accumulating mass 1 and a hot-water tank 4, a pipe 7 leading from the steam space of the water-jacket is arranged so that the steam heats the water in the hot-water tank without coming into direct contact therewith. The bottom part of the water-jacket and the upper part of the hot-water tank are connected by a pipe 8 fitted with a draw-off cock 9. A tank 5 supplies water to the hot-water tank.



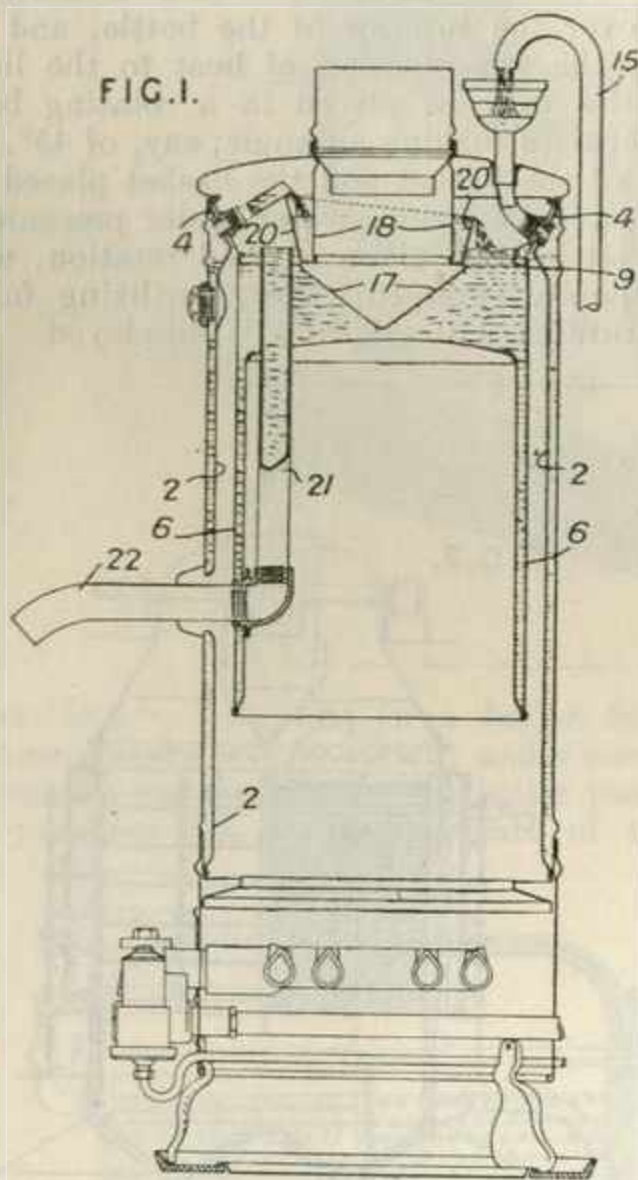


207,169. Peire, T. Nov. 18, 1922, [Convention date]. Void [Published under Sect. 91 of the Act].

Digesters.—The lid *d* of a cooking pot is secured by means of a bridge-piece having two or more arms *f* the hooked portions *h* of which engage beneath an interrupted flange or projections *c* on the pot, and a screw-threaded rod *R* having a handle *m*, which passes through the boss *g* of the bridge-piece to press upon the lid. The rod is free to rotate in a socket *p*. A safety valve *e* may be provided with a whistle.



207,344. Sugg, P. H., and Sugg & Co., Ltd., W. Oct. 20, 1922.

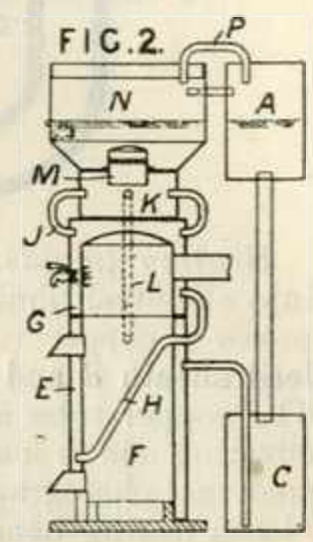


Internally-fired boilers provided with an inner water vessel and an outer water jacket have a coned seating 4 at the top of the inner wall 2 of the outer jacket upon which rests the coned upper part 9 of the outer wall 6 of the inner vessel. All soldered joints are cooled by contact with water when in use. Water from the supply 15 passes by a pipe traversing the coned seatings to the jacket and thence by a similar pipe on the opposite side to an annular trough 20 round the flue outlet 18

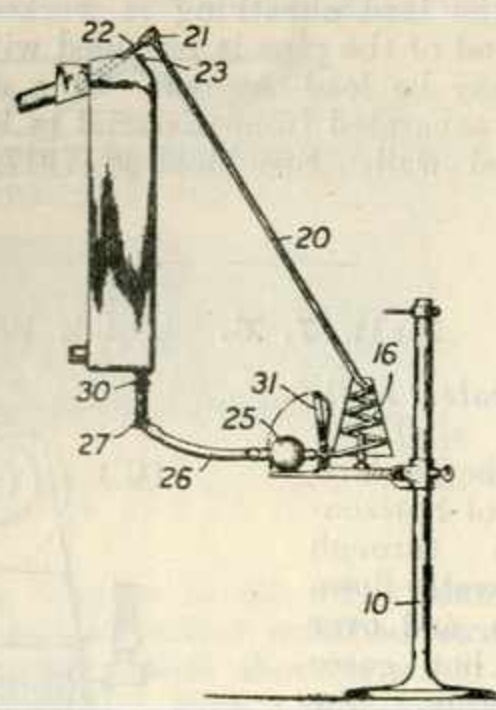
and to the inner vessel from which it flows by pipe 21 to the spout 22. The inner vessel is traversed by a flue 17 communicating with the annular space between the jacket and the inner vessel and with a central uptake 18.

207,473. Colliss, J. W. April 23, 1923.

Internally-fired boilers.—Water enters the annular boiler-section E from the feed-tank A and a lower tank C, and passes to the upper section G by a pipe H crossing the combustion chamber F; the heated water then passes to the tank K by pipes J, L and through a perforated connection or "silencer" M to the storage tank N which is connected by a pipe P to the feed-tank for pre-heating the water.

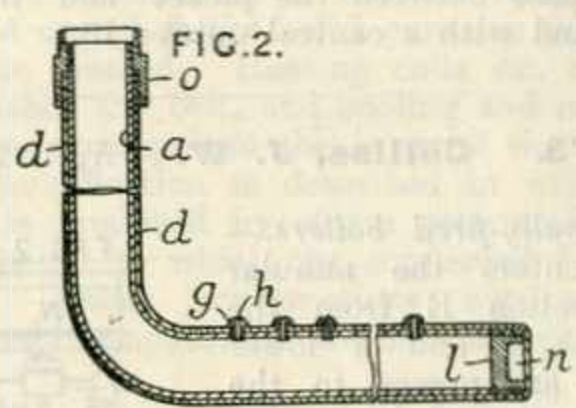


207,625. Perry, S. J., Jerram, A. E., and Pearson, S. W. Sept. 2, 1922.



Portable and small heaters.—A heater 16 mounted on a stand 10 can be coupled, by means of flexible or movable tubes 20, 26, with a container of water that is to be kept warm, for example the radiator and circulating system of a motor car. The auxiliary heating circuit thus formed includes a chamber of variable volume for example a rubber ball 25. The heater is shown connected to the radiator at the drain tap 30 and at the top by a down-turned pipe 22 entering the filling cap 23. At starting, to fill the circuit with water the tap 27 is closed and the tap 21 opened. On compressing the rubber ball 25 by hand or by the weight 31 water is forced upward in the pipe 20 expelling the air through the extension 22 which dips below the level in the radiator. After opening the tap 27, heat applied to the boiler 16 will cause a circulation through the body of water in the radiator.

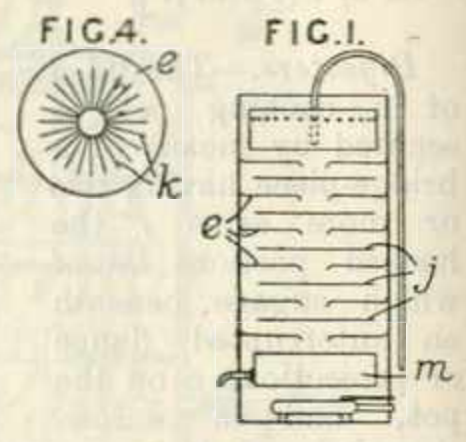
207,902. Judson, F., (Representative of Judson, G. R.), **Gibson, J. M.**, and **Galloway, H.** Sept. 15, 1922.



Heating liquids.—A pipe for injecting steam into chemical liquids particularly for dyeing, comprises a copper tube *a* which is covered with a lead sheath *d* and then bent to rectangular form. The copper tube is softened at the bend prior to covering and is loaded with a bending composition such as photographic soda and restrained by blocks during bending. Threaded holes arranged in one or more parallel lines or staggered, are then formed in the horizontal part and flanged nipples *g* are screwed therein and soldered, one or more holes *h* being finally drilled in each nipple. The nipples may be of an alloy of brass and zinc. A plug *l* having a square or other angular recess *n* is screwed and soldered to the end of the pipe and the lead sheathing is worked over it. The open end of the pipe is provided with a union *o* which may be lead-covered. In a dyeing vat the pipe is separated from material to be dyed by a perforated wall. Specification 7917/06 is referred to.

207,923. Stradwick, W. C. Sept. 26, 1922.

Heating water. — The alternate annular and circular baffles *e*, *j* of a direct contact geyser are provided with radial flutings or corrugations *k* to distribute the water evenly. The rising hot gases pass first around the periphery of a receiving vessel *m* mounted directly above the burner and adapted always to retain a small quantity of water.

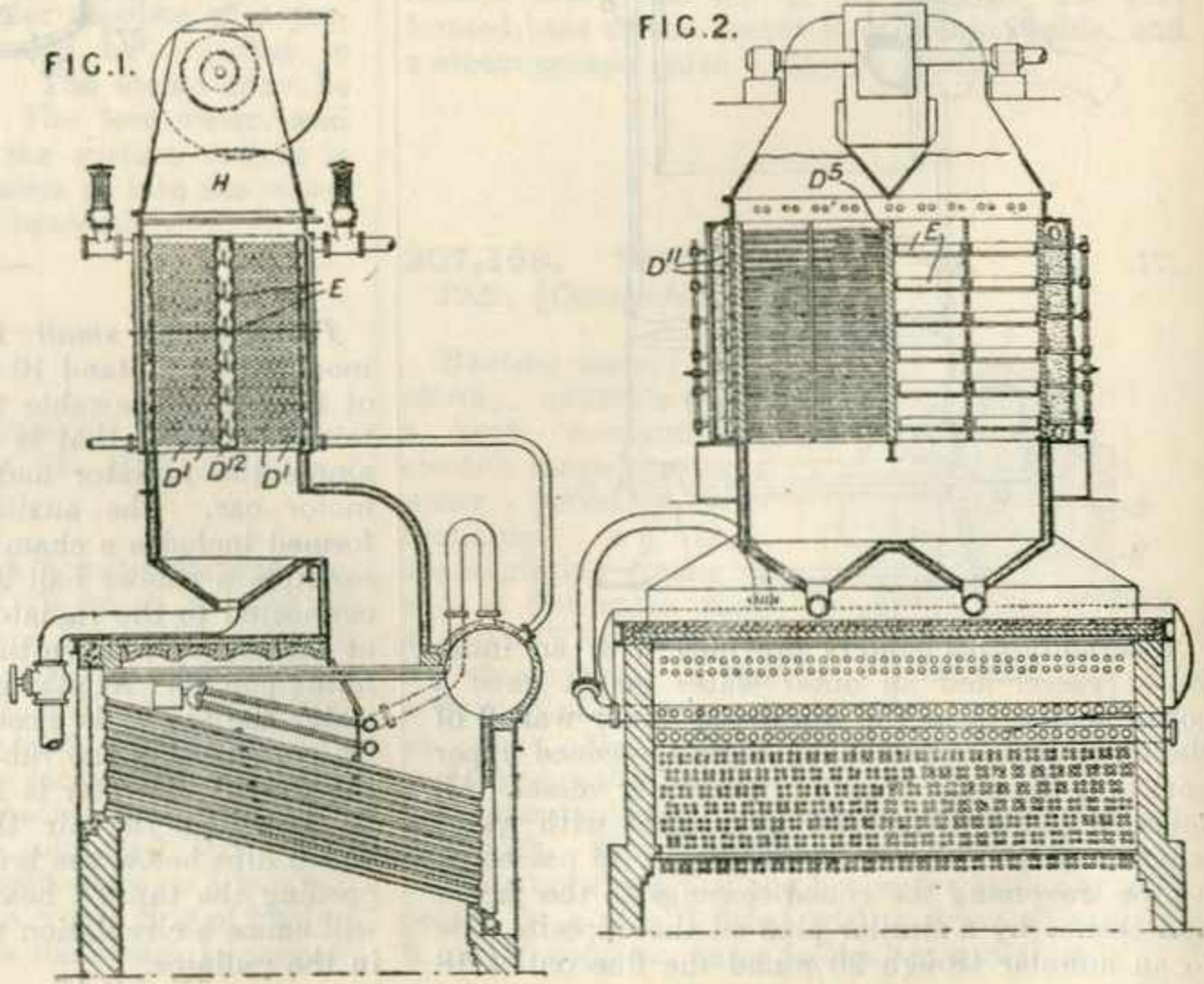


208,140. Rafn, R. Dec. 8, 1922, [Convention date].

Heating liquids.—In heating liquids in bottles &c. for sterilizing milk and other purposes, the bottles are given a rotary motion, varying periodically, so as to cause the liquid to have a washing motion over the interior of the bottle, and thus facilitate the transmission of heat to the liquid. The bottles may be placed in a rotating basket with their axes making an angle, say, of 45°, with the axis of the basket and the basket placed in a vessel heated by steam, water under pressure &c. The basket is then given a rapid rotation, which is periodically reversed. For sterilizing milk a temperature of 110–120° C. is employed.

208,158. Bell, J. E. July 1, 1922, [Convention date].

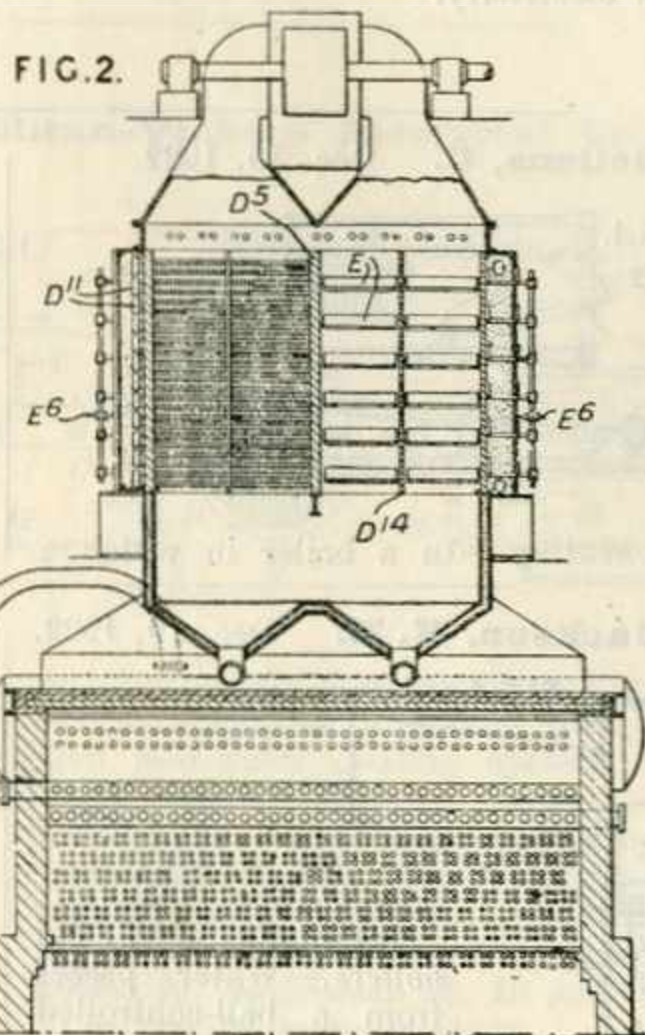
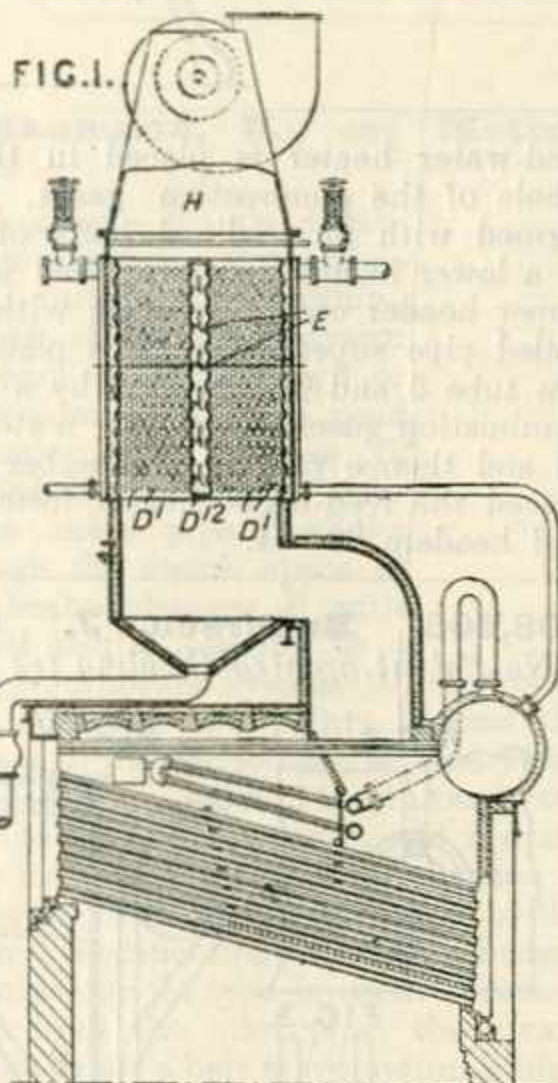
Feed-water, heating. — In a boiler feed-water heater having banks of horizontal tubes through which the water flows downwards, and over which the hot gases flow upwards, the number of tube paths is such that the velocity of the water flow during the normal operation of the boiler is above that which permits of the equalization of the water temperature throughout the heater by convection. The tubes *D*¹ of a feed-heater placed in a flue above a water-tube boiler are arranged in staggered rows, and are connected to junction boxes *D*¹¹ and supported at their centres by a plate *D*⁵. By



altering the tube connections, the velocity of water flow is so determined as to give a definite graduation of temperature increasing towards the bottom of the heater. Internal corrosion is thus confined to two or three rows of tubes in which the water is at about 180°. A vertical flue passage D^{12} between the tubes is fitted with dampers E , which are opened to allow part of the gases to pass directly to the fan casing H when the load on the boiler is high. The casing around the heater

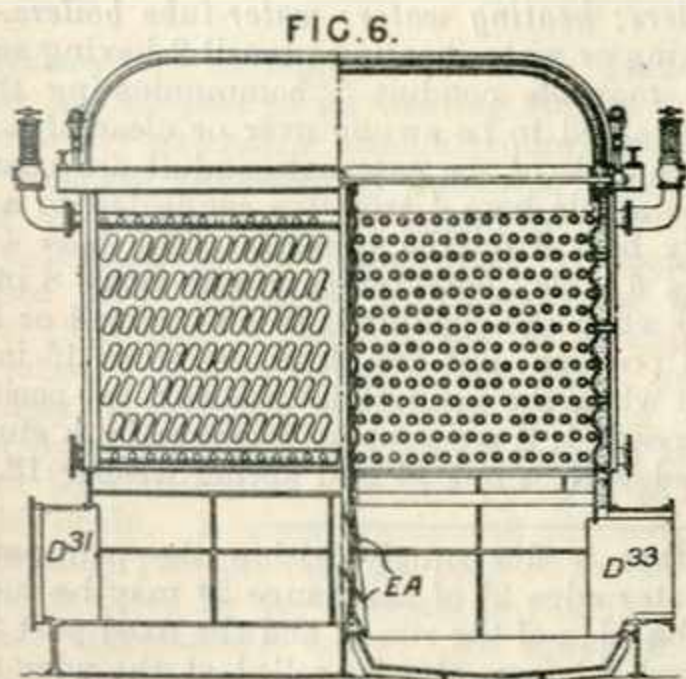
is packed with heat insulating material. Cast-iron rings are shrunk on the heater tubes. In a modification, two vertical banks of tubes connected to a common header are arranged in parallel flues so connected that the hot gases pass upwardly through one bank and downwardly through the other bank. Specifications 14868/96 and 22663/03, [both in *Class 123*, Steam generators], 24162/14 and 200,060 are referred to.

208,159. Bell, J. E. July 1, 1922, [Convention date].

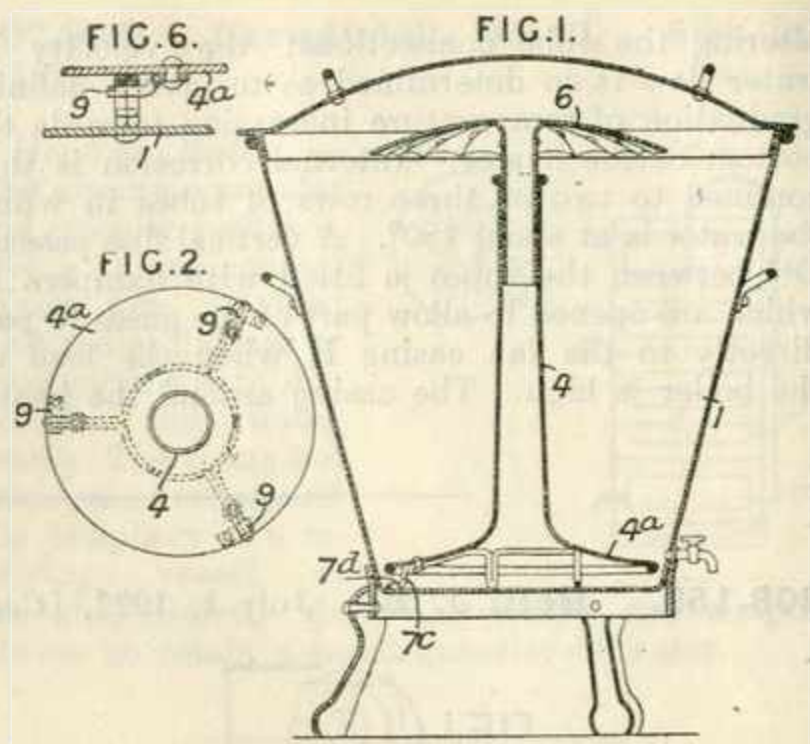


Feed-water, heating.—In a boiler fitted with an economizer through which, under normal conditions, all the gases from the boiler pass, means are provided for conducting part of the gases

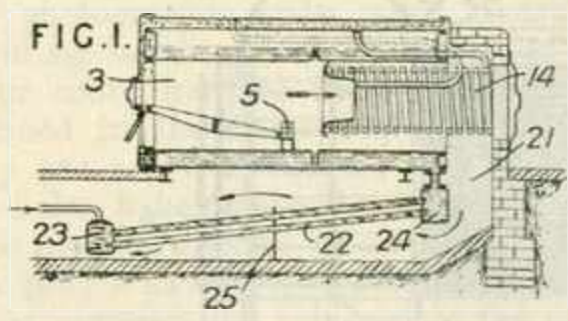
through a by-pass in the economizer when the boiler is worked under overload conditions. In an economizer placed above a water-tube boiler, a flue passage D^{12} , Figs. 1, 2, between economizer tube banks D^1 is fitted with dampers E , which may be opened to allow part of the boiler gases to pass directly to the fan-casing H . The walls of the economizer casing are corrugated, and the outer walls are packed with heat-insulating material. Cast iron rings are shrunk on the economizer tubes. The tubes are arranged horizontally in staggered rows and are connected to junction-boxes D^{11} and supported at their centre by a plate D^5 . The flue passage D^{12} is divided by the plate D^5 and plates D^{14} into four paths, each path being fitted with rows of dampers E , which are operated in horizontal pairs by hand wheels E^6 on vertical bars connected to the damper spindles. In a modification, the gases pass from the inlet D^{31} , Fig. 6, of the economizer casing to the outlet D^{33} through each of two banks of tubes in turn, part of the gases being allowed to pass directly to the outlet at high loads by opening dampers EA . Specification 200,060 is referred to.



Washing-boilers.—In a washing-boiler 1 provided with a circulator comprising a tubular member 4 fitted with a distributor 6, the bell-mouthed false bottom 4^a of the member 4 is mounted on a stand formed by bending a wire into a spiderlike structure provided with legs 7^c and feet 7^d. The stand may be fixed to the bottom 4^a and held in position by clips 9 mounted on the boiler, as shown in Fig. 2, or alternatively the stand may be fixed to the boiler and the clips 9 may be fitted to the false bottom 4^a, as shown in Fig. 6. The boiler may be heated by an open fire, gas, oil, or electricity.



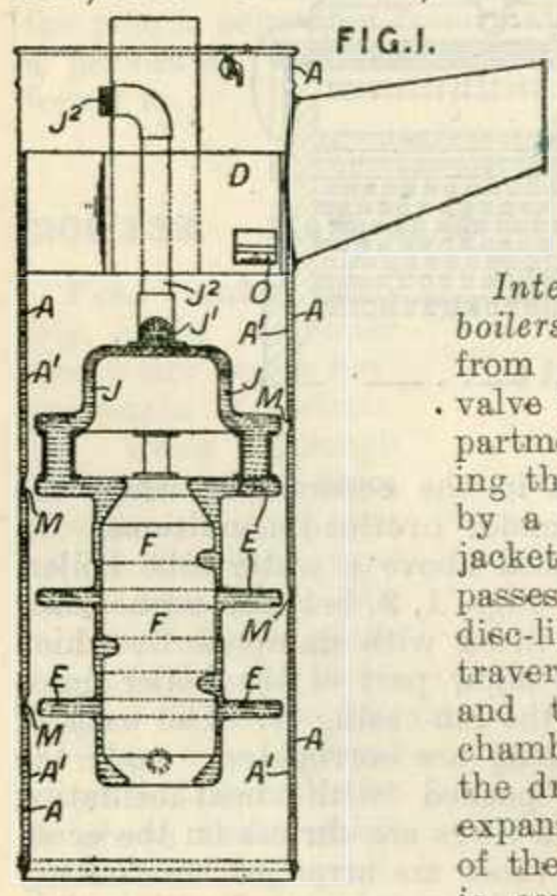
208,377. **Bellens, C.** Dec. 15, 1922.



Feed-water, heating.—In a boiler in which a

feed-water heater is placed in the path of the whole of the combustion gases, the heater is formed with an inclined bank of tubes secured to a lower header receiving feed water and to an upper header communicating with the boiler. A coiled pipe superheater 14 is placed in the main fire tube 3 and is protected by a guard 25. The combustion gases sweep over a steam superheater 14 and thence pass to a chamber 21 in which is placed the feed-water heater formed by tubes 22 and headers 23, 24.

208,380. **Jackson, H. B.** Dec. 19, 1922.



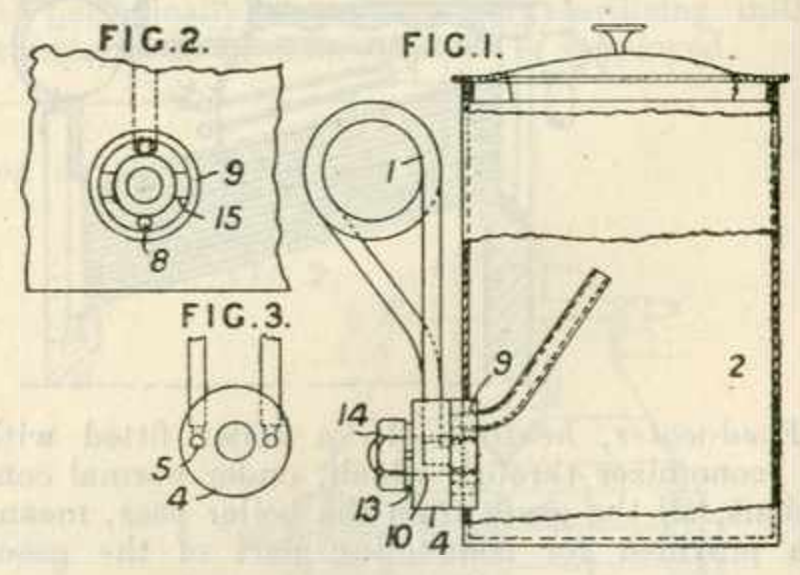
Internally - fired boilers.—Water passes from a ball-controlled valve to an upper compartment D surrounding the flue and thence by a port O to the jacket A from which it passes to a series of disc-like chambers E traversed by a flue F, and to a cup-shaped chamber J connected to the draw-off J¹ and the expansion pipe J². Each of the disc-chambers E is constructed of two

parts span to allow of their being joined telescopically. The inner lining A¹ of the jacket is indented, as at M, partly around the heater at points opposite the discs E. The pipe J² discharges into a pocket of the tank D, communicating with the jacket A.

208,600. **Thompson, A.** Sept. 28, 1922.

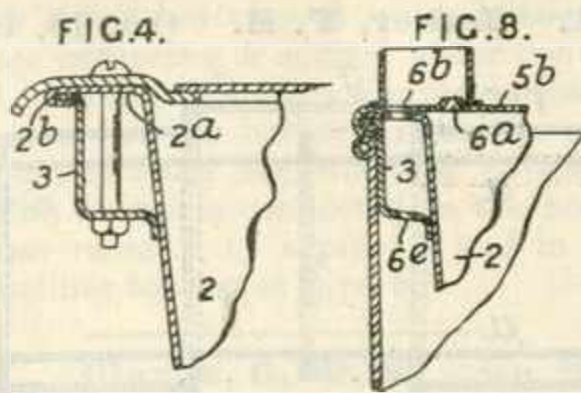
Washing-boilers.—The flange 2^a of a domestic washing-boiler 2 is strengthened by a rim 3 of sheet metal, the external diameter of which is

208,408. **Endersen, J.** Jan. 23, 1923.
No Patent granted (Sealing fee not paid).



Boilers; heating water; water-tube boilers.—In a cooking or water-heating utensil 2 having an external movable conduit 1 communicating therewith adapted to be swung over or clear of a fire, the free ends of the external conduit are inserted in a rotatable boss 4 trunnion-connected to a stationary boss 9 on the utensil. The boss 4 has orifices 5 which communicate with holes 8 in the boss 9 when the conduit is in an inclined or horizontal position, but are closed by stops 15 in the boss 9 when the conduit is in a vertical position. The bosses 4, 9 are coupled together by a stud 10 provided with a nut 14 and spring washer 13.

such that it fits snugly within the pan casing. The outer edge 2^b of the flange 2^a may be turned over the edge of the rim 3, and the fixed part 5^b of a hinged lid may also be rolled at the edge over the bead thus formed as shown in Fig. 8. Holes



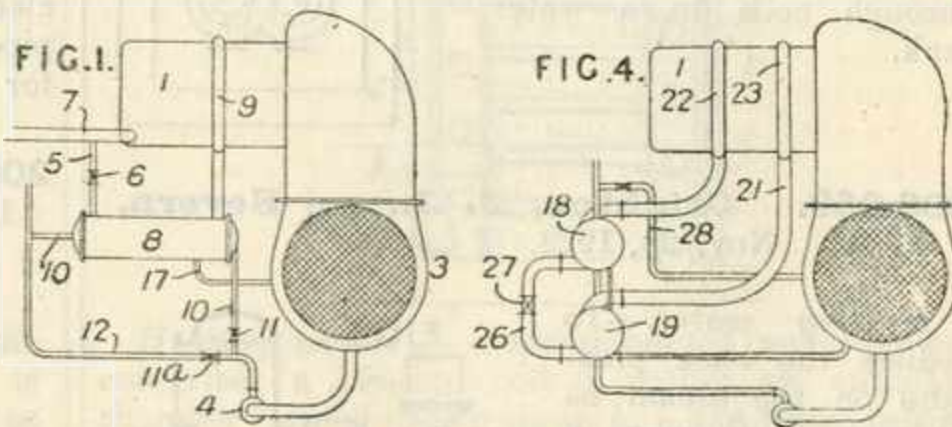
6a, 6b, 6e may be formed in the lid and rim respectively for the escape of steam and of the burnt gases.

208,727. André, M. Dec. 21, 1922, [Convention date]. Void [Published under Sect. 91 of the Act]. Drawings to Specification.

Annular boilers; water-tube boilers; portable liquid-heaters.—A portable heater for supplying water to baths &c. comprises an annular or coil-tube boiler within a casing mounted on a gas or other burner and detachable pipes supplying gas and supplying and delivering water. The boiler may be annular with radial partitions in the annulus arranged to form a sinuous conduit for the water, and may be heated by a spirit lamp or electricity.

208,841. Baumann, K., and Metropolitan-Vickers Electrical Co., Ltd. Oct. 13, 1922.

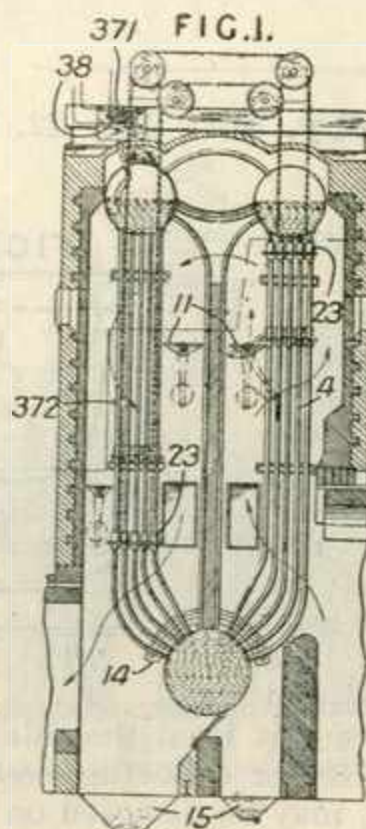
Feed-water, heating.—To avoid dangerously high temperatures at the low-pressure end of a turbine when running under a light load, steam is withdrawn from the inlet end, or from a high or intermediate-pressure stage, and used for heat feed-water. A by-pass 5, Fig. 1, controlled by a valve 6, connects the steam inlet pipe 7 of the turbine 1 through the steam space of a surface-type heat-exchanger 8 with a circumferential belt 9, leading to a low-pressure stage. Another by-pass 10, controlled by a valve 11, connects two points beyond the extraction pump 4 in the condensate or feed-water pipe 12, controlled by a valve 11a, through the water space of the heat-exchanger 8, and a drain 17 connects the lower part of the steam space of the heat-exchanger 8 and the steam space of the condenser 3. In a modification, a heat-exchanger of the direct contact or jet type is used. Instead of being tapped from the inlet pipe, the steam may be withdrawn from a belt surrounding a high



or intermediate pressure stage. Fig. 4 shows the invention applied to a turbine fitted with a progressive feed-water heating system, the feed-water under normal operation being passed through heaters 19, 18 and therein heated by steam tapped from belts 23, 22. By opening a valve 27 in a pipe 26, under light load conditions, steam from the intermediate-stage belt is passed through and cooled in the heaters 18, 19 and led by the pipe 21 to the low-pressure stage.

208,988. Babcock & Wilcox, Ltd., (Babcock & Wilcox Co.) June 7, 1923.

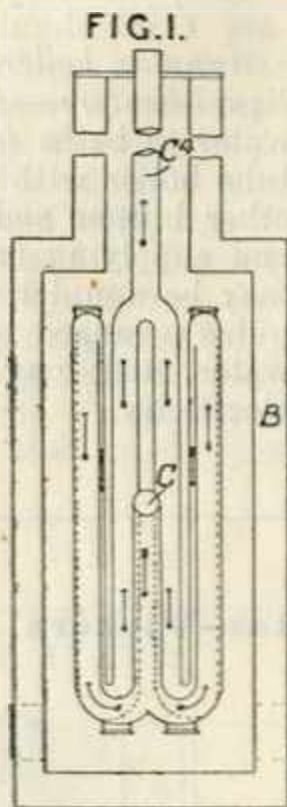
Feed-water, heating.—A boiler or feed-water heater having part of its heating surface formed of vertically extending straight tubes has traveling scrapers permanently mounted upon the tubes and movable baffles having a portion normally located in the path of the scrapers and adapted to be contacted by them to be moved out of their path. The scrapers 23 mounted on the tubes 4 are reciprocated by chain gearing and may be operated during the working of the boiler by an electric motor whose reversal is controlled by a switch 38 operated by stops 371, 372 on the chain. A counterweighted pivoted baffle 11 normally projects into the path of the scrapers 23 and is tilted by the scrapers out of their path as they traverse the tubes. An aperture 14 is provided for the insertion of a steam lance, the soot falling into the hoppers 15.





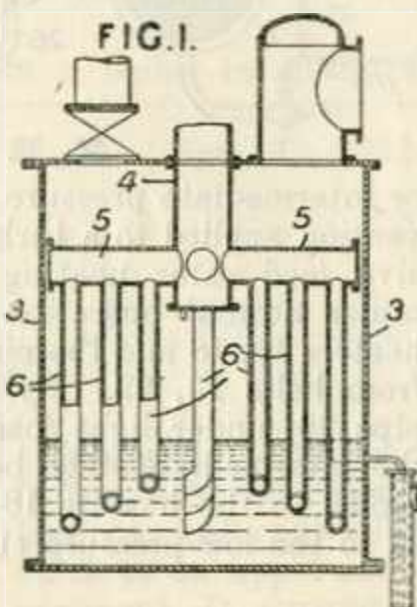
209,253. **Haller, J. G., and McLaren, G.** Nov. 22, 1922.

Heating air; feed-water, heating. — Flues C, bifurcated after entry into a chamber B, and looped and finally re-united before passing out of the chamber, are arranged so that the looped parts are vertical. A draught is thereby created sufficient to enable a chimney stack to be dispensed with. Air is heated by passing through the chamber and water may be heated by spraying on to the heated flues or into the heated air or by passing the heated air through coils in a water tank.



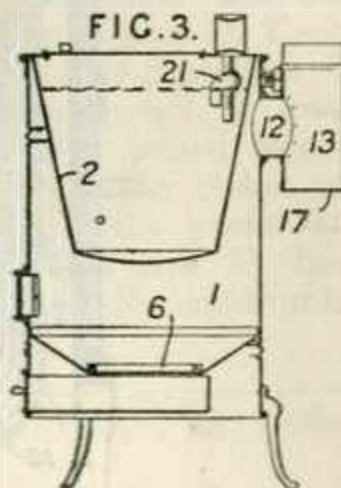
209,259. **Crighton, C. J., and Severn, J. A.** Nov. 28, 1922.

Heating water.—To reduce the back pressure on the steam as it issues from pipes 6 opening into the water in a cylindrical regenerative accumulator 3, the pipes open so that the issuing steam sets up a continuous circulation of the water about the vertical axis of the accumulator. The pipes 6 depend from branches 5 radiating from a central steam inlet 4. The lower ends of the pipes are curved as shown. The pipes open at different levels below the surface of the water.

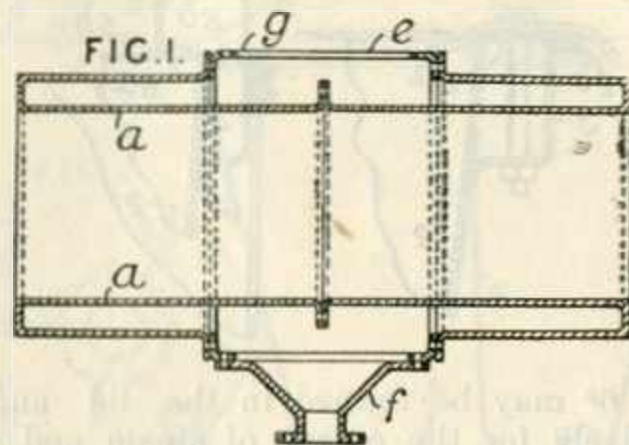


209,363. **Darby, E.** May 22, 1923.

Boiling pans. — Apparatus for heating liquids comprises in combination a casing 1 with a grate 6, an inner vessel 2 with flue space around it, an inlet pipe extending downwardly through the top of the inner vessel, a discharge pipe 21 at the upper part of the vessel passing through the sides of the vessel and casing, and a flue outlet 12 at the side of the casing. A chamber 13 for collecting soot, with removable cover 17, may be disposed on the outlet.

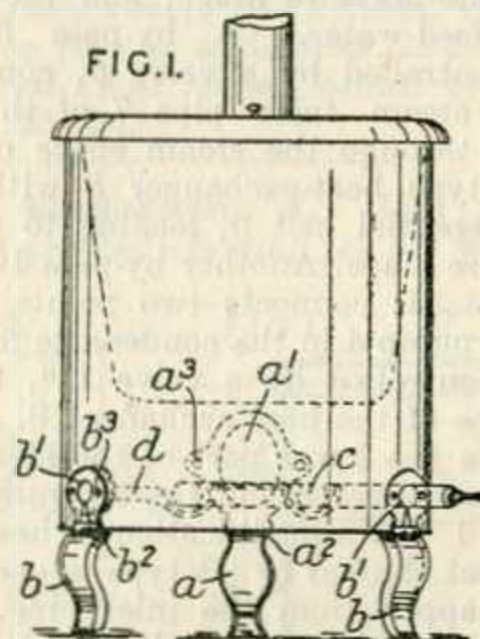


209,511. **Laker, F. S.** Oct. 19, 1922.



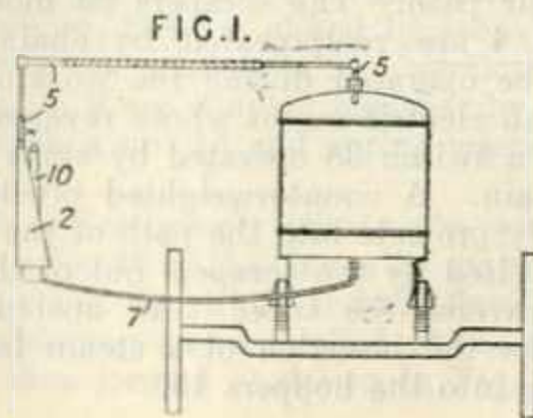
Feed-water, heating.—The connection between an external furnace burning powdered fuel and a Cornish or like boiler flue is made by a water-jacketed pipe a, the water jacket comprising a centrally disposed box e having a sludge outlet f at the bottom and an aperture g at the top provided with a removable cover (not shown) for cleaning purposes. The box e is connected by pipes to a feed-water tank to form a closed circuit for the heating of feed-water.

209,612. **Rigby, A., and Rigby, T.** Feb. 1, 1923.



Washing-boilers.—The casing of a gas-heated washing-boiler is supported by legs which have apertures to coincide with openings in the casing for lighting the burner and for the passage of its supply pipe or the support of the burners. A leg a and legs b have a hand-hole a¹, apertures b¹, and projections a², b² on which the casing rests, and bolts a³, b³ securing them to the casing. The supply pipe of the burner c passes through either of the holes b¹, the support d for the burner being secured by the bolts b³ to the other of the legs b.

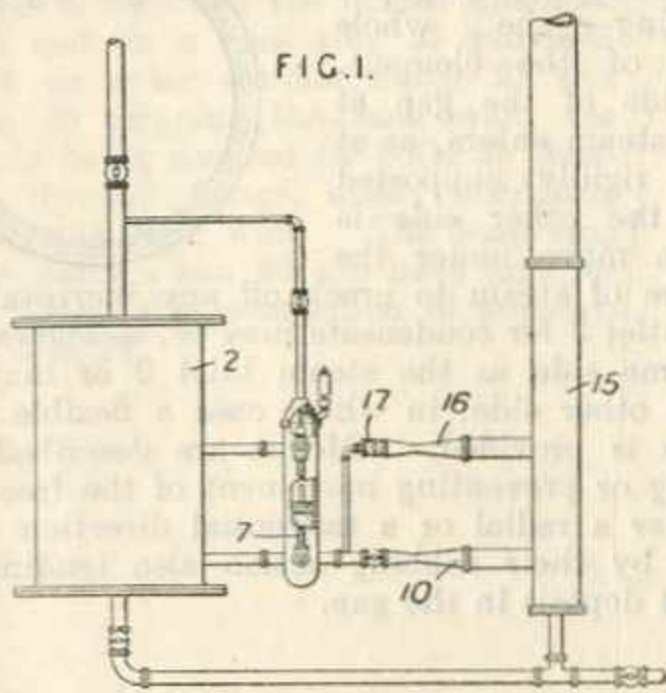
209,922. **Taylor, J., and Lloyd, S. S.** Dec. 13, 1922.





Portable liquid-heaters.—A water heater for use in a garage comprises a conical water container 2 traversed by a flue 10 with a thermostatically controlled burner at the bottom; both the air inlet and the outlet from the flue are covered with gauze. The heater is connected to the bottom of a motor-car radiator by a pipe 7, and to the top by a swivelling telescopic pipe 5.

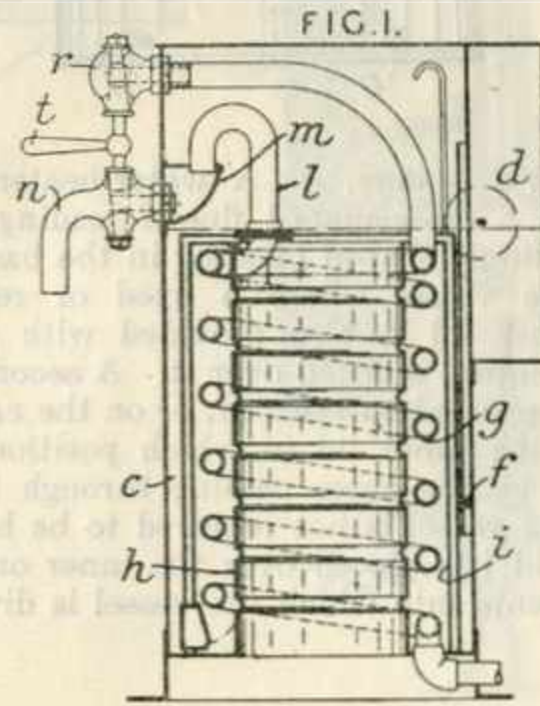
209,951. **Clarke, C. W. E.** Jan. 25, 1923.



Feed-water, heating. — The condensate in the steam lines of a high-pressure steam system is collected in a vessel under the same pressure as in the system and is then passed into a receiver under a lower pressure, the steam produced by the reduction of pressure being led off for use. Condensate collected in a vessel 2 is led through nozzles 10, 16 having restricted orifices to a low-pressure receiver 15 leading to an auxiliary exhaust main. Normally all the condensate is passed through the nozzles 10, the nozzle 16 being brought into operation by opening a valve 17 only

when the water in the vessel rises above a certain level; an alarm operated by a float in a gauge 7 is sounded when this level is reached. The valve 17 may be automatically operated by a thermostat comprising an inclined expansion tube in communication with the top or bottom of the vessel. The steam may be used for heating the boiler feed.

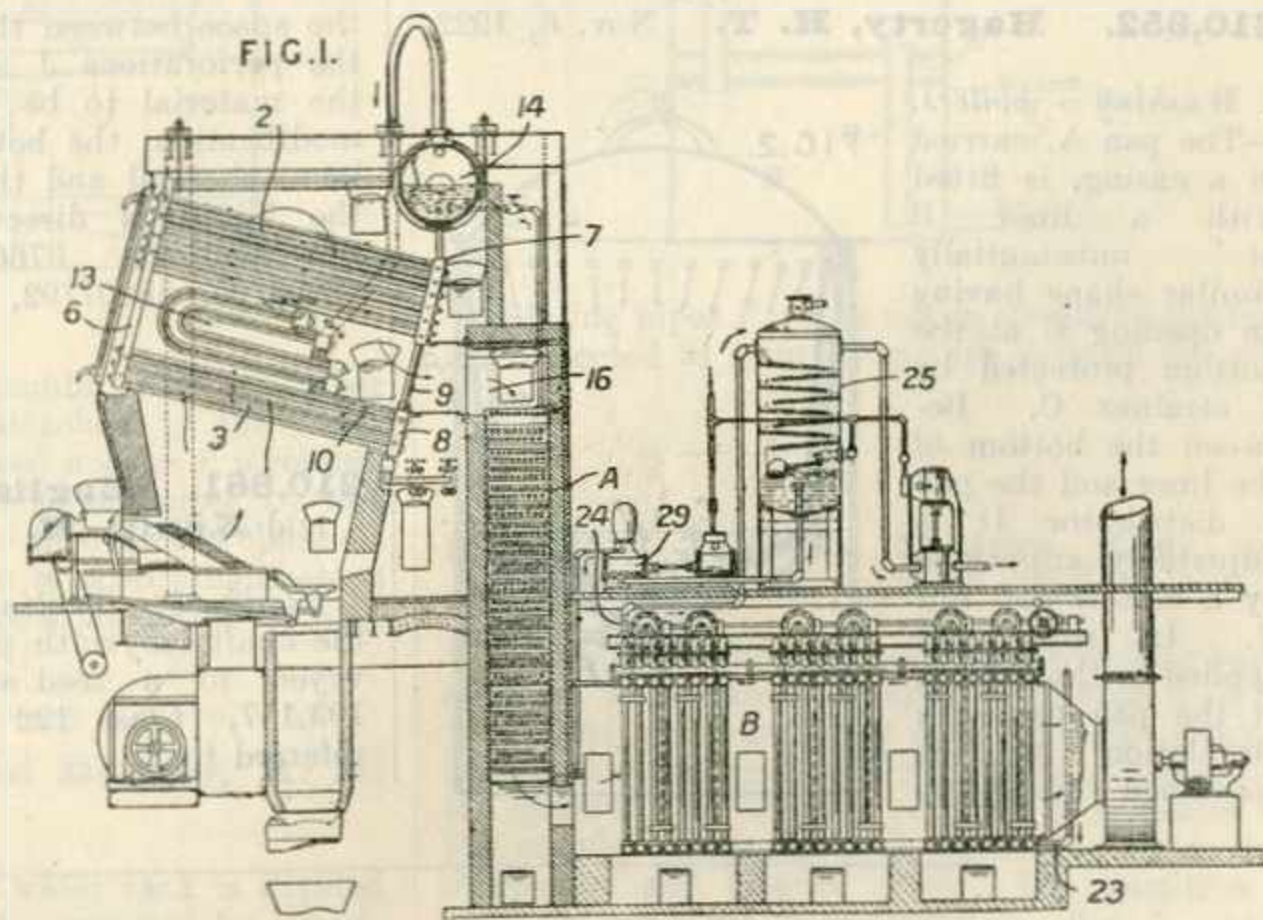
209,959. **Fildes, T. S.** Feb. 2, 1923.



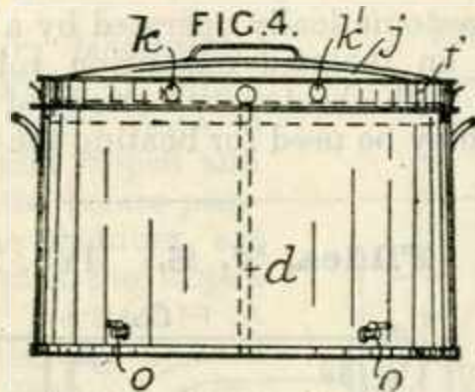
Heating water. — A steam-heated water-boiler comprises a heating coil *g* within an annular chamber formed of two shells *h, i*, the whole being placed within a hollow walled reservoir *c* to the bottom of which cold water from the cistern *d* flows through a channel *f*. Boiling water is led from the top of the inner boiler through a pipe *l* to a receiver *m* the outflow from which is controlled by a cock *n* the plug of which is in axial alignment with the plug of the steam control cock *r*. Both cocks are operated simultaneously by the handle *t*.

209,985. **Babcock & Wilcox, Ltd., (Babcock & Wilcox Co.)** March 9, 1923.

Feed-water, heating. — Feed-water is supplied by a pipe 23 to a low-pressure economizer B from which it passes by a pipe 24 to a de-aerating apparatus 25. A feed-pump connected to the tank 25 forces the water through a high-pressure economizer A to the drum 14. The economizer B may be arranged above the boiler and in one such modification, the economizer A consists of a series of vertical tubes and is provided with vertical baffles.



210,329. **Tocchio, M.** April 16, 1923.

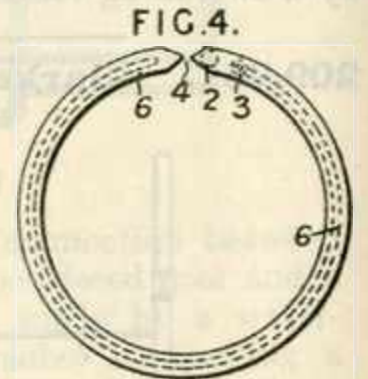


Block-form boilers. — A water-heater or like vessel has a cross-shaped flue *d* leading from a correspondingly-shaped opening in the base to the top of the vessel where a fixed or removable dished inner lid *f*, also provided with a cross-shaped opening, is fitted over it. A second vessel may be supported on the rim, or on the cross-bars *k, k'*, of the inner lid in which position it will be heated by the gases passing through the flue. If a second vessel is not required to be heated, a covering lid *j* is placed over the inner one. The compartments into which the vessel is divided by

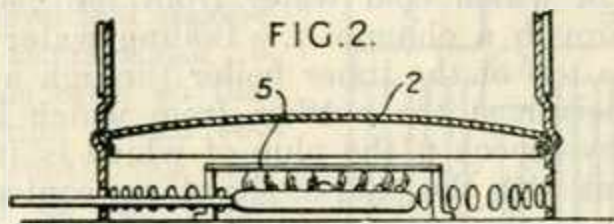
the cross-shaped flue are provided with draining cocks *o*.

210,464. **Akt.-Ges. Kummeler & Matter.** Jan. 29, 1923, [Convention date].

Heating liquids. — An annular heating element 6 for an evaporator is constructed with a gap 4 extending the whole height of the element. One side of the gap at which steam enters, as at 2, is rigidly supported while the other side is free to move under the pressure of steam to crack off any incrustation. The outlet 3 for condensate may be, as shown, on the same side as the steam inlet 2 or may be on the other side, in which case a flexible connection is provided. Means are described for limiting or preventing movement of the free end in either a radial or a tangential direction such means by their rubbing action also tending to prevent deposit in the gap.



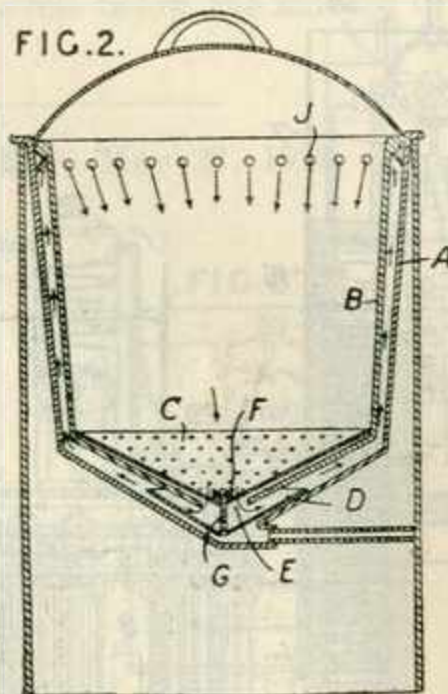
210,512. **Allen, F. J. C.** Oct. 31, 1922.



Boilers.—Under the bottom plate 2 of a flame-heated water-heater a disc 5 of corrodible material such as copper is placed so as to be above the flame, with the object of preventing the corrosion of the boiler itself. The disc may be spaced from but attached to the bottom plate, or may be mounted as a trivet above the gas burner as shown. Specifications 152,721 and 180,710 are referred to.

210,852. **Hagerty, H. T.** Nov. 6, 1922.

Washing - boilers. —The pan A, carried in a casing, is fitted with a liner B of substantially similar shape having an opening E at the bottom protected by a strainer C. Between the bottom of the liner and the pan a distributor D is adjustably supported by a bolt G and nut F. In use, heat applied to the bottom of the pan causes a circulation of the contained liquid up



the space between the liner and the pan through the perforations J and down over and through the material to be treated or extracted. In a modification, the bottom of the pan and liner is hemispherical and the holes J are so made that the liquid is directed tangentially downward. Specifications 3766/74, 3800/87, 5917/90, 13903/90, 16907/92, 15992/01 are referred to.

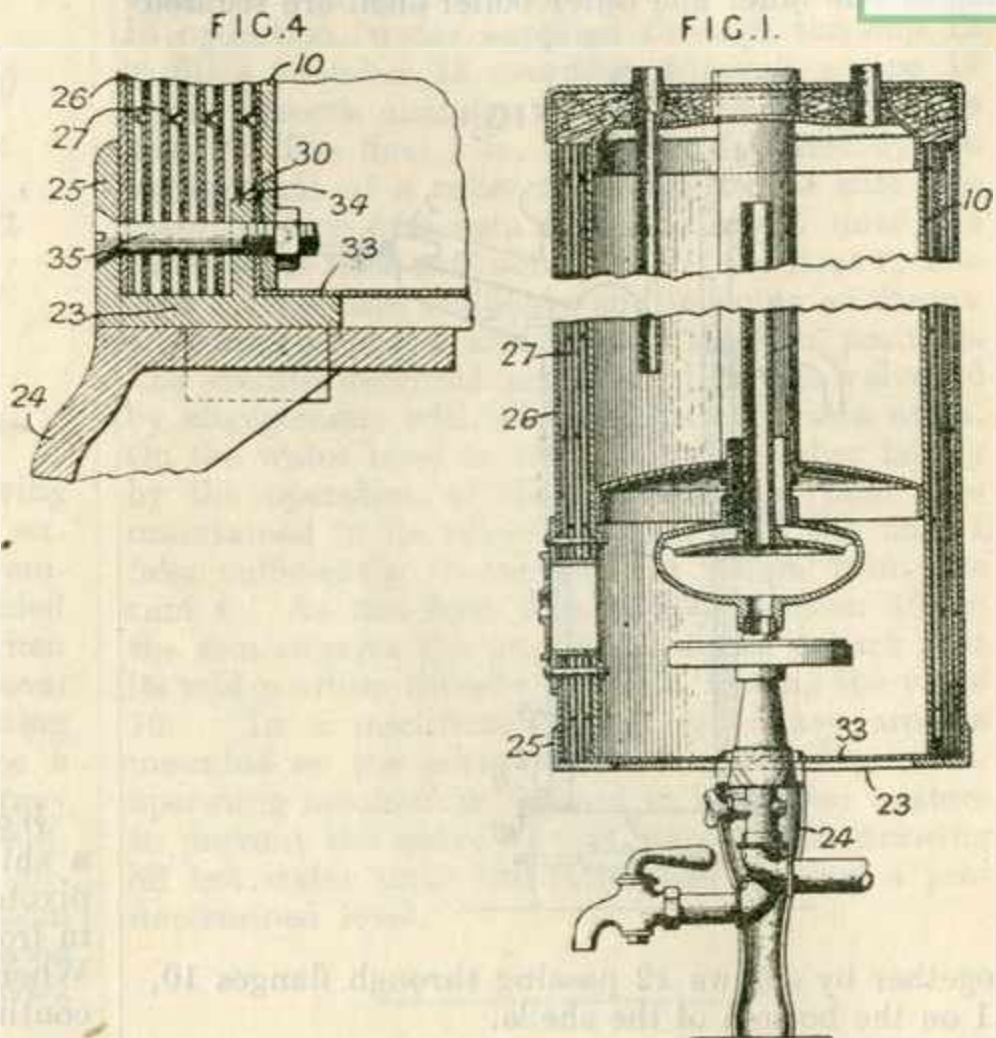
210,861. **English Electric Co., Ltd., and König, M.** Nov. 7, 1922.

Feed-water, heating. — Steam leaking through the shaft labyrinth packings of a turbine is conveyed to a feed-water heater. Specification 193,157, [Class 122 (v), Stuffing-boxes &c.], is referred to.

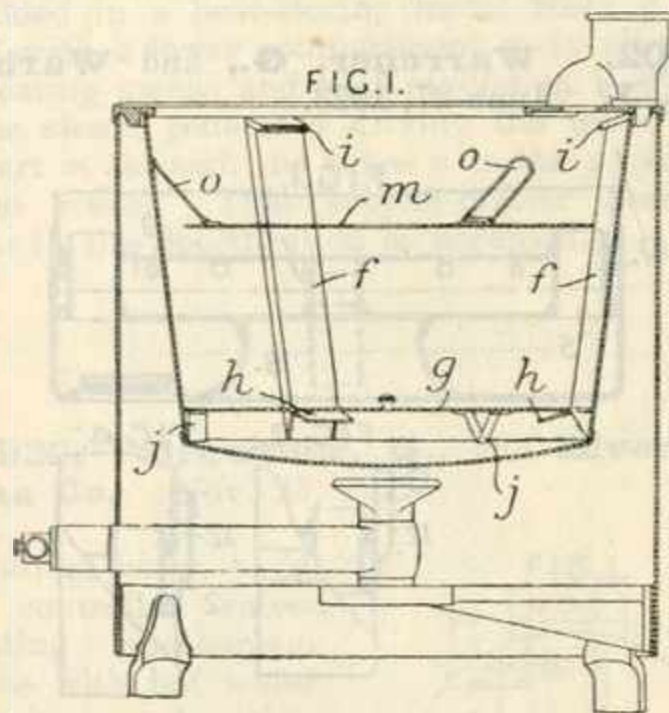


210,893. Withers, J. S., (Bastian-Morley Co.). Nov. 13, 1922.

Boilers.—In a boiler, the tank wall 10 and the shell 26 covering the insulating material 27 are both carried down to surround the burner chamber and rest on a base ring 23 provided with an outer annular flange 25 and lugs 30 gripping the tank wall, the whole being secured by bolts 35 passing through flange, shell, insulation lugs, and tank wall. The base ring may carry a pan 33 and have lugs for the detachable connection of supporting legs 24.



211,046. Williamson, H. G. May 5, 1923.

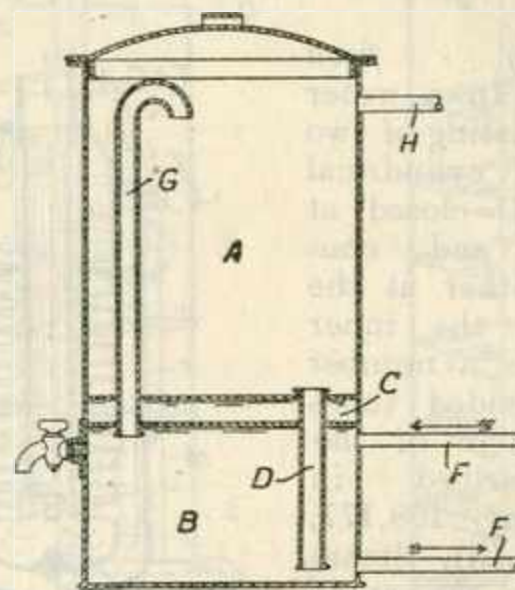


Washing-boilers have in combination a number of circulating passages *f* attached to the inner wall with downwardly-disposed nozzles *i*, a removable perforated false bottom *g*, supported by feet *j*, with peripheral notches to fit over the channels *f*, and a perforated top plate *m* with hinged stops *o*. Each channel *f* may have a projecting lip *h* at its lower end.

211,075. Carr, E., and Dansey, H. D. Aug. 13, 1923.

Heating water. — A hot-water tank is divided into two compartments A, B separated by a hori-

zontal closed air space C, and communicating through internal pipes D, G. The lower compartment is connected to a boiler or heater through



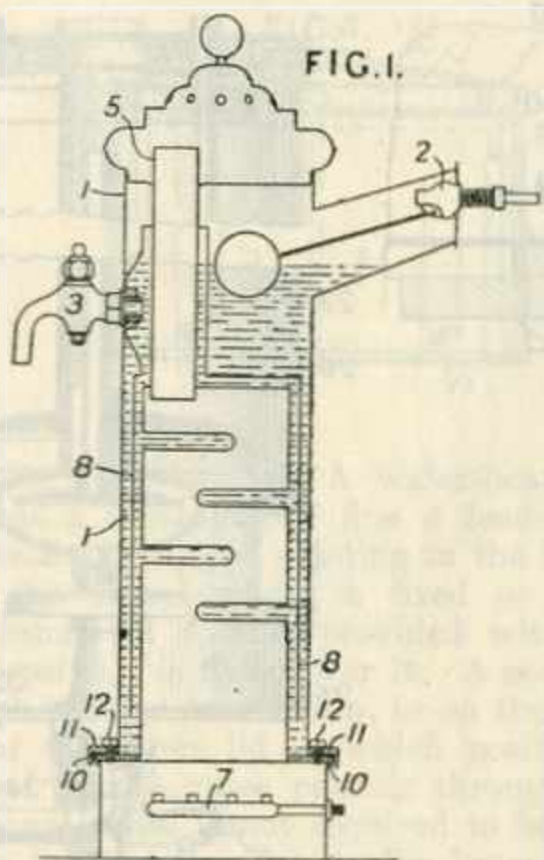
circulating pipes F. The upper compartment may be connected to a supply cistern through the pipe H.

211,335. Jackson Boilers, Ltd., and Hargreaves, H. Feb. 7, 1923.

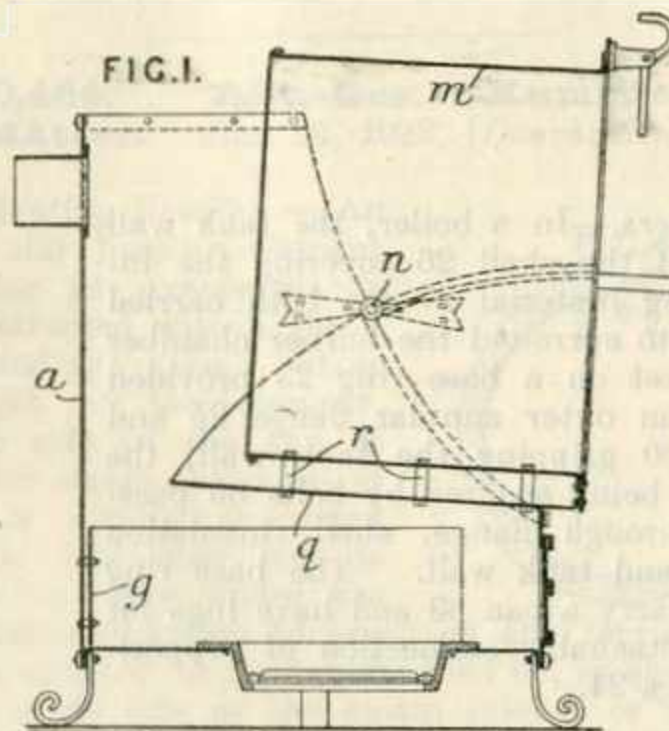
Internally-fired boilers.—In a self-feeding boiler supplied with water through a ball cock 2 at its upper end and having an annular water space 1 surrounding the space receiving the hot gases from the burner 7, a circular partition 8 is placed in the annular water space to direct the water in a downward and upward path. The partition is extended upwards to surround the flue 5, and is

secured to the outer boiler shell 1 by the draw-off tap 3. The inner and outer boiler shell are secured

211,353. Belpaire, A. March 12, 1923.



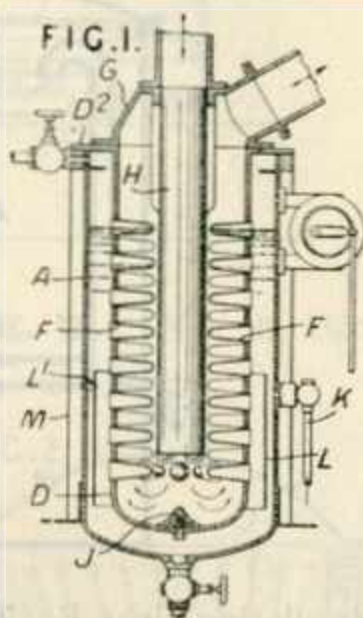
together by screws 12 passing through flanges 10, 11 on the bottom of the shells.



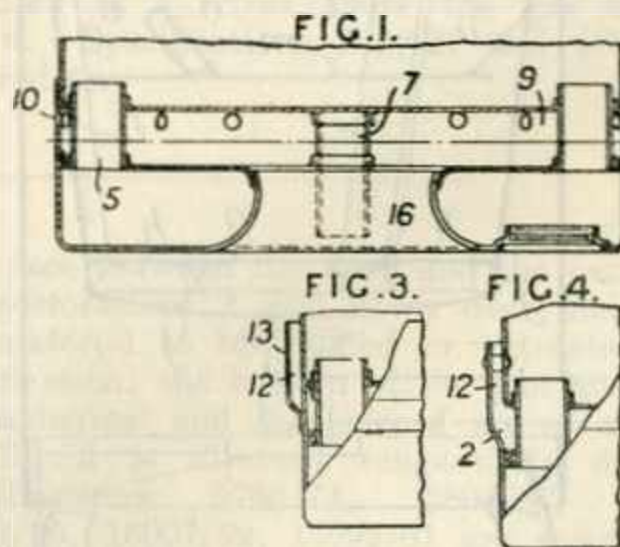
Washing-boilers.—A pan *m*, to which is secured a shield *q* by distance pieces *r*, is mounted on pivots *n* in a sheet-steel jacket *a* which is cut away in front to allow the pan to be tilted for emptying. When the pan is upright the shield *q* acts as a continuation of the jacket *a*. A conical lid is held in position over the boiler by suitable projections.

211,342. Clarkson, T. Feb. 15, 1923.

Internally - fired boilers.—In a water heater consisting of two concentric cylindrical shells *A*, *D* closed at one end and connected together at the other end, the inner shell carries a number of closed ended tubes or thimbles *F* of the kind described in Specification 108,177, [Class 123 (ii), Steam generators]. A cap *G* formed with an inlet and an outlet for the heating gases is secured to a flange *D*² around the open end of the inner shell. A pipe *H* extends from the gas inlet or outlet in the cap into the inner shell. A conical deflector *J* is fitted in the inner shell over the end of the pipe *H*. A cylindrical partition *L* secured to the outer shell by studs *L*¹ is mounted in the water space to direct the feed-water entering through a pipe *K* in a downward and upward course. The feed supply may be controlled by a float device of the kind described in Specification 121,799, [Class 102 (i), Pumps &c.]. The cylindrical shells may be arranged with their closed ends at the top instead of at the bottom, the hot gases being then directed upwardly into the inner shell instead of downwardly as shown.



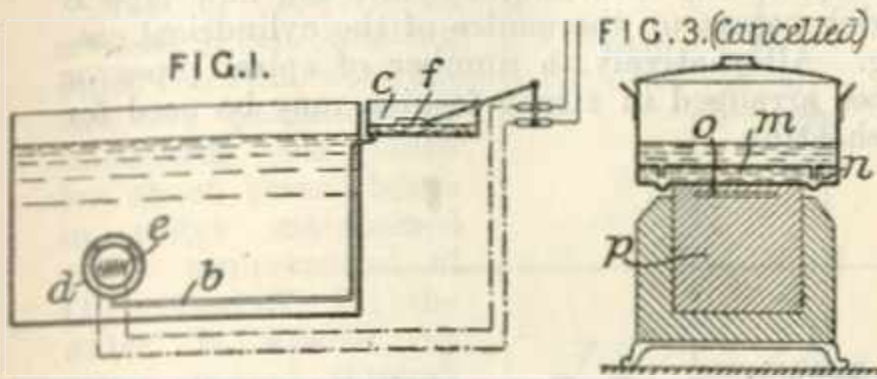
211,402. Warrenner, G., and Warburton, J. June 27, 1923.



Block-form boilers.—An urn or like vessel is provided with an auxiliary water-containing compartment having a central flue 16, Fig. 1, through which the flame gases can pass into the space 9 between the top of the compartment and the vessel bottom. Perforations 10 are formed in the upper wall of the attachment for the egress of the gases and tubes 5, 7 connect the compartment to the vessel and permit circulation of water. In modifications, the auxiliary compartment has an outer wall 13, Fig. 3, forming with the vessel wall a "jacketing" space 12 for the gases; and in Fig. 4, the upper wall 2 of the compartment may be cranked outwardly to provide the "jacketing" space, thereby avoiding perforations.



211,490. Saxegaard, A. Feb. 14, 1923,
[Convention date].

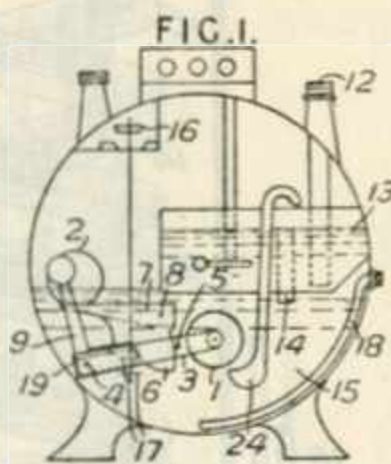


Heating water.—In a cooking apparatus having a body of water in which heat is stored, for example as a water bath, an electric heater *e* embedded in a solid heat storing body is surrounded by a water-filled jacket *d* so constructed that when steam is generated in this jacket the water level is forced down, so reducing the heat-transmitting surface. The jacket communicates by a pipe *b* with a reservoir *c* in which a float *f* on rising may cut off the supply of heating means. In a modification, the heating means in a metal block is surrounded by a similar jacket, open at the bottom to the main water space. A compartment heated by the water and an oven within the metal block are also provided.

The Specification as open to inspection under Sect. 91 (3) (a) comprises also the use of heating means other than electric, whether embedded in a solid body or not, and the modification shown in Fig. 3 (*Cancelled*), in which the heater *o* may be embedded in a heat-storing metal block *p*. A vessel with a lower compartment *m* is placed on the heating means and heat regulation is effected by the steam generated driving the water from the part *m* through the tubes *n* to the upper part of the vessel. This subject-matter does not appear in the Specification as accepted.

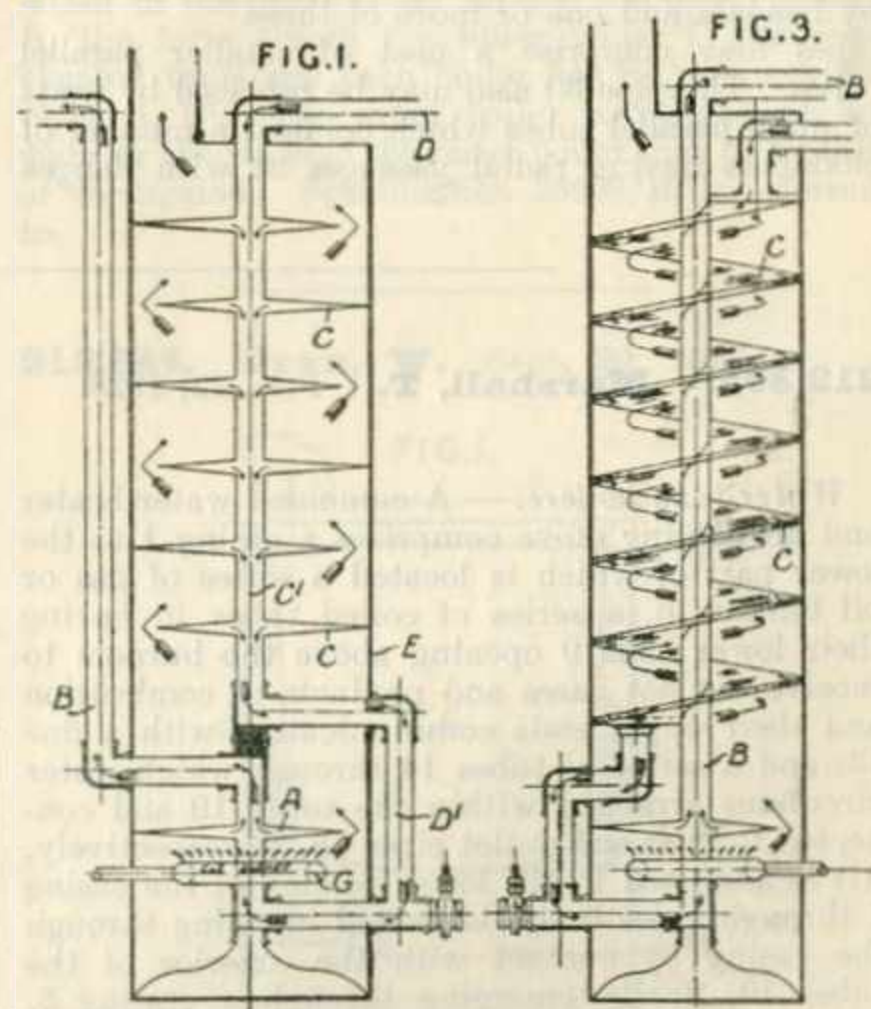
211,930. Crowther, G., and Liverpool Gas Co. Nov. 25, 1922.

Heating water.—A float controlled valve-operating mechanism for use with hot water delivering and other apparatus comprises a number of floats and connecting means arranged so that one float is detained while another is free to move to a predetermined position, on arrival at which it frees a previously detained float and is itself detained thereby, the freed float actuating a valve or valves. Fig. 1 shows the application of the invention to a wet gas meter in which the water on reaching its highest and lowest levels in the reserve chamber 15 opens and closes the gas valve 16. The valve-operating mechanism comprises two floats 1, 2 the float 1 being mounted



on a lever arm 3 pivoted at 4 and the float 2 being carried by a triangular arm 7 pivoted at 8. In operation, water supplied through the cup 12 to fill a chamber 13 overflows through a pipe 14 to the reserve chamber 15 and tends to raise the float 1. The float 1 is, however, detained by the engagement of a roller 5 on the arm 3 with the lower surface of a cam 6 on the arm 7 until the water level rises sufficiently to lift the float 2. The float 1 then rises suddenly and in doing so throws a counterweighted arm 9 past its mid position. The counterweighted arm then lifts the valve 16 by engagement with discs 17 on the valve stem. On the water level in the reserve chamber falling by the operation of the spoon 24 the float 2 is maintained in its raised position until the float 1 falls sufficiently to release the rollers from the cam 6. As the float 2 falls, a projection 19 on the arm engages the arm 9 and draws it back past its mid-position thereby suddenly closing the valve 16. In a modification, the secondary arm is mounted on the pivot of the arm 7. The valve-operating mechanism is used in hot-water heaters to prevent the entry of cold water when drawing off hot water until the latter has reached a predetermined level.

211,977. Mycock, W. Dec. 2, 1922.



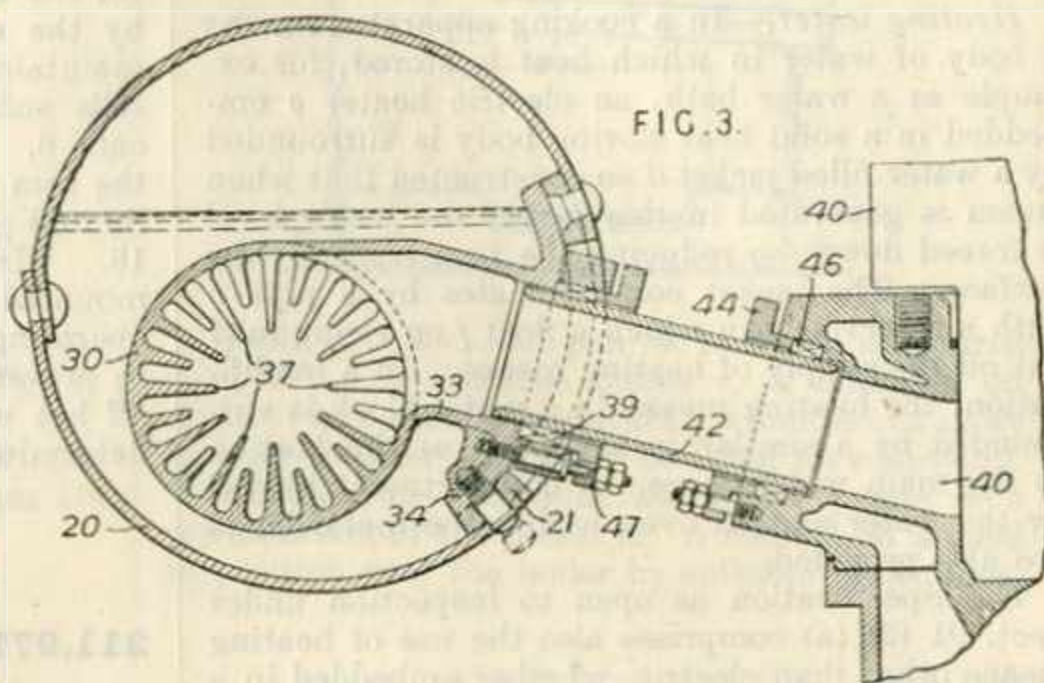
Boilers.—Apparatus for heating buildings comprises a closed hot-water circulating system, a main heating chamber to the top of which the flow pipe is connected, a preheating chamber, to which the return pipe is connected, in the path of the products of combustion, and a pipe connection between the preheating chamber and the bottom of the main heating chamber so that the cooled water returning from the system is preheated before passing into the main heating cham-

ber. The return pipe D, Fig. 1, is connected to a pipe c' having offset compartments c contained in a rectangular casing E and shaped to allow a sinuous passage for the combustion gases. A pipe D', passing outside the casing and upwards through the burner G, connects the pipe c' with the main heating chamber A to the top of which

is connected the flow pipe B. In the form shown in Fig. 3 the preheating chamber c is a hollow flat spiral and is arranged round the cylindrical casing. Alternatively, a number of spiral pipes or pipes arranged in zigzag fashion may be used for preheating.

212,015. Mason, V. B. Harley-- Dec. 30, 1922.

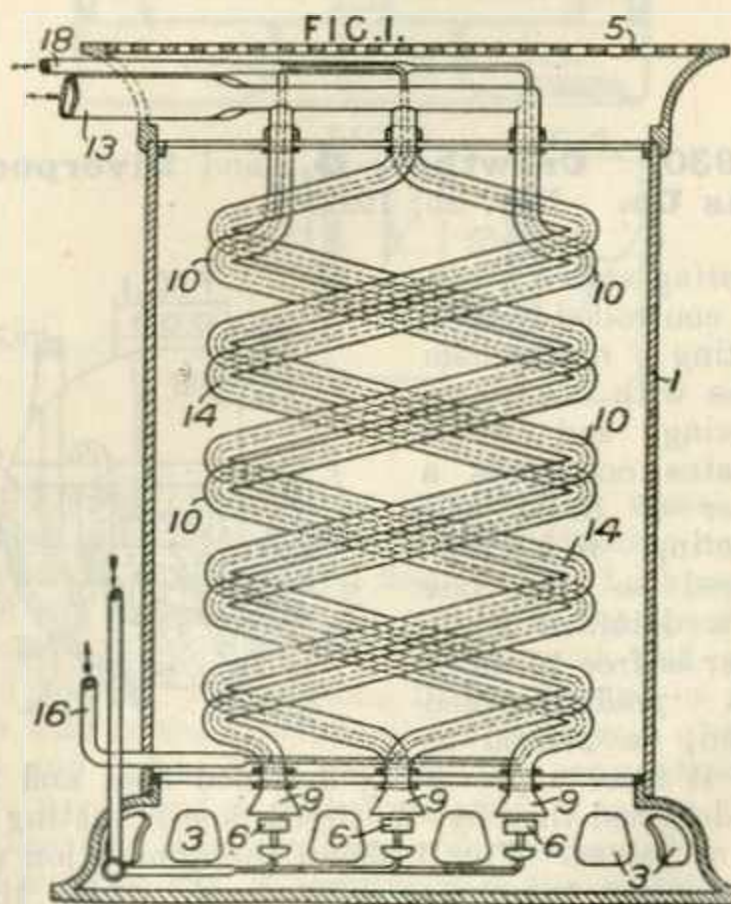
Heating water. — A water heater particularly adapted to be heated by gas engine exhaust comprises a pipe 30 having one or more branches 33, the ends 34 of which are curved to fit the inside of a cylindrical water jacket 20. A packing 21 may be interposed and fins 37 may be provided on the inside or on the outside of the pipe 30 or on both. The jacket 20 may be connected to the exhaust passages 40 either directly or by short lengths of tube 42 which may be flexible. The exhaust may be caused to traverse the cylinder 20 two or more times by providing additional parallel exhaust pipes which are connected together by headers and one or more of these pipes may comprise a nest of smaller parallel tubes. The pipe 30 also may be replaced by nests of small parallel tubes which connect a number of chambers having radial passages 33 with flanges



34. The jacket 20 may be constructed in sections which are connected by short lengths of pipe having an expansion joint at each end.

212,395. Marshall, T. Feb. 22, 1923.

Water-tube boilers. — A combined water-heater and air-heating stove comprises a casing 1 at the lower part of which is located a series of gas or oil burners 6, a series of coiled tubes 10 having their lower ends 9 opening above the burners to receive the hot gases and products of combustion and their upper ends communicating with a flue 13, and a series of tubes 14 through which water circulates arranged within the tubes 10 and connected to inlet and outlet pipes 18, 16 respectively. Air is admitted to the lower portion of the casing 1 through holes 3 and is heated in rising through the casing by contact with the exterior of the tubes 10, finally emerging through a grating 5, while the water is heated in its passage through the coiled tubes 14.

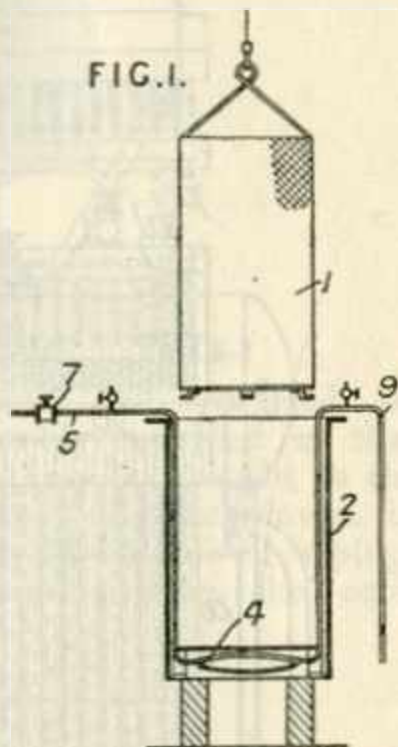




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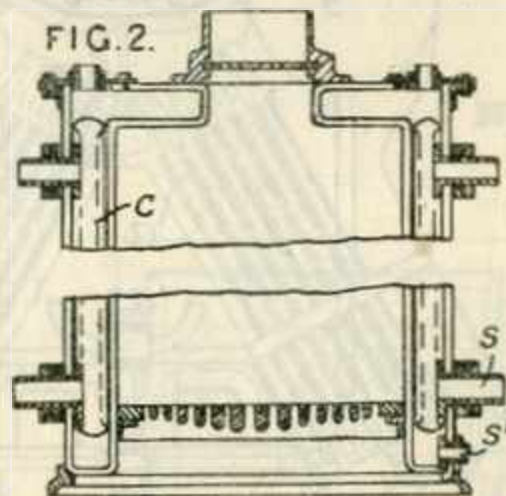
212,456. Barford & Perkins, Ltd., and Perkins, F. A. May 15, 1923.

Heating water.—In a method of treating bulbs for the destruction of parasites by immersing the bulbs in water maintained at a temperature of 110° F.—115° F., the water is heated by steam passed through a pipe 5 fitted with regulating valves 7 of the disc type and having its outflow end 9 raised above the level of the inflow end. The initial heating of the water is effected by opening the valves 7; when the critical temperature is reached the valves are closed so that a small leakage of steam maintains the temperature of the water in the coil 4. Separate coils may be fitted for the initial heating of the water and for maintaining the temperature. A thermostat, disconnected by a bye-pass fitting during initial heating, may be fitted in a single steam pipe or a thermostat may be fitted in the auxiliary pipe when two pipes are used. In a modification the steam is blown into the water in a tank 2.



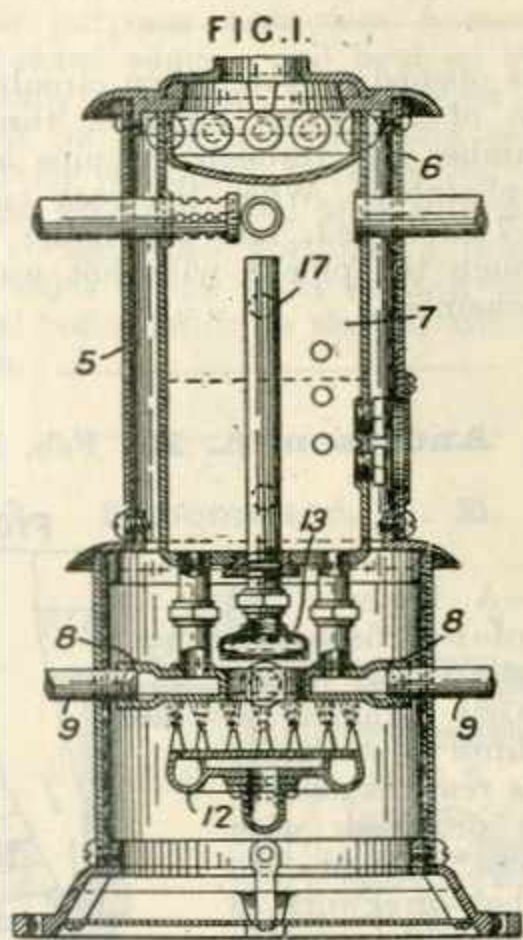
connect the upper chamber to the upper part of the container, and feed-supply pipes 9 open into the lower chamber. The pipes 9 pass through openings in opposite sides of the combustion chamber. The upper and lower chambers are directly connected by a pipe. The hot gases pass upwardly around the sides of the container and escape through a central opening in a cover 6 over the casing 5.

212,788. Binns, V., Binns, J., and Binns & Speight, Ltd. May 18, 1923.



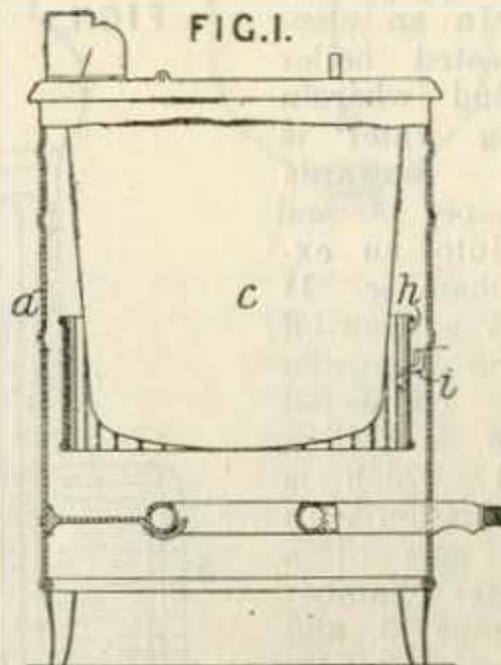
Internally-fired boilers for domestic and like purposes have an outer boiler of annular or jacket form which encloses an inner boiler which makes contact with both the inner and outer walls of the outer boiler while permitting circulation in the outer boiler around the inner boiler. In the form shown the inner boiler C has corrugated walls and each boiler has its own supply pipes S, S'. The inner boiler may have ribbed walls or the walls of the outer boiler may be ribbed or corrugated. Specification 25059/10 is referred to.

212,606. Lewis, C. H. Nov. 14, 1922.



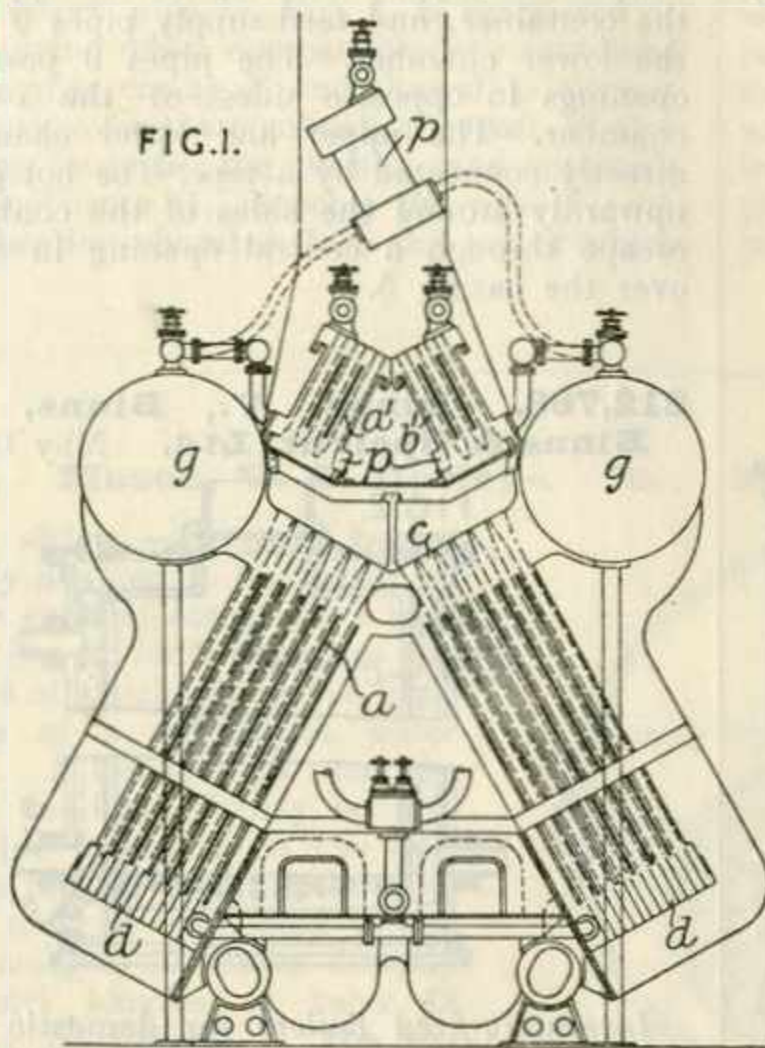
Block-form boilers.—In a boiler of the kind comprising upper and lower shallow water chambers 13, 8 placed below and connected to a water container 7, the lower chamber having a central opening for the passage of the hot gases from the burner 12, a pair of pipes 17

212,844. Dean, W. Sept. 29, 1923.

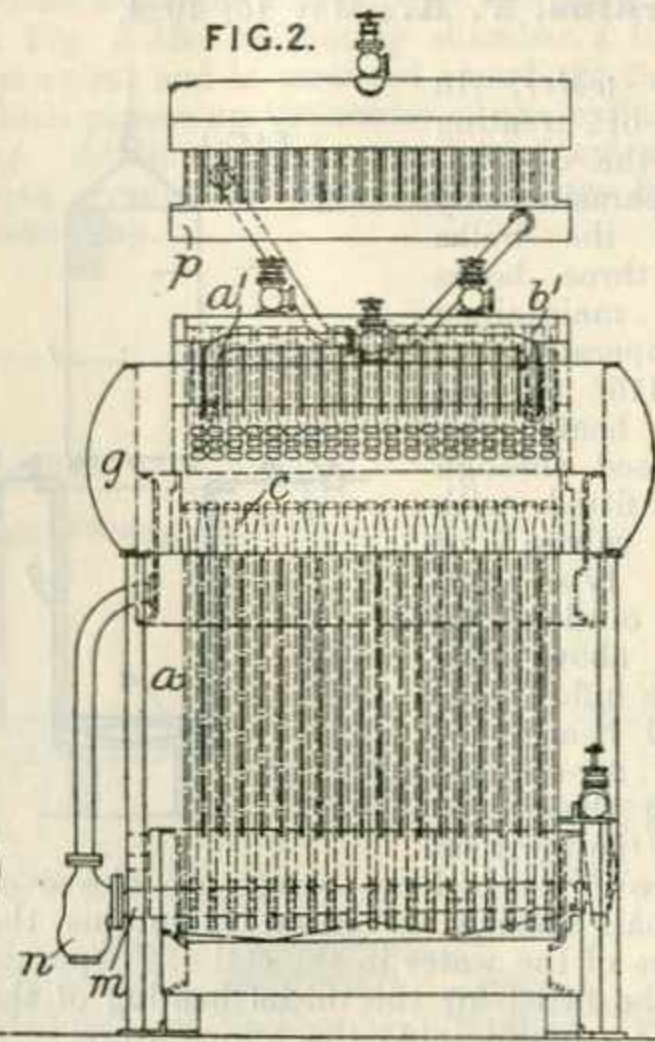


Washing-boilers.—In a gas-heated washing boiler of the type in which a plate is arranged between the pan c and casing a to direct the gases towards the pan, the plate h is corrugated. The corrugations extend vertically and the edges may be beaded with a wire. The plate is supported by brackets i screwed to the casing.

213,063. Kerfoot, J. Dec. 13, 1922.



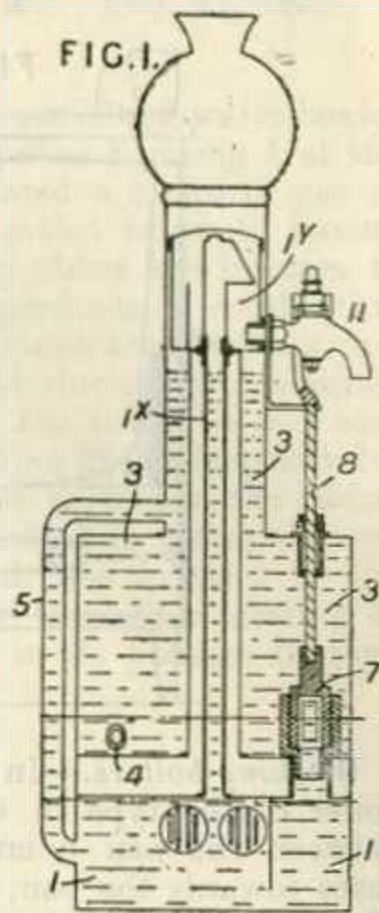
Feed-water, heating.—A boiler having water tubes traversed by smoke tubes and connected to upper and lower headers is supplied with water through one or more inclined conduits placed close to or in the fuel on the furnace grate. Groups of inclined water tubes *a* traversed by smoke-tubes are arranged on each side of a furnace and connected to an upper V-shaped header *c* and to two lower side



headers *d*. The upper header opens into two side drums *g*. The furnace gases pass around the water tubes then upwardly through the smoke-tubes. The feed water passes through an inclined conduit *m* in the furnace and through a depositing chamber *n*. Superheaters *p* having steam tubes *b* traversed by smoke-tubes *a* are arranged in the uptake.

213,066. Jackson Boilers, Ltd., and Hargreaves, H. Feb. 7, 1923.

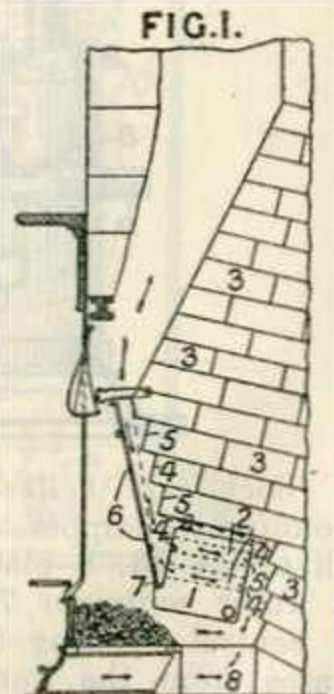
Water supply and delivery.—In an electrically heated boiler of the kind wherein the boiling water is conducted upwards through pipe 1^x and delivered into an expansion chamber 1^x fitted with a draw-off cock 11, the expansion pipe is connected directly to a boiling chamber 1, which is in communication with the upper part of a reserve water chamber 3 by a pipe 5, and with the lower part by way of a cut-off valve 7. Cold feed is supplied to the water chamber through an opening 4. The handle of the draw-off cock is so connected to the valve spindle 8, that when the cock is closed,



the valve is opened. Water then circulates from the bottom of the water chamber through the boiling chamber and through the pipe 5 back to the water chamber. When the cock is opened, the valve 7 is closed, and the boiler chamber is fed through the pipe 5 with hot water from the water chamber.

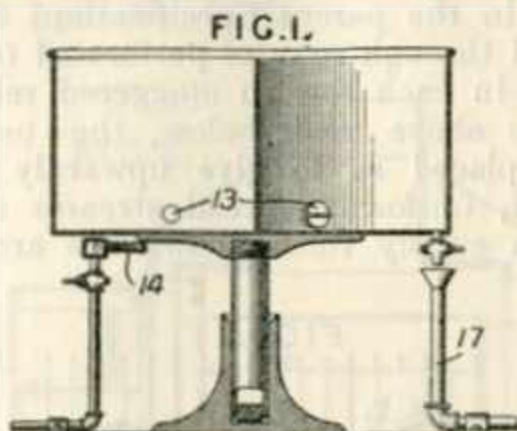
213,081. Anderson, A. B. Feb. 17, 1923.

Boilers.—A boiler 1 at the back of the fire-space of a domestic grate, range, or the like, is arranged so that it inclines downwardly towards the rear, as shown. It may be provided with internal flues 2, and the face of the brickwork 3 may be staggered in order to baffle the gases in the surrounding flue 4 and deflect them on to the boiler.



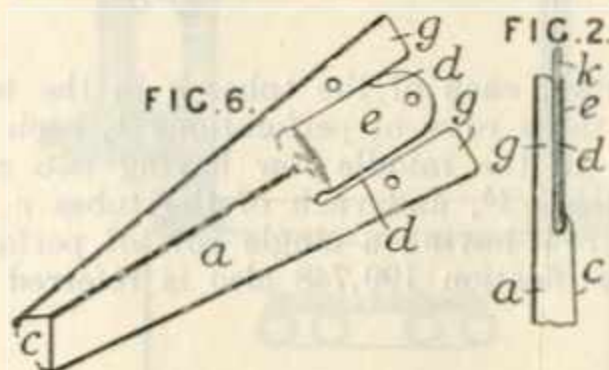


213,150. Vanatter, P. O. May 14, 1923.



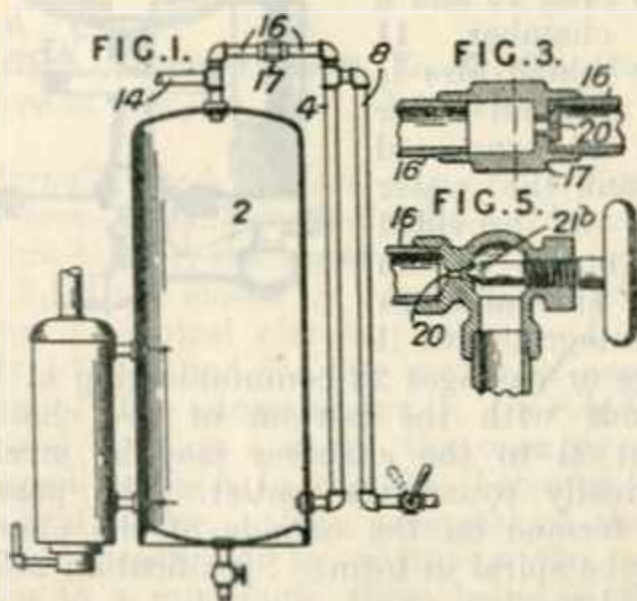
Washing-boilers.—A wash tub, divided by radial partitions, is rotatably mounted so that any of the compartments may be brought to the operator's position, or over a heating-device 14 or above a discharge pipe 17. Removable plugs 13 permit communication between the compartments when desired.

213,167. Rowell, J., Rowell, R. H., and Roxburgh, A. B. June 26, 1923.



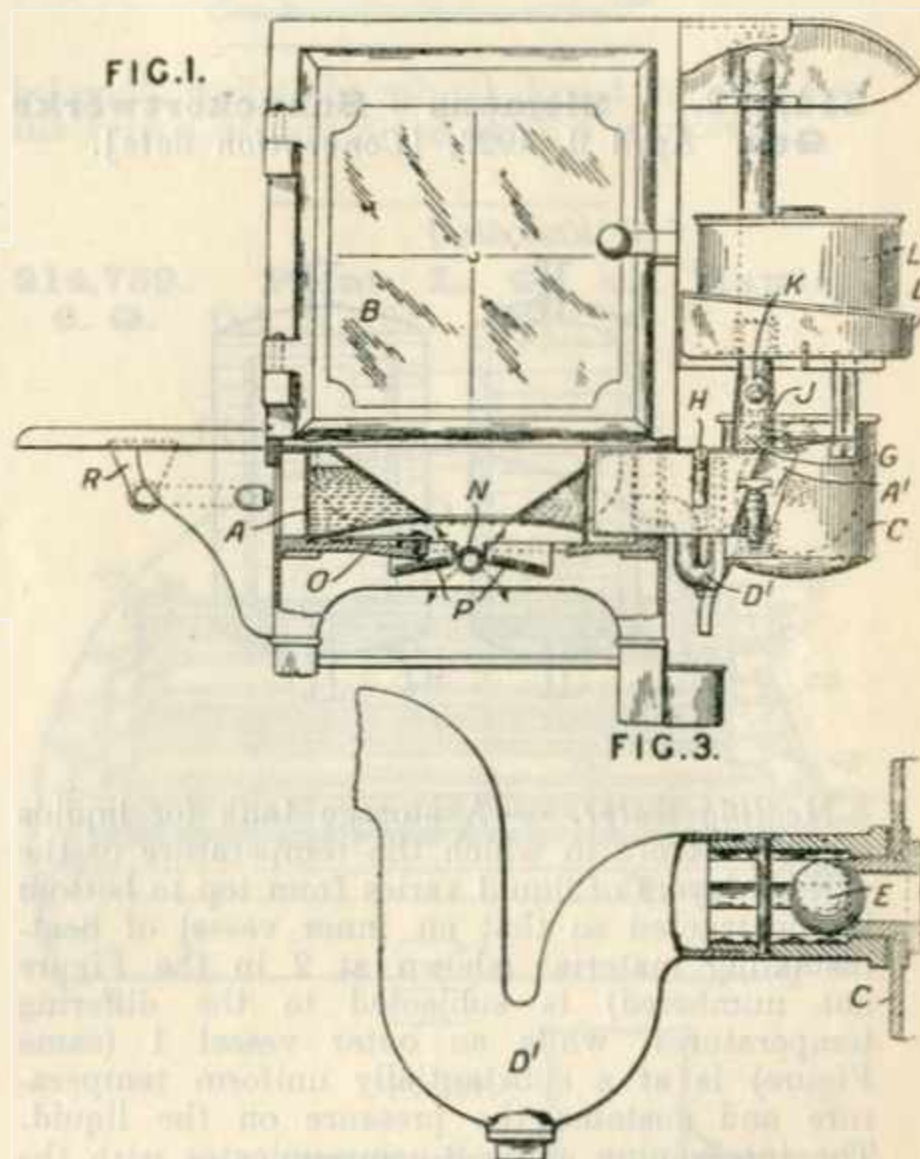
Washing-boilers, set-pans, and the like.—A foot or leg for use in supporting metal washing-boilers, set-pots, washing-coppers, and for analogous purposes comprises a metal strip *a* having beaded edges *c* and bent so that it is of substantially triangular, semi-circular, or channel section at its lower end, the said section being progressively flattened towards its upper end. The upper end is slotted at *d* to form a central tongue *e* and side portions *g* which lie on opposite sides of the lower edge of the casing of the metal boiler &c. *k*, as shown, and are secured by rivets.

213,189. Shoemaker, G. E. Aug. 30, 1923.



Heating water.—The cold water supply 8, 4 to a hot-water storage tank 2 in a domestic supply system is connected as at 16 directly with the hot-water delivery pipe 14 from the top of the tank, there being interposed a fitting 17 having a port 20, of area less than that of the pipe 16, which may be fixed, Fig. 3, or controllable by a screw plug 21^b, Fig. 5. By this connection syphonage of the contents of the tank 2 is prevented.

213,766. Nelson, T. B., and Nelson, A. April 3, 1923.

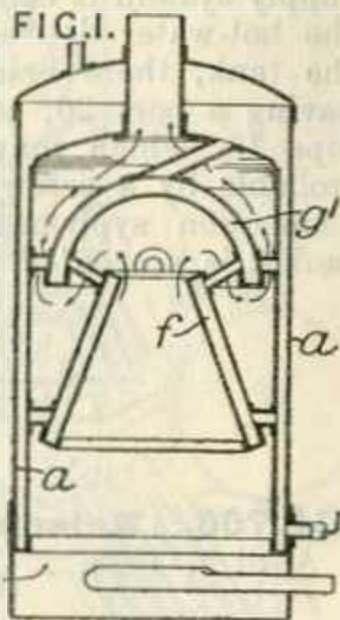


Water supply and delivery.—In a stove in which a single burner heats both an oven and a boiler from which water is delivered by the steam pressure on the steam outlet being closed, a ball or other non-return valve is arranged in the pipe connecting the boiler to the feed water cistern in order to prevent back flow of hot water or steam to the latter. The stove shown comprises an annular boiler *A* beneath an oven *B*. Water is supplied from the cistern *C* by a pipe having a steam-trap *D*¹, there being a non-return ball valve *E*, Fig. 3, at the end of the pipe adjacent the cistern. On a radial extension *A*¹ of the boiler is a vertical pipe *J* supplying steam to a steam-cooking apparatus and in which is a valve *G*, which when closed causes the steam pressure in the boiler to force boiling water from a delivery pipe *H*, whilst the valve *E* prevents back flow from the boiler to the cistern *C*.



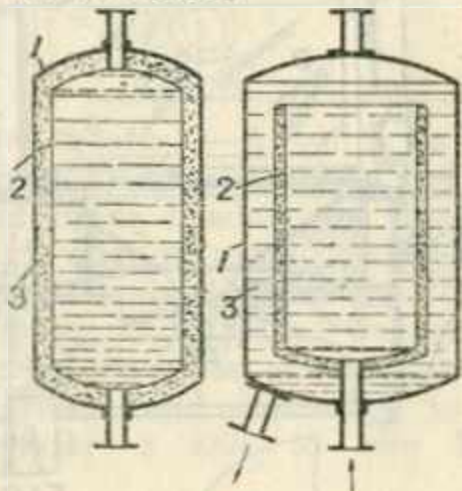
214,088. Fildes, T. R. Feb. 21, 1923.

Internally-fired boilers.
—A water-holding jacket *a* surrounds a firebox in which is mounted a boiler *f* of hollow truncated cone form, surmounted by a hemispherical boiler *g*.



214,212. Siemens - Schuckertwerke Ges. April 9, 1923, [Convention date].

FIG. 1 (Cancelled)



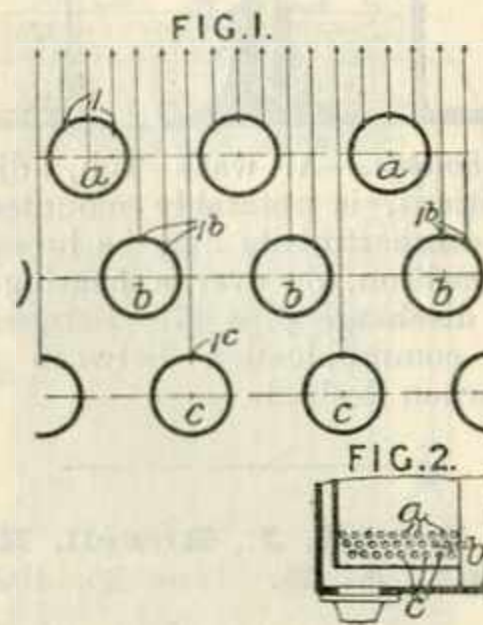
Heating water. — A storage tank for liquids under pressure in which the temperature of the various layers of liquid varies from top to bottom is constructed so that an inner vessel of heat-insulating material (shown at 2 in the Figure not numbered) is subjected to the differing temperatures, while an outer vessel 1 (same Figure) is at a substantially uniform temperature and sustains the pressure on the liquid. The intervening space 3 communicates with the topmost layer and with the outflow and is filled with hot liquid.

The Specification as open to inspection under Sect. 91 (3) (a) comprises also the construction shown in Fig. 1 (Cancelled) in which the space 3 between an inner vessel 2 and the outer casing 1 is filled with non-conducting material and also a modification in which an outer casing has an impermeable non-conducting lining. This subject-matter does not appear in the Specification as accepted.

214,328. Morison, D. B. Jan. 18, 1923.
Addition to 173,534.

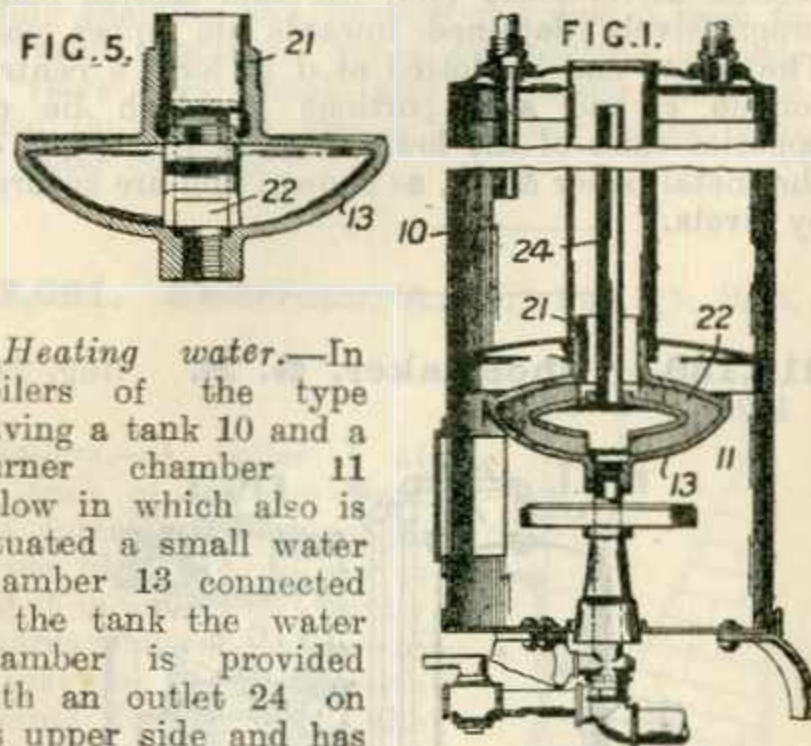
Heating liquids.—In apparatus for heating and deaerating liquids by directing thin streams of

steam upwardly through a body of the liquid, as described in the parent Specification, the steam is supplied through rows of perforated tubes with the tubes in each row in staggered relationship with those above and below, the perforations being so placed as to give upwardly directed, unimpeded, uniformly-spread streams of steam. The steam supply tubes shown are arranged in



three rows, each of the tubes *a* in the top row having three rows of perforations 1, each of the tubes *b* in the middle row having two rows of perforations 1^b, and each of the tubes *c* in the bottom row having a single row of perforations 1^c. Specification 199,748 also is referred to.

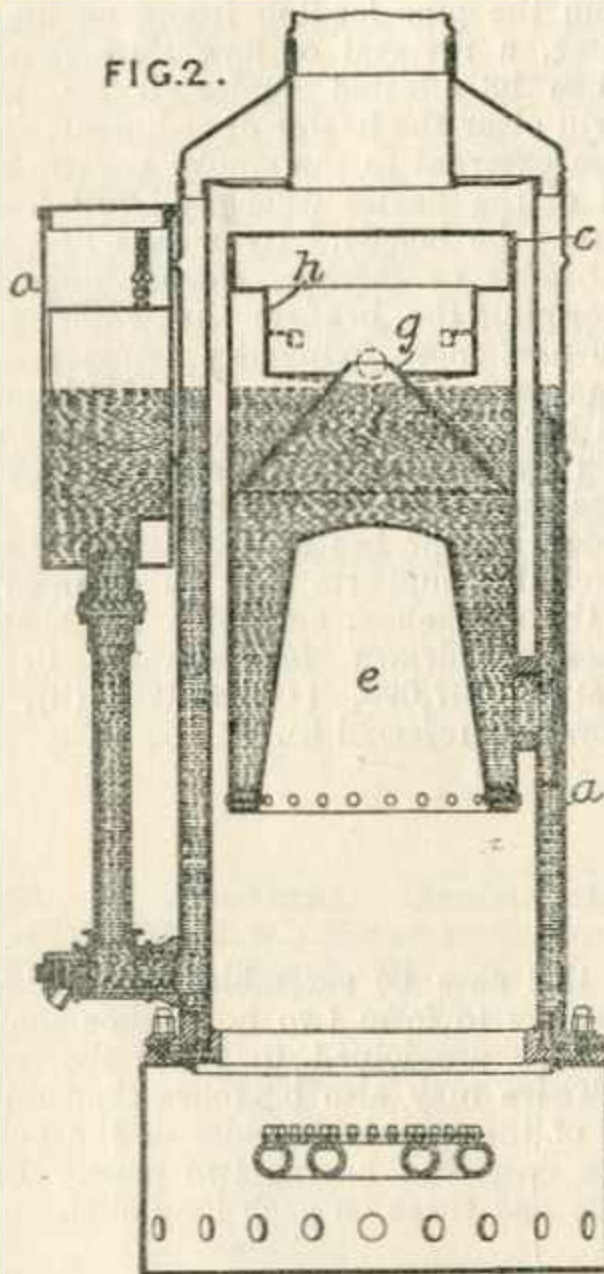
214,427. Withers, J. S., (Bastian-Morley Co.). March 27, 1923.



Heating water.—In boilers of the type having a tank 10 and a burner chamber 11 below in which also is situated a small water chamber 13 connected to the tank the water chamber is provided with an outlet 24 on its upper side and has formed integral with it a passage or passages 22 communicating at their lower ends with the bottom of the chamber. The inlet 21 to the chamber may be arranged concentrically round the outlet. The passages may be formed on the outside of the chamber and may be spiral in form. Specification 203,159 is referred to.



214,465. **Radiation, Ltd., and Yates, H. J.** April 30, 1923.

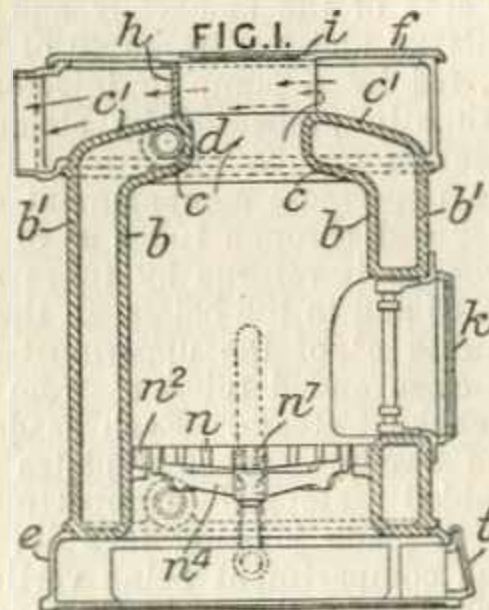


Internally-fired boilers.—Boiling water is drawn from a vessel *h* above the water level in a water chamber *c* mounted within the outer jacket *a*. A pocket *e* is formed in the base of the chamber *c*. On boiling, ebullition under a cone *g* in the water space delivers the water to the vessel *h*. The supply tank *o* mounted on the outside of the boiler may be heated by a pipe through which steam evolved is passed. The delivery cock for water and the gas cock may be interconnected so that, after starting from cold, the gas is only full on when water is being delivered.

214,693. **Cornelissen, L. D. J.,** (Representative of *Douglas, J.*). Jan. 16, 1923.

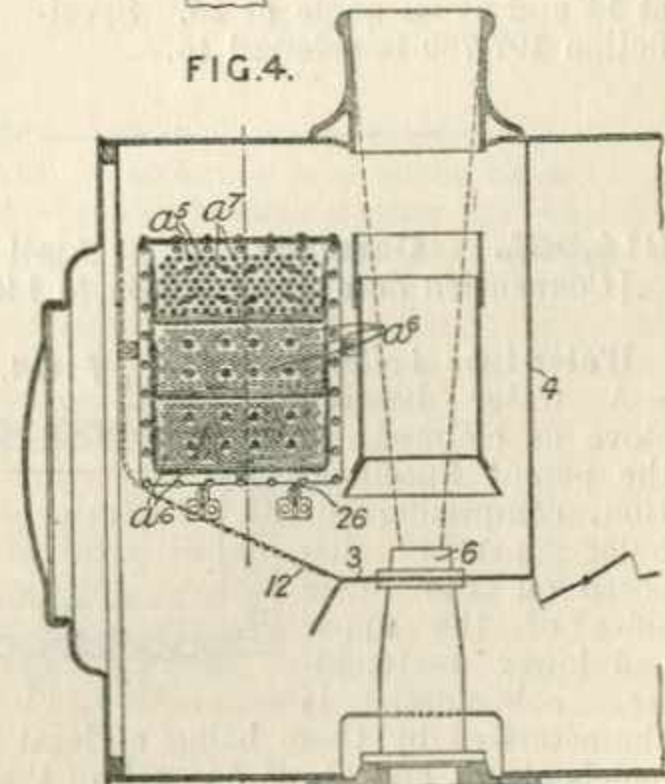
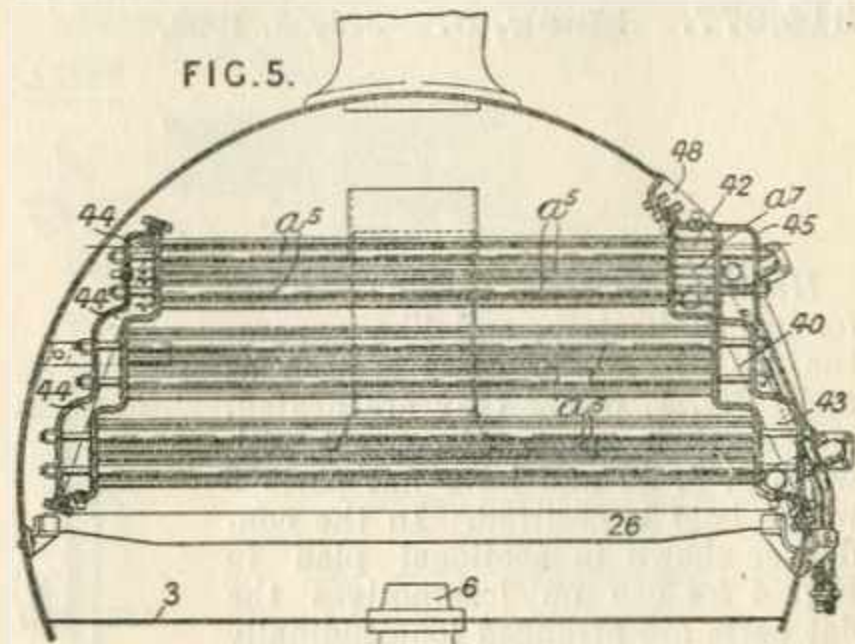
Internally-fired boilers.—In a self-contained boiler-stove having double walls *b, b'* surmounted by a hot-plate *f*, the upper ends of the cylindrical walls *b, b'* are closed by dome-shaped ends *c, c'*, leaving a central circular passage *d* for the supply of fuel and for the escape of combustion products. The stove shown is provided with a fuel feed opening *i* above the opening *d* and a U-shaped baffle *h* in the flue between the hot-plate and boiler. The strength of the boiler walls is preserved by reducing the apertures therein to a minimum, there being in the stove

shown only an inspection door *k* in such a position that the shell is well tied together above and



below it, whilst the ash-pit door *t* is formed in the base *e* on which the shell is supported.

214,769. **Plant, L. G., and Hawley, C. G.** Oct. 26, 1922.



Feed-water, heating.—In a locomotive engine a tubulous feed heater is arranged forward of the