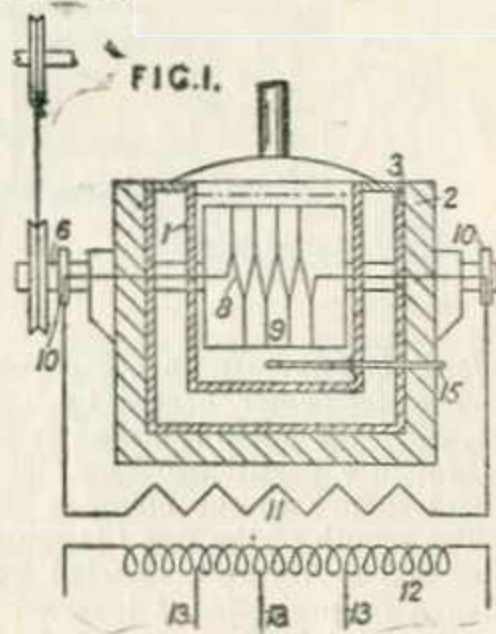




ulating-fan *a* is passed through the heaters or radiators *j* by which the incoming air is heated. According to the invention, the turbine and fan are supported on a bracket *r* arranged externally to the casing *b* containing the heaters *j*, and the exhaust steam or other heated fluid from the turbine passes down through a pipe *h* in the supporting-member *r* to the heater. The heating-elements *j* are preferably inclined at a small angle to the vertical, and the fan is located in an opening *s* in the casing *b* above the heater. The exhaust steam from the heaters is either led to a condenser header *k* connected with a steam-trap *m*, or by valved draining-pipes *o* to a condensed main *p*.

127,987. Alexander, H., Vint, W. T., and Imbery, A. June 12, 1918.

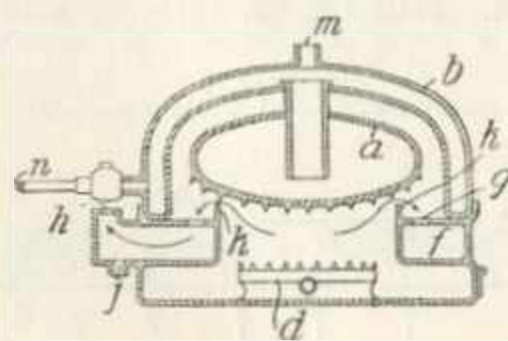


Set-pans.—Oils, fats, and other liquids are heated electrically by a metal or other resistance *8* rotated by a shaft *6* which resistance may have spiral or other stirring-vanes *9*. The vat *1* in which the liquid is heated is enclosed in a brick chamber *2* lined internally with magnesia or other heat-insulating material *3*, an air space being provided between the vat and the magnesia lining. Superheated steam or ozone may be admitted through a pipe *15* for deodorizing, bleaching, and purifying.

128,079. Watson, M. Sept. 7, 1918.

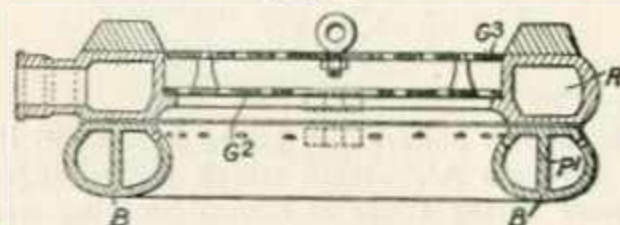
Boilers.—In a water-heater of the type comprising a dome-shaped outer water chamber *b* communicating with an inner chamber *a*, a burner or fire *d* below, and out-flow and return-flow pipes *m*, *n* from a circulation system, the products of combustion are led over an annular flange *k* into a vent chamber *f* disposed at the base of the dome-shaped chamber *b*. The vent chamber *f* is provided with a number of vents *g* of varying sizes, the smaller ones being near to the outlet *h*, and with a down-draught vent *j*.

(For Figure see next column.)



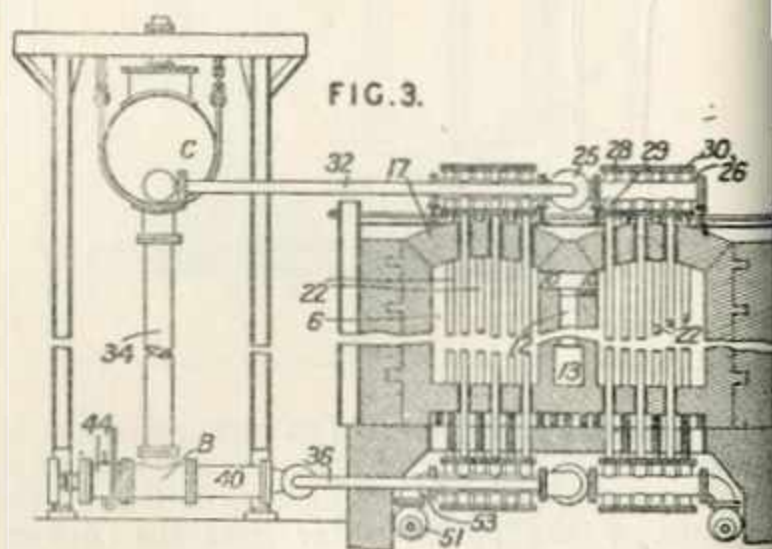
128,766. Mountain, H., and Worsfold J. July 10, 1918. Addition to 12676/15.

FIG. 2.



Boilers.—An annular circulator or water-heater and burner as described in the parent Specification is modified by constructing the burner *B* with a closed top as shown independent of the base of the circulator *R*. The annular partition *P*¹ is made in one piece with the burner. A duplex grilling and heat-conserving plate *G*², *G*³ is provided in place of the single plate described in the parent Specification. The lower plate has a large central opening, and both plates are perforated, as shown.

128,806. White, A. E., (Sinclair Refining Co.) Sept. 12, 1918.



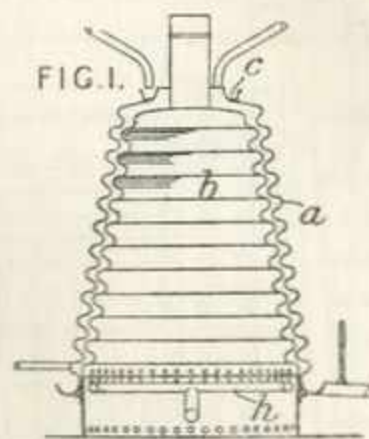
Water-tube boilers.—In cracking hydrocarbons for the production of lighter hydrocarbons, the hydrocarbons are rapidly circulated upwards

through substantially vertical heated tubes 22. The cracked hydrocarbons are discharged through pipes 32 to a supply tank C, where the vapours are disengaged. The liquid hydrocarbons are withdrawn from the tank C through a downcomer 34, and are forced by a pump B through pipes 36 to the cracking-tubes 22. The cracking tubes 22 extend through the walls 17 of the heating-flues 6, and are connected to upper and lower headers consisting of parallel laterals 26 branching from a main 25. Branches 29 on the laterals 26 communicate with each pipe 22. Corresponding branches 28 on the outer side of the laterals are closed by covers or plugs 30. The lower laterals communicate by elbows 53 with traps 51 for the collection and removal of carbon and other deposits. The tubes 22 are heated by products of combustion from separate furnaces situated at the front and back of each of the heating-flues 6. The products of combustion escape by ports 10 situated along the central wall of the flues 6 and pass down flues 12 to stack-flue 13.

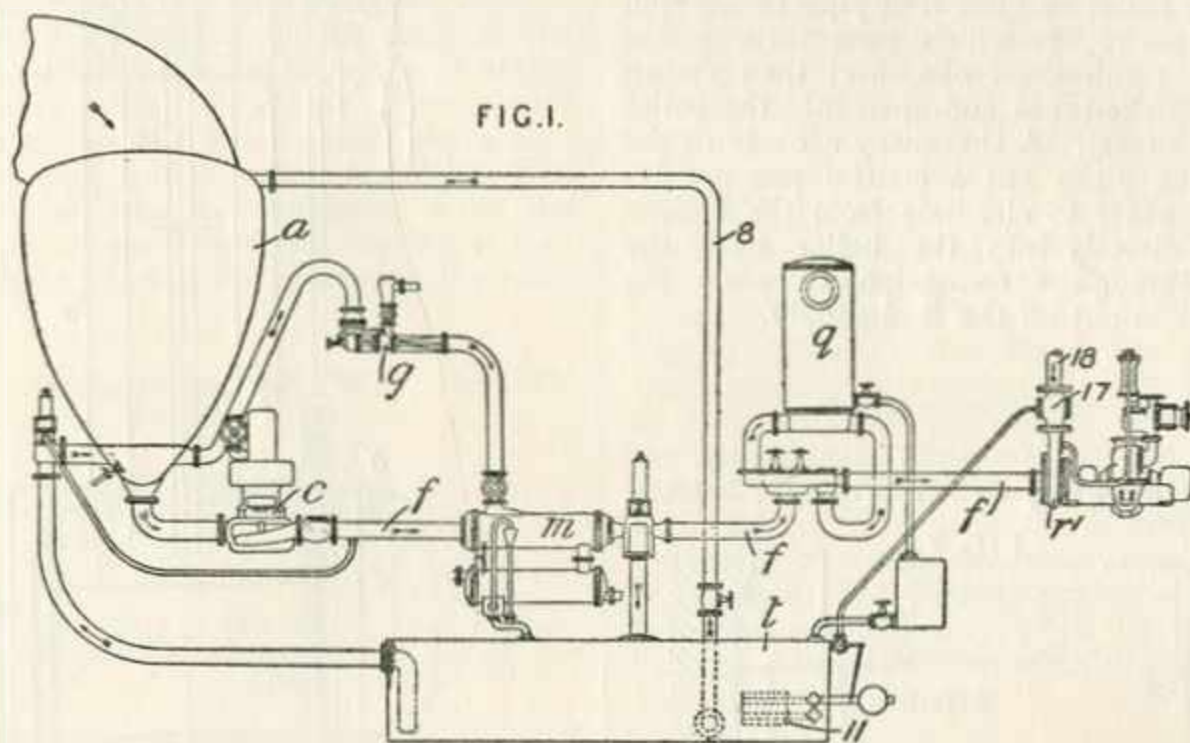
128,845. Waight, C., and Walker, A.
Dec. 13, 1918.

Heating liquids. —

A device for sterilizing milk in which the usual stirring-devices &c. are dispensed with, consists of two co-axial cones of corrugated metal *a*, *b*, the space between which is filled with water. The milk is supplied to a perforated gutter *c* and flows down the outer cone *a*. The water is heated by a gas burner or other heating-appliance *h* arranged within the inner cone. In a modification, the cones are arranged vertex downwards; the milk flows down the inner side and the heating appliance is outside. The apparatus is stated to be sufficiently powerful to prevent good milk from souring, but not to free milk from serious contamination.



128,849. Weir, G. & J., and Lang, C. R. Dec. 20, 1918.

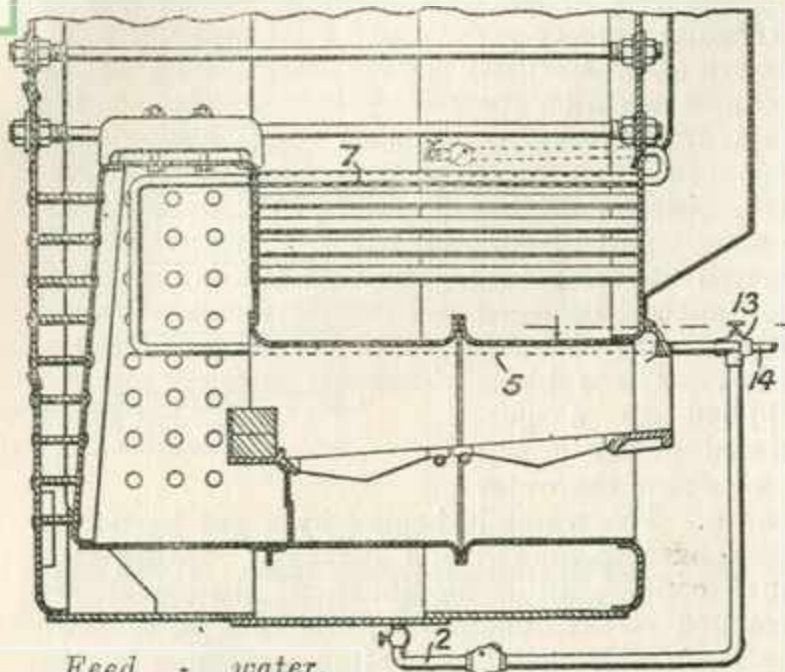


Feed-water, heating. — Relates to feed-water systems of the kind described in Specifications 125,149 and 126,014, and comprising a condenser *a*, condensate pump *c*, air ejector *g*, surface feed-heater *m*, feed-tank *t* and a feed-pump *r*. The invention consists in controlling the rate of discharge of the feed pump in accordance with the level in the feed-tank *t* in order to prevent the emptying of the feed-tank, and the consequent access of air to the system. For this purpose a float *11* is provided in the feed-tank together with link-work or other means for actuating a throt-

tling-device *17* in the discharge pipe of the pump or for controlling the supply of motive fluid to the motor driving the pump. Where a number of feed pumps are used together, the centrifugal pumps are controlled by throttling the discharge and the direct-acting steam driven pumps by controlling the motive fluid. Instead of providing a return pipe *8* leading from the feed-tank to the condenser as described in the above-mentioned Specifications, the return pipe *8* may be led from the main feed pipe *f* on the discharge side of the secondary feed-heater *q*.

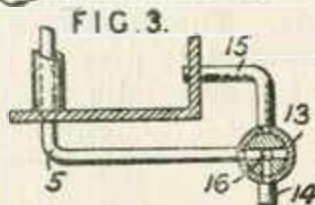
129,058. Walsh, R. May 4, 1918.

FIG. 1.



Feed - water, heating. — To promote the water circulation in a marine boiler and to heat the feed-water, a pipe 2 leading from the bottom of the boiler and the feed pipe 14 are connected to pipes 5, 7, which pass through the boiler to the combustion chamber, then return through the smoke-tubes and open into the boiler near the water level. A three-way cock 13 at the junction of the pipes has a central passage 16, which allows water to circulate from the bottom of the boiler directly into the boiler near the water level through a connexion 15 when the cock is turned to cut off the feed-supply.

FIG. 3.



129,465. Simpson, C. D. July 19, 1918.

FIG. 2.

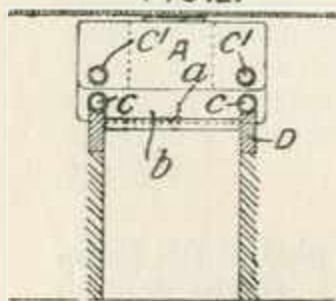


FIG. 7.

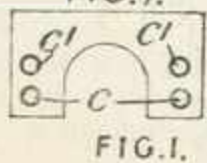
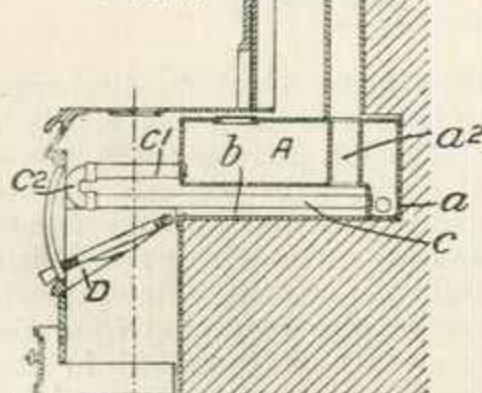


FIG. 1.

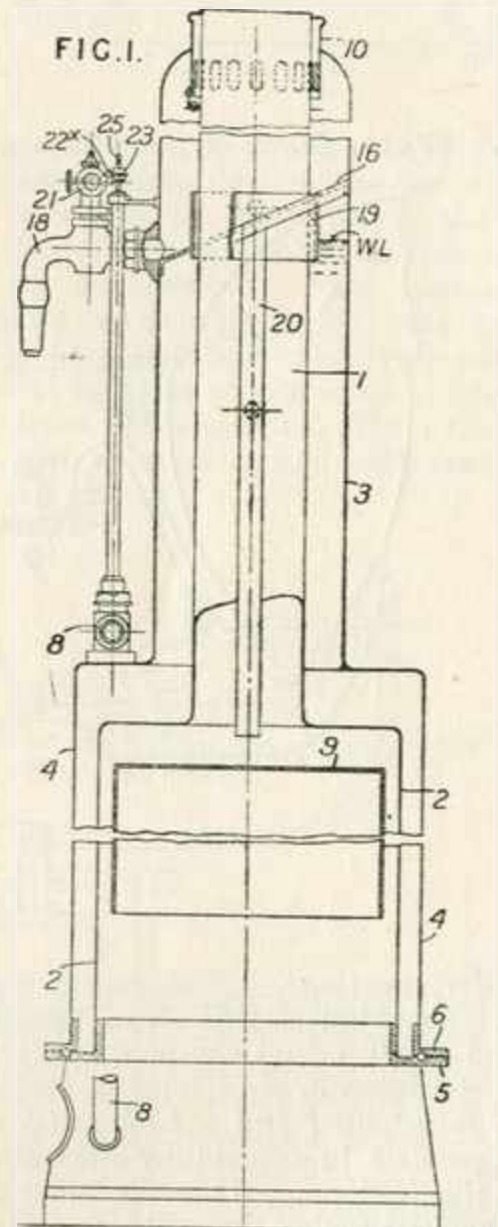


Block or slab form boilers.—Range boilers are provided on each side of the fire grate with circulating pipes, which are additional to and independent of the main circulating pipes and project forward substantially horizontally so as to be exposed to the direct heat of the fire and to com-

municate between a higher and lower portion of the boiler. In the construction shown in Figs. 1 and 2, the pipes consist of an upper pipe c^1 and a lower pipe c on each side of the grate connected by a bend c^2 , the lower pipes c resting on the side cheeks D of the grate. The upper pipes c^1 communicate with the main portion A of the boiler and the lower pipes c with a lower or heel portion a , and flues b , a^2 extend through the boiler. An additional pipe may extend transversely between the upper portions c^1 . In a modification, the upper and lower parts of the boiler are made entirely separate with a flue passage between them. Fig. 7 shows the invention applied to the ordinary saddle type of boiler, in which both sets of pipes c , c^1 are connected to the front of the boiler.

129,750. Richmond Gas Stove & Meter Co., and St. Leger, A. May 14, 1918.

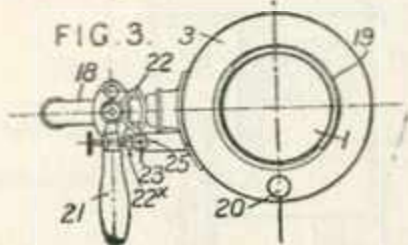
FIG. 1.



Heating water.—Relates to water-heaters of the type comprising inner and outer shells 1, 3, Fig. 1, connected at their bases by means of outwardly-directed flanges 5, 6 so as to be readily separable, the lower portions 2, 4 of each shell being of larger diameter than the upper portions 1, 3. According to the invention, an annular weir or sleeve 19, of a diameter slightly larger



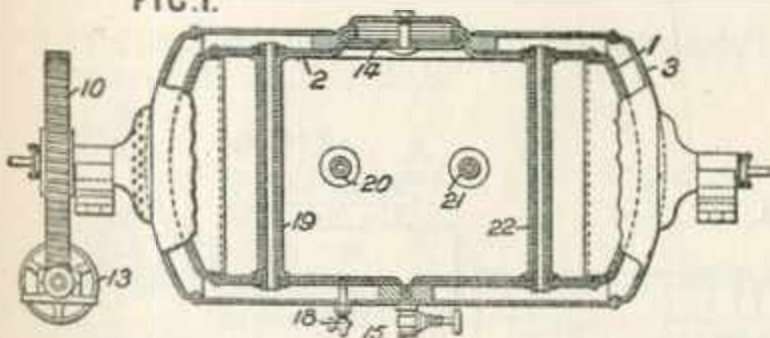
than that of the portion 1 of the inner shell, is located about the height of the water-level W_1 , over which the water boils into a closed space above and can be drawn off by a tap 18. The weir 19 is supported by a diaphragm 16 connected to the outer shell, and a pipe 20 located between the two shells returns surplus water from above the diaphragm to the lower or heating portion of the boiler. A cam-shaped member 22, Fig. 3, is mounted on the tap handle 21, so that, when the tap is turned on, the cam engages a spherical head 23 at the top of a valve-rod 25 and increases



the supply of gas through the pipe 8 to the burners, thus causing the water to boil rapidly over the weir 19. An auxiliary sliding member 22^x may also engage the spherical head 23 in the closed position of the tap, so that the gas supply can be increased until the water is at boiling-point; then the gas supply can be reduced, until water is drawn off at the tap 18. A dome-shaped member 9 may be arranged over the burners to deflect the gas into contact with the inner shell 2, and a perforated sleeve 10 may be fixed at the upper part of the shell 3 to allow escape of steam without allowing water to escape. The water-level may be maintained automatically by a supply reservoir fitted with a valve, and other hot-water receptacles may be connected with the water-heater, such as receptacles having a container for making beverages supported in the main receptacle.

130,119. McLaurin, W. W. June 26, 1918.

FIG. 1.



Digesters.—An apparatus for use in converting starch into dextrin comprises a jacketed vessel connected to a steam supply and provided with a lead lining 2 which is rotatable by gearing 10, 13. Cross tubes 19—22 are provided to assist the agitation of the contents. A man-hole 14, discharge valve 15 and pet cock 18 for withdrawing samples are fitted.

130,120. McLaurin, W. W. June 26, 1918. Drawings to Specification.

Digesters.—Apparatus for dextrin making is described identical with that described in Specification 130,119.

130,161. Ionides, A. C. July 26, 1918.

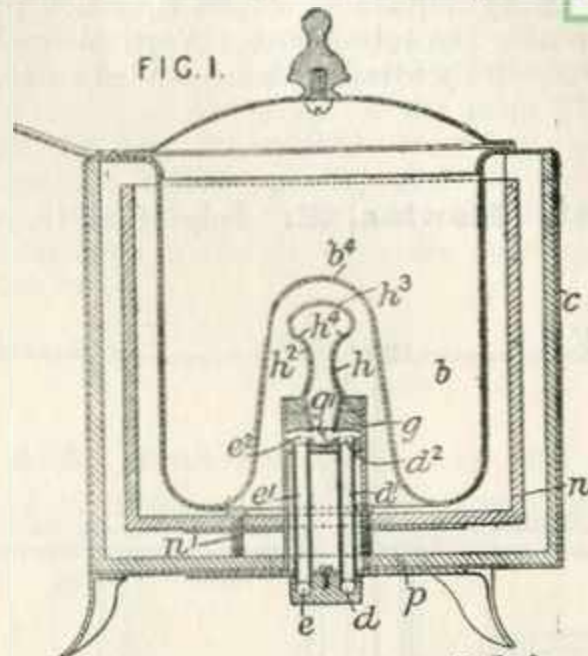


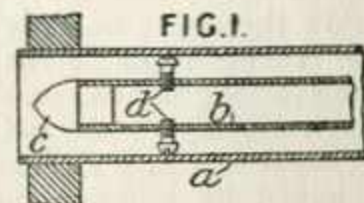
FIG. 3.



Portable and small liquid heaters.—A burner for consuming a correctly-proportioned mixture of gases consists of a tube or nozzle h of non-conducting or heat-insulating material, such as silica glass, with a conical, flared, or like diverging mouthpiece h^2 , in which combustion takes place. It may be surmounted by a dome h^3 beneath which are apertures h^4 through which the combustion products escape. The gas and air are supplied by conduits d, e and tubes d^1, e^1 to passages directed tangentially towards a central cavity g^1 in the block g , in which the gases mix before entering the burner tube h . In a modification, Fig. 3, a tube q of fire-clay or the like has a converging-diverging passage q^1 , and is surmounted by a domed shield or cover q^2 , with apertures q^4 , the flames being directed upwards by a cup-like deflector r in a metal casing s . The burner, Fig. 1, is shown fitted to a liquid-heating apparatus consisting of a vessel b with a large internal bulge b^4 , in a double heat-insulating shell c and an inner receptacle n supported by screws n^1 and forming flues down which the combustion products pass to outlets p .

130,234. Kirke, P. St. G. Oct. 30, 1918.

Boilers; feed-water, heating.—In a multi-tubular waste-heat boiler for heating water in which the length of the tubes is limited by situation or otherwise, the relation between effective cross-section and length necessary to efficiency is obtained by fitting the tubes with cores, and the number of tubes is increased; also, if necessary, the draught is increased. Fig. 1

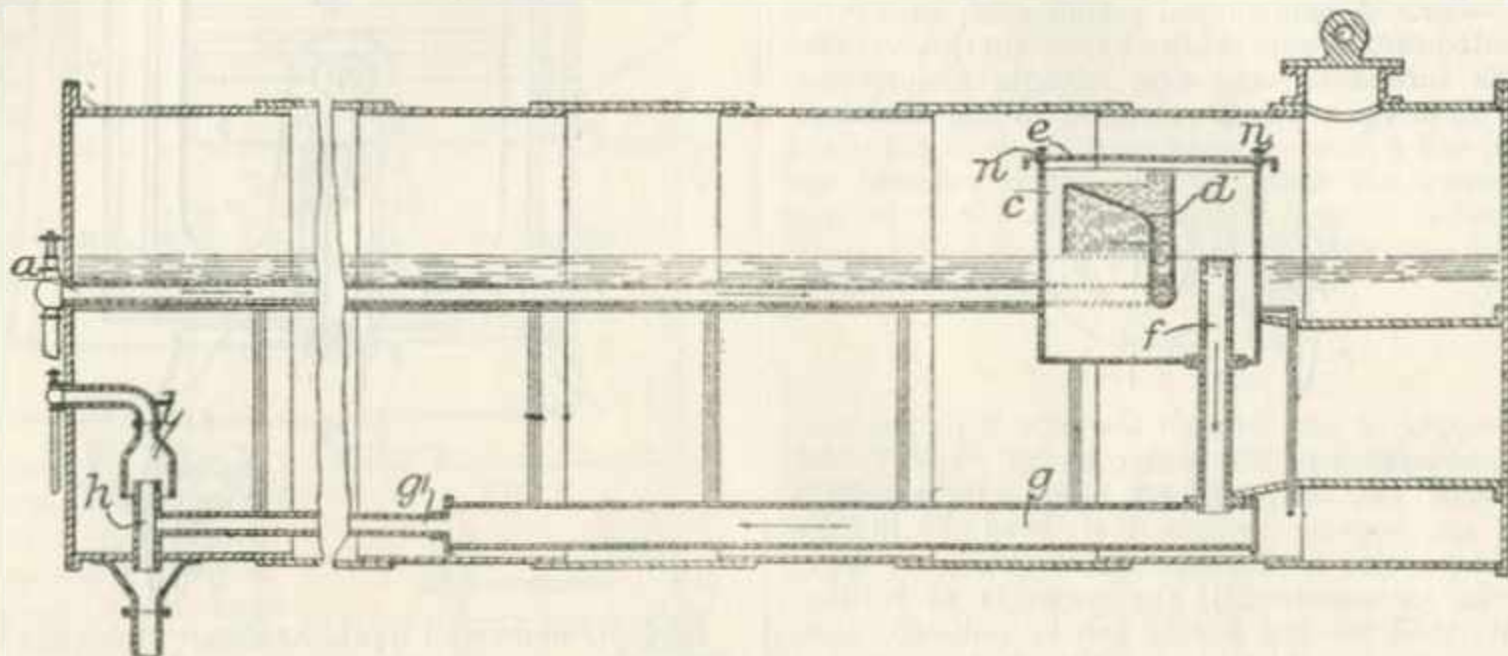




shows a shell-nosed core tube *b* supported in a fire-tube *a* by adjustable screws *d*, which preferably are near the tube plates. Vertical fire-tubes may be similarly fitted with suspended cores. The

cores may be attached to the upper or outer projecting ends of the tubes by split-pins. The screws *d* may be replaced by radial supports on the stoppers *c*.

130,443. **Hewins, H.** July 18, 1918.



Feed-water, heating.—The feed-pipe *a* is led through the water space and over a spreader plate *d* in a tank *c*, which is open to the steam space and has a cover *e* mounted freely on studs *n* on the tank. The outlet from the tank is connected

to a sludge trap *g*, from which the water flows through a pipe *g*¹ to a vertical cross-pipe *h* opening at its lower end into the blow-off and at its upper end into a grease trap *l*.

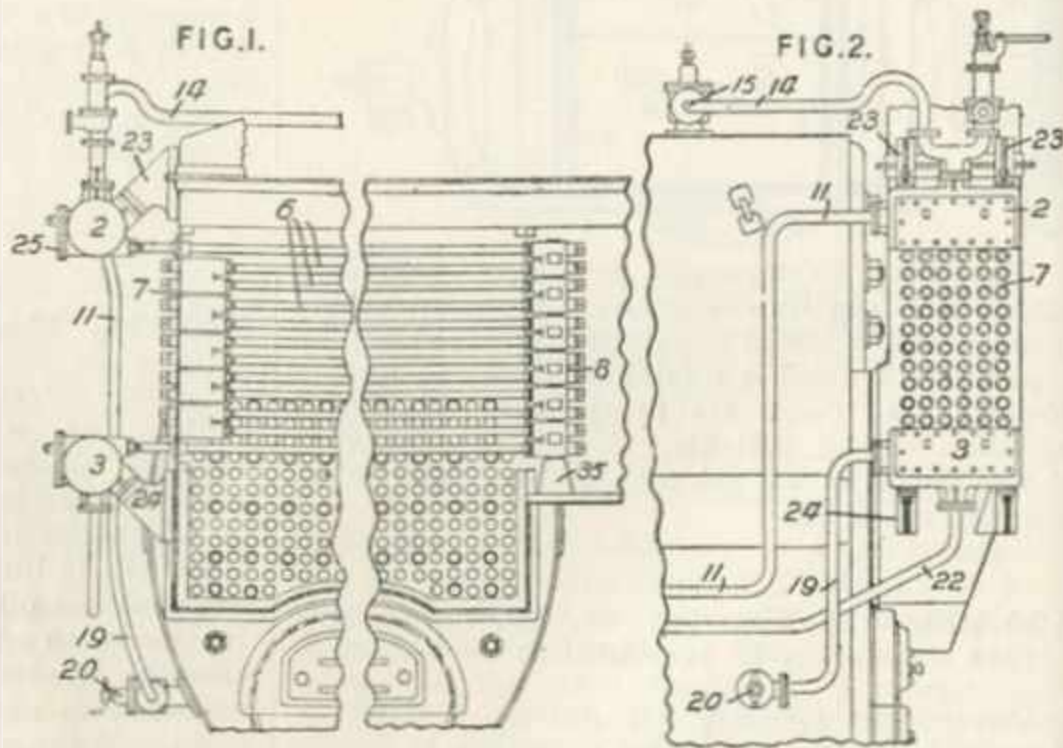
130,458. **Weltert, F.** July 30, 1918.
Drawings to Specification.

Heating water.—In a steam-heated water-

heater, the supply of steam is controlled by two thermostatic cells, one surrounded by the hot water, and the other by the condensate from the heating-pipes.

130,540. **Harbinger, W.** Dec. 16, 1918. *No Patent granted (Sealing fee not paid).*

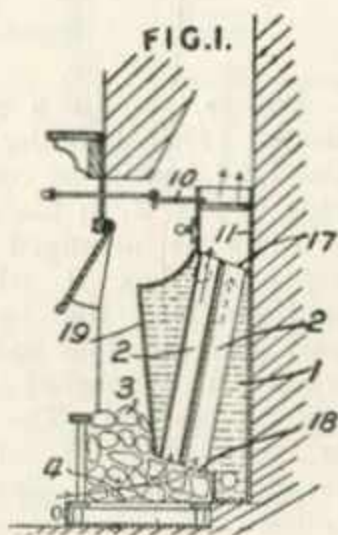
Feed-water, heating.—In a feed-water heater and auxiliary steam-generator fitted in the smoke-box of a marine boiler, of the kind comprising horizontal water-tubes connected to horizontal headers as described in Specification 27760/08, [Class 123, Steam generators], one of the headers is placed above and the other below the boiler water-level, the tubes being arranged transversely and the headers longitudinally of the boiler. Vertical sets of water tubes *6* joined by junction boxes *7, 8* are connected to cylindrical headers *2, 3* supported by brackets *23, 24* on the sides of the smoke-box. Doors *25* are fitted on the



front of the headers to afford access to the tubes. The junction boxes 8 are free to slide one upon the other and upon their support 35. The tubes may be fitted with tubular cores. To use the apparatus as an auxiliary generator, the feed-supply connexions 11, 22 are closed and the cocks 15, 20 are open to place the tubes in free communication with the boiler through pipes 14, 19.

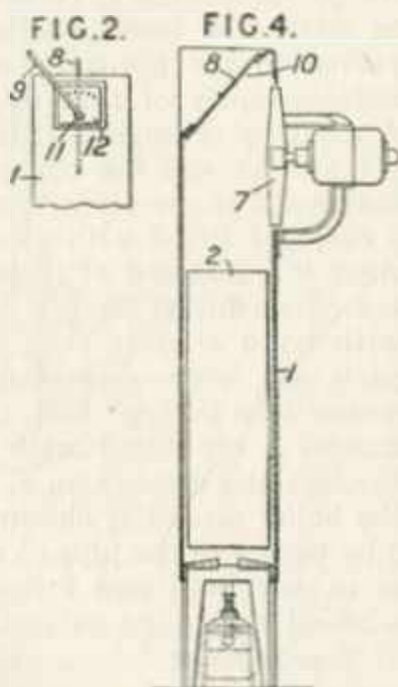
130,841. Brett, H. S. Nov. 19, 1918.

Blocks or slab form boilers. — Relates to hot-water boilers of the kind in which the front 19 of the boiler 1 forms the back deflecting plate of the fire-place and in which steeply inclined fire-tubes 2 pass through the boiler from a point below the level of the top of the fire 3. According to the invention, the boiler is provided with a tube-plate 18 which overhangs the fire-grate 4 below the level of the top of the fire and the tubes 2 are fitted between the tube-plate and the top 17 of the boiler. The draught is regulated by a damper 10 sliding in a casing 11 fitted on the top of the boiler.



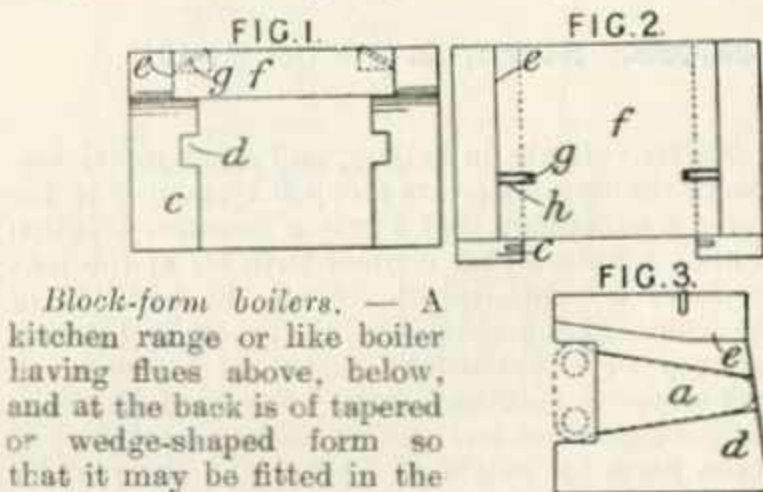
131,107. Russell, J. N., and Rosser & Russell. July 4, 1918.

Heating air. — Relates to apparatus for heating and ventilating buildings of the type in which a fan 7 and a damper 8 co-operate with a heating-element 2 arranged in a casing 1, the damper being closed when the fan is in motion so that the air is forced downwards past the heater, and, when the fan is at rest, the damper is opened so as to allow the air to rise from the casing through the opening 10 under natural draught. According to the invention, the



movements of the damper are controlled by mechanical or electrical means brought into operation by setting the fan in motion. In the construction shown, a rod 9 connected to the damper 8 is secured to the pivot of the lever 11 of the switch 12 for controlling the fan, which is arranged in a side opening near the top of the casing, a solenoid for regulating the damper may be connected in circuit with the starting switch for the fan.

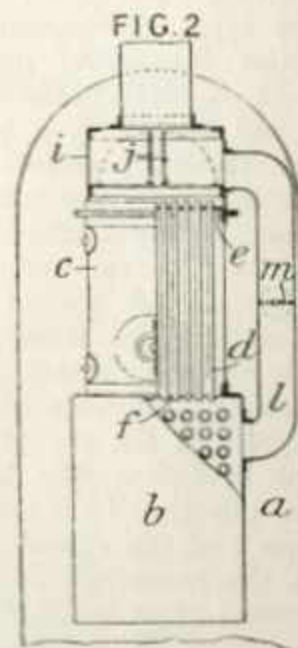
131,433. McAlpine, G. Aug. 17, 1918.



Block-form boilers. — A kitchen range or like boiler having flues above, below, and at the back is of tapered or wedge-shaped form so that it may be fitted in the setting with either face upwards, thus allowing the inlet and outlet connexions to be brought to either side. The side bricks *c* of the setting of the wedge-shaped boiler *a* have tapered recesses *d* on their inner faces to receive the sides of the boiler. Recesses *e* are formed in the upper edges of the side bricks to receive the top brick *f*, which is held in position by pins *g* projecting from the side bricks and engaging in slots *h* in the top brick. The under side of the top brick is inclined and so shaped that the flue above the boiler has an enlarged front opening.

131,733. Wood, A. Aug. 28, 1918.

Feed-water, heating. — Relates to feed-water heaters which are arranged in or adjacent to the flue of the boiler. The smoke-box *b* of the boiler *a* is provided on its upper side with a cylindrical casing *c* containing a number of vertical smoke-tubes *d* fixed in top and bottom plates *e, f*. An auxiliary smoke-box *i* is provided above the heater, having a pair of dampers *j*, which may be operated by external means to open or close the dampers. An auxiliary flue *l* is provided, as



shown, and may be controlled by a damper *m* which is operated in conjunction with the dampers *j*. Inlet and outlet pipes and a manhole are provided for the heater. When the apparatus is applied to an ordinary vertical boiler, the uptake of the boiler carries an inverted cone-shaped member to the top of which the heater is attached. The lower end of the auxiliary flue opens into the conical member which may also be provided with a door for cleaning purposes.

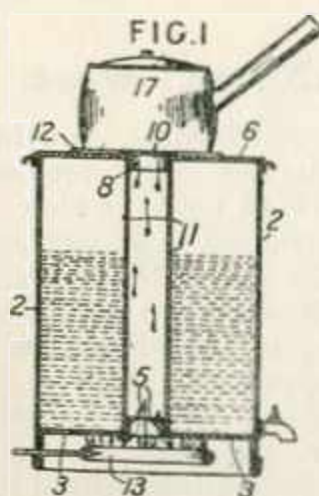
132,088. Stern, L. J. Oct. 1, 1918.

Boilers.—Leaks in boilers, and other metal vessels containing water are stopped by adding to the water a substance that forms a colloidal solution of such a nature that contact with air at the leak produces a hard deposit. After the addition of the leak-stopping substance, the water in the vessel may be circulated by means of a pump. A leak-stopping substance may be formed by melting cube gambier and adding thereto a mixture of seven parts by weight of alcohol and one part by weight of water, the resultant mixture being heated in a closed vessel to about 350° F. and then cooled. The cube gambier may be replaced by bark extracts containing catechin &c. The water in the boiler &c. may be heated to a temperature that vaporizes the alcohol or other solvent.

132,155. Brampton, F. W. Jan. 20, 1919.

Boilers.—Relates to apparatus for use in heating water and for cooking purposes, of the type comprising a water chamber fitted with a detachable lid 6 and heated by a burner 13, the products of combustion from which pass upwards through one or more vertical passages 10 so as to heat both the water in the chamber 1 and also cooking - utensils 17

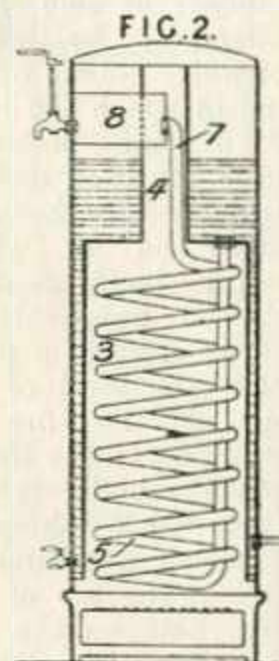
placed on the top of the chamber. According to the invention, the burner 13 is located beneath the chamber in a space formed by extending the side 2 of the chamber and flanging the bottom 3. In the construction shown, the water chamber is formed of an outer cylinder 2, an inner cylindrical flue-tube 10, a detachable lid 6 having a boss 8 engaging the tube 10, and a base 3 also having



a boss 5 engaging the tube 10. The lid 6 is provided with integral projections, ribs, or channels 12 pressed out of the material so as to form passages for the escape of the gases beneath the cooking-utensil when the latter is in position on the chamber.

132,201. Robertson, T., and Robertson, T. April 22, 1919.

Boilers.—In a gas-heated vertical boiler of the kind having a coiled pipe 5, Fig. 2, in the flue 3, there is arranged an expansion box 8 which projects into the upper part 4 of the flue, and to which is connected the top 7 of the coil. The top is perforated to allow escape of fumes. Tea or coffee urns are connected to the water space and expansion chamber of the boiler.



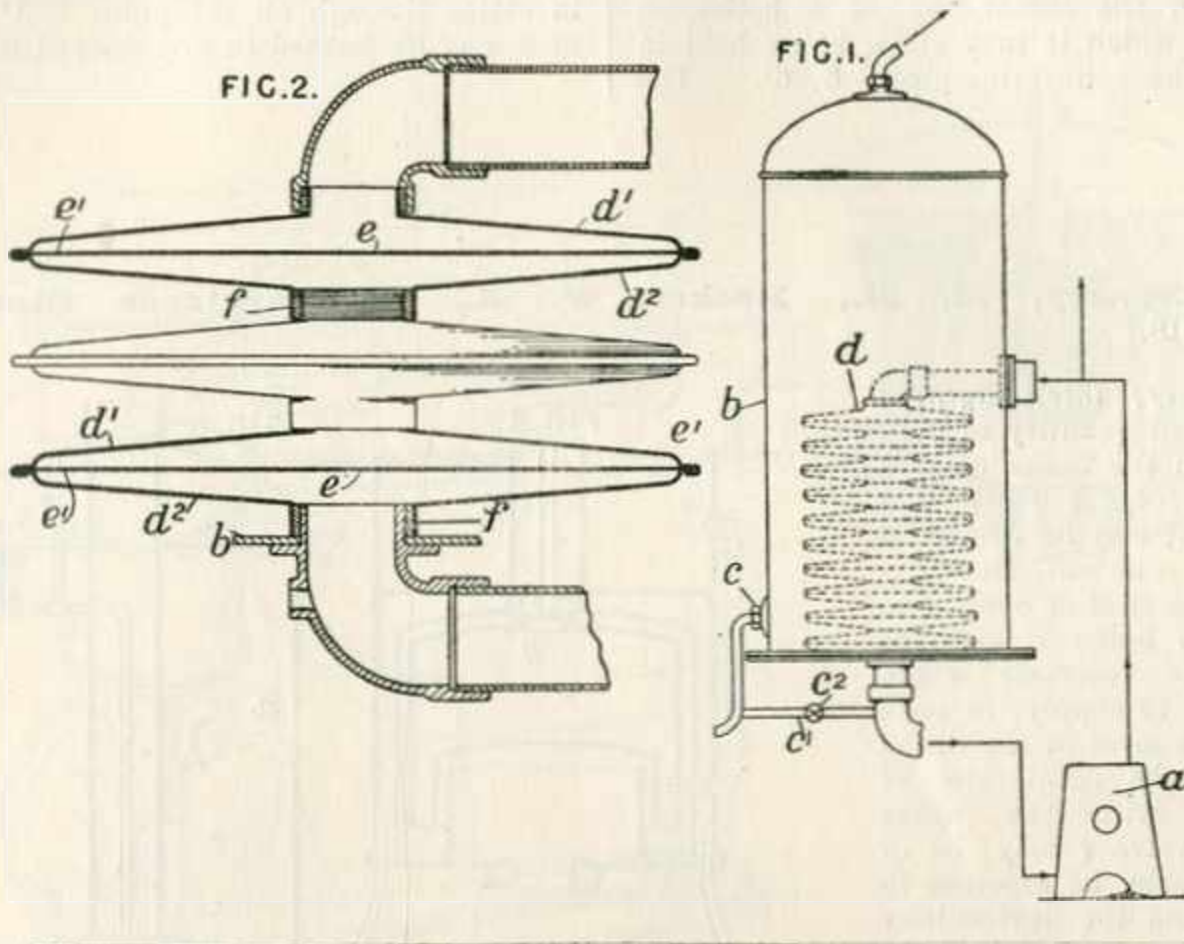
132,317. Heyworth, C. F. Sept. 3, 1918.

Heating water.—Comprises improvements in that type of apparatus for heating water which comprises a boiler in closed circuit with a calorifier in which the heat generated in the boiler is imparted to the hot-water supply which circulates independently of that used in the boiler circuit. A make-up arrangement is fitted between the supply system and the boiler circuit. The domestic boiler *a* is in circuit with a calorifier *d* enclosed in a casing *b* fitted with a supply pipe *c*. The calorifier is composed of disked plates *d*¹, *d*² of non-corrodible metal having a central disk *e* provided with holes *e*¹ near the outer edge. The various parts are screw-connected, as shown, or held together by a through-bolt, in which case the central flanges *f* are fitted with distance-pieces passing through the diaphragm *e*. The make-up water to the boiler circuit is obtained from the supply pipe *c* by means of the pipe *c*¹ and a cock *c*², as shown; or it may be drawn from the cylinder *b* through a small bore pipe extending to near the bottom of the cylinder *b*.

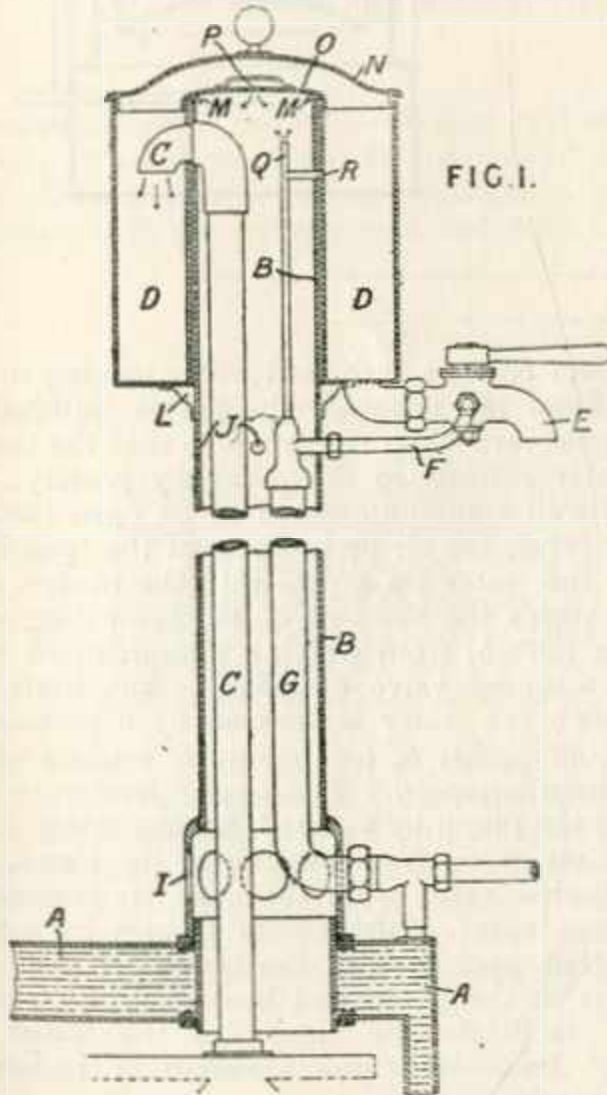
(For Figs. see next page.)



132,317.



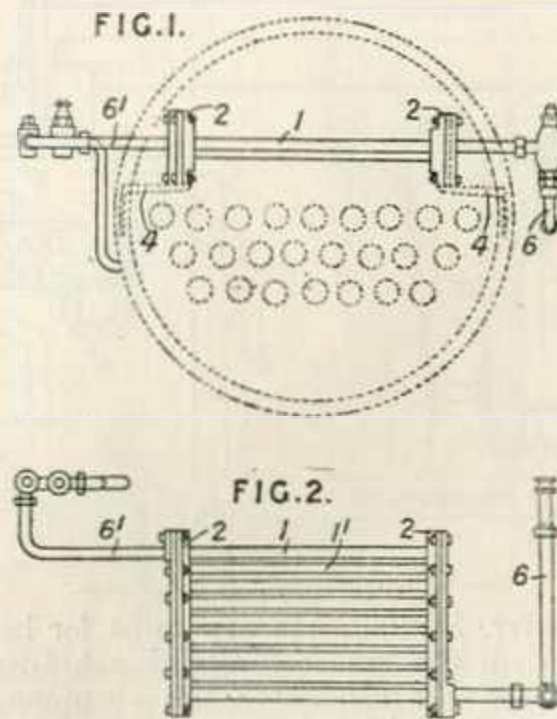
132,427. Jackson, H. B. Jan. 18, 1919.



Water supply and delivery.—Relates to self-feeding gas-heated water-boilers of the type in which the hot water is drawn from an expansion chamber above the water-level. The pillar B is mounted on the boiler jacket A and encloses the expansion and return pipes C, G. Gas outlets I

and vent-holes J are provided. The expansion chamber D slides loosely over the pillar, and is provided with flanges L, M and a double cap N, O, the cap having a steam vent P. The three-way draw-off tap E communicates with an auxiliary pipe F which is opened only when the draw-off tap is closed, so as to empty the expansion chamber back to the boiler. A vent-pipe Q is provided on the pipe G, and an overflow R permits the return of an excess of boiling water.

132,506. Viotti, G. B. Sept. 11, 1918, [Convention date].



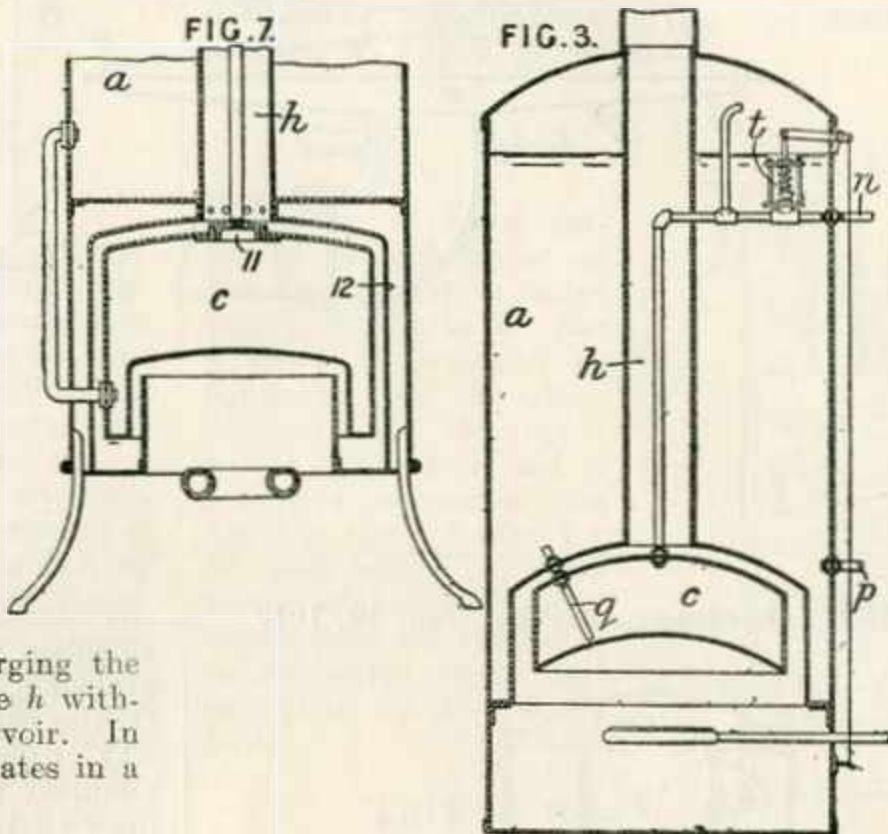


Feed-water, heating. — A heater is mounted horizontally in the smoke-box of a boiler on brackets 4 on which it may slide, being held in position by the connecting-pipes 6, 6¹. The

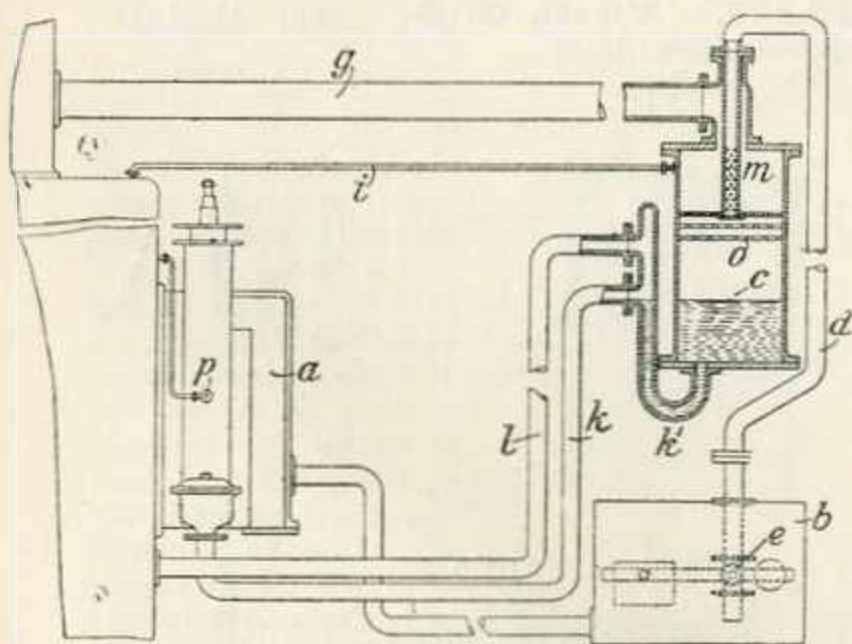
headers 2, 2 have partitions so that water flows in series through all the pipes 1, 1¹. The tube nest may be formed in any desired manner.

132,598. Creasey, H. H., Becket, W. H., and Parkinson Stove Co.
Sept. 16, 1918.

Heating water; internally-fired boilers.—A small quantity of boiling water from the boiler *c*, or a larger quantity of hot water from the reservoir *a*, can be drawn at the outlet pipe *n* at will, according as the valve *t* is shut or open. The inlet *q* to the boiler *c* and the feed *p* to the reservoir *a* are arranged so as to supply, in each case, below the level of the draw-off to avoid the admixture of colder water with the water drawn. The valve *t* may be of any form and may be external to the cylinder, and the device may be fitted with an expansion pipe so operated under pressure. In the modified form shown in Fig. 7, a mantle 12 surrounds the boiler, discharging the products of combustion direct to the flue *h* without contact with the bottom of the reservoir. In this form, too, the draw-off pipe terminates in a hand-hole 11 for cleaning purposes.



132,825. McMaster, A. A., and McMaster, E. April 22, 1918.

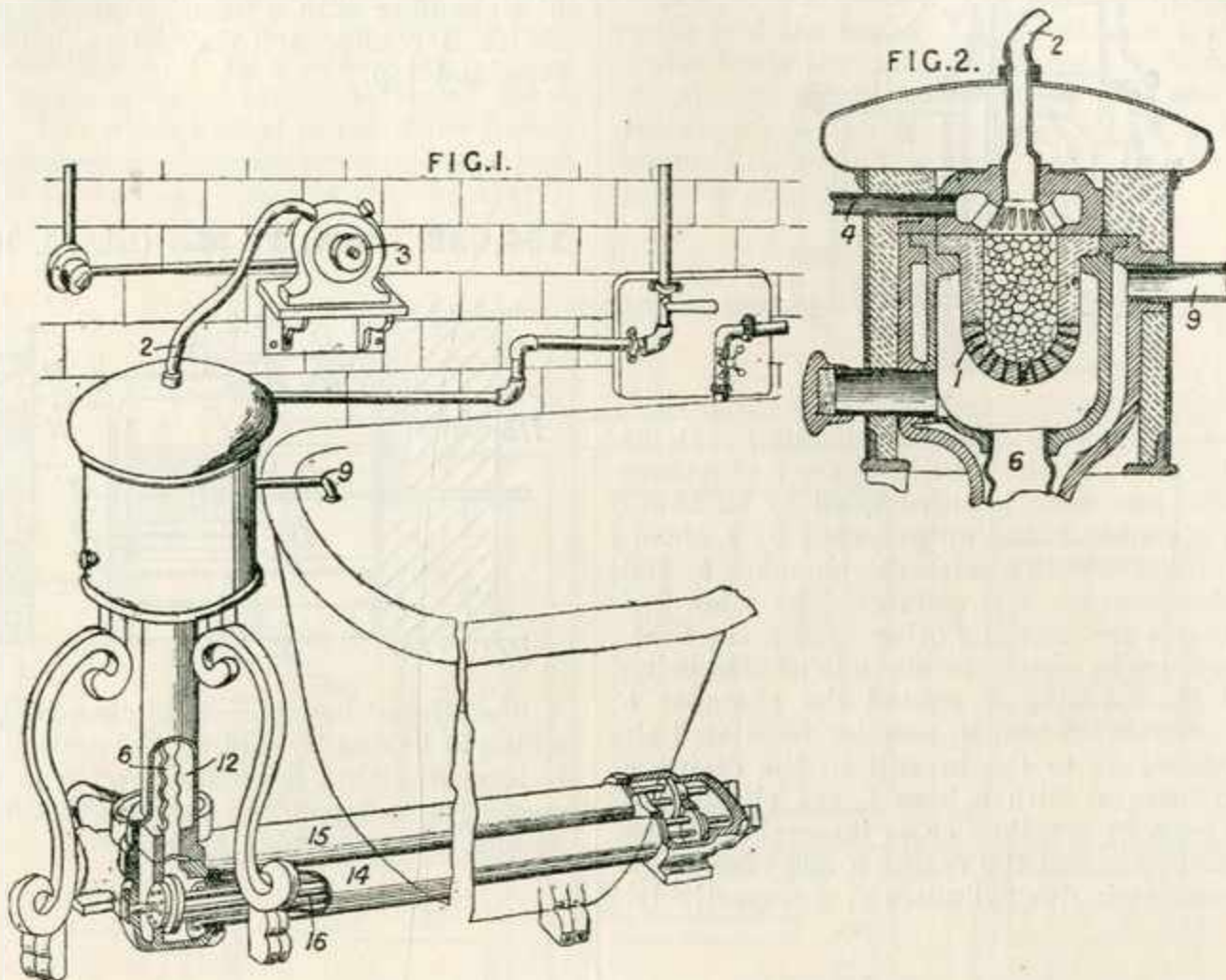


Feed-water, heating.—In apparatus for heating feed-water, of the kind comprising a hot-well in association with a condenser and air-pump, and a heater supplied with exhaust steam which comes

into direct contact with feed-water passing to the heater from the hot-well, the heater is arranged at a higher level than the pump so that the heated feed-water returns to the pump by gravity, and the hot-well communicates with an open tank at a lower level, the air pressure upon the open tank forcing the water up a pipe into the heater. The Figure shows the hot-well *a* communicating with an open tank *b*, from which a pipe *d*, fitted with a float-actuated valve *e*, leads to the heater *c*, into which the water is sprayed by a perforated pipe *m* and grids *o*, coming into contact with steam from a pipe *g*. The heated feed-water returns to the pump by a pipe *k* having a trap *k*¹ to prevent air or oil from passing to the pump. A spring-loaded valve *p* on the pump is connected to the condenser, which communicates by a pipe *i* with the upper part of the heater, so that the pressures in the pump and heater become equalized to facilitate the return of the water by gravity. An overflow pipe *l* leads from the heater to the condenser.



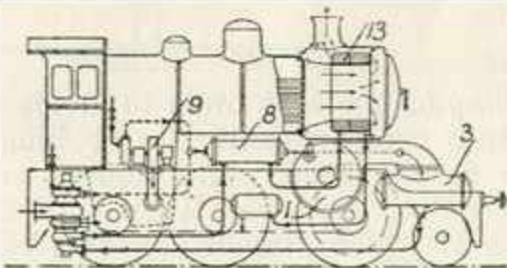
133,254. **Mathy, M.** March 18, 1919



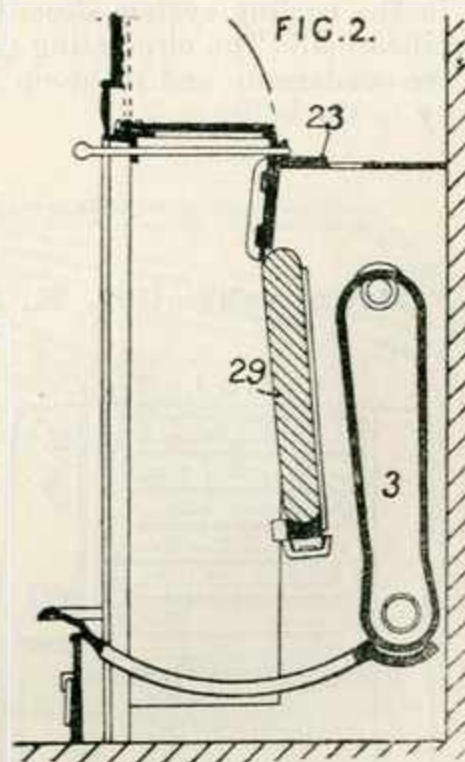
Internally-fired boilers.—Water is heated by passing in counter-current to the flow of combustion products from a surface combustion burner 1 supplied with gas by a pipe 4 and with air by a

fan 3 through the pipe 2. Water passes first through a nest of pipes 16 in the flue pipes 14, 15 and then through the annular space 12 surrounding the flue 6 to the draw-off pipe 9.

133,299. **Köhler, C.** Sept. 20, 1919.



Feed-water, heating.—In a steam locomotive having a surface condenser 3, the condensed steam from the condenser before being pumped into the boiler is passed through a heater 8 heated by the exhaust from the auxiliary engines and then through a heater 13 heated by the combustion products. The locomotive is driven by a steam turbine 1.

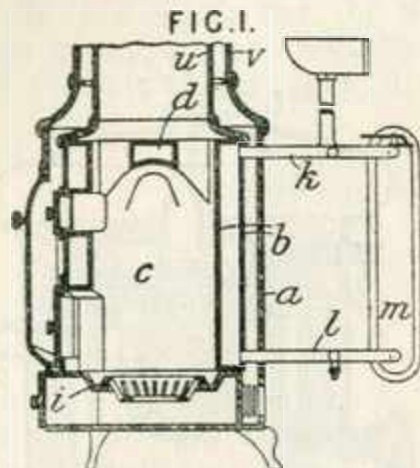


133,503. **Fowler, F., and Coalbrookdale Co.** Nov. 6, 1918.

Block or slab form boilers.—Open fireplaces and cooking-ranges are fitted with circulating boilers

3 of slab form with curved top and bottom, which are arranged vertically behind the fireplace back or between the backs of twin-grate stoves,

130,549. Hansen, H. K. Jan. 2, 1919.

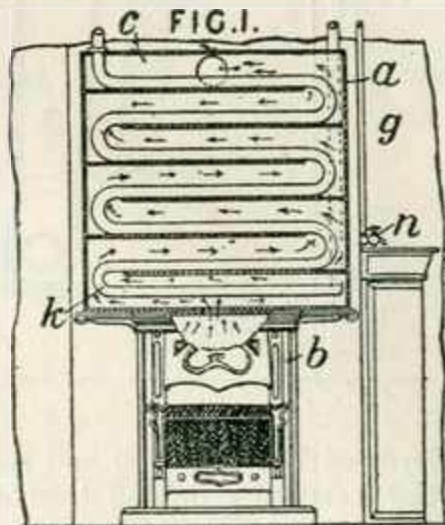


Boilers.—Relates to hot-water heating systems of the kind in which the heating-space *c* of a stove for warming one room is surrounded by an annular water chamber *b* and surmounted by a chamber *d* in communication with the chamber *b*, and the annular chamber *b* is connected by pipes *k*, *l* to radiators *m* for warming other rooms, the heating of the room in which the stove is located being regulated by a casing *a* around the chamber *b* forming between the two an annular ventilated air space. According to the invention, the casing *a* is formed integral with a base *i*, the chamber *d* is in the form of a hollow cross integral with the water chamber *b*, and the casing *a* and chamber *b* support concentric flue cylinders *v*, *u* respectively.

133,748. Thompson, H. F. J., and Wood, T. H. Oct. 12, 1918. Addition to 121,005. Drawings to Specification.

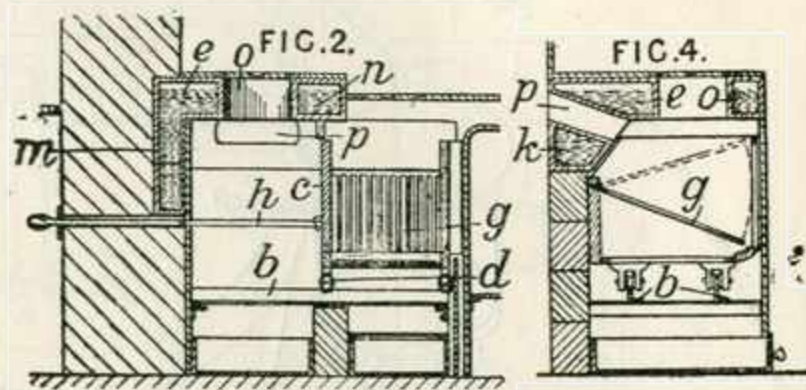
Feed-water, heating.—Carbon dioxide, ammonia, or other gas which will not support combustion, or compressed air or other gas, is used as the circulating medium through the electric apparatus in the cooling system described in the parent Specification. The circulating gas may be cooled by the condensate and make-up feed-water on their way to the boiler.

133,850. Brunnschweiler, K. A. Dec. 30, 1918.



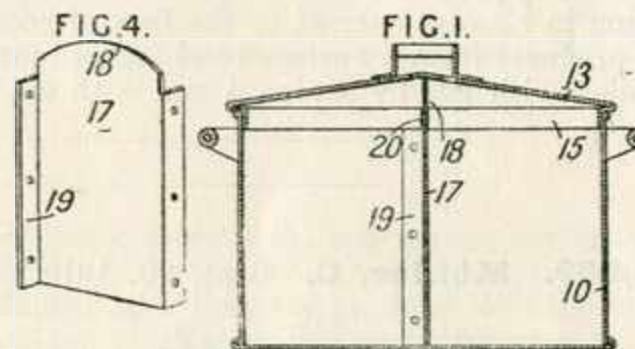
Water-tube boilers.—A tortuous pipe *k* containing water is fitted in a heat radiator *a* consisting of a chamber with a tortuous flue through it. The outlet is connected to a cistern with a draw-off pipe and tap.

134,036. Lea, F. M. Oct. 25, 1918.



Block-form boilers.—A kitchen-range boiler *e*, which is heated by sliding the grate *c* beneath it, is formed with a horizontal part *n* in which is an opening *o*, a depending back portion *k* with a flue *p*, and a vertical side by *m*.

134,305. Corritore, M. Oct. 29, 1919.



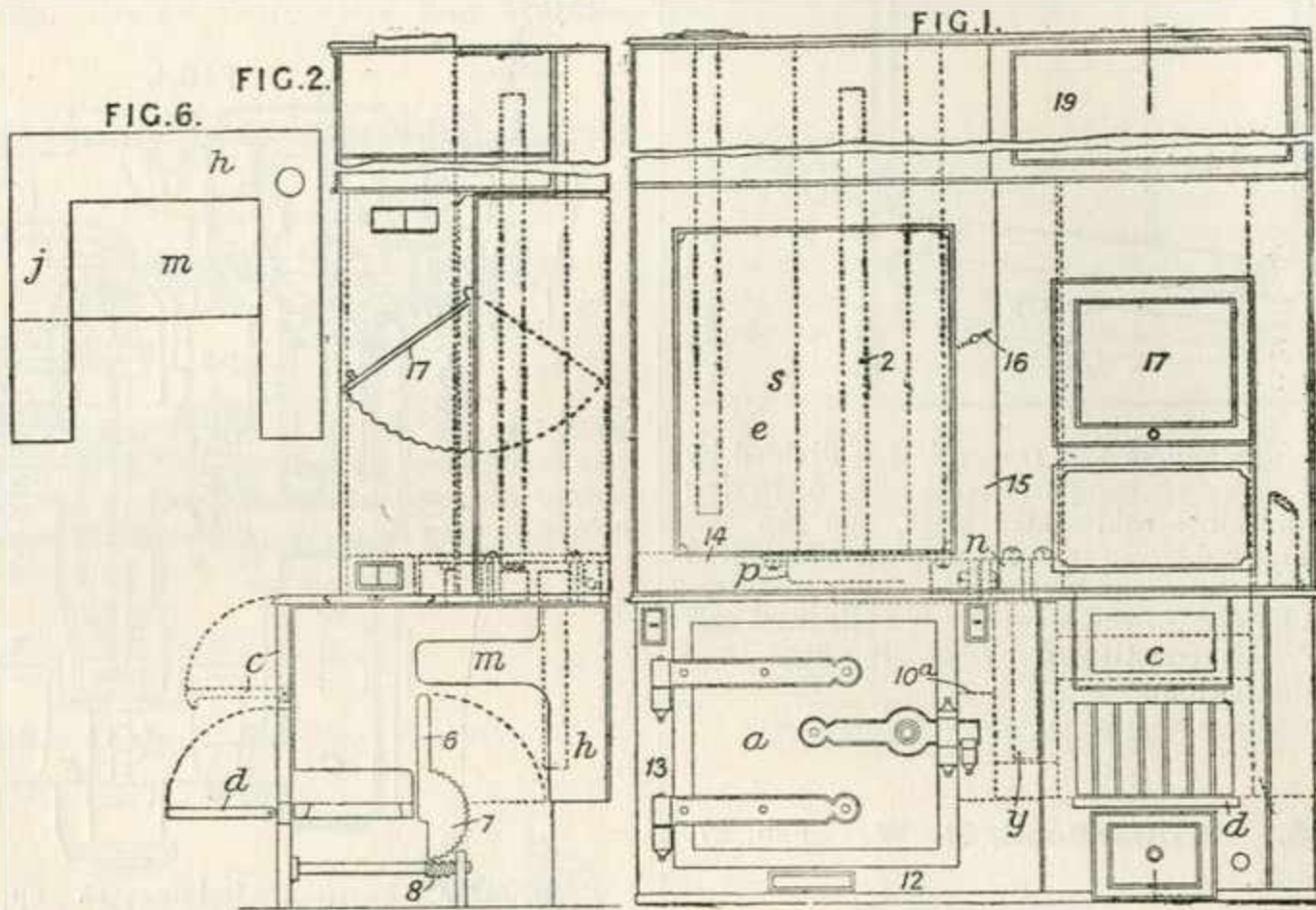
Washing-boilers.—In order to divide a washing-boiler into compartments for boiling different articles at one time, e.g. coloured articles and white articles, the boiler *10* is provided with a partition *17* which extends upwardly at *18* to contact with a dome-shaped cover *13*, and its sides fit into slots *20* arranged on the flange *15* of the cover. The partition has rectangular flanges *19* at its edges, which are secured to the sides of the boiler, preferably by riveting.

134,610. Coffin, A. G. Nov. 4, 1918.

Block-form boilers.—A kitchen range is provided with water-heating fittings adapted to heat water for domestic purposes, and for a radiator system. The fire-grate has a rear section *6* which is adapted to be raised and lowered by means of a worm *8* and sector *7* so as to vary the capacity

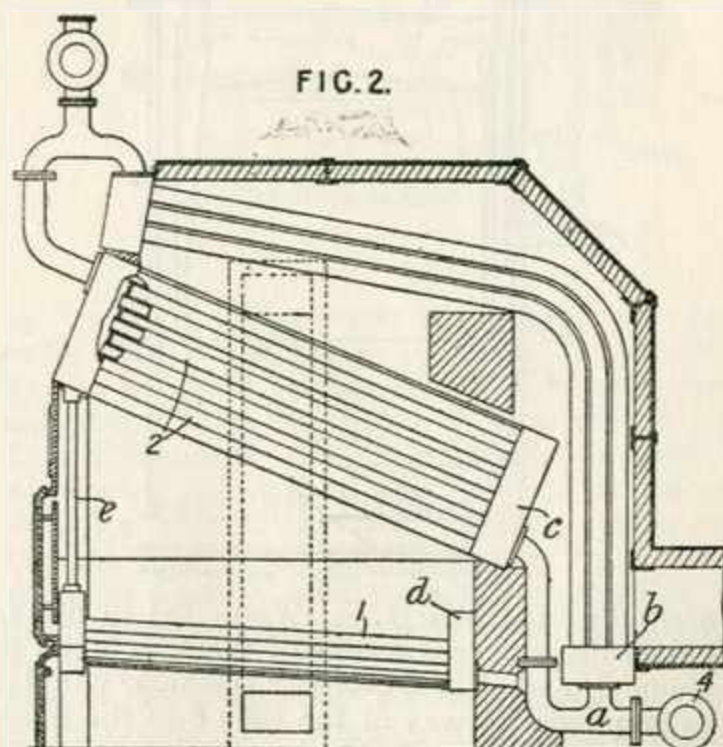
of the fuel-holder. The sides of the fuel holder are the vertical side walls *i* of the boiler, which has also a vertical rear wall *h* and one or more horizontal water "walls" *m*. The boiler is connected by castings *n*, *p* to a cylindrical closed chamber *s* inside a water tank *e* arranged above the oven *a*. The water heated in the boiler passes through a passage in the castings *n*, *p* to a pipe 2, rises in it to the upper part of the chamber *s*,

and thence passes to the radiators, returning to the chamber *s* and by another passage in the castings *n*, *p* to a vertical pipe *y* in one of the vertical walls *j* of the boiler. The water in the chamber *s* also heats the water in the tank *e*, which is provided with a cold-water supply pipe and flow and return pipes leading to and from the hot-water supply fittings. The pipes leading to the radiators may be closed by means of cocks.



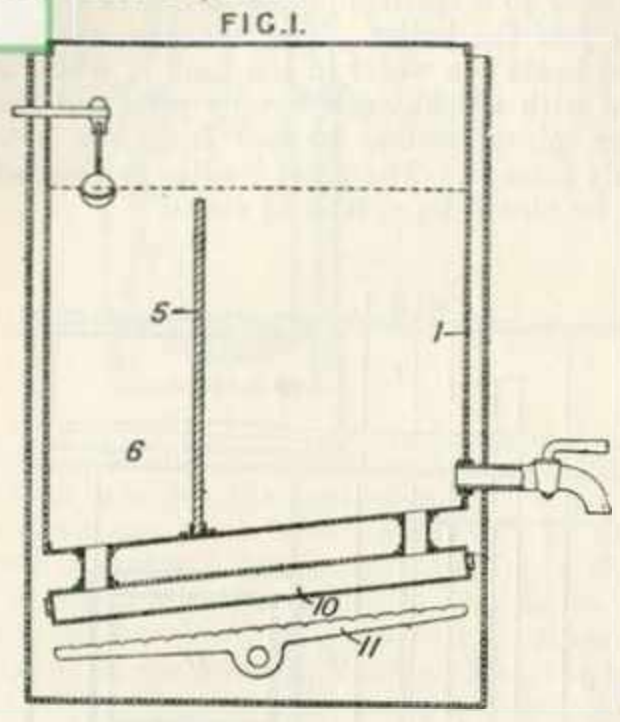
135,004. Haden, W. N., and Haden, C. I., (trading as Haden & Sons, G. N.), and **Horton, F. H.** Dec. 12, 1918.

Water-tube boilers.—In a boiler comprising sets of tubes upwardly inclined in the same direction, the sets are separately connected to the junction-piece between the tubes and the supply as return pipe. The lower headers *d*, *c*, *b* of the tube sets shown are separably connected to the junction-piece *a* opening into the return pipe 4. The lower set of tubes 1 forming the grate is connected to the upper set 2 by vertical pipes *e*. Air for combustion is heated in passages in the setting preferably formed of the hollow blocks described in Specification 26854/08, [Class 87, Moulding plastic &c. substances].



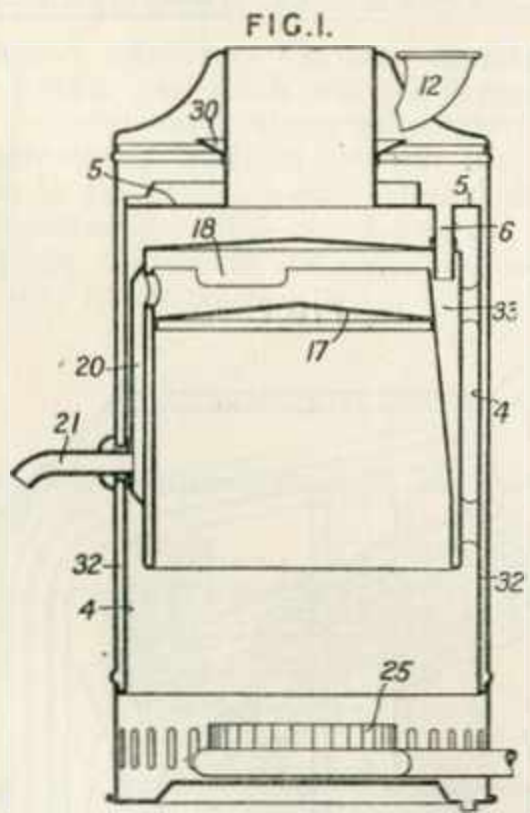


135,077. **Roxburgh, A. B., and Craggs, E. F.** Feb. 17, 1919.



Water-tube boilers.—A reservoir 1 is divided by a weir 5 into two compartments, one, 6, having a float-controlled cold water inlet, and the two being connected by an inclined passage 10 adapted to be heated by a gas burner 11. In a modification, the bottom of the reservoir is horizontal and the weir 5 is constituted by an air space in a fold of the bottom.

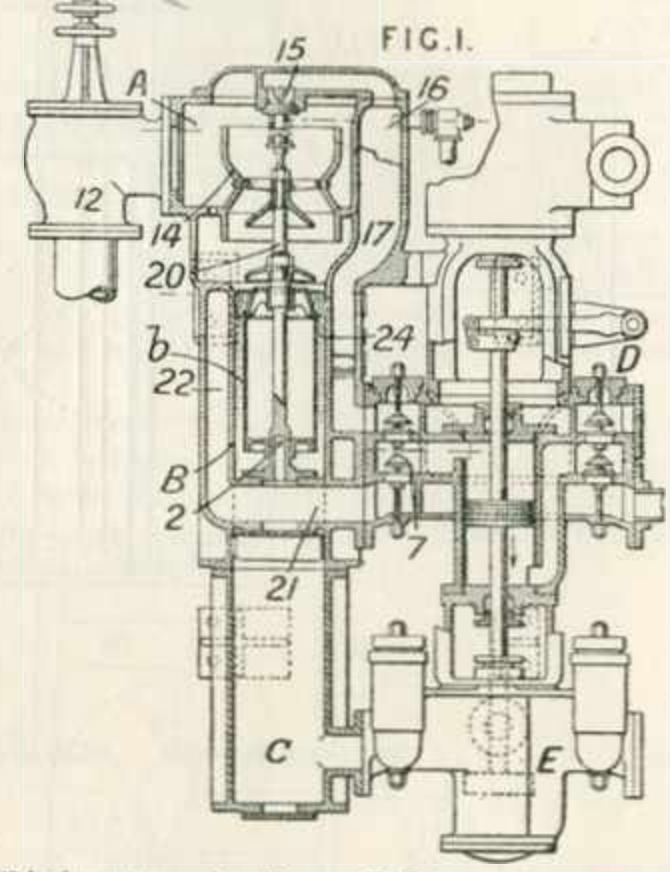
135,085. **Winterflood, B. W.** Feb. 27, 1919.



Internally-fired boilers. — Water fed in at the funnel 12 drips over the edge of the tray 30 on to the dome 5, and after traversing the outer annular space 32 passes by way of the tube 6 to the inner annular space 33 finally passing to the outlet 21 by way of the cut-away part 18, dome 17, and tube 20. The tube 20 is fitted either outside the inner annulus as shown, or in the water space

itself of the annulus 33. In a modification, the inner space 33 is flanged outward to meet the cylinder 4 to lead any condensation away from the burner 25. In this case the flared skirt is perforated to allow the passage of products of combustion.

135,232. **Marks, E. C. R.,** (Worthington Pump & Machinery Corporation). Aug. 30, 1918.

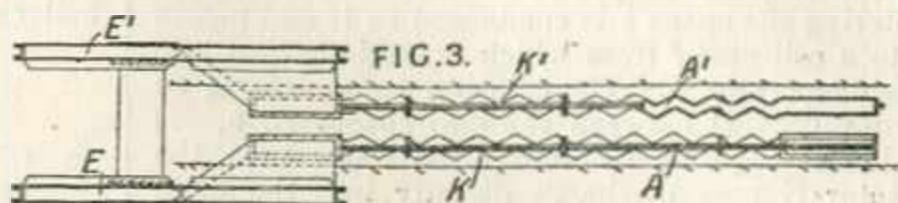


Feed-water, heating.—Relates to apparatus, particularly intended for heating and supplying feed-water to locomotives, of the kind in which excess heated water is returned to the water supply, as described, for instance, in Specification 13444/03, [Class 123, Steam generators], and consists in controlling the delivery of the excess water by a bucket which floats in the water passing through the heater, and is lowered by the weight of the excess water. Water from the supply pump D enters the heating-chamber A through a spring-closed spray valve 15, and is brought into contact with steam entering the chamber through the check valve 12. The steam is distributed around the chamber by a baffle 14. The heated water falls into a tank B containing a bucket b controlling the discharge of excess water, the water normally overflowing from the tank through side passages 24 into the storage tank C, from which it is withdrawn by the feed-pump E. When the water collects in the tank B faster than it is withdrawn by the feed-pump, it overflows into the bucket, which then sinks and opens ports 2 on the guide-stem 20, thus allowing the excess water to enter a passage 21 opening through a valve 7 into the suction side of the supply pump. The passage 21 and the pump-discharge passage 16 are in communication with closed passages 22, 17 forming air chambers ensuring a regular flow of water. The heater and the pumps are secured together to form a single unit.

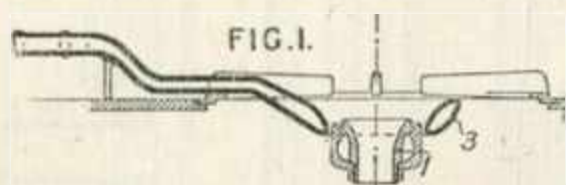


135,262. Weir, C. Nov. 15, 1918.

Heating air.—Air is forced in counter-current to hot gases through corrugated metal fuel-boxes A, A' and also vertical boxes E, E' arranged on either side of a boiler. The flue-boxes are constructed of sections K, K', and may be protected by fire-bricks. The air thus heated may be circulated to heat other air, or used for combustion.



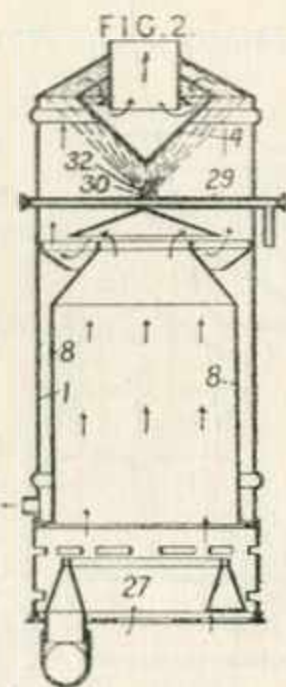
135,352. Lidvall, N. A. F. Dec. 31, 1918.



Boilers.—A water-heater for gas and oil stoves &c. consists of a tube 3 of oval cross-section surrounding the burner 1. The surface which faces the burner has approximately the form of an upward-widening cone.

135,432. Drevet, E. May 16, 1919.

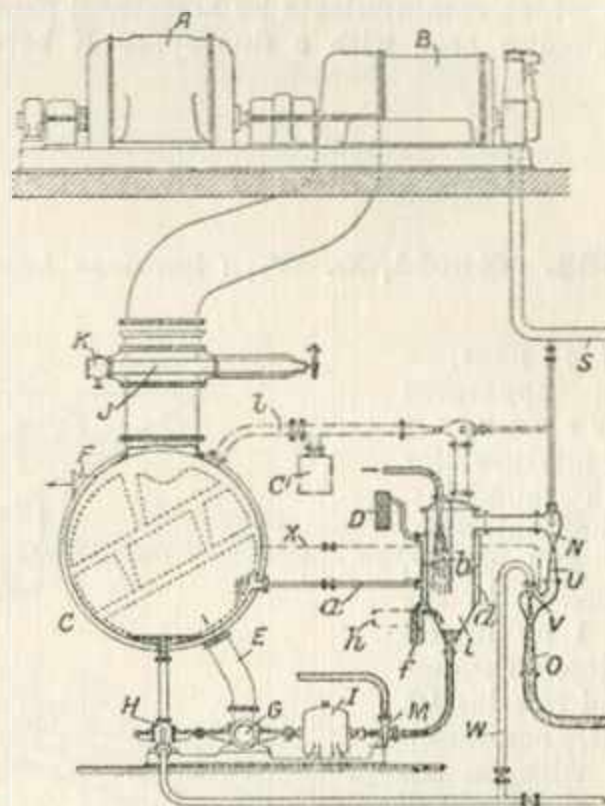
Heating water. — Water is sprayed upwards from a transverse pipe 29 through a hole 30 against a cone plate 4. A smaller cone 32 may be placed close to the aperture. Falling, the water, heated by the gases from the burner 27, collects in the annulus between the cylinders 1, 8. The gas and water may be controlled simultaneously.



135,493. Soc. de Moteurs à Gaz et d'Industrie Mécanique. Oct. 14, 1918, [Convention date]. Void [Published under Sect. 91 of the Act].

Feed-water, heating.—Means are provided for cooling dynamos, transformers, &c. and for utilizing the heat taken from such machines for heating the feed-water of steam-generators supplying steam to the engines. The exhaust steam from the turbine B which drives the dynamo A is con-

densed in the main condenser C, in which a "dry" vacuum is maintained by the apparatus D. Water is circulated through the condenser from the inlet E to the outlet F. The condensed water is extracted by the pump H, which, with the circulating pump G, is driven by the motor I. The condenser may be cut off from the turbine by the valve J, and an automatic escape valve K may also be provided. The water which was used for cooling the dynamo passes into an evaporator L which is subjected to a vacuum produced by an ejector N supplied with steam from

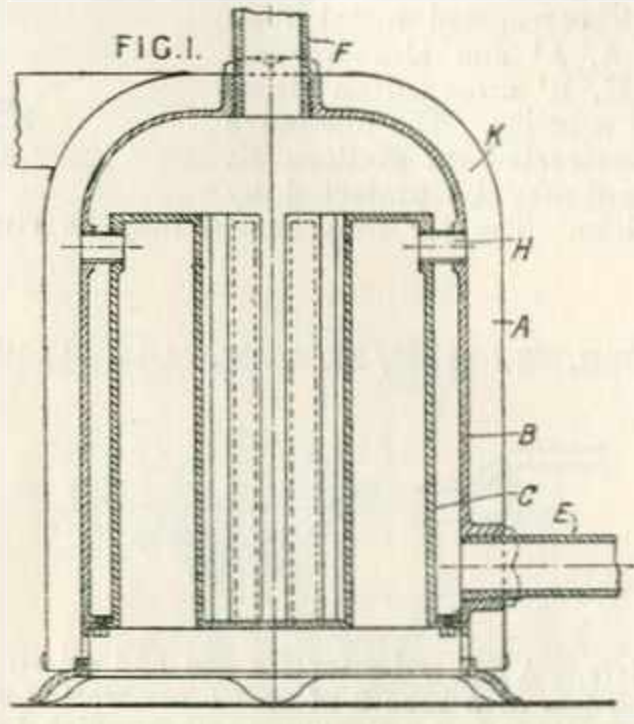


the main S. The water is cooled and partly evaporated in the vessel L, and is then drawn off by the pump M for use again. The cold vapour and steam from the ejector N pass into the cone U and thence to a separate ejector-condenser V which may be supplied with cold condensed water from the branch pipe W. The heat given up in the condenser O is thus taken up by the water which is used to feed the steam-generators. The discharge of air from the condenser O is facilitated by connecting it to the main condenser C by a pipe X, or a separate vacuum-generating device may be used. The mixture of air, gas, and vapour extracted from the main condenser C by the device D may be reduced in weight and volume by providing an annular jacket b into which the pipe



The inner wall *d* of this jacket is cooled by the evaporator *L*, and most of the water vapour entering the space *b* is condensed by it and passes into a collector *f* from which it is discharged into the evaporator *L*. The collector *f* also acts as an hydraulic seal between the two spaces *L*, *b*. If it is not required to recover the waste heat, the ejector *N* may discharge directly into the main condenser through the pipe *i*, and an auxiliary condenser *C*¹ may be provided in case of breakdown of the main condenser. The device *N* may alternatively open into any of the condensers of the station or to a separate condenser.

the casing *A* and boiler *B*. The boiler inlet is at *E* and outlet at *F*. The outer surface of the boiler has a number of helically disposed webs



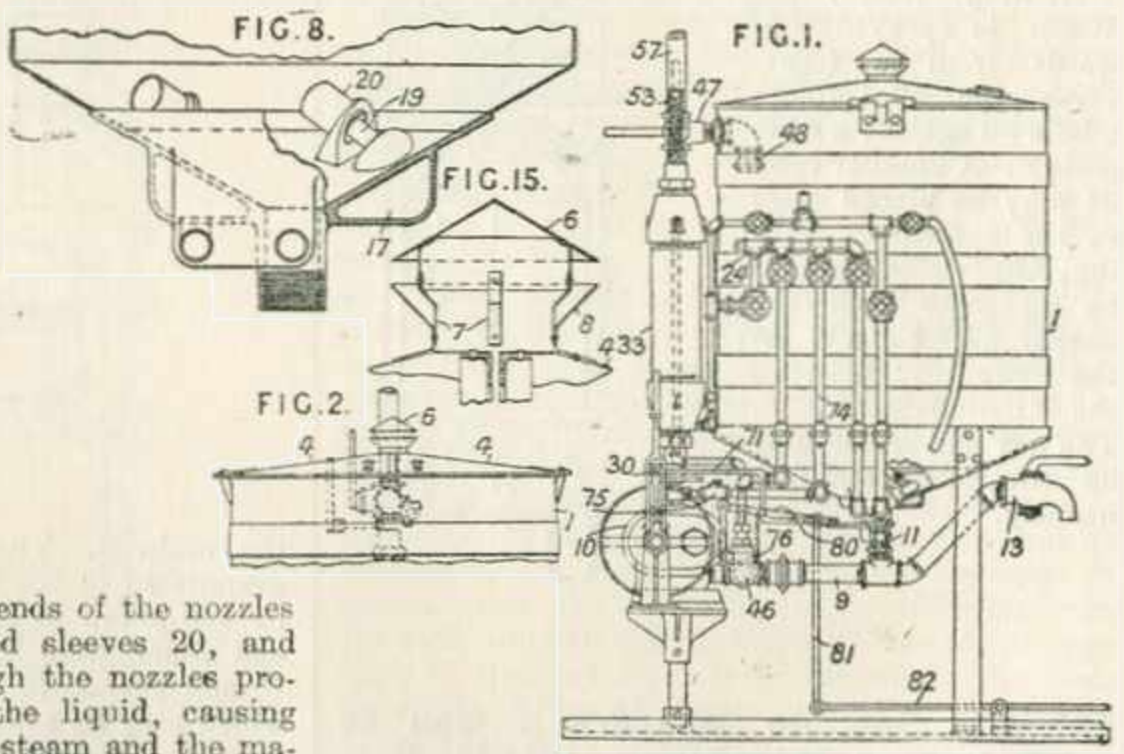
135,538. Shawcross, W., and Green, T.
Sept. 25, 1918.

Internally-fired boilers.—A gas-heated vertical boiler of the kind having vertical flues which lead to an outer casing is provided with communicating passages of restricted area. The water container *B* has flues *C* preferably of truncated-wedge section which communicate by horizontal passages *H* of smaller area with a flue space *K* between

projecting into the space *K*. The boiler may be made of aluminium, aluminium alloy, or other metal.

135,588. Goold, L. W., (*American Laundry Machinery Co.*). Nov. 27, 1918.

Boiling - pans. — In an apparatus for preparing starch mixture for use in laundries, &c., the materials, starch and water, are cooked in the vessel *1* by injecting steam through inclined nozzles *19*, Fig. 8, communicating with an annular chamber *17* which forms the lower portion of the hopper-shaped bottom of the vessel; the outlet ends of the nozzles are surrounded by open-ended sleeves *20*, and the discharge of steam through the nozzles produces an injector action in the liquid, causing intimate mixture between the steam and the materials to be cooked, and at the same time a thorough circulation of the mixture by means of the upward swirling movement. The vessel *1* is provided with a two-part cover consisting of

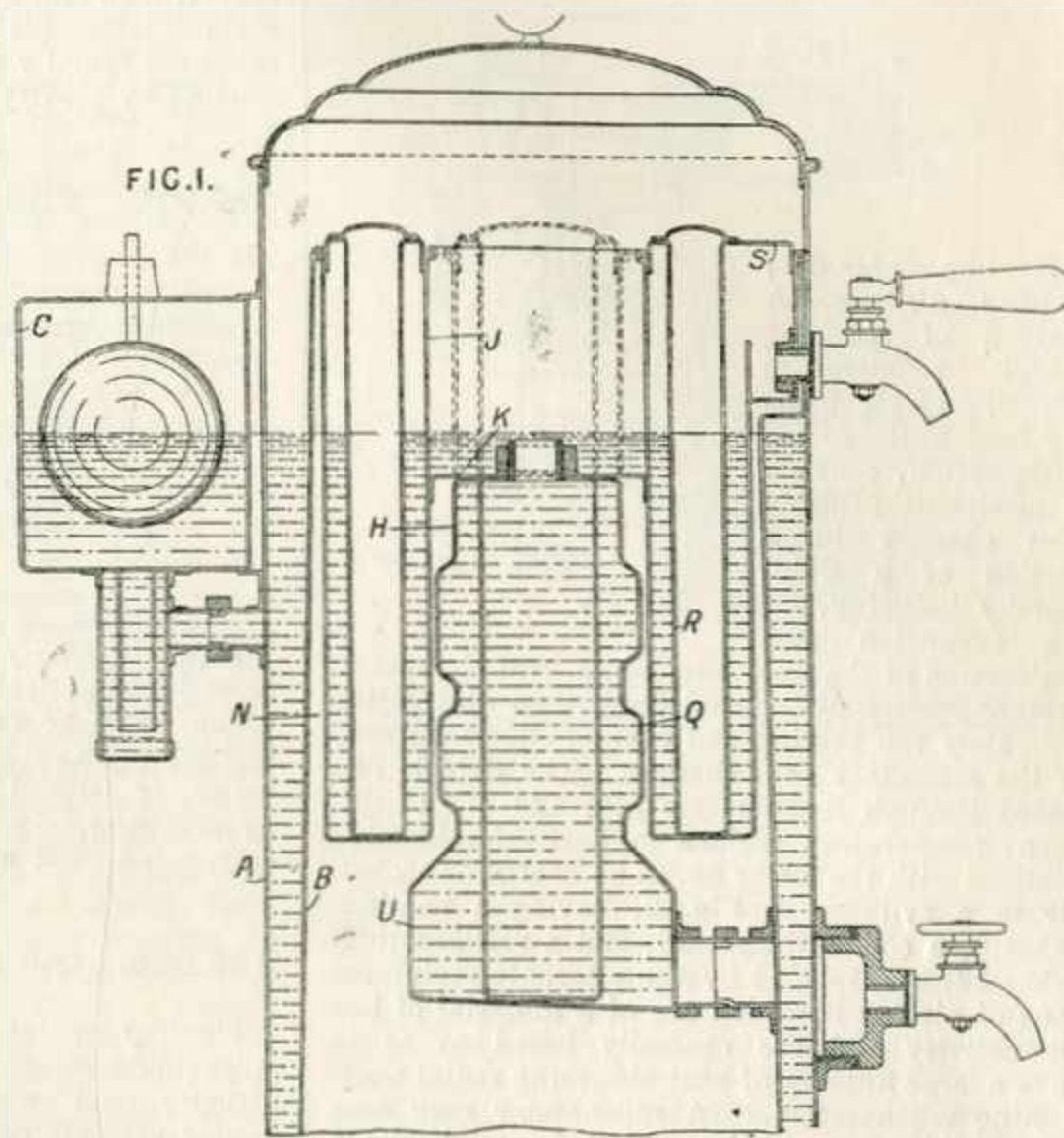


hinged members *4*, Fig. 2; and to one member is secured a vent cap *6*, Fig. 15, consisting of an inverted conical member *6* supported by bars *7* from a funnel-shaped member *8*.



135,606. Jackson, H. B. Nov. 28, 1918.

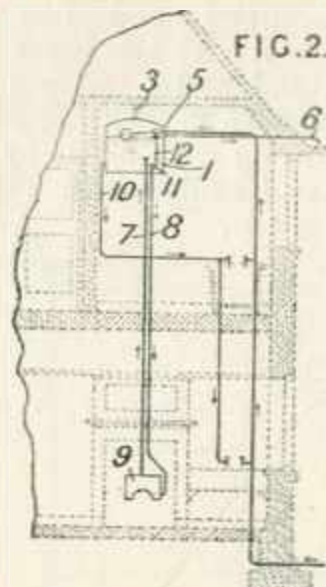
Internally-fired boilers. — Relates to self-feeding gas-heated boilers wherein all the parts are readily and separately detachable, the construction being such that internal waterways are visible. The boiler comprises an outer annular shell A, B, Fig. 1, fed from a cistern C, and having drain and draw-off taps. Inside the shell is a rectangular water chamber H, positioned diametrically in, and connected at the bottom with the shell A, B. On each side of this chamber are D-shaped chambers J connected with each other at the top by an open channel K and with the central chamber H, whilst gas passages N closed at the top by flanges exist between the various chambers. The chambers H, J have loose inner cores R which, with lids S, are readily withdrawable.



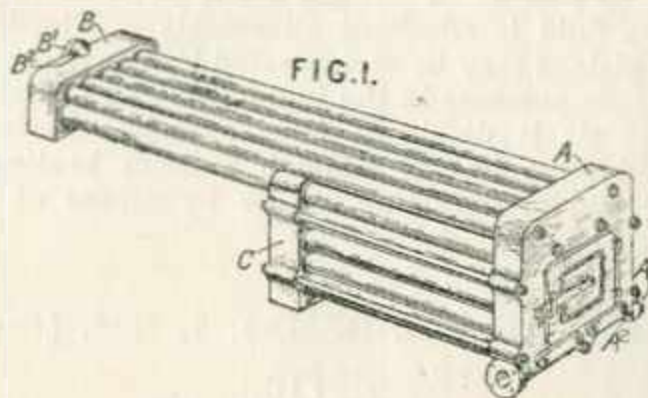
The bottom U of the chamber H is enlarged, and projections Q are provided to baffle the flow of the heating gases.

135,790. Owens, C. W. June 11, 1919.

Heating liquids. — Domestic hot-water supply systems in which a common hot and cold water cistern is used have the cold-water supply delivered to the down-flow pipe from the tank to the boiler. A cistern is coupled by a down-flow pipe 8 and up-flow pipe 7 to a boiler 9. A ball-controlled valve 5 admits cold water to a pipe 12, which passes to the pipe 8 at 11 just below its open end connexion with the tank. An overflow pipe 6, hot-water draw-off pipe 10, and vent-pipe 3 are fitted to the tank 1.



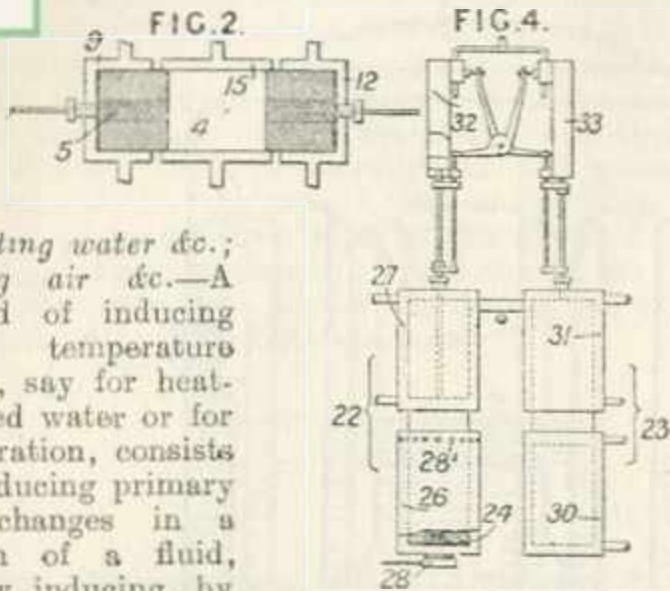
136,032. Hopkins, S., and Thames Bank (Blackfriars) Iron Co. Feb. 11, 1919.



Water-tube boilers. — In cast-iron boilers with horizontal water tubes connecting a front header A with two rear headers B, C, the joints with the external circulating pipes are made by flanged connexions A', B'. The flanges project at no point more than about one inch from the headers, and are strengthened by webs or a thickening of the metal A'', B'' at the back. The headers are made rather wider from back to front than is usual in this type of boiler.



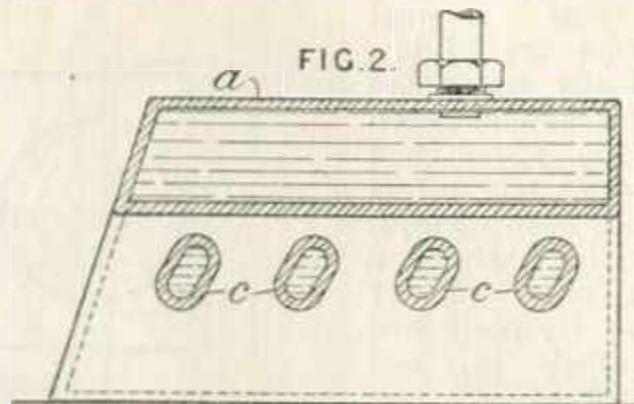
136,195. **Vuilleumier, R.** June 4, 1918.



Heating water &c.; heating air &c.—A method of inducing useful temperature effects, say for heating feed water or for refrigeration, consists in producing primary heat changes in a portion of a fluid, thereby inducing, by the expansion and contraction of the fluid, secondary heat changes in another portion of the said fluid, then abstracting separately the heating and cooling effects induced by the secondary heat changes. The fluid is displaced through regenerators into and out of different temperature regions in heat-interchanging relations with the water &c. to be heated or cooled. Air in a cylinder 4, Fig. 2, having a heating-jacket 9, a cooling-jacket 15, and a refrigerating-jacket 12, is displaced by the alternate reciprocations of pistons 5, which are of a material of low conductivity and are centrally bored so as to leave a large number of heat absorbing radial walls forming regenerators. A regenerator may consist of thin perforated or slotted metal plates arranged so as to form a large number of air passages. The apparatus shown in Fig. 4 comprises a high-temperature inductor 22 and a low-temperature inductor 23, the former having heating and cooling jackets 26, 27 and the latter cooling and refrigerating jackets 31, 30. The heating-jacket may be heated by gas jets 28, vent-holes 28¹ being provided for the escape of the gases. To reciprocate the inductor pistons 24, they may be connected to pistons in cylinders 32, 33, to which pressure fluid is admitted alternately. The inductor pistons may be reciprocated by the fluctuations of air pressure in the inductors. In a modification, air is displaced from cylinders having low-conductive linings through exterior heating, cooling and refrigerating spaces by means of a

reversible fan or propeller. In a further modification, high and low temperature inductors having reciprocating pistons as described above are mounted radially on a rotating shaft, the pistons moving by gravity as the shaft revolves.

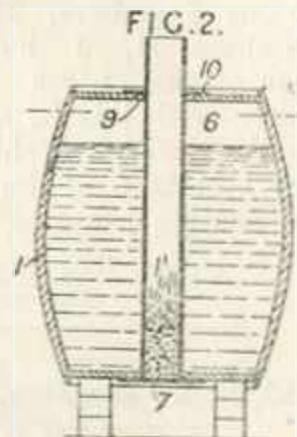
136,232. **Fildes, T. S.** Dec. 7, 1918.



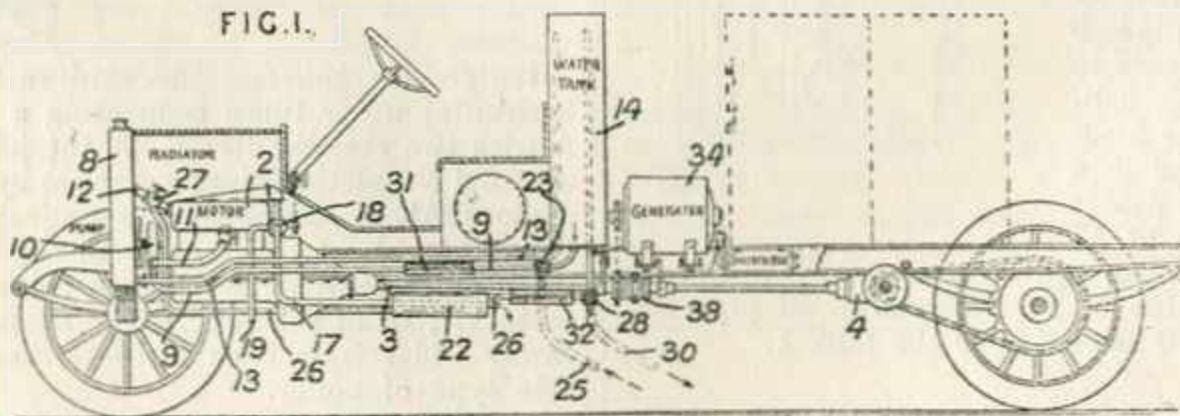
Block or slab form boilers.—In saddle boilers, cross-tubes of oval section *c* are placed in the flue at an angle so as to deflect the gases into the boiler *a*. The tubes may be cast in one with the boiler, or formed separately and secured thereto by screwing, riveting, &c. The tubes may be corrugated, and curved or arched longitudinally.

136,508. **Quinnell, W. C.** Aug. 28, 1919.

Heating water.—A portable refuse-destructor and water-heater consists of an ordinary wooden barrel 1, with a vertical central iron pipe 6 attached to the lower end and passing through the upper end, and serving as a combustion chamber for domestic, dairy, and like refuse. At the lower end of the pipe is a grate 7, and at its upper end is a ring 10 closing the aperture 9. The upper end of the barrel has an opening with a lid, by means of which the barrel may be filled with water, and near its lower end is a tap.

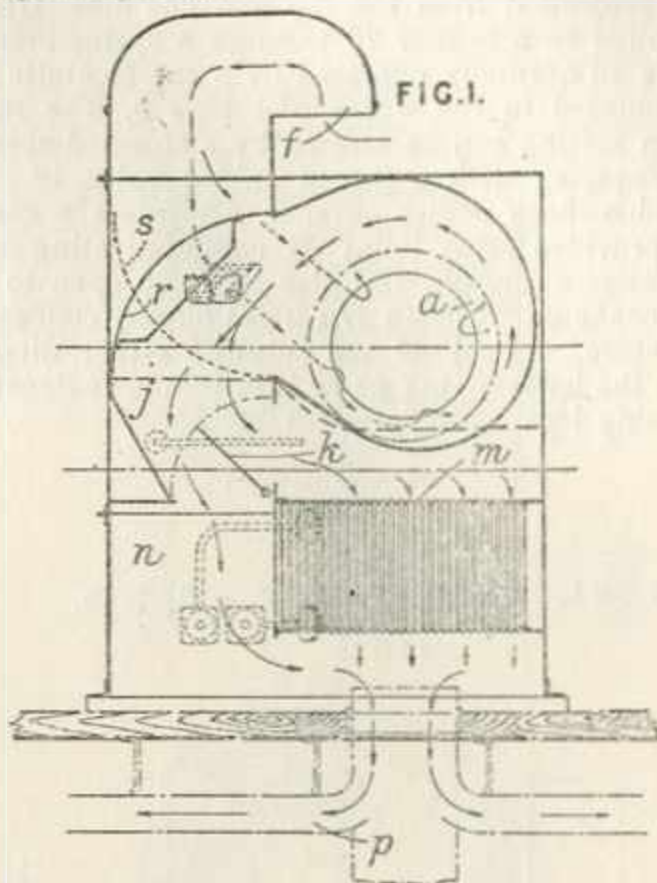


136,542. **Rice, A. S.** Dec. 7, 1918, [Convention date].



Heating water.—In a portable water-heating apparatus, particularly adapted for use on motor-vehicles, the heat required is derived from an internal-combustion engine, both directly from the cylinder jackets and indirectly by means of electric heaters supplied with current from a generator driven by the engine, further heat, if desired, being derived from the exhaust gases. In the construction shown, which is applied to a motor-car, a clutch 38 is employed so that the transmission shaft 3 can be connected either to the rear drive 4 when the vehicle is running or to the generator 34 when the vehicle is stationary. In the former case, the water from the tank 14 is used in the ordinary way for cooling the engine 2 by circulating through an outflow pipe 9 to a pump 10, thence by a pipe 11 to the cylinder jackets, thence by a pipe 12 to the radiator 8, and returning by a pipe 13 to the tank. When the vehicle is stationary, and hot water is required, the radiator 8 is cut out of the circuit by means of a three-way cock 27 in the pipe 12, and the water returns by a pipe 26 to the tank 14. Arranged in or around the pipe 9 is an electric heater 31, and in or around the pipe 26 an electric heater 32 and an additional heater 22 warmed by the exhaust gases pass through a pipe 17. The exhaust gases may be by-passed by a three-way cock 18 through a short pipe 19, so that no heating at all occurs when the vehicle is running. In order to fill the tank 14 initially, the pipe 9 is connected by a three-way cock 23 to a supply pipe 25, the water flowing through the pump 10, pipe 11, cylinder jackets, and pipe 26 to the tank 14, which it reaches in a slightly heated state. Instantaneously heated water may be drawn off from the pipe 26 through a hose pipe 30 which is connected as an alternative to the tank 14 to the pipe 26 by means of a three-way cock 28. Current from the generator 34 may also be employed for lighting purposes, or for operating apparatus, such as laundry or cooking apparatus, carried on the vehicle or on a trailer.

137,210. Neilson, T., and Groom, S.
April 25, 1919.

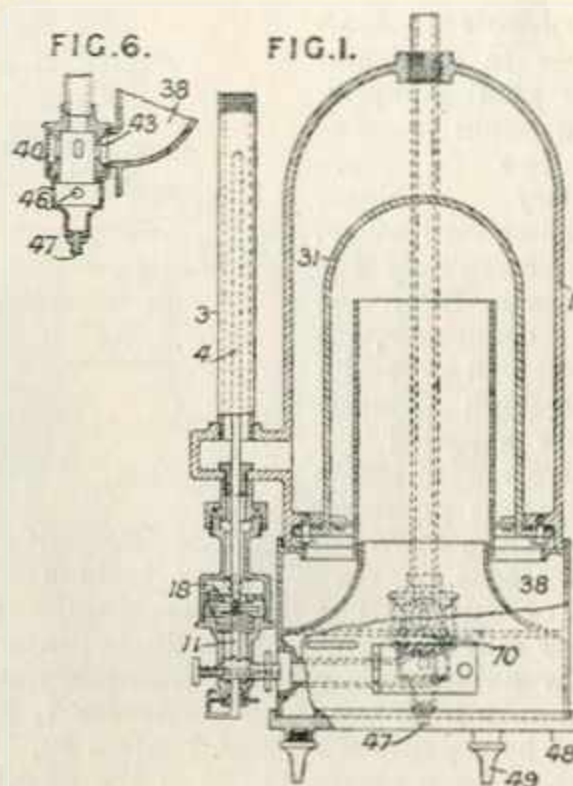
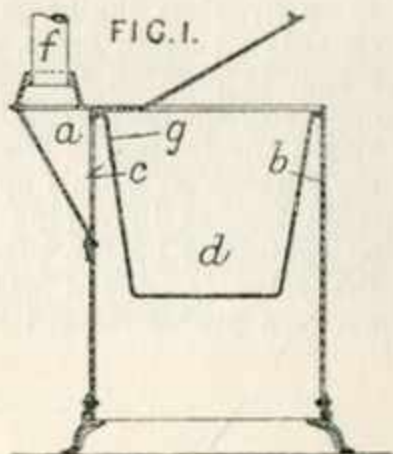


Heating air.—The positions of two interdependent valves *r*, *s* determine whether the eye and the delivery of a fan *a* are in communication with the cowl *f* and the exit *j* to the lower compartment *n*, or vice versa. In the positions shown, the fan draws air from the cowl *f* and delivers it past the valve *r*, its subsequent path to the trunks *p*, either through a by-pass *n* or a heat-exchanger *m*, depending on the position of the damper *k*. On altering the valves *r*, *s*, the flow is reversed.

137,364. O'Byrne, T. J. Jan. 4, 1919.

136,885. Smith, J., and Smith & Co., W.
Dec. 20, 1918.

Washing-boilers.
—A washing-boiler or copper is provided with a fume chamber *a* detachably secured to the casing *b*, which has an opening *c* through which fumes and steam from the casing and pan respectively may pass away by a pipe *f*. The pan *d* is loosely fitted in position and has a side opening *g* for the escape of steam. The arrangement is designed to prevent dirt from passing from the discharge pipe into the pan.



Internally-fired boilers.—Water is heated in the annular space between an outer dome 1 and an

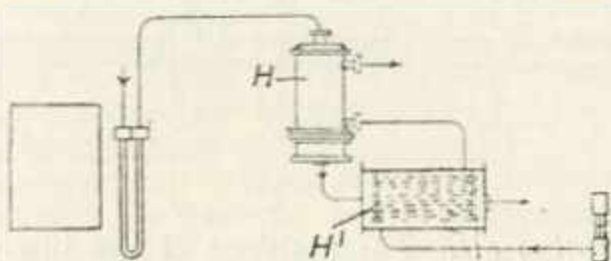


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... wall 31, which may also have a water-holding projection from the top and one side. Gas is supplied to a burner 70 through a spring-pressed valve 18 normally operated by a thermostatic rod 4 mounted in the water-inlet pipe 3. The minimum setting can be altered by a screwed spindle 11 engaging with a thread on the valve 18. An anti-blowback device, Fig. 6, comprises a casing 40 provided with holes 43 communicating with the smoke-ring 38, and also holes 46 open to the atmosphere. A drain 47 carries off any condensed moisture. Feet 49 are screwed either directly into the bottom ring 48 or into tubular extensions forming legs of any desired height.

137,571. Codd, T. J. Jan. 2, 1919.

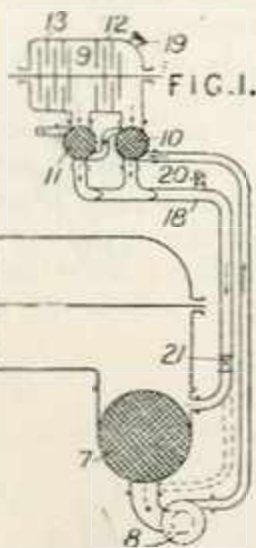
FIG. 3.



Heating water.—Water is heated by steam in two stages; at the first it is raised to a high temperature in one or more vessels H' by saturated steam, and at the second to a higher temperature in other vessels H by superheated steam.

137,597. Baumann, K., and British Westinghouse Electric & Manufacturing Co. Jan. 16, 1919.

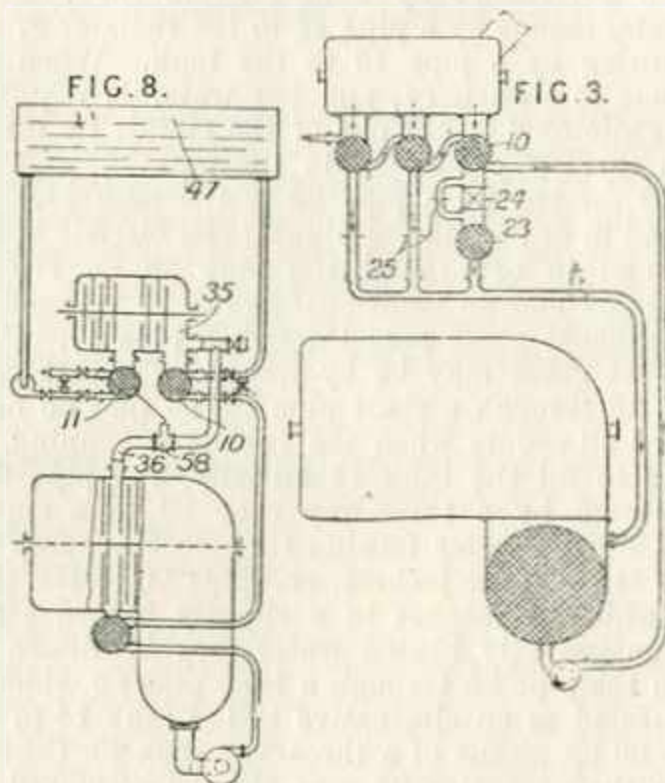
Feed-water, heating.—In a steam-power plant comprising a main turbine and one or more auxiliary turbines, the boiler feed-water, which is usually the condensate from the main condenser, is passed in series through separate heaters supplied respectively with steam at different pressures taken from two or more stages of the auxiliary turbine or from two or more auxiliary turbines. Separate heaters may be replaced by a single heater divided into a number of separate compartments. The condensate from the main condenser 7, Fig. 1, is passed by a pump 8 through heaters 10, 11 heated by steam from stages 12, 13 of the auxiliary turbine 9. A relief valve 19 on the auxiliary turbine allows uncondensed steam to escape to the atmosphere, or to pass up to the main or auxiliary



condenser, or to a stage of the main turbine, or to a heater in connexion with the main turbine. The pipe 18 conducting the condensate from the heaters to the main condenser is fitted with a valve 21 adapted to close when the vacuum in the condenser falls below a predetermined limit. A valve 20 in the pipe 18 allows non-condensable gases from the heaters to escape when the valve 21 is closed. Before passing through the heaters 10, 11, the feed-water may pass through a heater supplied with steam from a low-pressure stage of the main turbine. An auxiliary condenser 23, Fig. 3, may be connected to a heater 10 supplied with steam from the last stage of the auxiliary turbine. A back-pressure valve 24 is adapted to

FIG. 8.

FIG. 3.



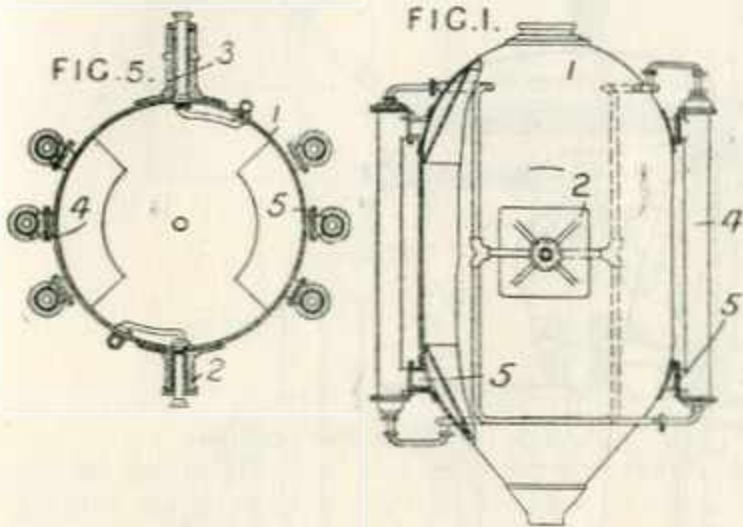
open and allow steam to pass to the auxiliary condenser when the pressure in the heater rises above a certain point. Adjustable valves or diaphragms 25 for decreasing the size of the passages are fitted in the pipes connecting the heaters to the main condenser. Heaters supplied with steam from separate auxiliary turbines are connected together by a steam-pipe fitted with a valve arranged to open, when the pressure in one of the heaters exceeds a certain limit, so as to allow the surplus steam to pass to the other heater. A closed or open storage tank 47, Fig. 8, may be inserted between the heaters. The exhaust 35 of the auxiliary turbine is, in this apparatus, connected to the main turbine by a pipe 36 fitted with a valve 58 so controlled by the pressure in a heater 11 that the valve is opened when the air pressure rises above a predetermined limit.

137,742. Hellner, K. May 28, 1919.

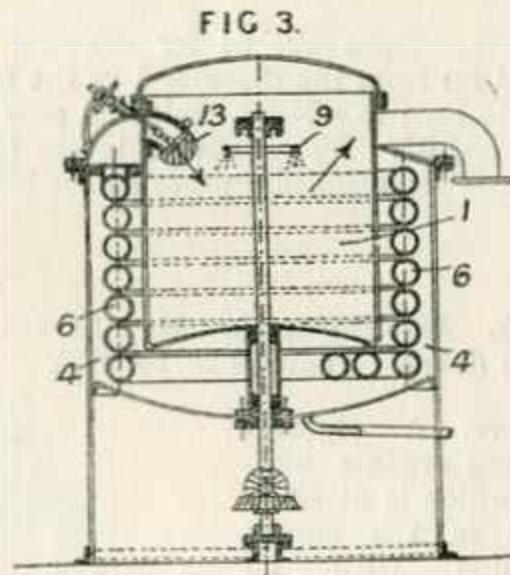
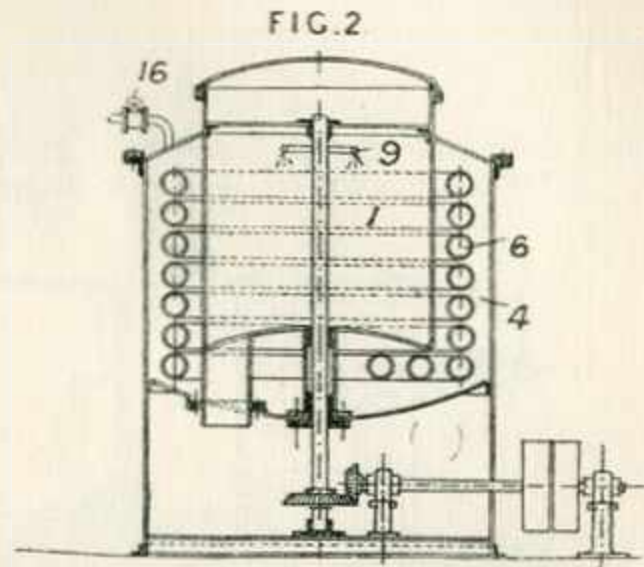
Digesters.—A rotary digester 1 mounted on trunnions 2, 3 is heated by means of chambers 4 each connected to the interior by two ports 5, and through each of which extends a nest of steam-

tubes provided with an expansion member at one end. Steam is supplied and exhausted through

jacket and overflowing at 16. Steam may be injected through jets 9 at an early stage in the process.



the hollow trunnions, the connexions being made by external pipes.

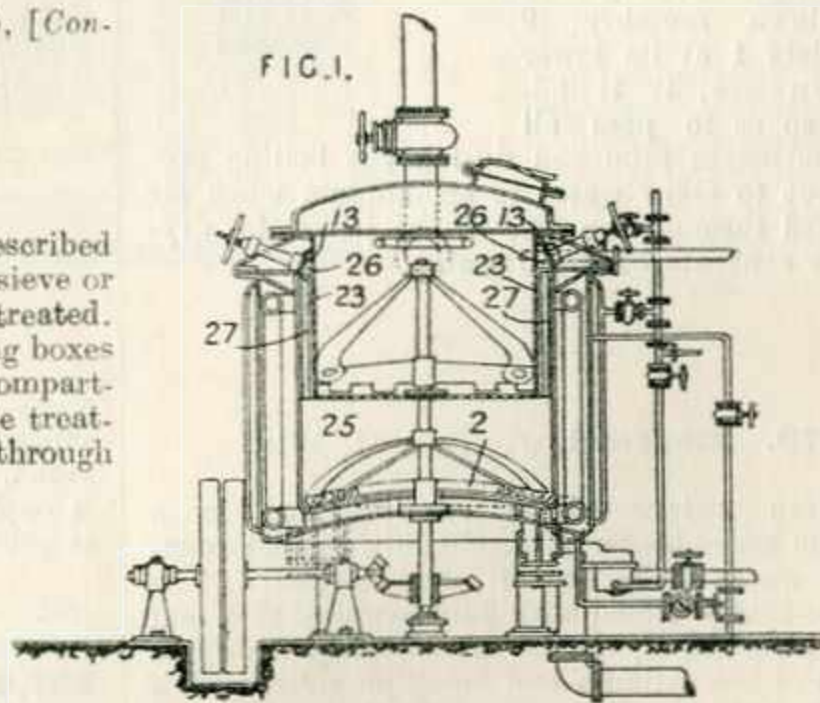


137,828. Niessen, K. May 11, 1915, [Convention date].

Digesters. — Slaughter-house offal and other organic substances are treated in a steam-jacketed digester 1 and subsequently dried at a lower temperature by passing air into the interior through a pipe 6 in the steam jacket 4 and a valve 13. The air is thus heated and the steam in the jacket condensed, the condensate ultimately filling the

137,841. Niessen, K. July 20, 1916, [Convention date]. Addition to 137,828.

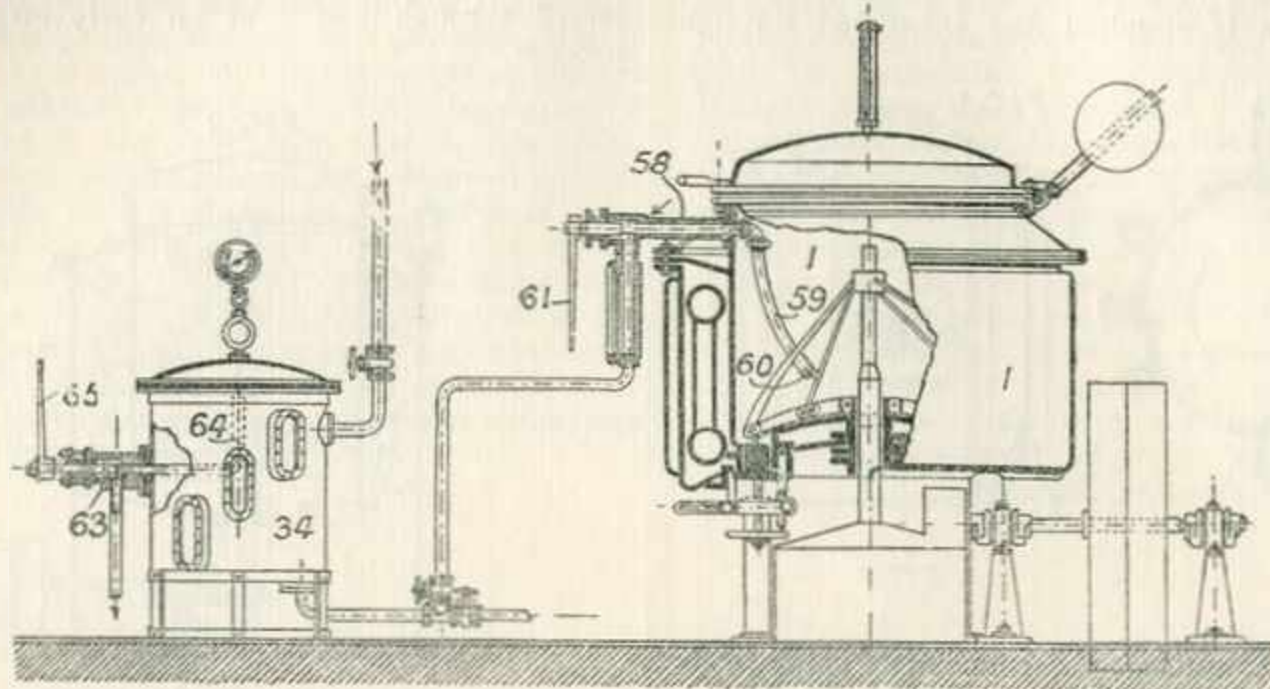
Digesters.—A digester constructed as described in the parent Specification is fitted with a sieve or container 23 for holding the offal &c. to be treated. The air inlet valves 13 open into distributing boxes 26 having pipes 27 leading to the lower compartment 25. Stirrers 2 at a given point in the treatment break up the material and force it through the sieve into the lower compartment.





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137,843. Niessen, K. Jan. 2, 1917, [Convention date].

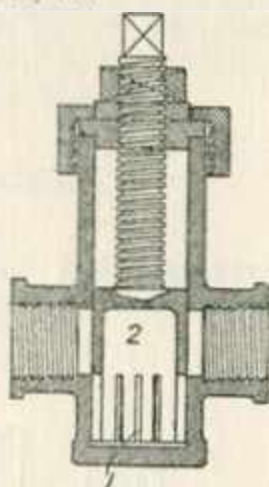


Digesters.—Pipes 59, 64 for drawing off glue water and fat from the digester 1 or the fat separator 34 are bent to a right-angle and pass through bearings 58, 63. By means of levers 61, 65 or hand wheels the discharge pipes on the inside may

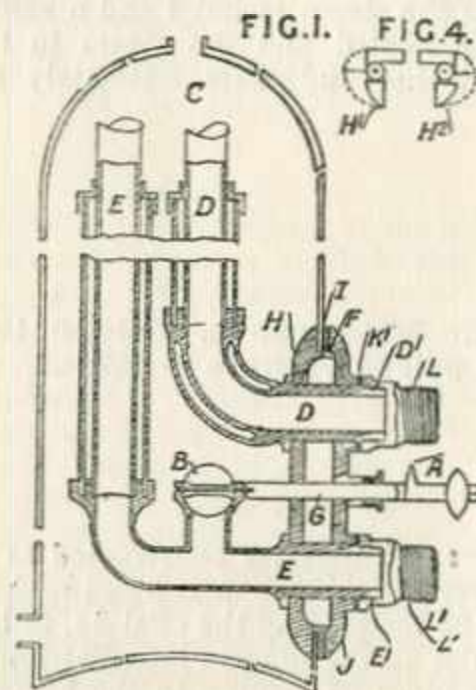
be set to draw off liquid at any level. Floats may be attached to the inner ends to alter their level automatically, and each may be provided with a sieve 60.

137,844. Niessen, K. May 12, 1917, [Convention date]. Addition to 137,828.

Digesters.—A digester for treating organic substances, which is fitted as described in the parent Specification with an air-heating pipe passing through the steam jacket is provided with a regulator, on the lower condensate outlet to the jacket, comprising a screw-down member 2 with slots 1 at its lower end. In use, it is adjusted so as to pass all the condensate produced during the boiling process, but to allow water to accumulate when air is passed through the pipe in the jacket for drying the contents of the digester.



its insertion through the opening in the cylinder. A rubber washer I is placed outside a flange F and an outer plate J is added. The ends of the pipes D, E are screwed as at D', E' to receive



137,879. Heaford, J. Dec 11, 1918.

Heating water.—Means are provided in a domestic water-heater to enable only a small quantity of water to be heated when desired. The cylinder C is provided with double-walled flow and return pipes D, E, the latter extending nearly to the top of the cylinder and being provided with a valve B at the bottom. The valve is carried by a spindle G which is provided with an indicator A. The pipes are mounted on a plate H which is provided with two hinged portions H', H' to permit

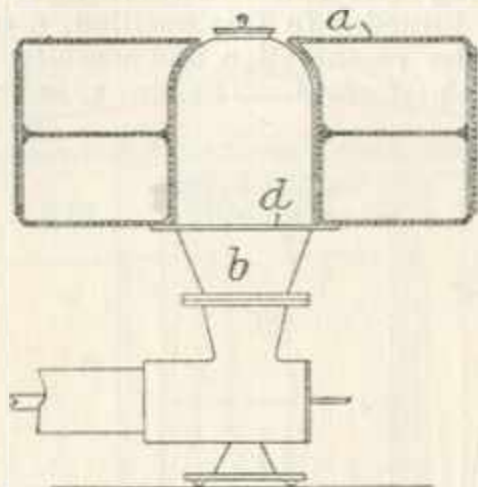
union members L, L', and washers K' are provided. When only a small quantity of hot water is required, circulation of the main body of water is prevented by closing the valve B.

137,970. Lea, F. M., and Lea, D. H. April 8, 1919.

Portable liquid-heaters.—A detachable water-heater or oven a surrounds the chamber b of a



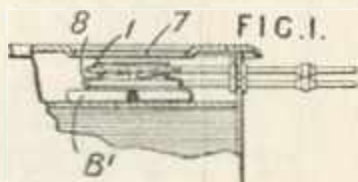
gas heating-apparatus of the kind described in Specification 121,619, [Class 126, Stoves &c.]. It



may be supported by a flange *d*, and may be separated by a narrow air space from the chamber *b*.

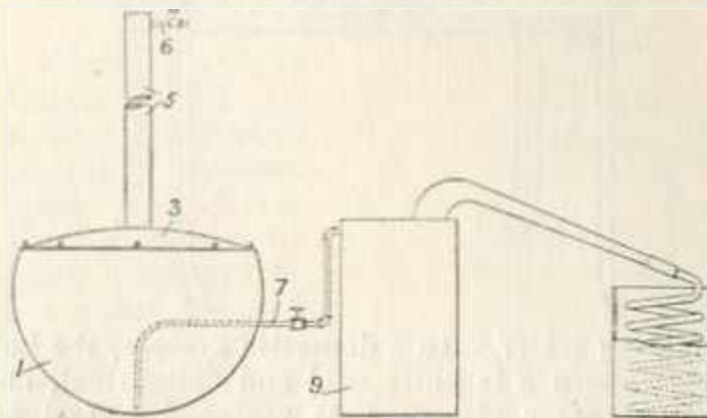
138,181. Lumley, H. J. Feb. 18, 1919.

Water-tube boilers. — A coiled-tube water-heater 1, adapted to fit over a gas burner B' so as not to interfere with its use for heating



vessels &c. is fitted with a flame-spreading disk 7 held in position by spring clips 8.

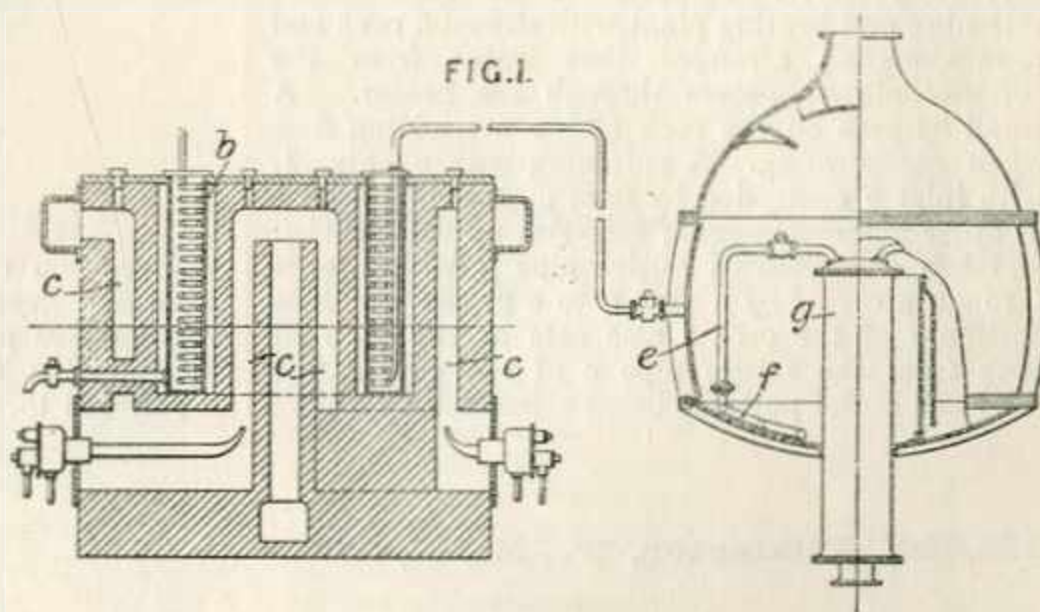
138,372. Marks, E. C. R., (Du Pont de Nemours & Co., E. I.) July 18, 1917.



Digesters. — An autoclave used in the manufacture of diphenylamine comprises a container 1 the lid 3 of which carries a long condensing column 5 with a valve outlet 6 at the top. After reaction the charge is blown out through the pipe 7.

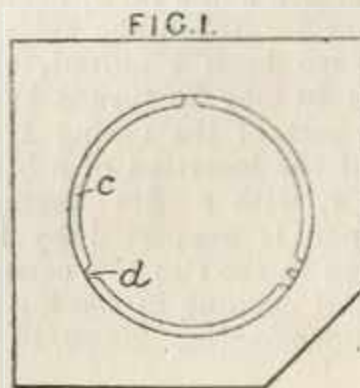
138,388. Bateman, J. T. Nov. 14, 1918.

Heating liquids. — Oils and other liquids are heated by passage through a coil *b* immersed in molten metal, heated, for example, by products of combustion flowing through flues *c*.

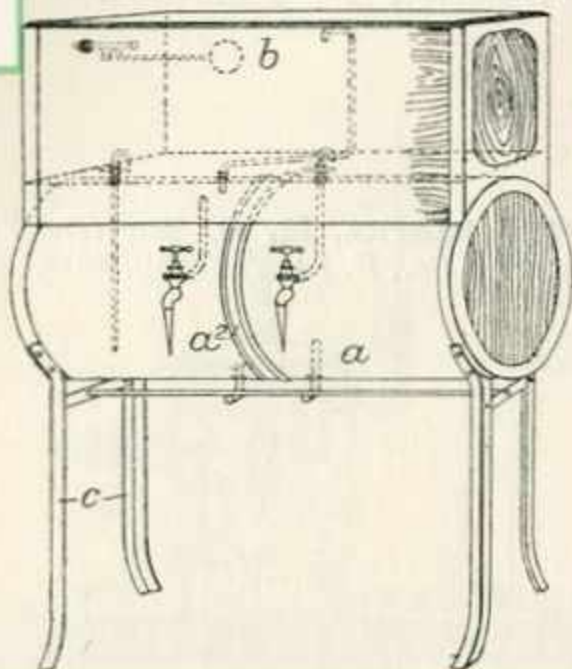


138,490. Simonds, J. April 7, 1919.

Washing-boilers. — A household copper or furnace pan is fitted with a glass or stoneware top which rests on the brickwork body and supports the pan. The flange of the pan rests in a recess *c*, and slots are formed in the top to receive lugs formed on the pan.



130,504. **Dyer, J. H.** April 24, 1919.

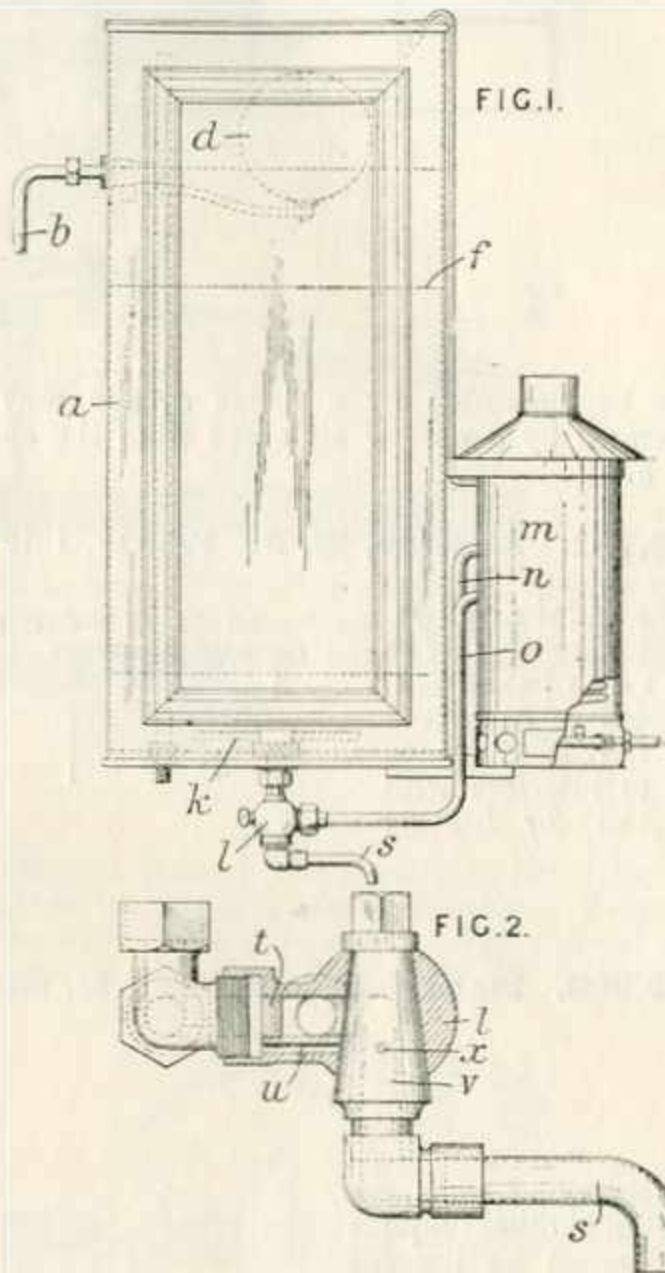


Heating water.—In a domestic system, the hot-water cistern *a* is horizontal and cylindrical, and the cold-water cistern *b* is rectangular and arranged saddle-wise on the former, the whole being mounted on legs *c*. The cistern *a* may be corrugated or beaded as at *a²* to increase its strength, and one or both may be covered with wood lagging.

138,975. **Magrath, H. J.** Jan. 29, 1919.

Heating water.—Comprises a combined water softening and heating plant with draw-off cock and connexions so arranged that water from the softener always passes through the heater. A small by-pass on the cock allows a trickling flow when regenerating. A softening-tank *a*, Fig. 1, with inlet *b* controlled by float *d*, contains zeolite or other base-exchanging material up to a level *f*, and has a perforated outlet pipe *k* which leads through a cock *l* by a pipe *n* to a geyser *m*. The portion *s* of the cock *l* also acts as the draw-off cock from the return pipe *o* of the geyser, the inlet and outlet portions being separated by a plug

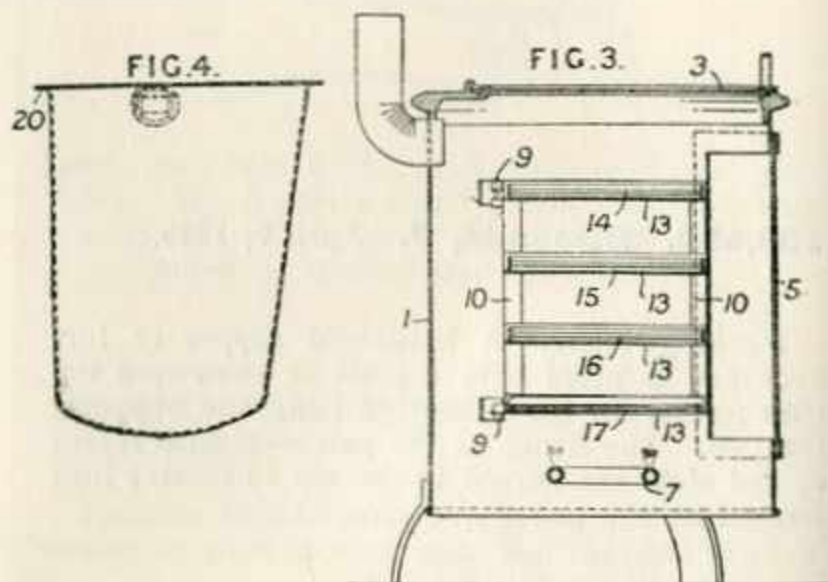
t, Fig. 2; but a small passage *u* leads to the cone *v* which registers with a hole *x* therein when the arm *s* is turned. In this position, a slow direct flow enables regeneration and washing-out of the tank to be performed. The arm *s*, as shown, is in



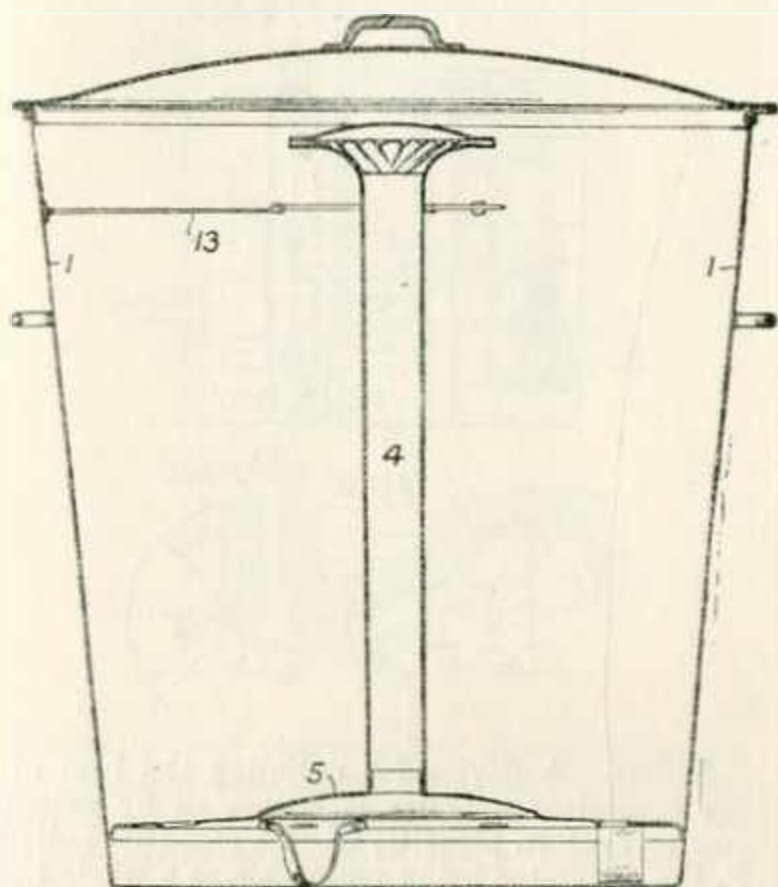
the position requisite for drawing off hot water from the geyser. When turned opposite to the regenerative position, no flow of any kind exists. Specification 17133/15, [Class 46, Filtering &c.], is referred to.

139,080. **Pilkington, W.** May 21, 1919

Boiling-pans.—A convertible gas-oven and boiling-pan consists of a casing *1*, with a door *5* and a lid *3*, heated by a gas burner *7*. When the shelves *14*, *15*, *16* have been removed, the pivoted frames *10* may be turned back into the rear part of the casing *1* so as to permit of the insertion of a boiling-pan, Fig. 4, with a flat vertical back. The pan is supported by its flange *20* resting in the rim of a correspondingly-shaped opening in the top of the casing. Specification 20943/14 is referred to.



139,089. **Lavender, W. S.** June 10, 1919.

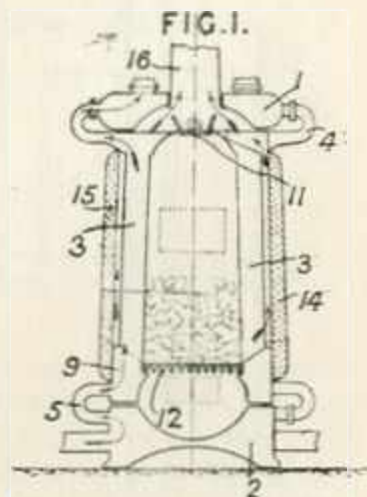


Washing-boilers. — A circulating-device comprises a vertical tube 4 secured to a domed central part 5 of a coned base member the periphery of which is downturned to fit the sides of the vessel

1. The clothes &c. may be held in position by detachable radial arms 13.

139,149. **Daillant, P.** Feb. 18, 1919, [Convention date]. Void [Published under Sect. 91 of the Act].

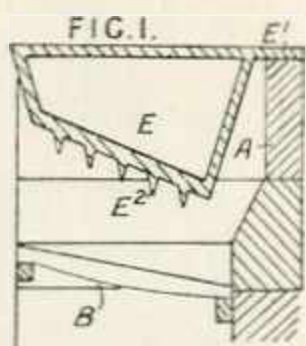
Water-tube boilers. — In a boiler for a central heating system, upper and lower water chambers 1, 2 are connected to a circular nest of vertical water-tubes 3 by external pipes 4, 5. The upper ends of the tubes form the furnace crown, which has a central opening, normally closed by a lid 11. The lower ends of the tubes form a base 9 resting upon the lower water chamber and supporting the grate 12. An asbestos casing 14 around the tubes is made in semi-cylindrical parts. The gases pass between the tubes into the space 15 between the tubes and the casing, and escape through a central flue 16.



The lower ends of the tubes form a base 9 resting upon the lower water chamber and supporting the grate 12. An asbestos casing 14 around the tubes is made in semi-cylindrical parts. The gases pass between the tubes into the space 15 between the tubes and the casing, and escape through a central flue 16.

139,540. **Augustus, E. M.** May 27, 1919.

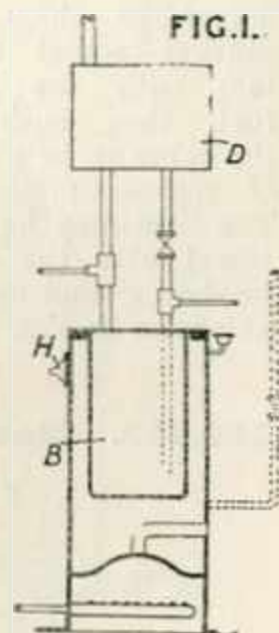
Block or slab form boilers. — The boiler is placed in the fire-box so that the sides and bottom are swept by the gases. A boiler E with sloping sides and base is placed at the back of a kitchen range, the flanged extension E¹



of the top of the boiler resting on the walls A of the fire-box. The base of the boiler is provided with projections E², and the setting is arranged so that there is a space between the walls A and sides of the boiler for the passage of gases. The front of the boiler is in line with the back of the main grate, a supplementary fire-grate B being fitted beneath the boiler at the rear of the range.

139,585. **Wheeler, E. A.,** (Representative of Wheeler, A. E.), **Clare, G. E.,** and **Eldred, H.** Feb. 18, 1919.

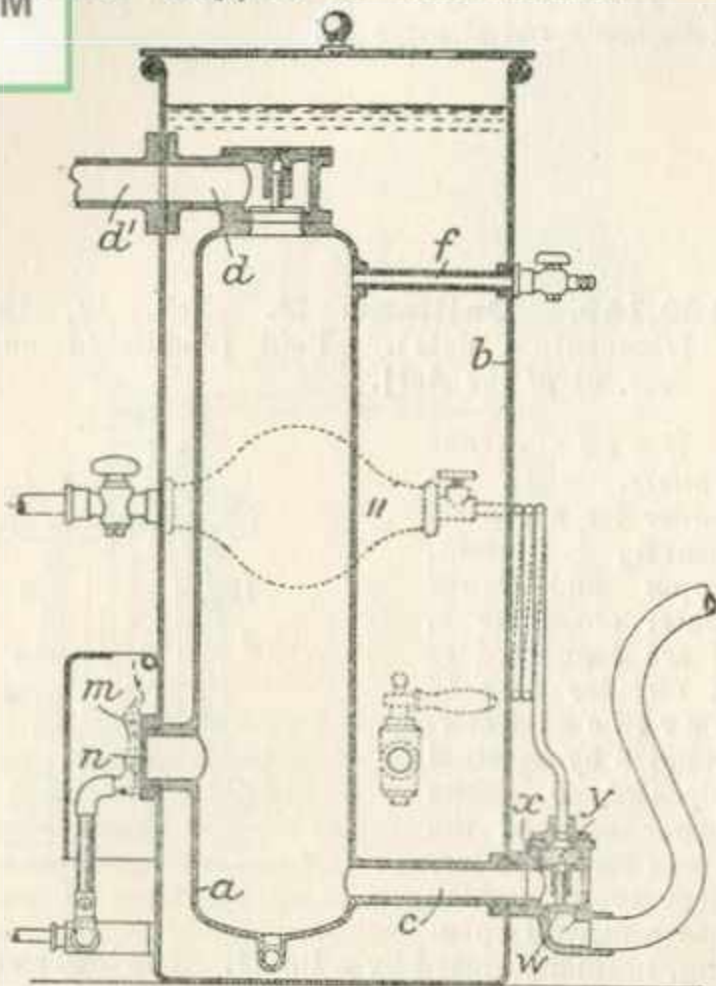
Heating water. — The water in a boiler B is heated from any source through the medium of a jacket in which steam is generated. The supply of fuel or heating-medium is controlled, according to the pressure of steam, by a diaphragm valve H. Flow and return pipes may connect the boiler with a storage reservoir D.





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139,609. Joy, B. C. March 1, 1919.

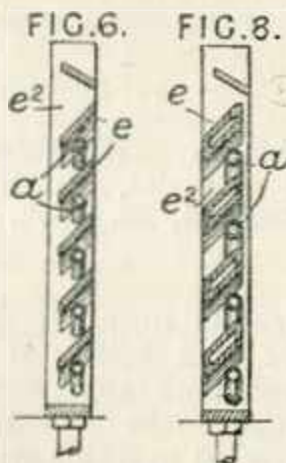


Heating liquids.—A water jacket *b*, surrounding an explosion chamber *a* used in the creation of a vacuum for dust extraction, constitutes a hot-water boiler.

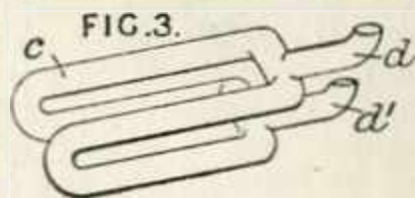
139,635. Bohar, V. March 24, 1919.

Water-tube boilers.

—In water-heaters of the type consisting of a grid of inclined water-tubes *a* adapted to be placed in a fire-grate, a series of louver-like bars *e* prevent actual contact with the live fuel, thus enabling the tubes to be made of thinner material. The bars may be integral with the end headers *e*² and may be water-holding themselves, as shown in Fig. 8.

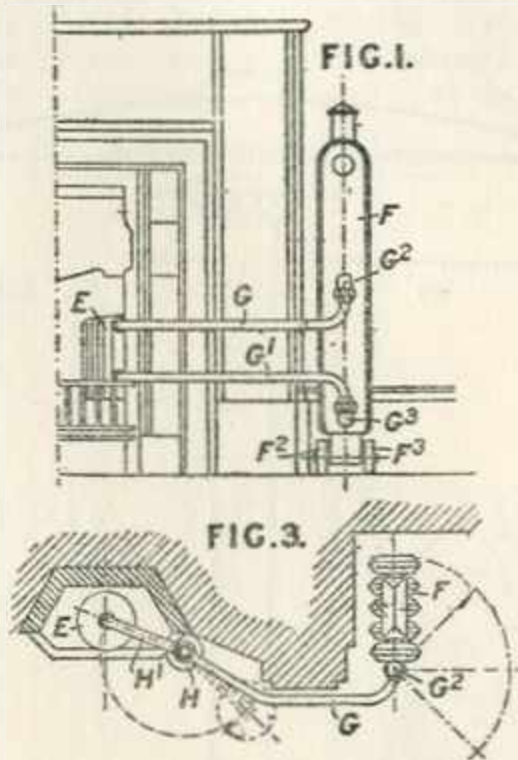


139,643. Mantle, A. W. March 28, 1919.



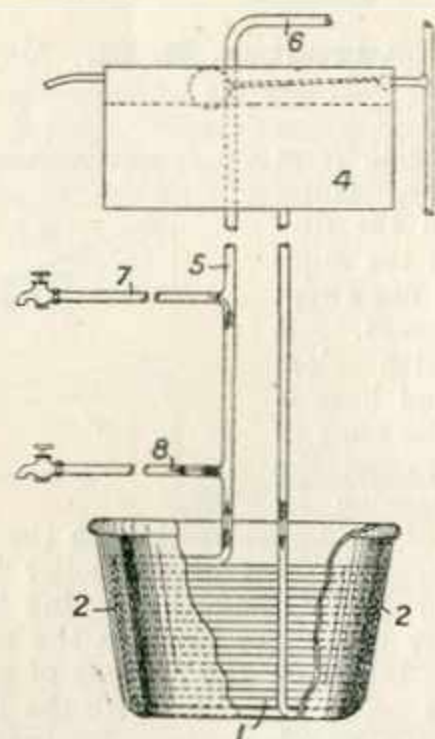
Water-tube boilers.—A range or like fire-place boiler consists of two C-shaped tubes *c* connected by cross-pipes at the back of the fire-grate, where the inlet or outlet pipes *d*¹, *d* are also fitted.

139,675. Simpson, S. W. April 24, 1919.



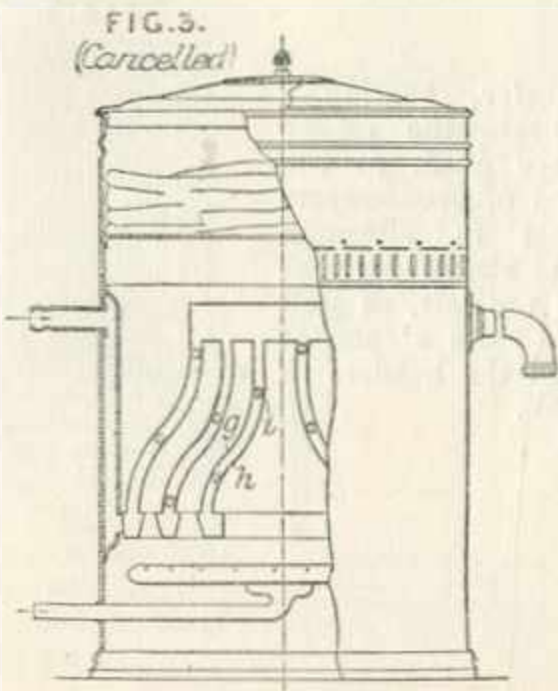
Boilers.—A device for radiating the heat of a fire comprises a boiler *E* connected by external flow and return pipes *G*, *G*¹ to a cast-iron radiator *F*, the apparatus being removable as a whole from room to room. The boiler may be of water tube or globular form, and may be mounted upon a stand *H*, Fig. 3, the connecting-pipes *H*¹ in this instance being jointed so as to permit the swinging of the boiler over or away from the fire.

139,709. Williams, T. June 11, 1919.



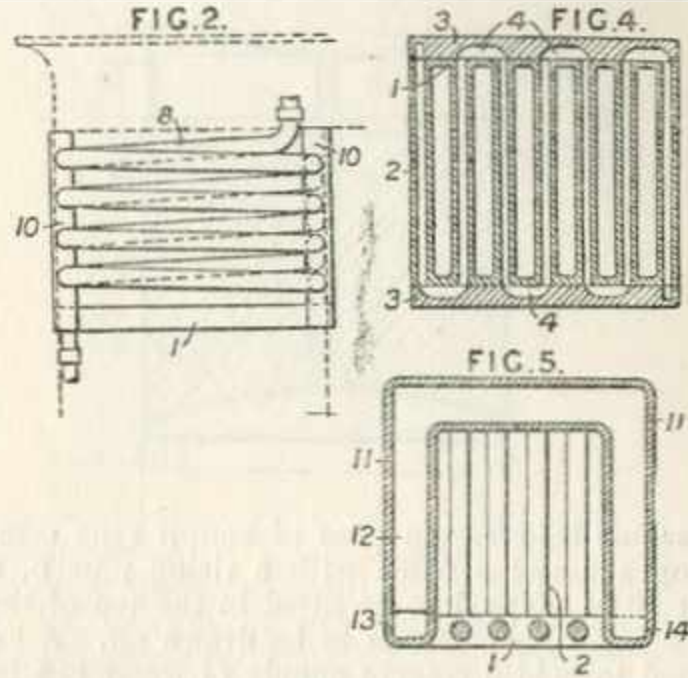
Heating water.—A coil *1* immersed in the water of a boiling-pan *2* is connected at its lower end to the bottom of an open cistern *4*, and at the top has a pipe *5* leading at *6* over the edge of the cistern *4* and having branches *7*, *8* supplying water, heated in the coils, to baths, basins, &c.

139,750. **Chardard, J. B. D. L.** March 3, 1919, [Convention date].



Internally-fired boilers.—The Specification as open to inspection under Sect. 91 (3) (a) comprises the following subject-matter:—The heat-exchange elements of motor-car radiators, water-heaters, or other apparatus comprise co-axial hollow plates of cylindrical, conical or paraboloidal form, having a wire coiled between the walls of the plates to provide a circuitous path for the water circulating therethrough. The application of the elements to a bath-water heater is shown in Fig. 3 (*Cancelled*), with the wire *i* between the walls *g*, *h* of the elements. This subject-matter does not appear in the Specification as accepted.

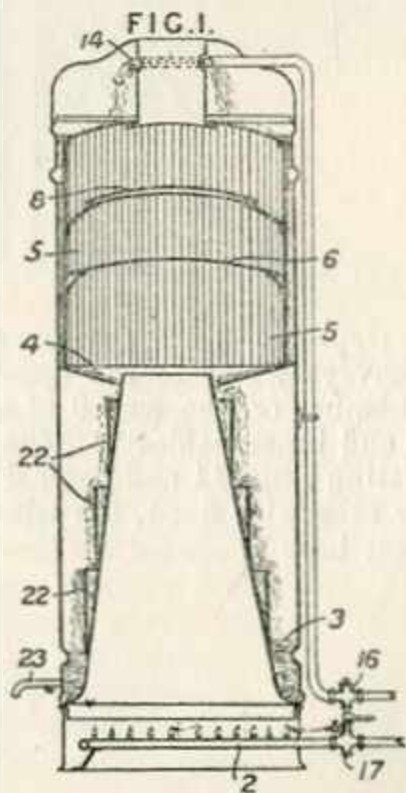
139,902. **Jackson, G. H.** March 31, 1919.



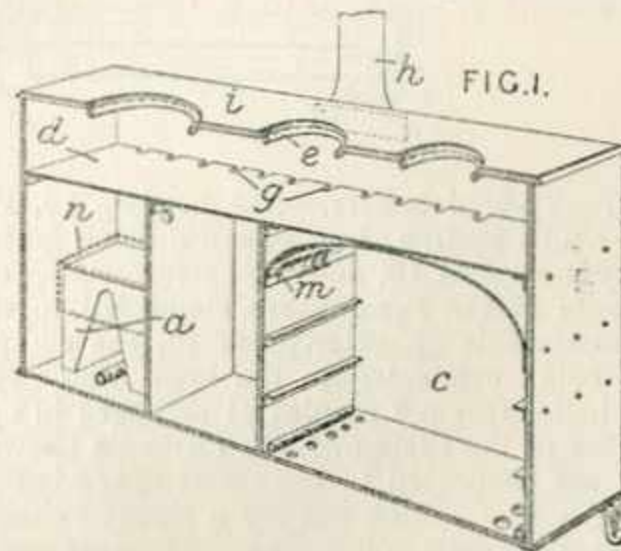
Block or slab form boilers; water-tube boilers.—The boiler comprises a system of hollow fire-bars connected with a heating-coil surrounding the fire, or with a heater of block form forming the sides and back of the fire-grate. The base comprises a casting 1 having a series of hollow fire-bars 2 connected by headers 3 having passages 4, so that a zig-zag passage is formed for the water. The base is connected to a rectangular spiral tube 8 which surrounds the fire and is secured in position by means of angle-irons 10 attached to each corner of the base. In a modification, Fig. 5, the spiral coil is replaced by a hollow U-shaped casting 11 which is open at the front to receive the ordinary grate bars. A series of horizontal baffles 12 extend alternately from each end 13, 14 to provide a sinuous path for the water.

139,896. **Vincent, J., Vincent, G., and Vincent, H.** March 19, 1919.

Geysers.—Water delivered through a perforated ring-tube 14 flows over the outside of a cylindrical chamber 5 with corrugated sides, and passes by a plate 4 to a series of annular cups 22 arranged on a conical flue 3, and thence to the outlet 23. The up-rising gases from burners 2 are diverted by baffles 6, 8 to the sides of the chamber 5. The gas and water cocks 16, 17 are adapted for simultaneous operation.



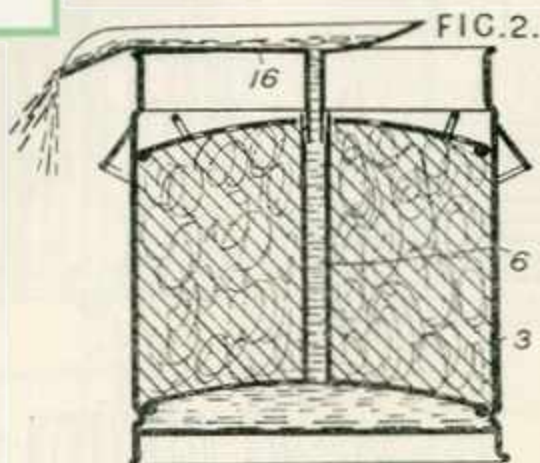
139,928. **Jefferies, W.** April 17, 1919.



Boilers.—In a complete gas kitchener comprising a boiler and fire, as well as the necessary cooking-appliances, the boiler *a* is of divided form, as shown, and is provided with a top cover or cap *n* to retain heat and prevent condensation.

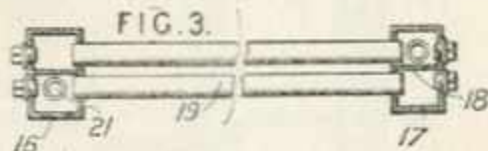
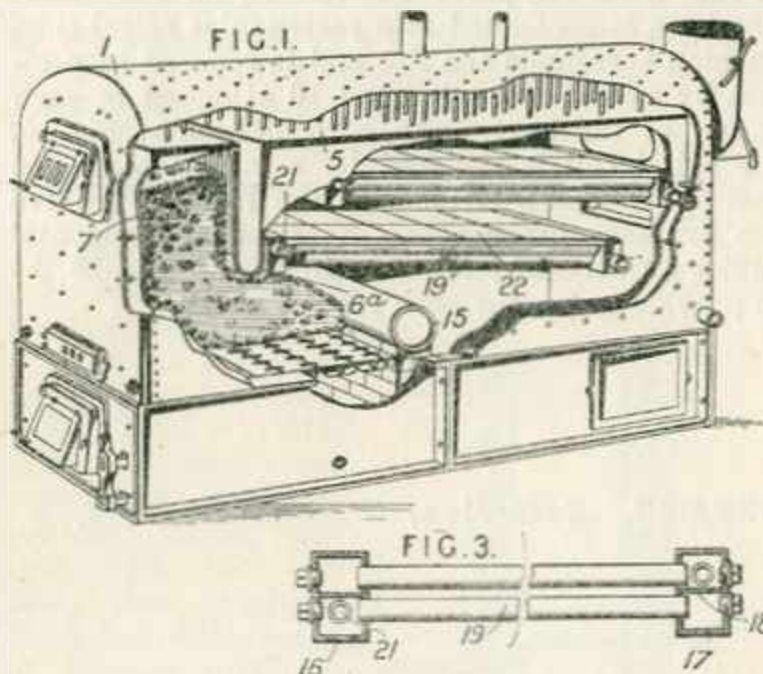


Evans, A. J., and Langford,
July 2, 1919.



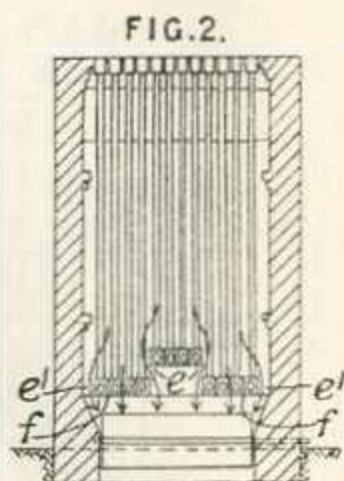
Washing-boilers.—In pans of known type comprising a vessel 3 fitted with a rising pipe 6, a spout 16 is adapted to be fitted in the top of the pipe 6 when the water is to be drawn off. A lid adapted to hold a reserve supply of water can be used.

140,003. Herbert, M. E. Aug. 13, 1919.



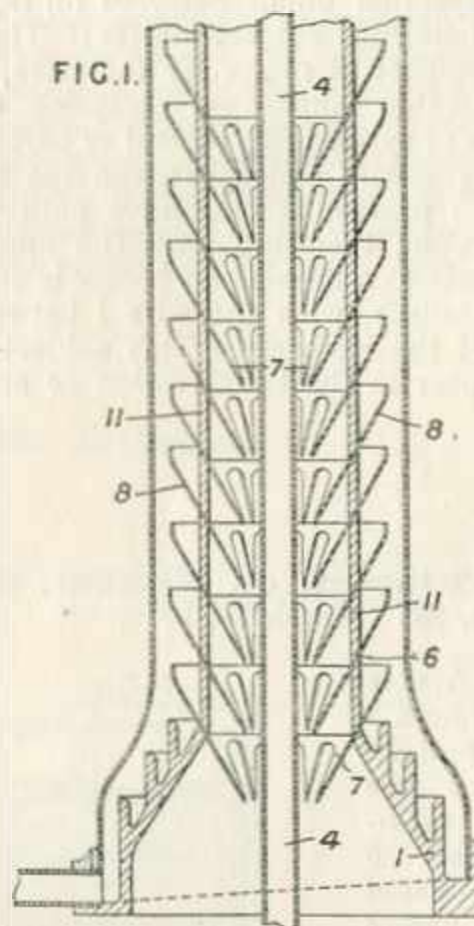
Internally-fired boilers.—The headers 16, 17 of a water-tube section, Fig. 3, are divided horizontally by partitions 18, and the corresponding compartments of the headers are connected together by separate sets of water-tubes 19, the compartments being connected to the main water space of the boiler through nipples 21 arranged in opposite sides of the section. The elements shown in Fig. 1 are connected to the water space between two shells 1, 5, which enclose a furnace chamber 7 and a rear heating-chamber. The rear wall 6^a of the fuel magazine is formed by a depression in the inner shell. A water chamber 15 extends across the heating chamber at the rear of the grate. The water-tube elements are covered with brick tiles 22.

140,097. Deutsche Babcock & Wilcox Dampfkessel-Werke Akt.-Ges. March 10, 1919, [Convention date].



Feed-water, heating.—To facilitate the escape of furnace gases at the lower end of economizers the tubes in alternate banks are shorter so that spaces *e* are left, as well as at the sides *e'* and at *f* between the headers in each bank.

140,253. Rouse, E. E. May 9, 1919.

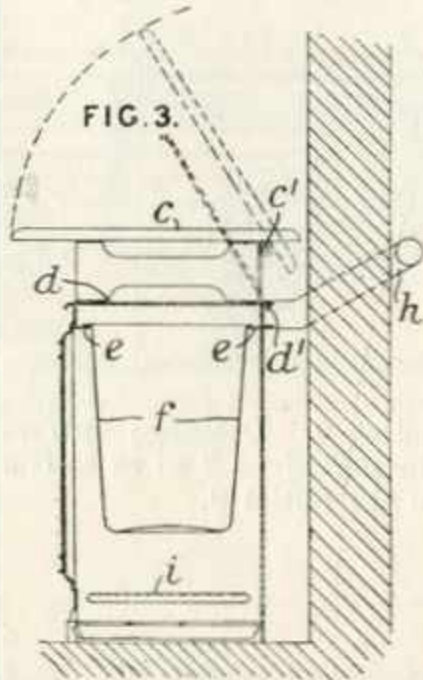


Geysers.—In a geysers, a central water-pipe 4 conveys water to the upper end of a heating-chamber on the wall 6 of which are annular caps 8 and inner baffles 7. The wall is made by alternating rings 11 and conical members 7, 8 soldered or otherwise fixed, the whole being mounted on a cast base 1.

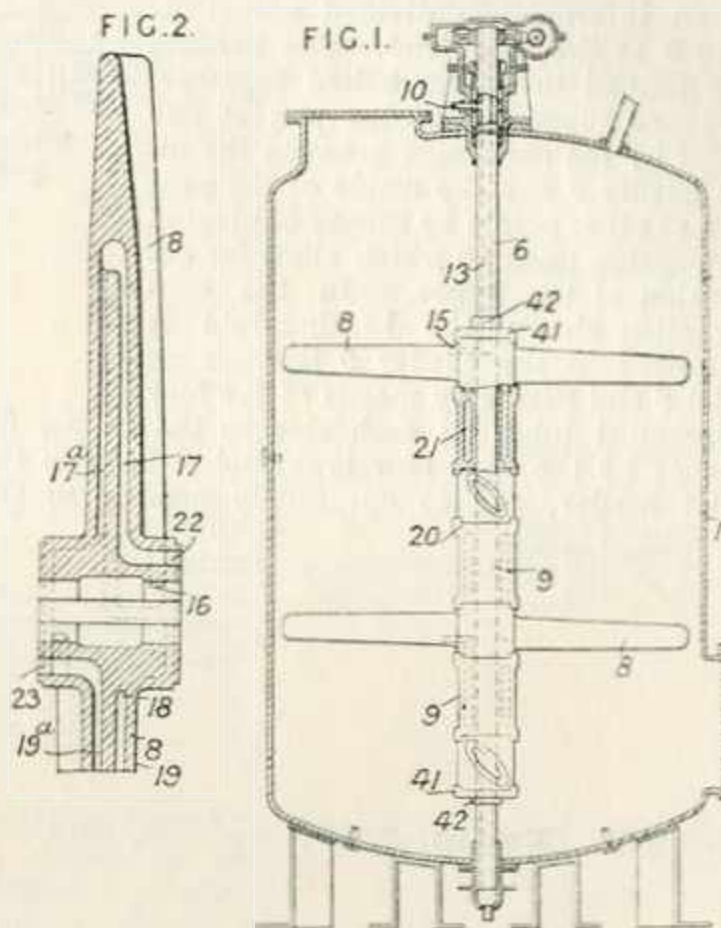


140,264. Camp, R. M., Ling, S., and Woodhouse, T. May 16, 1919.

Washing-boilers.—A gas cooker is made with a hot-plate *c* hinged at *c'* and oven top *d* hinged at *d'* to enable a copper *f* to be inserted into the oven, and heated by the burners *i*. The copper is supported by its flange *f* resting on a seating *e* beneath the top *d*, an exhaust pipe *h* being fitted above the seating. The boiling-rings &c. on the hot-plate *c* are preferably secured in their positions on it.



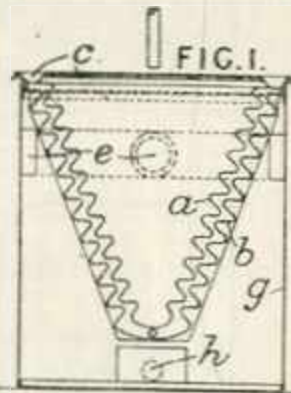
140,513. Engel, H. Dec. 20, 1918.



Digesters.—In combined heating and stirring apparatus of the kind in which steam enters one end of a shaft 6 disposed centrally within an extractor 1 and before escape from the other end of the shaft passes in turn through hollow-bladed propellers 8 adapted to lift continuously the material treated, the propellers 8 are separated by distance-pieces 9 having recesses 20 for the bosses of the propellers. The propellers and distance-pieces are clamped between collars and lock-nuts 41, 42. The steam takes the following course: inlet 10, passage 13, ports 15, 16, each blade in turn of a propeller, by the passages 17, 17^a, 18, 19, 19^a, ports 23, 22, and annular passage 21 in the distance-piece 9 to one blade of the next propeller.

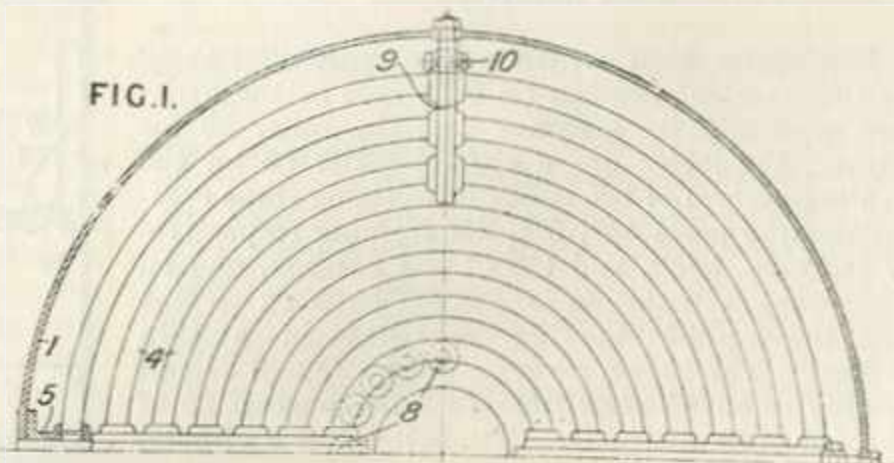
140,289. Waight, C., and Walker, A. June 30, 1919.

Heating liquids.—An apparatus for pasteurizing milk &c. consists of two inclined walls of corrugated sheet metal enclosing a space containing water which is heated by a gas flame or otherwise, the liquid treated flowing over one of the walls. In the arrangement shown, the water space between the walls *a, b* is V-shaped, the milk flowing down the inner wall *a* from the perforated trough *c*, arranged at the top of the apparatus, and being drawn off by a pipe. The whole is surrounded by a casing *g* provided with a flue *e* for carrying off combustion products from a gas burner *h*. In a modification, the water space is formed as an inverted V, the milk flowing down the outer wall.



140,635. Fawcett, Preston, & Co., (Taylor, H. W.). May 3, 1919.

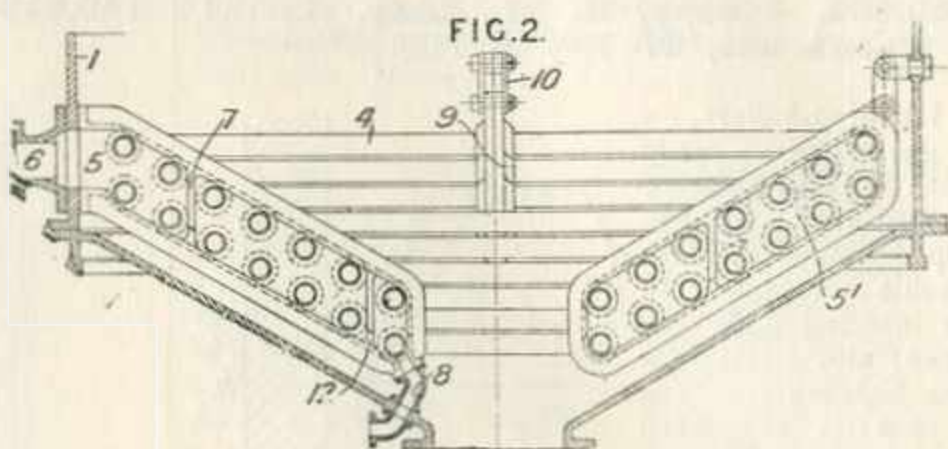
Boiling-pans and the like.—A tubular heating-apparatus for use with vacuum and like pans comprises a series of tubes 4 connected to two headers 5, 5' in the bottom of the pan or vessel 1, the heating-fluid being caused to circulate to and fro between the headers by the tubes both on the right and left hand sides by means of partitions 7 arranged in the headers. The tubes 4 are preferably segmental in shape, the inner ones extending through a semicircle, and the outer ones





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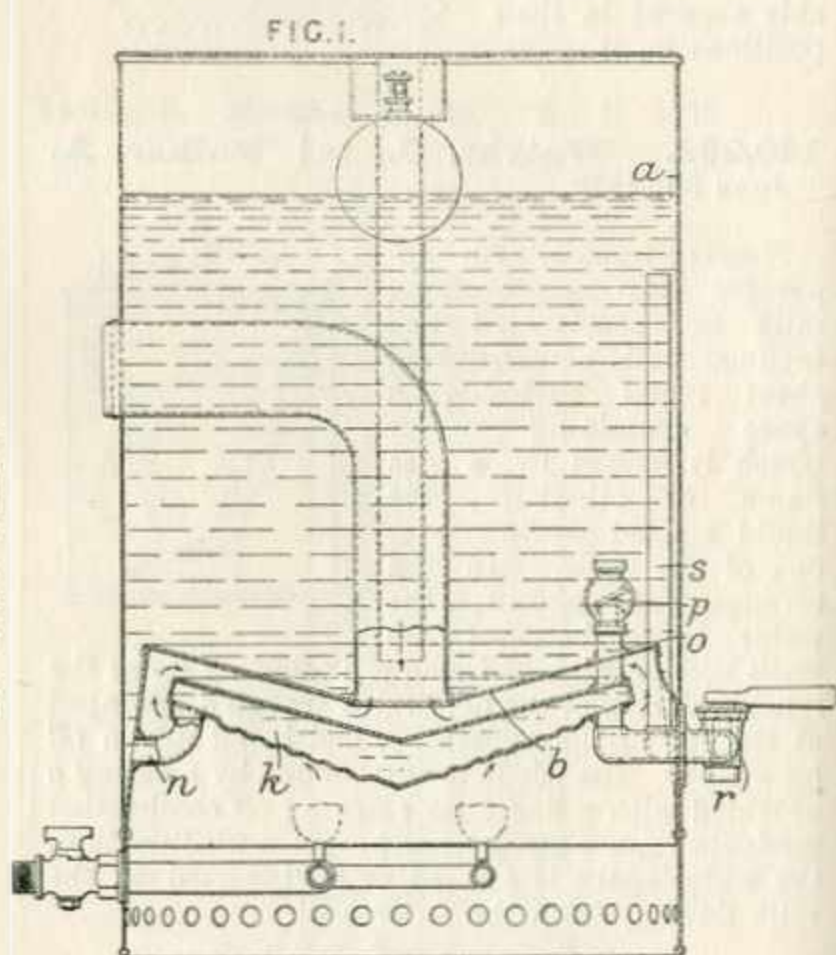
a quarter of a circle, being connected to the headers at one end and to an intermediate divided socket-fitting 9 at the other end. The headers are formed in halves bolted together, and are supported in the pan at one point by the connexion between the inlet header 5 and the inside of the pan, and at other points by means of pivoted suspension links 10 which allow for expansion of the tubes. In the construction shown, the heating-fluid is admitted to the header 5 through an inlet 6 and passes by means of the four uppermost tubes on each side to the header 5', thence by the next four lower tubes back to the inlet header, and so on, finally passing to the



outlet 8. Drainage apertures 12 are formed in the partitions 7 so as to conduct condensed water to the outlet 8.

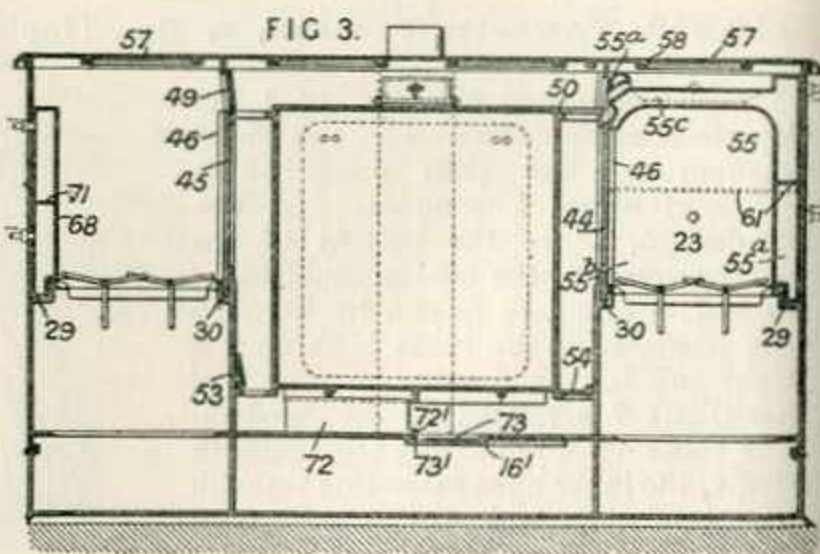
140,676. Ewart, J. W. June 28, 1919.

Internally-fired boilers.—By means of a two-way tap r , either a small quantity of very hot water can be drawn from the inverted-cone shaped boiler k , or a larger quantity of warm water through the pipe a from the reservoir a . If no water is being drawn, a circulation takes place into the boiler by the pipe n and out by the pipe o and valve p . The under surface b of the container a is coned like the boiler k , and both of these surfaces may be studded or corrugated.



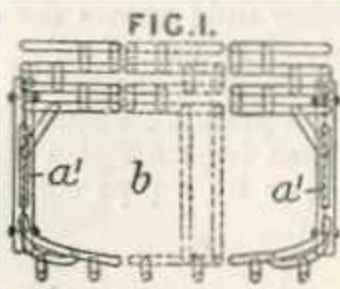
140,788. Zimmerman, J. E. Aug. 29, 1918, [Convention date].

Block-form boilers.—In a kitchen-range having an independent fire-box on each side of the oven, one primarily for summer use, the other 23 for winter, the latter has a special boiler 55 for the heating-system of the house comprising three communicating parts 55^a, 55^b, 55^c forming respectively the side, back, and top of the fire-box, and an additional circulating member between which and the top 55^a the fire-gases pass in a thin stream. The boiler rests on ledges 29 and can be readily removed after lifting off the portion 58 of the hot-plate above it. The boiler has a circulation partition 61.

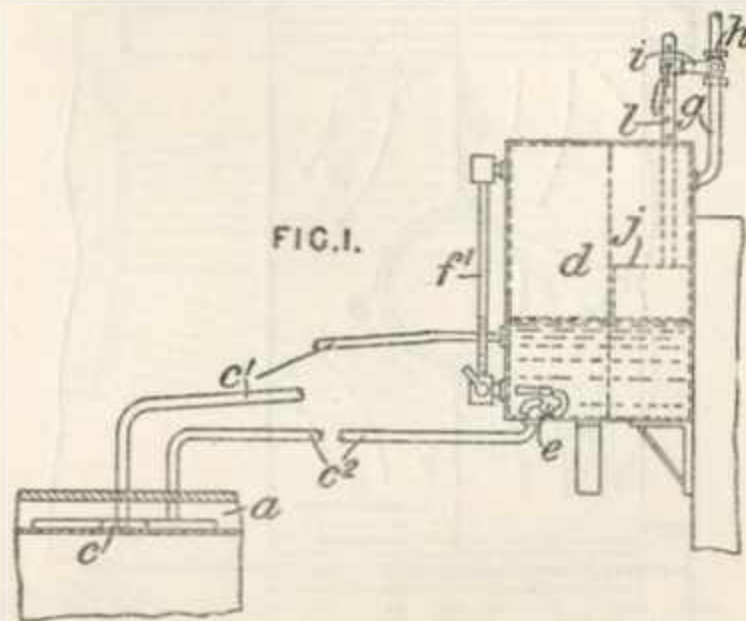


140,978. Johnson, G. E. Oct. 15, 1919.

Water-tube boilers. — A boiler, shown in cross-section, is made in sections comprising a right and left hand part, with or without the addition of one or more intermediate parts. Each section comprises a water-tube looped many times above the fire-box *b* with a lower part *a'* constituting the side-walls of the fire-box and in some cases the fire-bars also.



c is situated in the oven flue *a* and is in communication with the hot-water tank *d* by means of pipes *c'*, *c''*. A draw-off cock *e* and a gauge glass *f'* are fitted. The cold-water supply pipe *g* is fitted with a valve *h* actuated by a lever arm *i*

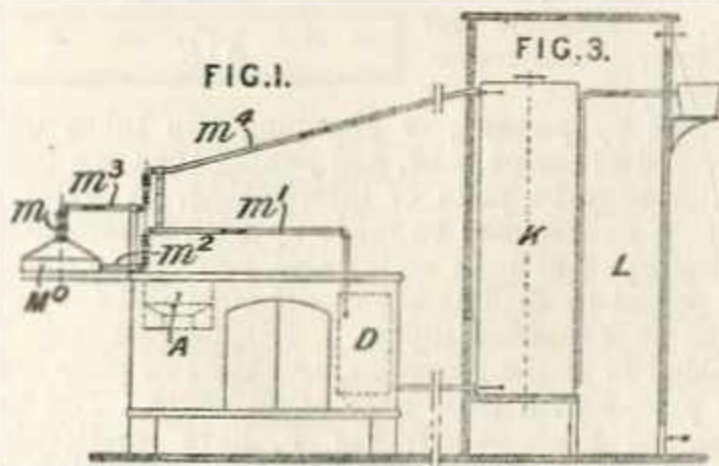


141,168. Campbell, K., Campbell, C., and Fyfe, W., (trading as McSymon & Potter). March 13, 1919.

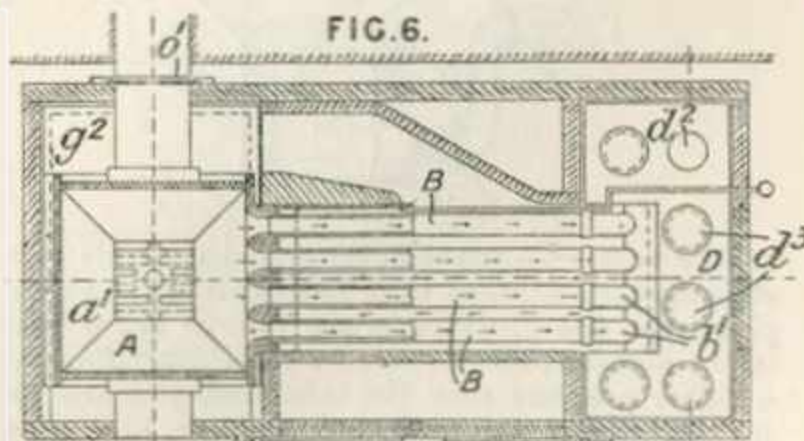
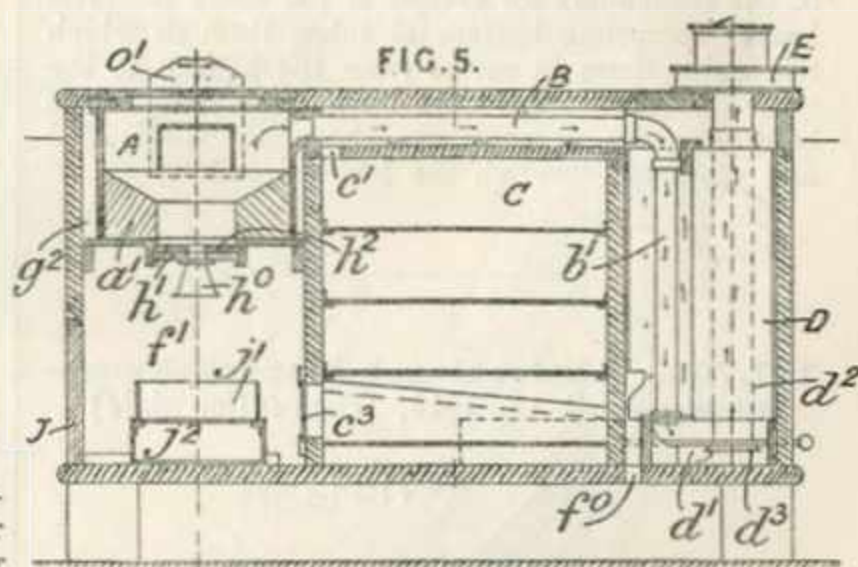
Water-tube boilers.—A hot-water supply system for use in connexion with ships' galleys comprises a circulating-pipe heated by the range fire and connected to a hot-water tank. The heating-coil

which is moved by the rod *l* attached to the float *j*. Holes are provided in the rod *c* to permit different quantities of water to be supplied to the tank before it is cut off by the valve *g*.

141,424. Cockburn, S. M. Jan. 13, 1919.

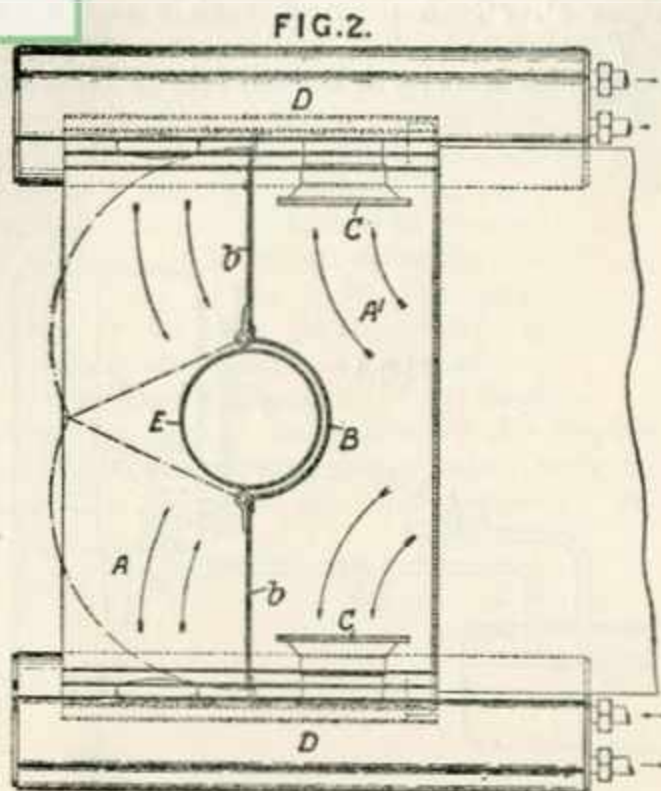


Heating water; block-form boilers.—A domestic cooking-stove comprises an improved boiler fitted in the body of the stove, and a second boiler movable over or away from the fire. In connexion with these is a hot-water storage tank arranged so as to heat air. Fig. 5 shows a range with a fire-grate *A* out of which the combustion products pass through horizontal tubes *B* above and vertical tubes *b'* at the side of the oven *C*. They pass thence into a chamber *d'* beneath a boiler *D*, and through a tube *d''* in the boiler to a fan *E*, and to the chimney. The boiler *D* comprises a number of vertical heating-tubes *d''*, with open lower ends and blind upper ends. It is connected to a storage tank *K*, Fig. 3, in a closet *L* for drying or airing or for providing warm air for the house. The boiler and tank are also connected by pipes *m'*, *m''*, Fig. 1, and swivelling arms *m''*, *m'''* to a boiler kettle *M^0*, which, by means of a



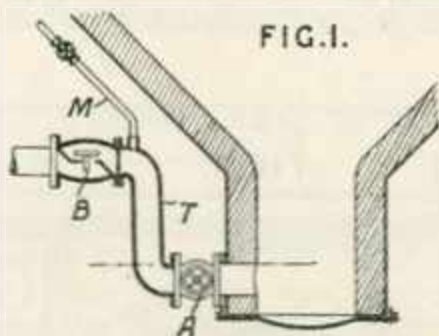
handle *m*, may be drawn over the open top of the fire when that is not otherwise in use.

141,595. **Trevithick, A. E.** Aug. 29, 1919.



Feed-water, heating.—A feed-water heater D for locomotive boilers is arranged in two parts disposed on either side of the smoke-box and so as not to obstruct access to the fire-tubes. The smoke-box is divided into two parts A, A' by a vertical semicircular plate B and two hinged doors b, and has two openings C for enabling the products of combustion to traverse the heaters. The gases pass from the heater to the front portion A of the smoke-box for escape at the stack E. The heater comprises horizontal tubes through which the water flows in series from the bottom to the top, a vertical transverse baffle-plate directs the heating gases downwardly through the aft end and upwardly through the forward end.

141,708. **Aktiebolaget Vaporackumulator.** April 12, 1919, [Convention date].

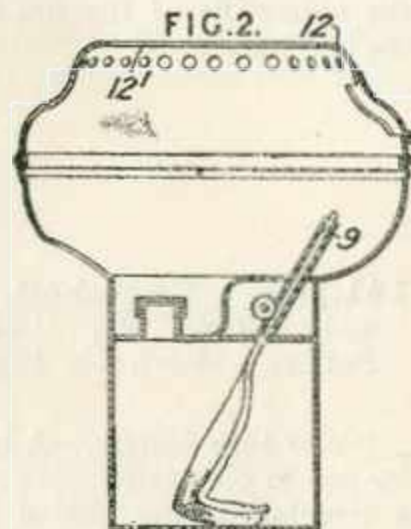


Digesters.—To prevent the liquid contents of a steam-heated digester from flowing into the steam pipe when the pressure in the pipe is below that in the digester, steam, air, water or other fluid at a higher pressure than the maximum pressure on the digester is forced into the steam pipe at a point intermediate of the cut-off valve and a non-return valve. The part T of the steam pipe between the cut-off valve A and the non-return

valve B is arranged vertically so as to form a liquid seal. A supply of high pressure steam or other fluid enters the top of the seal from a pipe M. The cut-off valve and the vertical part of the steam pipe are made of acid-proof metal. The high-pressure steam supplied to the seal may be taken from a steam accumulator connected to the boiler by a pipe containing a non-return valve.

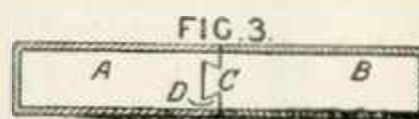
142,035. **Lynn, N. O.** Oct. 30, 1919.

Portable liquid-heaters.—A device for keeping water warm in a tumbler for dentist's use has a burner 9 so disposed as to be on one side of the central aperture 12' in a collar 12 adapted to support the tumbler.



142,186. **Green & Son, E., and Tansley, G. E.** Jan. 29, 1919.

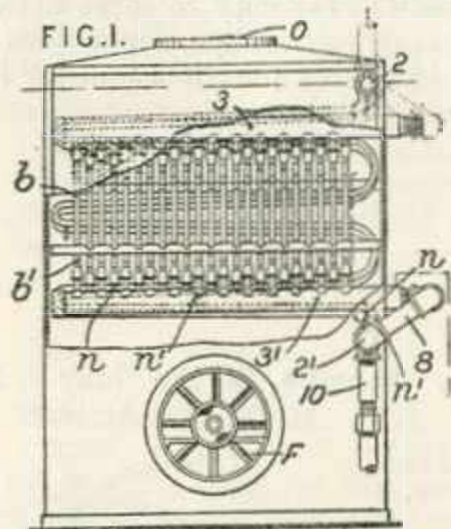
Feed-water, heating.—Headers for boilers, fuel-economizers, &c. are formed by pressing or stamping two tubes with one end of each closed, and joining the open ends, which may be plain or interlocking, by welding. A long header may be made up with intermediate tubes open at both ends; also two or more may be joined by drilling the closed ends and coupling with an expanded nipple. Diaphragms may be welded in at the junctions, and the two parts may be placed with their axes at an angle. The two stamped tubes A, B, Fig. 3, have interlocking open ends C, D, the joints being completed by welding.



142,352. **Baetz, H.** June 28, 1919.

Heating air.—An air-heating apparatus comprises steam inlet pipes 2, 3 disposed along the inner surfaces of two contiguous walls and connected to the lower drain pipes 2', 3' by sets of coils provided with terminal bends b, b' of unequal size, the individual pipes of the coils being disposed in distinct planes and in staggered relation. The nipples n, n' by which the coil pipes are connected to the steam and drain pipes are alternately of different height and disposed in different planes. The drain pipes 3' are connected by an elbow fitting 8 to a water collector

10 containing a water-discharge valve under the control of a thermostatic device contained in the pipe 2¹. The air to be heated is drawn into the

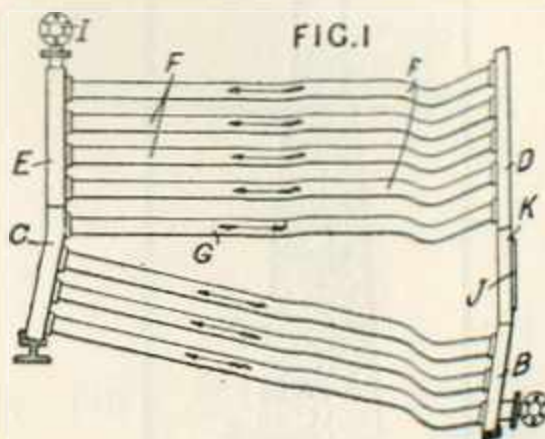


apparatus by a fan F and escapes through an outlet O.

142,537. Green & Son, E., and Tansley, G. E. Feb. 1, 1919.

Feed-water, heating.—An economizer consists of two nests of tubes, water flowing from a header

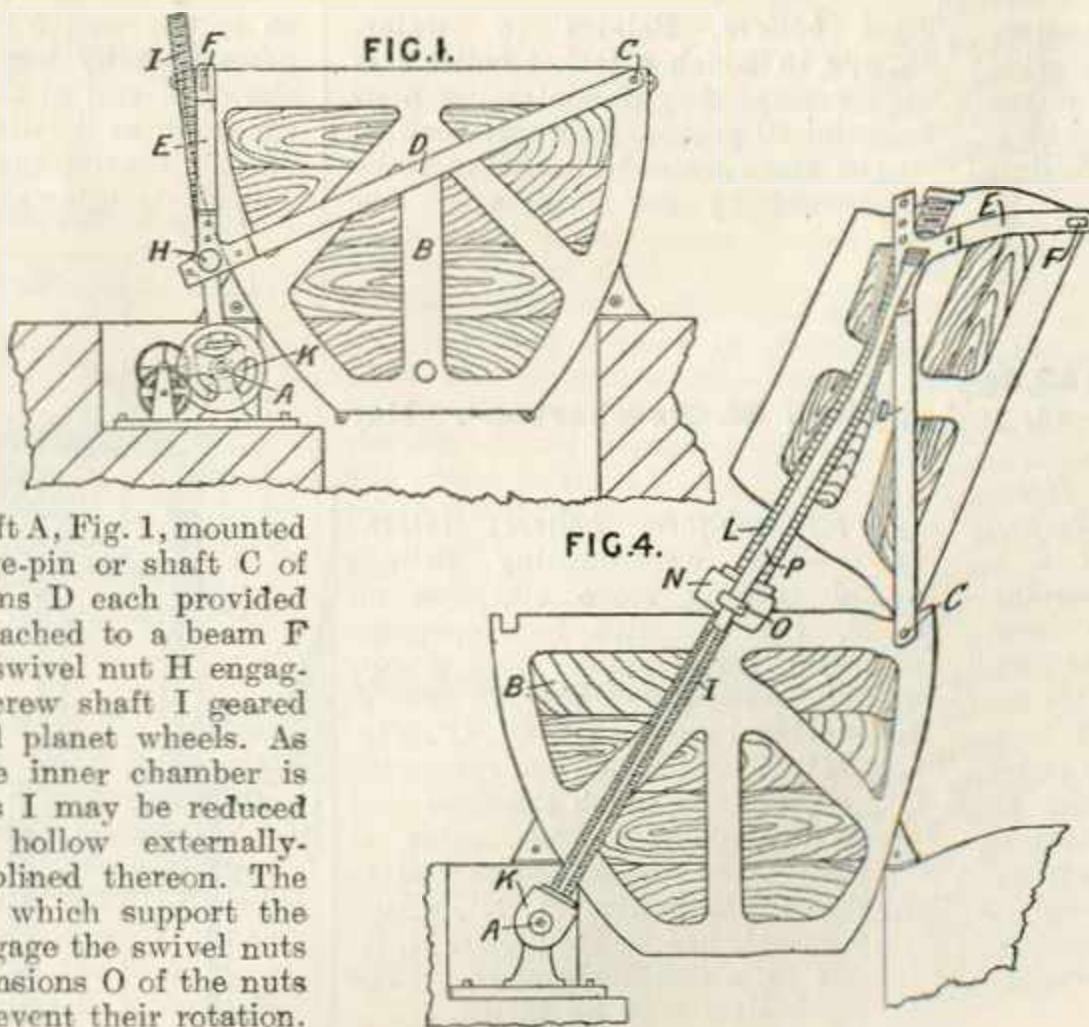
B through the lower set to a header C, thence by a row of tubes G common to both sets to a header D, and from this header through tubes F to a header E and outflow I. The lower headers and tubes may be inclined, an inspection door J being



fitted on the framework K between the two headers B, C. Vertically-disposed longitudinal corrugated baffles are placed between vertical rows of tubes in addition to the usual transverse baffles.

142,602. Whitaker, J., and Whitaker, R. March 14, 1919. *Addition to 101,060.*

Washing-boilers and the like.—An improved lifting-gear is provided for the hinged chamber of the apparatus described in the parent Specification consisting of an upwardly-projecting screw shaft at each end of the chamber, rotated by a power-shaft and having swivel-nut and lever-arm connexions to the chamber, which is thereby lifted from each end instead of from the middle. The tipping

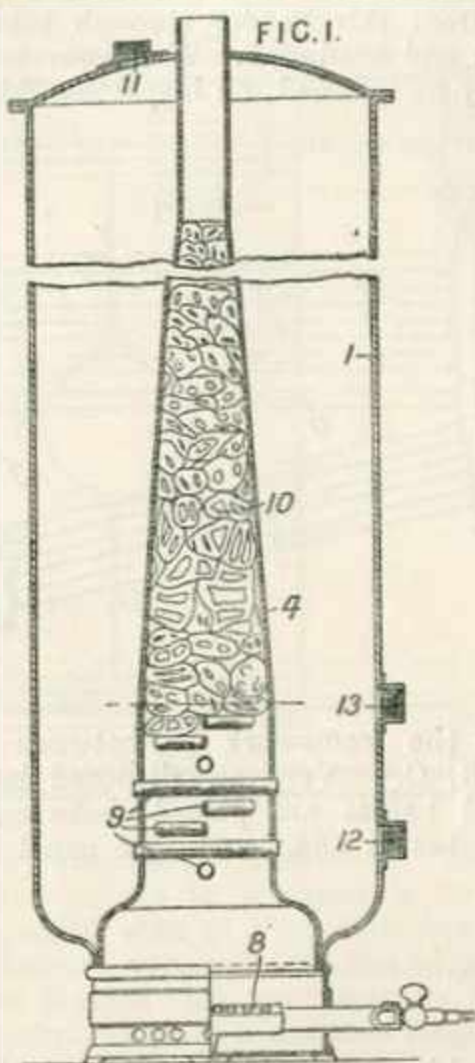


is controlled from a power-shaft A, Fig. 1, mounted behind the vat B. The hinge-pin or shaft C of the inner chamber carries arms D each provided with a double bracket E, attached to a beam F on the inner chamber, and a swivel nut H engaging an upwardly-extending screw shaft I geared to the shaft A through bevel planet wheels. As the shafts I are rotated, the inner chamber is thus raised. The solid shafts I may be reduced in length and fitted with hollow externally-screwed shafts L, Fig. 4, splined thereon. The solid shafts I carry nuts N which support the hollow shafts L, and these engage the swivel nuts on the brackets E. Side extensions O of the nuts N engage a guide-rod P to prevent their rotation.



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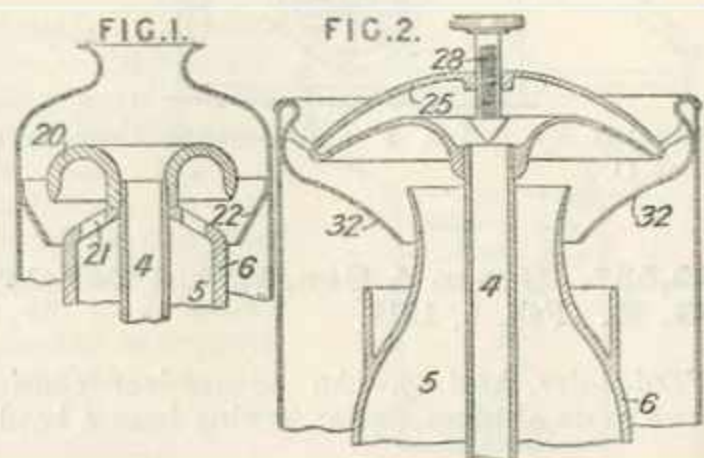
142,646. Freer, W. April 22, 1919.



Internally-fired boilers.—Relates to water-heaters of the type in which a jacket boiler 1 is provided with a central flue 4 containing non-combustible material 10 such as asbestos adapted to be supported on cross water-tubes 9 and to be rendered incandescent by gas burners 8. Ac-

ording to the invention, the flue 4 is of upwardly tapering form and extends completely through the vessel 1, which is of closed cylindrical form and of sufficient capacity to serve both as a boiler and as a reservoir. Pipe connexions 11, 12, 13 are made for filling purposes and for flow and return circulating-pipes.

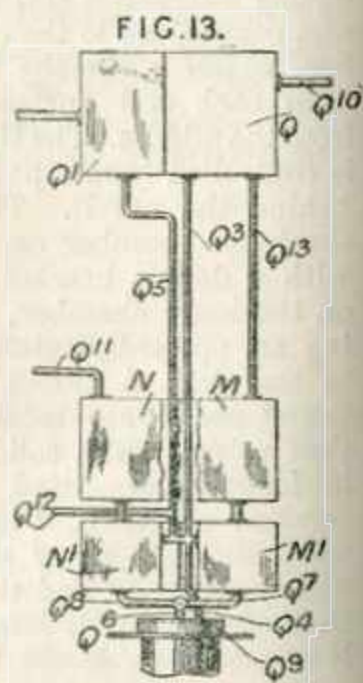
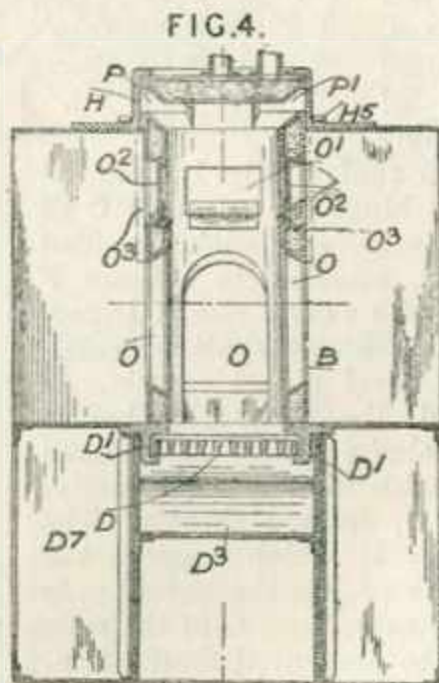
142,661. Rouse, E. E. May 9, 1919.



Heating water; geysers.—Relates to means for distributing water from a central tube 4 in a heating-chamber 5 comprising a lip 20 or a perforated head 25, the water being directed by an inwardly inclined baffle 22, Fig. 1, or 32, Fig. 2, on to the wall 6 of the heating-chamber. The gases pass by way of ports 21, Fig. 1, or from the open end of the chamber 5, Fig. 2, through the water as it falls. In the second form, a screw 28 can control the flow of water. Specification 140,253 is referred to.

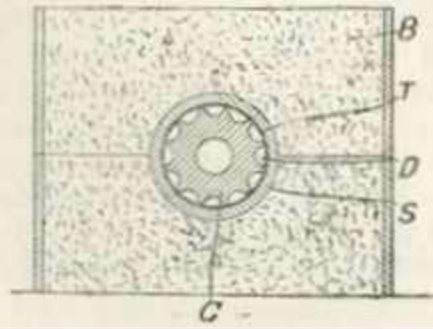
142,667. Billing, N. Pemberton. May 14, 1919.

Heating water; block-form boilers; internally-fired boilers.—The water-heating fittings of a heating and cooking stove comprise an annular boiler B, Fig. 4, with four openings O facing four ways, for example, four rooms, the walls of which radiate from the stove. This boiler is connected by pipes Q⁶, Q⁷, Q⁸, Fig. 13, to boilers M, M¹, N, N¹, which are connected to cisterns Q, Q¹ adjacent to which the flues lead from the stove to the chimney. A valve is fitted so as to control the flow of gases and to heat as desired either the boilers M, N¹, which supply water for domestic use, or the boilers N, N¹ which supply water to a radiator system. The arrangement of the boilers may be varied.



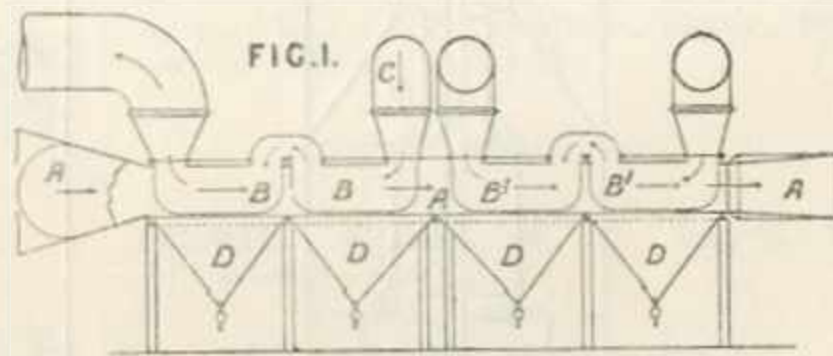
142,893. Mills, C. H., Hannan, J. R., and English, W. E. Jan. 8, 1919.

Feed-water, heating.—The steel or iron tubular parts of a feed-water heater or like heat-exchanger are coated with a layer of chilled cast iron in order to protect the parts against corrosion by the furnace gases. The coating S cast on the tube T in a mould B is chilled by running water through a loosely fitting hollow core 6 formed with flutings D. A layer of chilled cast iron may also be cast upon the inner surface of a tube.

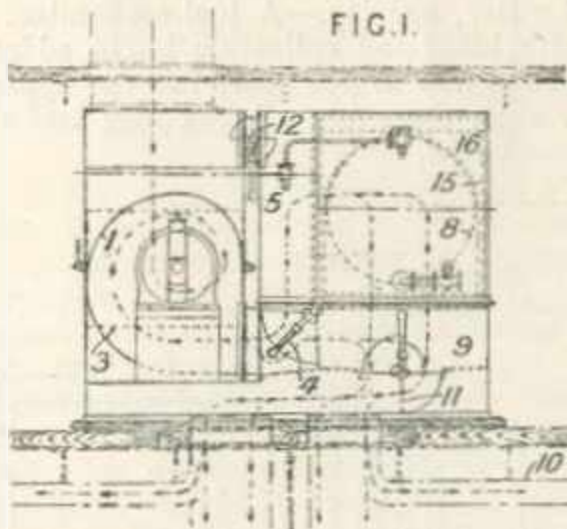


142,938. Turnbull, N. K. Feb. 15, 1919.

Heating gases.—The heat of the crude gases passing in the flue A from blast furnaces is abstracted firstly by previously cooled gas, on its way from the purifying and filtering apparatus, passing through flat plate elements B, and subsequently by cold air passing through similar elements B'. The crude gases are freed from heavy dust in the heat-exchanging apparatus, the dust collecting in hopper-like pockets D, and are further purified and filtered before returning through the duct C to be re-heated by incoming hot gases. Fig. 5 shows a section through the mouths of the plate elements B.



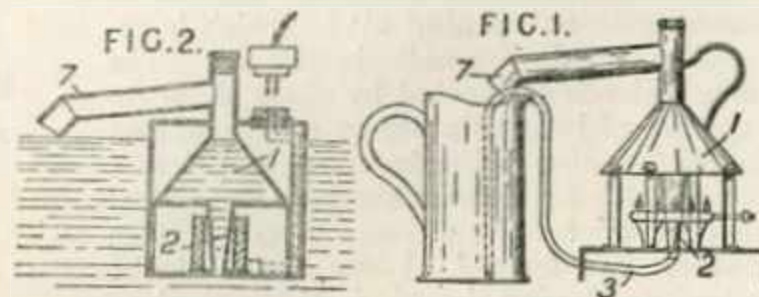
142,975. Neilson, T., and Groom, S. March 21, 1919.



Heating air.—Relates to apparatus for heating, cooling, or ventilating purposes of the type comprising a circulating-fan 1 and a heating or cooling device 8 enclosed in a single casing 15, an arcuate plate valve 3 controlling the passage of fresh or exhausted air to the fan, and a temperature-control valve 4 adapted to by-pass a certain proportion of the fresh air from the heating or cooling device. In order to obtain a thorough mixing of the two streams of air before passing them to the distributing-ducts 10, a mixing-chamber 9 is provided below, and in communication with, the heating or cooling device 8, having

at its base a discharge valve 11, and at one side an inlet port leading from the fan and controlled by the temperature-control valve 4, both valves 4, 11 being closed when the apparatus is exhausting air. When air is being supplied to a building &c., the current which passes through the heating or cooling device rises through a vertical duct 5, where it may be humidified, the duct having at its upper end a valve 12 which leads to the exhaust and is opened only when the apparatus is exhausting air. The tubes of the heating or cooling device are preferably arranged horizontally, and access to them is obtained through detachable panels 16 at the front and rear of the casing 15.

143,044. Lawton, W. A. May 22, 1919.



Portable liquid-heaters.—In devices for circulating and heating the contents of a larger liquid-

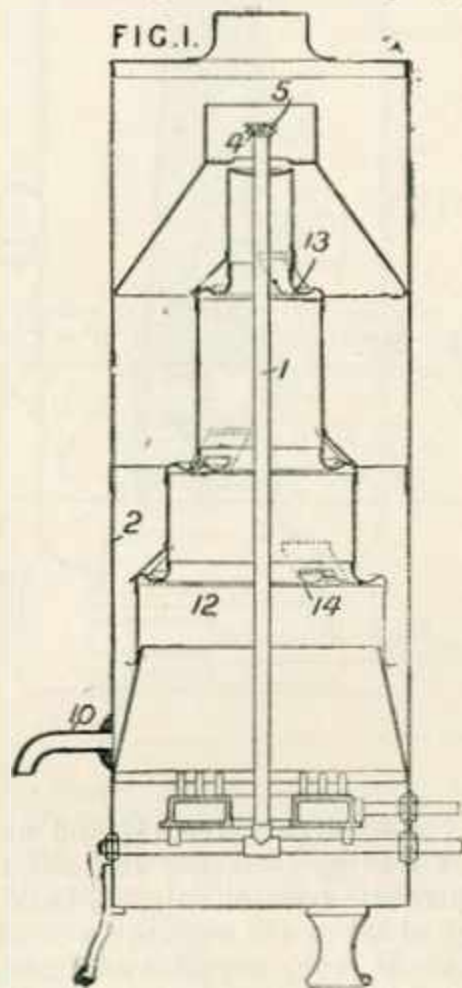


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having a conical vessel 1 heated by gas or electricity, the inlet pipe 2 is made in inverted conical formation, the base being attached to the vessel 1, and the apex being connected to the larger container either directly as shown in Fig. 2, or by means of a tube 3. A spout 7 returns the heated liquid. In modifications, two conical vessels 1 are used in series, and the device can be made to clip on to the edge of the liquid-container the contents of which it is desired to heat.

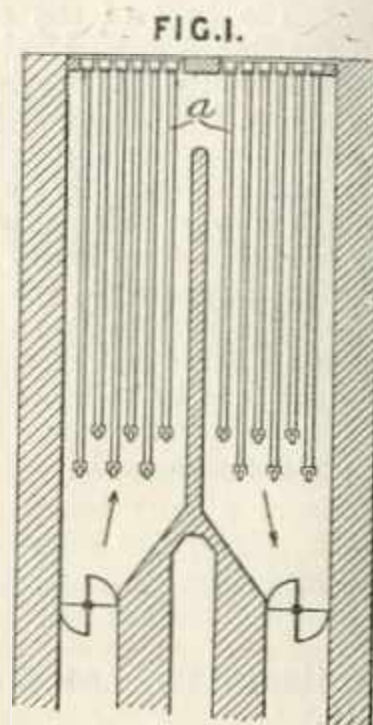
and a jet pipe 1 with horizontal jet flanges 4, 5; the water falls through the uprising hot or cold gases, over annular cups 13 of gradually increasing diameter mounted on an inner casing 12, to an exit pipe 10. Protected openings 14 permit the gases to pass into the space between the casing 12 and the outer container 2.

143,086. Webb, G. W. July 4, 1919.



Heating water.—A water heater or cooler or steam-generator comprises an outer container 2

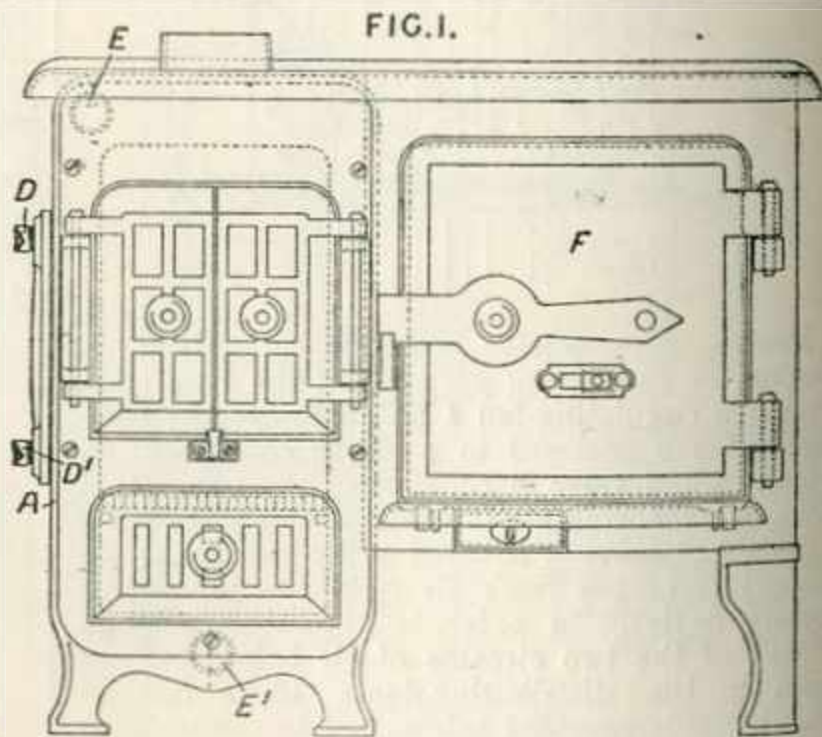
143,271. Allgemeine Elektricitats-Ges. Oct. 7, 1915, [Convention date].



Feed-water, heating.—A fuel-economizer of the type with staggered collecting boxes adapted for longitudinal flow of flue gases has the upper boxes side by side, the tubes a being long and short in alternate banks.

143,337. Mort, J. March 7, 1919.

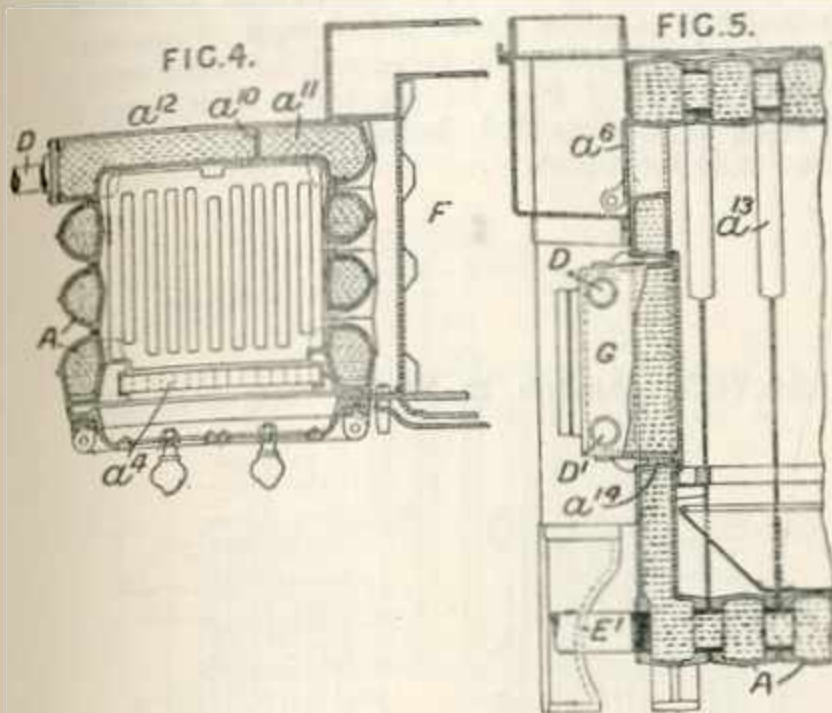
Heating water.—The boiler A of a heating and cooking apparatus is formed of connected sections enclosing the fire space, the back section forming the back of the fire-box and being divided by a partition a^{10} into two parts a^{11} , a^{12} , of which the former is connected to the other sections, whilst the latter forms an independent boiler. In a modification, Fig. 5, the back section is formed with an opening a^{14} in which is removably fitted a small boiler G. The main boiler is connected by pipes E, E' to a system of heating pipes or radiators, and the independent boiler by pipes D, D' to a storage tank for domestic supply. Vertical passages a^{13} for the passage of combustion products are formed at one side of the boiler by reducing the width of the sections for a portion of their height.



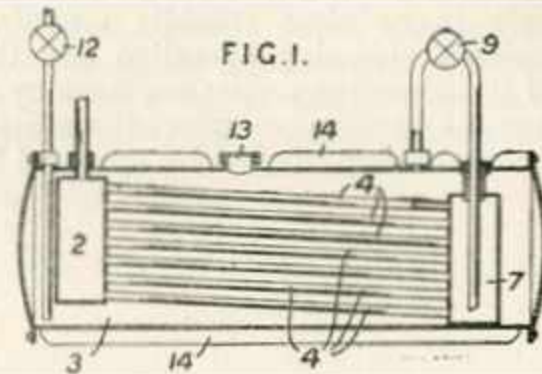
(For Figs. 4 and 5 see next page.)



143,337.

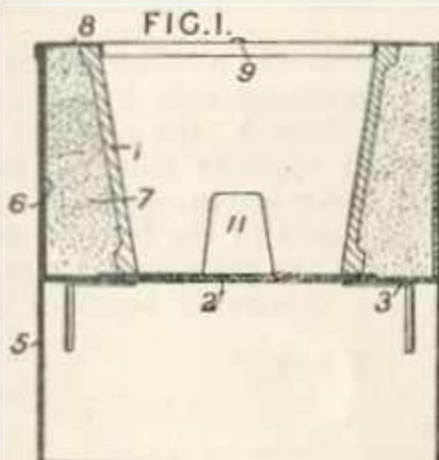


steam-receiving drum 2 and to a water sump or well 7. A pump 9 passes the condensate from the sump directly into the condenser chamber. The heated water is drawn off and supplied to



the boiler by a pump 12. The condenser chamber may be provided with heat-radiating fins 14 and with a filling-opening 13.

143,424. Murray, J. M., Murray, T. F., and Steven, J. G. July 10, 1919.

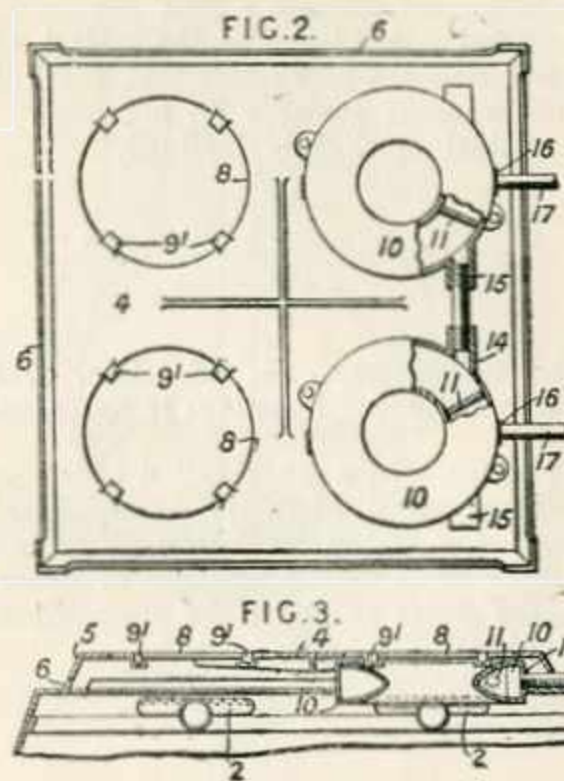


Boiling or set-pans.—The liner 1 of a stove for heating sugar-boiling pans is constructed in the form of an inverted frustum of a cone, and is surrounded by refractory material 7, the whole being enclosed by a sheet-metal casing 5 having an internal asbestos liner 6. A gas burner is arranged at the bottom of the furnace chamber and projects through the opening 11 in the lining. An annular ring 8 has projections 9 for the reception of the pan, which is suspended in the furnace chamber. The furnace chamber is supported upon a bottom plate 2 having an asbestos covering 3.

143,822. Valente, A., Curzon, M., and Curzon, S. Feb. 22, 1919.

Feed-water, heating.—In a surface condenser and feed-heater intended particularly for use on steam motor-cars, the condenser chamber 3, which also serves as a feed-supply reservoir, contains a battery of condensing-tubes 4 connected to a

143,878. Elliott, W. J. May 25, 1918, [Convention date].



Boilers.—A combination stove top and water-heater for placing on an existing stove comprises a body 4 with a marginal flange 5 cut away at 6 to provide air inlets, and having openings 8 below which water-heaters 10 are arranged. The water-heaters are spaced from the body 4 by contacting with lugs 9' which support lids or cooking-utensils. The heaters are formed with screwed bosses 14, 15, 16 by which they may be connected together and to flow and return pipes 17, the bosses not in use being plugged. Partitions 11 in the heaters ensure the circulation of the water round them. When the auxiliary top is in position on the stove, the water-heaters project into the utensil openings in the hot-plate above the burners 2. They may be of the V-section shown, to deflect the hot gases centrally. A modified form of heater is illustrated, having portions of reduced thickness to suit stove tops of different shape.



144,084. Ruths, J. K., and Aktiebolaget
Accumulator. May 29, 1919. Draw-
ings to Specification.

Digesters.—To shorten the period of digesting, for example in cellulose sulphite manufacture, the preliminary steaming operation and the beginning of the digesting proper are done by steam drawn from a steam-accumulator, the completion of the operation being effected by steam of higher pressure.

144,298. Jrinyi, A. J. G. J. June 26, 1914,
[Convention date].

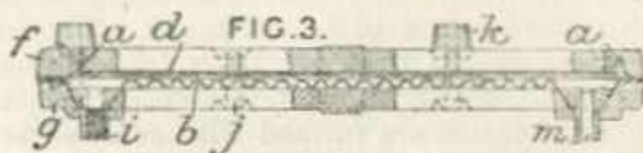
Boiling-pans and the like.—An externally-heated vessel for boiling or evaporating oil, tar, fat, resin, &c., for use in connexion with oil burners, distilling-apparatus, &c., is formed with ribs *a*, shown in plan in Fig. 2, of such height as to project through a film or vapour that may adhere to the wall *b* of the vessel. The ribs are so spaced that the bubbles forming on adjacent surfaces do not join. The ribs are vertical or slightly inclined.



144,560. Cockburn, S. M. Dec. 4, 1919.
Addition to 141,424. Drawings to Specification.

Heating water.—In a modification of the water-heating fittings described in the parent Specification, one of the water-circulating pipes is constructed in order to retard the flow of water and to ensure the water reaching the storage tank as hot as possible.

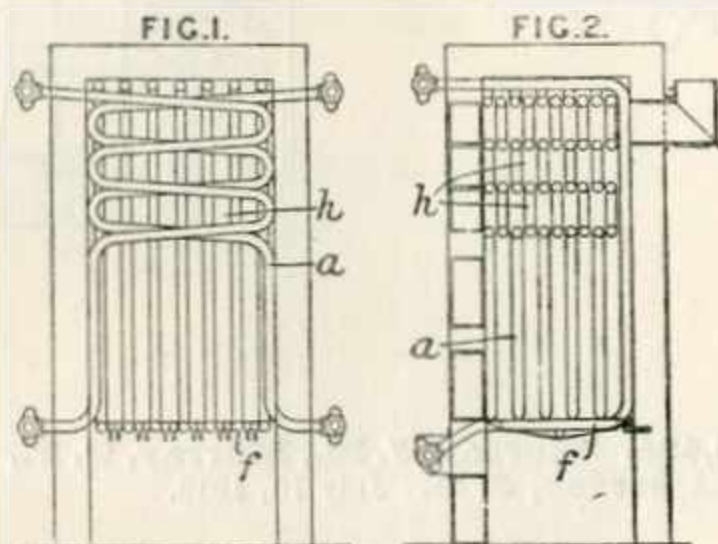
144,569. Brewtnall, A. W. Dec. 19, 1919.



Instantaneous water-heaters.—An instantaneous heater for water or other liquids comprises upper and lower corrugated plates *d*, *b* having flat borders *a*, the corrugations of the two plates running in different directions, and the plates being clamped at their edges between two rings *f*, *g* connected by screws *j*. The liquid flows through the space between the two plates, where it is heated by means of a gas burner, electric heater,

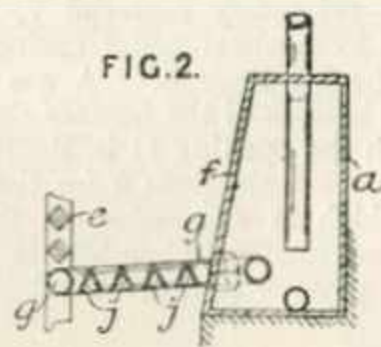
or the like, the space having an inlet connexion *i* for connexion to a supply source and an outlet connexion *m*. The plates and clamping-rings may be circular, square, or polygonal, and the upper clamping-ring *f* may be provided with lugs *k* having screw-threaded holes for attaching the heater to a support.

144,783. Smith, D. V. H. March 14, 1919.



Water-tube boilers.—In a boiler having sinuous-tube sections *a* arranged side by side so as to form longitudinal flues *h*, the sections are connected together at opposite sides of the boiler, and bent tubes *f* are arranged behind the sections, the bottom parts of the bent tubes passing between the bars of the grate. The ends of alternate sections are connected together by short header pieces.

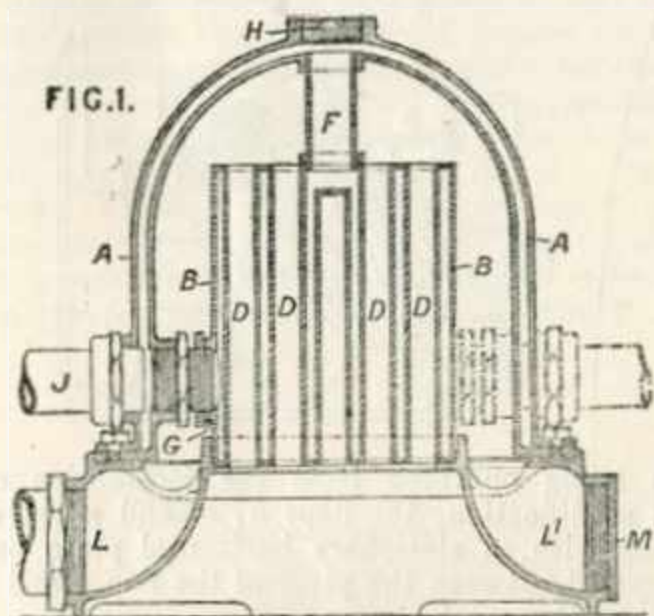
144,808. Shaw, J. S., Shaw, S. H., and Shaw, A. E. March 19, 1919.



Boilers.—The grate of a domestic stove consists of a boiler *a* set in the brickwork and a bottom consisting of a tubular frame *g* with triangular section or other transverse bars *j* parallel to the face *f* of the boiler.

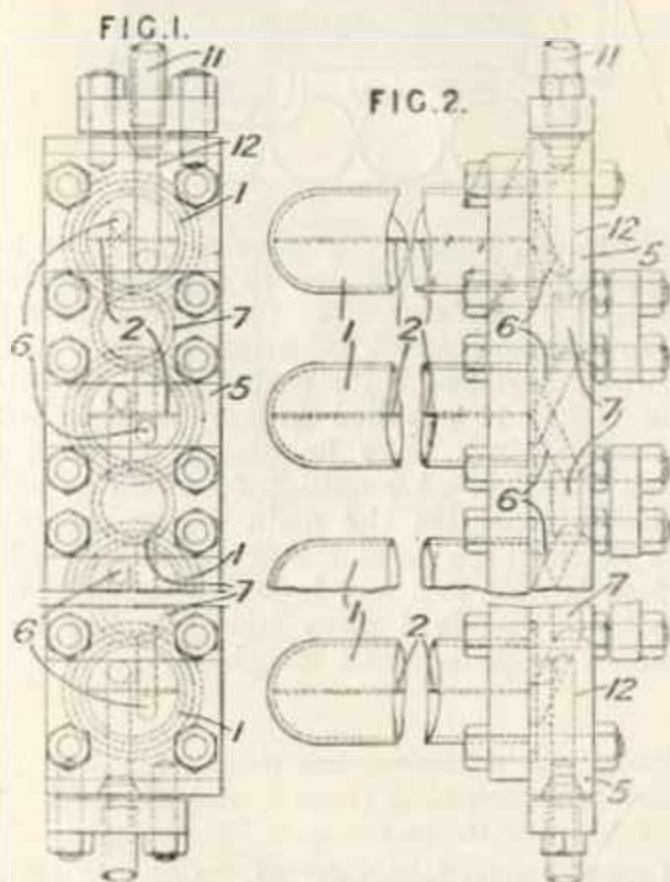
144,905. Inglis, J. M. July 23, 1919.

Internally-fired boilers.—An outer water-holding casing A with hemispherical head is connected to an inner chamber B traversed by vertical flue tubes D by junction boxes G, F situated opposite the inlet J and outlet H for water. The whole is



heated by a gas-burner arranged beneath the inner member, and escape pipes L, L' leading to a flue are provided, one of which may be closed by a plate M if not required.

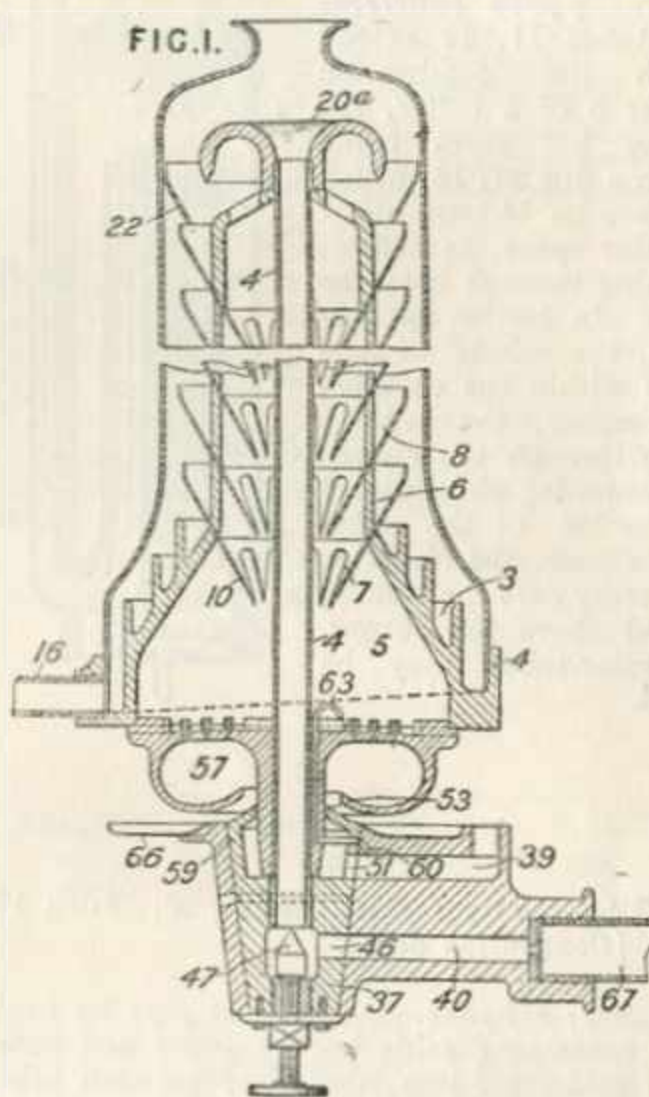
145,109. Lewis, W. Y. March 12, 1919.



Feed-water, heating.—Apparatus such as feed-water-heaters, steam-superheaters, &c. are constructed with vertical series of units, the circulation within them being so arranged that the direc-

tion of flow within and without is the same in each unit but opposite regarding the apparatus as a whole. In the example shown, the heating-medium flows upwards outside the close-ended tubes 1, the steam or water within the tubes enters at 11 and passes through the passage 12 in the thickness of the plate header 5 to the underside of the baffle 2, along the tube and returns on its upper side, being thence conveyed by passages 6 and hole 7 to the underside of the tube 1 next below it, and so on.

145,213. Rouse, E. E. May 9, 1919.



Heating water; geysers.—The burner and casing of a water-heater are attached to the rotary part of a plug valve controlling simultaneously the supply of water and gas, and this control is effected by rotating the whole apparatus. Water fed in at 67 passes by a passage 40 through the port 46 in the plug 37 to the central supply pipe 4 to the heater, a separate screw valve 47 providing for independent regulation. The water falls from a distributor 20 and is directed by a baffle 22 to the exterior of the wall 6, where it falls over a series of cups 8, and annular channels 3 leaving the apparatus by the pipe 16. The hot gases ascending through the space 5 are baffled by the rings 7 and serrations 10. Gas passes by the passage 39 and the port 51 in the plug 37 to the annular slot 53 and the mixing-chamber 57. A by-pass 63 communicates with a ring groove 59,

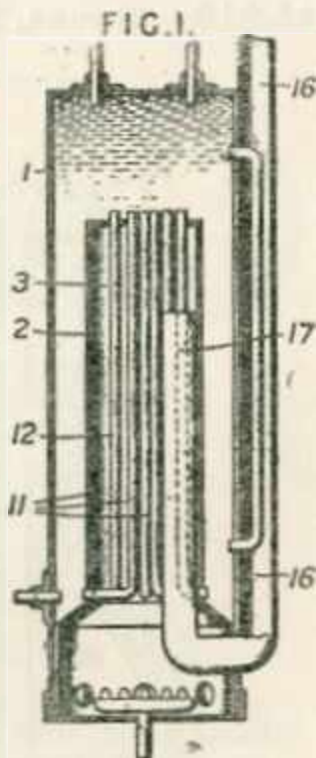


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ways open to the gas passage 39 by a hole 60. Trays 66 serve for catching moisture. In a modification, a form of distributor with downwardly-directed jets is used, and in another the distributor is arranged so that the water does not come into direct contact with the gases. In a further modification, an annular form of burner with adjustable air supply is used.

145,604. Martens, J. Sept. 7, 1916, [Convention date].

Internally-fired boilers.—Water-tubes 11, 12 extend through the combustion chamber 3 of a boiler, the exit for hot gases being through a flue 17, 16, which may have its U-bend below the water space, as shown, or passing through it to the outside. In further modifications, the whole of the bend is within the combustion chamber, the leg 16 passing through the crown, or the outer leg 16 is formed as a section of the water space between the shells 1, 2. In every case the bend is arranged above the burner. The water-tubes may be omitted.



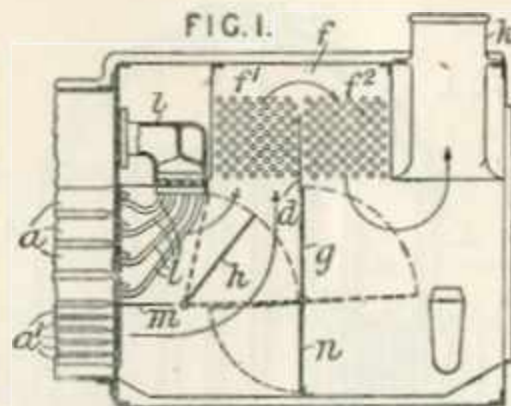
145,732. Krupp Akt.-Ges., F. June 17, 1918, [Convention date].

Digesters; set-pans.—A vessel or pipe for heating or containing acids has an inner and outer wall of acid-proof iron, the space between being cast full of lead.

146,352. Schmidt'sche Heissdampf-Ges. March 4, 1918, [Convention date].

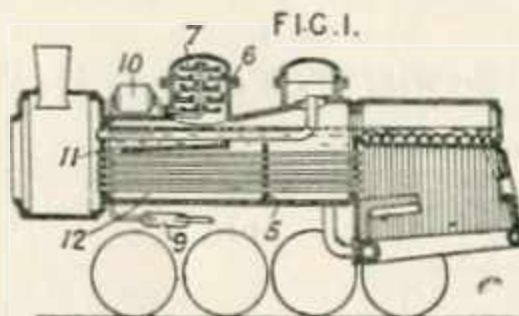
Feed-water, heating.—Relates to means for guiding and diverting the fire-gases in the smoke-box of a locomotive fitted with a fire-tube superheater, consisting of elements *l* connected at their ends with the steam-chest *i*, and a feedwater-heater *f* situated in the upper part of the smoke-box. A pivoted flap *g*, having an extension *n*, is mounted beneath a fixed vertical plate *d*, the two forming together, in the working position, a vertical partition which guides the fire-gases upward through the portion *f*¹ and downward through the

portion *f*² of the feed-heater before passing to the chimney *k*. A flap *h* is pivoted at the extremity of an horizontal plate *m* situated beneath the superheater, and regulates the amount of fire-gases passing through the superheater. The fire-tubes and superheater are accessible for repair when the flaps are in the horizontal position, the



flaps being operated from the locomotive cab. In a modification, the flaps *h*, *m* and *n* are dispensed with, a stationary horizontal plate being interposed between the pivot of the flap *g* and the front of the smoke-box.

146,522. Stumpf, J. March 17, 1916, [Convention date].



Feed-water, heating.—The feed supply to a locomotive boiler is heated first in a steam heater 9 supplied with exhaust from the main engine and then in a direct-contact live-steam heater 6 having depositing surfaces 7 for scale. An additional steam heater 10 supplied with exhaust from the auxiliary engines may be placed between the heaters 9 and 6. A partition 5 extending across the boiler separates the main steam-generating space at the back from the space 12 into which the feed is delivered and in which impurities are deposited. The feed flows from the live steam heater on to an inclined trough 11.

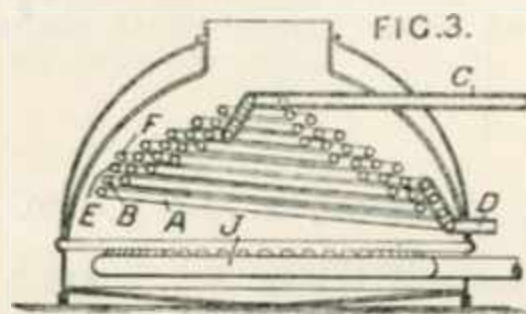
146,579. Duviensart, F. April 3, 1919.

Heating liquids.—In a process for exchanging the heat of solutions, a liquid which is non-miscible with respect to the solutions to be treated is used as a carrier of heat from one to the other

of the solutions. This general idea may be applied to crystallizing and the separation of salts in solutions by fractional crystallization. Fig. 3 shows diagrammatically a crystallizing plant. Throughout the process the heat exchange takes place by the passage through the non-miscible liquid of the solution in form of drops. The mother-liquor is fed in by a pump P¹ and falls in drops through the distributor P (shown on an enlarged scale in Fig. 2) comprising successively reduced apertures in plates 1 - 7 surrounded by cylindrical rings a - g. The tube A is filled with a cold non-miscible liquid for example petrol. Crystals and cooled solution settle in the lower part of the tube in a cone K from which they are pumped to a settling tank D with a screw for the removal of the crystals. The pump P⁴ works

maintained through a pipe M from a tank Y to which the warm petrol from the tube B arrives after passing through the pipe S, distributor P in tube C (through which falls a saline solution cooled in an ice-making machine), and pipe V.

146,695. Winterflood, B. W. Dec. 4, 1919.



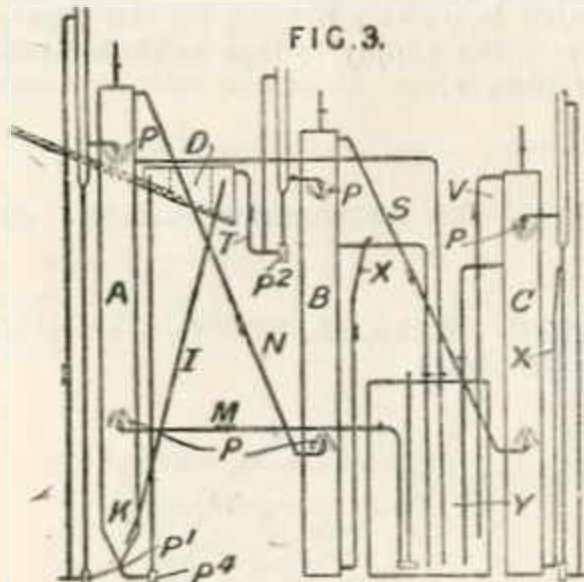
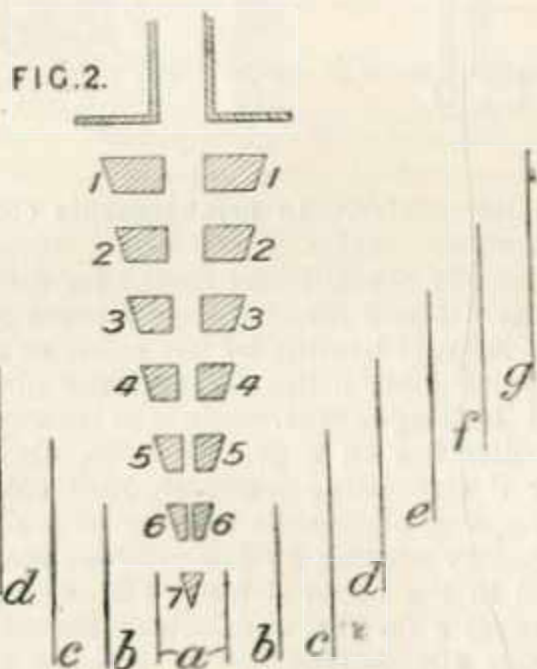
Water-tube boilers.—Two or more coiled pipes A, B, E, F are interwoven so that they form a ring wall of any desired shape round a burner J, such pipes having common headers connected to inlet and outlet pipes C, D, the whole being mounted within a double walled casing with non-conducting filling or a vacuum between the walls. Specifications 13359/94 and 25067/13 are referred to.

Reference has been directed by the Comptroller to Specification 148,611.

146,999. Braach, P. Jan. 9, 1914, [Convention date]. Void [Published under Sect. 91 of the Act].



Heating water.—Relates to a gas cooking-stove in which a funnel-shaped deflector E is arranged above a gas burner M, the upper ends of the segmental plates resting upon a frame B. The outer casing contains a boiler I, the whole structure being covered with a hot-plate K through which the cooking-vessel passes. The combustion gases are deflected toward the periphery of the frame B, which is cut away to allow the gases to pass between its edge and the inner wall of the boiler I.



in a closed circuit completed by the return tube I. The overflow from tank D passes through pipe T, and pump P² to a second distributor P in the tube B filled with warmed petrol fed to it from the upper end of the tube A through a pipe M. The solution warmed in its passage through the tube B in the form of drops is discharged from the bottom through the tube X, the length of which can be altered so as to regulate the levels in the tubes. The cold petrol supply to tube A is

Water-tube boilers.—The water-tubes 2 of a hot-water boiler are attached to the casing or combustion chamber 1 by metal straps 3 rivetted at 6, 7, instead of being soldered as described in Specification 12626/07. The tubes may bear heat conducting-gills.

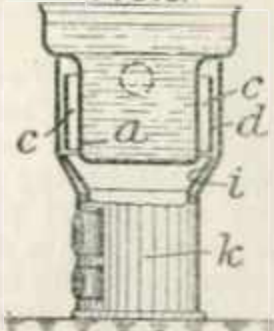
FIG. 3.



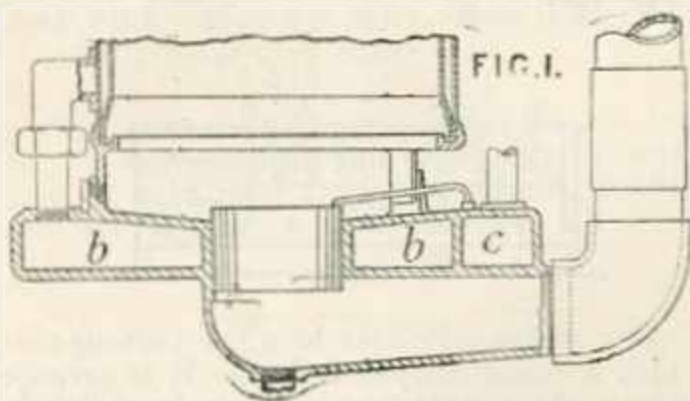
147,221. Junkers, H. July 7, 1920.

Boiling-pans.—A boiling or evaporating pan *a* is surrounded by a jacket *d* connected to it by vertical heat-conducting webs *c*. The lower part may be narrower than the upper, as shown, and the furnace *k* can also be contracted at its lower part. In this case a connecting cone *i* will lead the products of combustion into the space between the jacket and the pan.

FIG. 3.

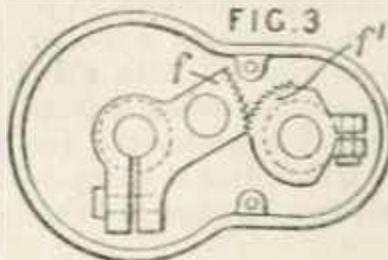


147,363. Shannon, J., and Shannon, R. W. Aug. 23, 1919.



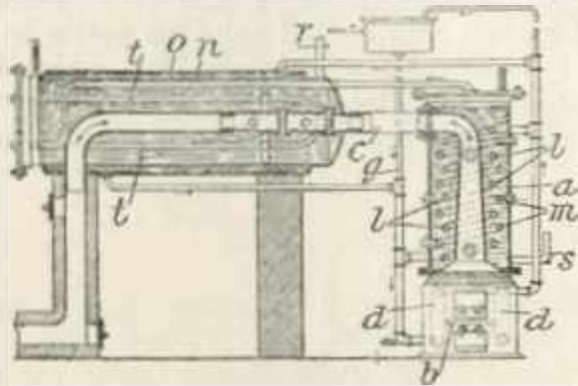
Internally-fired boilers.—In a water heater of the kind described in Specification 18736/13, the hollow base contains a water chamber *b*, through which the boiler is fed, and a gas chamber *c* in communication with the gas burner. Adjacent cocks mounted on the base and adapted to be operated simultaneously control respectively the supply of water to the water chamber and the supply of gas passing from the

FIG. 3.



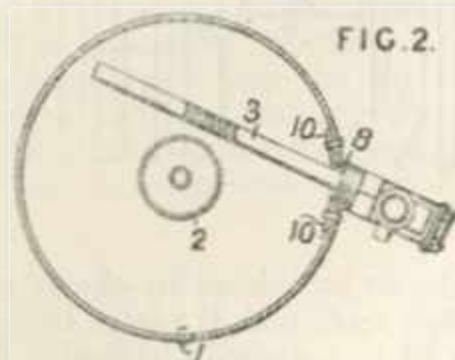
gas chamber to the burner. A quadrant *f* on the spindle of one of the cocks engages with a pinion *f'* on the spindle of the other cock.

147,523. Voggenauer, J. April 10, 1916, [Convention date].



Heating water.—In arrangements comprising a warm-water heater *n* and a hot-water boiler *a* wherein the heater *n* has means for direct heating such as a flue *c* for the gases from a fire as well as for indirect heating by hot water or steam coils *c*, the hot water boiler *a* has similar direct and indirect heating-means. In the example shown, the boiler fire on a grate *b* heats also a smaller boiler *d* circulating water through coils *l* in the water-space, other coils *m* being provided for supplementary heating by low-pressure steam. Water heated in the boiler *d* also flows through a heating-jacket *o* on the warm-water heater *n*. Cold water is supplied to the boiler *a* by the pipe *s*, steam or hot water passing by the pipe *g* to the heater *n*, the supply to taps &c. being taken from the outflow *r*.

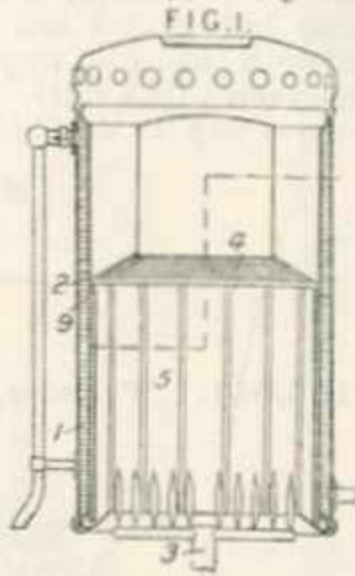
147,636. Kite, G. W. Oct. 18, 1916, [Convention date].



Heating water.—A thermostat 3 passes through the wall 1 of a hot-water cylinder at such an angle that it extends across but avoids the central flue 2. To effect this it is held in a hollow fitting 8 with flanges 10 suitably curved and riveted to the wall 1.

147,732. Junkers, H. Jan. 13, 1919, [Convention date].

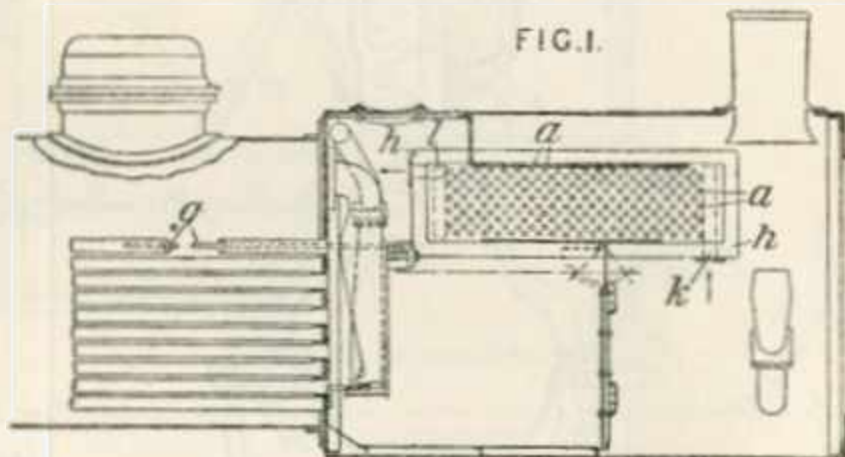
Annular boilers; internally-fired boilers.—To prevent condensation on the internal walls of heaters for liquids or steam-generators &c., a protecting wall is arranged in front of the main wall and connected with it at certain intervals by heat conductors. In the form shown in the Figure, the inner wall 1 of an



annular boiler 2 heated by a burner 3 and fitted with a radiator 4 is provided with a protecting wall 5 having vertical grooves in contact with the main wall. The grooves may be horizontal or may be replaced by saucer-like indentations. The top of the protecting wall is bent back at 9 or fitted with a packing-ring to prevent the entry of gases between the two walls. For transmitting the heat a separate intermediate body, for example a corrugated wall, may be inserted between the main and protecting walls. The protecting wall may be made in segments having flanges in contact with the main wall. Where cooling pipes are attached to the main plate, they are arranged intermediate of the contact points between the main and protecting walls.

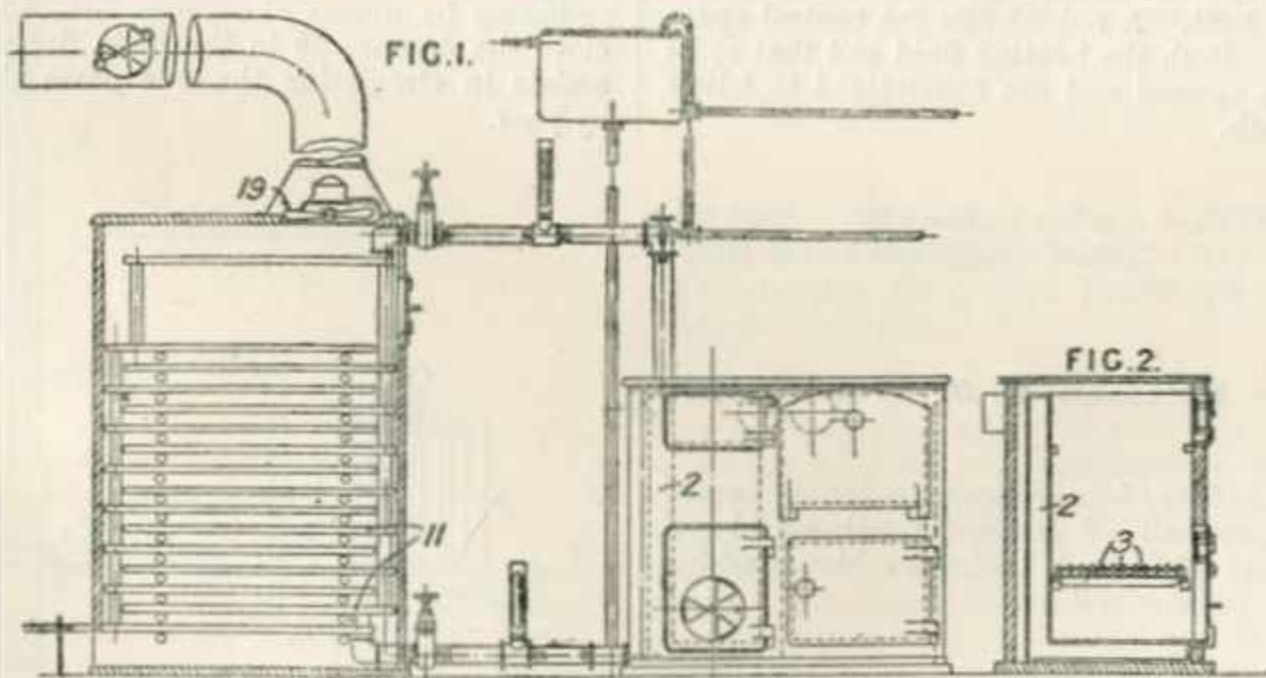
147,870. Schmidt'sche Heissdampf-Ges. Nov. 25, 1916, [Convention date].

Feed-water, heating.—In a locomotive boiler with superheater and feedwater-heater in the smoke-box, to enable superheating of the steam and heating of the feedwater to be carried to the highest point practicable, the boiler tubes are shortened to such an extent that the furnace gases issuing from them pass to the feedwater heating tubes at a temperature not substantially lower than the maximum temperature attained by the steam in the superheater tubes. The superheater is of the fire tube type, having tubes *g* inserted in the boiler tubes. The feedwater heater has tubes *a* lying crosswise of the boiler, having their ends closed by bends connecting the tubes in series. The ends are supported in box-like compartments *h* closed by a plate on the outside shell. The feedwater enters at inlet *k*, and flows in the



opposite direction to the combustion gases, to the outlet *l*. The feedwater heater is placed sufficiently high for accessibility of the superheater and also the whole of the boiler tubes.

147,970. Schoenenberger, G. April 9, 1910.



Heating air; block-form boilers.—An apparatus for treating air for ventilation comprises a flat plate heat-exchanger 11 through which air is drawn by a fan 19, water being circulated from a boiler 2



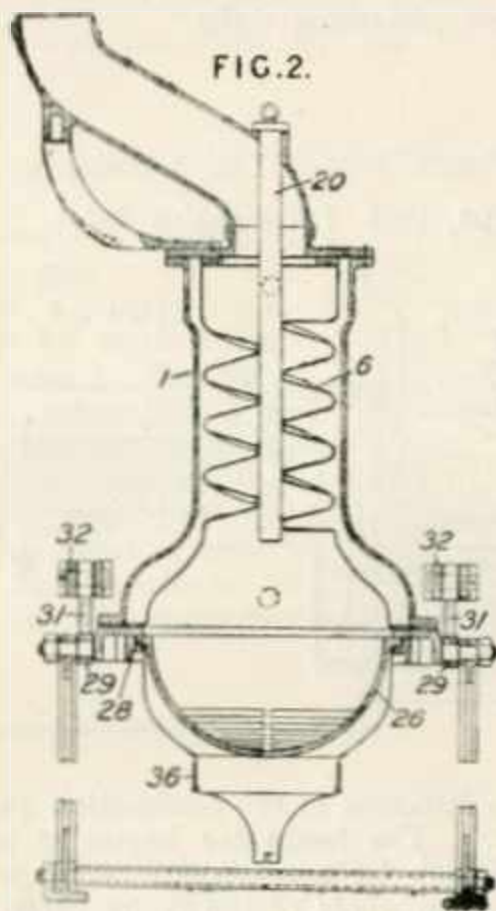
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a kitchen stove. A movable grate 3 is adjustable as to height and as to spacing of bars. Cold water can be circulated through the plate 11 in summer time to cool the air. The air may be purified by passing through a chamber having moist flannel surfaces. In a modification,

CLASS 64 (i), HEATING LIQUIDS &c.

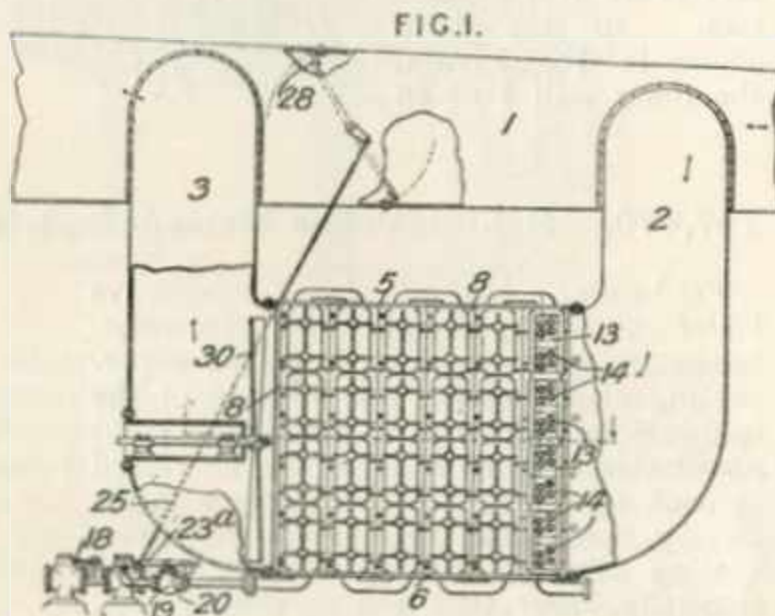
the heat exchanger is fitted in a cupboard which may have a sink and spaces for storing food or utensils, and also may contain a drinking water reservoir with a filter. More than one air-treating device may be supplied from one boiler.

147,979. Rouse, E. E. April 17, 1919.



Internally-fired boilers.—A helical flue 6 is enclosed in a cylindrical casing 1 and mounted over a source of heat. A rod 20 fills the central space in the flue. Both the heating fluid and that to be heated pass upward and are constrained to follow a helical path.

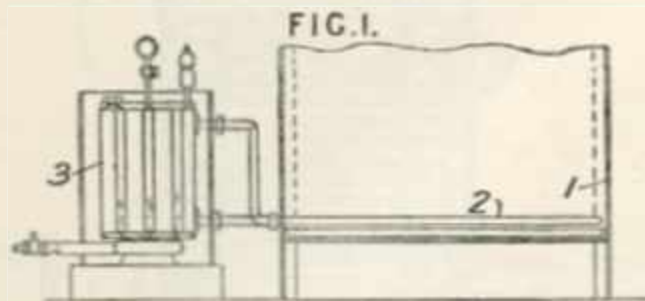
148,041. Frazier, J. O. July 8, 1919.



Heating liquids.—A tubulous heater of the economiser type for heating cane-juice is arranged in a by-pass flue connected to the main flue 1 by trunks 2, 3. The heater has top and bottom plates 5, 6, but the sides are composed of a series of frames 8 carrying headers 13 connected by tubes 14, the headers being arranged for the flow of liquid through groups of tubes in series. While the pump 18 is circulating liquid through the heater, the flow causes a pendulum plate 20 in the damper control 19 to swing, the movement operating by means of an arm 23^a and rod 25 to close the damper 28 in the main flue. A fan 30 assists in circulating the flue gases through the by-pass.

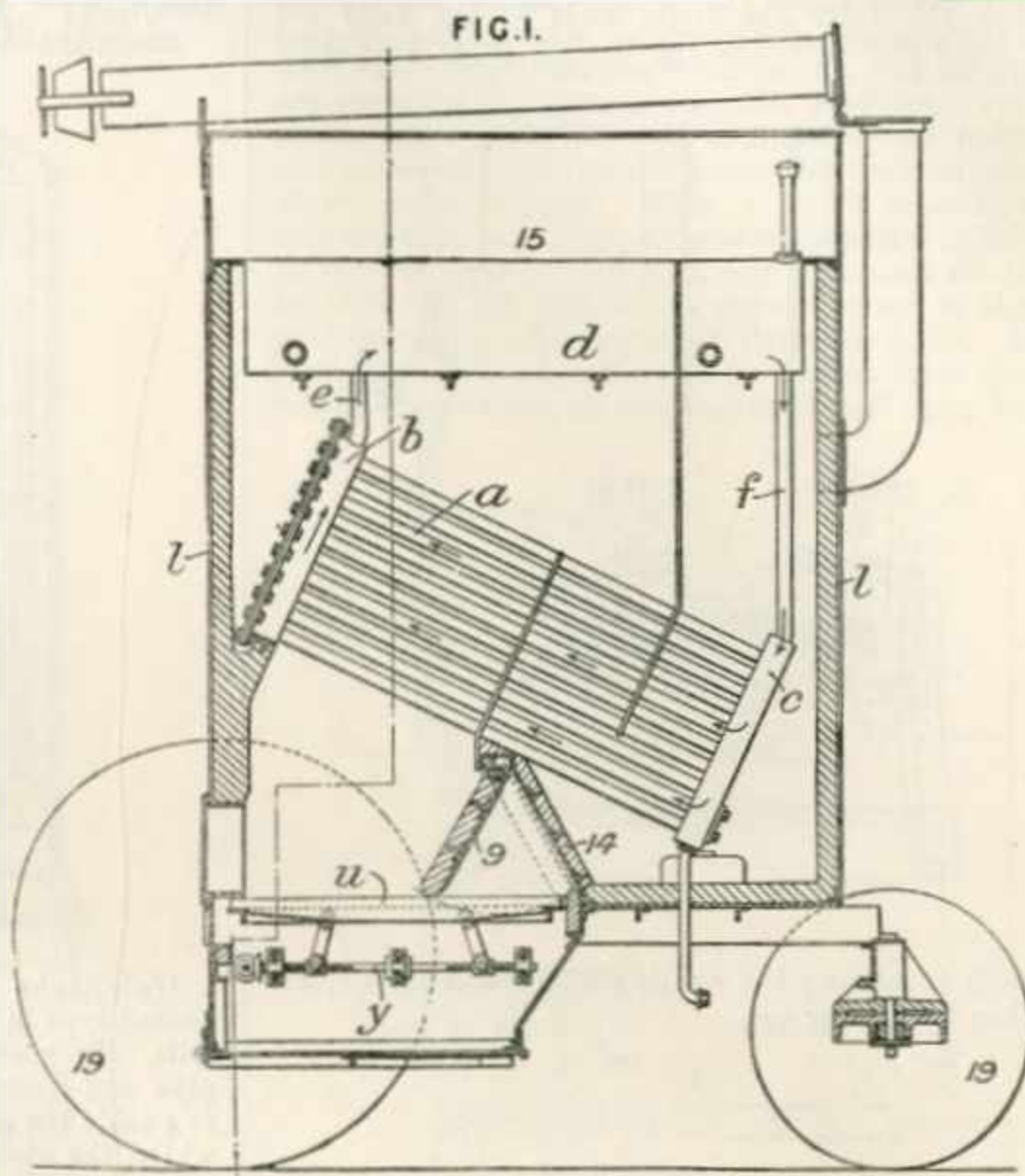
148,047. Coleman, C. J. July 24, 1919.

Washing-boilers; heating water.—Liquid heated in an adjacent boiler 3 passes through a grid coil 2 in the base of the tub 1 of a washing-machine for heating the liquor therein.

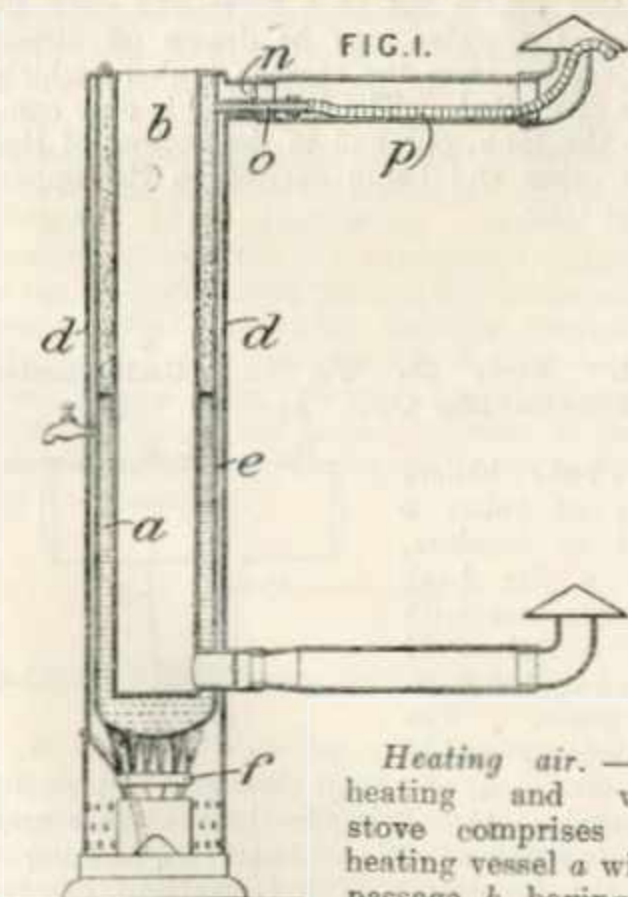


148,049. Empson, A. W.
Aug. 2, 1919.

Water-tube boilers. — A water-heater comprises a casing *l* and a bank of tubes *a* connected to headers *b*, *c*, and by tubes *e*, *f* to a tank *d*. The furnace chamber is adjustable for capacity by rising and falling bars *u* operated by a screwed shaft *y*, and by a flap *9* adapted to swing from the position shown to one against the wall *14*. The boiler is mounted on wheels *19* or on a motor chassis. A chamber *15* for warming drums of oil or the like is fitted above the boiler.



148,072. Geisler, G. C. Sept. 20, 1919.



Heating air. — An air-heating and ventilating stove comprises a water-heating vessel *a* with an air-passage *b* having an inlet for cold air at the bottom and an outlet for heated air at the top, the vessel *a* being contained in a

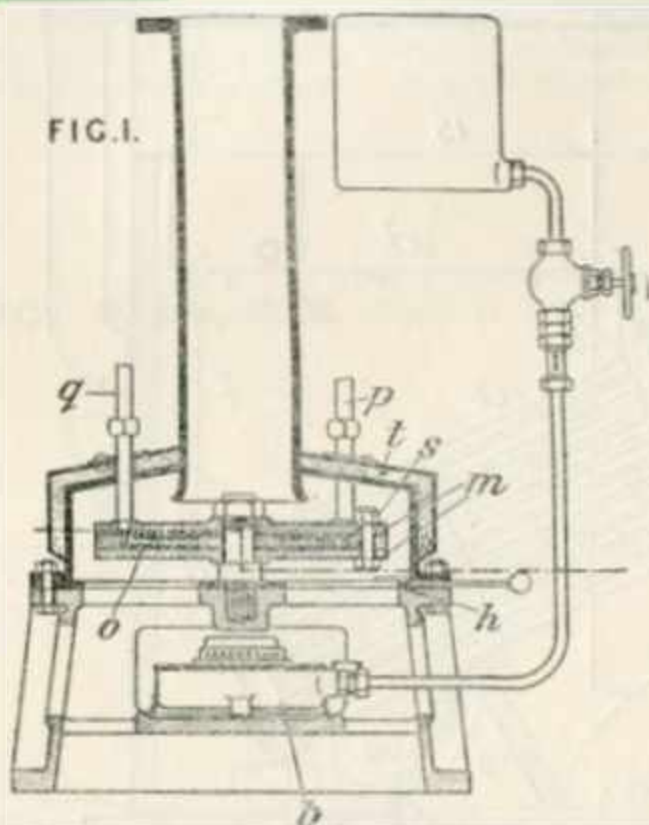
casing *d* so that an annular passage *e* is made for the combustion products from a heating element *f* situated in the casing beneath the water heater. A helical baffle may be inserted in the air passage *b*. In a modification the base portion of the casing *d* beneath the vessel *a* is made removable, and the bottom of the vessel *a* is sweated in place so that it may be taken off for removing scale.

148,092. Maschinenbau - Akt. - Ges. Balcke-Abteilung Moll. Oct. 18, 1919, [Convention date]. No Patent granted (Sealing fee not paid).

Boilers. — A pre-heater for oil used for heating purposes comprises a number of superposed plates *m* united by bolts *s*. The faces in contact are provided with oil-passages *o* of preferably spiral form. The oil enters by the pipe *p*, and after traversing the passages passes out through the pipe *q*. The plates *m* are enclosed in a non-conducting casing *t* beneath which is a burner *b* by which the plates are heated. Between the burner *b* and the plates *m*, a disk valve *h* is situated, and contains sector-shaped slots moving over a plate with radial slots having parallel sides. By turn-

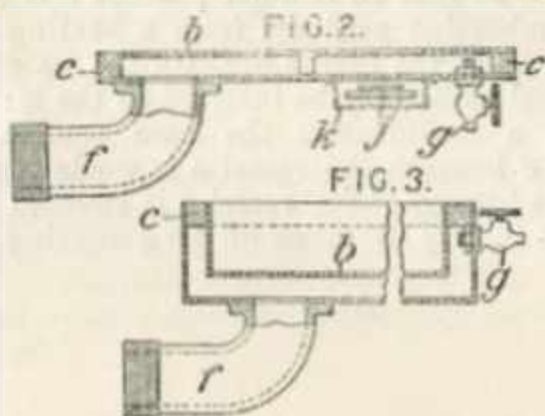


the inner ends of the slots are closed first directing the heating gases outwardly



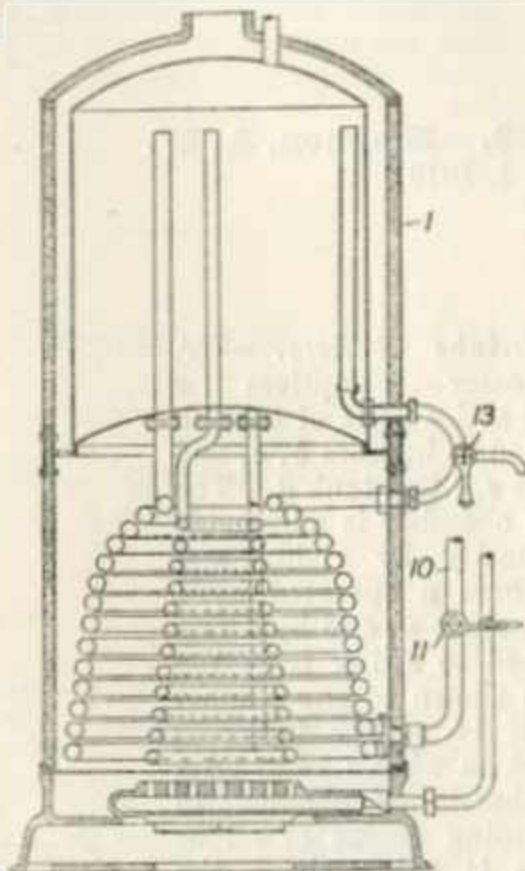
and regulating the heating effect without adjusting the burner.

148,097. Allensby, C. R. Dec. 29, 1919.



Heating liquids.—A hot plate attachment for a steam or hot water radiator for warming food, liquids, plates, &c. comprises a hollow plate or vessel *b* communicating by means of a single connection *f* with the interior of a radiator. The vessel may be formed of two flat sheets *b* welded to distance pieces *c* as shown in Fig. 2, or the sides may be upturned as in Fig. 3 to form a receptacle for food or liquids. An air-cock *g* provides for the release of the enclosed air when the steam or hot water is admitted into the hot plate, and a cover may be provided. In addition, external heating means such as an electric heater *j* enclosed in a protective cover *k* may be combined with the hot plate.

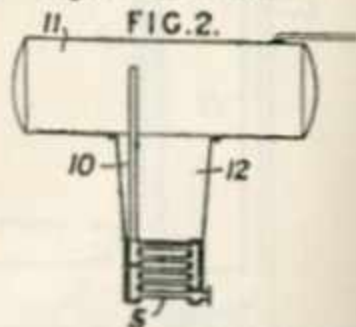
148,611. Tod, D. V., and Caledonia Manufacturing Co. April 22, 1919.



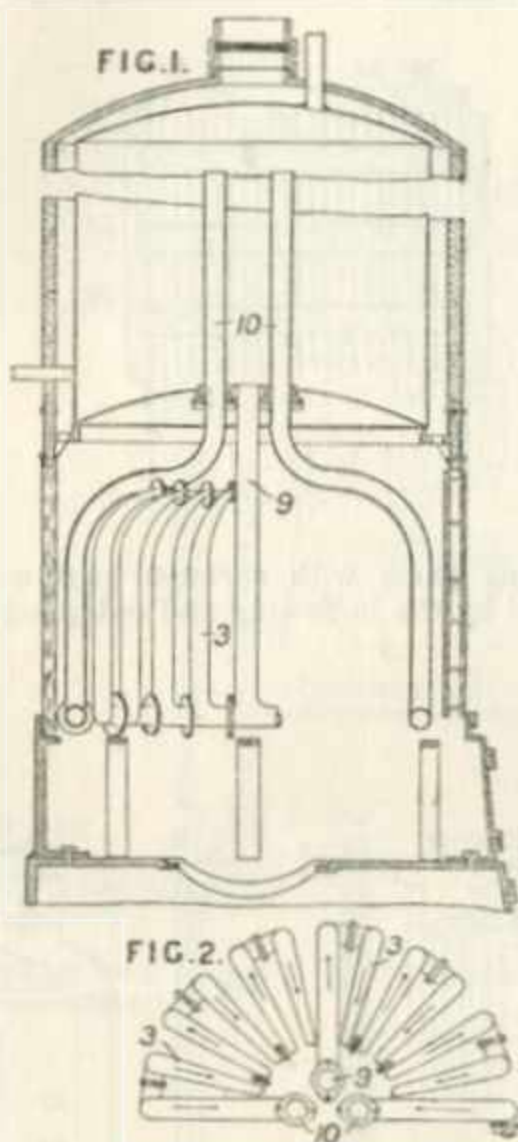
Water-tube boilers.—In geysers of the gas-heated type in which the water is heated in conical coils, which are in communication with a supply-pipe and a storage tank, arrangements are made to enable the geyser supply to be run continuously whilst the storage water is being heated or to enable the geyser supply to be diverted to the storage tank. The outer casing 1, which is lined, contains two conical coils of copper tubing, the outer of which is supplied with water from a supply-pipe 10 having a control cock 11. The heated water passes out to a three-way cock 13 from which the water may be drawn off direct from the coil or from the storage tank to which the coil is connected. The inner coil is only connected to the tank, one end to the bottom of the tank, the other end being carried to the upper part of the tank.

148,612. Tod, D. V., and Caledonia Manufacturing Co. April 22, 1919.

Water-tube boilers consisting of tubes 5 connected to headers, serve as a fire back and communicate with an upper container 11 also heated by the combustion gases. The water travels upward in a zig-zag direction, and then through the pipe 10 to the container 11. Between the container and the boiler is fitted a sectional heater 12 forming a back for the fireplace. The lower part of the container may be provided with a pipe communicating with the lower part of the boiler,



148,613. Tod, D. V., and Caledonia Manufacturing Co. April 22, 1919.

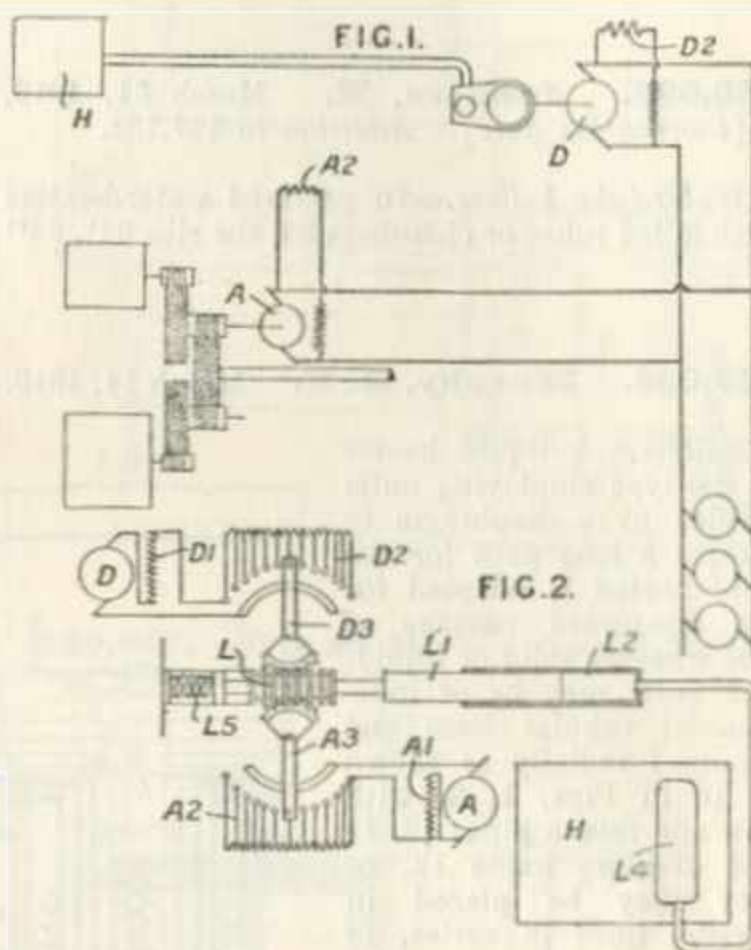


Boilers.—In water heaters or boilers of the type in which the combustion chamber is enclosed by a number of water-tubes converging at their upper ends and communicating with a superposed water chamber, each water-tube is constructed as a separate unit connected at its upper and lower ends by detachable connexions to the adjacent tubes so that any tube is readily removable. The tubes may thus be interchanged or replaced by a distance block facilitating cleaning &c. The water passes from the superposed chamber down a centrally-disposed tube to the lower ends of the water tubes, returning through uptake pipes to the tank. In one example water stored in the tank passes down the pipe 9 to the lower ends of pipes 3, which are bolted together at their upper and lower ends in series and returns to the tank by the pipes 10.

148,687. Poole, W. J. July 11, 1919.

Feed-water, heating.—Relates to motor power plants for operating auxiliary machines on ships, in particular to the type of plant in which electric motors are connected to bus-bars fed by the dynamos driven by the engines. According to the invention one dynamo is driven by the main

turbine and another dynamo by the auxiliary turbine or reciprocating engine, which also heats the feed-water supply for the main engine, and means are provided for transferring the load from the main engine to the auxiliary engine and vice versa in accordance with variations in the temperature of the water supply. Figs. 1 and 2 show one arrangement for carrying the invention into effect. In this form the alteration of load is brought about by rheostats A2, D2, which are connected in the field circuits of the respective dynamos A, D. A thermostat L4, responsive to deviations from the mean temperature of the feed-heater H acts by



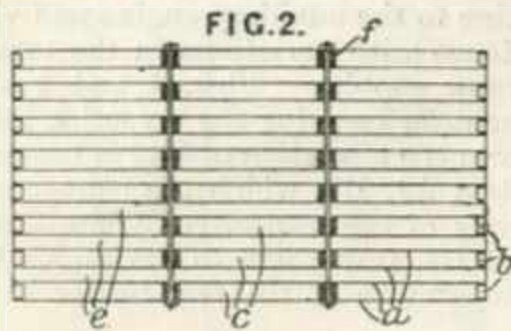
vapour pressure upon a piston L1 and is opposed by a spring L5. The movements thus produced are communicated by a rack L to rheostat arms A3, D3, which add or subtract resistance to or from the dynamo fields A1, D1, thus varying the relative electrical loads imposed upon the engines driving the dynamos A and D, while the total electrical load is not affected. In a modified arrangement, a thermal relay controls a reversible motor which actuates rheostats. In a modification which does not employ rheostats, the variation of load is effected by thermostatic control of the steam valve of the auxiliary engine.

148,873. Pfeiffer, O. Feb. 7, 1919. [Convention date]. Void [Published under Sect. 91 of the Act].

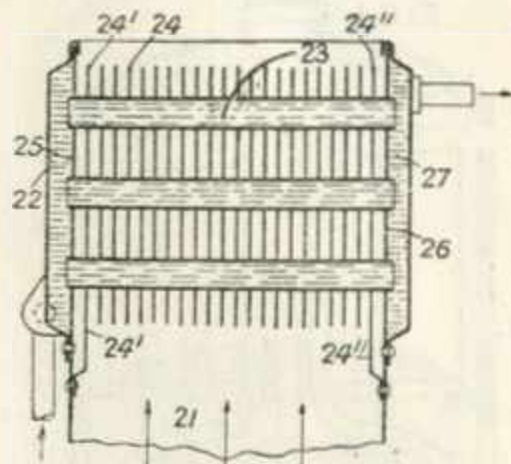
Heating air.—Air and hot gases are passed through alternate chambers e, c formed between parallel plates a in such a way that their paths cross at right-angles. The chambers are closed



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 on two sides by metal strips *b*, and are strengthened by strips *f* placed longitudinally preferably only in the air chambers.



nearest to the walls 25, 26 of the headers, 22, 27 are prolonged downwards and secured to the wall of the heating chamber 21 to prevent contact of



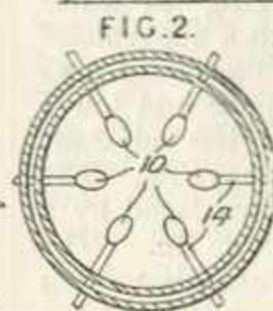
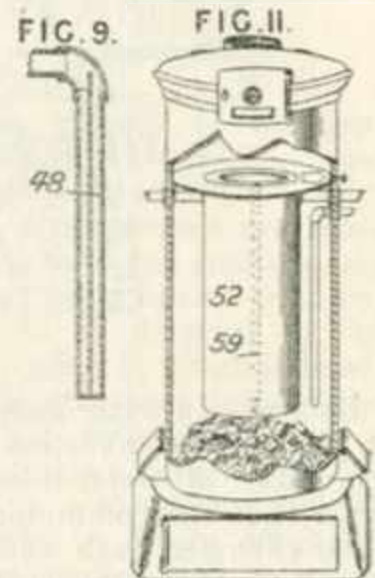
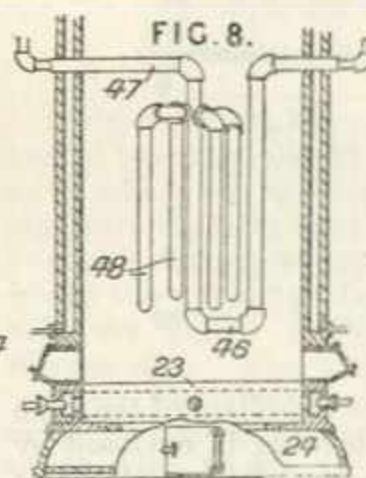
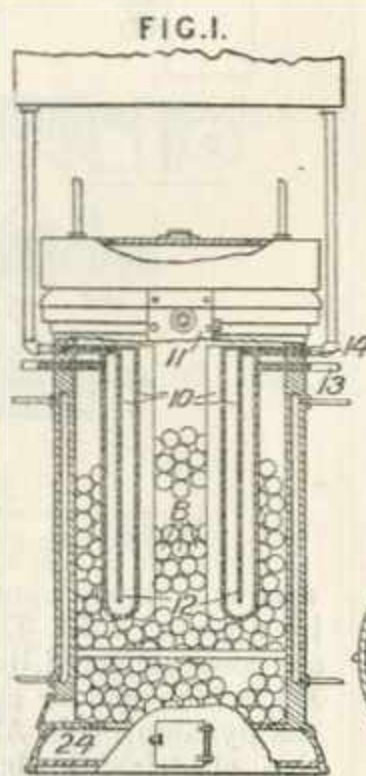
148,896. Junkers, H. March 31, 1919.
 [Convention date]. Addition to 147,732.

Water-tube boilers.—In gas-fired water-heaters with gilled tubes or chambers 23, the ribs 24', 24''

the heating gases with surfaces kept comparatively cool by the in-flowing and out-going water.

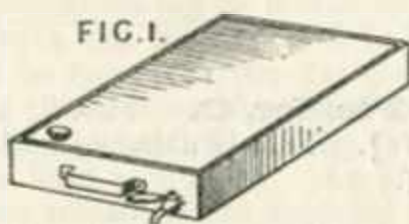
149,026. Murphy, R. N. March 14, 1919.

Boilers.—A liquid heater of the type employing units divided by a diaphragm to compel a long path for the fluid heated is adapted for the downward passage of fuel whether solid or liquid. The units may be of independent tubular form and arranged radially as shown at 10 in Figs. 1, 2, with flow and return pipes 13, 14 and dividing baffle 12, or they may be placed in parallel lines in series, or depending from an annular divided header. In a further modification, tubes 48, Figs. 8, 9, may be arranged in clusters round a central supply pipe 46, 47, or a boiler may be constituted by a single annular container 52, Fig. 11, with a



dividing baffle 59 causing a devious flow from one side to the other.

149,087. O'Driscoll, R. A. May 15, 1919.



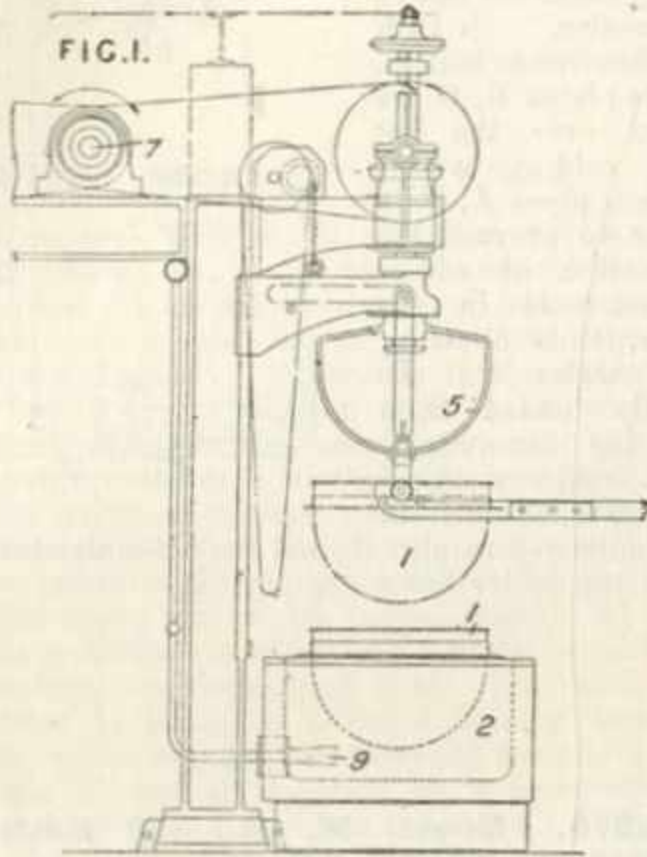
Heating water.—A water container is adapted for insertion between the top or crown plate of

the oven of a gas or similar stove and the hot plate to utilize the waste heat of the stove.

149,172. McColl, R. S., McColl, T. N., and Dryden, T. F. Dec. 9, 1919.

Set-pans.—An installation primarily for the manufacture of confectionery comprises a number of pans 1 grouped in a row or rows, a

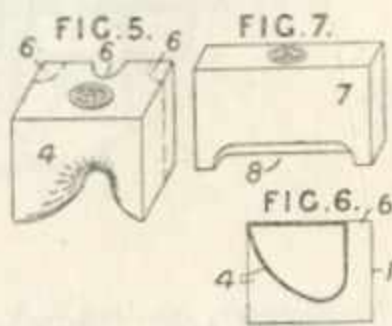
water-containing vat 2 common to each row, means for raising and lowering the pans, and stirring-devices 5 driven by an overhead shaft 7.



The water bath is heated by the injection of steam through a nozzle 9.

149,478. **Davies, P. C.** June 2, 1919.

Block-form boilers.—Boilers for kitchen ranges are formed with the front face 4 converging from the top and sides toward the back of the boiler, the walls of which may be flat, concave, or curved, with or without vertical up-takes 6. The front face of the boiler may incline either forward or backward. Supplementary wing boilers 7, formed with a recess 8 at the base, may be made integral with or connected to the main boiler 1.

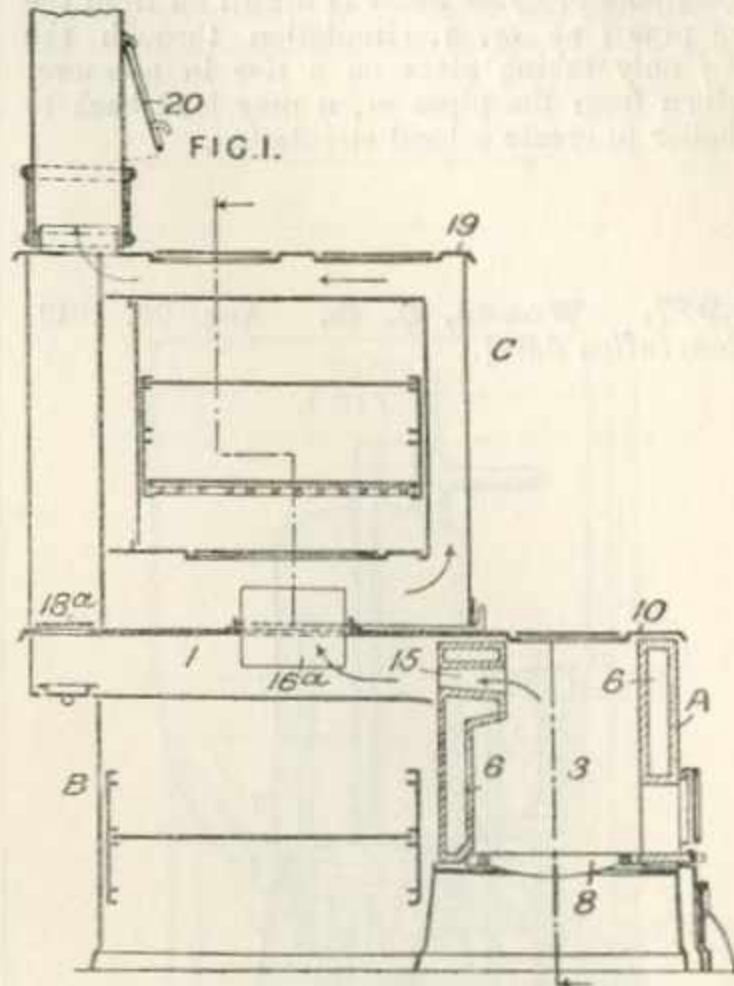


149,523. **McDowall, Steven, & Co., and Steven, A. W.** Aug. 12, 1919.

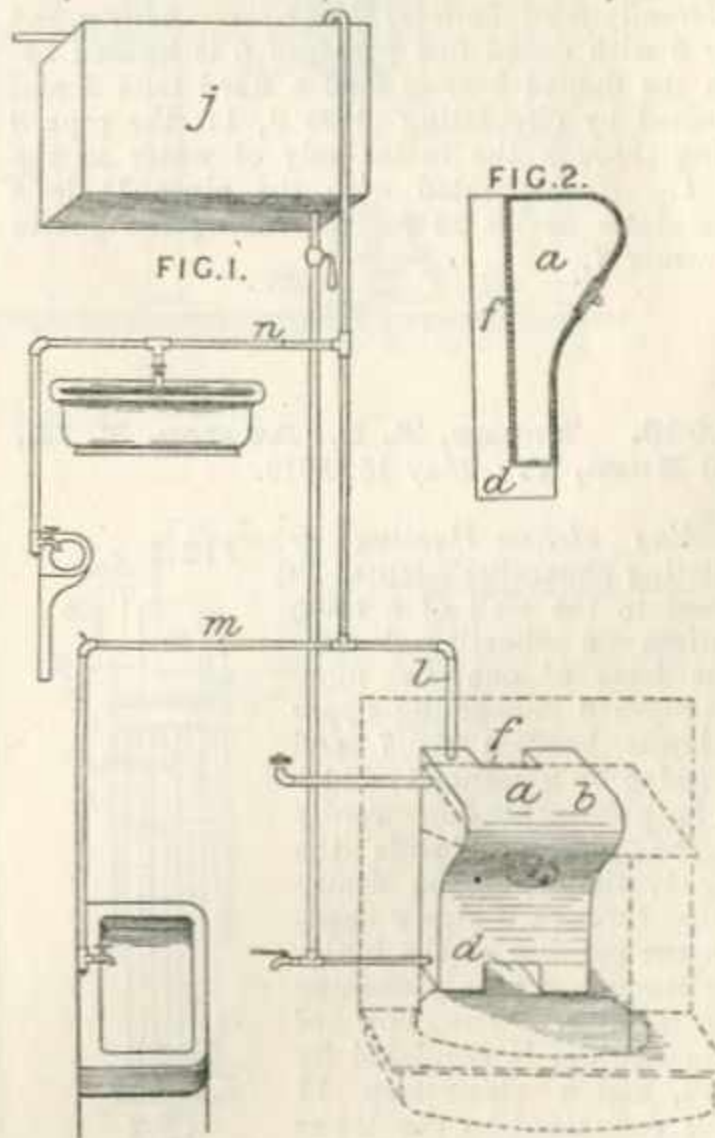
Internally-fired boilers.—An internally-fired boiler A forming part of a stove has a preferably annular water-space 6 and a water-jacketed flue 15 for the combustion products.

(For Figure see next column.)

149,523.



149,867. **Grant, W. J.** Oct. 22, 1919.



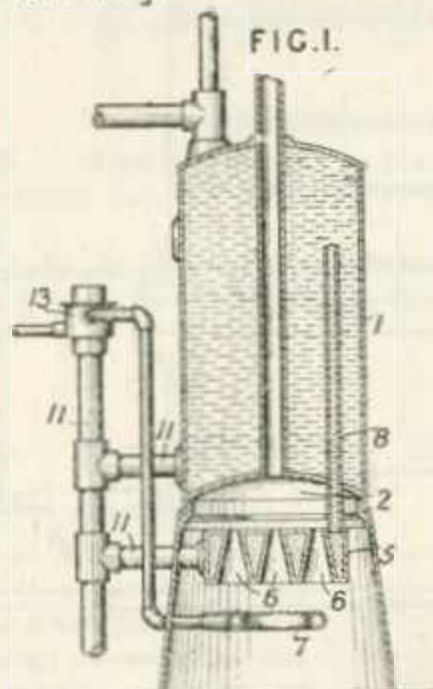
Heating water; block-form boilers.—A boiler a for use in an open grate has a recess d, f at the



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bottom and back to form a flue and an overhanging part 6. Hot water is drawn off from the rising pipe 1 at *m*, *n*, circulation through the tank 7 only taking place on a rise in pressure. A return from the pipes *m*, *n* may lead back to the boiler to create a local circulation.

149,977. Woods, C. G. Aug. 26, 1919, [Convention date].



Internally-fired boilers; block-form boilers.—A boiler 5 with coned flue passages 6 is located beneath the domed bottom 2 of a flued tank 1 and connected by circulating pipes 8, 11, the pipe 8 passing through the main body of water in the tank 1. Incorporated with the pipes 11 is a thermostatic device 13 for controlling the gas to the burner 7.

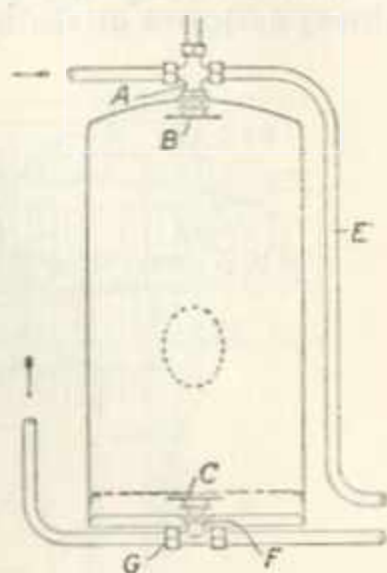
150,026. Young, E. C., Austen, F. H., and Burn, F. May 15, 1919.

Heating air.—Heating or ventilating apparatus adapted to be fixed to the wall of a room comprises a heating-element in the form of one or more steam-pipes 5 connecting upper and lower headers 6, 7 and surrounded by a casing 1, and a fan 3 for passing air downwardly over the pipes 5 inside the casing 1, the air being drawn in either through a pipe *x* opening to the exterior of the building or through a pipe *y* opening to the interior. The flow of heating-medium is regulated by a valve, and a steam-trap 12 may be connected to the lower header 7. Specifications 1900/02, 18821/07, 8988/13, and 122,294 are referred to.

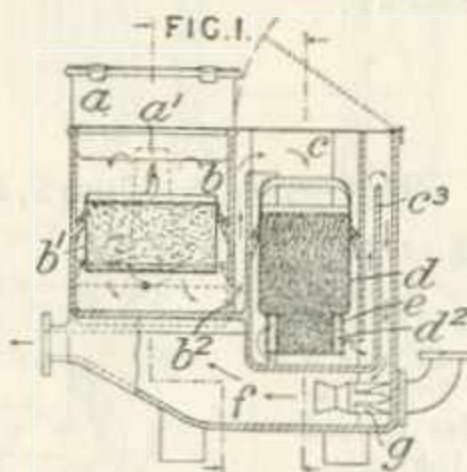


150,093. Ferguson, W. D. June 6, 1919.

Heating water.—In a hot-water tank or cylinder for use in connexion with kitchen-range boilers, baffle-plates B, C are fitted over the hot and cold-water branch pipes A, F in order to prevent the formation of eddies or currents in the tank, thus allowing the water to be evenly heated from the top downwards. The cold-water branch is led off from the boiler return-pipe G, and the hot-water branch from the boiler hot-water pipe E.



150,575. Scott, H. B., and Smith's Dock Co. Dec. 1, 1919.



Feed-water, heating.—A feed-water heater and filter for water supplied to steam generators and the like of the kind in which water is passed successively through a scumming chamber, and filtering material such as coke and finally into a chamber where it is heated by steam comprises a casing *a*, the upper portion of which is divided into a series of compartments containing filters *b*¹, *d*, and the lower portion *f* is a heater in which the water is heated by a jet of steam. The water enters by a passage *a*¹ extending upward from the floor, passes downward and upward between baffles, and finally downward through a filter of coconut fibre in a removable perforated bucket *b*¹. Thence the water passes upward through a channel *b*² to a chamber *c* containing two filters *d* consisting of buckets with reduced perforated lower sections filled with coke breeze. Surrounding the reduced section is a perforated plate *d*² covered with towelling or cloth *e*. The water

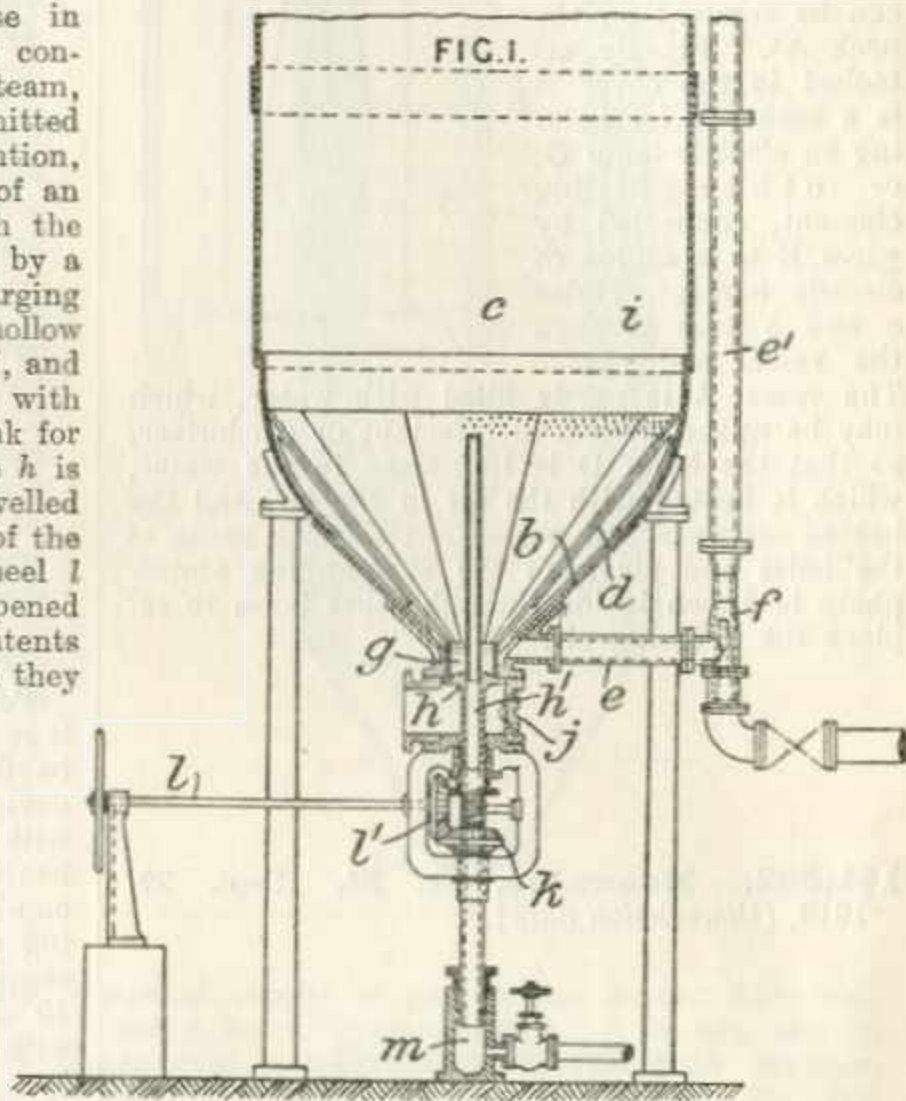


issuing from the filters passes round a baffle c^2 into the chamber f where it is heated by a steam jet g . The filters are covered with perforated

plates and fitted with handles. The top of the heating chamber f is inclined and provided with air vents to facilitate the escape of air.

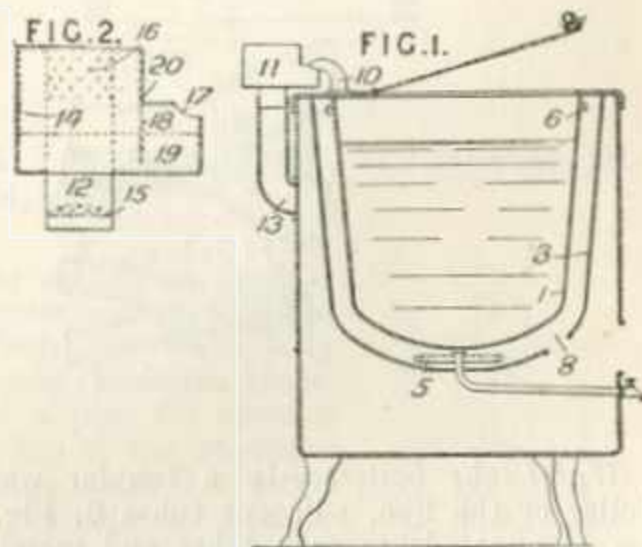
150,782. Milne, S. June 4, 1919.

Digesters.—Relates to digesters for use in paper-making &c. of the type in which the contents are discharged by means of jets of steam, water, used liquor, air or other fluid admitted into the digester. According to the invention, the base b of the digester is in the form of an inverted cone, at the lowest part of which the discharge outlet g is located and controlled by a hollow valve h through which the discharging fluid is admitted. At its upper end, the hollow valve communicates with a perforated pipe i , and at the lower end of its hollow spindle h^1 with a box m communicating with a pump or tank for delivering the discharging fluid. The valve h is adjusted by means of a nut k having bevelled teeth, which engages the threaded exterior of the spindle h^1 and is operated by a bevel-wheel l and rotary shaft l^1 . When the valve h is opened and the discharging fluid admitted, the contents are discharged into a chamber j , from which they are delivered where required. The base of the digester is fitted with a conical grid c , beneath which is a space d communicating with pipes e, e^1 fitted with a steam jet f , pump or the like for circulating the contents. The grid c and circulating-means may, however, be dispensed with, in which case, the steam for heating the contents is also admitted through the box m and valve h .



151,039. Tyzzer, J. R. Nov. 3, 1919.

Washing-boilers.—A domestic boiler comprises a pan 1, a baffle shell 3, with exit holes 6, and a lighting-hole 8 for the source of heat 5, and a duct 10 leading to a purifier and condenser 11 on the flue 13. The condenser shown in Fig 2 has an inner chamber 12, fitted at its lower end into the flue 13, with perforated base plate 15 and walls 16, and filled with coke or charcoal. An outer box 14 connects with the duct 10 at the aperture 17, steam or vapour arising passes into water 19 and any air passes under a baffle 18 and thence makes an exit with the gases from the flue through the perforated front 20.

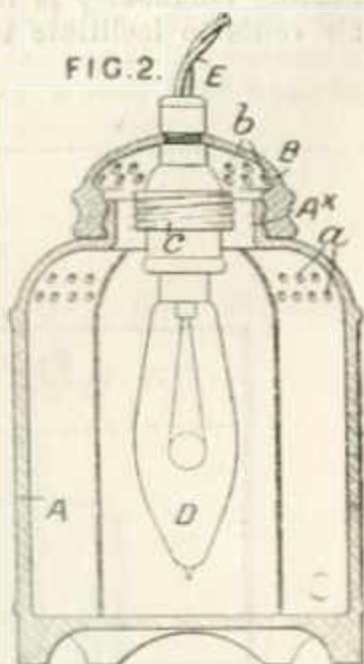




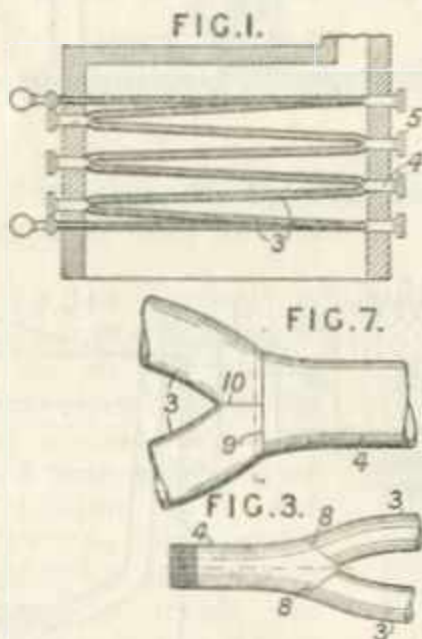
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Kleemann, M. Oct. 1, 1919.

Heating air.—Relates to a heating means for use with apparatus for purifying and moistening the air in rooms, halls, &c., such apparatus comprising a vessel A and a removable cover B which can be screwed on the neck A^x. Fixedly attached to the cover B is a socket C for holding an electric lamp D, or other heating element, connected by wires E to a source of electric current. Holes a and b pass through the vessel and cover. The vessel A is partly filled with water, which may be mixed with a disinfectant or deodorizer, so that the lamp D is immersed in the water, which is heated with the air in the jar, and the heated air rises and passes out through some of the holes and air from the surrounding atmosphere is drawn inside through other holes to replace the outgoing air.



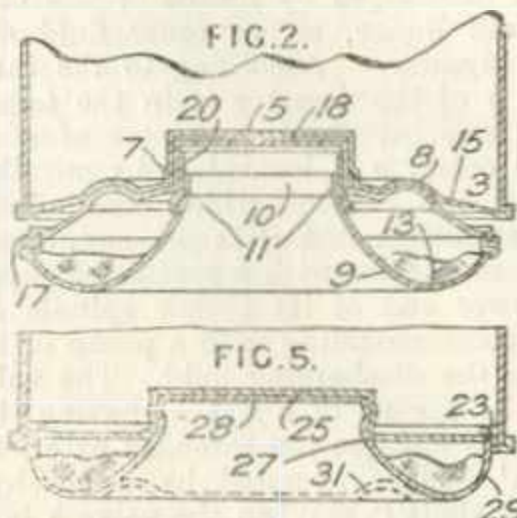
151,582. Brownlee, R. H. Sept. 22, 1919, [Convention date].



Water-tube boilers.—In a tubular water-tube boiler or the like, adjacent tubes 3, Fig. 1, are set at an angle to each other and metallic connecting-tubes 4 of greater diameter are welded to the tubes 3 within the furnace. The tubes 4 project outside the furnace wall so as to give access to the interior of the tubes 3, and are

normally closed by the usual packing-flange 5. Two forms of welded joint are shown in Figs. 3 and 7, the tubes 3 and 4 being cut along lines 8, 9, 10 and welded together along those lines.

151,703. Nakamizo, H. T. June 25, 1919.



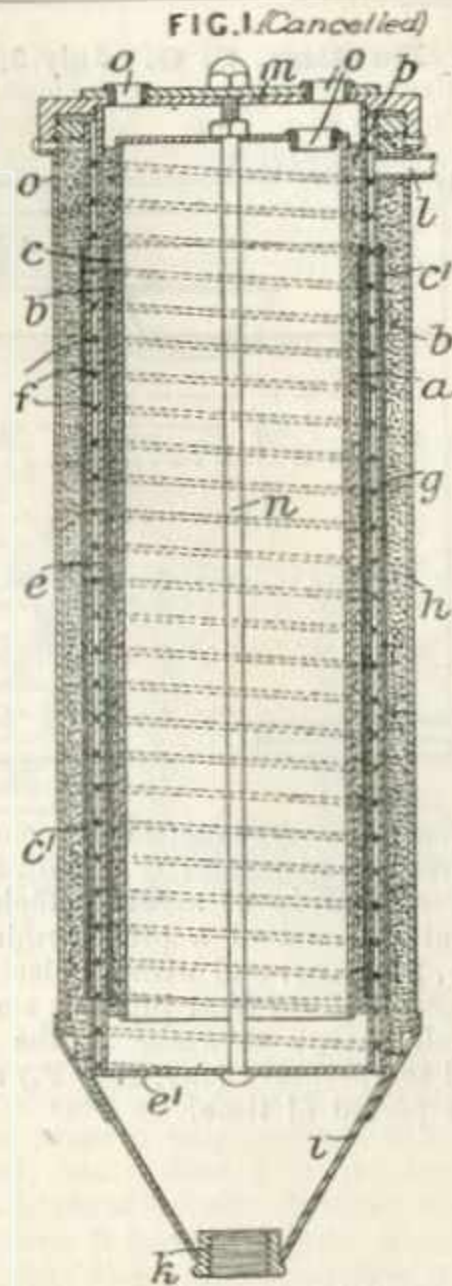
Portable and small liquid-heaters.—A canister is made with a recessed bottom so that there may be fitted thereto an annular liquid-fuel heating device. Fig. 2 shows the lower end of a canister with an inwardly dished bottom 3, which also has an annular groove 8 and a central inverted cup-like recess 5, adapted to receive corresponding parts of a heater 9. This consists of an annular sheet-metal part A with central opening 10 and a groove 13 containing a wick saturated with fuel, the evaporating of which is prevented by a cover 15. A rubber joint 17 is made between the outer edges of the parts 9, 15. The central part 18 of the cover 15 is cup-shaped, and has also a removable sleeve 20 with an enlarged lower end. In use, the sleeve 20 is reversed, and its enlarged end is slipped into an enlargement 7 of the recess 5. The other end of the sleeve 20 receives the neck 11 of the heater, and the fuel in the wick is ignited so as to heat the can and its contents. In a modification, Fig. 5, the neck 27 is closed by a plate 28 and screw-threaded so as to screw into the similarly threaded recess 25. The edge 29 of the heater makes joint with the bottom of a rubber filled recess 23. The rotation of the heater is facilitated by recesses 31 in which the fingers &c. are inserted.

152,012. Colebrook, W. Oct. 7, 1919, [Convention date].

Annular boilers; water-tube boilers; geysers and instantaneous water heaters.—The Specifica-

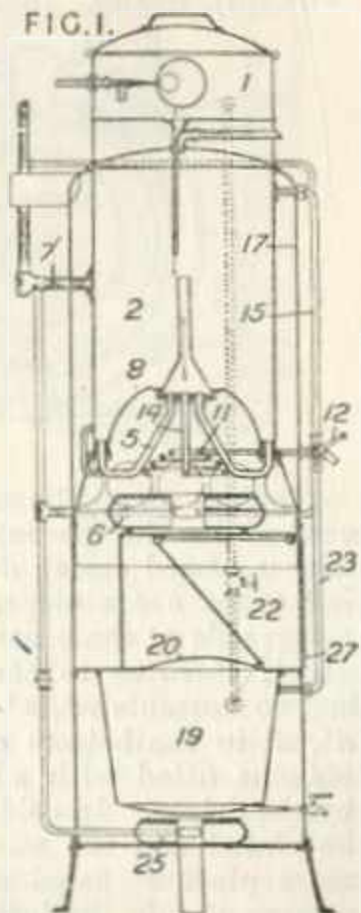


tion as open to inspection under Sect. 91 (3) (a) comprises a water-heater wherein heat is applied to a continuous flowing thin stream of water traversing a spiral path. An electric heater is shown having four concentric cylinders *a, e, g, h*, the space between *a* and *e* and between *g* and *h* being filled by heat-insulating material *b*, and the cylinders *e, g* being separated by a projecting spiral *f*, either formed on the cylinder or consisting of a metal wire. Insulated electric heating-elements *c, c'* are arranged, as shown, the leads to these elements passing through orifices in the caps of the cylinders. The bottom of the cylinder *e* is fitted with a cover-plate *e'* held in position by a screwed rod *n*. A conical water inlet *i* is secured to the bottom of the cylinder *g*, and is fitted with a union *k*, the water traversing the spiral path between the cylinders *e, g* and leaving by the outlet *l*. Any other means of causing a thin stream of water to travel in a continuous spiral path, for example, a thin spiral tube, may be used. This subject-matter does not appear in the Specification as accepted, which is confined to an electric heater as in Fig. 1 (Cancelled) wherein the cylinder *h* and fittings *m, n, e', o* are removed and the cylinder *a* is fitted with gutta-percha and its external heating insulation removed.



152,167. Tod, D. V., and Caledonia Manufacturing Co. Aug. 18, 1919.

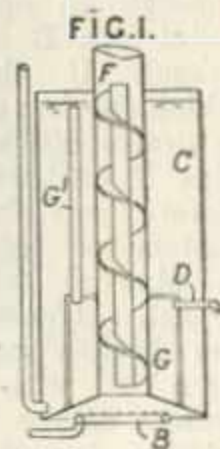
Heating water; boilers; washing-boilers.—A combined self-supporting hot-water system comprises current and bulk heaters, a laundry pan, and a cold water supply tank. The storage tank 2 has a domed bottom 8 with water circulating tubes 5, and is supplied by a removable cold water tank 1. A coil 11 fitted so as to be heated by the main burner 6 supplies boiling water by a cock 12 which also controls an additional gas supply. When boiling water is not required the coil 11 circulates the water in the tank 2 through the pipes 14, 15. The



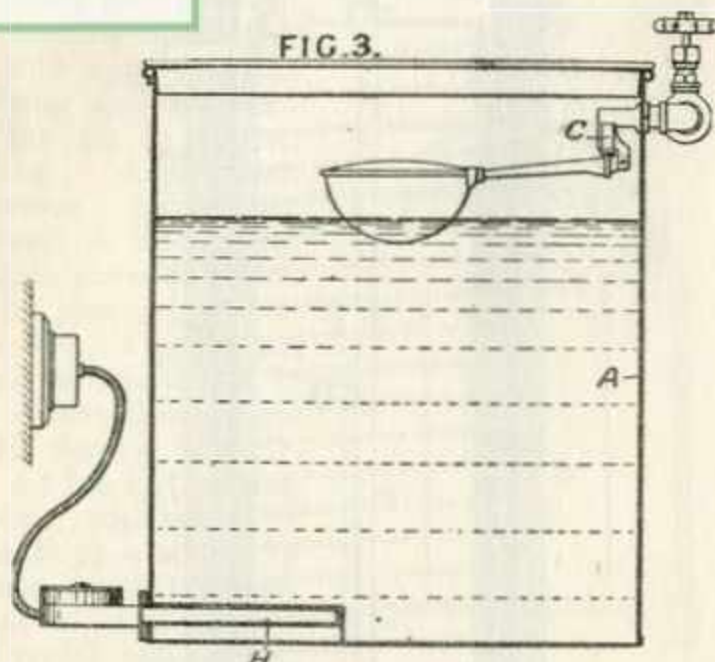
normal supply of gas to the burner 6 is controlled by a thermostat 7. A boiling pan 19 mounted beneath has a lid 20 with counterweight 27, and has a separate burner 25. Hot water is supplied to it through the pipe 23 and cold through the pipe 22. A casing 17 surrounds the whole apparatus.

152,224. Wilson, J. W., and Davies, H. Nov. 14, 1919.

Heating water.—A tank C has an inner container G insulated from the main body of water and connected therewith by a pipe G' opening from the top of the container G and from which hot water is drawn through the pipe D. The water may be heated by a burner B and flue F or by a separate boiler in circulating connexion with the inner container G.



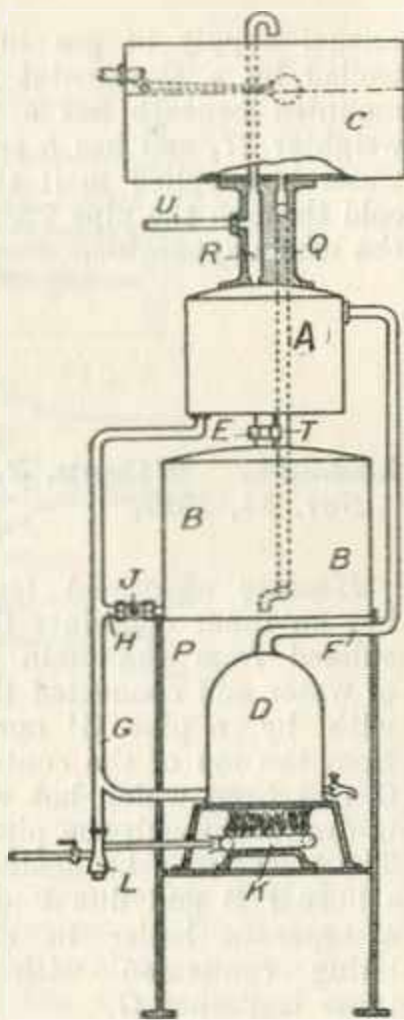
Bastian, C. O. July 5, 1919.



Heating water.—A water-heater comprises a vessel A with a water inlet C so adjusted as to allow water to flow in at a rate sufficient to fill the vessel at the end of a predetermined time, for example, 24 hours, and with an electric heater H so arranged that the heat input is such as will raise the full charge of water in the vessel to the required temperature (say, 150° F.) at the end of the same period of time.

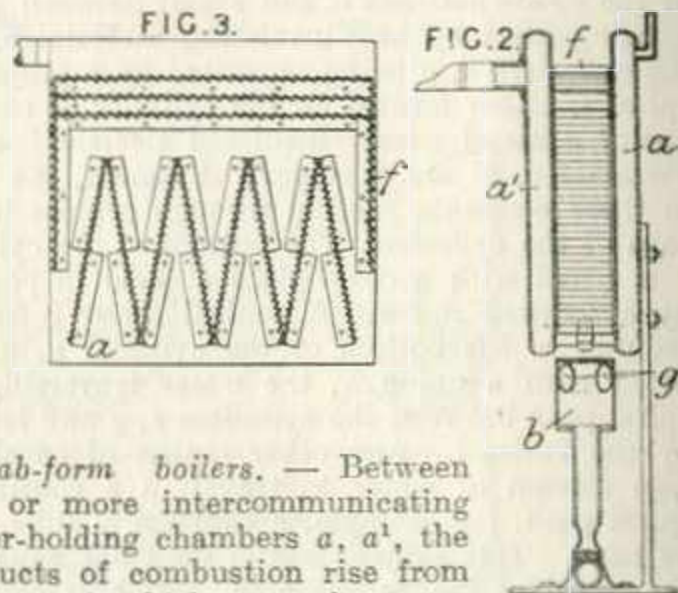
152,783. Inglis, J. M. July 23, 1919.

Heating water.—A domestic hot-water supply system comprises a base structure P supporting a burner K, a boiler D and a large storage tank B, a junction box E on the tank B supporting a small storage tank A and a junction-box Q on the tank A supporting a cold-water cistern C; the tank A communicates with the cistern through an upcomer relief pipe R with a branch U through which the hot supply is drawn off and a pipe T connects the cistern with the bottom of tank B. A pipe G with a branch H connects the bottom of the tanks with the bottom of the boiler and a pipe F con-



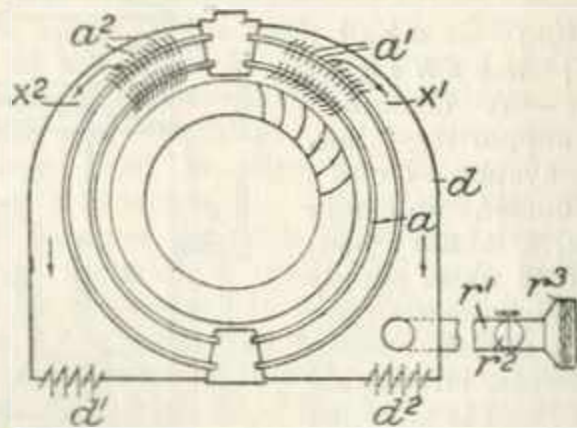
nects the top of the tank A with the top of the boiler. A cock J puts the tank B out of circuit when a small supply of hot water is required. A thermostat L controls the supply of gas to the burner K.

152,787. Simpson, W. M. July 24, 1919.



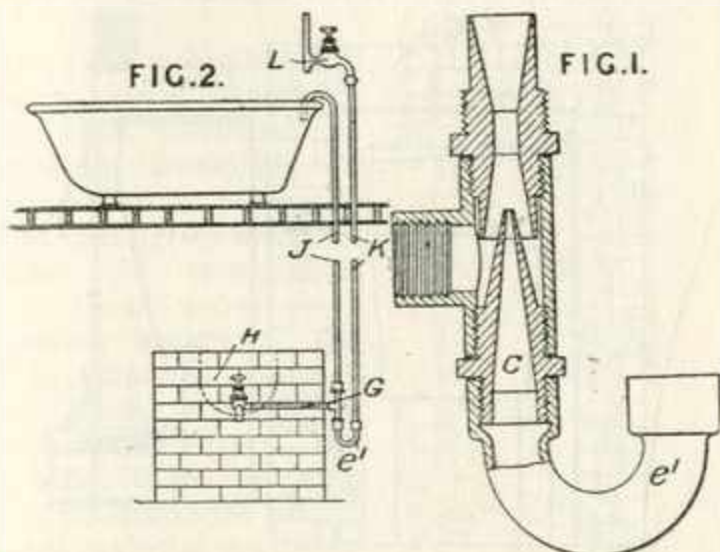
Slab-form boilers.—Between two or more intercommunicating water-holding chambers a, a', the products of combustion rise from a burner b which may be water jacketed as at g. Three series of baffles f are fitted to the walls of the chambers a, a' and extend across the flue, one being horizontal, another zigzag below the first, and the third may be vertically arranged at the sides or ends. The baffles are formed from slit plates, each of the teeth thus formed being given an angular twist.

153,175. Harter, E. April 23, 1919, [Convention date]. Addition to 142,071, [Class 64 (iii), Surface apparatus &c.].



Heating air.—The radiator for motor cars described in the parent Specification is provided with a closed casing d, and the gills on the cooling tubes a are sloped in reverse directions on either side of the centre of the radiator, as shown at a¹, a² so as to cause a discharge of the air in two currents x¹, x² towards adjustable outlets d¹, d² in the bottom of the casing. The outlets may be fitted with adjustable louvres controlled by the driver. In cold weather these louvres may be closed and the warm air led through one or more pipes r¹ fitted with dampers r² and filter screens r³ into the body of the vehicle to heat it.

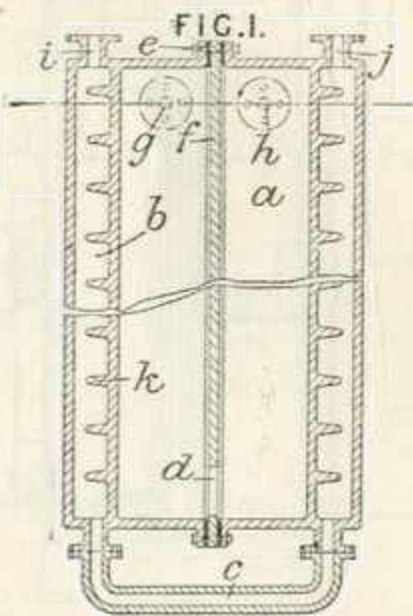
153,486. Letheren, T. W. Dec. 30, 1919.



Water supply and delivery.—A device for supplying a bath with water from a washing-boiler comprises an ejector in which cold water from a cock L passes through a pipe K, bend e' , and a nozzle C entraining heated water from the boiler H by way of a pipe G, the mixed water being delivered by a pipe J. In one modification, the cold-water tap is near the boiler and in another, the ejector is adapted to be placed within the pan H, with removable connexions to the cold-water tap and the pipe J.

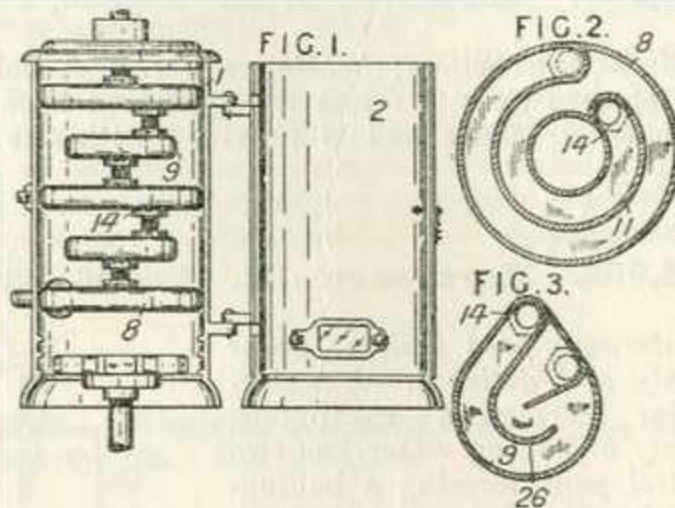
153,616. Adam, M. A. May 13, 1919.

Heating liquids.—Relates to the prevention of corrosion of apparatus such as metal tanks, pipes, pumps, heaters, or the like, containing or carrying corrosive metallic solutions of metals which are capable readily of yielding electrolytically a metallic protective deposit, more particularly to the protection of iron vessels used in the detinning of tinned iron. The tank &c. is made the cathode in a special electric circuit and a potential is applied which allows a deposit of the protecting metal at a slightly greater rate than it is dissolved. An apparatus for heating the liquid for treating tinned scrap comprises two flanged cast iron troughs a bolted together through two rubber joint rings e as shown in plan. Each trough has a steam jacket b on the outside and the two are separated by a graphite or moulded carbon anode plate f . Inlet and outlet openings g, h are provided for the liquid, and i and j for the steam. Connecting passages c and d are provided between the two sides of the apparatus.



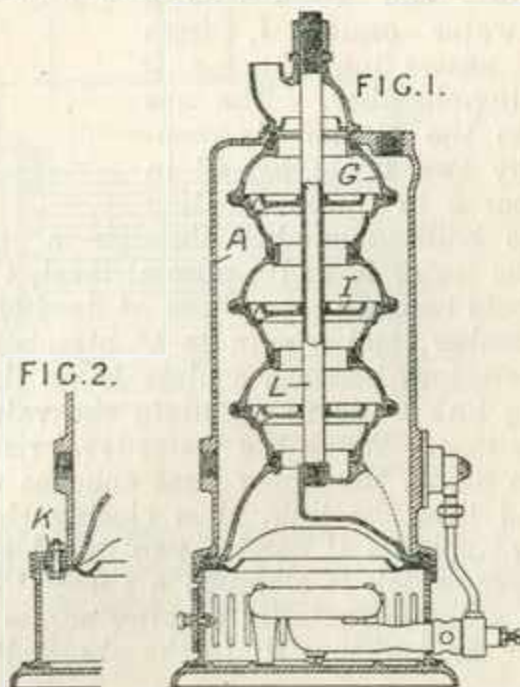
External ribs k may be provided on the troughs, and internal ribs may also be provided to baffle the flow of liquid. In a crushing-mill, the stand, framework, and delivery shoot form one piece and the feed-hopper shoot another. The concrete may be reinforced by means of wires wound around ferrules provided with projecting tongues.

153,728. Lott, A. M., and Giffin, W. D. Sept. 16, 1919.



Boilers.—A water-heater with alternate annular and disk-shaped sections 8, 9 each with partitions 11, 26 to cause a long pathway for the water to be heated, has a door 2 to the casing 1 which occupies preferably half the circumference. The disk sections 9 have a lateral extension on one side to bring the water connexion 14 into alignment with the outlet from the annular section beneath. Modified arrangements of partitions are also described, in which the flow of water in each section is reversed or divided.

153,737. Hurdle, G. C. Sept. 22, 1919.



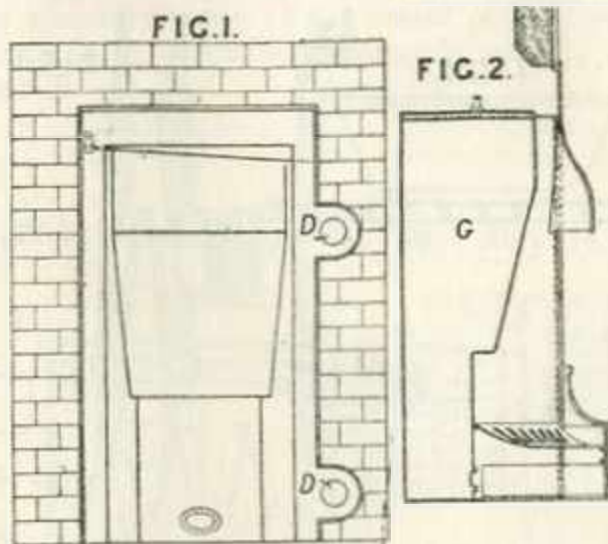
Internally-fired boilers.—The joints between the substantially hemispherical sections G of the



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central part of a heater and between the end section and the casing A are made tight by the use of packing and a single operation such as the securing of a central tubular bolt L, Fig. 1, or of the lower flange by bolts K, Fig. 2. Baffles I in the largest parts of the sections serve also to trap moisture condensing at starting.

more pockets D in which auxiliary heating-means, for example, electric heaters, may be placed.

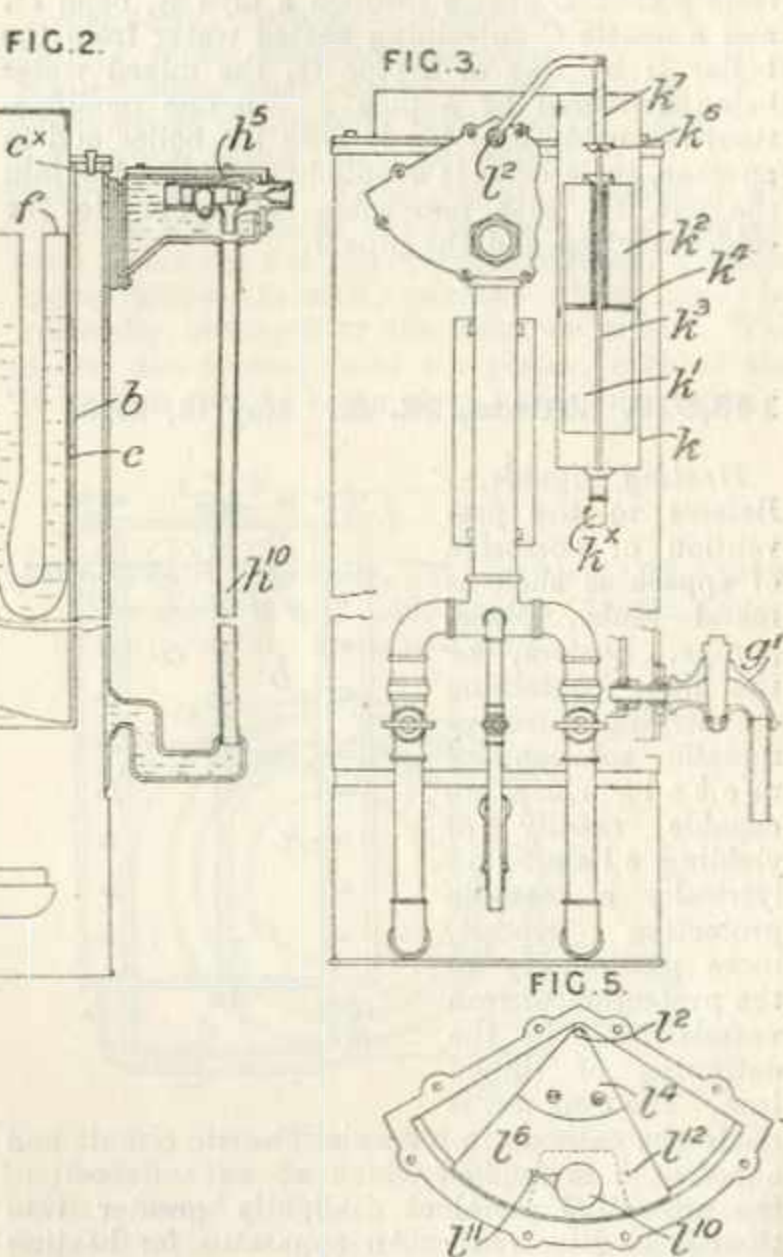


153,960. Robinson, J. H. Aug. 16, 1919.

Block-form boilers; heating water.—A boiler and storage tank G forms the sides and back of an open fire-place and is provided with one or

153,962. Hargreaves, H. Aug. 16, 1919.

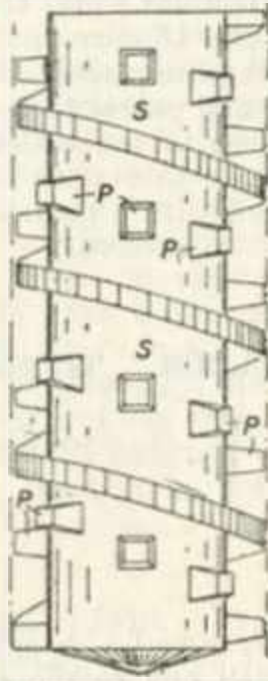
Internally-fired boilers; water supply and delivery.—A water-heater giving a continuous supply of boiling water has two central pans forming a boiling-chamber and a collecting-chamber, water being forced from the boiling-chamber into the collecting-chamber by the pressure of the steam generated. Water boiled in the space c^x between two concentric pans b, c is forced up a pipe f projecting from the bottom of the space and overflows into the inner pan, from which it may be drawn off through a cock g^1 . A float d^1 in a chamber d in communication with the boiling-chamber operates a sliding valve h^5 controlling the feed-supply. The feed passes down a pipe h^{10} and flows into a hollow water casing i , from which it passes into the top of the boiling-chamber. The gas supply to the burner is controlled by two floats k^1, k^2 in a chamber k in communication with the boiling-chamber through a pipe k^x . When the water is at its normal level, the lower float is held beneath a partition k^4 fixed across the float chamber, and a spindle k^3 attached to the float so engages beneath a plate k^6 on the valve-operating link k^7 as to maintain the valve in its open position. When the water-level rises above a certain point, the upper float engages with the plate and lifts the link, thus closing the valve. The valve spindle l^2 carries two metal segments l^4 , between which is clamped a sheet l^6 of paper or other suitable material moving across the gas passage. An aperture l^{10} in the sheet allows the



full quantity of gas to pass, a narrow slit l^{11} allows sufficient to pass to maintain the water at the boiling point, and a small hole l^{12} allows a small quantity to pass to a pilot light.

154,080. Wilson, C. L., and Davies, H.
Dec. 11, 1919.

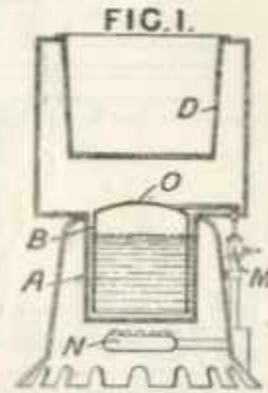
Boilers.—In water-heating apparatus, more especially of the kind described in Specification 28996/11, in which a spiral is placed in the flue through which the products of combustion flows to heat water in a surrounding reservoir, the spiral is arranged round a cylinder S and is formed of fire clay or porcelain. Between the turns of this spiral protuberances P of the same material are fitted in order to break up the path of the hot gases and increase the efficiency of the apparatus. This construction may be used with hot water heating apparatus having a luminous flame burner.



154,666. Stott, V. H., and Schofield, L.
Aug. 2, 1919.

Portable and small heaters.

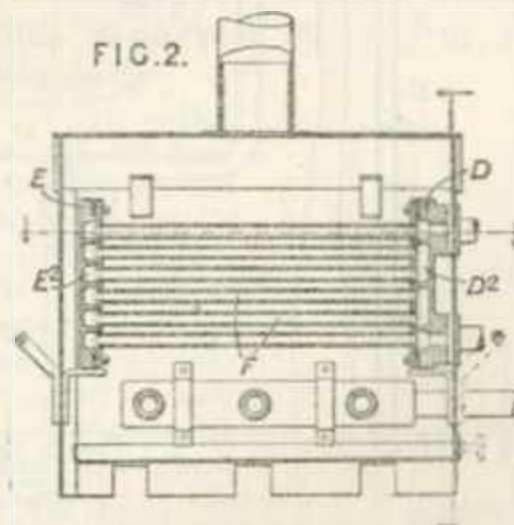
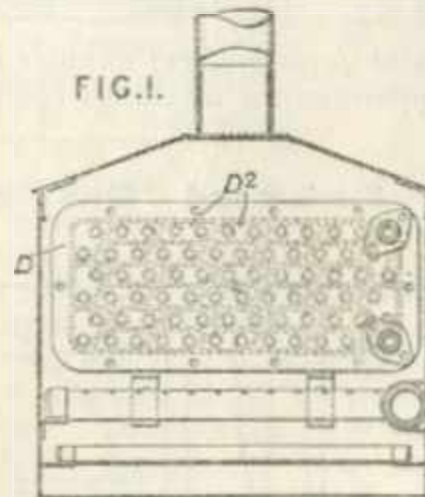
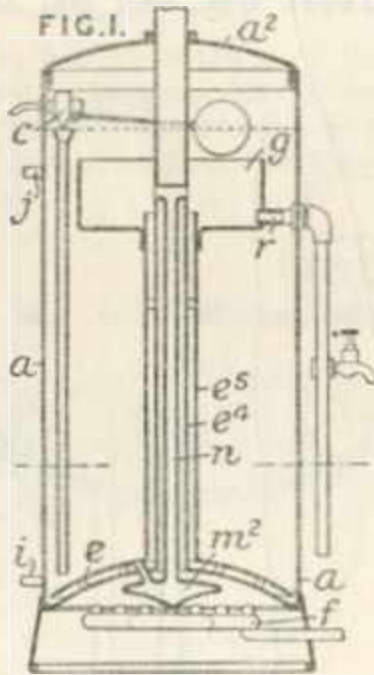
—An apparatus for performing minor heating operations the principle of which can be used in ovens steamers and hot plates comprises a gas-regulating valve M operated by the rising and falling of a bell float B immersed in a vessel A, heated by the burner N. The walls of the float chamber are extended above the float to act as a well for the reception of the pots D or ovens to be heated by steam escaping from beneath the float through the orifice O. A tap may be fitted for drawing off hot water, and a small float controlled cistern may keep the water level constant in the chamber A. Specification 20277/14 is referred to.



154,781. Rogers, F., Rogers, A. J., and Hewitt, R. Nov. 8, 1919.

154,476. Webb, H. C., Cooke, E. A., and Tremlett, W. H. Jan. 10, 1920.

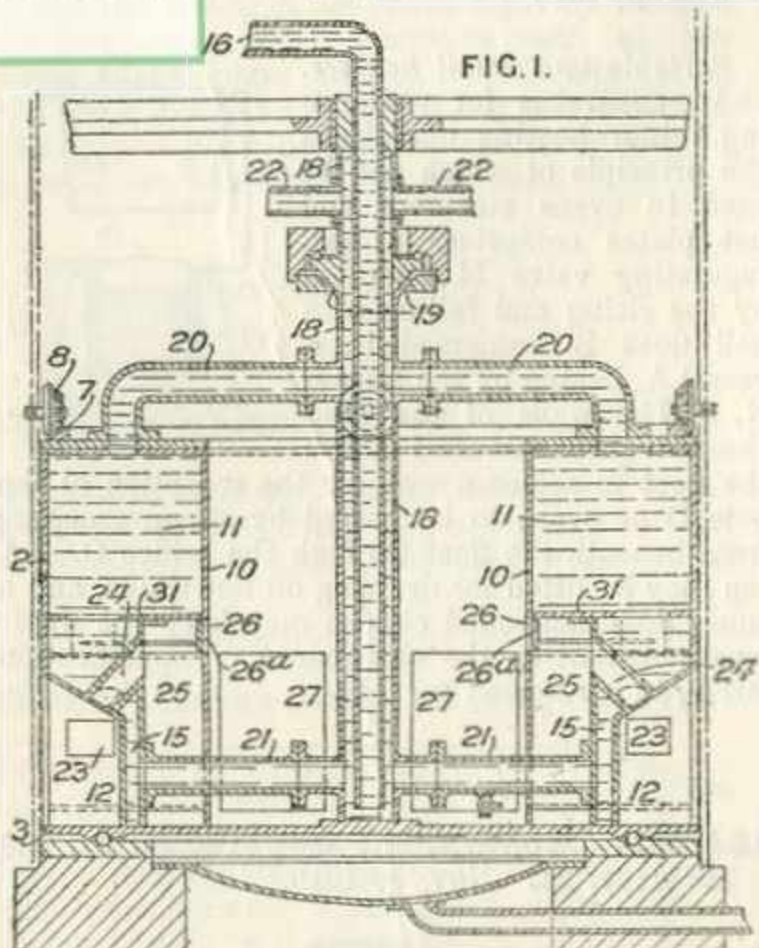
Internally-fired boilers.—A tank boiler a closed by a steam-tight removable cover a^2 and supplied with water under the control of a ball-cock c has a central water-heating chamber m^2 placed directly over the burners f, and a bottom dome-shaped water-heating space formed by an internal partition e. Water heated in the central chamber rises in a tube n in the flue e^4 , and discharges into an open collecting-vessel g in the upper part of the boiler. Water heated in the dome-shaped heating-space rises through a tube e^5 surrounding the flue and discharging into the bottom of the collecting-vessel. Hot water is drawn from the collecting-vessel through a pipe r. The boiler may be connected by pipes i, j to the boiler of a cooking-range.



Water-tube boilers.—Heaters D, E in a water-tube boiler have pockets D^2 , E^2 such that each affords communication between two tubes F only, the other ends of which open into two adjacent pockets in the other header, so that the water passes through the tubes in series in a zigzag course.



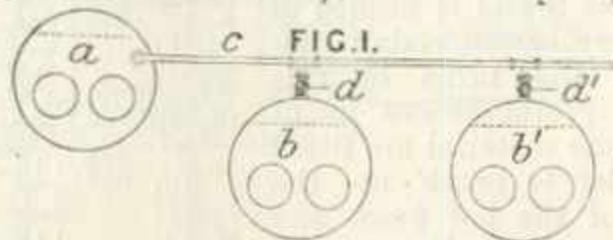
Martyn, P. B. Dec. 15, 1919.



Block or slab form boilers; annular boilers.—In a heating-apparatus for dwellings comprising fire-

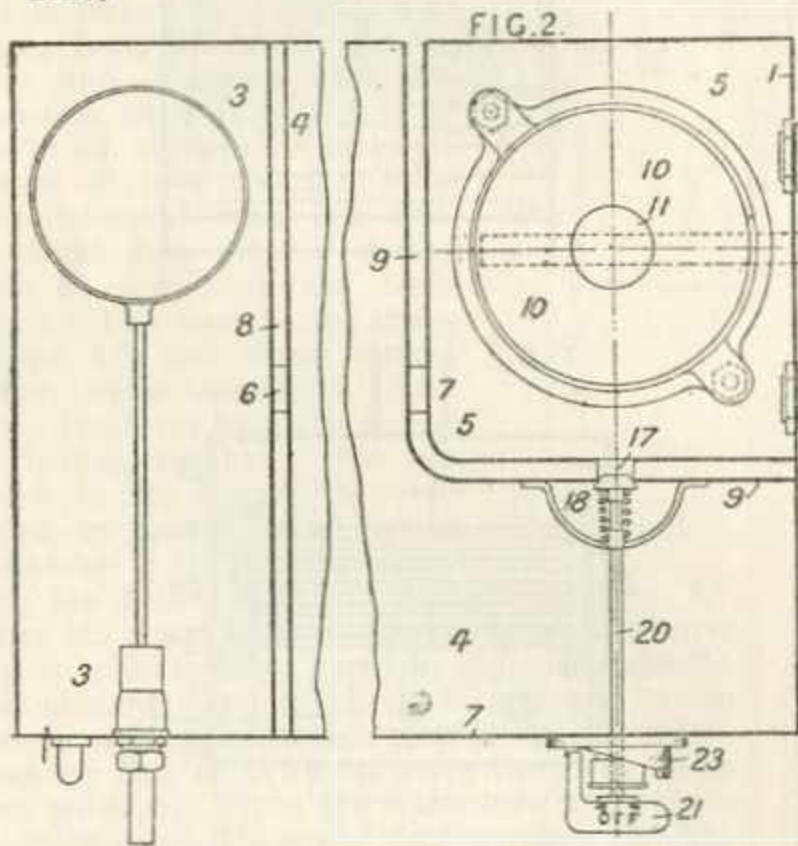
places 12 arranged in a revoluble structure for the purpose of moving them from room to room, an annular water space 11 is connected to water-jackets 15 surrounding the backs, sides, and tops of the fire-places. Water is supplied from a pipe 16, and passes through pipes 21 to the jackets 15, thence to the boiler 11, and thence by pipes 20 and 18 to service-pipes 22. The pipe 18 is provided with a conical joint 19 to enable the lower part to revolve.

155,008. Williams, G. M. Sept. 6, 1919.

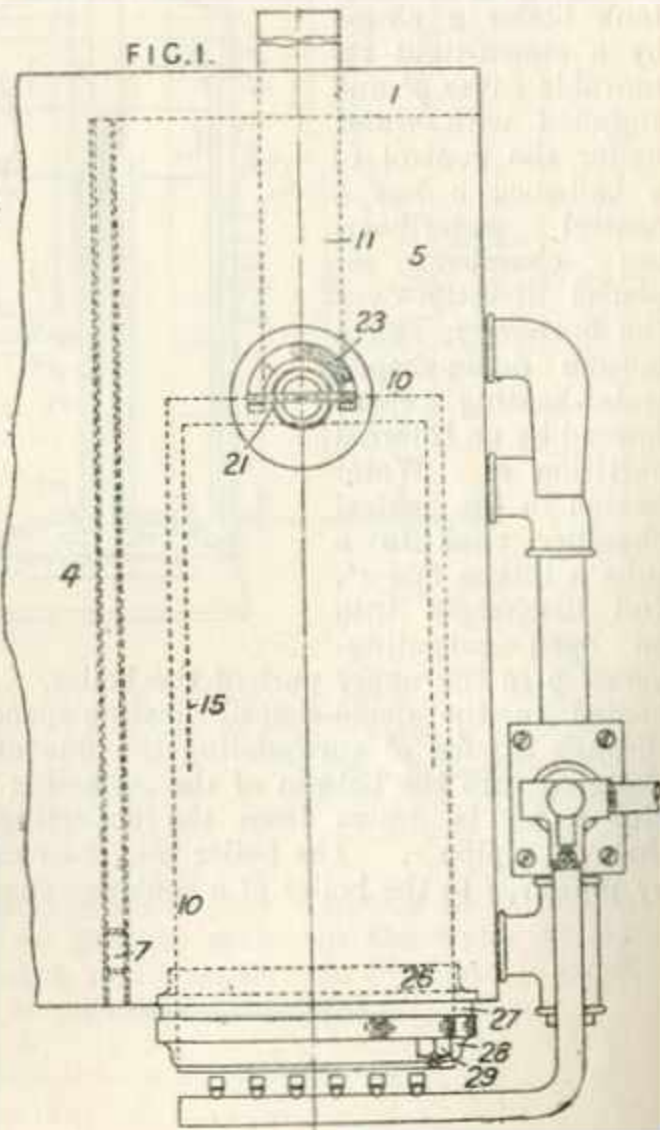


Feed-water, heating.—In a battery of boilers in which one or more are maintained at a higher pressure and are used solely for supplying feed-water to the remainder, the feedwater from them is sprayed into the steam space of the steam generating boilers. The feed-supplying boiler *a* is connected by a feed pipe *c* to steam generators *b*, *b'*, the feedwater from the feed-supplying boilers may be sprayed into the steam space of the steam generators by means of an injector supplied by superheated steam from the feed-boiler.

155,051. Richmond Gas Stove & Meter Co., and St. Leger, A. Sept. 20, 1919.

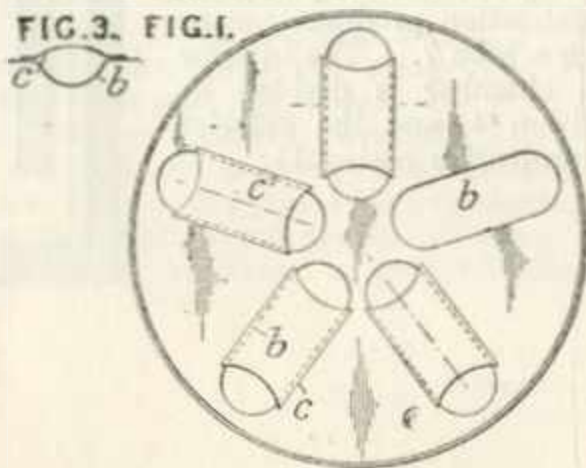


Heating water.—A tank 1 for use in a domestic water-heating system is divided by vertical insulating-partitions 8, 9 into three compartments, one relatively small compartment 3 forming an automatic cold-supply cistern, a second compartment 5 containing a boiler or like heating-means 10, and the third relatively large compartment 4



constituting a storage tank. The compartments 3, 4 communicate by means of an aperture 6, and the compartments 4, 5 by means of a lower aperture 7 and an upper aperture 17 adapted to be closed by a hand-operated valve 18. When only a small quantity of water is required, the valve 18 is closed, and the compartment 5 alone is heated; when the larger quantity of water is required, the valve 18 is opened to allow circulation between the compartments 4 and 5, the valve movements being controlled by the valve-spindle 20, rotatable handle 21, and cam-surface 23. The boiler comprises an open body portion 10, which is provided with a flue 11 and an inverted cylinder 15, and is removably secured to the bottom of the tank by means of bolts 29 connecting a fixed flange 26 and a loose flange 28 with an intervening packing-ring 27.

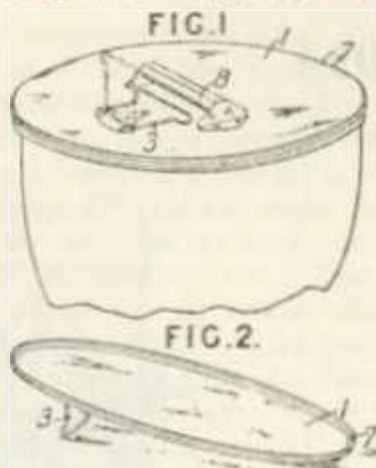
155,069. **Bint, F. C.** Oct. 6, 1919.



Boilers; set-pans.—The heating-surface of the bottoms of boilers, coppers, kettles, &c. is increased by pressing out radial channels *b* which are covered in part by plates *c*, leaving apertures at each end for circulation.

155,117. **Daniels, S., and Miles, G.** Dec. 30, 1919.

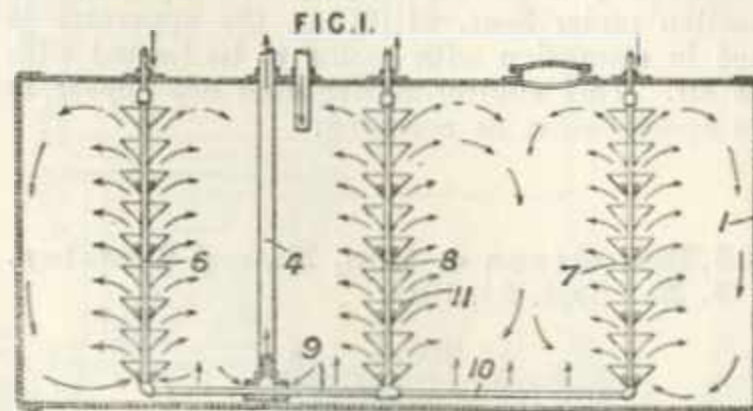
Washing-boilers.—In a washhouse boiler, the lid 1 has a pivoted strut 3 adapted to support it in a reversed position at a suitable angle for draining purposes. Holes 7 in the rim allow drainage, and the wide handle 8 prevents excessive side tipping.



155,210. **Bates, L. W.** Dec. 10, 1919, [Convention date]. Void [Published under Sect. 91 of the Act].

Heating liquids.—In fuels consisting of a blend of immiscible combustible liquids or of solid carbonaceous particles such as coal suspended in oil or other liquid, the stability of the blend is increased or prolonged by agitation, particularly

during storage, whether a stabilizing agent has been added or not. In the storage tank 1 the agitation is effected by passing heating agent through pipes 6, 9, 7, 10 and 8 to set up convec-

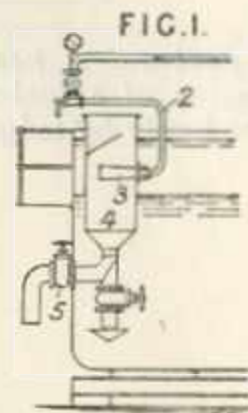


tive currents. Cone-shaped heat-radiating pins 11, some or all of which are perforated, are secured to each pipe, and the pipe 9 passes through the end of the fuel outlet pipe 4.

155,290. **Verein der Spiritus-Fabrikanten in Deutschland.** Aug. 19, 1916, [Convention date].

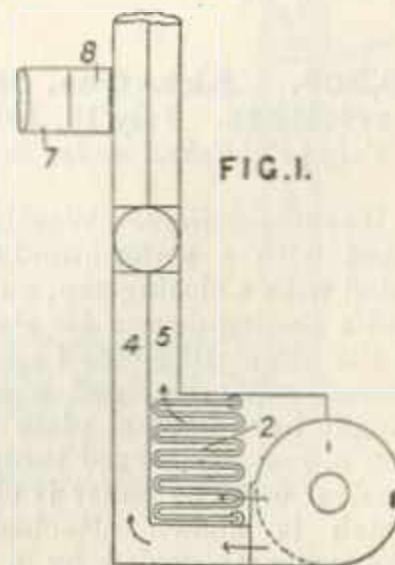
Boiling-pans and the like.

—To remove and break up froth in receptacles containing boiling and fermenting liquids, it is driven by air currents against a partition. A current of air at a pressure between 0.1 and 0.4 of an atmosphere over that obtaining in the vessel enters by a pipe 2, picks up the froth through a set of injector nozzles 3 arranged at an appropriate level, and throws it against the side of the casing 4, a baffle being provided to prevent splashing over. The broken-up froth runs down the side of the casing and may be drawn off through a valve 5, or returned to the vessel.



155,306. **Geurten, P.** Aug. 21, 1917, [Convention date].

Heating air.—Hot and cool air are supplied to each of the compartments of a drying plant through separate passages, and a rotary valve common to the passages is fitted to each drying compartment to control the mixture of hot and cold air supplied. Air from a fan 1 is forced partly through the tubulous heater 2 into the hot air passage 5, and partly below the heater into the cool air passage 4. Rotary regulating valves 8 are fitted at the entrances to the branch distributing passages 7 leading to the compartments. The



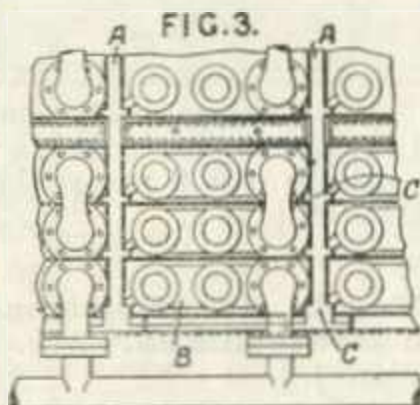


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...be further divided into say, three passages, the middle passage containing cold air and the outer passages hot air.

According to the Specification as open to inspection under Sect. 91 (3) (a), the apparatus is used in connexion with rooms to be heated with hot air. This subject-matter does not appear in the Specification as accepted.

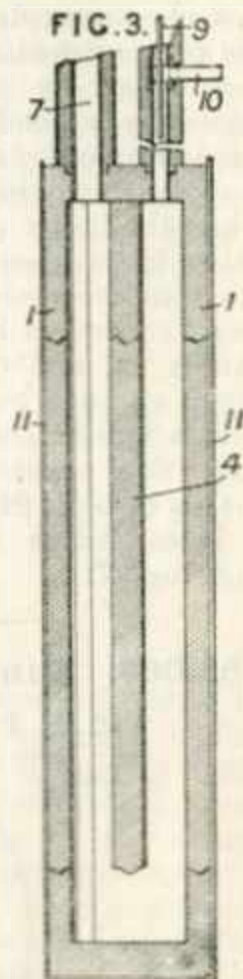
155,388 Green & Son, E., and Tansley, G. E. Sept. 24, 1919.



Feet-water, heating.—The headers B of each section of a fuel-economizer are supported independently by ledges C on a framework A.

155,732. Diver, D. March 20, 1920.

Submersible liquid-heaters.—A heater for use in the destructive distillation of oil-bearing material in situ consists of a cylindrical combustion chamber 1 adapted to be lowered into a well or bore-hole. Fuel is supplied through a pipe 9 and air through a pipe 10, ignition is effected by an electric spark, and the combustion products escape through a tube 7. The interior of the chamber is divided by a partition 4, and the exterior has a protective casing 11.



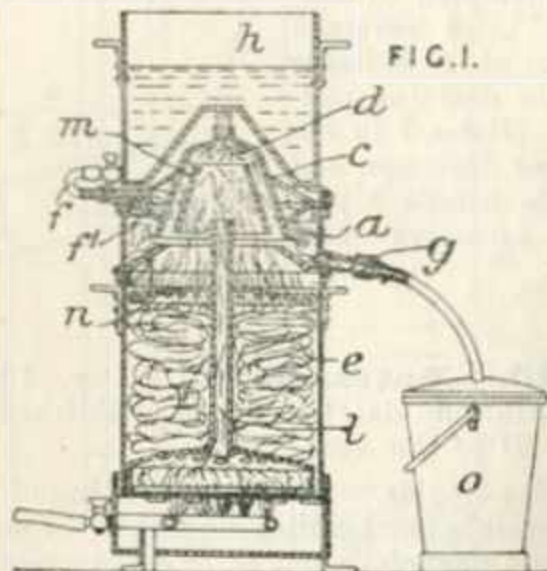
APPENDIX

The following two abridgments should be added to those appearing in the volume of this Class for the period A.D. 1909-15.

A.D. 1914

13,205. Akt.-Ges. für Gas und Electricitäts. July 19, 1913, [Convention date].
Void [Published under Sect. 91 of the Act].

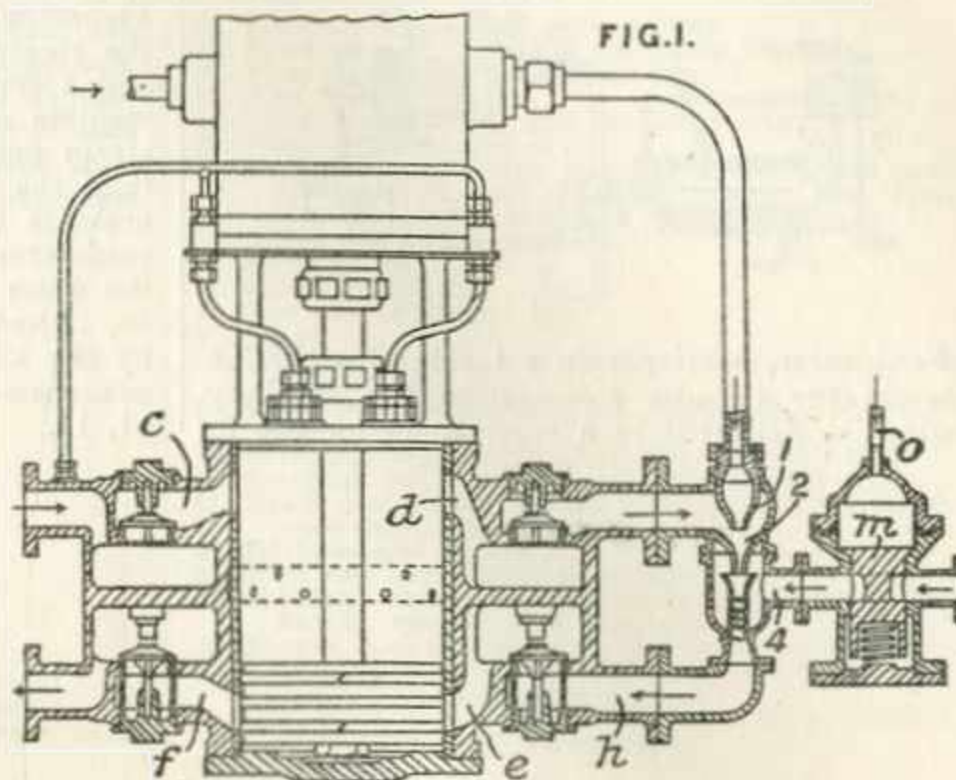
Washing-boilers.—Washing-boilers of the kind fitted with a water-circulating arrangement are fitted with a closing-cap, an overflow arrangement, and a cooling-device for the cap. The upper end of the circulating-pipe *l* opens into a double cone-shaped cap *c, m*, and a portion of the water is caught by a conical plate *n*, carried by the section *a*, and discharged through the pipe *g* into the receiver *o*. The boiler is closed by a double cover which is shown attached to the cap *c, m*. The cover is cooled by a water-vessel *h*, from which water flows through the pipe *f* into the double cover and thence through holes in the plate *f'* over the conical plate *n* and to the receiver *o*. The caps *c, m* may be reversed and used



for filling the boiler, the plug being removed from the neck *d*.

20,683. Caille, C. Oct. 13, 1913, [Convention date].

Feed-water, heating. — Relates to the heating of feed-water for locomotive and other steam-engines by apparatus of the type in which the water is mixed with the exhaust steam from the engine by an injector prior to its admission to the hot-water feed-pump. In the present construction a double-acting feed-pump, the barrel of which forms hot and cold water chambers on opposite sides of the piston, draws cold water from a tank through an inlet pipe *c* and delivers it through a pipe *d*, and also withdraws the heated water through the pipe *e* and delivers it through the pipe *f*. The cold water in the pipe *d* is mixed with the exhaust steam from the pump passing through the nozzle 1. The mixture passes through the nozzle 2 and induces exhaust steam from the engine through the pipe 4, before passing into the hot-water suction passage *h*. A valve *m*, which is balanced between a predetermined spring

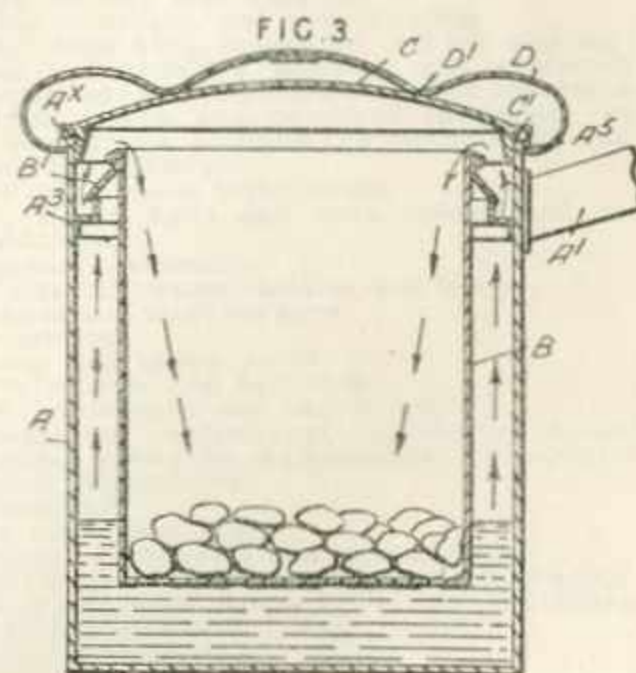


pressure and the pressure of the live steam in the engine cylinders transmitted through the pipe *o*, automatically closes the pipe 4 when the engine is running without steam or is at rest.

The following abridgments should be inserted in place in the present volume.

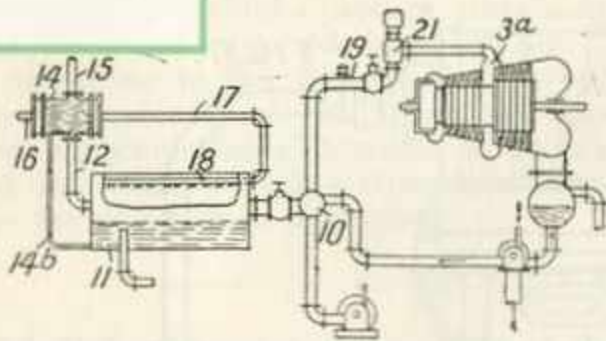
106,942. Masters, P. G. Nov. 8, 1916.

Digesters.—A steam cooking apparatus, wherein the steam is used at such a pressure that no condensation occurs, consists of an outer vessel *A*, provided with handles as *A*¹, a perforated internal flange *A*² having a vertical portion, a lid *C* having a depending flange *A*³, steam tight packing *C*¹ contained in an annular groove, and a handle and an adjustable safety-valve. The lid is secured by two crossed springs *D* which engage under a bead *A*⁴ on the outer vessel. The springs press on the lid at *D*¹ or they may be riveted thereto. The inner vessel *B* has an outer depending flange *B*¹ to rest on the flange *A*², and a wire handle. Water is placed in the outer vessel and food in the inner one. By the use of this apparatus, the food does not become more moist than it was before being placed in the container. The food container may have vertical partitions so as to divide it into independent compartments.





Manders, W. B. June 17, 1919.



Feed-water, heating.—In a turbine installation wherein the exhaust steam from the auxiliary engines is delivered to a receiver 10 for use in

a feed-water heater 11, the heater 11 is connected by an air &c. vent 12 with a heat-utilizing device 14 having a vent 15 open to the atmosphere, and the receiver 10 is connected through a pipe 19 and a constant-pressure valve 21 with an intermediate stage 3^a of the main turbine, so that steam passes from the heater to the turbine or from the turbine to the heater according as the pressure in the heater exceeds or is less than a predetermined pressure. The heater 14 may heat the water passing to the heater 11 through pipes 16, 17 and spray nozzles 18 or it may be replaced by any apparatus utilizing low-pressure fluid. A condensate-return pipe 14^b connects the heaters 14, 11.

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115, _____ Div. III.
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1916—1920.

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3 (i), Advertising and displaying apparatus, Moving and changing.
3 (ii), Advertising and displaying other than by moving and changing apparatus.
4, Aeronautics.
5 (i), Farmyard and like appliances, (other than Housing and feeding animals).
5 (ii), Housing and feeding animals, (other than Chaff and vegetable cutters).
5 (i), Cultivating implements and systems.
6 (ii), Gardening and like appliances, (including Miscellaneous agricultural appliances).
6 (iii), Harvesting-appliances.
7 (i), Combustion-product, compressed-air, hot-air, and vacuum engines.

- 7 (ii), Internal-combustion engines, Arrangement and disposition of parts of, (including Construction of parts peculiar to internal-combustion engines).
7 (iii), Internal-combustion engines, Carburetting-apparatus, vaporizers, and heaters for.
7 (iv), Internal-combustion engines, Igniting in.
7 (v), Internal-combustion engines, Starting, stopping, and reversing.
7 (vi), Internal-combustion engines, Valves and valve gear for, (including Other means and methods for regulating and controlling internal-combustion engines).
8 (i), Air and gases, Compressing, exhausting, and moving, (including Bellows and Vacuum and like dusting and cleaning apparatus).
8 (ii), Air and gases, Treating otherwise than by compressing, exhausting, and moving.
9 (i), Ammunition and ammunition receptacles.
9 (ii), Torpedoes, explosives, and pyrotechnics.
10, Animal-power engines and miscellaneous motors.
11, Artists' instruments and materials.
12 (i), Bearings and bearing-surfaces.
12 (ii), Lubricating passages, channels, reservoirs, and baths, and lubricating-cans.
12 (iii), Lubricators and lubricating bearing-surfaces, (other than Lubricating passages, channels, reservoirs, and baths).
13, Bells, gongs, foghorns, sirens, and whistles.
14 (i), Aerating liquids and gazogenes, seltzogenes, and siphon bottles.
14 (ii), Beverages, malt products, and organised ferments, (other than Aerating beverages).
15 (i), Dyeing and otherwise treating textiles, textile materials, and the like with liquids and gases, Apparatus for, (including Bleaching and washing, Processes and materials for).
15 (ii), Dyeing, Processes and materials for.
16, Books, mercantile forms, and the like.
17 (i), Boots and shoes, Apparatus for making and repairing.
17 (ii), Boots and shoes, Construction of.
17 (iii), Boots and shoes, Protectors and trees and other accessories for.
18, Boxes and cases.
19, Brushing and sweeping.
20 (i), Buildings and structures, Kinds or types of.
20 (ii), Buildings and structures, Miscellaneous accessories and details applicable generally to.
20 (iii), Doors and windows and their accessories.
20 (iv), Floors, roofs, walls, and ceilings.
21, Casks and barrels.
22, Cements and like compositions.
23, Centrifugal machines and apparatus, (other than Centrifugal fans, pumps, and reels).
24, Chains, chain cables, shackles, and swivels.
25, Chimneys and flues, (including Ventilating-shaft tops).
26, Closets, urinals, baths, lavatories, and like sanitary appliances.
27, Coin-freed apparatus and the like.
28 (i), Bread-making, confectionery, and cooking-appliances.
28 (ii), Kitchen and like appliances other than cooking-appliances.
29, Cooling and ice-making, (including Refrigerators and Ice-storing).
30, Cutlery.
31 (i), Cutting and severing machines for paper, leather, fabrics, and the like.
31 (ii), Punching and perforating machines and hand tools for cutting, punching, perforating, and tearing paper, leather, fabrics, and the like.
32, Distilling, concentrating, evaporating, and condensing liquids.
33, Drains and sewers.
34 (i), Drying gases, clothes, and materials in long lengths.
34 (ii), Drying systems and apparatus, (other than Drying gases, clothes, and materials in long lengths).
35, Dynamo-electric generators and motors, (including Frictional and influence machines, magnets, and the like).
36, Electricity, Conducting and insulating.
37, Electricity, Measuring and testing, (including Electric resistances and inductances).
38 (i), Electric couplings, and cut-outs other than electro-magnetic and thermal.
38 (ii), Electric currents, Converting and transforming other than by rotary converters and rotary transformers, and condensers.
38 (iii), Electric motor control systems and motor and like controllers.
38 (iv), Electric supply and transmission systems and apparatus not otherwise provided for.
38 (v), Electric switches and electro-magnetic and thermal cut-outs, (other than Motor and like controllers).

LIST OF CLASSES



- 39 (i), Electric lamps, Arc and incandescent-arc, and vacuum or low-pressure apparatus for electric discharges through gases or vapours.
- 39 (ii), Electric lamps, Incandescent.
- 39 (iii), Heating by electricity, (including Electric furnaces and ovens).
- 40 (i), Electric signalling systems and apparatus, (other than Telegraphs and Telephones).
- 40 (ii), Phonographs, gramophones, and like sound transmitting and reproducing instruments.
- 40 (iii), Telegraphs, Electric.
- 40 (iv), Telephones and telephone systems and apparatus, Electric.
- 40 (v), Wireless signalling and controlling.
- 41, Electrolysis, (including Electro-deposition and Electro-plating).
- 42 (i), Fabrics, Finishing and dressing.
- 42 (ii), Fabrics, Treating otherwise than by finishing and dressing.
- 43, Fastenings, Dress, (comprising Buckles, Buttons, Jewellery, and certain other fastenings specially applicable to wearing-apparel).
- 44, Fastenings, Lock, latch, bolt, and other, (including Safes and strong-rooms).
- 45, Fencing, trellis, and wire-netting.
- 46, Filtering and otherwise purifying liquids.
- 47 (i), Fire-escapes and fire and temperature alarms.
- 47 (ii), Fire-extinguishing and fire preventing and minimizing.
- 48, Fish and fishing.
- 49, Food preparations, food-preserving, and the like.
- 50, Fuel Manufacture of.
- 51 (i), Furnaces and kilns, Combustion apparatus of, (including Details in connexion therewith).
- 51 (ii), Furnaces and kilns for applying and utilizing heat of combustion, (other than Combustion apparatus and details in connexion therewith).
- 52 (i), Furniture, Fittings and details applicable generally to, and articles of furniture not otherwise provided for.
- 52 (ii), Furniture for sitting and lying upon.
- 52 (iii), Tables, desks, and leaf turners and holders.
- 52 (iv), Upholstery, wall furniture, screens, and looking-glasses.
- 52 (v), Window, stair, and like furniture, brackets, racks, and stands, (including Antimacassars and Table and like covers).
- 53, Galvanic batteries.
- 54, Gas distribution.
- 55 (i), Coking, gas-producers, and retorts.
- 55 (ii), Gas manufacture other than gas-producers and retorts.
- 56, Glass.
- 57, Governors, Speed-regulating, for engines and machinery.
- 58, Grain and seeds, Treating, (including Flour and meal).
- 59, Grinding, crushing, pulverizing, and the like.
- 60, Grinding or abrading, and burnishing.
- 61 (i), Hand-tool, brush, mop, and like handles.
- 61 (ii), Hand tools, (other than Wrenches and bolt, nail, screw, and like inserting and extracting tools).
- 61 (iii), Wrenches and bolt, nail, screw, and like inserting and extracting tools.
- 62, Harness and saddlery.
- 63, Hats and other head coverings.
- 64 (i), Heating liquids and gases.
- 64 (ii), Heating systems and apparatus, (other than Heating liquids and gases and Surface apparatus for effecting transfer of heat).
- 64 (iii), Surface apparatus for effecting transfer of heat, (other than Apparatus in which the heat is transferred from products of combustion).
- 65 (i), Door and gate operating-appliances, furniture, and accessories, (other than Fastenings, Lock, latch, bolt, and other and Hinges and pivots).
- 65 (ii), Hinges and pivots.
- 66, Hollow-ware, (including Buckets, Pans, Kettles, Saucepans, and Water cans).
- 67, Horseshoes.
- 68 (i), Excavating earth and rock, booms, buoys, canals and rivers, ferries, and water supply.
- 68 (ii), Subaqueous buildings and structures, diving, and raising sunken ships and objects.
- 69 (i), Hydraulic apparatus not otherwise provided for.
- 69 (ii), Hydraulic presses, meters, motors, and like apparatus for use with high pressures.
- 69 (iii), Spray-producers and liquid-distributing sprinklers and nozzles.
- 70, India-rubber and gutta-percha, (including Plastic compositions and Materials of constructive utility, other than metals and stone).
- 71, Injectors and ejectors.
- 72, Iron and steel manufacture.
- 73, Labels, badges, coins, tokens, and tickets.
- 74 (i), Braid and braiding-machines, crochet, lace and lace-making, and net-making machines.
- 74 (ii), Knitting and knitted fabrics.
- 75 (i), Burners and burner fittings.
- 75 (ii), Lamp chimneys, globes, lenses, shades, reflectors, and smut-catchers, and holders therefor.
- 75 (iii), Lamps for lighting and heating, Details and accessories applicable generally to, (including Lighting burners, pipes, cigars, and the like).
- 75 (iv), Lamps for lighting and heating, Kinds or types of, (including Lighting, Systems of).
- 76, Leather, (including Treatment of hides and skins).
- 77, Life-saving, (Marine), and swimming and bathing appliances.
- 78 (i), Conveyers and elevators for dealing continuously with articles and materials in bulk.
- 78 (ii), Lifting, lowering, and hauling not otherwise provided for.
- 78 (iii), Lifts, hoists, and jacks.
- 78 (iv), Loading and unloading, (including Transporters and cranes).
- 78 (v), Winding and paying-out apparatus for lifting, lowering, and hauling, (including Pulley-blocks and the like).
- 79 (i), Locomotives and tramway, traction, portable, and semi-portable engines.
- 79 (ii), Motor vehicles, Arrangement and disposition of driving, transmission, balance, and reversing gearing on.
- 79 (iii), Motor vehicles, Arrangement and disposition of parts of, not otherwise provided for, (including Construction of parts peculiar to motor vehicles).
- 79 (iv), Motor vehicles, Frames and undercarriage work of.
- 79 (v), Motor vehicles, Steering and controlling.
- 80 (i), Gearing, Belt, rope, chain, toothed, and friction, and gearing for converting and conveying rotary or reciprocating motion.
- 80 (ii), Gearing, Variable-speed, differential, and reversing, and for stopping and starting, and shafting and its accessories.
- 80 (iii), Link-work, cams and tappets, and ratchet and screw-and-nut gearing.
- 80 (iv), Mechanism not otherwise provided for.
- 81 (i), Disinfecting and deodorizing, and medical and like preparations.
- 81 (ii), Medical, surgical, and dental appliances.
- 82 (i), Metals, Extracting and refining, and alloys.
- 82 (ii), Washing granular, powdered, and like materials, and amalgamating, cleaning, coating, and granulating metals.
- 83 (i), Casting and moulding metals.
- 83 (ii), Metal articles and forms, Combination apparatus and processes specially designed for producing and treating.
- 83 (iii), Metals, Cutting.
- 83 (iv), Metals, Working.
- 84, Milking, churning, and cheese-making.
- 85, Mining, quarrying, tunnelling, and well-sinking.
- 86, Mixing and agitating machines and appliances.
- 87 (i), Bricks, building and paving blocks, slabs, tiles, and pottery.
- 87 (ii), Moulding plastic and powdered substances, (including Casting substances other than metals and Presses, Mechanical).
- 88 (i), Musical instruments, Automatic.
- 88 (ii), Music and musical instruments other than automatic.
- 89 (i), Bolts, studs, nuts, washers, and rivets.
- 89 (ii), Hooks, nails, cotters, pins, staples, wedges, and wood-screws.
- 89 (iii), Nailing and stapling and wire-stitching.
- 90, Non-metallic elements.
- 91, Oils, fats, lubricants, candles, and soaps.
- 92 (i), Ordnance and machine-gun carriages and mountings.
- 92 (ii), Ordnance and machine guns.
- 93, Ornamenting.
- 94 (i), Packing and wrapping-up for transit and storage, (including Baling).
- 94 (ii), Paper bags, sacks, wrappers, and the like, (including Making envelopes).
- 95, Paints, painting, and the like.
- 96, Paper, pasteboard, and papier mâché.
- 97 (i), Optical systems and apparatus.
- 97 (ii), Surveying, nautical, and astronomical instruments.
- 97 (iii), Thermometers, photometers, meteorological and mathematical instruments, and miscellaneous philosophical instruments.
- 98 (i), Photographic cameras and auxiliary appliances therefor.
- 98 (ii), Photographic processes and apparatus other than for taking photographs, (including Photographic plates, films, and papers).
- 99 (i), Pipes and tubes, Joints and couplings for, (including Joints for tubular framework and like Wire and rod couplings and joints).



LIST OF CLASSES

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VIRTUAL MUSEUM
- 100 (i), Pipes, tubes, and hose, (other than Joints and couplings for).
100 (ii), Printing processes and apparatus, (other than Type setting and composing).
100 (iii), Type making, setting, and composing, (including Type-bar-making machines).
100 (iv), Typewriters and like machines.
102 (i), Pumps, Reciprocating, for liquids, (including Steam-engine air-pumps and Combined pumps for liquids and gases).
102 (ii), Water and other liquids, and semi-liquids, Raising and forcing otherwise than by pumps.
103 (i), Brakes and retarding-apparatus.
103 (ii), Rail and road vehicles, Details applicable generally to.
103 (iii), Railway and tramway vehicles, Accessories for.
103 (iv), Railway and tramway vehicles, Body details and kinds or types of.
103 (v), Railway and tramway vehicles, Draught, coupling, and buffing appliances for.
103 (vi), Railway and tramway vehicles, Under-carriage and underframe details of.
104 (i), Railway and tramway crossings and points and switches.
104 (ii), Railway and tramway permanent way other than crossings and points and switches, and railway and tramway systems other than electric.
104 (iii), Railways and tramways, Electric, (including Electric traction).
105, Railway signals and communicating-apparatus.
106 (i), Calculating, counting, and cash-registering apparatus.
106 (ii), Dynamometers, gauges, measures of length, steam-engine and like indicators, and testing-apparatus.
106 (iii), Fares and admission-fees checking, revolution and speed indicators, and odometers.
106 (iv), Indicating, recording, and registering apparatus not otherwise provided for.
106 (v), Measured quantities delivering, measures of capacity, and sampling liquids.
107, Roads and ways.
108 (i) Road vehicles, Body details and kinds or types of.
108 (ii), Road vehicles, Undercarriage details and draught appliances for.
108 (iii), Springs and vibration-dampers.
109, Ropes and cords.
110 (i), Centrifugal and screw fans and pumps.
110 (ii), Rotary engines, pumps, blowers, exhausters, and meters.
110 (iii), Turbines and reaction-wheels.
111, Sewage, Treatment of, (including Manure).
112, Sewing and embroidering.
113 (i), Ship and boat fittings and accessories, and pontoons and rafts.
113 (ii), Ships and boats, Kinds or types and structural details of.
114, Ships, boats, and rafts, Propelling, steering, and manoeuvring.
115, Ships, boats, and rafts, Rigging, sails, and spars for, (including Boat raising, lowering, and disengaging gear).
116, Shop, public-house, and warehouse fittings and accessories.
117, Sifting and separating.
118 (i), Indicators and burglar and like alarms.
118 (ii), Signals, (including Marine signals).
119, Small-arms.
120 (i), Spinning, Preparation of fibrous materials for, (including Obtaining, opening, carding, and like treatment of fibres in general).
120 (ii), Spinning, twisting, and winding yarns and threads, (including Winding cords, wire, and the like).
120 (iii), Yarns and threads and miscellaneous spinning accessories and processes and treatment of fibres.
121, Starch, gum, size, glue, and other stiffening or adhesive materials.

- 122 (i), Engine and like cylinders, connecting-rods, cross-heads and guides, fly-wheels, piston-rods, and pistons.
122 (ii), Steam-engine distributing and expansion valves and valve gear and valve-actuating arrangements therefor.
122 (iii), Steam-engines, Kinds or types of, and details not otherwise provided for, (including Steam and other fluid-pressure hammers and presses).
122 (iv), Steam-engines, Regulating or controlling, starting, stopping, and reversing.
122 (v), Stuffing-boxes and substitutes therefor, (including Packing therefor).
123 (i), Liquid-level regulating, indicating, and registering, incrustation and corrosion preventing and removing, and door lids and covers for resisting fluid pressure.
123 (ii), Steam-generators.
123 (iii), Steam separators and superheaters.
124, Stone, marble, and the like, Cutting and working.
125 (i), Bottles, jars, and like vessels, (including Non-refillable bottles, jars, and like vessels).
125 (ii), Bottles, jars, and like vessels, Filling, opening, and closing, (other than Stoppers, lids, covers, and capsules).
125 (iii), Stoppers, lids, covers, and capsules, Bottle, jar, and the like.
126, Stoves, ranges, and fire-places.
127, Sugar.
128, Table articles and appliances.
129, Tea, coffee, cocoa, and like beverages.
130, Tobacco.
131, Toilet and hairdressing articles, and perfumery.
132 (i), Amusement and exercising apparatus other than games and toys.
132 (ii), Games.
132 (iii), Toys.
133, Trunks, portmanteaux, hand and like travelling bags, baskets, hampers, and other wicker-work.
134, Umbrellas, parasols, and walking-sticks.
135, Valves and cocks.
136 (i), Velocipede, cycle, and like vehicle brakes, steering-mechanism, and miscellaneous accessories.
136 (ii), Velocipede, cycle, and like vehicle driving-mechanism, (including Hand and foot driving-mechanism for apparatus other than vehicles).
136 (iii), Velocipedes, cycles, and like vehicles, Kinds or types and structural details of.
137, Ventilation.
138 (i), Washing and cleaning buildings and domestic articles other than clothes.
138 (ii), Washing, mangling and wringing, ironing, and starching clothes.
139, Watches, clocks, and other timekeepers.
140, Waterproof and like fabrics.
141, Wearing-apparel.
142 (i), Looms, Driving, reversing, stopping, and starting, and loom shedding-mechanism and pattern cards, chains, surfaces, and the like.
142 (ii), Looms, Kinds or types of, and details not otherwise provided for.
142 (iii), Looms, Weft supplying, inserting, beating up, cutting, doubling, and twisting in.
142 (iv), Woven fabrics and articles, and warping, leasing, balling, and beaming yarns, (including Pile fabrics and Floor coverings).
143, Weighing-apparatus.
144 (i), Wheels for vehicles, (other than Wheel tyres, Pneumatic and other elastic, and rims for use therewith).
144 (ii), Wheel tyres, Pneumatic and other elastic, and rims for use therewith.
145 (i), Wood, Cutting, (other than Sawing).
145 (ii), Wood, Working, (including Sawing).
146 (i), Filing papers and documents.
146 (ii), Stationery, wafers and seals, educational appliances, and ciphers and codes.
146 (iii), Writing-instruments, ink, receptacles for writing-materials, pads, and blotters.

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