



PATENTS FOR INVENTIONS

ABRIDGMENTS OF SPECIFICATIONS

CLASS 64(i)

HEATING LIQUIDS AND GASES

PERIOD—A.D. 1916-20 [100,001-155,800]



LONDON

PRINTED UNDER THE AUTHORITY OF HIS MAJESTY'S STATIONERY OFFICE

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EXPLANATORY NOTE

The contents of this Abridgment Class may be seen from its Subject-matter Index, which is in accordance with the 1910 edition of the *Abridgment-Class and Index Key* (now out of print), as amended up to date, and includes all index headings, subheadings, and subdivisions allotted to this Class, as well as cross-references under them, although there may be no cases affected within the period covered by this volume. A revised edition of the *Abridgment-Class and Index Key* is now in preparation.

It should be borne in mind that the abridgments are merely intended to serve as guides to the Specifications, which must themselves be consulted for the details of any particular invention. Printed Specifications, price 1s., may be purchased at the Patent Office, or ordered by post, no additional charge being made for postage.

Abridgments are printed in the chronological order of the Specifications to which they refer, and this index quotes only the number of each Specification.

NOTE.—The Patent Office does not guarantee the accuracy of its publications, or undertake any responsibility for errors or omissions or their consequences.

SUBJECT-MATTER INDEX

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This heading comprises only closed heaters in which substances are disintegrated and assimilated under pressure with liquids or steam.

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This heading includes only heating processes and apparatus which are not specially modified or adapted for particular purposes, and which do not involve structural modifications of, or additions to, parts of furnaces, gas generators or producers, kilns, and stoves, (including their flues and casings).

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- | | | | |
|----------|----------|----------|----------|
| 102,109. | 103,875. | 117,471. | 117,730. |
| 122,267. | 122,999. | 126,452. | 131,433. |
| 132,155. | 133,503. | 134,610. | 136,232. |
| 139,540. | 139,675. | 139,902. | 139,928. |
| 140,788. | 142,667. | 144,569. | 147,970. |
| 148,092. | 149,087. | 149,478. | 149,867. |
| 152,167. | 152,787. | 153,960. | |
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- | | | | |
|----------|----------|----------|----------|
| 106,015. | 111,620. | 112,744. | 122,597. |
| 127,507. | 129,465. | 130,234. | 130,841. |
| 132,155. | 134,036. | 135,538. | 141,424. |
| 148,612. | 149,977. | 154,802. | |
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- | | | | |
|----------|----------|----------|----------|
| 103,899. | 106,015. | 106,727. | 114,840. |
| 117,730. | 132,201. | 133,254. | 140,003. |
| 142,646. | 145,604. | 149,026. | |
- miscellaneous. [No cases.]
- water-holding chambers in firebox and flues.
- | | | | |
|----------|----------|----------|----------|
| 103,364. | 113,112. | 116,470. | |
| 123,307. | 128,079. | 132,598. | 133,549. |
| 135,085. | 135,606. | 137,364. | 139,750. |
| 140,003. | 140,676. | 144,905. | 149,026. |
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142,667.	145,604.	147,363.	147,732.
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135,606.	154,080.		
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132,598.	133,254.	135,085.	140,676.
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154,476.			

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140,978.	141,168.	144,783.	144,808.
147,220.	148,612.	148,896.	151,582.
154,781.			

substantially-vertical tubes.	110,905.		
128,806.	139,149.	144,783.	147,220.
148,613.	149,026.		

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by—

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 143,271. 145,109. 146,352. 147,870.
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 115,631. 117,524. 118,364. 130,443.
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 miscellaneous. [No cases.]
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 pipes and tubes for, metal. *See* Pipes and tubes, Metal, [Class 99 (ii)].
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The following abridgments should be *deleted* :—**127,987. 136,542. 142,893.**



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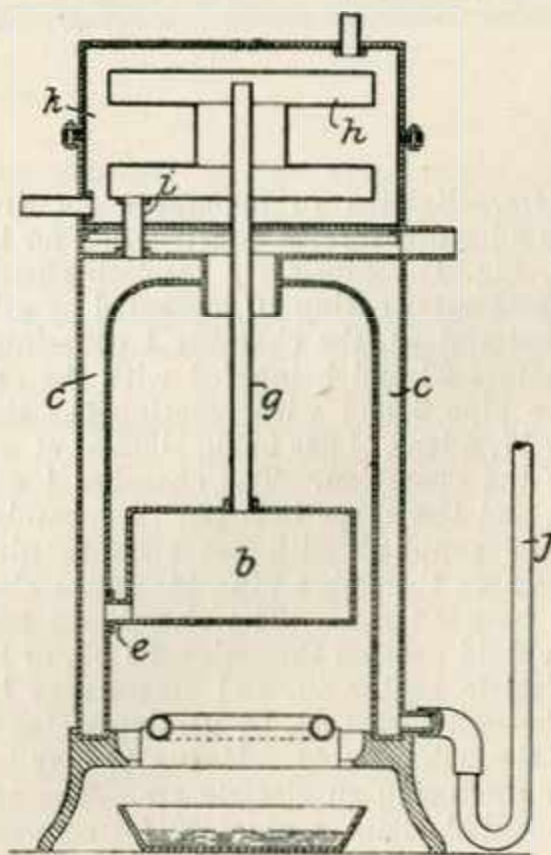
HEATING LIQUIDS AND GASES

Patents have been granted in all cases, unless otherwise stated. Drawings accompany the Specification where the abridgment is illustrated, and also where the words *Drawings to Specification* follow the date.

PERIOD 1916—20

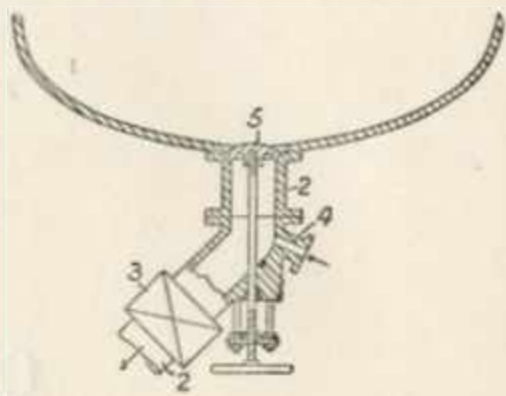
100,121. **Stimson, E. F.** Jan. 5, 1916.

Heating water.—Relates to water-heating apparatus for a domestic hot-water supply system, of the kind in which service water is heated indirectly by a volume of distilled water circulating between a boiler and a heat-exchanger, and consists in the combination of a boiler and a water jacket enclosing the gas burner directly heating the boiler, the jacket being so connected to the boiler and to the heat-exchanger that the coolest water from the heat-exchanger, before entering the boiler, is heated in the water jacket by the coolest flue gases. Water circulates between a heat-exchanger *h* in the water-heater *k* and a boiler *b* through a flow pipe *g* and a water jacket *c* connected to the heat-exchanger and the boiler by short pipes *i*, *e*. The heater *k* is preferably lined with copper or other non-resisting metal. A U-pipe *j* is provided to take up the expansion of the heating-water.

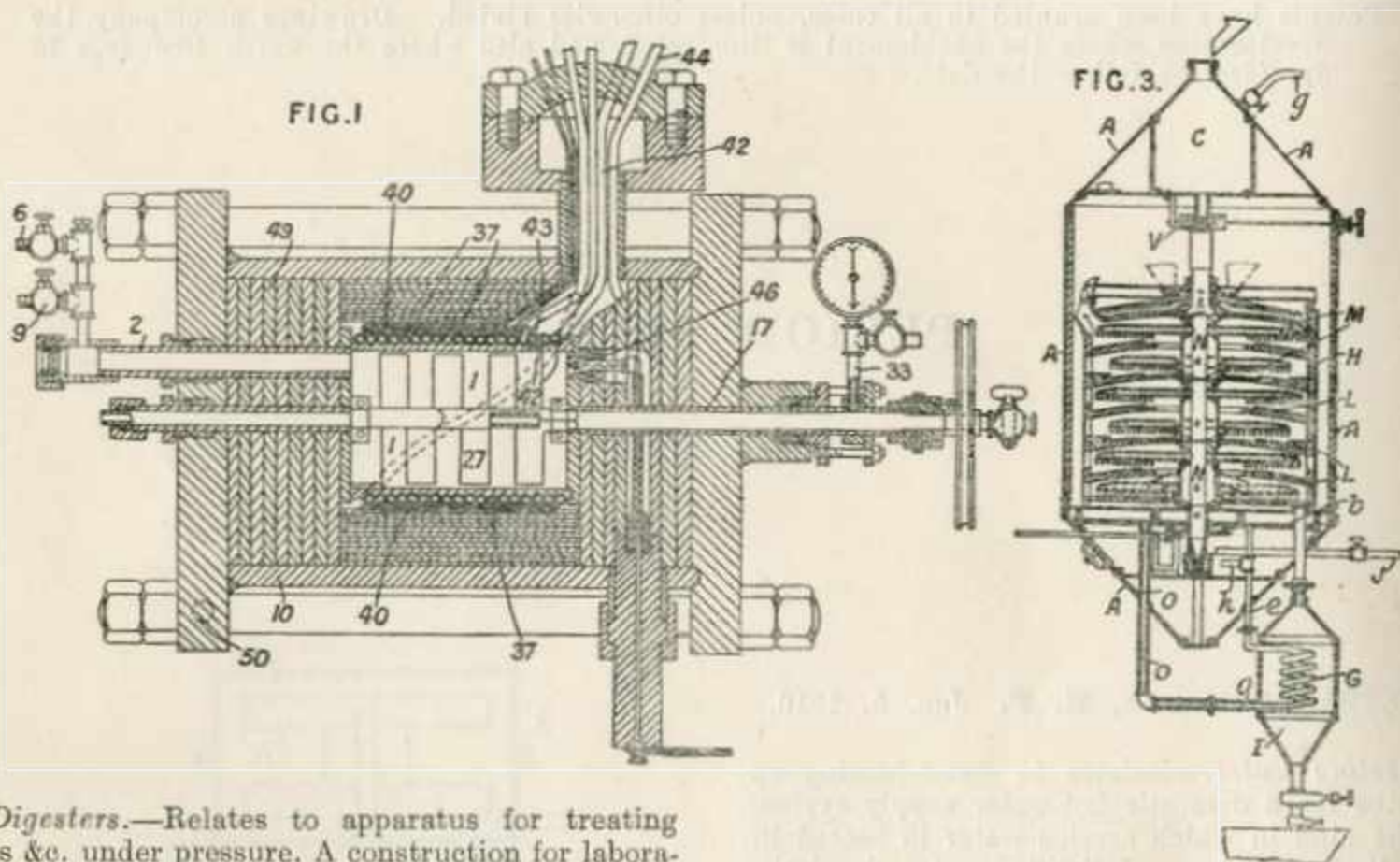


ULTIMHEAT® 100,447. Norsk Hydro-Elektrisk Kvaestofaktieselskab. May 12, 1915, [Convention date].

Digesters; heating liquids.—Relates to a digester or receptacle for carrying out chemical reactions, of the type which is provided with a discharge pipe 2 fitted with a sluice 3 and a steam inlet 4. An additional valve 5 is provided at the inlet to the pipe 2 for cutting off the supply of steam to the receptacle and for breaking up hard crusts which may form on the bottom of the receptacle. The apparatus is more particularly applicable in the production of ammonia from calcium cyanamide.



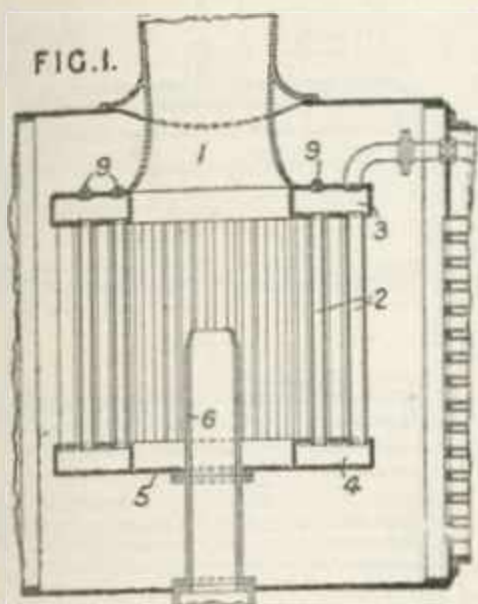
100,545. Hovland, H. B. May 27, 1915 [Convention date].



Digesters.—Relates to apparatus for treating ores &c. under pressure. A construction for laboratory use, Fig. 1, comprises a reaction chamber 1 and a closed outer casing 10 separated by asbestos or like material 49, the chamber 1 containing rotary agitators 27 and being fed with the ore &c. through a pipe 2 and with reacting gas through pipes 33, 17, a leak of gas being allowed at a valve 9 during the operation. The chamber 1 may be gas-tight and the space between the chambers 1, 10 may be supplied with gas such as nitrogen under pressure through a pipe 44; or the chamber may not be gas-tight. The chamber 1 may be cooled by fluid passing through coils 37, or heated by an electric heater 40, and steam may be admitted through a port 43, by passing water to the chamber through coils 42. Means 46 may be provided for producing an electric arc. The apparatus is mounted about a pivot 50 for convenience

in charging and discharging through the pipe 2. The chamber 1 may be exhausted through a pipe 6 when required. A construction for commercial use, Fig. 3, comprises a chamber H supported within a casing A and heated by oil burners, hot air currents or the like. The charge is admitted through a hopper C and feed screw V to hearths L over which it is moved by rabbles M supplied with the reacting gas through pipes J, k, e, o, and a hollow shaft N. Gas is allowed to escape through a valved outlet g and the treated material passes through a pipe b and a chamber I surrounding a coil G in the gas pipe outlet. The casing A may be replaced by or enclosed in a subterranean cavity.

100,557. **Anderberg, A.** March 3, 1916.



Feed-water, heating.—A feedwater-heater and spark-arrester consists of one or more rings of vertical tubes 2 connected to upper and lower annular headers 3, 4 placed around the base of the chimney 1 of a locomotive or like boiler. The centre of the bottom header is closed by a plate 5. The blast-pipe 6 projects into the space enclosed by the tubes. Plugs 9 in the top header and a door in the side of the bottom header afford access to the tubes. In a modification, the headers have removable cover-plates.

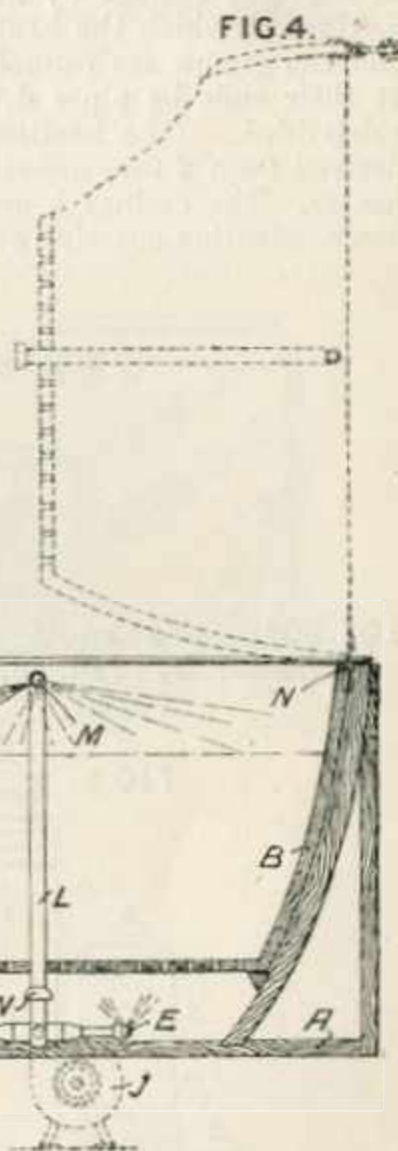
100,796. **British Westinghouse Electric & Manufacturing Co.,** (Assignees of Chubb, L. W.). June 30, 1915, [Convention date]. Drawings to Specification.

Increasing electrolytically the rate of heat transference from the container to the liquid.—A difference of electric potential is established between a liquid and its containing-vessel for the purpose of increasing the rate of heat transference to the liquid from the container, which is heated from an external source, the surface of the vessel in contact with the liquid being coated with an asym-

metric conducting film, for example of aluminium. The current employed may be direct or alternating, and in the latter case the auxiliary electrode is also coated with the film-forming metal. An electrolyte, such as boric acid and borax, is employed. The invention is applicable to steam-generators.

101,060. **Whitaker, J., and Whitaker, R.** March 17, 1916.

Washing - boilers and the like.—An apparatus for dyeing, scouring, and washing wool, rags, jute, hemp, &c., comprises a perforated vessel B hinged at its side N to the side of a vat A and having sloping sides, so that it may be raised into the position shown in dotted lines to discharge the wool &c. Steam is injected into the vat A through perforated pipes E. Dye



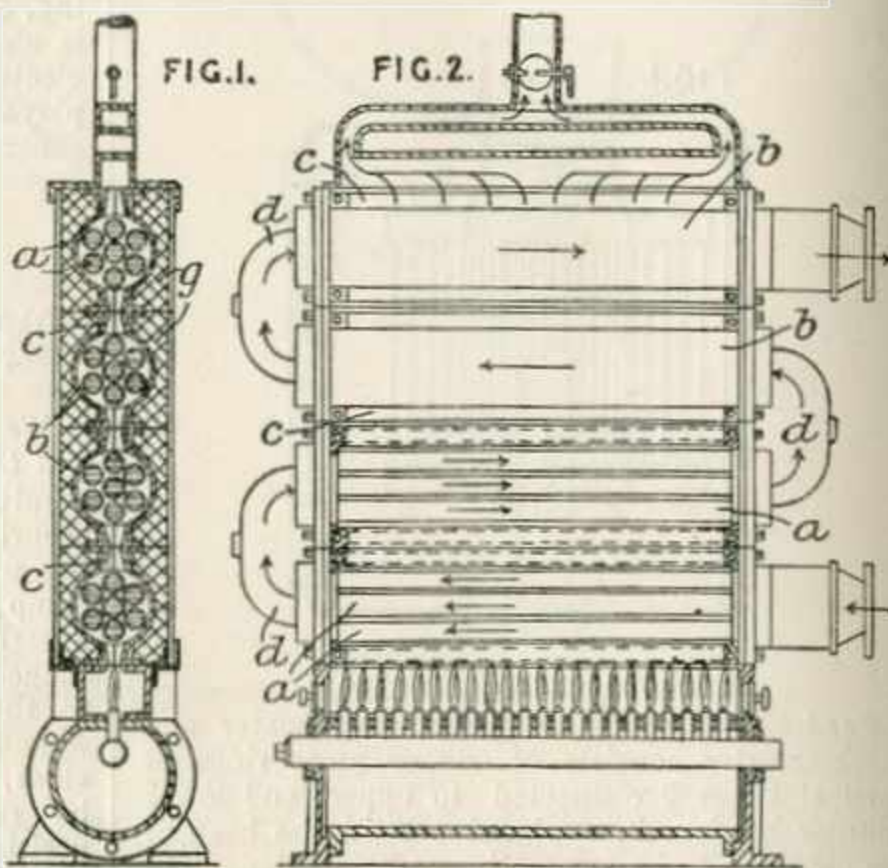
may be supplied to the steam-pipes, and the steam may be mixed with air by passing it, on its way to the pipes E, through an injector communicating with the air. Circulation of liquid is obtained by a pump J withdrawing liquid from the base of the vat and discharging it through a perforated pipe M. A joint W is provided in the communicating-pipe L.



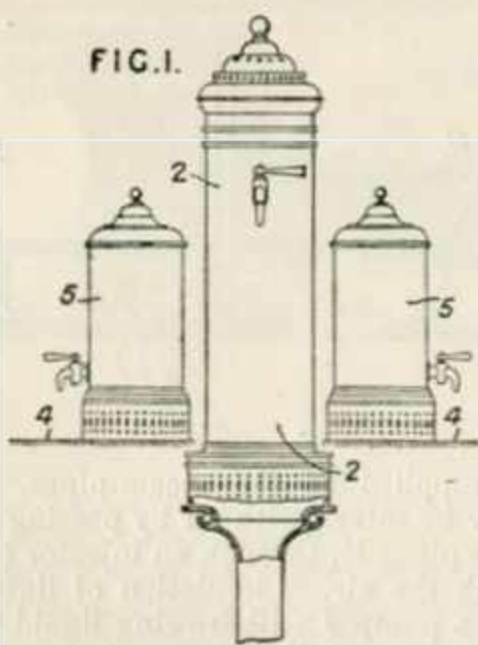
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101,871. Haefely et Cie Akt.-Ges., E. Oct. 18, 1915, [Convention date].

Heating air; heating liquids; water-tube boilers.—Relates to horizontal-tube apparatus for heating air, water, oil, steam, or other fluid to be circulated in a heating system. The tubes *a*, through which the fluid is passed within the heater, are arranged in groups, each group being disposed in a casing *b* connected to adjacent casings by narrow channels *c*, through which the heating-gases flow, and the groups are connected alternately at their ends by pipes *d*, which are not subdivided. The heating-gases may be derived from a fire, gas-stove, or electric heater. The casings *b* are fitted with a non-conducting covering *g*.

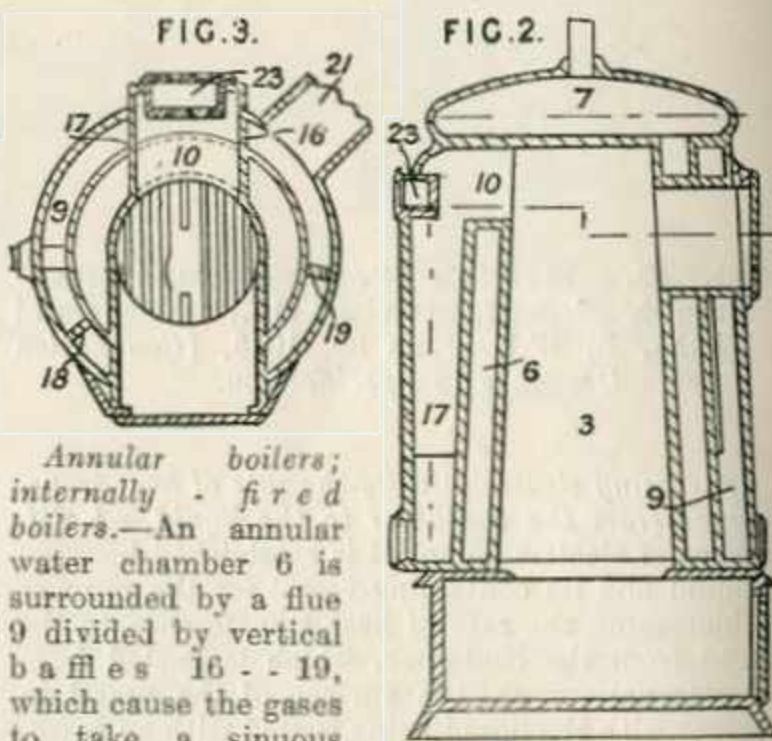


101,901. Jackson Boilers, Ltd., and Brooke, G. Jan. 26, 1916.



Heating water; water supply and delivery.—A number of urns *5* are arranged on a platform *4* concentric with a boiler *2*, which is mounted to rotate or is provided with a rotary delivery pipe. The urns can thus be filled in succession by rotating the boiler or its delivery pipe. A drip tray may be provided and the urns may be heated or jacketed. If one urn is to contain milk, this urn is made of distinctive appearance.

101,924. Gillespie, W., and Cooney, C. April 11, 1916.

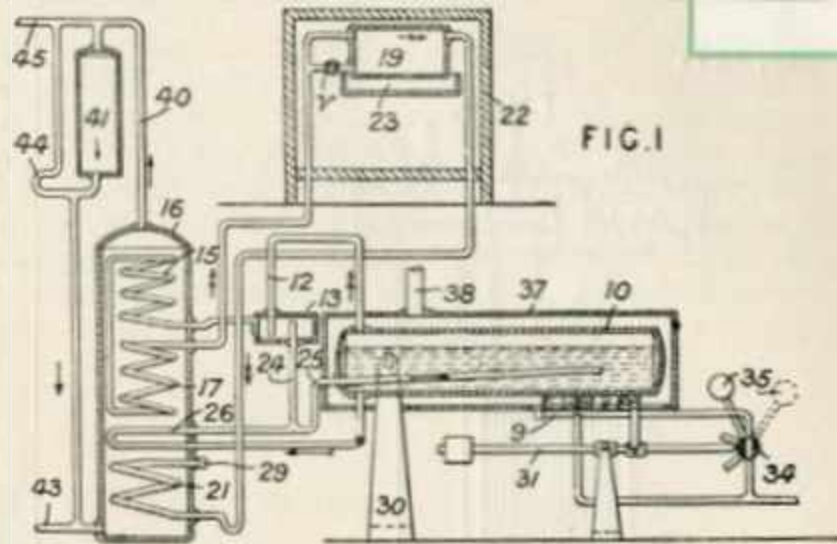


Annular boilers; internally-fired boilers.—An annular water chamber *6* is surrounded by a flue *9* divided by vertical baffles *16-19*, which cause the gases to take a sinuous course from the outlet *10* of the combustion chamber *3* to the flue outlet *21*. Air is led into the gases from a casing *23* having perforations in its inner wall and a sliding damper on its outer wall for regulating the admission of air. The top of the combustion chamber is closed by a hollow head *7* formed integral with the annular chamber.



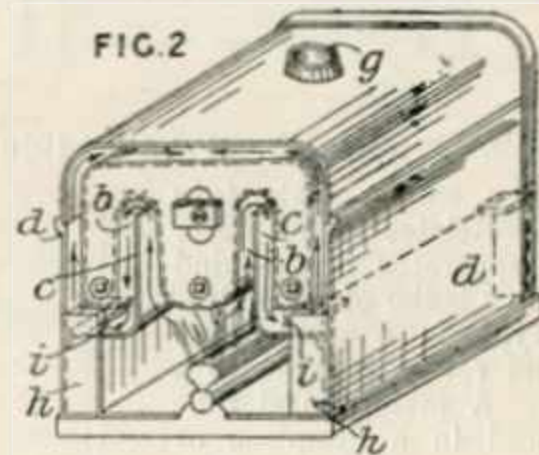
102,080. **Willsie, H. E.** Feb. 10, 1916.

Heating water.—The water warmed in the cooling-tank 16 of a refrigerating plant is circulated through the hot-water cistern 41 of a domestic hot-water service. The cold water enters the tank 16 by a pipe 43, and the warm water rises through a pipe 40. A coil 44 heated by a stove may be connected with the cistern 41 and with the pipe 43. Hot water is led to the taps by a pipe 45.



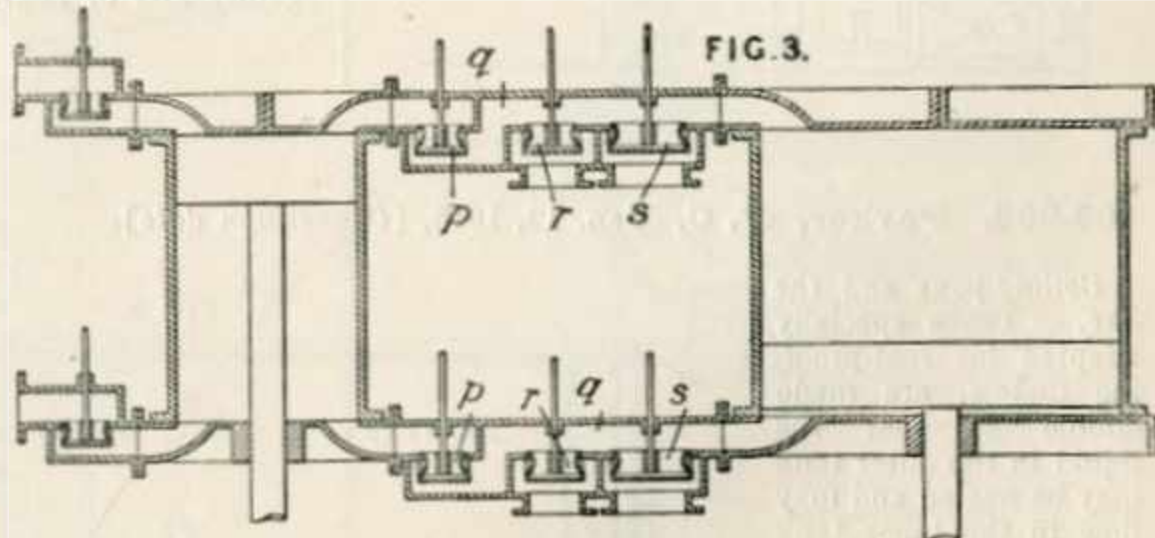
102,109. **Potterton, T.** May 15, 1916.

Block-form boilers.—The bottom of a gas-heated boiler is provided with substantially parallel recesses *b* into each of which extends a baffle-plate *c* to direct the products of combustion up one side of the recess and down the other, such products then passing within a jacket *d* over the sides and top of the boiler to the flue *g*. The plates *c* are each bent at right-angles and bolted to the inner wall of the jacket *d*. Angle-irons *i* bolted to the bottom of the boiler rest on supports *h*.



102,217. **Davey, H.** May 15, 1916.

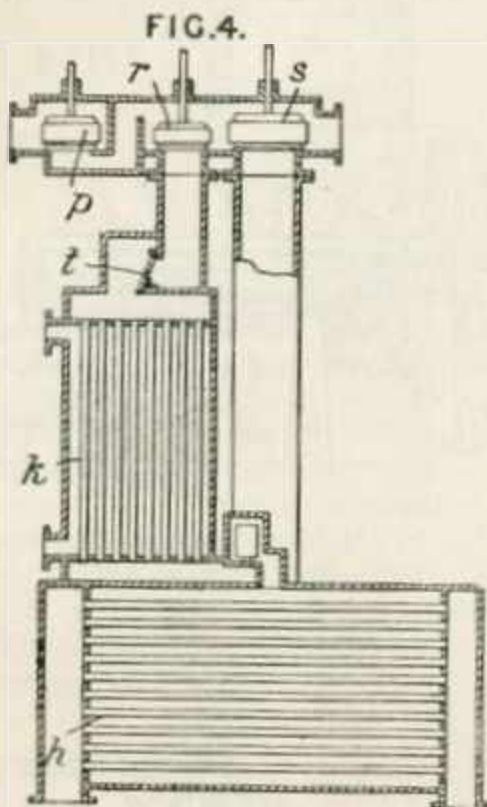
Feedwater, heating.—In a compound condensing steam-engine, steam is supplied to a feedwater-heater from the low-pressure cylinder before the end of the power stroke. In the construction shown in Fig. 3, the high-pressure cylinder exhaust valves *p* serve as admission valves to the low-pressure cylinders. On the pipes *q* connecting the two cylinders are two valves *r* which communicate with the feedwater-heater *k* arranged above the condenser *h*. A non-return flat valve *t* is arranged between the valves *r* and the heater *k*. The valves *r* open at about seven-eighths of the stroke. The low-pressure exhaust valves *s* which lead to the condenser open



just before the end of the stroke and remain open for about one-eighth of the exhaust stroke when compression begins. In a modification flat slide low-pressure exhaust valves are used.

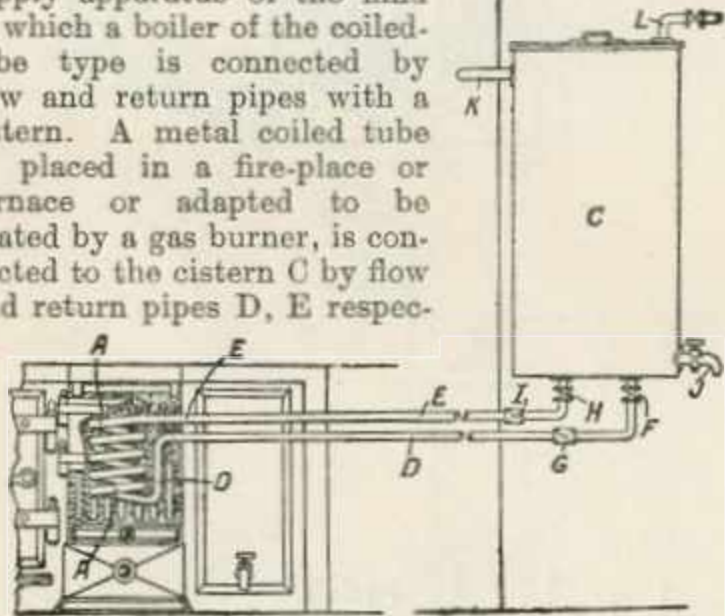
(For Fig. 4 see next page).

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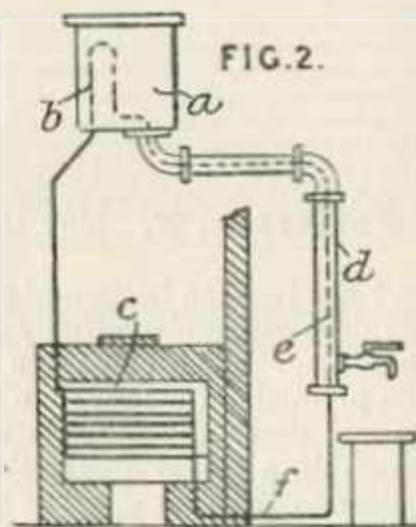
102,543. Dickie, J. Feb. 15, 1916.

Heating water; water-tube boilers.—Relates to hot-water supply apparatus of the kind in which a boiler of the coiled-tube type is connected by flow and return pipes with a cistern. A metal coiled tube A, placed in a fire-place or furnace or adapted to be heated by a gas burner, is connected to the cistern C by flow and return pipes D, E respec-



tively, each fitted with a stop-cock F, H and with a non-return valve G, I. The cistern C is provided with a feed-pipe L, an overflow pipe K, and a draw-off tap J. A number of separate coils A may be connected as described above to one cistern C.

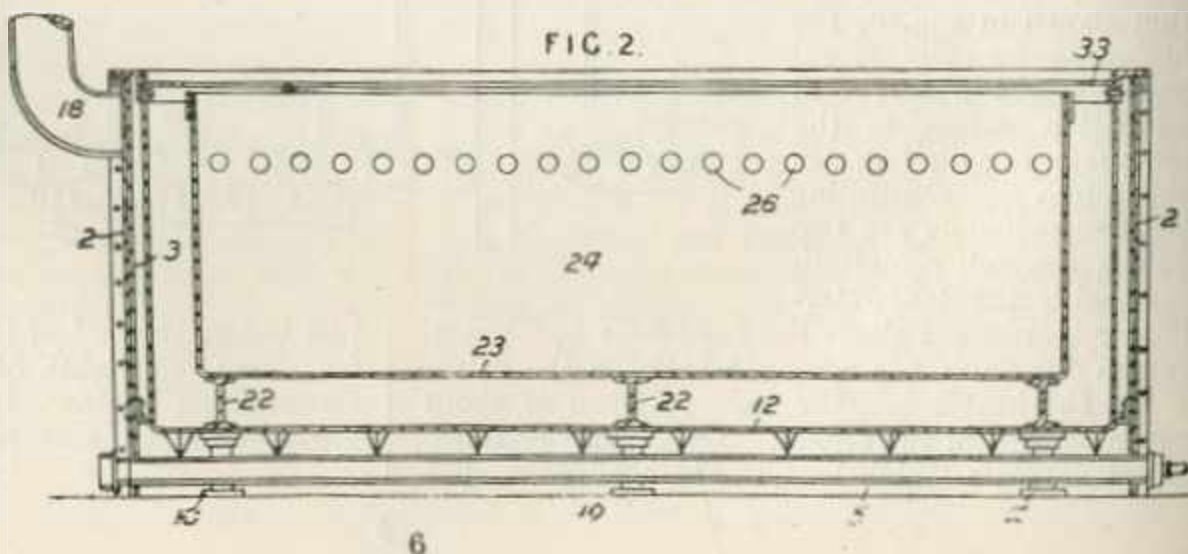
102,835. Goodyear, C. W. Jan. 13, 1916.



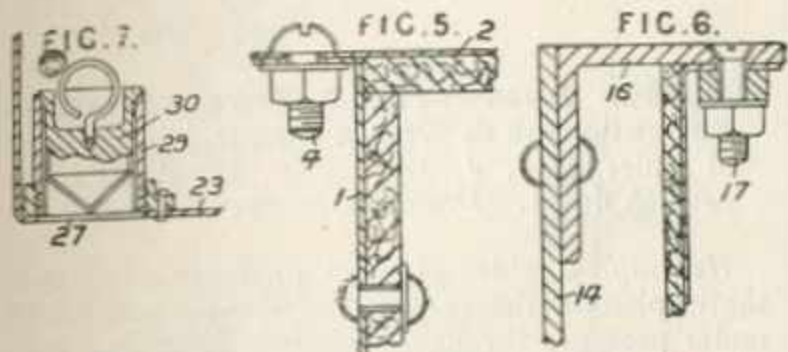
Heating liquids.—Relates to apparatus for melting and delivering resin, tar, &c., and comprising a tank a heated by steam or hot-water pipes b, and one or more delivery pipes d heated internally by pipes e or externally by jackets. According to the invention, the internal pipes e or the jackets are in a complete circuit with the source of heat, the hot water or steam being returned to the source c by a pipe f. Preferably, the pipes b of the tank are in the same circuit. Various parts of the apparatus may be lagged against loss of heat.

103,288. Parker, W. C. Jan. 12, 1916, [Convention date].

Boiling-pans and the like.—Tanks specially adapted for rust-proofing metals, are made double so that the liquid in the outer tank may be heated and may flow in the inner tank without disturbing any sediment in the latter. The inner tank 24 is supported by I-beams 22 on the bottom of the tank 12, which in turn is supported, together

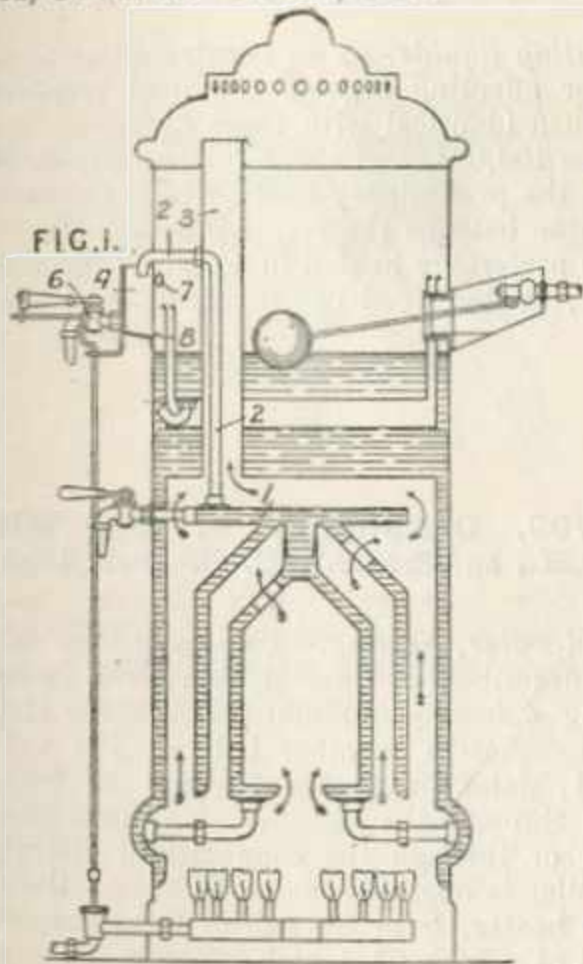


with an asbestos casing 2, 3, by pillars 10. The side and end plates 1, 2 of the casing may be secured by bolts 4, Fig. 5. The outer casing wall 2 and the outer tank wall 14 are secured by an angle bar 16 and bolts 17, Fig. 6. A gas-burner pipe 5 extends below the plate 12, and the combustion products escape by the pipe 18. The inner tank is provided with holes 26 near the top, or its rim may be at a suitable level below the top of the outer tank so that the water circulates from the outer to the inner tank without disturbing sedi-



ment in the latter. A flange 33 projecting inwards may be provided on the outer tank to prevent the liquid from boiling over. The bottom plate 23 of the inner tank is provided with an opening 27, Fig. 7, having a short pipe 29 projecting upwards and provided with a weighted valve 30. When the valve is removed, the inner tank may be slowly lifted out, so that only the bottom layer of the liquid containing the sediment remains and may then be drained out and the tank washed, upon unscrewing the tube 29.

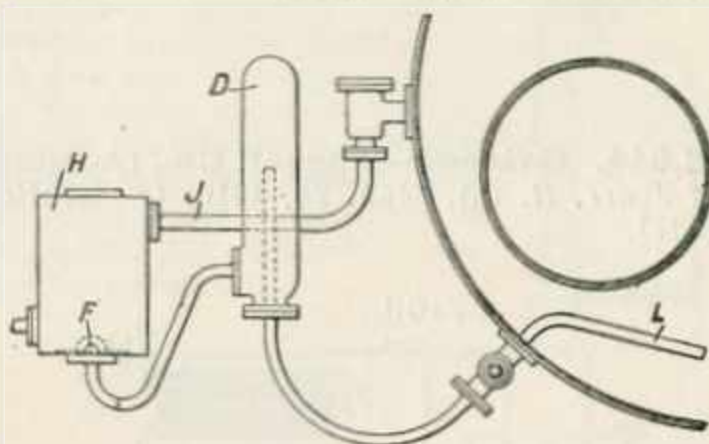
103,364. Jackson Boilers, Ltd., and Peel, J. H. N. Feb. 8, 1916.



Internally-fired boilers.—In a boiler of the kind

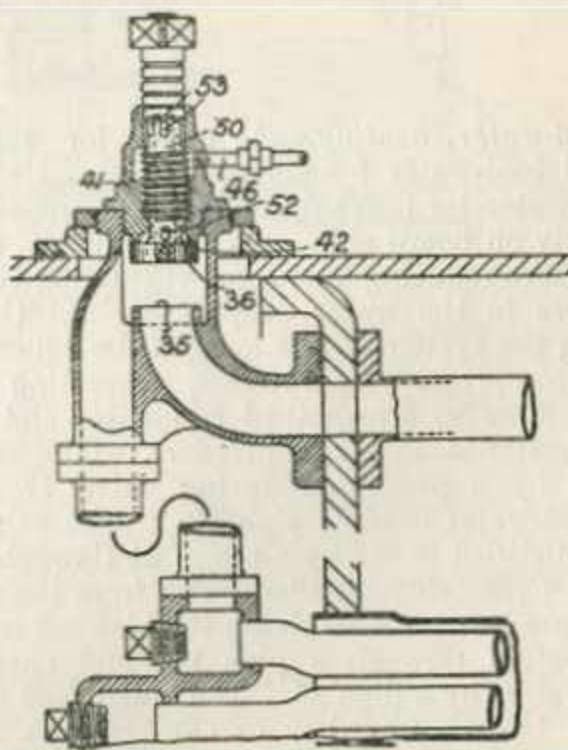
described in Specification 16804/07, the boiling water passing upwards from the top of the water-heating chambers 1 through an expansion pipe 2 in the flue 3 is delivered into an expansion chamber 4 secured to the outside of the boiler, instead of around the flue as formerly. The chamber is provided with a draw-off tap 6, and overflow and drain apertures 7, 8 are formed in the boiler shell at the side of the chamber.

103,414. Jenkins, D. J. May 19, 1916.




Feed-water, heating.—A feed-water heater and circulator for a boiler comprises a mixing-vessel H, means to pump feed-water into such vessel intermittently, a hot-water supply pipe L fitted with an air chamber D delivering water from the lower part of the boiler through a non-return valve F to the vessel H, and a pipe J for discharging water from the vessel to the boiler.

103,534. Willans, G. H., and Luard, E. S. Feb. 3, 1916.



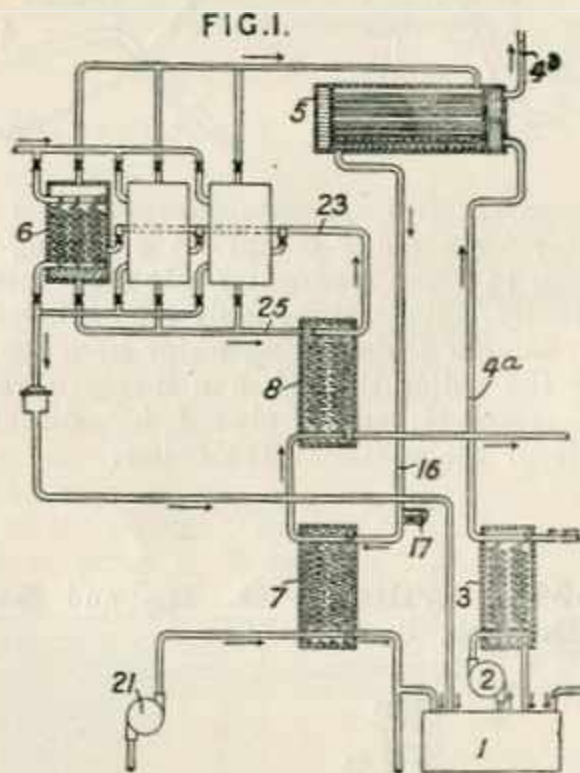
Feed-water, heating.—In a feedwater-heater, or in a combined feed-water heating and boiler-water circulating apparatus for locomotive and



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other boilers, the water outlet is controlled by a valve formed with relief passages, so that when the valve is closed to cut off the flow of water into the boiler, the relief passages place the heater in communication with the atmosphere. The valve 36 is shown applied to the heating and circulating apparatus described in Specification 4085/15. When the valve head 42 is screwed down on to the end of the boiler inlet pipe 35, the heater is open to a relief pipe 46 through radial passages 52, 53 and a longitudinal passage 50 in the valve stem. When the valve is open, the head is seated against the bottom of the valve casing 41. The outlet end of the relief pipe is carried to a position where it is visible to the engine-driver.

103,644. Griscom-Russell Co., (Assignees of Jones, R. C.). Jan. 26, 1916, [Convention date].



Feed-water, heating.—A plant for supplying heated feed-water for steam-boilers and also distilled water for make-up and other purposes, particularly on board ship, comprises means, such as a pressure-reducing valve, for regulating the temperature in the water evaporator, and thus adjusting the system to the load on the boiler. The plant comprises evaporators 6 generating steam, which flows to a combined condenser and boiler-feed heater 5 under a pressure which may be varied by a pressure-reducing valve 17 on the distilled-water outflow pipe 16. The salt water to be distilled is fed by a pump 21 through a pre-heater 7 receiving distilled water from the pipe 16 and a pre-heater 8 receiving the blow-off from the evaporators through a pipe 25, and enters the evaporators by a pipe 23. The boiler feed is withdrawn from a filter-box or storage tank 1 by a pump 2 and is forced through a heater 3 receiving exhaust steam from the auxiliary engines and thence through a pipe 4^a to the condenser and feed-heater 5, passing to the boiler by a pipe 4^b.

The tank 1 is supplied with water of condensation from the main condensers, the heater 3, and the heating-coils of the evaporators, and also with a portion of the distilled water. In examples, the valve 17 is set at 43 lb. pressure for full load and at 50 lb. for cruising speed, the corresponding evaporator temperatures being 290 and 297° F. and the boiler-feed temperatures being 265 and 282° F.

103,664. Aylsworth, A. M., and Savings Investment & Trust Co., (representatives of Aylesworth, J. W.). Jan. 24, 1916, [Convention date]. Drawings to Specification.

Heating liquids.—In the production of synthetic phenol, the reacting substances are forced under pressure through a coil immersed in a bath of fused sodium nitrate, which serves as the heating means.

The Specification, as open to inspection under Sect. 91 (3) (a) states also that the bath of fused sodium nitrate is useful as a heating-means in various processes. This subject-matter does not appear in the Specification as accepted.

103,665. Aylsworth, A. M., and Savings Investment & Trust Co., (representatives of Aylesworth, J. W.). Jan. 24, 1916, [Convention date]. Drawings to Specification.

Heating liquids.—Two constructions of apparatus for effecting organic chemical reactions are described identical with those described in Specification 103,664, and also a further modification in which the preliminary heating-coil is immersed in the same bath as the reaction coil. The reaction coil is preferably heated in a bath of fused sodium nitrite, as described in Specification 110,547.

103,709. O'Donnell, J. P., Willans, G. H., and Luard, E. S. Feb. 18, 1916.

Feed-water, heating.—Relates to the valve devices described in Specification 4085/15 for controlling a feed-heater and boiler-water circulator in a locomotive or other boiler. The valve 45, Fig. 1, determining the passage of feed-water either through the connexion 7 into the feed-heater or through the connexion 9 directly into the boiler is operated, so as to cut off the supply to the heater, from the cab of the locomotive by means of a cock 68, which controls the supply of steam to a cylinder containing a piston 63 on the valve spindle. The stop valve 36 on the outlet 30

from the feed-heater is similarly operated by steam pressure acting upon a piston 72 on the end of the hollow stem 71. The valves may be maintained in their open positions by springs, or the inlet valve may be positively operated by

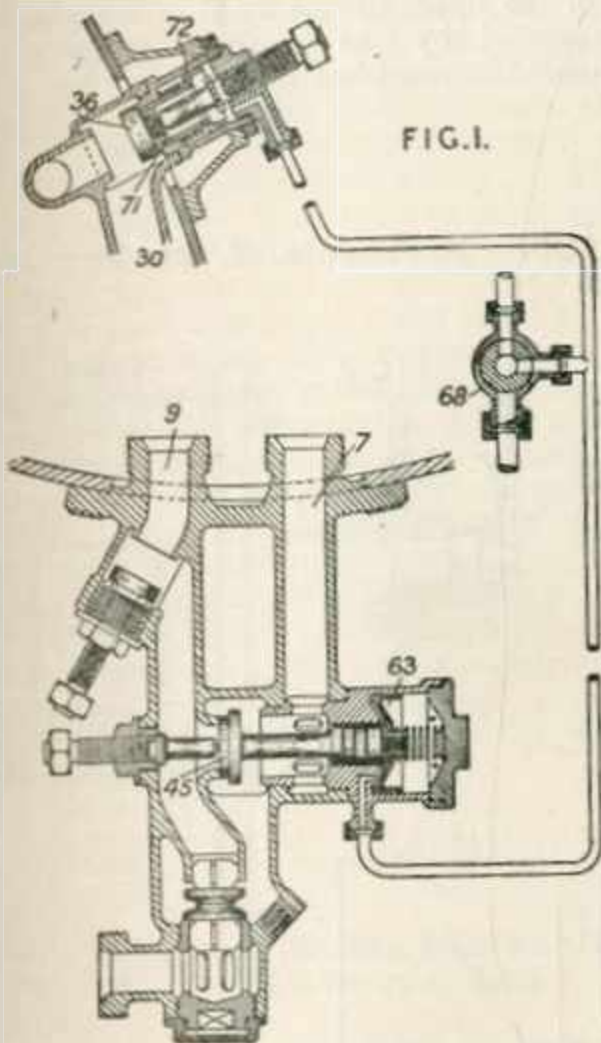


FIG. 1.

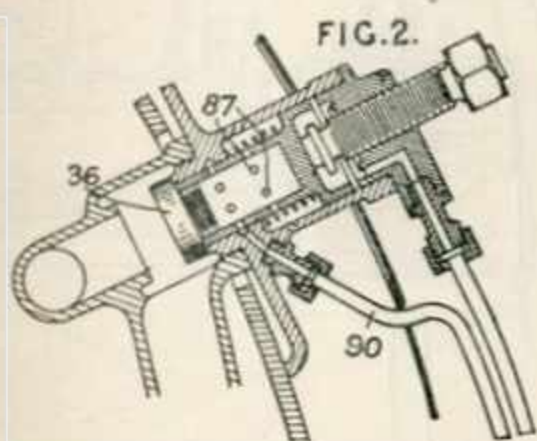


FIG. 2.

steam pressure acting on either side of the piston. The stop valve 36 may be provided with relief passages 87, Fig. 2, for placing the heater in communication with the atmosphere, through the pipe 90, when the valve is closed.

103,840. Coffin, A. G. Feb. 2, 1916.

Heating water. — Relates to water-heating apparatus for two separate circulating systems, of the kind comprising a boiler H and a superposed tank G, the water in which is heated by the circulation of water from the boiler through the tank. The boiler and tank are connected together by a flanged tubular piece E fitting over the end of a chamber C in the tank and having a partition separating the ends of the flow and return pipes D, T for the boiler water circulating through the chamber. The flow pipe of a circulating system using the boiler water is connected to an opening A in the side of the tubular connexion.

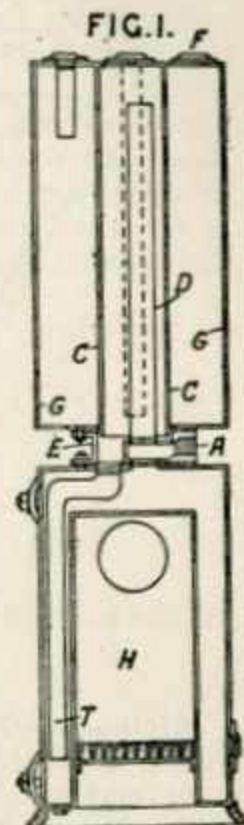
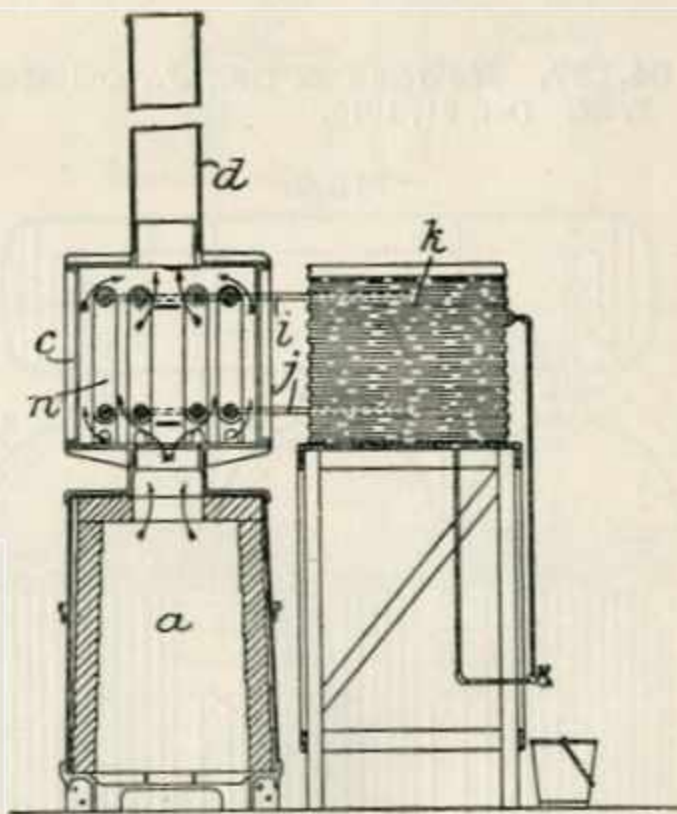


FIG. 1.

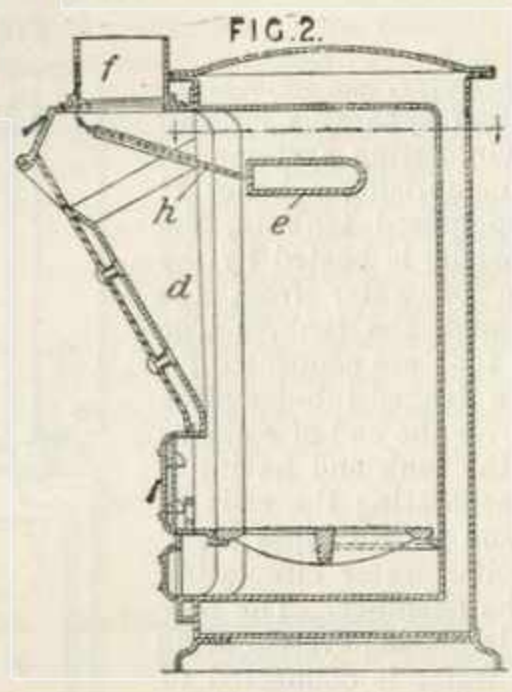
103,875. Watson, G. Aug. 16, 1916.



Heating water. — A casing c, removably disposed between a portable refuse-destructor a and its chimney d, contains water compartments n connected in series by tubes. Pipes i, j connect the compartments n to a reservoir k, from which the water may be drawn off.

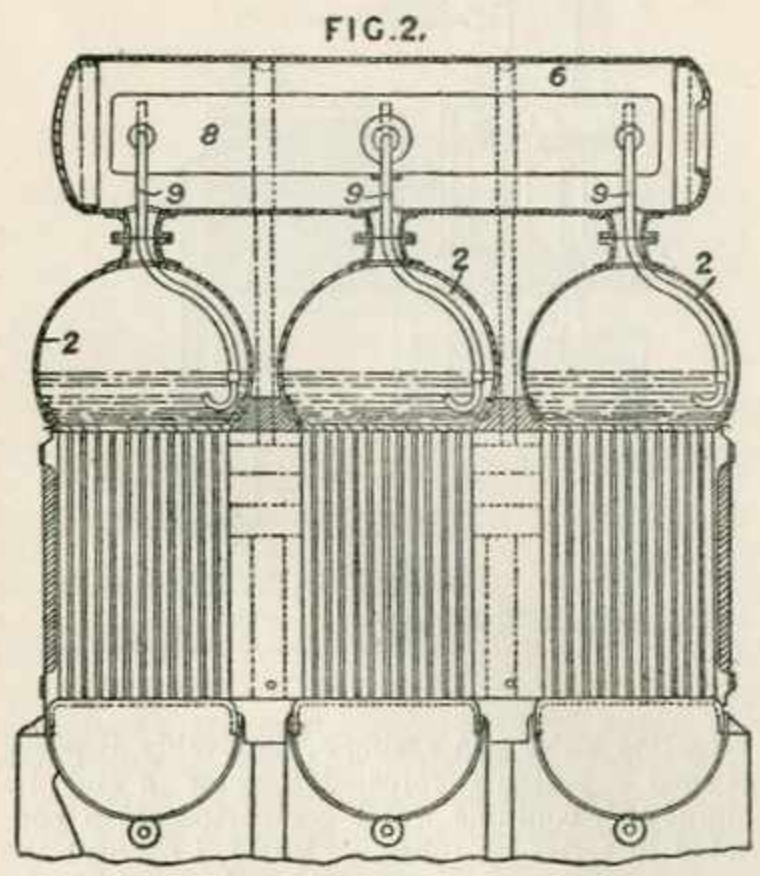


ULTIMHEAT[®] 103,899. **Marshall, L.** March 21, 1916.
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Internally-fired boilers.—In a vertical boiler with a fuel-feeding hopper *d* at one side and a transverse water tube or plate *e* at the upper part of the furnace space, a baffle-plate *h* is provided, extending from the tube or plate *e* to the upper front edge of the hopper, so that the furnace gases pass above the tube or plate *e* and the plate *h* to the flue outlet *f* located above the hopper. The upper water-way of the boiler may be extended upwardly and fitted with a cross-pipe, through which pass the gases from the outlet *f*.

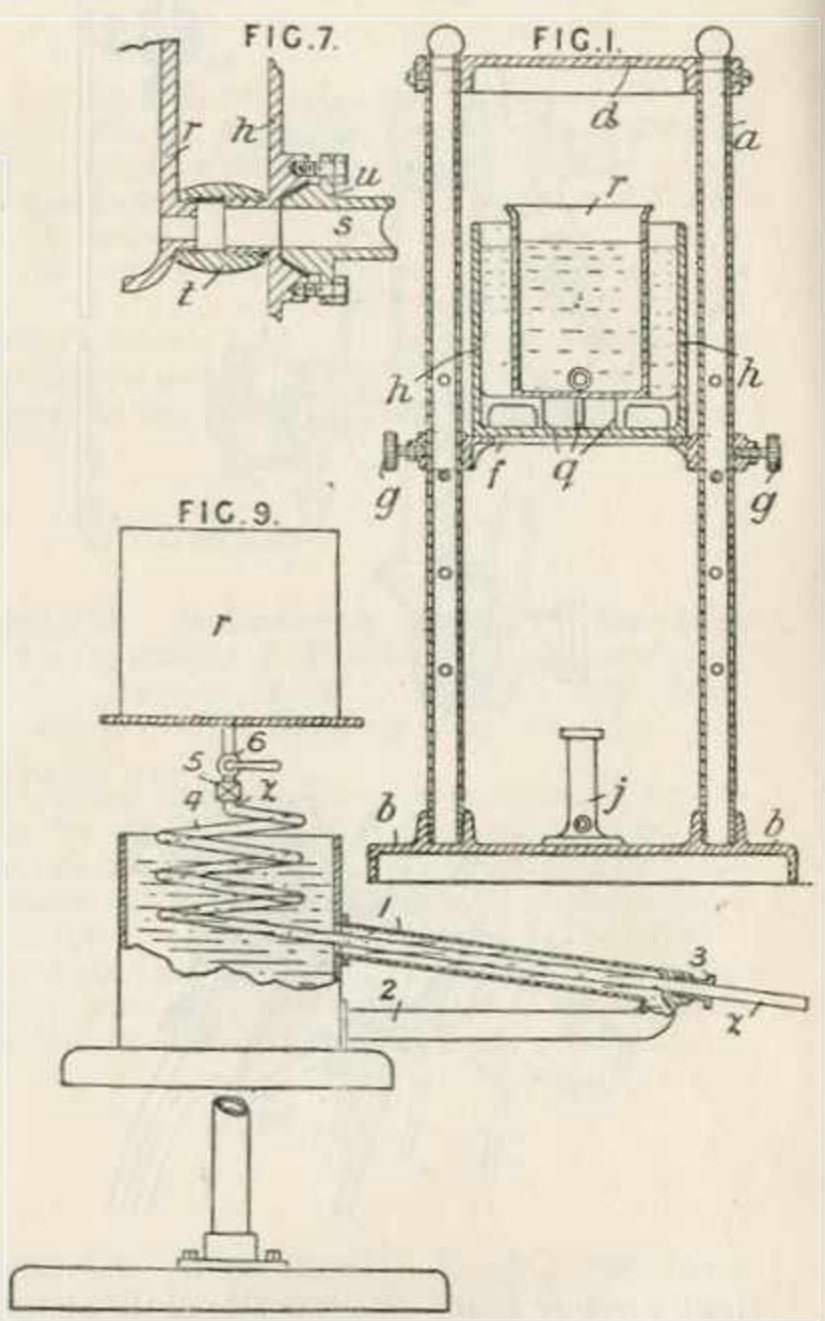
104,137. **Howden & Co., J., and Hume, J. H.** Oct. 21, 1916.



Feed-water, heating.—In a steam-generator

built up of sections consisting of upper and lower drums connected by vertical water-tubes as described in Specifications 26330/08, 27449/10, and 5383/12, [Class 123 (ii), Steam-generators], the feed is heated and distributed by supplying it to a receptacle 8 placed in the steam-receiver 6 and having feed-tubes 9 depending into each of the upper drums 2. The receptacle may be traversed by one or more tubes to afford additional increased heating-surface.

104,190. **Macardle, J. St. P.** Jan. 18, 1916.



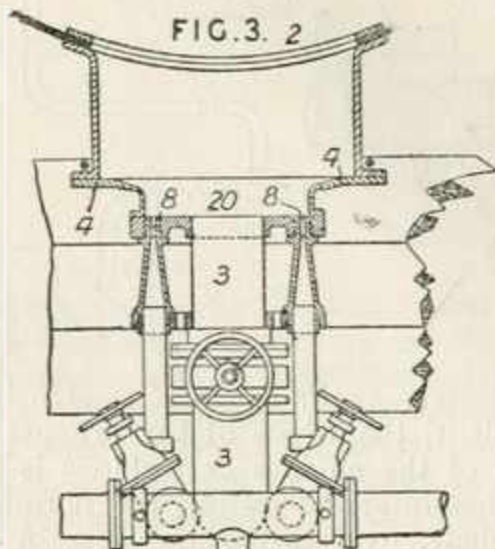
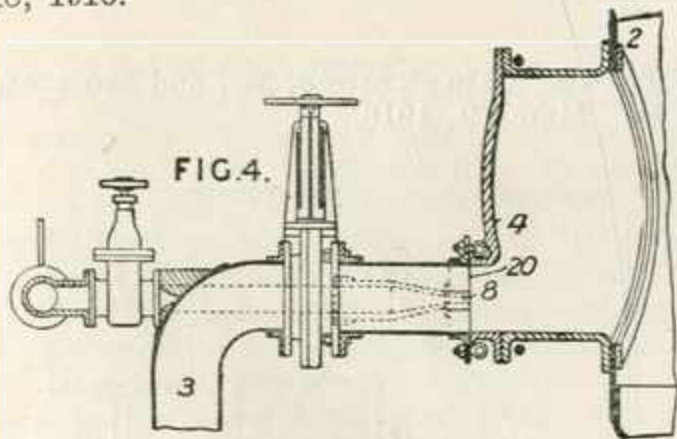
Heating liquids.—Relates to apparatus, particularly adapted for use in the treatment of wounds by the passage over them, or by the injection, of a saline liquid, wherein the temperature of the liquid is maintained constant by means of a heating-liquid in a bath provided with a thermostat. Upon uprights *a*, Fig. 1, suitably supported in a base-plate *b* and coupled by a cap or frame *d*, an annular ring *f* is held at the desired height by means of set-screws *g* and carries the bath *h*, which is heated by a burner *j* controlled by a thermostat within the bath and encloses the



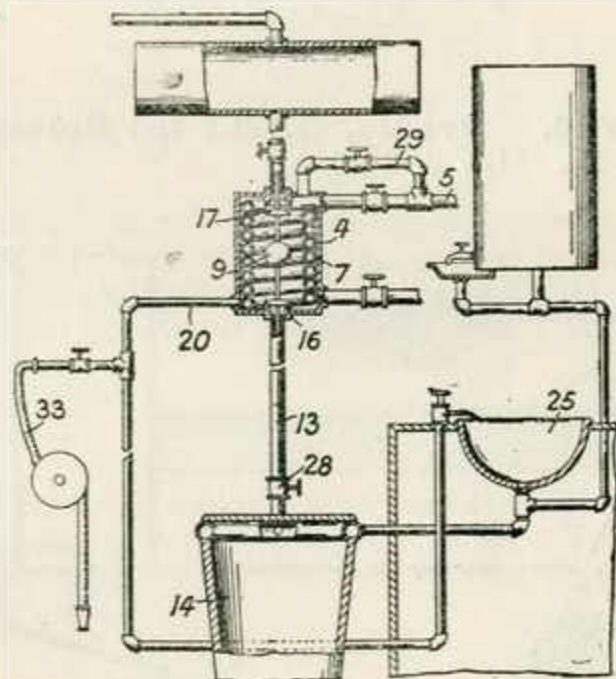
vessel *r* for the saline solution mounted on supports *q*. In modified constructions, the annular support *f* is raised and lowered by screw or belt gear. The delivery spout *s*, Fig. 7, from the lower part of the vessel passes through the wall of the bath by means of a gland *u* and a flexible joint sleeve *t*. Thermostatic apparatus of the kind described in Specification 22595/11, [Class 64 (ii), Heating systems &c.], may be employed, and the whole arrangement enables different delivery velocities to be obtained, as required in the spraying of septic wounds with saline solution at from 100 to 120° F. Fig. 9 shows a modification in which the main saline-solution vessel *r* is outside the bath, and the delivery pipe *z* descends from beneath it as a coil 4 immersed in the heating-bath *h* and issuing therefrom through a jacket with overflow 1 and return flow 2 for the liquid in the bath, and a gland 3, in order that the temperature of the solution may be maintained almost up to the point where the delivery tube passes beneath the patient's bedclothes. A drip-gauge and cock 5, 6 may be provided, and in further modifications, the bath-supporting upright may be telescopic, or the reservoir for saline solution may be adjustable with respect to a fixed bath, the pipe *z* supplying the heating-coil being flexible or telescopic, or, alternatively, communication being made by way of the telescopic uprights.

Digesters.—Digested esparto grass or the like is disintegrated and removed from the digester by subjecting it to the action of jets of water under pressure. Water nozzles 8 and a discharge pipe 3 are secured against an opening 20 in the discharge cover 4 of a digester 2. The discharge pipe may be connected to the discharge main through a flexible connexion. The jets of water may be directed downwards through the filling opening against a conical projection on the bottom of the digester.

104,578. Wallace, W. M., Marshall, T., Brown, A., and Bertrams, Ltd. April 18, 1916.



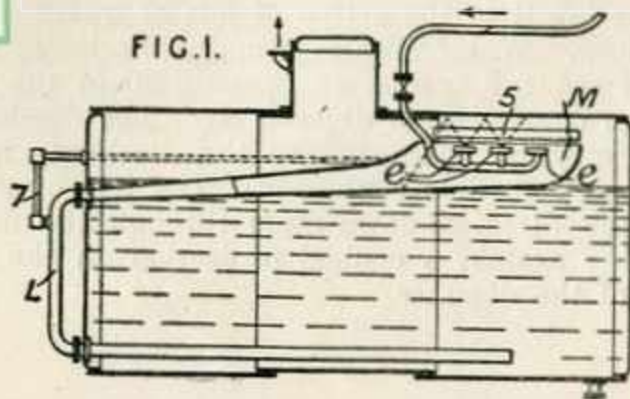
104,709. Gonsouland, H. P. March 10, 1916.



Heating water.—Apparatus for providing hot water in the lavatory of a railway carriage or the like comprises a steam-heated water-heater 4 having a hot-water outlet pipe 13, shown discharging into the closet pan 14, and an outer pipe 20 for supplying hot water to the basin 25 or to a flexible branch pipe 33. The water is heated by a steam coil 7. A valve-controlled by-pass 29 on the steam-pipe 5 may supply steam through the heater to the branch pipe for use in cooling bearings and for other purposes. When the water-level in the heater rises above a certain height, a float 9 closes the inlet valve 17 and opens the discharge valve 16. When the closet pan is flushed by opening the valve 28, the water-level in the heater falls, and the valve 16 is closed.

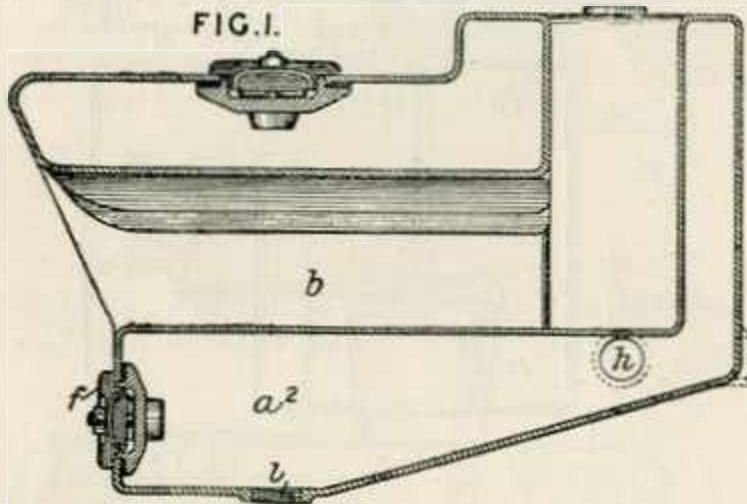


104,755. **Winer, I. P.** March 24, 1916.

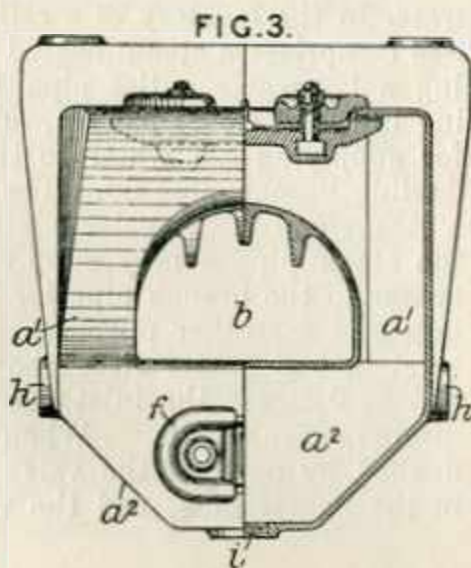


Feed-water, heating.—Feed-water enters the boiler through spraying-nozzles *e* above a tobacco-pipe shaped receptacle *M*, the stem *L* of which opens into the lower part of boiler. A gauge *7* is provided for indicating the water-level in the receptacle. Ledges *5* conduct water sprayed upon the boiler walls into the mouth of the receptacle.

104,786. **Brodie, G. G., and Coleman, A. B.** May 9, 1916.

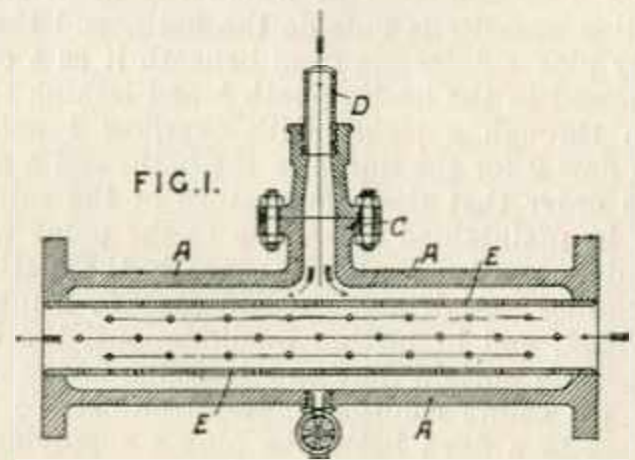


Block - form boilers. — A kitchen - range boiler, having an arched or **D**-shaped flue the bottom of which is approximately level with the grate of the fire-box, is provided with a well portion *a*² below the flue *b*, into which the waterway spaces *a*¹ at the sides of the flue open, and such well portion is provided with a cleaning-opening normally closed by a cover *f*. The bottom of the well is inclined at the rear, as shown in Fig. 1, and the inflow pipe or pipes may be connected at *h* to deliver water near the top of



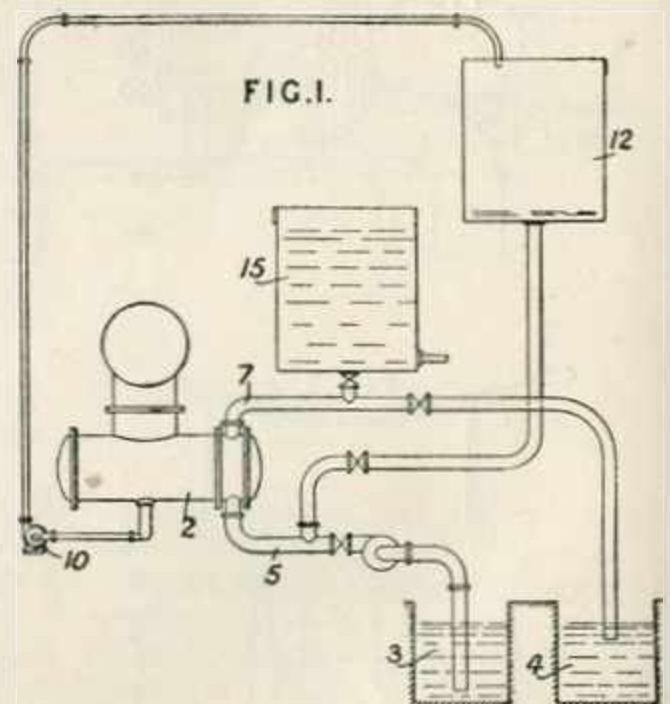
the slope. A screwed hole *i* in the bottom of the well serves to receive a sludge pipe and cock or a screw plug adapted to uncover a branch discharge pipe. The front of the boiler above the grate is inclined forwardly to overhang the fire, and the flue *b* may be fitted with a detachable grating to support the fire.

104,991. **Savage, C., and Green, F. W.** June 24, 1916.



Feed-water, heating.—To preheat the water supply to a fuel-economizer, the inlet pipe is fitted with a length of piping *A* having an internal concentric perforated tube *E*, and a branch *C* coupled up with a hot-water return pipe *D* from the economizer.

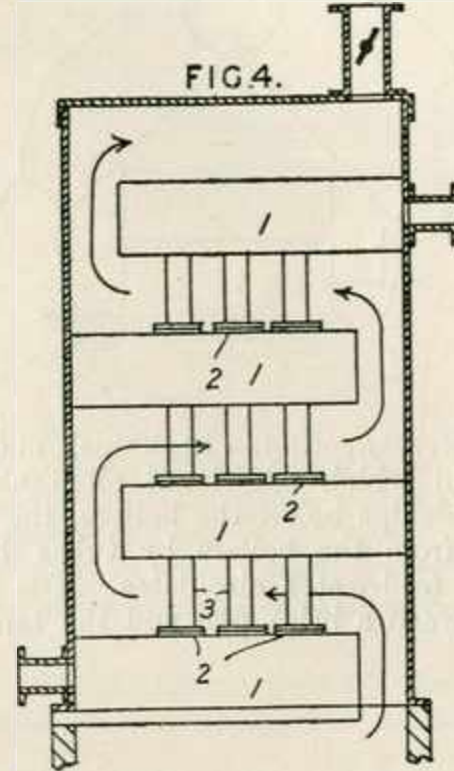
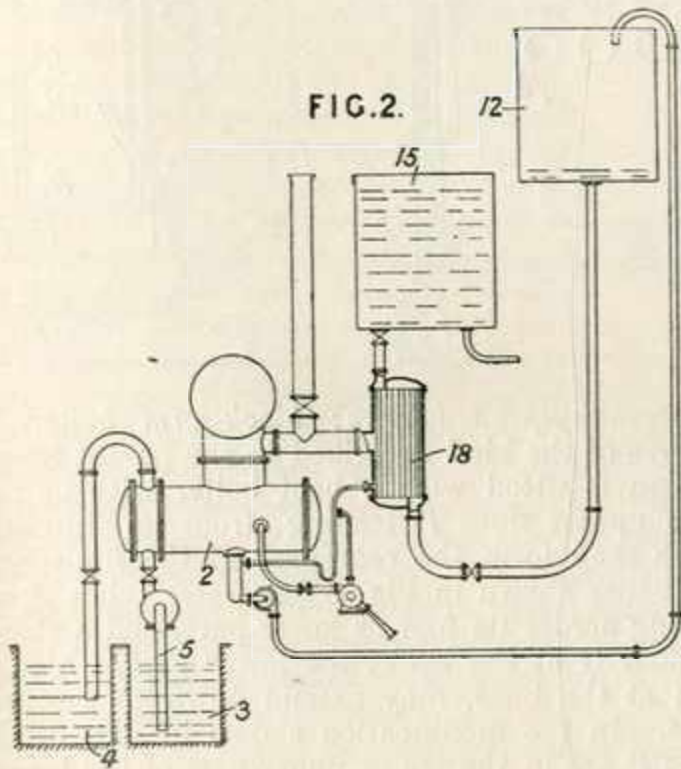
105,248. **Blackmore, R., and Baumann, K.** March 9, 1916.



Feed-water, heating.—In a condensing steam-power plant, the whole of the exhaust from one or more of the engines or turbines is condensed at suitable intervals during the normal running of the plant, by feed-water, either in the main

condenser or in an auxiliary condenser, the flow of circulating water through the condenser being cut off. The cold-feed tank 12, Fig. 1, and the hot-well 15 are in valve-controlled communication with the pipes 5, 7, through which water is circulated through the condenser 2 from the culvert 3 to the culvert 4. A pump 10 delivers the condensed steam to the feed-tank. An auxiliary condenser 18, Fig. 2, may be provided for use exclusively as a feed-heater. Water is not circulated through the main condenser 2 when the auxiliary condenser is in use. The main condenser may be partitioned, one or more parts serving as an auxiliary

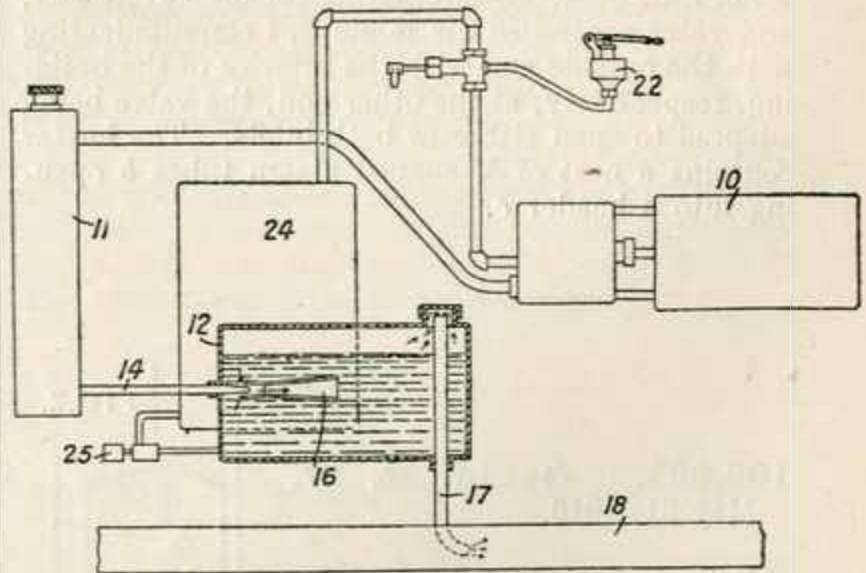
the superposed tanks or elements, each being fitted with one or more pipes 3 cast in one piece therewith or secured thereto, and formed with holes and bosses 2 in line with the pipes. Doors may



be formed in the casing to enable articles to be placed in the flue on the tanks, thus forming an oven or cooking-stove; or each tank may be in the form of a water jacket around an oven.

for use in the manner described above. The condensers may be of the direct-contact type, and the feed-water may be passed through a condenser several times. The apparatus may be provided with two hot-wells, the pipe connexions and valves being so arranged that water may be withdrawn from one of the wells for supply to the boiler while the other well is being filled with condensed steam, and vice versa. In a further modification, the flow and return pipes for the feed-water are connected to the same tank, into which the condensed steam is discharged.

105,554. General Engineering Co., (Assignees of *Doble, A.*). April 8, 1916, [Convention date]. Void [Published under Sect. 91 of the Act].



105,319. White, W. B. Jan. 5, 1917.

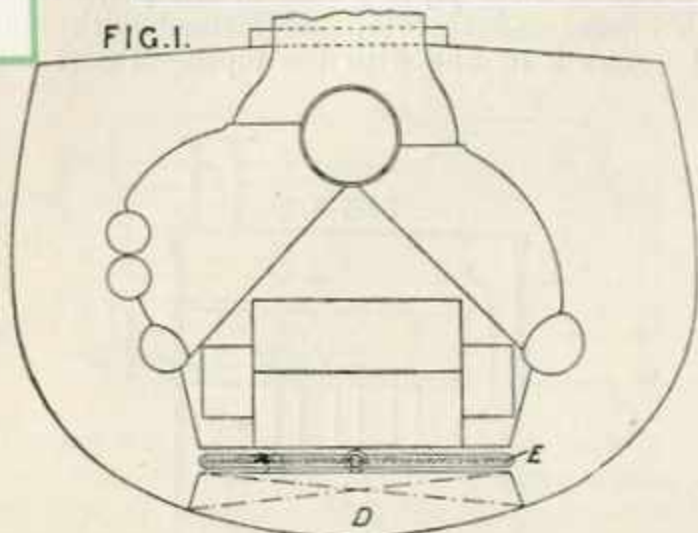
Boilers.—A boiler for heating water and for warming greenhouses, churches, and other buildings comprises a series of superposed tanks 1 enclosed in a casing through which are passed the hot gases from a fire or from a gas or oil stove; the tanks are connected by vertical pipes 3 and staggered to form a sinuous path for the hot gases. The boiler may be built up from any number of

Feed-water, heating. — In a steam-power plant for motor-vehicles, exhaust steam from the engine 10 is condensed in a radiator 11 at the front of the vehicle, and the water passes through a pipe 14 to a reservoir 12, from which a feed pump 25 supplies the steam generator 24. A Venturi tube 16 is placed in the reservoir to prevent noise if any uncondensed steam enters the water.



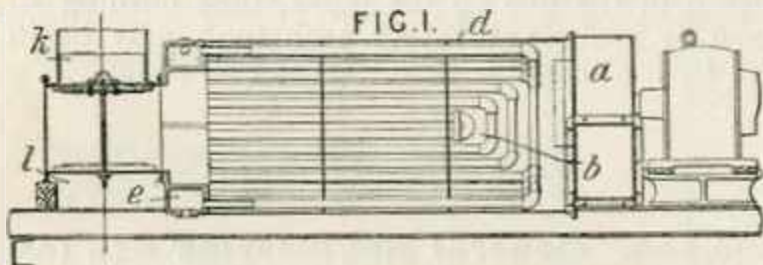
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105,727. **Yarrow, H. E.** Dec. 8, 1916.



Feed-water, heating.—In ships, such as destroyers, in which additional oil tanks D are placed amidships below the boilers, the tanks are separated from the boilers by tubes E through which the feed-water circulates. The tubes are placed between a brick pan and the tank

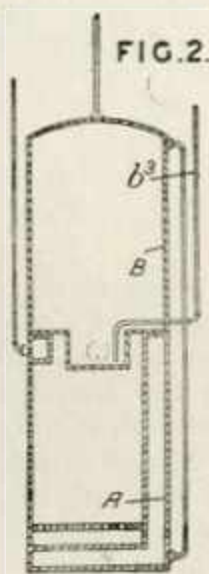
105,790. **Nesbit, D. M., and Snodgrass, D. G.** April 25, 1916.



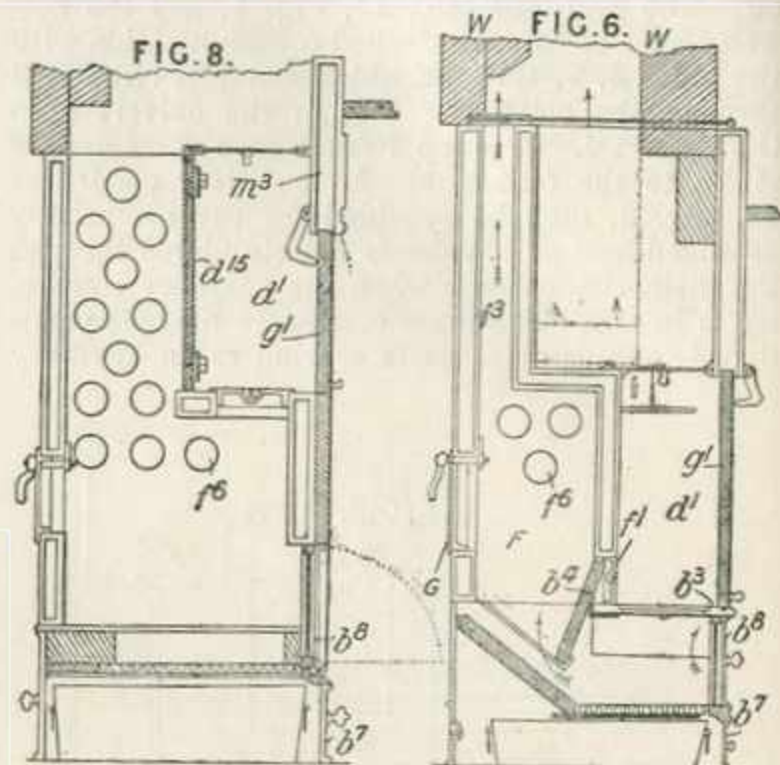
Heating air.—Apparatus for heating and ventilating buildings comprises an air heater *d* having a fan *a* or other air-circulating means at one end, and valve-controlled air inlets *k*, *l* communicating with the outside and with the interior of the building, respectively, at the other end, the valve being adapted to open either or both inlets. The heater contains a nest of U-shaped steam tubes *b* opening into a header *e*.

105,821. **Gould, H. W.** May 31, 1916.

*Boilers of the kind having primary and secondary heaters A, B for heating and circulating water, have the cold water from the supply cistern fed with the lower part of a secondary heater B as by a pipe *b*³.*

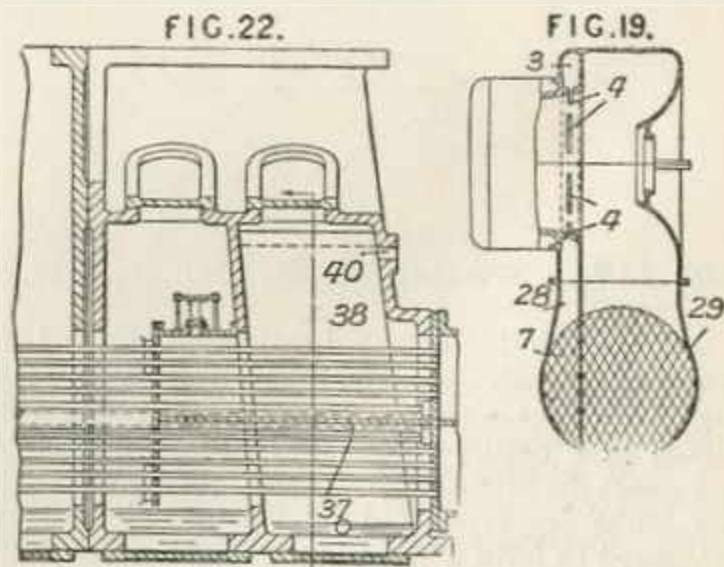


106,015. **Rutter, J. M.** June 24, 1916.
Addition to 17829/15, [Class 126, Stoves &c.]



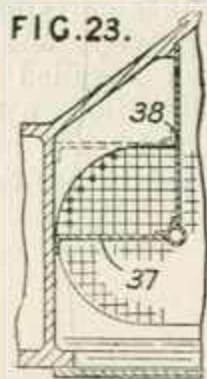
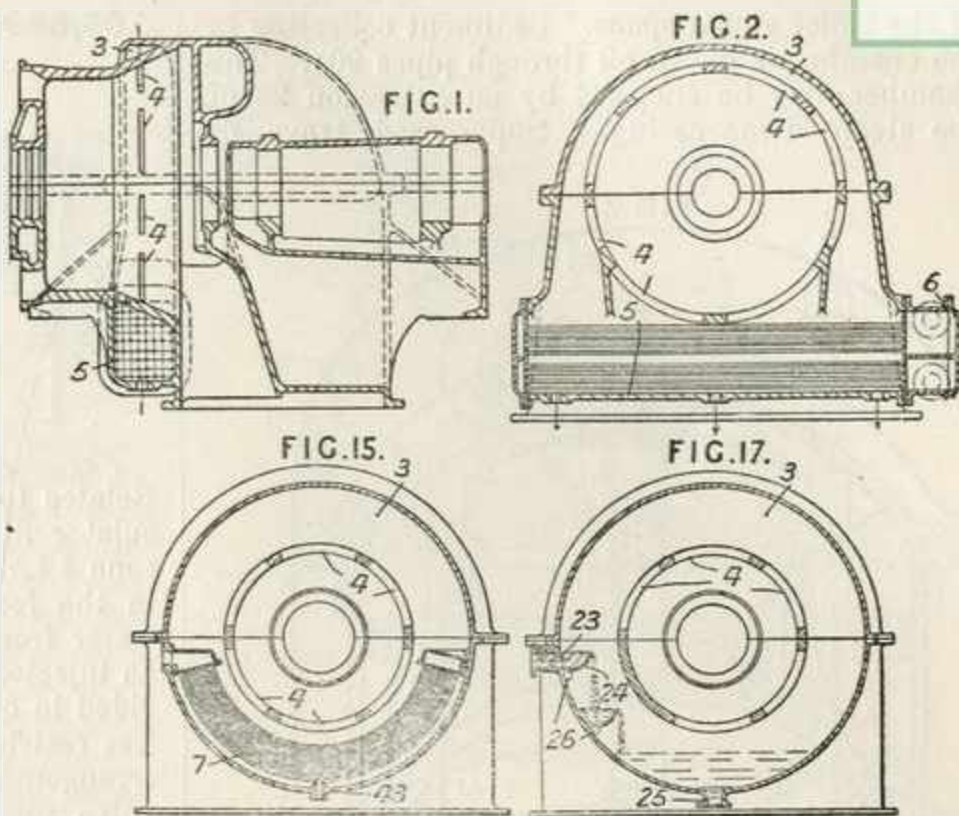
Internally-fired boilers; block-form boilers.—A stove of the kind described in the parent Specification is fitted with a boot boiler with one or more upcast flues *f*³ leading from its interior, which may form the rear part of the fire-space. The boiler shown in Fig. 6 has water tubes *f*^a extending across its foot or lower part, and a stocking-door *G* at the back; the lower part, which is open at the base, may extend down to the fire-grate. In the modification shown in Fig. 8, the tubes *f*^b are in the leg or upper part of the boiler, the lower part of which forms the whole of the fire-space. The front of the upper part is closed by a plate *d*¹⁵ secured by hook-ended bars and screws. Apertures through the water space are provided with doors to give access to the interior from either apartment. In another arrangement the leg of the boiler is situated on the parlour side, and the fire-grate is immediately beneath it.

106,104. **Baumann, K.** Feb. 12, 1916.



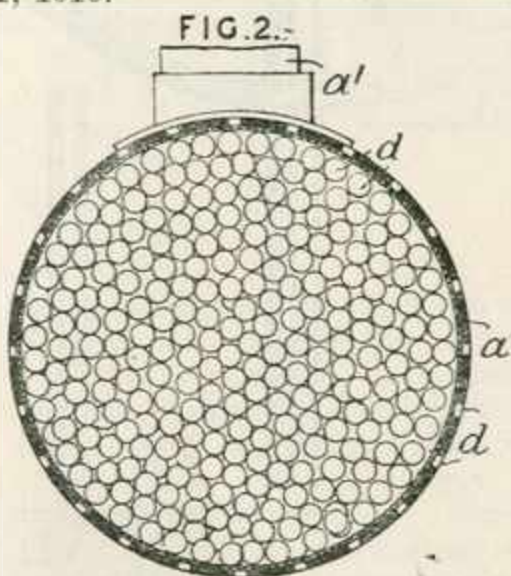


Feed-water, heating. — Relates to condensing steam-turbines having a steam belt or chest partially or wholly surrounding the turbine casing and receiving a portion of the steam flowing through an operative low-pressure stage, and consists in arranging a feed-water heater in said steam belt or an extension thereof, or in a separate compartment formed within the condenser shell or in an extension thereof and directly connected with the steam chest. Slots 4, Figs. 1 and 2, conduct steam tapped from a low-pressure stage to a belt 3 which is extended to form a compartment 5 for a feed-water heater 6 of known construction. In a modification, the compartment 5 is placed between the modified exhaust casing and supporting feet described in Specification 105,933. Drains may be provided to conduct to the compartment 5 hot condensate and leakage steam from those parts of the turbine operating above the pressure in the feed-water heater. Surface heaters and direct contact heaters are described. A surface heater with curved tubes 7 and a weir 43 is shown in Fig. 15; another set of heating tubes may be arranged in the upper half of the steam belt 3, a suitable shield being provided to prevent water of condensation falling through the slots 4. A direct contact heater is shown in Fig. 17, the feed-water passing through an inlet 23 and over weirs 24 to an outlet 25, and air &c. being led away through outlets 26. The heater tubes 7, Fig. 19, may be arranged within a partitioned-off portion 28 of the condenser shell 29, the portion 28 being directly



connected with the steam belt 3. Arrangements are described for conducting the condensed heating steam, vapours &c. from the heater compartment to the discharge outlet of the condenser. A portion of the heater, for example the final portion of the fourth flow, may be partitioned off by plates 37, 38, Figs. 22 and 23, so that steam at a higher temperature from another source, such as gland or leakage steam from the turbine, may be admitted by an inlet 40 for heating the feed-water after it has been heated by steam from a low-pressure stage of the turbine. More than one heater may be provided in the steam belt or compartment communicating therewith, and steam may be taken from two or more operative stages of the turbine into appropriate belts and supplied to separate heaters, the water circulating through them in series.

106,193. Phillips, J. E., and Wheatcroft, F. C., (trading as Gapp & Co., J. B.). Aug. 1, 1916.



Heating liquids.—To lessen the noise made in heating a liquid by passing steam into it, the end

of the steam pipe a' is fitted with a transverse, perforated, cylindrical chamber a closed at its ends and packed with lead shot or other small balls d . The chamber may be lined with gauze.

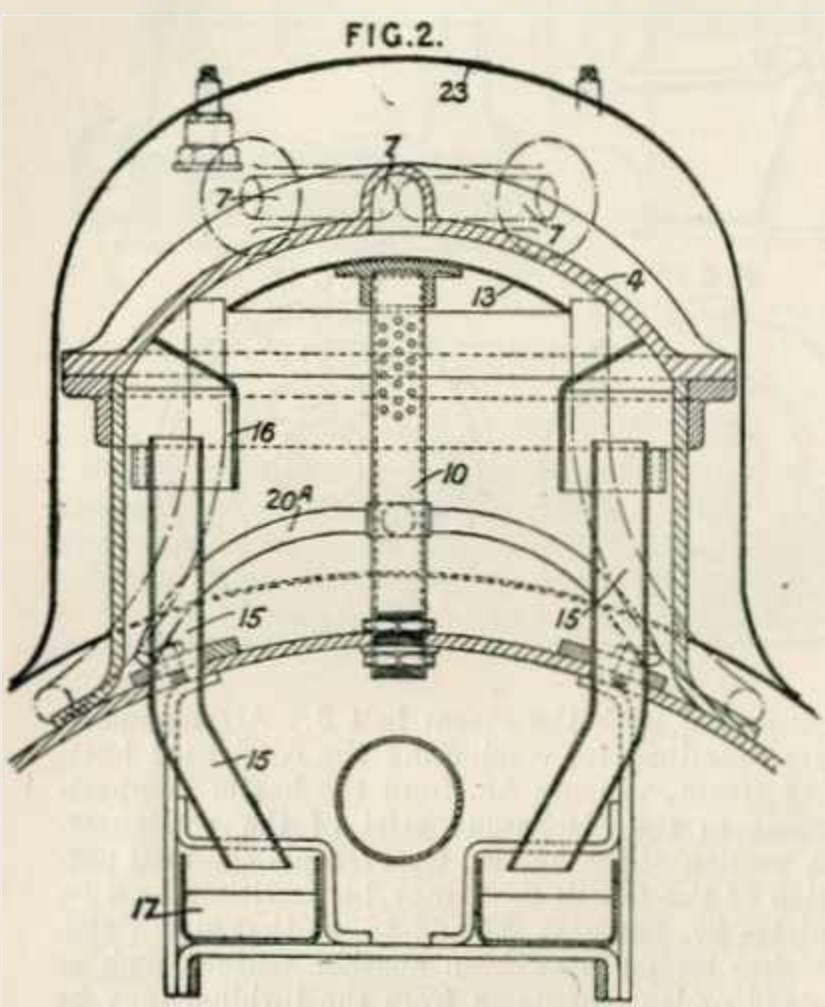
106,303. Gresley, H. N. May 12, 1916.

Feed-water, heating.—In a locomotive or like boiler, the feed-water is delivered through a pipe 7 into a chamber 4 mounted on the boiler barrel, and is heated by boiler steam led into the chamber through a perforated pipe 10. A dished plate 13 for spreading or spraying the water is mounted on the top of the pipe 10. The heated water flows into the boiler through pipes 15 projecting into the vessel and having hoods 16 over their ends to prevent the incoming water from passing directly into the boiler. The water may flow into trays 17

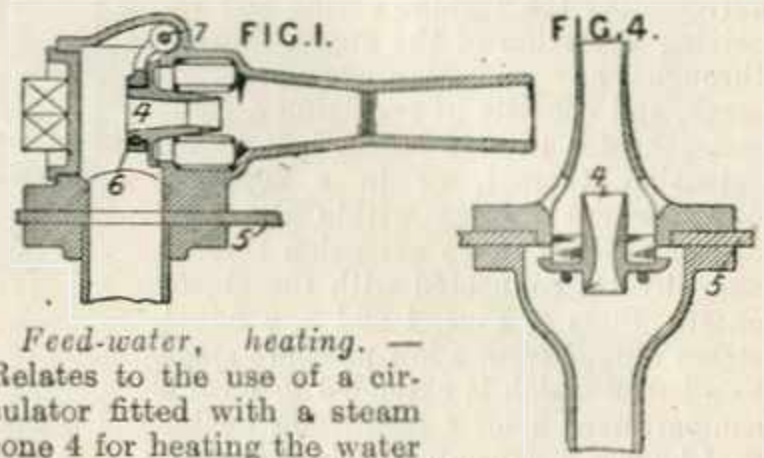


the boiler steam space. Sediment collecting in the chamber is blown off through pipes 20A. The chamber may be enclosed by an extension 23 of the steam dome casing. Superposed trays or

106,529. Brooke, R. G. May 23, 1916.



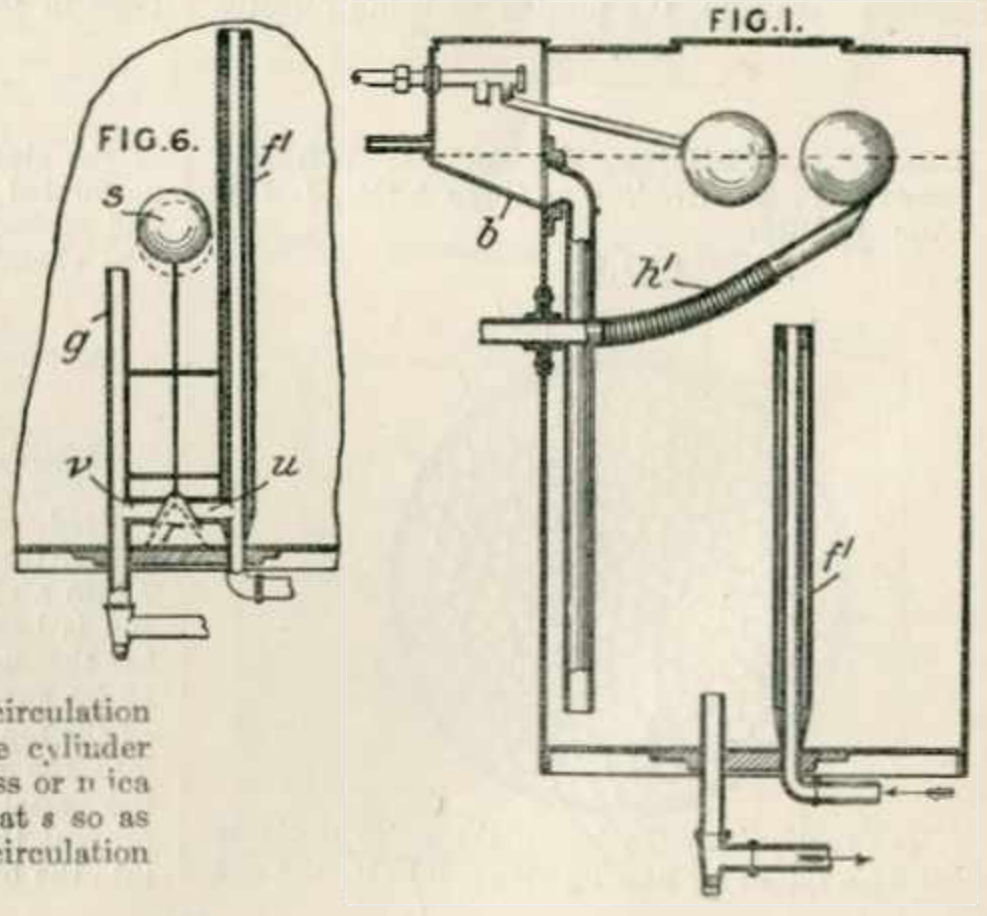
plates may be fitted in the chamber around the steam pipe to compel the water to flow backwards and forwards in thin layers in contact with the steam.



Feed-water, heating. — Relates to the use of a circulator fitted with a steam cone 4 for heating the water in the feed-tank 5. To facilitate the supply of water from the tank 5 to the boiler by means of an injector (not shown), a non-return valve is provided in conjunction with the cone 4 to provide a less restricted passageway for the water. In one arrangement, Fig. 1, the cone 4 is formed in the valve member, which is carried by a frame 6 hinged at 7. In a modification, Fig. 4, the valve member carrying the cone 4 is arranged to open by gravity, and to close under the pressure of steam supplied to the circulator. In a further modification, a non-return valve is mounted adjacent to, but independent of, the cone 4, which is fixed in position.

106,683. Coleman, A. B. June 2, 1916.

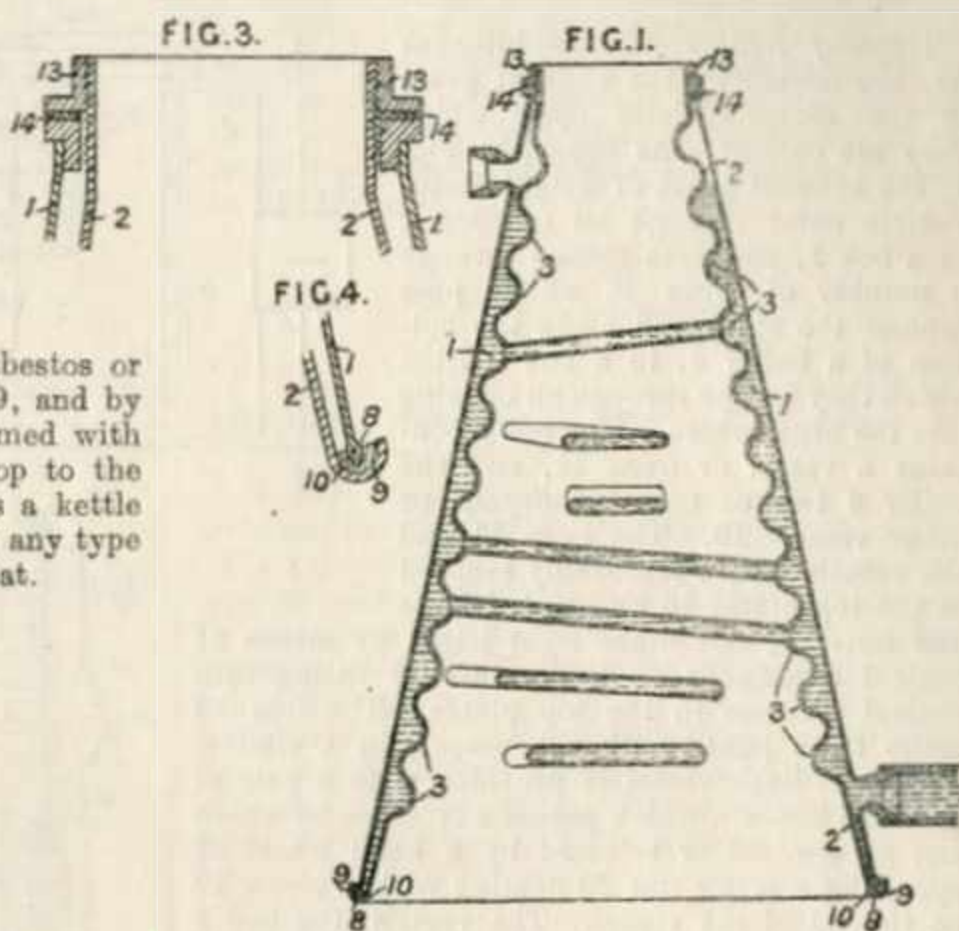
Heating water; water supply and delivery.—In a domestic hot-water-supply apparatus having only a single tank or cylinder in connexion with the boiler, the cylinder having a float-controlled extension of the draw-off pipe, this extension is wholly or partly formed of a flexible pipe h^1 , Fig. 1, or consists of a pivoted pipe with stops to limit the angular movement of the pipe. The cold water may enter the cylinder through a supplementary chamber b , the arm of the ball-cock working through a slot in the side of the chamber. The stand-pipe f^1 and other pipes within the cylinder may be double-walled, the space between the walls being exhausted, and may have a readily detachable joint. Where a large cylinder is employed, providing a reserve of cold water, the circulation pipes g, f^1 , Fig. 6, project well into the cylinder and have branches u, v governed by glass or mica faced spring valves r controlled by a float s so as to bring the cold-water reserve into circulation as the level falls.





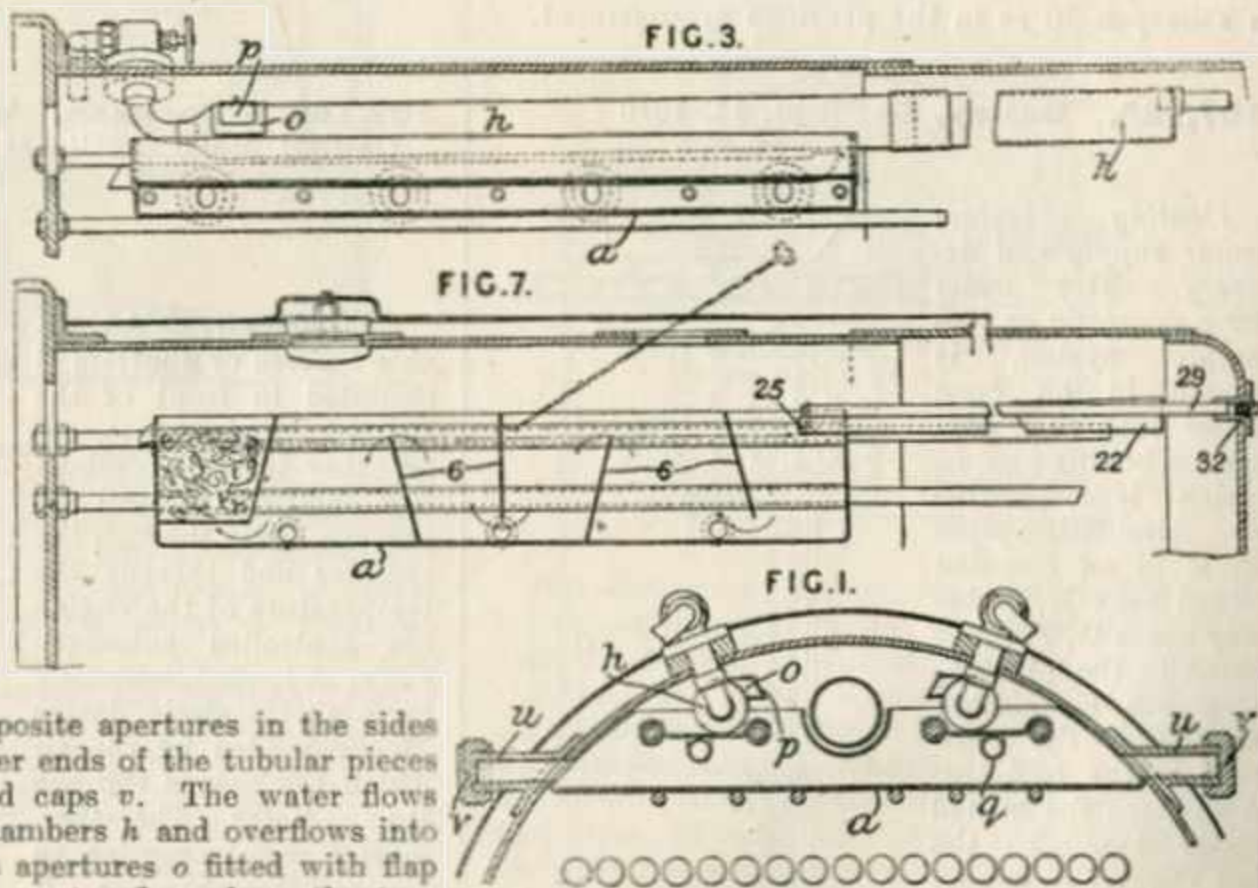
106,727. Adnams, A. C. Aug. 11, 1916.

Internally-fired boilers.—In water-heating apparatus of the type comprising inner and outer conical casings forming a water space with connecting-tubes across the central combustion space, the casings 1, 2 are secured together by a single nut 13 screwing upon the upper and narrow end of one of the casings, as shown. Water-tight joints are made by means of the beaded edge 8 and asbestos or like washer 10 in the turned-over edge 9, and by the washer 14. The inner casing is formed with a spiral groove 3 extending from the top to the bottom. The apparatus may be used as a kettle or as an instantaneous water-heater over any type of gas or oil burner or other source of heat.



106,845. Stirling, J. H. May 25, 1916.

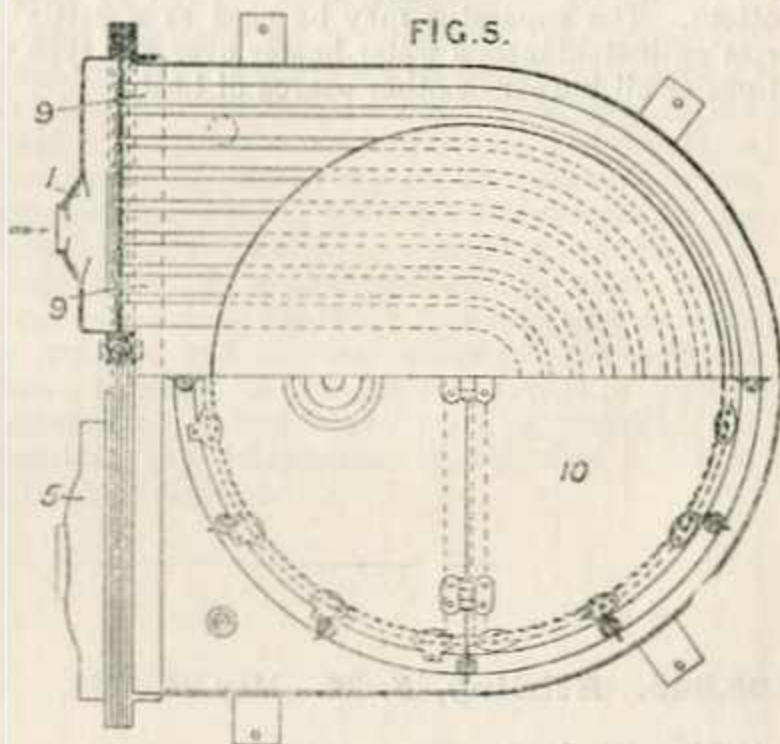
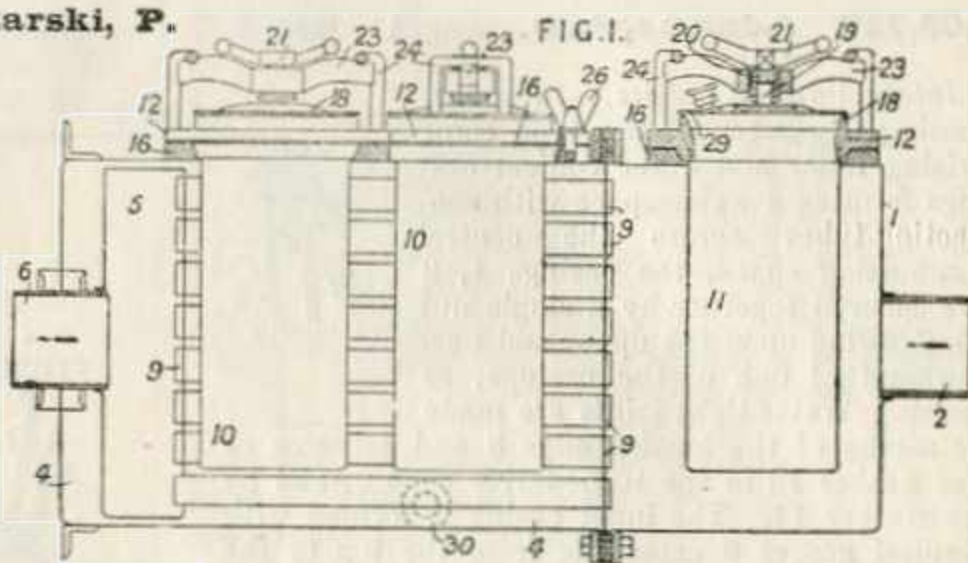
Feed-water, heating. — Feed-water heating and purifying apparatus, comprising open vessels or trays mounted in the boiler steam space, is provided with means for cleaning the vessels without removing them from the boiler. Access to the tray *a*, Figs. 1 and 3, extending across the top of a locomotive boiler is afforded by tubular pieces *u* secured to the boiler shell opposite apertures in the sides of the tray. The outer ends of the tubular pieces are closed by screwed caps *v*. The water flows through perforated chambers *h* and overflows into the tray through side apertures *o* fitted with flap or like valves *p*. The water flows from the tray through pipes *q* having upturned ends. The baffles 6, Fig. 7, in open vessels *a* mounted in the boiler on both sides of the steam-pipe, are cleaned by rakes inserted through hand-holes in the top of the boiler shell. To reciprocate a scraper 25



placed permanently in the tray 22, the rod 29 on the scraper projects into a sleeve in the side of the boiler, so that when the screwed plug 32 in the sleeve is removed, a handle may be screwed on the end of the rod.

107,022. Levinson, D., and Szarski, P.
March 6, 1916.

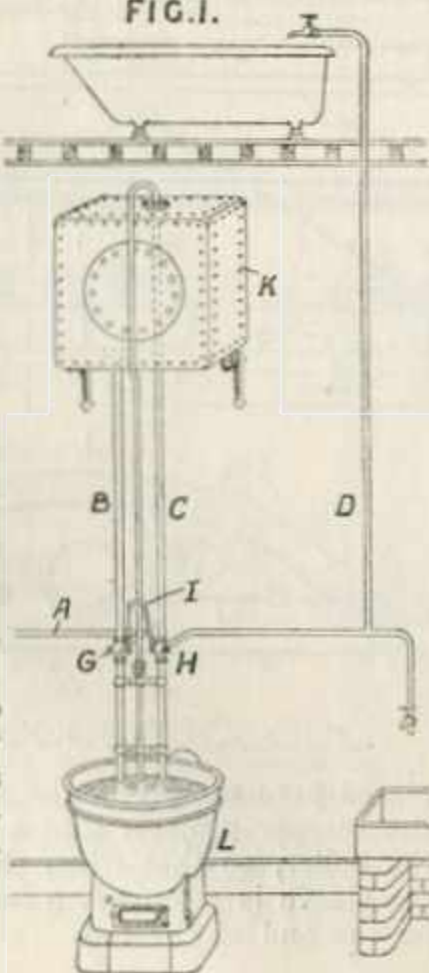
Heating liquids.—Camp kitchens &c. are heated by the exhaust gases of the motor-vehicles upon which they are carried. As shown in Fig. 1, the exhaust gases of a light motor vehicle enter through an opening 2 to a box 1, and pass thence through a number of tubes 9, which pass around the sides and along the bottom of a boiler 4, to a box 5 from which they escape through an opening 6 to the atmosphere. The box 1 contains a vessel or oven 11, and the boiler 4 two or more saucepans or other vessels 10. The oven 11 and the vessels 10 are removably secured in the top plates 16 by pivoted bolts and nuts 26, and make tight joints by means of conical extensions on their rims 12 fitting into conical recesses in the top plates. The lids 18 make tight joints with the vessels in a similar manner. Each vessel is provided with a pair of yokes 24 beneath which passes a crossbar 23 which can be secured or released by a hand wheel 21 operating a screw nut 20 gearing with a screw 19 on the lid of the vessel. The vessels, the box 1 and the boiler 4 are provided with safety valves 29, and the boiler with draw-off cocks 30 for hot water. The whole device may be mounted on the step of the motor and may replace the usual exhaust pot. In the modification shown in Fig. 5, the exhaust gases enter a box 1 and pass through tubes 9, beneath and around a boiler 4 to an outlet 5 adjacent to the inlet. The boiler contains a saucepan 10 as in the previous arrangement.



107,125. Bailey, G. Sept. 14, 1916.

FIG. 1.

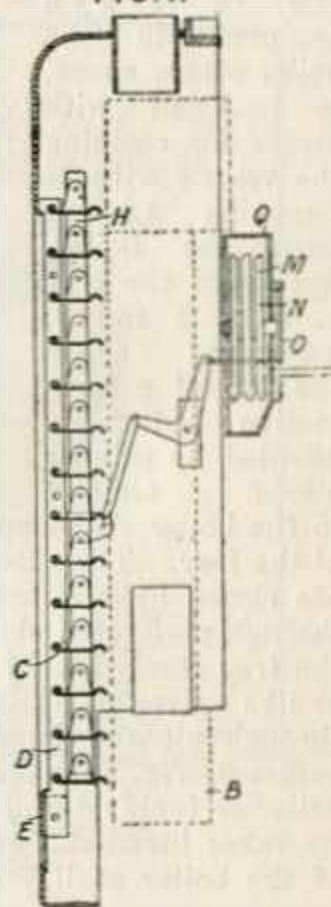
Heating water; water supply and delivery.—Hot water for a domestic or like supply system is heated in an open boiler such as a copper or boiling-pan L, which is connected by circulating-pipes B, C to an elevated closed tank K, three-way cocks G, H being fitted in the pipes to stop the circulation and allow the pressure in the feed-pipe A to force the heated water through the hot-water supply pipes D. The cocks are operated simultaneously by a handle I.



107,140. Jackson, W. J. Mellersh-,
(Detroit Motor Appliance Co.). Oct. 6, 1916.

FIG. 4.

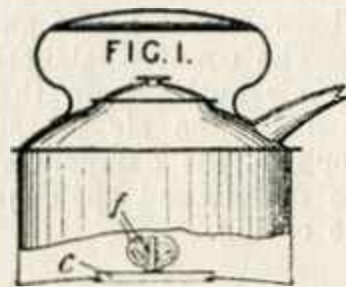
Heating air.—Adjustable louvres or shutters C mounted in front of the radiator B of a motor-car or other internal-combustion engine to control the passage of air through the radiator and thereby the temperature of the engine are controlled automatically and simultaneously by a thermostatic device M surrounded by the air which has passed through the radiator. The thermostat may comprise an expansible chamber N within an open chamber Q.





107,170. Miller, J. H. K. Jan. 5, 1917.

Boiling-pans and the like.—To expedite the heating of liquids in kettles, boilers, and other containers, inwardly projecting dishes or disks *c* having bars, strips, or other conductors *f* are fitted, as shown. The arms *f* may hold a piece of loofah, sponge, &c. to form a fur collector.

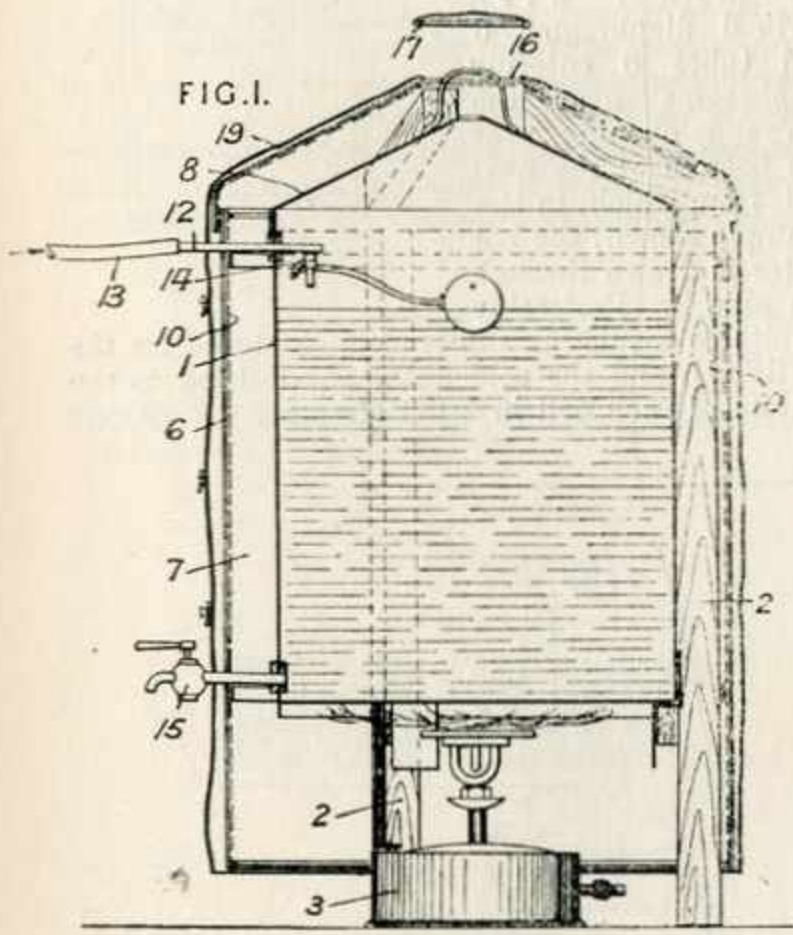


netting cage 10 and may be enclosed in an outer cover 19 of metal for impermeable material such as oilskin. A supply pipe 12 controlled by a ball valve 14 and having a flexible connexion 13 for attachment to a tap and an outlet tap 15 may be fitted to the container. A portion of the jacket 6 may be formed as a door to permit access to the burner 3.

107,300. Cecil, V. A. Gascoyne. Sept. 7, 1916.

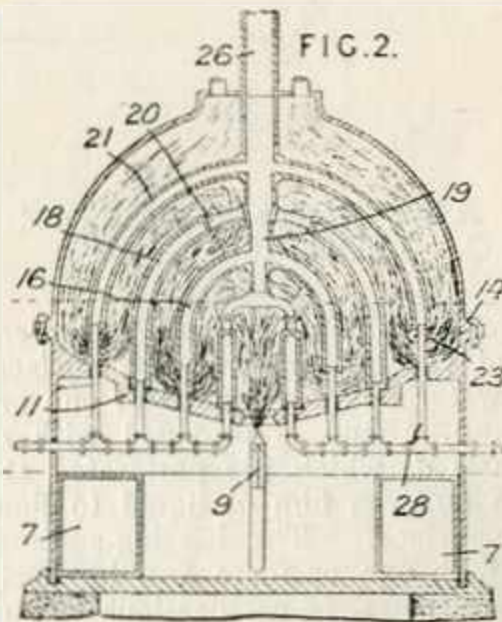
107,443. Semmler, C. July 24, 1916.

Heating air.—A liquid with a boiling point of between 100 and 360° C. is circulated in the jacket of a cylinder or slag mould or in apparatus for cooling coke, and is then used to heat air for use in blast furnaces &c. Oil of turpentine, aniline, paraffin, calcium-chloride solution, glycerine, and alloys freezing below 360° C., are mentioned as suitable liquids. Excess heat may be extracted from the liquid and stored or dissipated. Specification 23274/13, [Class 51 (ii), Furnaces and kilns for applying &c.], is referred to.



107,531. Bergeron, H. Dec. 21, 1916.

Portable and small liquid-heaters. — An apparatus for heating and keeping warm a supply of water for domestic or like purposes comprises a container 1 mounted on legs 2 and adapted to be heated by a burner 3, a non-conducting jacket 6 surrounding the container so as to form an intermediate annular space 7, and a lid 8 also spaced from the container and provided with a non-conducting covering 6 and with an aperture 16 adapted to be closed by a detachable cap 17, the arrangement providing a passage for the heated air and products of combustion around the container when the burner is lighted and the cap 17 removed and also a means for retaining the heated air and gases in the annular space round the container by replacing the cap 17 when the burner has been extinguished. The non-conducting jacket preferably consists of a layer of felt, asbestos or the like 6 supported on a wire-

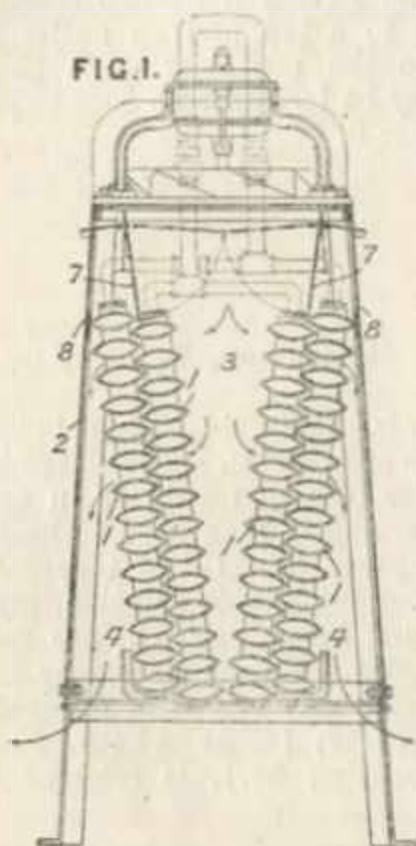


Internally-fired boilers; annular boilers — A boiler comprises a central open-ended annular chamber 14 and concentric inverted cup-shaped chambers 16, 18, 21 formed with flue passages 20, 23 alternately at their upper and lower ends, so that the furnace gases take an upward and downward course between the chambers. Branch feed-pipes 28 open into the bottoms of the chambers, and hot water or steam is led off by a pipe 26 in line with the connecting nipples 19 at the tops of the chambers. Air for combustion is supplied to the flues between the chambers through openings in the baseplate 11. The furnace casing may enclose a reservoir 7 containing oil for supplying the burner.



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107,697. **Boyd, J., Boyd, J., and Boyd, J. B. W.**, (trading as Boyd & Sons, J.), and **Arneil, J. M.** Sept. 15, 1916.

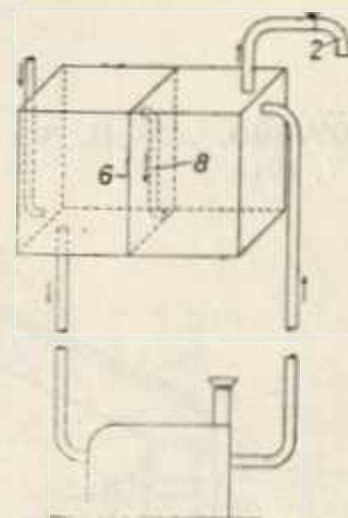


Heating air.—Relates to an air-heater of the kind in which air is circulated by a fan through a casing containing tubulous heating-elements 1 supplied with hot water or steam, and consists

in arranging the elements in inclined banks, as shown, so as to form a wedge-shaped space 3 between the banks and outer wedge-shaped spaces 4 between the banks and the walls of the casing 2. The counter-balanced hinged dampers 7 over the air outlet from the fan are normally kept open by the air pressure. When the fan is stopped, the dampers swing upwards and close the outlet, and open apertures 8 in the sides of the casing.

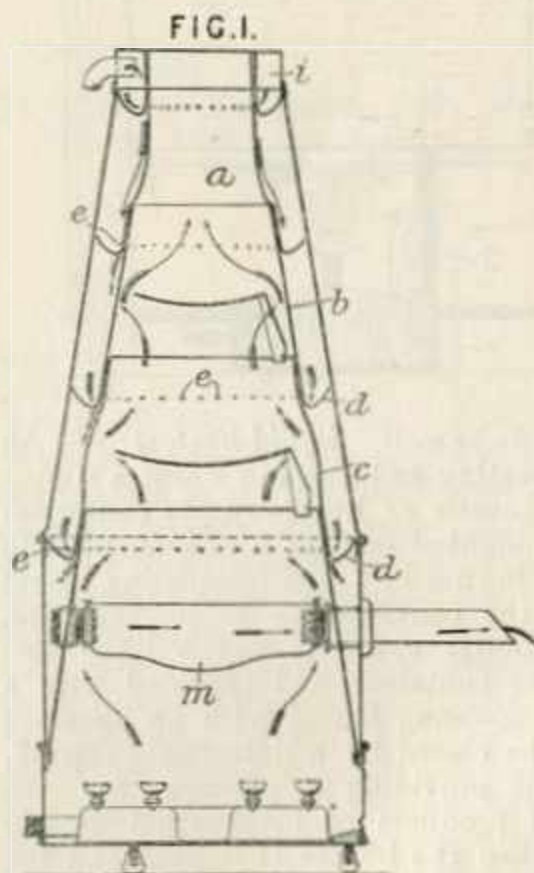
107,774. **Troost, C. F.** April 5, 1916.

Heating water.—In order to prevent mixing of incoming cold water with the hot water in the tanks of hot-water supply systems these are provided with vertical diaphragms 6 and tubes 8 entering diaphragms near the top and opening near the bottom of the next cell. In the example shown, the hot water is drawn through the pipe 2. Preferably a suitable insulating material is employed for the partitions, and the cold water is admitted to the bottom of each cell in a flat stream.



108,737. **Ajax Heaters, Ltd., and Bus-sell, R. C.** Aug. 23, 1916.

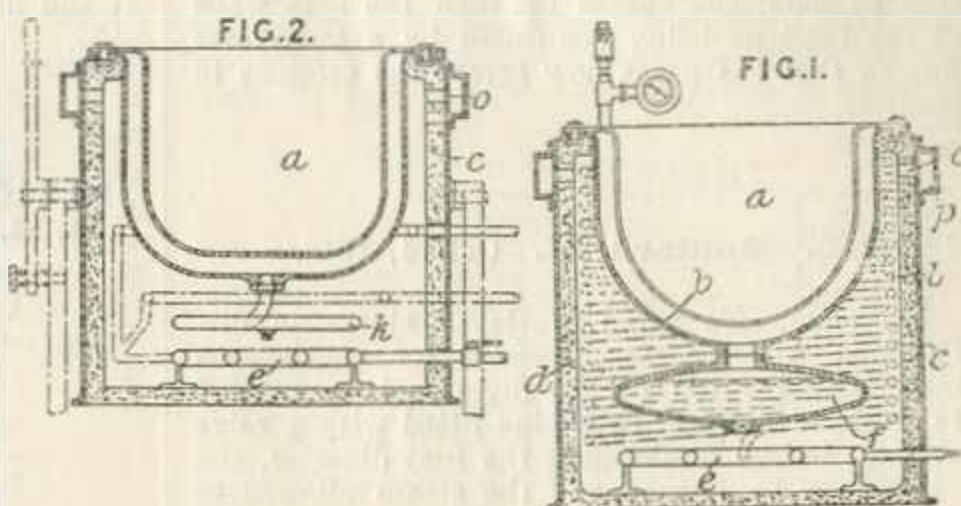
Geysers and instantaneous water-heaters.—In apparatus of the geyser type, the surface over which the water flows is formed of one or more elements a, b, c and is provided with one or more channels d, which are perforated at e, so as to cause an even film of liquid to flow over the heating-surface. The heating-surface may be formed with one or more annular peripheral channels, ribs, rings, or corrugations to facilitate the filming of the liquid. A superheater m has the lower part thereof curved, as shown, to distribute the hot gases. The liquid enters the apparatus through an upper perforated chamber i, as shown. The liquid may be preheated in a chamber depending within the central portion of the heater.





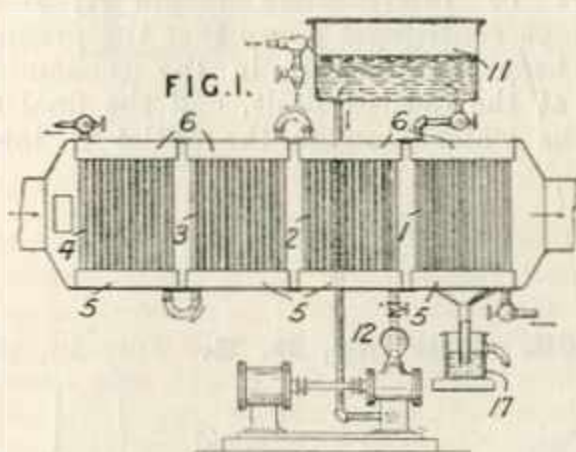
109,688. Senior, H. V. Nov. 4, 1916.

Heating liquids; boiling-pans.—In a self-contained steam-jacketed heating or boiling pan for use in rendering lard and similar operations, the generator portion is formed as a separate member secured centrally to the lower portion of the jacket *b* and is of shallow depth and presents a large surface to the heater *e* from which the hot gases are directed over the exterior of the jacket. The generator may take the form of a lenticular chamber *f* as shown in Fig. 1, or of a spiral pipe *k* as shown in Fig. 2. The pan *a* and jacket *b* are supported in an external casing *c* lined with heat-insulating material *d* and provided at its upper end with a series of equally spaced passages *o* which secure a uniform heating of the jacket and conduct the burnt gases to an annular chamber *p* connected to a flue. The air and gases, before reaching the burners *e*, are preferably pre-heated by passing them through a pipe *l*, Fig. 1, or through separate pipes, or through an annular chamber located inside the casing *c*. Complete evaporation of the

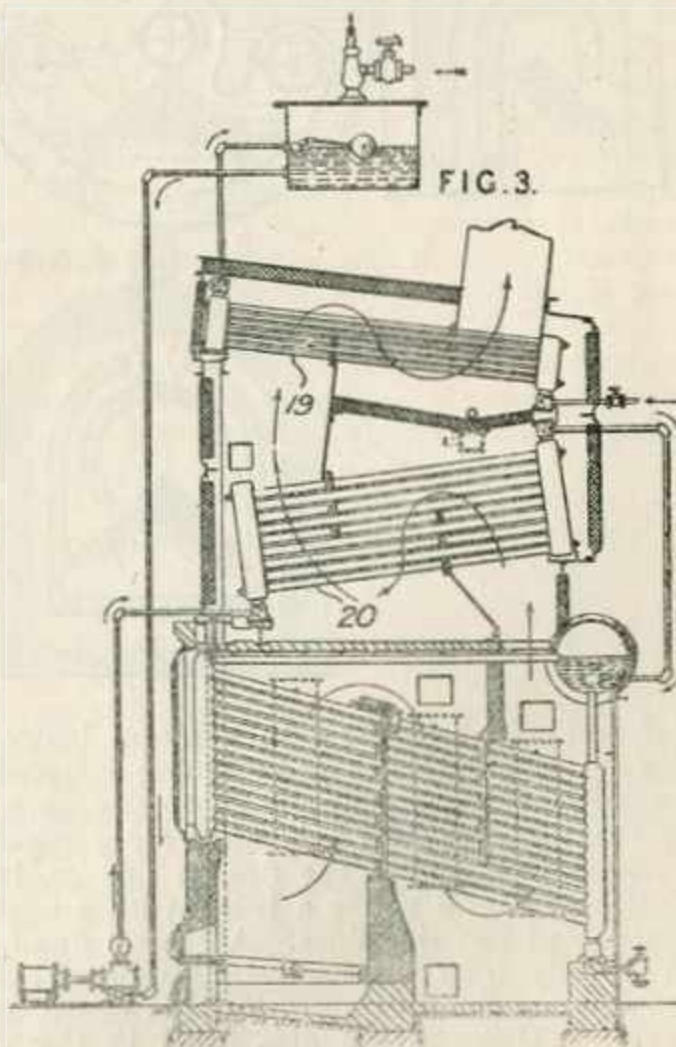


water in the generator and superheating of the steam produced may be carried out, and the temperature may be controlled by a thermostat which regulates the supply of fuel to the burners *e*. The surface area of the pan and jacket may be increased by corrugating or fluting, and the pan may be formed with an upwardly extending conical or like projection at its base. The pan may be mounted on trunnions as shown in Fig. 2 so as to be capable of tilting.

109,717. Babcock & Wilcox, (Babcock & Wilcox Co.). Dec. 28, 1916.



Feed-water, heating.—Relates to an economizer having high and low pressure heating sections and means for allowing air and other gases to escape from the water between the sections. The tubes of the two sections are of different materials, that of the low-pressure section being better adapted to resist external corrosion than that of the high-pressure section. The tubes of the low-pressure section may be made of cast iron and those of the low-pressure section of wrought iron or steel. In an economizer built up of groups of tubes 1 - - 4, Fig. 1, connected to upper and lower headers 6, 5, the water flows through the group of tubes 1 forming the low-pressure section into a tank 11, in which the gases are liberated, and then is forced by a pump 12 into the groups 2, 3, 4 forming the high-pressure section. The pressure on the tank may be maintained below atmospheric by an injector or a



pump. The vapour condensed on the outer surface of the low-pressure section is collected in a receptacle 17. The tank may be fitted with a rotating agitator. Fig. 3 shows an economizer having low and high pressure sections 19, 20

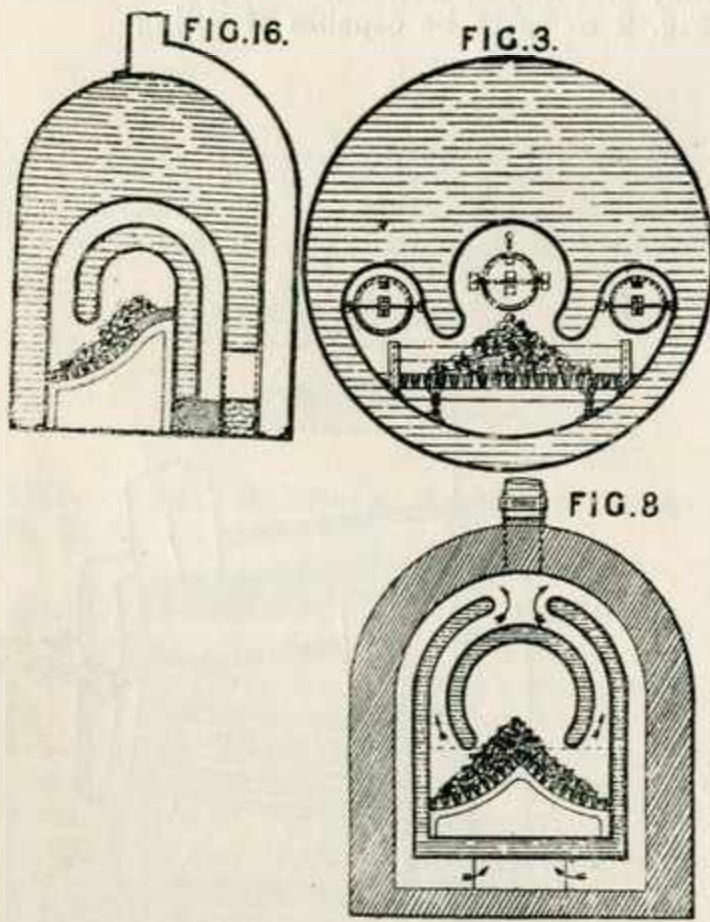


installed in a Babcock and Wilcox boiler. In a modification, vertical tube sections are arranged side by side, the spaces between the side walls of the sections being connected by a transverse flue so that the gases flow across the sections in turn.

110,015. Boulard, H. Oct. 4, 1916.

Digesters.—To avoid waste of steam in discharging a non-rotary digester for amylaceous materials, the top of the digester is connected to a second digester by a pipe fitted with a valve so that, before discharging the first digester, the valve may be opened and the steam allowed to pass into the second digester, which is freshly charged. Three or more digesters may be connected together in this manner.

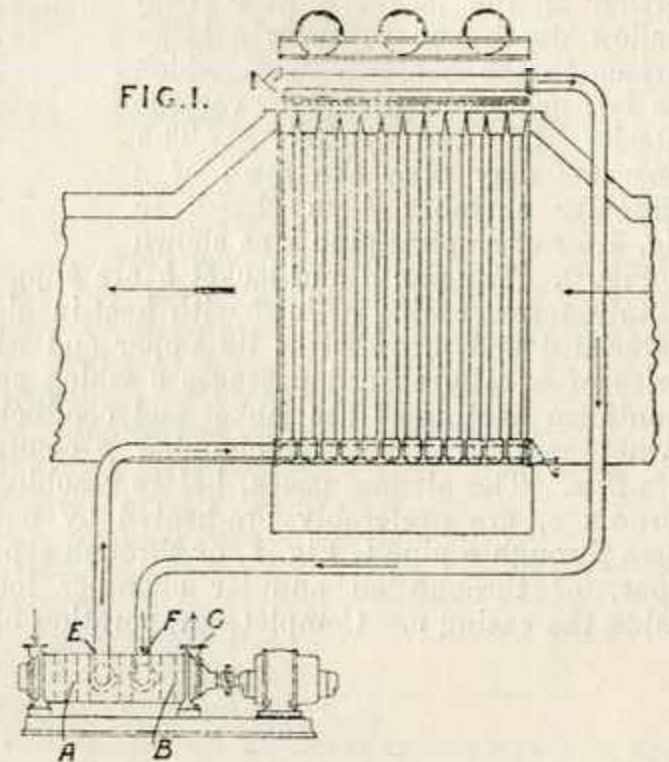
110,034. Farley, J. Oct. 16, 1916



Internally-fired boilers—In a steam boiler or water heater, a saddle-shaped chamber surrounded by water is arranged centrally above the grate, so that the products of combustion are compelled to pass laterally over the fire in one or both directions. Fig. 3 shows a boiler with a central chamber and two side flues. A central flue may lead directly from the central chamber for use when starting the fire; normally it is closed by a damper. Dampers are also fitted in the side flues as shown. Fig. 8 shows a water heater with internal side flues opening at the top into descending external side flues. In a modification the space above the internal side flues has a central horizontal outlet. Fig. 16 shows another modifi-

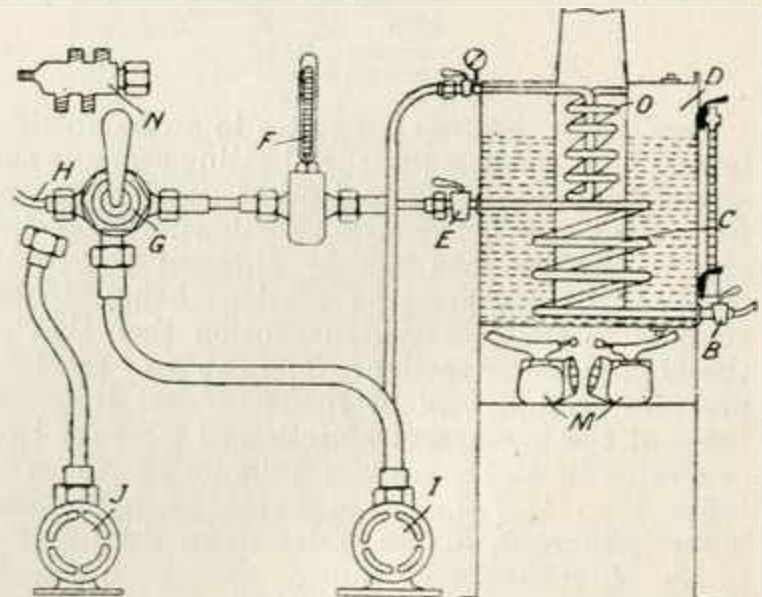
cation, in which the central chamber has an outlet at one side only to a flue which rises over it and descends to an external flue on the other side.

110,210. Green, F. W., and Tennant, G. E. Oct. 20, 1916.



Feed-water, heating.—The water-supply pipe E and the delivery pipe F of an economizer or exhaust steam heater are so connected to two consecutive or intermediate stages A, B of a multistage centrifugal pump that the preliminary stages keep the pressure in the economizer or heater at the desired limit, and the final stages force the water through the outlet G into the boiler.

110,368. Stirling, D. R. July 12, 1916.



Heating liquids.—Liquid fuel is heated in a coil C provided with inlet and outlet cocks B, E and arranged inside a water container D heated externally by blow-lamps M, coal, wood, waste &c.

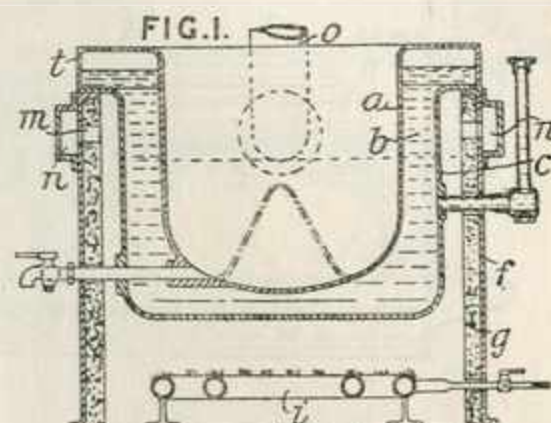


110,547. Aylsworth, A. M., and Savings Investment & Trust Co. Jan. 24, 1916, [Convention date].

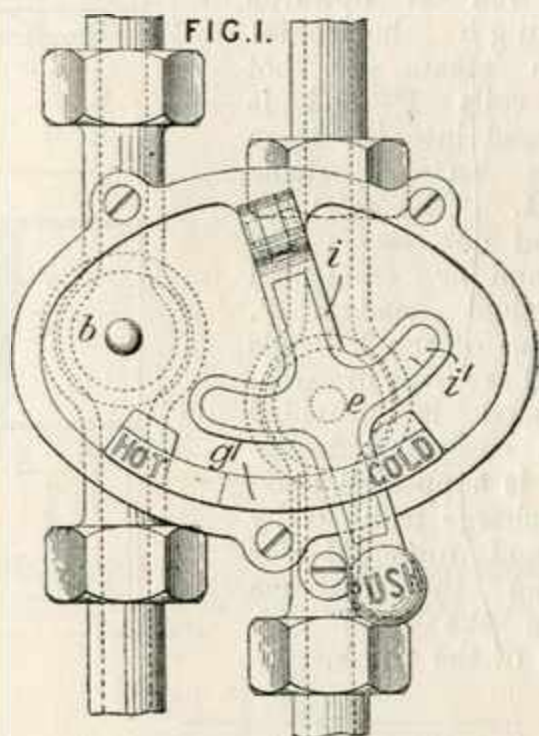
Heating liquids.—Vessels in which organic chemical reactions are effected are heated by a bath of fused sodium nitrite; such a heating-bath may be used in the apparatus described in Specification 103,664.

The Specification as open to inspection under Sect. 91 (3) (a) is accompanied by drawings of apparatus identical with that of the aforesaid Specification; these drawings do not accompany the Specification as accepted.

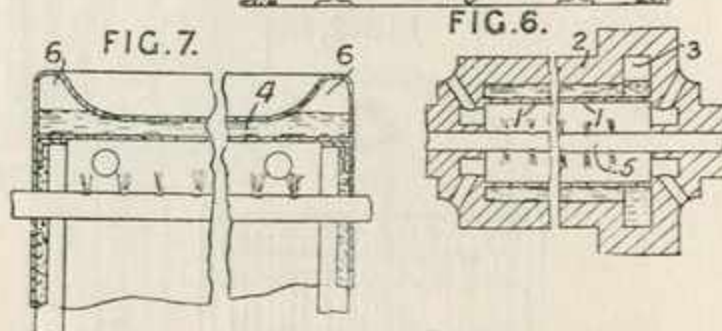
jacket is provided with an enlargement in order to reduce the variation in the area of the surface of the pan in contact with the oil owing to the expansion or contraction of the oil. In the construction of boiling-pan shown in Fig. 1, the jacket *b* is formed between the pan *a* and a



110,694. Sawyer, R., and Illston, A. C. March 27, 1917.



Water delivery.—To control the delivery of hot or cold water from water-supply apparatus such as is provided in railway-carriage lavatories, a hinged handle *i* in front of the valves *b*, *e* in the steam pipe leading to the heater and to the water-outlet pipe, respectively, is swung from side to side and forced inwards so as to open both valves or the water-outlet valve alone. The handle is formed with lateral extensions *i'*, which come opposite the projecting valve spindles. The lower end of the handle projects through a slot in a flange *g'*, the ends of the slot being widened to allow the handle to be pressed down.



surrounding casing *c* supported on an external casing *f* lined with insulating material *g*, and the extension of the jacket is formed by providing the pan *a* and casing *c* with flanges at their upper ends spaced apart by a web *t* or by a separate channel-iron. The jacket is heated by a burner *i* supplied with gas, or a mixture of air and gas, or liquid fuel, and an even heating is obtained by conducting the gaseous products through a number of equally spaced orifices *m* leading to an annular chamber *n* and flue *o*. The gas or fuel may be preheated by conducting it to the burner through a single pipe, or through an annular chamber, or, in the case of a mixture of air and gas, through two separate pipes or through a partitioned annular chamber located in the heating space inside the casing *f*. The temperature of the oil may be regulated by a thermostat or similar means controlling the supply of gas or fuel, and the pan may be mounted on trunnions. The boiling-pan or the casing *c* may be corrugated, fluted, or provided at the base with a conical projection in order to increase its heating surface. In the case of a calendering-roller, Fig. 6, the jacket, which is provided with an enlargement *3* at one end is formed between an inner casing *1* heated by burners *5* and an outer casing *2*. Fig. 7 shows a heating-table in which the enlargement *6* of the jacket is formed along one or more edges of the table by bending upwardly the upper surface of the container for the oil.

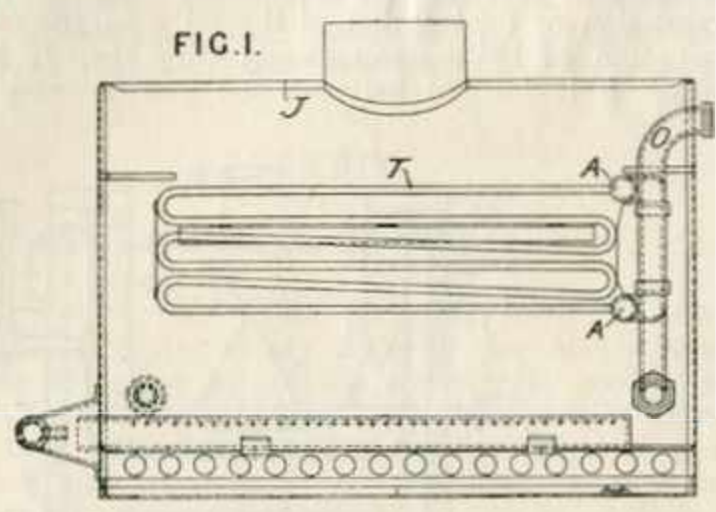
110,803. Senior, H. V. Nov. 4, 1916.

Heating liquids; boiling-pans and the like.—Relates to boiling-pans for use in rendering lard or boiling sugar, or to calendering-rollers, or heating-tables, of the kind in which the pan or the like is surrounded by or comprises a jacket containing an oil which is not vaporisable at the working temperature. According to the invention, the

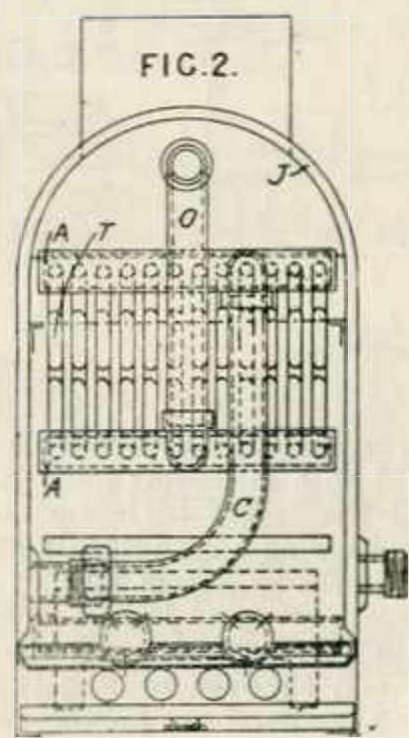


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110,905. **Lowe, J.** Nov. 3, 1916, [Convention date].

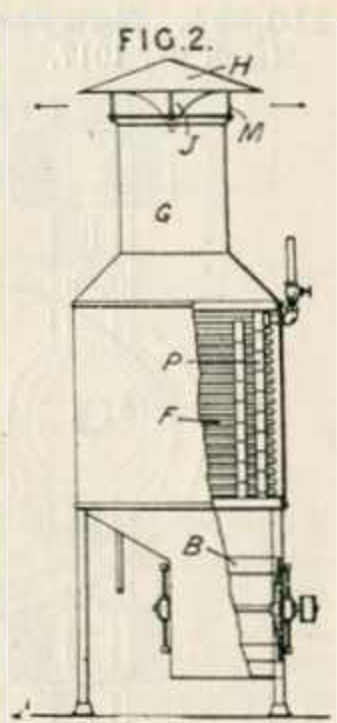


Water-tube boilers.—Horizontal sinuous water-tubes T connected to headers A are removably supported in a combustion chamber enclosed by a water-containing casing J. Water flows from the casing into the tubes through a pipe C connected to the upper header, and is led from the lower header through a pipe O. The casing may be replaced by vertical inverted U-tubes connected to longitudinal collectors.



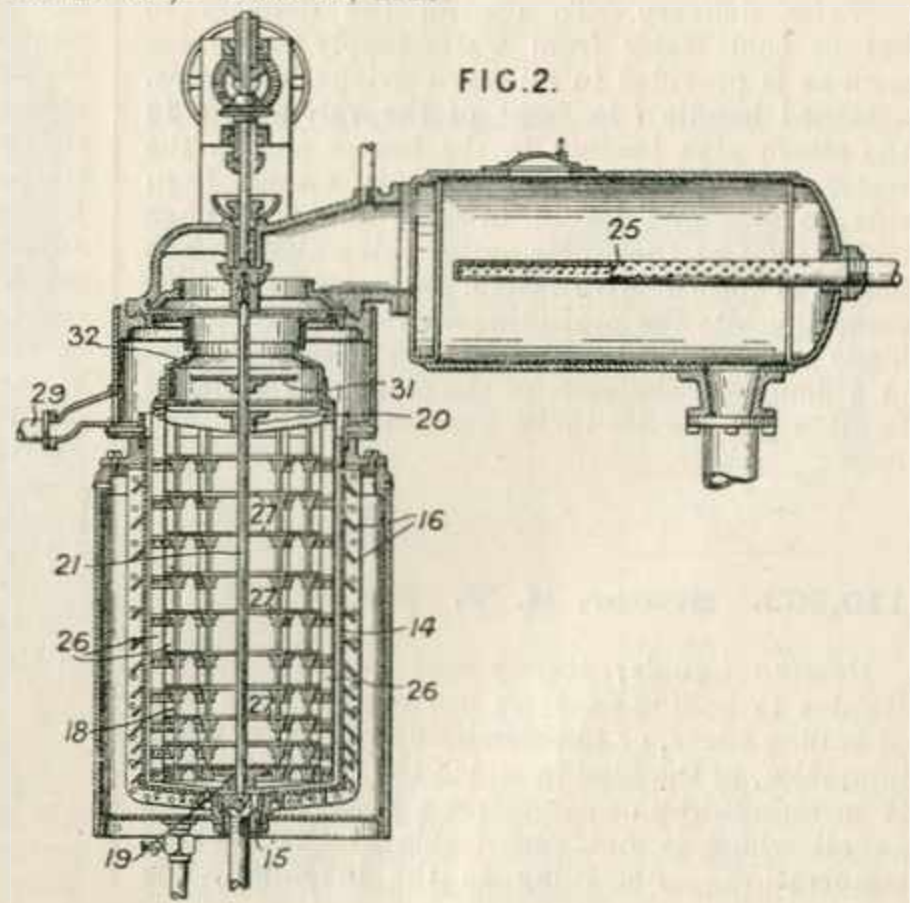
111,177. **Smith, D. V. H., and Conner, S. J.** Nov. 29, 1916.

Heating air.—The air supply to a room is forced by a fan B upwards through horizontal sinuous steam or hot water coils F and is discharged into the room through an adjustable head H. The coils are arranged one above the other and are connected to vertical headers P. The sides of the U-bends of a coil are bent inwards. The hood is provided with a conical deflector J, and is supported upon the discharge trunk G by bolts and nuts M for adjusting the distance between the hood and the top of the trunk.



111,340. **Marks, E. C. R., (Merrell-Soule Co.)** Nov. 24, 1916

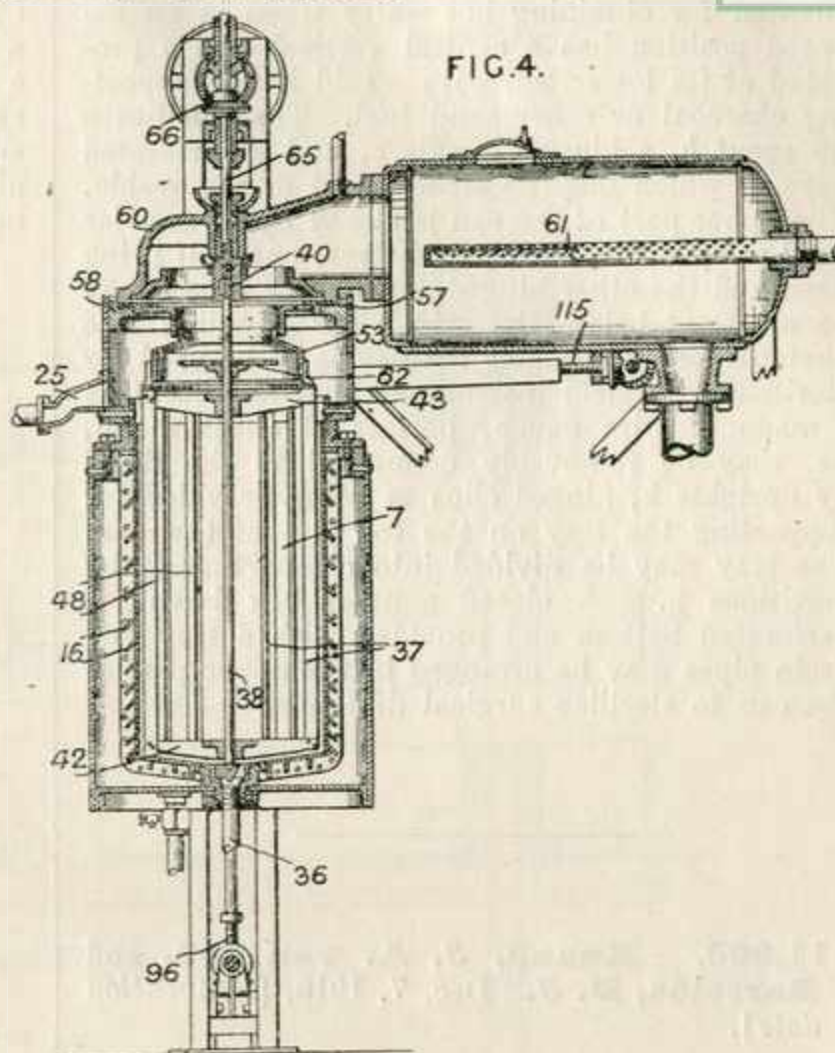
Heating liquids.—The steam-jacketed wall of a cylinder 14 for concentrating buttermilk is fitted with drip rings 16, preferably with fluted edges, to lead away the water of condensation. The cylinder 14 is provided with a rotary beater 18, whereby the buttermilk entering by a pipe 15 is caused to flow spirally upwards in a layer of diminishing thickness.



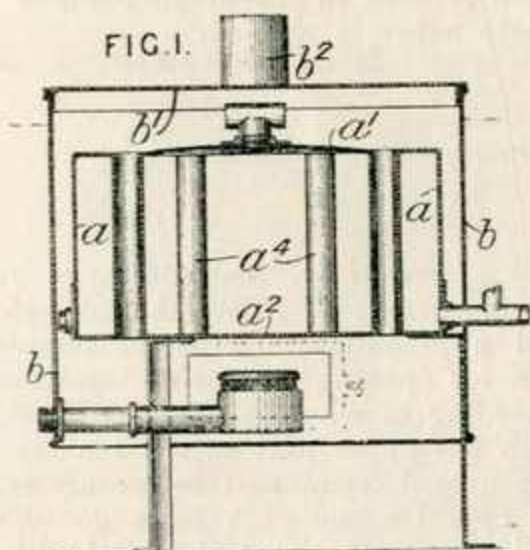


111,508. Marks, E. C. R., (Merrell-Soule Co.). Nov. 24, 1916.

Heating liquids.—The steam-jacketed wall of a cylinder 7 for concentrating milk &c. is fitted with drip rings 16, preferably with fluted edges, to lead away the water of condensation. The cylinder 7 is provided with a rotary beater 37 whereby the milk entering by a pipe 36 is caused by centrifugal force to flow spirally upwards in a layer of diminishing thickness.

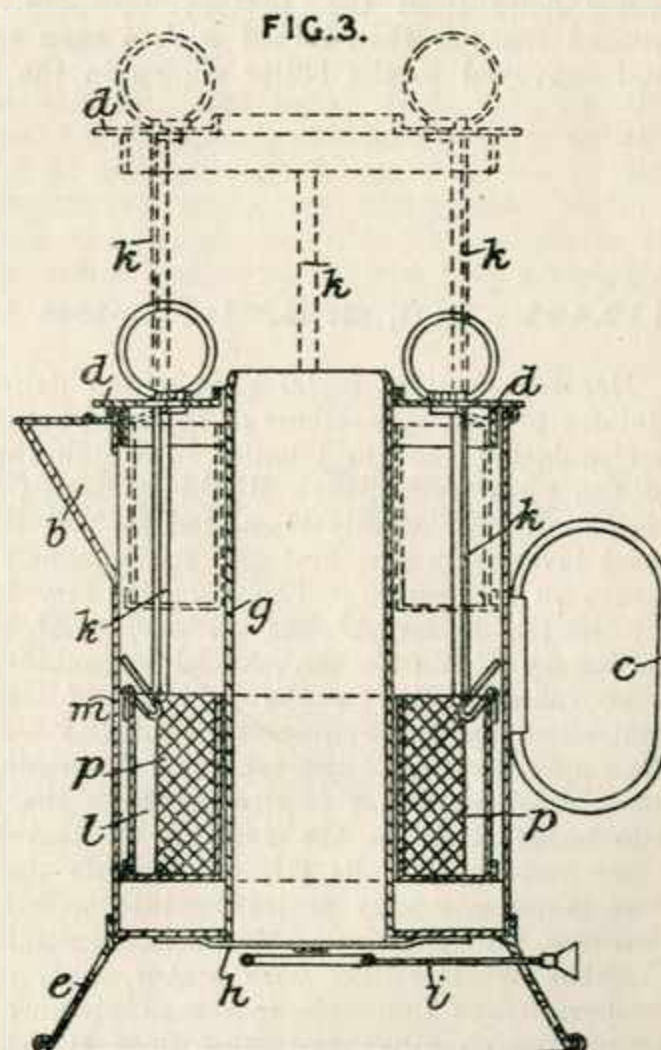


111,620. Birch, J., and Birch, G., (trading as Birch & Son, J.). April 13, 1917.



Block-form boilers.—In a gas-heated multi-tubular boiler for a hot-water supply plant, the top and bottom plates a^1 , a^2 , made preferably of wrought iron or mild steel, are connected to the cylindrical side a , and the flue-tubes a^1 are connected to the top and bottom plates by the process of "hammer welding," the parts being heated by an acetylene flame and welded together by hammering. The boiler is enclosed by a casing b having a loose cover b^1 carrying the flue pipe b^2 .

111,688. Arbuthnot, G. H. Oct. 30, 1916



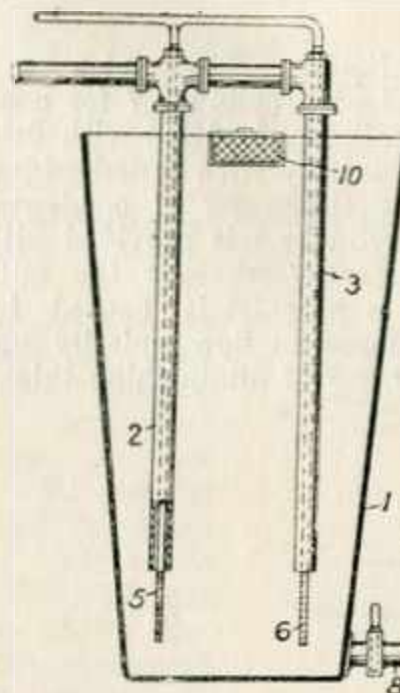


Portable and small liquid-heaters.— A can adapted for obtaining hot water when in an exposed position has a central vertical flue *g* provided at its lower end with a grid *h* for supporting charcoal or other solid fuel. The can has a lip spout *b*, a hinged handle *c*, and a perforated base *e*, which may be either fixed or removable. The upper part of the can is closed by an annular lid *d* or by a cover made in halves, one half being fixed and the other hinged. A blower tube *i* may be arranged below the grid *h* for kindling the charcoal &c. To enable the device to be used for sterilizing surgical instruments, an annular tray *l* made of wire gauze, perforated sheet metal, &c. may be removably connected to the lid *d* by uprights *k*, hinged clips *m* being provided for supporting the tray on the top rim of the can. The tray may be divided into compartments by partitions *p*. A closed annular box having a perforated bottom and provided with a tray and drain pipes may be arranged in the upper part of the can to sterilize surgical dressings.

111,860. Knaap, J. A. van deu, and Bartelds, B. J. Dec. 7, 1916, [Convention date].

Washing-boilers.—In a method of utilizing old paper for the purpose of producing new paper, the old paper, after being freed from dirt &c. is ground in a pulping-engine fitted with a rotating washing cylinder through which a current of cold water flows from the bottom upwards. The ground mass is then mixed with a soap solution and conveyed to the boiler shown in the Figure

in which the material is also washed. The boiler consists of a conical vessel or tub *1* fitted with a drain pipe *8* and an overflow *10* provided with a removable strainer. Within the tub are inserted steam pipes *2, 3* for boiling the material and through the steam pipes are passed hot water pipes *5, 6* perforated at their inner ends. The material is first boiled by the injection of steam,



and afterwards hot water is admitted to the vessel, when the unclean water passes through the overflow *10* and the clean fibre gradually settles to the lower part of the tub and may be drawn off at *8*. The operations of boiling and washing may be repeated as often as desired. The material is finally bleached and passed to the stuff chest of a paper machine, the waste water of which is used in the pulping-engine in which the waste paper is washed.

112,484. Bell, G. G. Dec. 6, 1916.

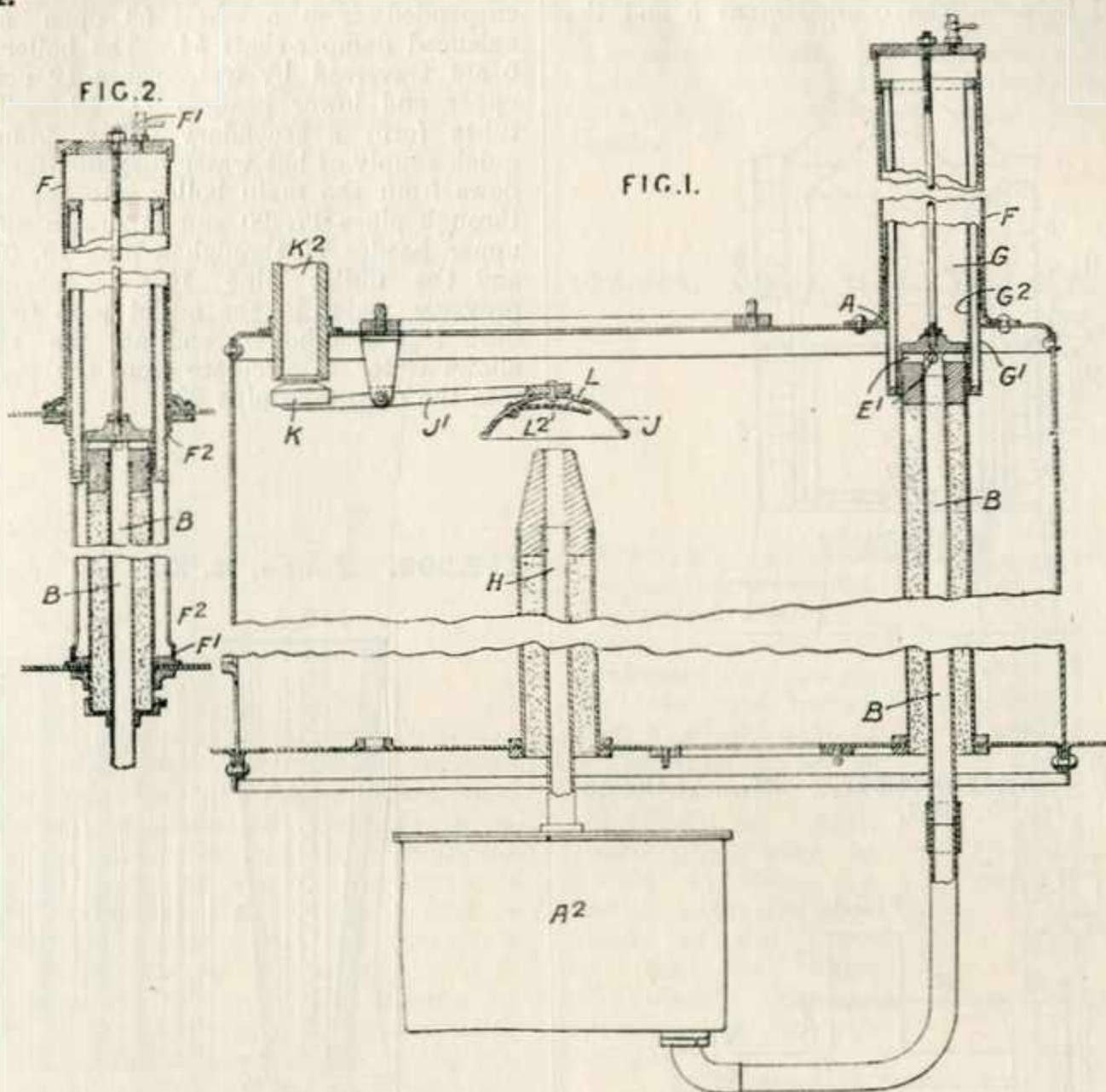
Heating liquids: water supply and delivery.—Relates to heating systems of the kind comprising a circulating tank and boiler in which the level in the tank from which liquid is drawn to the boiler is automatically regulated so that the top-most layer is heated first and subsequently lower layers in succession. The duct *B*, Fig. 1, leading to the boiler *A*² has an orifice *E*¹ that is stationary within the tank *A* and is combined with a movable baffle *G*, the position of which is controlled by the temperature of the water in the upper portion of the tank and determines the level at which water is drawn off to the boiler. The baffle *G* is in the form of a float having inner and outer walls *G*², *G*¹ slidable upon the duct *B* and normally projecting into an extension chamber *F* at the top of the tank. Initially, the chamber *F* is filled with water, but, as the temperature of the water increases, steam collects within the chamber and the float *G* gradually

sinks to a lower level. In order to prevent liquid from being drawn off from the tank before it has reached a predetermined useful temperature, a valve *K* for opening or closing the draw-off pipe *K*² according to whether the temperature of the water in the upper part of the tank is above or below the predetermined temperature is mounted at the opposite end of a lever *J*¹ to a bell *J*, which is arranged above the inlet pipe *H* from the boiler and in which steam accumulates so as to lift the bell when the temperature is sufficiently high. Any air which may collect within the bell is allowed to escape when the temperature falls again through a vent *L* controlled by a bi-metallic strip *L*². In a modified construction, Fig. 2, the duct *B* and chamber *F* are adapted for insertion as fittings through apertures in the bottom and top of the tank, the chamber *F* being extended to seat at *F*¹ on the bottom of the tank and being slotted between the points *F*².

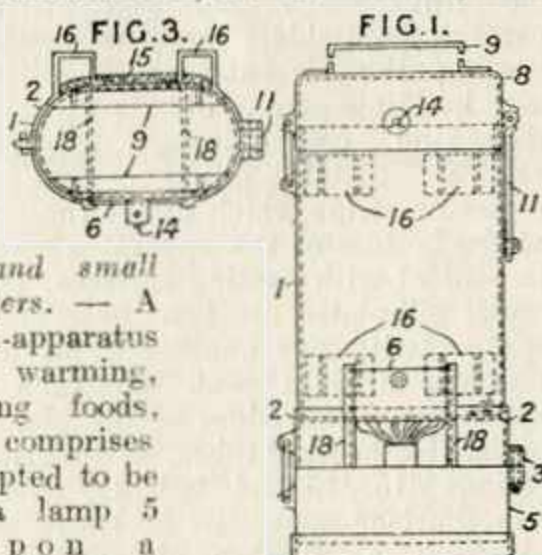
(For Figs. 1 and 2 see next page)



112,484.



112,604. Johansson, F. G. Oct. 9, 1917.



Portable and small liquid - heaters. — A portable field-apparatus for cooking, warming, and roasting foods, liquids, &c. comprises a flask 1 adapted to be heated by a lamp 5 mounted upon a vertical hinge 3 so that it can swing aside in an horizontal plane out of alinement with the flask and be used to heat a frying-pan, which is furnished in the form of a detachable hinged lid 8 provided with stirrups 9, which serve both as handles to the flask and as supports for the frying-pan, and with a lock-hasp 11, which serves as the handle of the frying-pan. A sliding-piece 6 on one side of the flask regulates the air-supply to the burner, and a safety-valve 14 is arranged in the lid 8 to

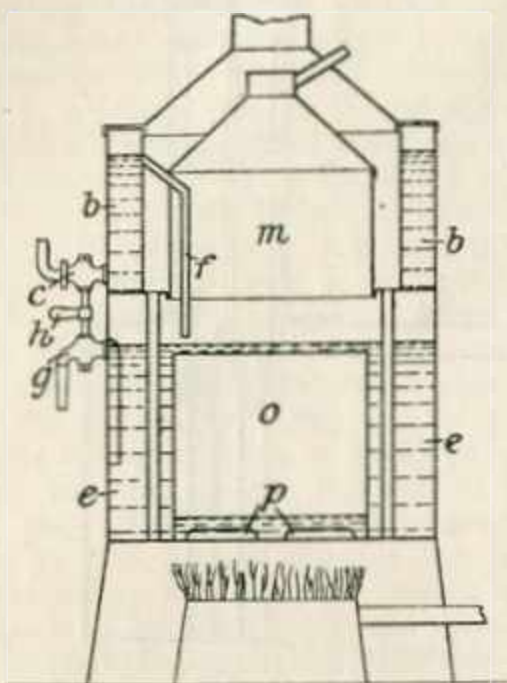
prevent the lid from being blown off by the pressure of the steam in the flask 1. Insulating-material 15 and stirrups 16 on one side of the flask respectively protect and distance the bearer's back from the apparatus. Two vertical plates 18 prevent undue heating of the rim 2 by which the lamp is attached to the flask.

112,744. Fletcher, Russell, & Co., Fletcher, T. W., and Banks, W. Aug. 18, 1917.

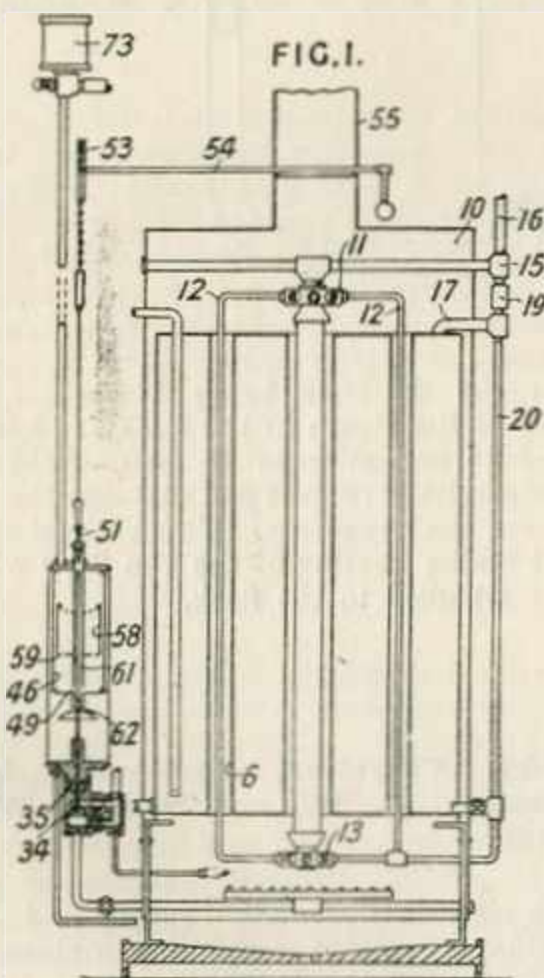
Block-form boilers; water supply and delivery. — A boiler *c* contains a chamber *o* closed at the top and open at the bottom to the boiler water space through apertures *p* so that, when the water boils, the pressure in the chamber raises the boiler water-level, which is normally below the level of the outlet cock *g*, above the outlet cock, thus allowing only boiling water to be drawn off. The outlet cock and the water inlet cock *c* are operated simultaneously by a handle *h*. The inlet water enters an annular compartment *b* around the dome *m*, and overflows through a pipe *f* into the boiler. The cock *c* may



be placed between the compartment *b* and the boiler.



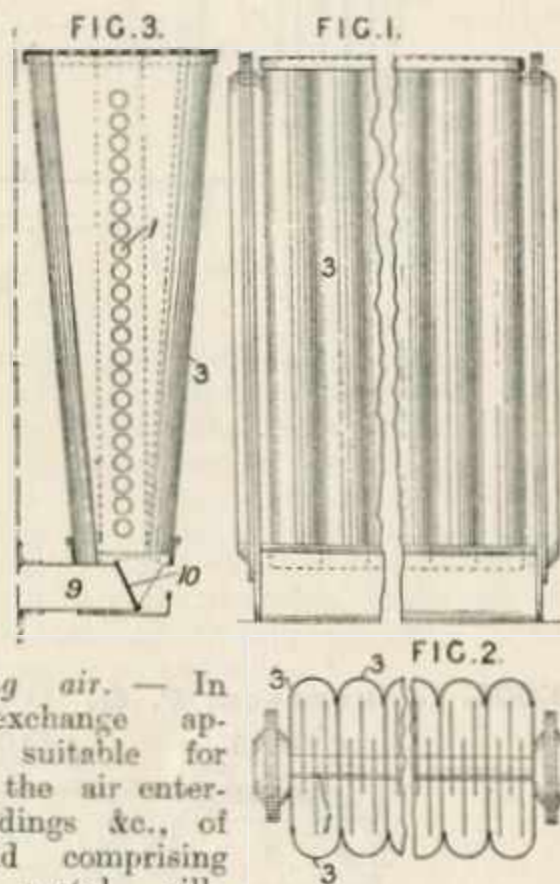
113,112. Fairbrother, H., (Allman, D. W.). Jan. 2, 1917.



Internally-fired boilers: water supply and delivery.—A gas-heated water heater is provided with apparatus for automatically turning on the gas supply and cutting it off after a predetermined period. The gas valve 34 is opened by the weight of water or other liquid supplied to a container 58 from a distant measuring device 73, and is closed by a spring or the like as the liquid gradually escapes from the container. The casing is

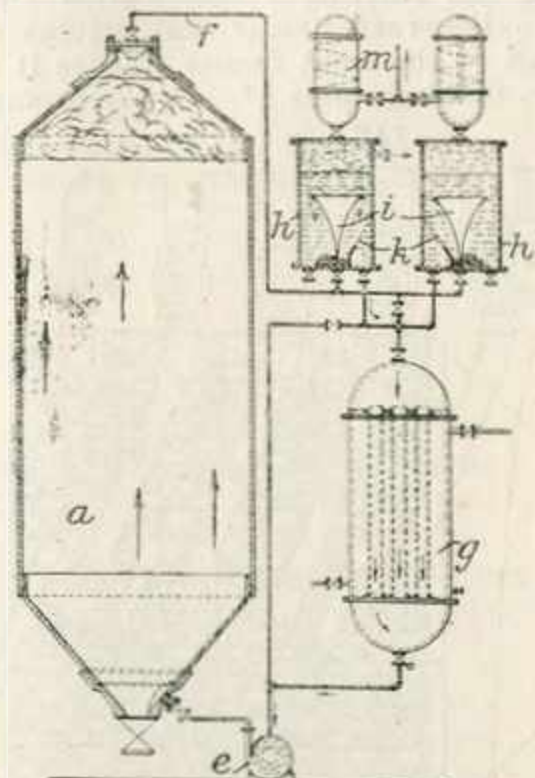
suspended from a wheel 53 upon a counter-balanced damper-shaft 54. The boiler flue-tubes 6 are traversed by water-tubes 12 connected to upper and lower headers 11, 13. The water-tubes form a secondary boiler, from which a quick supply of hot water may be drawn. Water flows from the main boiler into the water-tubes through pipes 17, 20 and is drawn off from the upper header 11 through a pipe 10, T-pieces 15 and the outlet pipe 16. A check-valve 19 prevents water in the outlet pipe from passing back into the boiler, and at the same time allows water to circulate from the upper header into the downtake pipe 20.

113,298. Pease, E. L. Jan. 16, 1917.



Heating air.—In heat-exchange apparatus suitable for heating the air entering buildings &c., of the kind comprising vertical metal gill-plates or strips which direct the air &c. entering at the bottom of the apparatus upwards over and in contact with heating surfaces, the edges of the metal gill-plates are bent over and brought into contact with one another so as to form a continuous air-tight wall on each face of the apparatus. The edges of the plates 3 strung on horizontal heating-tubes, as described in Specifications 4154/15 and 104,721, [both in Class 64 (iii), Surface apparatus &c.], are bent over so as to form a number of separate vertical air passages. A flap 10 at the bottom of the passages controls the entrance of air either from the room, or from the outside atmosphere by way of ducts 9. A damper formed of sliding perforated plates may be used in place of the flap 10. The supplies of air from the inside and outside may be controlled separately. A removable dust-collecting trough may be fitted in the apparatus at the bottom of the air passages. Specification 103,492, [Class 64 (iii), Surface apparatus &c.], also is referred to.

113,494. **Schauffelberger, E.** Feb. 28, 1917.

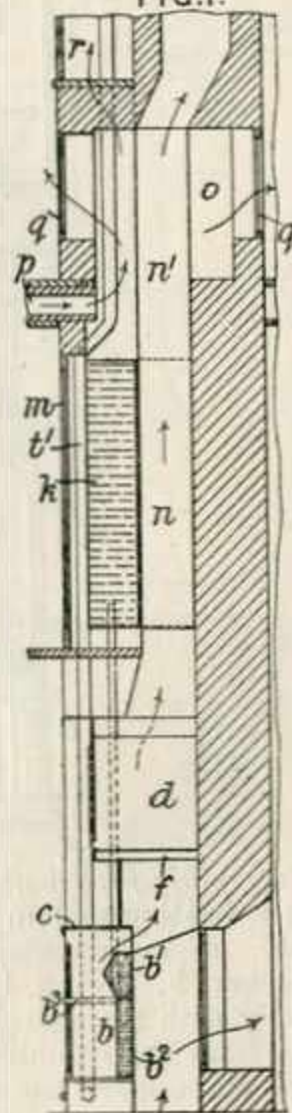


Digesters.—In apparatus for digesting bamboo, esparto, wood pulp, and the like, to prevent clogging and incrusting of the pumping and heating devices, a separator is provided to remove the scum and other impurities from the liquor. In the apparatus shown, the liquor is forced upwards through the digester *a* and is drawn off through a pipe *f* and led through a separator *h* before entering the heater *g*. It is then returned to the bottom of the digester by the pump *e*. The liquor enters the separating tanks through trumpet-shaped vessels *i*, the impurities rising to the top of the tanks and the purified liquor passing away through strainers *k* at the bottom. The tanks may be provided with rotary blades to assist the separation. Gas-separators *m* for the separation of gases from the liquor are arranged on top of the tanks. The outlet pipe from the digester may terminate in a

float and a flexible connexion so that it follows the drop in level of the liquor. The pump may be arranged between two separators in front of the heater. A strainer having relatively large apertures may be fitted in the upper part of the digester.

113,644. **Clare, G. E.** Feb. 26, 1917.

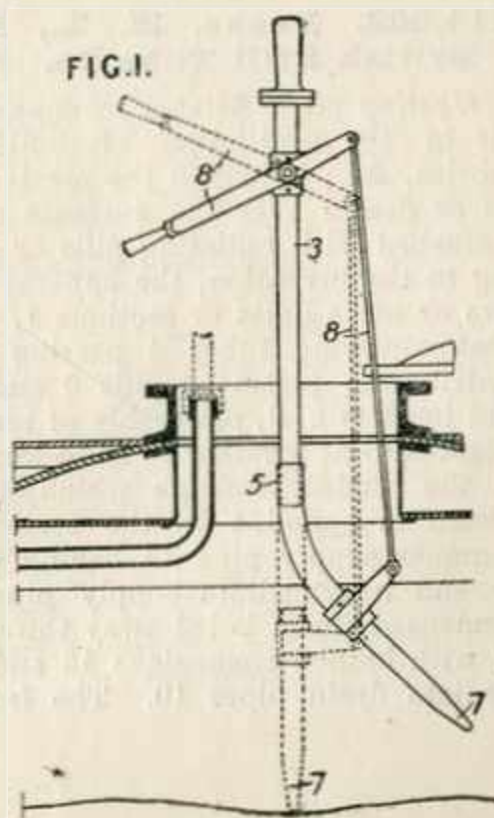
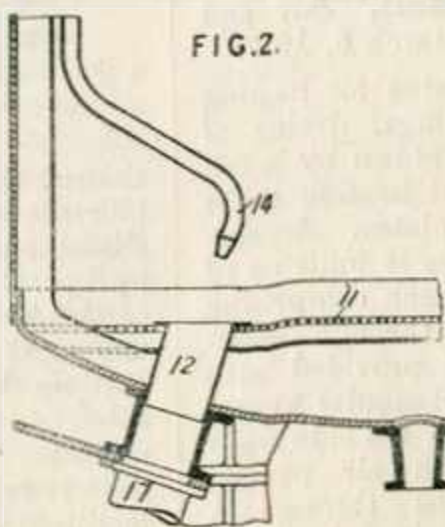
FIG. I.



Heating water.—The heating of water in a cistern *k* above a kitchen range is accelerated by passing the inlet and return pipes *f* at the side of it, or through it, in which case they may be gilled or coiled. These pipes may be used to heat the various rooms and cupboards of the house by the hot water circulating through them and through radiators.

214,348. **Wallace, W. M., Marshall, T., Brown, A., and Bertrams, Ltd.** April 10, 1917. Addition to 104,578.

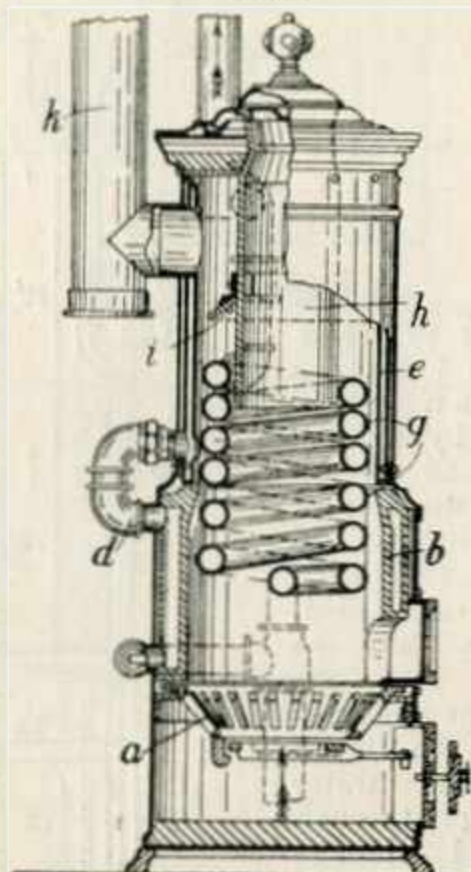
Digesters.—The apparatus for emptying digesters described in the parent Specification is applied to other receptacles such as storage chests, tanks, or drainers used to contain pulp and other similar material. The stream of water may be directed into the receptacle by a nozzle having a swivelling, universal, or flexible joint and provided with a rod and lever for moving the nozzle in all directions inside the receptacle. The nozzle 7, Fig. 1, is connected to the water pipe 3 by a rubber pipe 5 and is directed against the walls of the receptacle by a rod and a pivoted handle 8 so mounted that it may be rotated around the water pipe. A second stream of water may be directed into the discharge pipe 17, Fig. 2, by a nozzle 14 fixed inside the receptacle and connected to the main by a pipe passing up to the filling door. The



pipe 12 leading the material from above the grating 11 into the discharge pipe is made readily removable or is of smaller diameter than the discharge pipe so that material collecting beneath the grating may be easily washed down.

114,840. Sambuc fils, C. April 13, 1917.
[Convention date].

FIG. 1.



Internally-fired boilers.—A boiler for a hot-water heating-system comprises a basket-shaped grate *a* surmounted by an annular water chamber *b*, and a branch coil *g* arranged coaxially with the charging tube *h*. The water may pass from the chamber *b* through a connexion *d* into an upper annular chamber *e*. Baffles *i* prevent the direct escape of the combustion gases to the chimney *k*. The coil is connected at each end to the circulation pipe.

114,863. Pease, E. L., Bell, A., and British Still Tube Co. March 6, 1917.

Heating air.—Relates to apparatus for heating air in the ventilation of buildings, drying of fabrics, &c., in which the air is blown by a fan 28 or drawn over the surfaces of heating tubes furnished with radiating gills or plates. According to the invention, the apparatus is built up of two or more units or sections 1, each comprising heat-conveying tubes 4 passing through heat-distributing plates or gills 5 and provided with end headers 2, 3, preferably of rectangular shape, adapted to fit together so as to form the side walls of the conduit through which the air passes. Steam is supplied to the sections through a common supply pipe 14 having valved branches 12 and intermediate supply pipes 18, and the condensed steam is led away through a drain pipe 17 with branch connexions 15 and through intermediate drain pipes 19. The front header 2 of

each section is divided by an horizontal partition so that steam entering a section from a pipe 18 passes to the rear header and returns to the lower part of the front header whence it is conducted to the drain pipe 17. In the arrangement

FIG. 1.

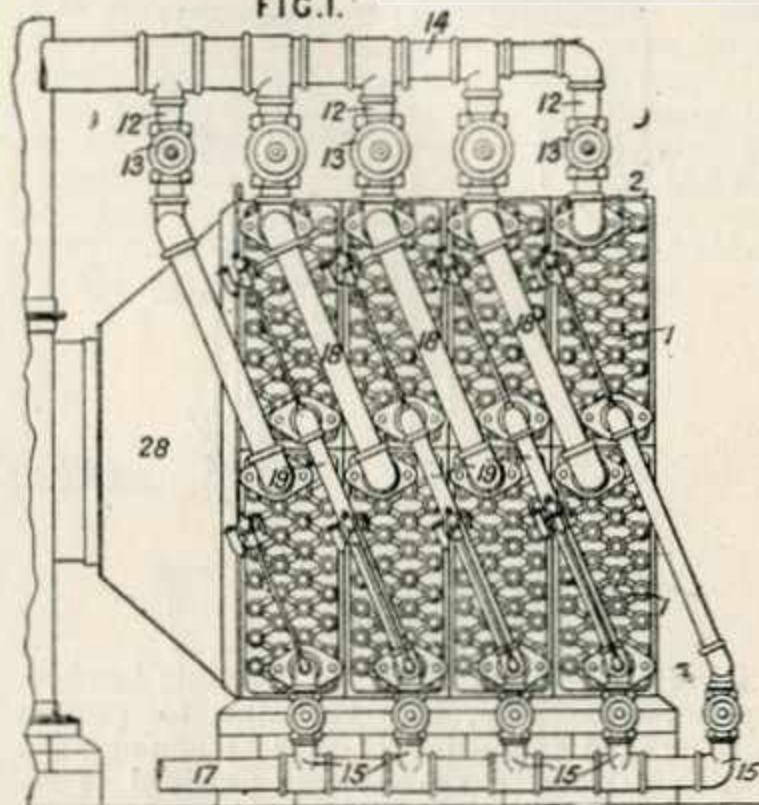
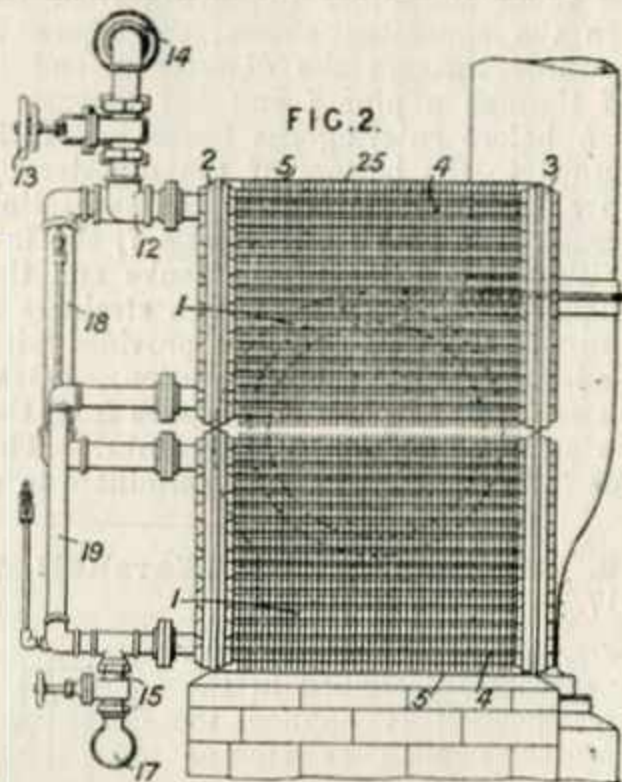


FIG. 2.



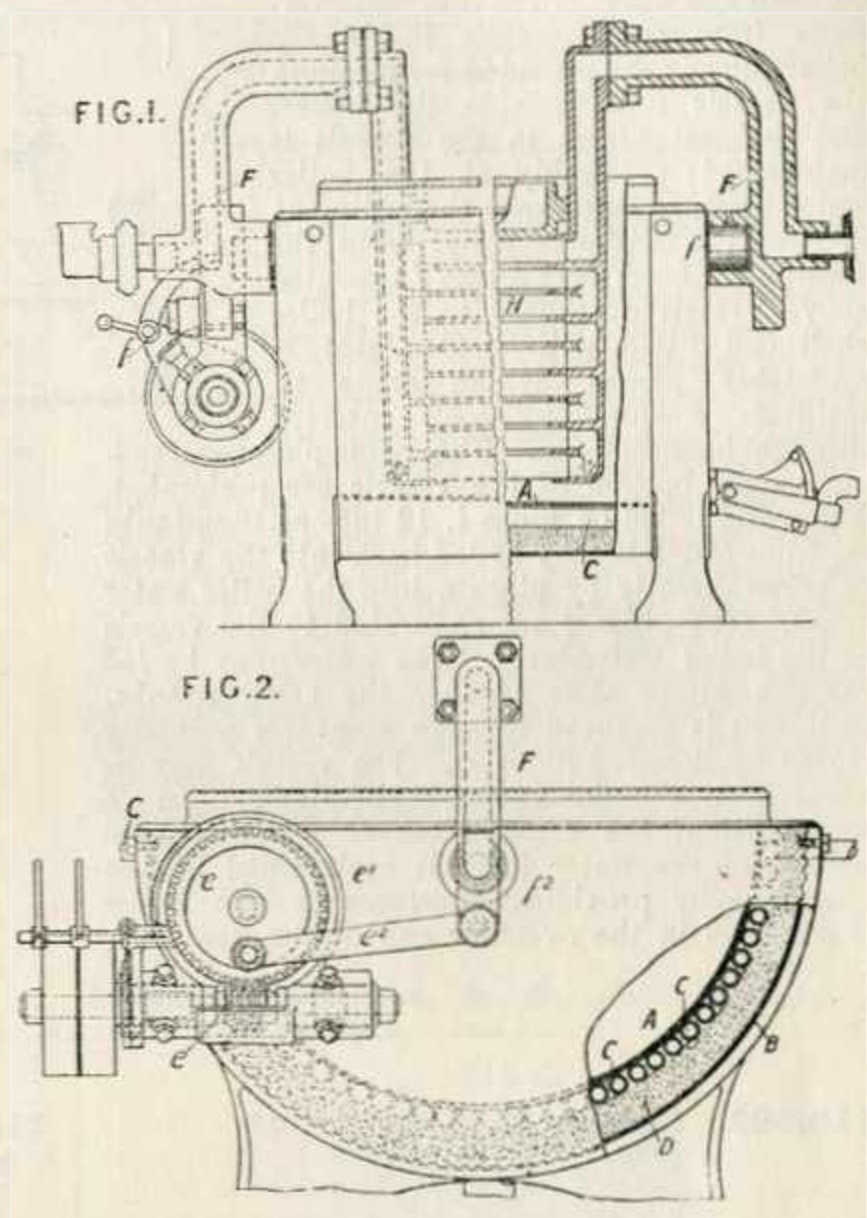
shown, the sections are arranged in two tiers of four sections each, and the pipes 18, 19 are inclined and so connected with the sections that, by operation of the valves 13, the first section of the lower tier or the last section of the upper tier can be cut out independently, the other sections being cut out in pairs. The number of tubes 4 used in proportion to the number of radiating plates or gills 5 is chosen according to the temperature requirements. In order to facilitate the introduction of a cleaning-tool or of an expanding-tool for connecting the tubes to the plates 5, the headers 2, 3 may have removable end plates or be provided with openings opposite the tubes closed by screw-plugs. A cover-plate 25 forms the upper wall of the air conduit. Modifi-

ations are described in which the tubes are arranged vertically to form a high battery of small depth, and in which the tubes are arranged

horizontally to form a battery of small height, the headers being coupled directly with the steam supply and drain pipes.

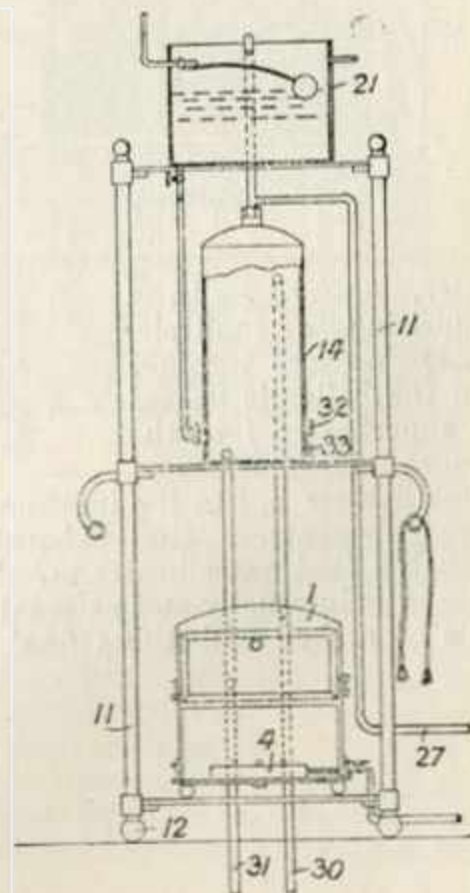
**115,126. Enock & Co., A. G.,
Enock, A. G., and Enock, E. C.
June 1, 1917.**

Heating liquids; boiling-pans and the like.—The contents of a vat heated or cooled by steam, hot water, cold water, brine, or other medium circulated through tubes C placed between the lining A and the outer casing are agitated by a swinging coil H suspended from tubular brackets F pivoted on pins f projecting from the ends of the vat. The brackets serve as inlet and outlet pipes for heating and a cooling liquid passed through the swinging coil. The coil is oscillated by a short crank f² and a connecting-rod e² pivoted to a wheel e¹ driven through worm gearing c. The heating-tubes C are surrounded by insulating material D held in position by the outer casing B.



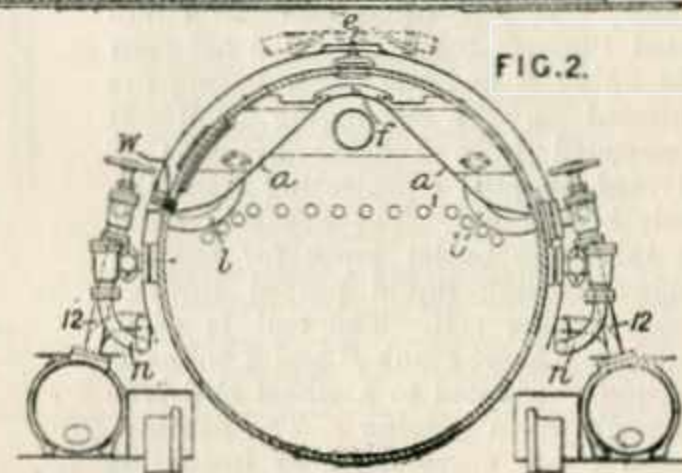
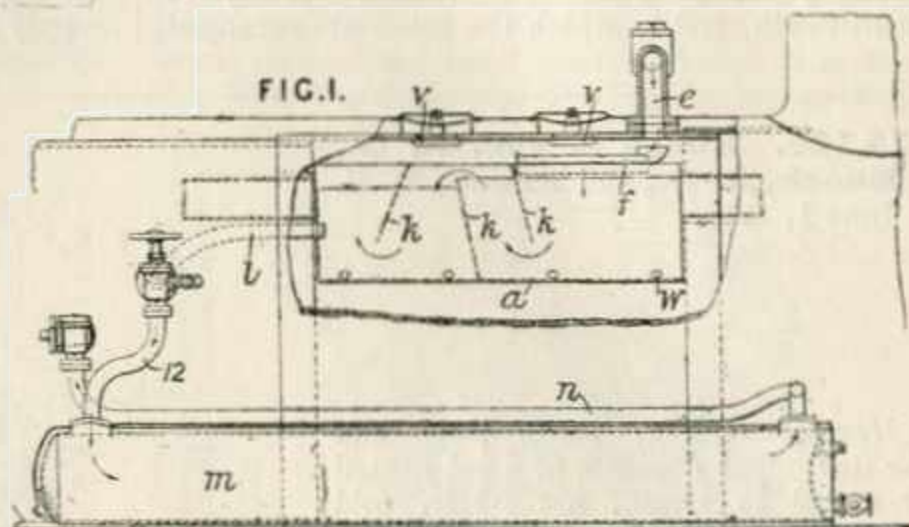
115,134. Cundall, J. L. June 23, 1917.

Heating water.—Water-heating apparatus for a domestic hot-water supply-system comprises a portable frame 11 carrying a supply cistern 21, which is connected directly to the bottom of a storage tank 14, and a boiler 1 connected directly to the top of the tank. The boiler is enclosed by a casing and is heated by gas burners 4. The tubular standards forming the frame have rollers 12 on their feet. The water supply to the cistern is regulated by a ball-cock. Hot water is led off from the tank through a pipe 27. Pipes 30, 31 may connect the boiler to another supply system, and the storage tank may be connected by means of unions 32, 33 to an independent boiler.



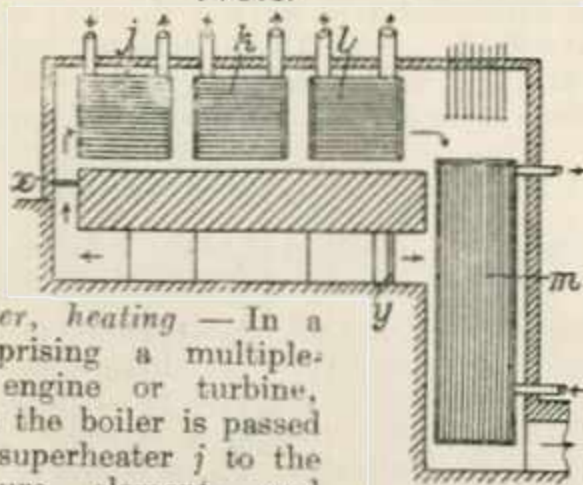
115,253. Stirling, J. H. March 28, 1917.

Feed-water, heating.—In feed-heating apparatus for use particularly in locomotive boilers, of the kind wherein the water is fed into and overflows from open vessels inside the boiler, means are provided for cleaning the vessels from outside the boiler, and the water-level in the vessels is maintained; preferably at the boiler water-level, so as to keep the sediment in a soft condition. Water from the feed-pipe *e* flows over a tray *f* mounted above vessels *a* secured to the boiler shell and fitted with baffle-plates *k*, preferably placed at an angle to facilitate cleaning by tools inserted through hand-holes *v*. The baffle-plates extending to the bottom of the vessels are perforated. The water is led by pipes *l*, *12* into settling-tanks *m*, from which it may be led back into the vessels or taken directly by pipes *n* into the boiler water space. The pipes *l* are connected to the vessels at the boiler water-level. The water may be led through filters after leaving the settling-tanks. Sediment is removed through apertures normally closed by screwed plugs *w*. The vessels may be secured to the smoke-box tube-plate. In a modification, the settling tanks are dispensed with, and the water level is maintained in the chambers by providing apertures at the boiler water-level in the overflow end of the vessels.



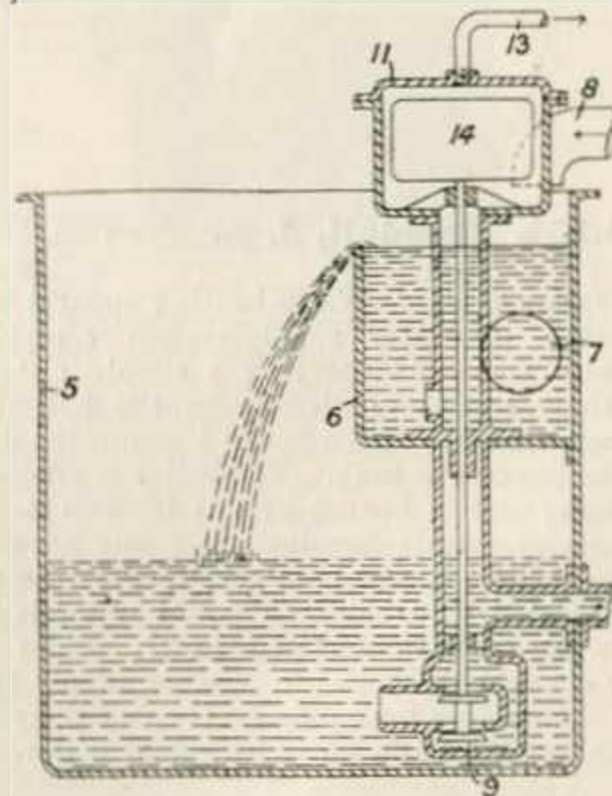
115,582. Davey, H. Oct. 19, 1917.

FIG. 3.



Feed-water, heating—In a plant comprising a multiple-expansion engine or turbine, steam from the boiler is passed through a superheater *j* to the high-pressure element, and through superheaters *k*, *l* to the intermediate and low-pressure elements. The exhaust finally passes through a feed-water heater *m*. The feed-water heater *m* is internally and externally heated and consists of a shell with tubes fixed into end plates.

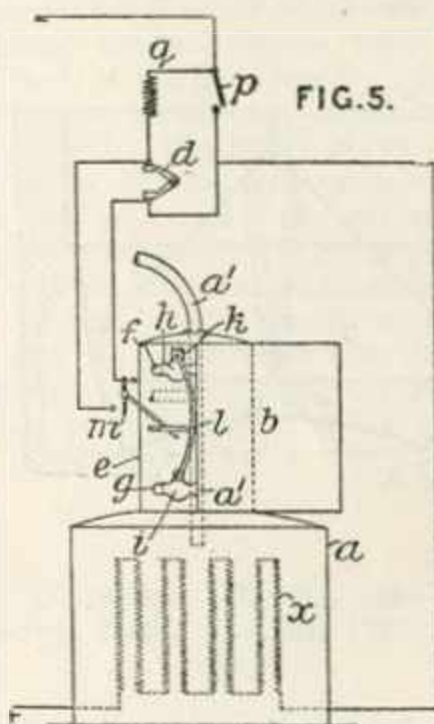
115,631. British Westinghouse Electric & Manufacturing Co., (Assignees of Ehrhart, R. N.). May 4, 1917, [Convention date].



Feed-water, heating.—A steam-condenser system, in which the exhaust from the steam-jet air-ejector used for withdrawing air from the main

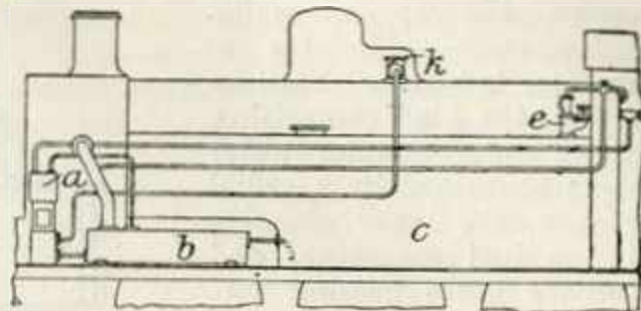
condenser is led by a pipe 7 to an auxiliary condenser 6 in which it is used for heating condensate admitted by a pipe 8, is provided with means responsive to the temperature of the condensate for admitting a supplementary supply of water to the auxiliary condenser in the event of the supply of condensate being insufficient. The auxiliary condenser 6 is mounted in a hot-well 5 into which the heated condensate flows, and the supplementary supply is obtained by opening a valve 9 and thus allowing water to flow from the hot-well into the upper part of the main condenser, whence after it has been cooled by passage over the condenser tubes, it is forced by the condensate pump into the auxiliary condenser 6. The valve 9 is controlled by a float 14 arranged in an elevated float chamber 11 containing hot condensate from the auxiliary condenser and maintained under a reduced pressure, as by a pipe 13 communicating with the main condenser. The level in the float chambers 11 falls as the temperature of the water nears the boiling-point, and the valve 9 is consequently opened.

115,904. **Barr, J. F.** May 24, 1917.



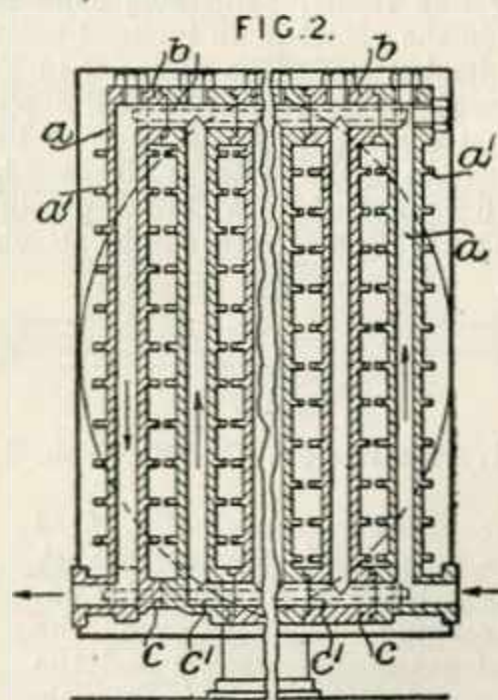
Water supply and delivery.—Water supplied to a tank *a* from a cistern *b* with a float-controlled supply valve is maintained at a temperature just below boiling point by electric heaters *x* and a thermostatic regulator *d*, steam escaping freely from the upper part *e* of the tank through a pipe *f* into and through the cistern *b* which communicates with the tank by a water pipe *g* also. Valves *h*, *i* in the pipes *f*, *g* respectively, are connected by a bridge piece *l* to a handle *k* and a switch *m*, so that on closure of the valves the regulator *d* is cut out of operation and the full current supplied to the heaters by the electromagnetic switch *p*, *q* quickly boils the water which is thereupon discharged through the delivery pipe *a*¹ by the steam pressure.

116,017. **Weir, G. & J., and Latta, J. G.**
Oct. 15, 1917.



Feed-water, heating.—In a feed-heating and supply system of a locomotive boiler, the difficulty of pumping the hot feed-water from the heater into the boiler is overcome by forcing air into the feed tank so as to keep the pressure of the water supply above atmospheric pressure. Air is forced into the closed feed tank *c* by an injector *e* worked either by live or exhaust steam. The tank may be connected to the compressed air brake-pipe, the injector being dispensed with. The pressure on the feed tank is maintained at from five to ten pounds per square inch above atmospheric pressure. The feed heater *b* is preferably of the kind in which the exhaust steam surrounds tubes through which the water passes. The water may be delivered by the pump *a* into the boiler through a spray valve *k* of the kind described in Specification 3622/14.

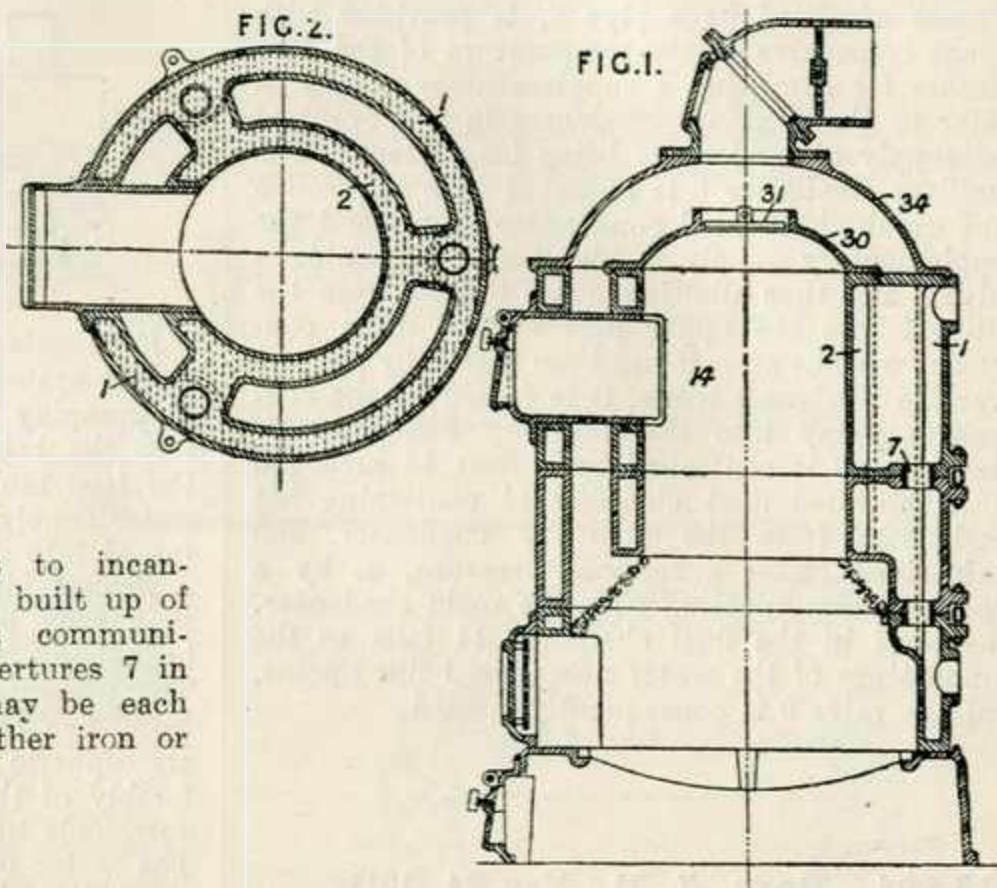
116,209. **Bloxam, A. G.,** (*Wolf Akt.-Ges., R.*) Oct. 9, 1917.



Feed-water, heating.—In a feed-heater consisting of a row or two or more parallel rows of vertical pipes *a* having transverse ribs *a*¹, cross-pieces *b*, *c* on the ends of the pipes are bored and fitted together so as to form the upper and lower communication ducts or headers. The pipes are secured together by bolts passing through the cross-pieces. The ribs on consecutive pipes may be in relatively staggered arrangement, or they may be inclined in opposite directions.

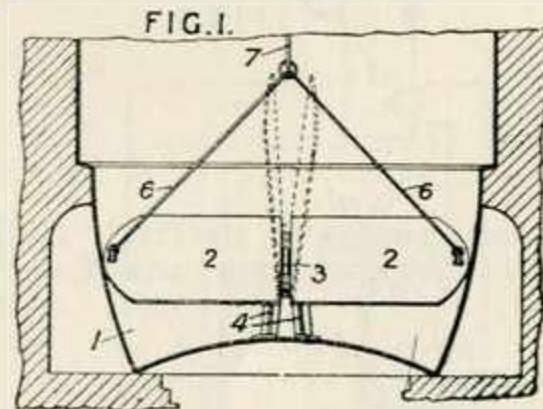
116,470. Roberts, A. Jan. 16, 1918.

Annular boilers; internally-fired boilers. — Relates to boilers for hot-water heating-systems of the kind comprising inner and outer annular water chambers connected by a radial water way, the inner chamber forming a fuel magazine, and the furnace gases passing upwards through the flue spaces between the chambers. The tops of the sections 1, 2 are closed by covers 30, 34. The inner cover is provided with a damper 31 so that the fuel magazine 14 may be opened to the draught and the fuel brought to incandescence. The chambers shown are built up of vertically superposed cast sections communicating with one another through apertures 7 in their end faces. The chambers may be each made in one piece by riveting together iron or steel shells.



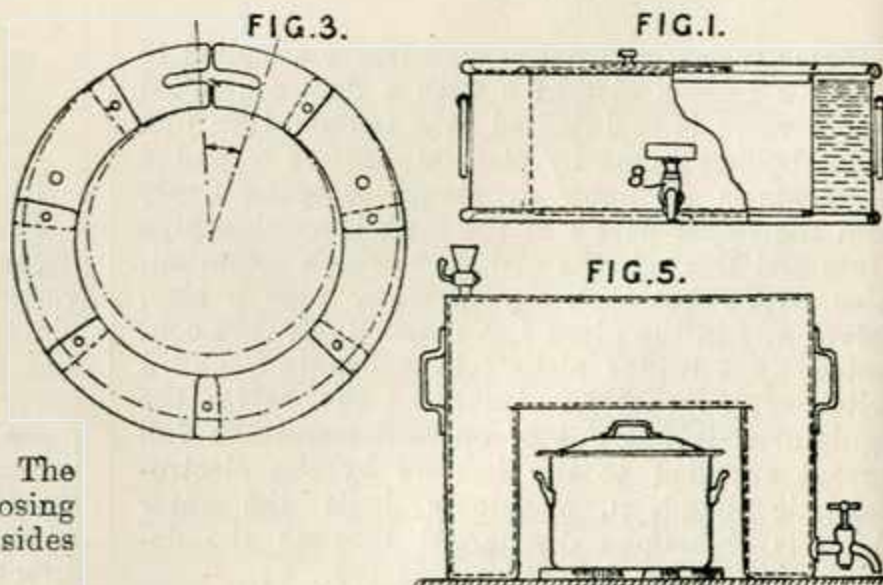
116,486. Hill, A. March 23, 1918.

Boiling-pans and the like. — To promote and control the circulation of the liquid in a brewer's copper or like vessel, adjustable baffle-plates are fixed inside the vessel in an inclined position relatively to its bottom. The plates 2 in the vessel 1 are hinged on an inclined rod 3 supported by standards 4 secured to the bottom of the vessel. The inclination of the plates is adjusted by means of cords 6 connected to a cord 7 passing over a pulley and having a counterweight attached to its free end.

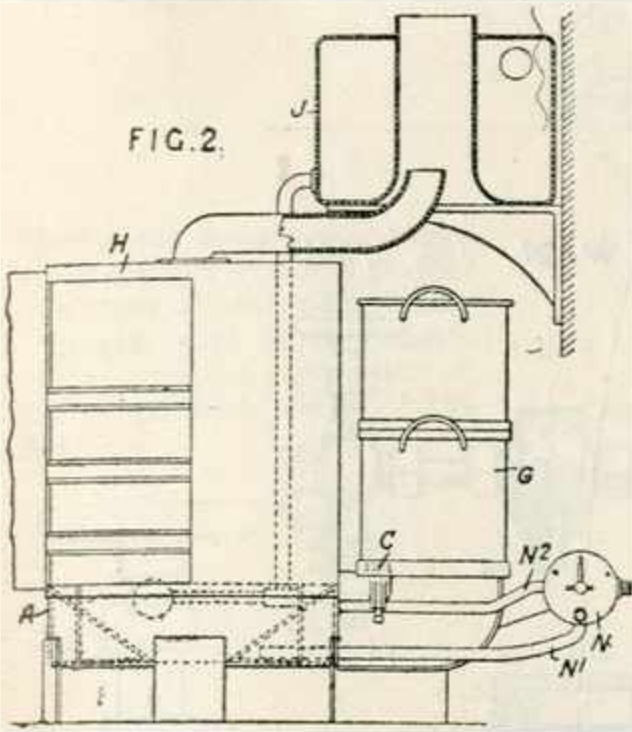


116,861. Zehnder, O. W. Feb. 2, 1918.

Annular boilers; internally-fired boilers. — A portable water jacket serving as a boiler is provided for enclosing cooking utensils over the burners of gas cooking-ranges and the like. It may be annular in form with or without an opening in front at the lower part as shown in Fig. 5. An opening at the top closed by a sliding lid, or a funnel fitted with a valve allows water to be introduced and hot water may be drawn off by a tap 8. A flat jointed ring, Fig. 3, may rest on the top so as to be adjustable to the size of a cooking-utensil within the jacket. The open-fronted form may have a slide for closing the opening. Handles are provided at the sides of the jacket.

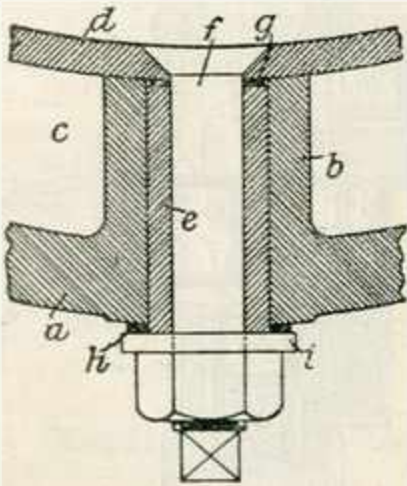


116,953. Nelson, A. July 17, 1917.



Annular boilers; water delivery.—A boiler combined with an open or other cooking-apparatus, and intended particularly for supplying steam to a steam-cooker, is fitted with a steam valve and with a water outlet through which water is forced by the internal steam pressure when the steam valve is closed or partly closed. The annular boiler A supplies steam to a steam-cooker G through a valve C. The boiler is fed from a tank at its side, water flowing from an elevated reservoir J into the tank under the control of a ball cock. A gas-heated oven H is mounted above the boiler. When the steam valve is closed, water is forced out of the boiler through a pipe N¹ and three way-cock N. Hot water may be drawn off from the supply-tank through a pipe N². The cock N may control the steam supply to the cooker.

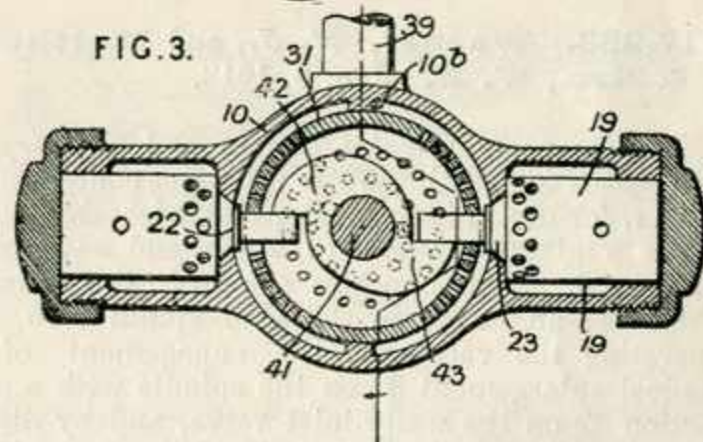
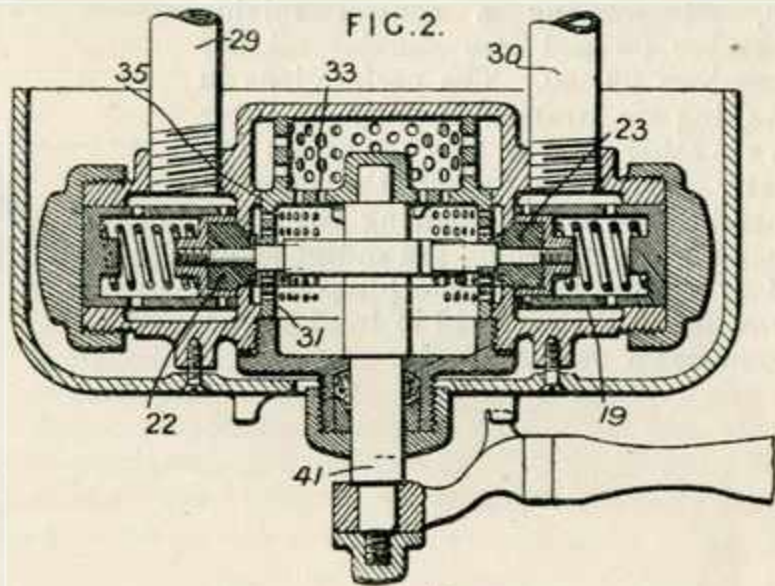
117,005. Pointon, J. E., and Perkins Engineers, Ltd. Oct. 24, 1917.



Heating liquids. — Relates to jacketed troughs for machines for kneading and mixing plastic substances and for like purposes. The inner and outer walls d, a of the heating jacket c through

which steam or other heating medium is circulated are stayed together by bolts f which pass through bushes or sleeves e within bosses b on the wall a. The conical head of the bolt engages a countersunk aperture in the wall d, and copper or other jointing-rings g, h are provided at the ends of the bush e. When the nut i is tightened up on the bolt f, a joint is made simultaneously at both ends of the bush e. The bush e and bolt f are preferably made of phosphor bronze.

117,221. Warner, W. J., and Matthews & Bro., W. N. Jan. 3, 1918.



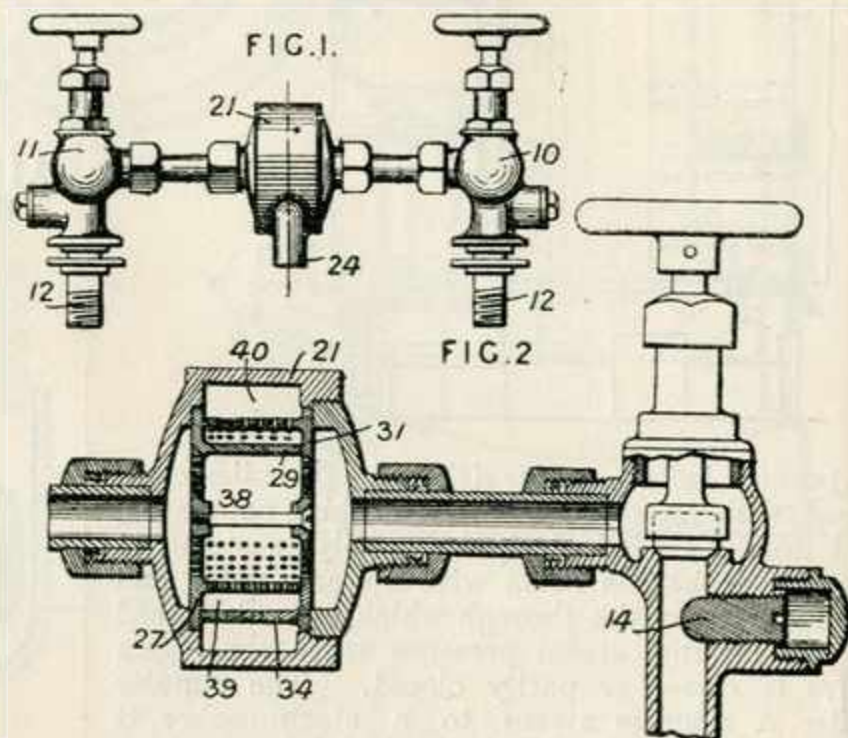
Heating water; water supply and delivery.—In a direct-contact water-heater for use in bath rooms, laundries, &c., the steam and water enter the mixing-chamber through oppositely disposed valves 22, 23 which are operated simultaneously by a rotatable spindle 41. The mixing chamber contains a removable perforated cylinder 31 divided transversely by a perforated partition 33, through which the mixture passes on its way to the outlet pipe 39. The annular space between the cylinder and the casing 10 is divided by a circumferential rib 35. Longitudinal ribs 10^b in the front part of the annular space prevent the direct contact of steam and heater before passing through the perforations in the cylinder. The inlet valves are operated by the rotation of cams 42, 43 bearing against the valve spindles, the

cams being so shaped that, while the water valve opens directly, the steam valve is not opened until the operating handle has been moved over, say, a half its length of travel. The valves slide

in perforated sleeves 19 and are pressed against their seats by springs and by pressures of the steam and water entering through the pipes 29, 30 respectively.

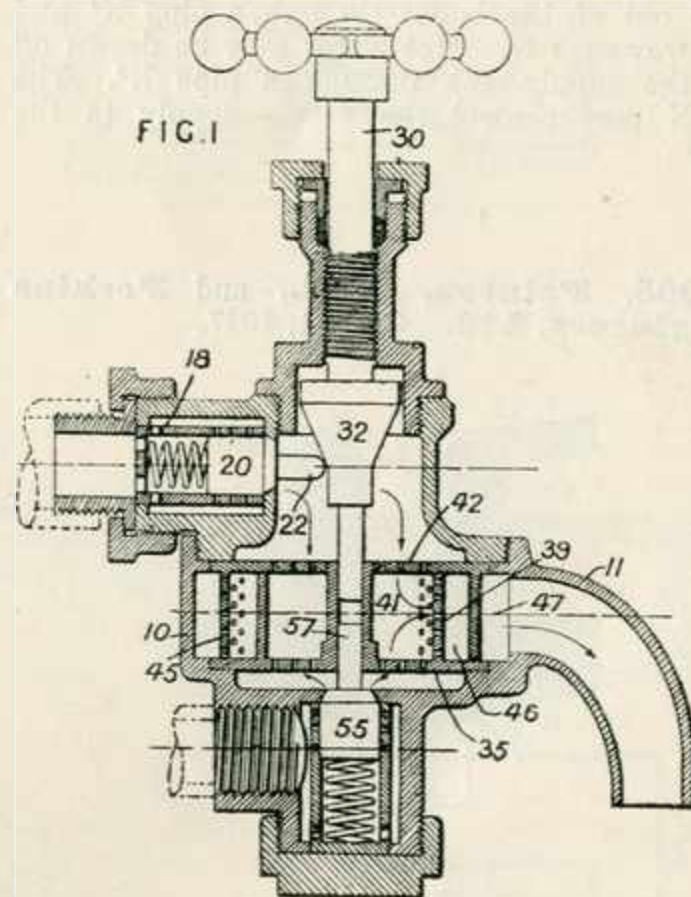
117,222. Warner, W. J., and Matthews & Bro., W. N. Jan. 3, 1918.

Heating water. — In apparatus for heating water by direct contact with steam, for use in bath-rooms, laundries, &c., the steam and water pipes 12 are connected to a chamber 21 containing perforated plates 27, 31 having projecting perforated rings 29, 34 forming a central mixing chamber 38 and two annular mixing chambers 39, 40. The perforations in one ring are arranged opposite to those in the other ring, so that the steam and water must pass around the annular chamber 39 before entering the outer chamber 40, on which the outlet spout 24 is fitted. Adjustable plugs 14 are provided in the pipes 12 in front of the screw-down valves 10, 11.



117,223. Warner, W. J., and Matthews & Bro., W. N. Jan. 3, 1918.

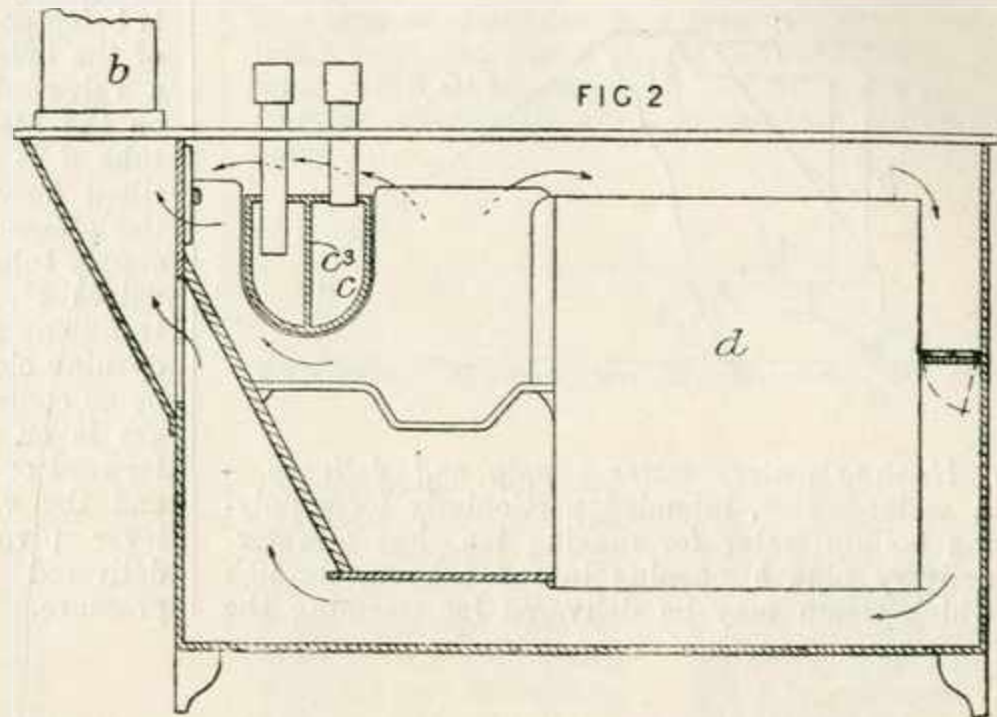
Heating water; water supply and delivery.— Apparatus for heating water by direct contact with steam, for use in bath rooms, laundries, &c., comprises a mixing-chamber 10, steam and water inlet valves 55, 20 on opposite sides of the mixing chamber, and a screw-threaded spindle 30 for operating the valves by the engagement of a conical enlargement 32 on the spindle with a projection 22 on the water-inlet valve, and by direct engagement with the spindle 57 of the steam-inlet valve. The mixing-chamber consists of perforated plates 42, 35 carrying oppositely perforated ring-shaped partitions 39, 45, which form annular passages 46, 47 around a central mixing-compartment 41. The water is discharged from the outer annular passage into a spout 11. The valves slide in perforated sleeves 18, and are pressed upon their seats by springs, and by the pressure in the steam and water pipes. The water inlet is opened before the steam inlet valve, so that cold water is discharged during the first few turns of the spindle 30.



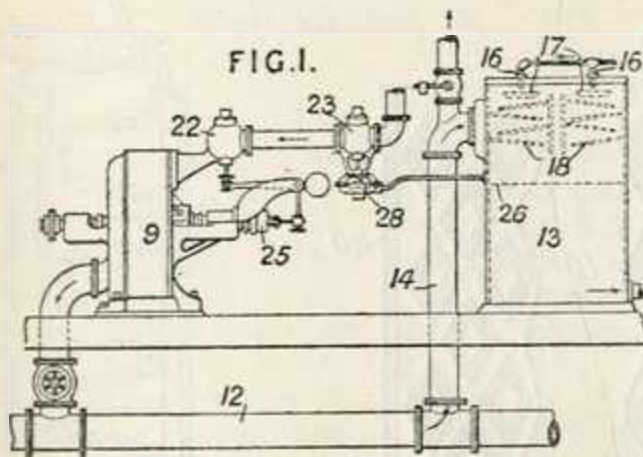


117,471. Florence, A. P. May 5, 1917.

Block-form boilers.—A range boiler is divided by a mid-feather or partition c^3 , extending along the greater part of its length, which ensures the circulation of water round both sides of the boiler.



117,524. British Thomson - Houston Co., (General Electric Co.). Aug. 27, 1917.

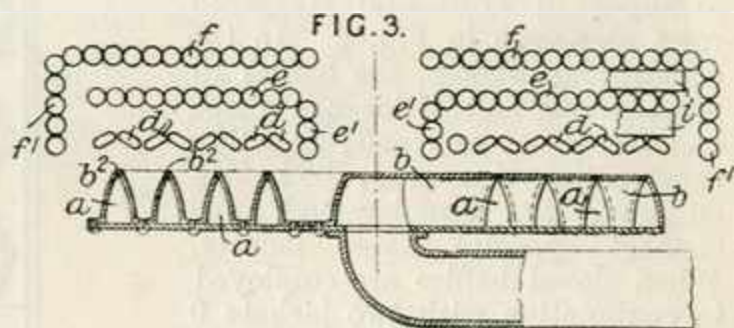


Feed-water, heating.—One or more auxiliaries of a main condensing engine or turbine are driven by a non-condensing engine or turbine 9 up to a point at which its exhaust can be efficiently utilised for heating the feed-water, the remainder of the load of the auxiliaries being driven by an electro-motor. The exhaust steam from the turbine 9 is led by pipes 12, 14 to feed-water heater 13, Fig. 1, the water dropping from pipes 16 into trays 17 and overflowing on to baffles 18, where it meets the exhaust steam.

117,529. Taylor, W. M. Sept. 7, 1917.

Water-tube boilers.—In a water-heater or steam-generator provided with water coils arranged above a gas burner and in horizontal planes one above the other, such as is described in Specification 22370/07, a spiral water tube d

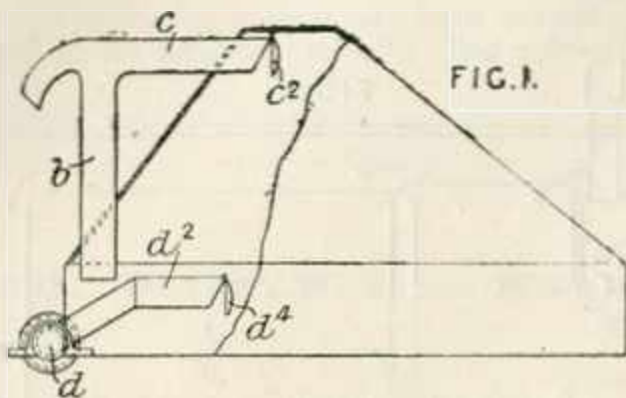
is disposed immediately above the burner in such a manner that two coils are arranged one on each side above the gas outlets of each burner tube, the coils being of flattened circular or of elongated elliptical section with the major axes of each pair of coils forming an inverted V above the corresponding burner tube so that the water of condensation from the coils drops clear of the coils of the burner. Spiral water tubes e, f are



arranged above the water tube d with the coils of each spiral contiguous and so that the water circulates through the tubes in a direction opposite to the flow of the combustion gases between adjacent tubes. The coils of the tubes may, in a modification, be spaced apart and covered by one or more plates. The lowermost spiral water tube d is preferably shrouded along one or both peripheries by a cylindrical plate supported from one of the upper spiral tubes, or by depending portions e^1, f^1 of one or more of the upper spiral tubes. Metallic space or cradles i may be placed between the tubes.



117,551. Mackay, R. Oct. 29, 1917.

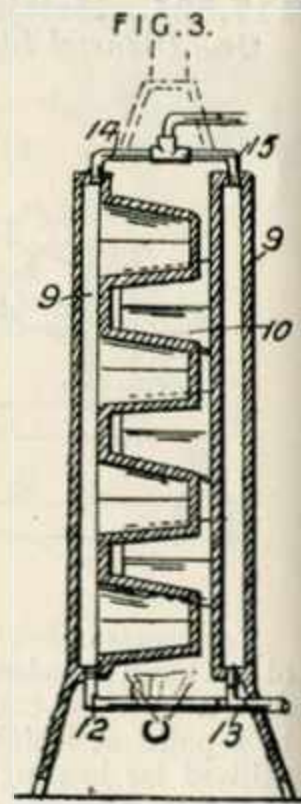
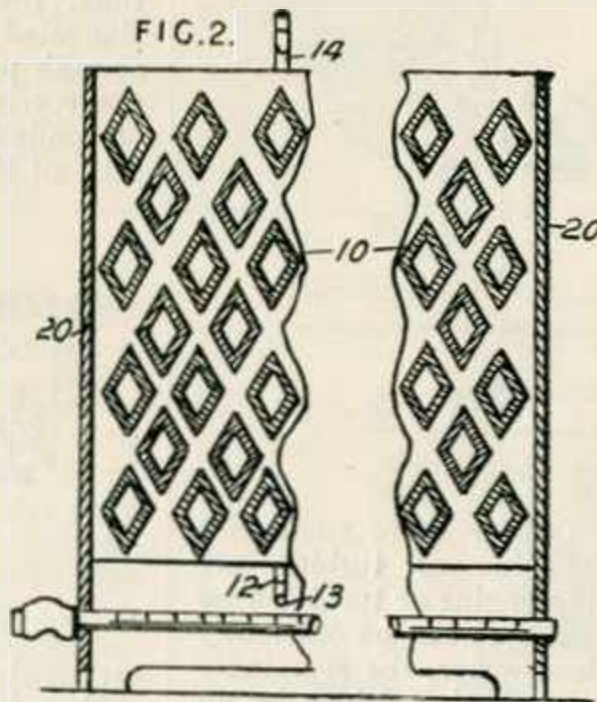


Heating water; water supply and delivery.—A water-heater, intended particularly for supplying boiling water for making tea, has a water-delivery pipe *b* opening into a tube *c*, through which steam may be delivered for warming the

tea pot, the inner end of the steam-delivery tube being fitted with a valve which closes when water is being poured through the spout. The inner end of the branch water-supply tube *d*² is fitted with a valve which opens and closes with the valve on the steam-delivery tube. The water-supply tube *d* is adapted to rotate when the heater is tilted forward to pour out water. The ends of the steam-delivery tube and the branch water-supply tube are shown fitted with hinged weighted valves *c*², *d*¹. The heater may be mounted on trunnions and water may be supplied through an opening closed by a stopper. The gas valve may be so controlled by a cam on the heater that the gas is on only when the heater is tilted either forward or backwards. The heater may be fixed, and the valves and cam device operated by a lever pivoted on the heater, the water being delivered through the spout by the steam pressure.

117,730. Jackson, J. D. Sept. 25, 1917.

Heating water.—An internally-fired domestic water-heater of rectangular shape is built up of water jackets 9, Fig. 3, on two or more sides having hollow baffles or tubes 10 communicating with one or more of the jackets and arranged in horizontal staggered rows as shown in Fig. 2. In the construction shown, the baffles 10 are tapering and of lozenge shape and closed at one end; in other constructions described, the baffles employed are circular and may connect opposite water jackets. When closed baffles are employed in conjunction with two jackets 9 connected by end plates 20 as shown, two inlet pipes 12, 13 and two outlet pipes 14, 15 are necessary; but when more than two jackets are used or the baffles extend completely across the heating space, one inlet and one outlet pipe are sufficient.



Reference has been directed by the Comptroller to Specifications 817/88, 13642/94, 2655/00, and 6895/03.

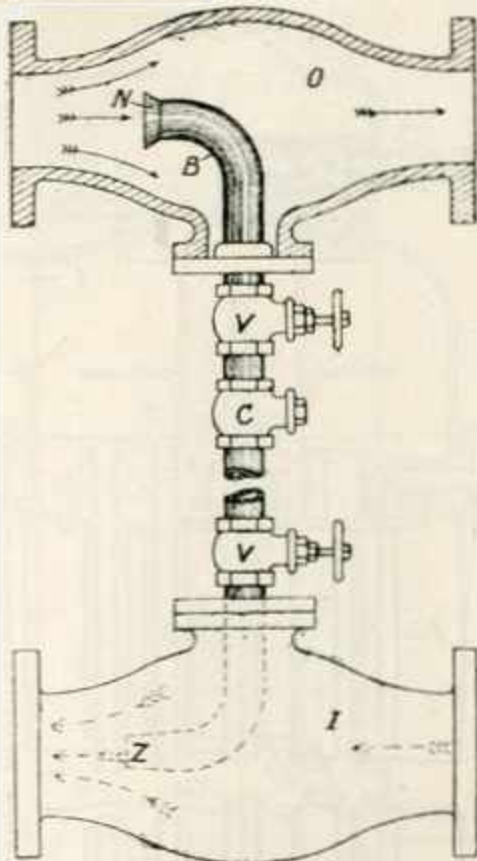
118,066. Gleave, F., and Stublely, J. R. March 13, 1918.

Feed-water, heating. — To diminish the deterioration of economizer pipes due to great differences of temperature between the incoming feed-water in the pipes and the flue gases, the temperature of the entering feed-water is increased by drawing off hot water from the

economizer outlet O through a pipe B opening so as to face the flow of the outgoing water and discharging it into the inlet I in the direction of flow of the incoming water. The inlet end N of the pipe is funnel shaped, and the outlet end Z is contracted to form a nozzle. The pipe is fitted with stop valves V and a check valve C.

(For Figure see next page).

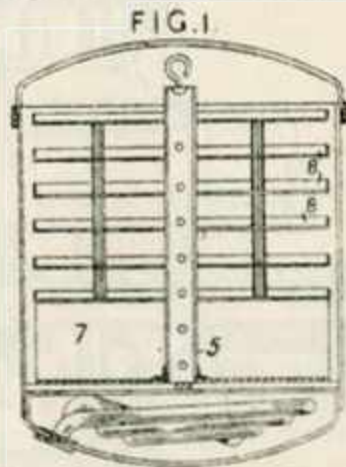
118,066.



forated pipe 5, which distributes the steam rising from the lower part of the digester. The glue accumulates in a reservoir 7 removable bodily with the plates 8. In a modification, the reservoir 7 is replaced by a perforated plate through which the glue passes into the water below.

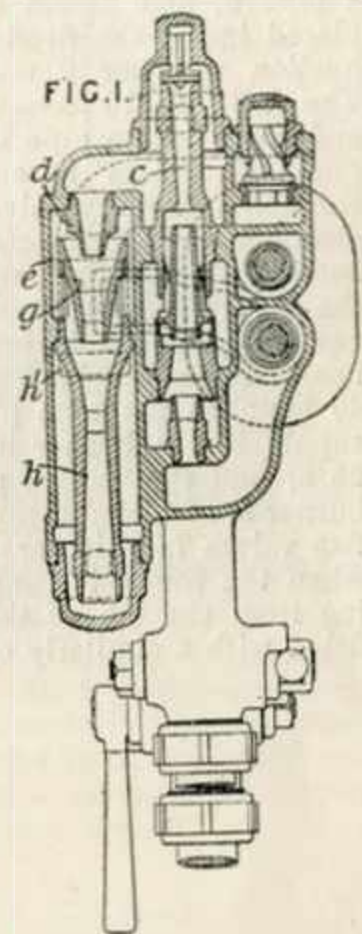
118,119. **Mauerhofer, L.** Feb. 5, 1916.
[Convention date].

Digesters for the steam treatment of glue &c., more especially in the leather industry. The glue instead of being treated in the mass is placed in thin layers on perforated plates 8 fitted one above the other on a central per-

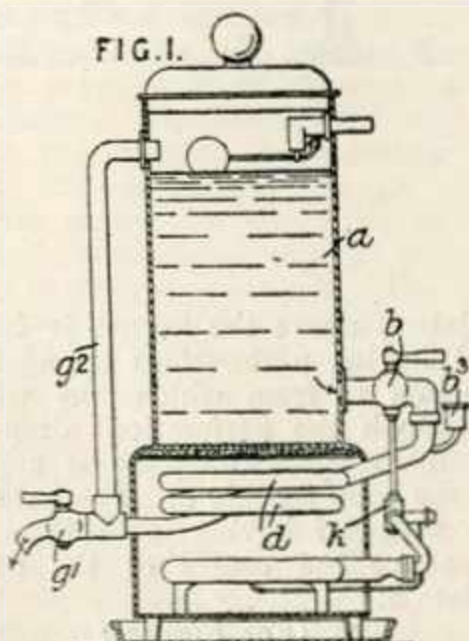


118,364. **Gresham, H. E.** Oct. 27, 1917.

Feed-water, heating.
—Feed-water is fed under pressure from the feed pump or injector through one or more converging nozzles entraining boiler steam, the water thus heated being delivered into the boiler through a diverging nozzle. The converging nozzles *d*, *g*, the diverging nozzle *h*, and the nozzles of the feed injector *c* may be enclosed by a common casing. The space *e* around the converging nozzles is in communication with the boiler steam space, and the heated water passes into the boiler through a port *h*¹. In a modification, the nozzles are placed in the boiler steam space.



118,558. **May, S.** Feb. 20, 1918.

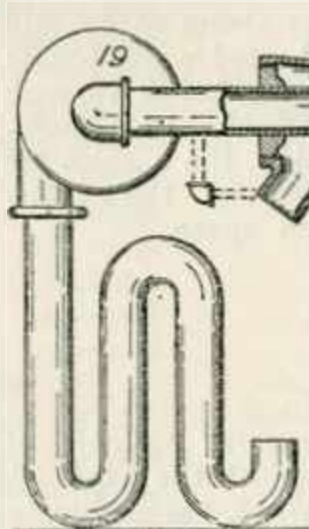
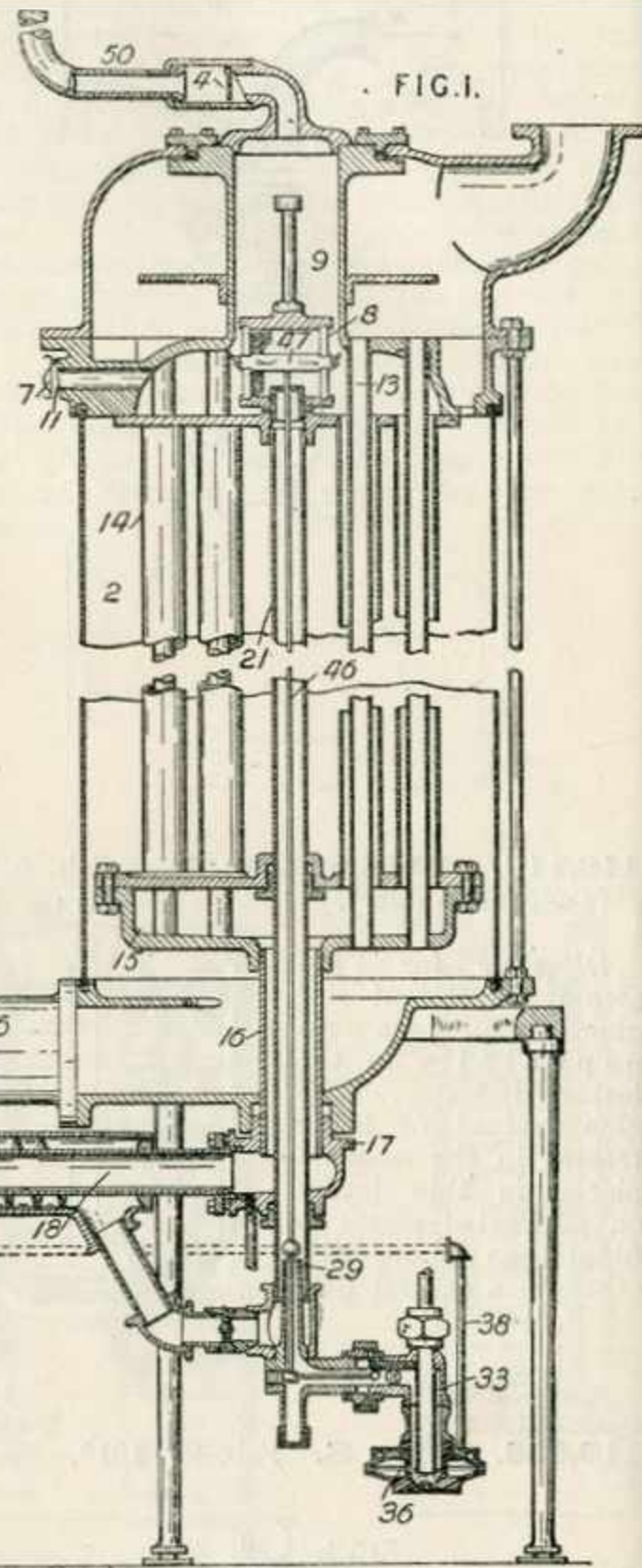


Geysers; portable liquid-heaters.—In a water-heater of the kind described in Specification 19547/13, the cold-water container *a* is self-filling, and the cock previously provided between the supply tap *b* and the heating-coil *d* is dispensed with, the end of the coil being fitted with a draw-off tap *g*¹ and connected by an external pipe *g*² to the top of the container, so that heated water may return to the container when the draw-off tap is closed. The coil is cleaned by pouring acid into a cup *b*³ fitted on its inlet end. In a modification, the supply tap *b* is dispensed with, and the gas-supply cock *k* is independently operated.



119,056. **Dodd, H. S.** Aug. 3, 1917.

Heating liquids; heating air.—In a tubular heater comprising a casing through which the water, air, or other fluid to be heated is circulated, a combustion chamber within the upper part of the casing, fire-tubes connecting the combustion chamber to a chamber in the lower part of the casing, and a pump for withdrawing the products of combustion, the combustion chamber is situated entirely within the casing, and a flue-pipe extends from the lower chamber through the lower end of the casing. Water, air, or other fluid enters at the bottom of the casing 2 through a pipe 6, and passes upwards through tubes 13 placed inside the fire-tubes 14 between the combustion chamber 9 and the lower chamber 15. The flue pipe 16 passes through a stuffing-box 17 and opens into a pipe 18 connected to an exhaust pump 19. Gas is supplied to the burner 8 through a mercury valve 36, in which the mercury chamber is so connected by a tube 38 to the suction pipe 18 that, when the pump is running, the level of the mercury around the end of the gas inlet-pipe 33 is lowered and gas enters the nozzle 29 in the burner supply-pipe 21. A pipe 46 supplies gas to a pilot burner 47. The air supply to the burner is preheated in a chamber 25 around the suction pipe 18. Air for the pilot burner is admitted through passages 11 fitted with flap valves 7, which are drawn against their seats when the pump is running. An outlet 50 leading from the top of the combustion chamber is fitted with a similarly operating flap valve 4.



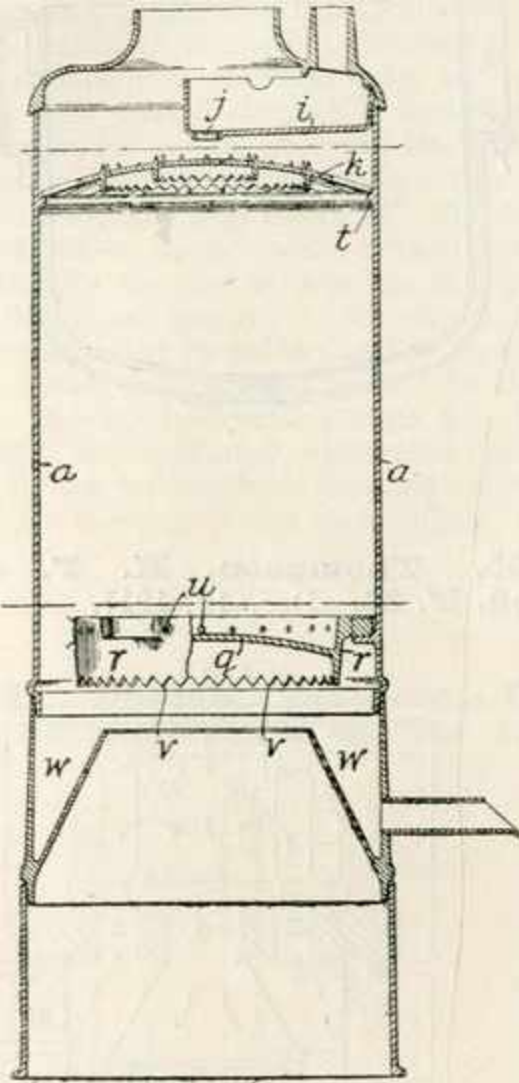
119,417. **Davis Gas Stove Co., and Barralet, J. H.** May 3, 1918.

Geysers.—Relates to geysers of the type wherein the inlet water is directed on to a convex perforated plate having projecting points adjacent to the perforations, the water falling from these points on to a convex plate above the burner and then into a tapering annular outlet chamber. The

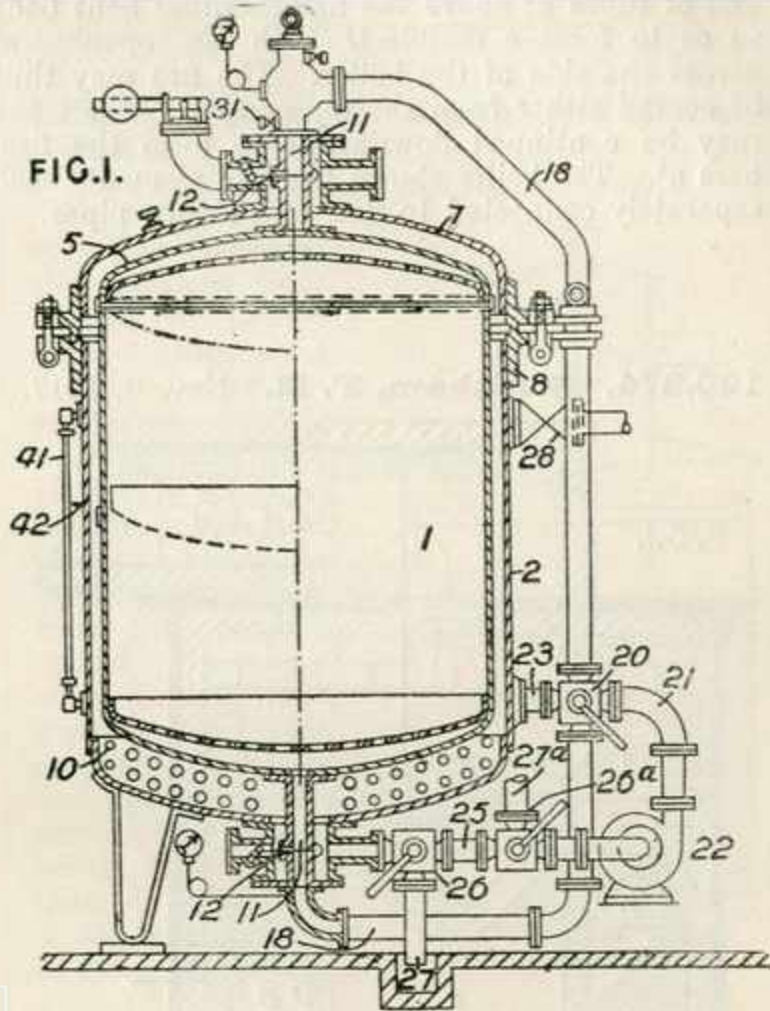
convex plate *g* above the burner is formed with a flange *r* having perforations *u* and lower projecting points *v*, from which the water overflowing through the perforations drops into the outlet chamber *w*. The plate is supported on lugs *t* on the body casting *a*. The entering water falls into a dish *i* having a bottom outlet *j* arranged above the centre of the convex perforated plate *k*.

(For Figure see next page).

119,417.



a sufficient height in the outer vessel 2 as indicated by a water gauge 41 and index 42; the cocks 28, 31 are then closed and the lye circulated by means of the pump 22, the direction of circu-

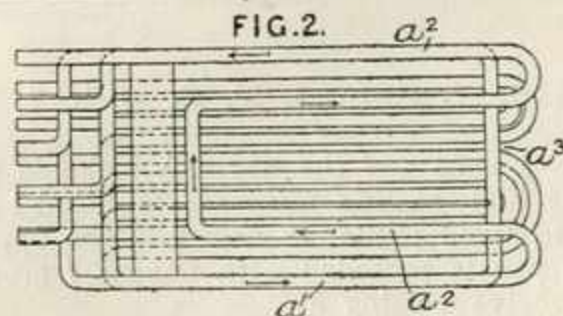
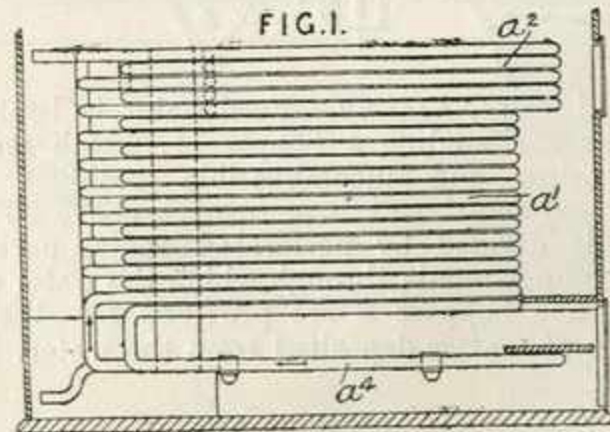


lation being reversed when desired by means of the four-way cock 20. In a modification, the vessels are disposed horizontally and the inner vessel is rotatably supported by means of channel bars on rollers carried by a carriage which runs on rails secured to the outer vessel.

119,663. Tütsch, C. Oct. 2, 1917, [Convention date].

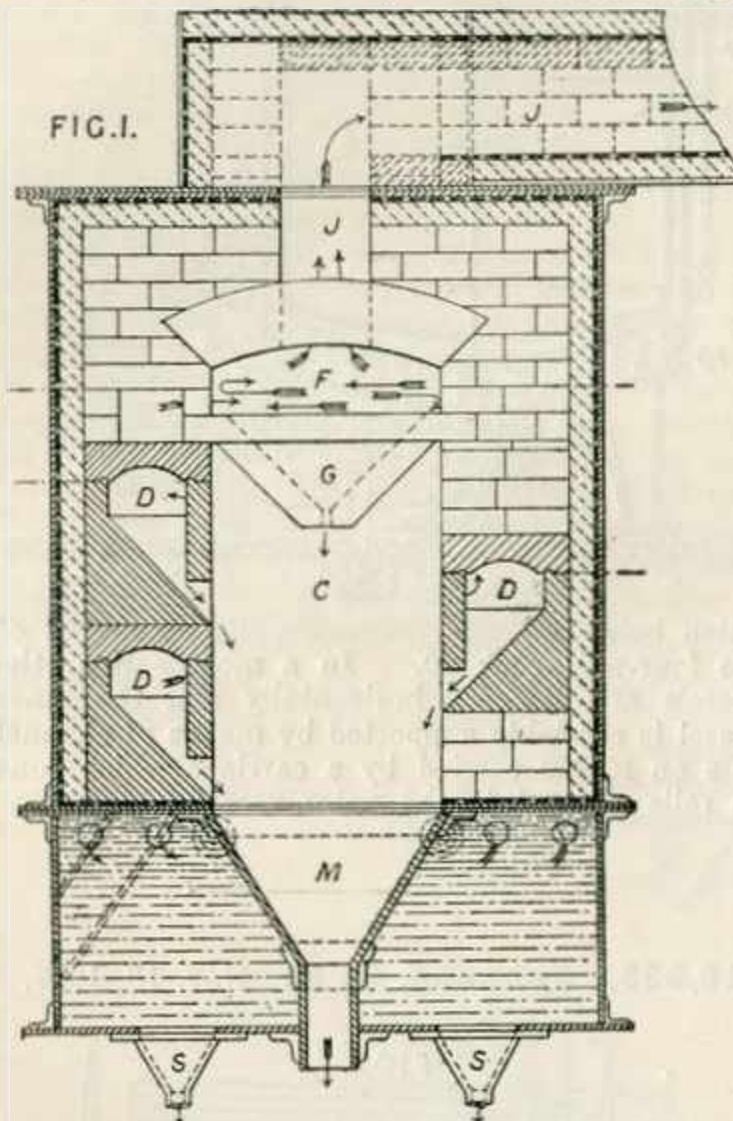
Digesters. — A bleaching-kier comprises inner and outer closed vessels 1, 2, the outer vessel 2 containing a heating-coil 10 and communicating by a pipe 25 with a pump 22 having a discharge pipe 21 with a four-way cock 20, which serves to place one section of the circulation pipe 18 of the inner vessel 1 in communication with the pipe 21, and the other section in communication with a pipe 23 leading back to the outer vessel 2. With this arrangement the inner vessel takes the pumping pressure and can be made considerably lighter than the outer vessel, which takes the higher boiling-pressure. To prevent the pressure in the inner vessel from rising above a predetermined maximum, counterweighted valves 12 are provided in the sections 11 connecting the inner vessel with the circulation pipe 18. Three-way cocks 26, 26^a enable the pipe 25 to be connected respectively to a discharge pipe 27 and to a pipe 27^a leading to a water container. The upper part of the circulation pipe 18 is removable with the covers 5, 7 of the vessels. The pipe 23 is curved to direct the lye into the vessel 2 in a tangential direction. The inner vessel may be made in one or more parts each provided with a straining bottom. In use, an air escape cock 31 is opened, and lye is admitted by a cock 28 into the outer vessel 2 and pumped through the lower section of the circulation pipe 18 into the inner vessel 1 until it flows off through the cock 31 and attains

119,935. Johnson, G. E. Nov. 10, 1917.



Water-tube boilers.—A boiler for heating buildings consist of a single wall of tubes a^1 arranged in rectangular formation around the fire-chamber, and of tubes a^2 above the fire-chamber bent back so as to form a double-U with an opening a^3 across one side of the boiler. The fire may thus be served either from the top or side. The tubes may be continued downwards to form the fire-bars a^4 . The boiler shown has five elements each separately connected to flow and return pipes.

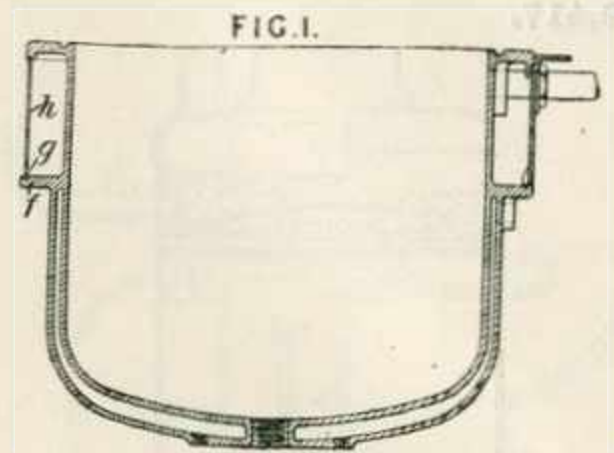
120,274. **Whitham, F. E.** Nov. 9, 1917.



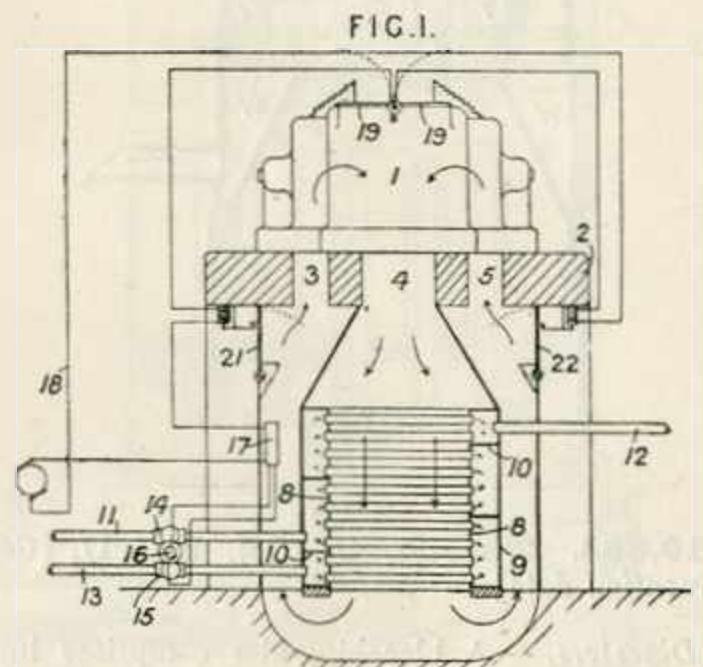
Feed-water, heating.—Feed-water is heated in a tank surrounding a hopper M, which receives hot ashes and incombustible residues from powdered fuel burnt in a furnace above it. The tank is divided by perforated radial partitions into compartments through which the water circulates, and hoppers S are provided for the collection of matter deposited from the water.

120,315. **Pulsford, F. C.** Feb. 7, 1918.

Boiling-pans and the like.—A jacketed pan for heating and cooling purposes is formed in one piece to avoid joints, as shown. The upper part of the pan is provided with flanges f grooved at g to receive lagging h .



121,005. **Thompson, H. F. J., and Wood, T. H.** Dec. 18, 1917.

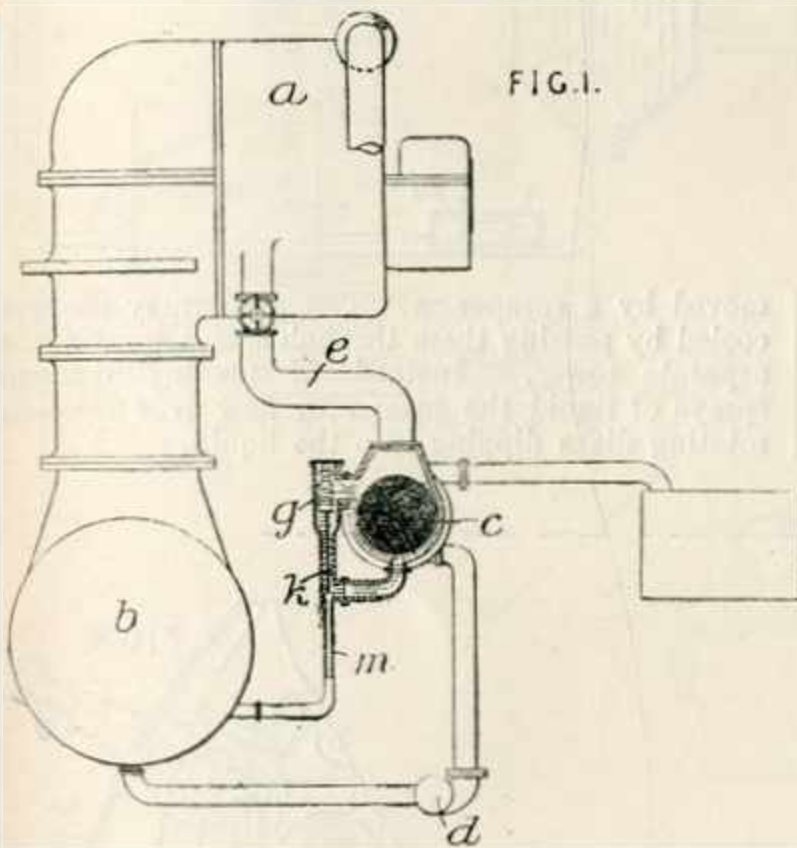


Heating liquids.—The heated air issuing from air-cooled dynamo-electric machines or other electrical machinery or apparatus is used to warm up boiler-feed water or other heat-absorbing medium of which the absorbed heat can be utilized. In the case of generating plant including a condensing steam engine or turbine, the condensate constitutes, wholly or in part, the heat-absorbing medium. In one form of heat utilizing plant, a totally-enclosed dynamo-electric generator 1, Fig. 1, is mounted upon a hollow foundation 2 of concrete &c. having openings 3, 4, 5 communicating with the interior of the generator. The heat-absorbing apparatus is contained within the foundation and comprises a multiple series of water tubes surrounded by passage ways communicating with the openings 3, 4, 5, the heated and cooled air of the machine 1 circulating in the directions shown by the arrows. The ends of the water tubes are secured in iron or steel plates 8, and the water is circulated in a zigzag manner through the tubes by the provision of other vertical and horizontal plates 9, 10, respectively. Boiler-feed water from a condenser enters through a pipe 11 and issues through a pipe 12 to the boiler. Make-up cold water may be introduced through a pipe 13, and manual or automatic valves 14, 15 may be arranged in the pipes 11, 13.



The automatic valves may be operated by an electric motor or the like 16 supplied with current from the leads 18 through a thermostat 17. The air for cooling the machine may be first compressed, then passed through a cooler, and afterwards expanded before entering the machine. In the case of the heat-utilizing apparatus becoming incapacitated, air-tight doors 19, 21, 22 may be provided, these doors being opened by hand or automatically for the circulation of atmospheric air in the usual manner. As shown, the doors may be controlled by solenoids having their windings in circuit with the leads 18. In the case of a motor driving hydraulic pumps &c., the water from the heat-utilizing apparatus after being heated by the hot air from the motor may be used to prevent freezing of the water pipes.

121,169. British Thomson - Houston Co., and Samuelson, F. Dec. 1, 1917.

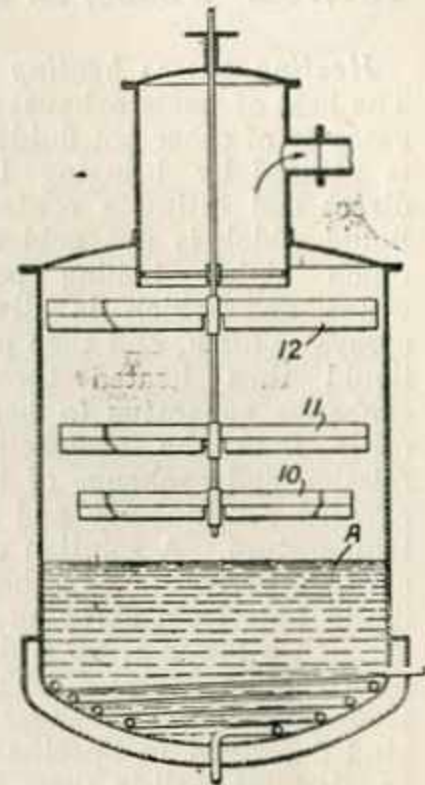


Feed-water, heating.—Relates to a steam power plant in which the exhaust steam or the steam from an intermediate stage of an engine or turbine is used to heat the condensate from the main condenser in a surface heater, the condensate passing through the tubes of the heater on its way to the hot-well tank. The condensed steam in the heater *c* is automatically maintained at a suitable level below the top of the heating-tubes, so that the upper tubes serve to condense the steam from an intermediate stage of the turbine *a*, and the lower tubes are submerged in the water of condensation. The condensate is withdrawn from the main condenser *b* by a centrifugal pump *d*, passes upwards through the tubes of the heater, and is discharged through the outlet pipe into the hot-well tank. The water-level in the heater is maintained by a float-valve *g*, which, when open, allows surplus water to drain

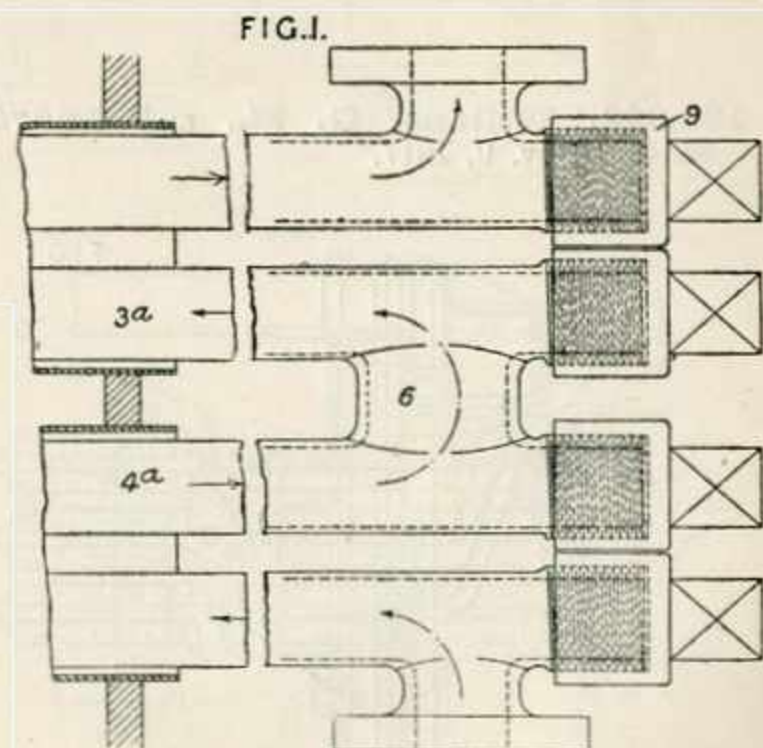
into the condenser through a pipe *m*. The steam space of the heater is in communication with the condenser through the hollow valve stem *k*.

121,293. Frey, E. Wirth-, and Henz, E. Jenny-. Dec. 5, 1918.

Boiling-pans.—In order to suppress the scum or froth formed in boiling and evaporating liquids such as soap lyes, rotating striking-vanes 10, 11, 12 are arranged in the upper part of the boiler in such manner as to form a central vapour space which is swept free from scum, the surface between this space and the surrounding scum being larger than that of the surface *A* of the boiling liquid.



121,649. Howell & Co., and Willans, G. H. Jan. 8, 1918.



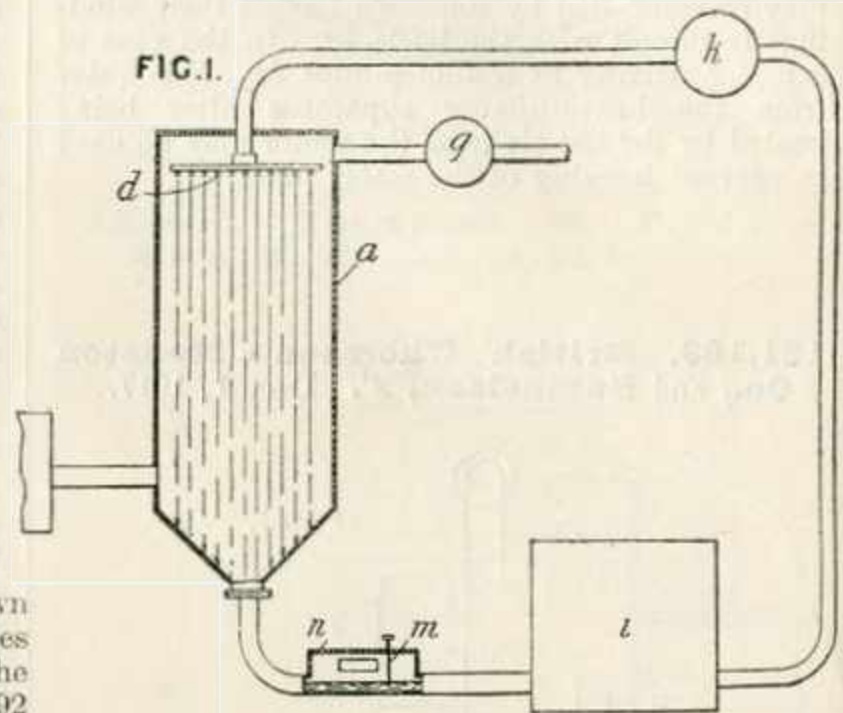
Feed-water, heating.—Relates to U-tube heating elements inserted in boiler smoke-tubes, particularly to feed-heating elements of the kind described in Specification 14976/15, and consists in connecting the U-tubes together by short tubular pieces 6, Fig. 1, secured directly, pre-

preferably by welding, to the sides of adjacent legs 3^a, 4^a of the tubes near to the ends extending into the smoke-box. The connexions may be made by bolting together flanged tubular pieces

on each of two adjacent legs. The ends of the tubes are closed by internally screw-threaded caps 9.

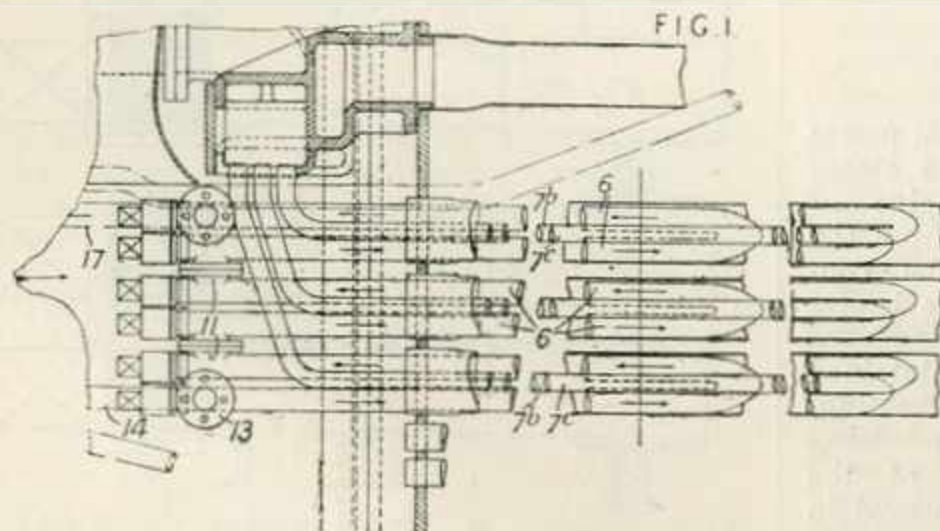
121,752. Pease, E. L. June 22, 1917.

Heating gases; heating liquids.—The heat of waste exhaust or furnace gases or of other hot fluids or bodies is utilized by bringing them into direct and intimate contact with a liquid which is not acid and has a much higher boiling point than water and which is divided into sprays or films, and then passing the liquid thus heated through heat exchange apparatus to heat air or other fluid, the abstraction, transmission and exchange of heat being effected continuously and at a high temperature. A solution of calcium chloride, creosote or other suitable liquid falls from spraying nozzles *d* through a tower *a*, up which hot gases are drawn by a suction device *g*. The heated liquid passes through a heat exchanger *i*, for example of the kind described in Specifications 4154/15, 103,492 and 104,721, [all in *Class 64* (iii), Surface apparatus &c.], and after giving up its heat is returned to the spraying nozzles by a pump *k*. The hot liquid passes through a box *n* having a side aperture through which solid matter may be re-

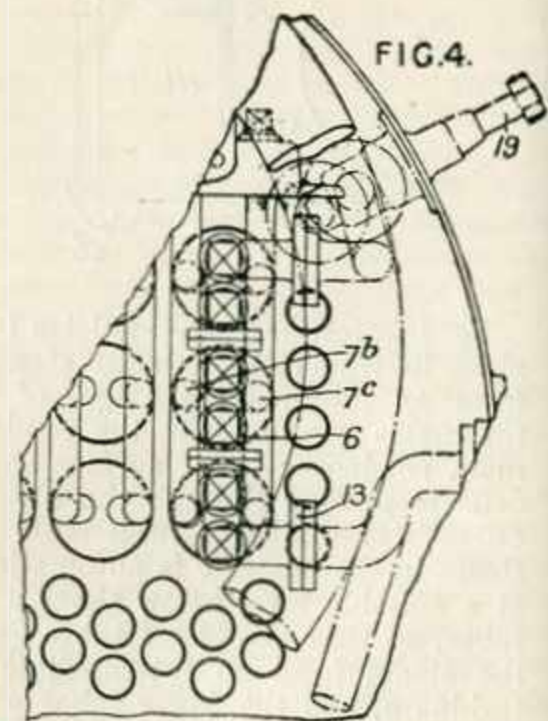


moved by a scraper *m*. The gases may be first cooled by passing them through water sprays in a separate tower. Instead of passing through sprays of liquid the gases may flow over films on rotating disks dipping into the liquid.

121,982. Willans, G. H., and Luard, E. S. Nov. 9, 1917.



Feed-water, heating.—Feed-heating elements and superheating elements are inserted together in enlarged smoke-tubes in a locomotive or other multitubular boiler. The flow and return legs, 7^b, 7^c of each of the superheating elements, which are preferably of the kind described in Specifica-

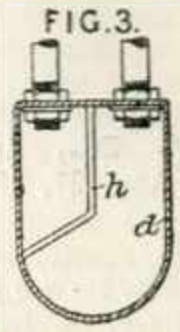


tion 13762/12, [*Class 123* (iii), Steam separators &c.], are bent or set outwardly near the sides of its smoke-tube so as to afford space in the smoke-tube for the insertion of a feed-heating element. U-tube feed-heating elements 6 of the kind described in Specifications 21118/13 and

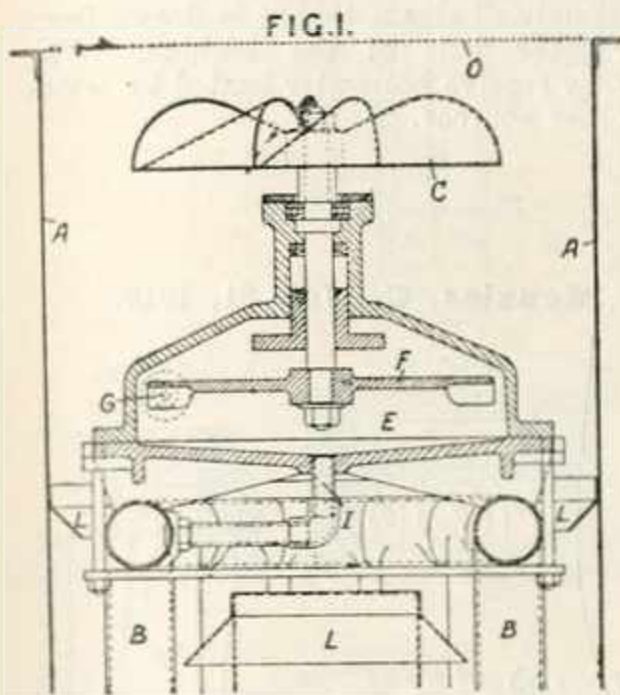
14976/15 are detachably connected together and to the inlet and outlet pipes 14, 17 by flanged branches 11, 13. Feed-water is supplied through the valve devices described in Specifications 4085/15 and 14976/15, and the heated water enters the boiler through a stop valve 19 of the kind described in Specification 103,534. Field-tubes may be used in place of the U-tube feed-heating elements shown. Specification 9165/11, [Class 123 (iii), Steam separators &c.], also is referred to.

122,267. Florence, A. P. Jan. 25, 1918.

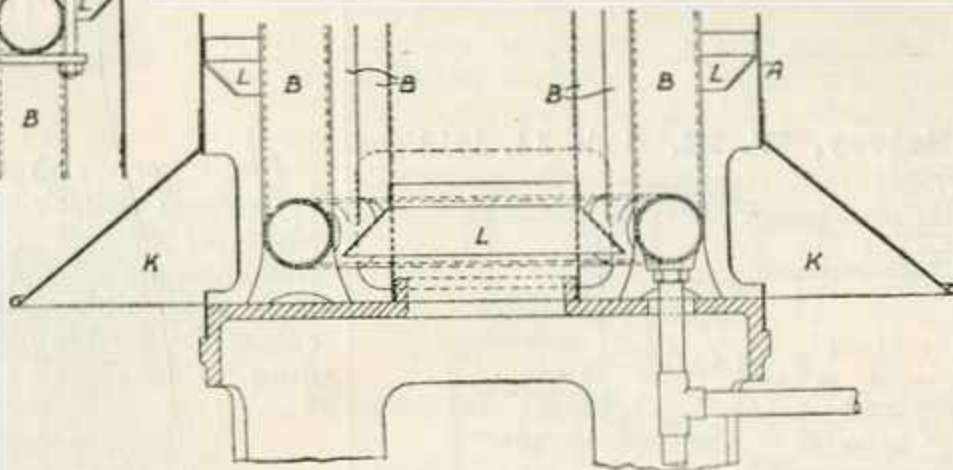
Block-form boilers.—A boiler similar to that described in Specification 117,471 has a bent internal partition *h*.



122,294. Yorkshire Copper Works, and Stansfeld, J. Feb. 14, 1918.

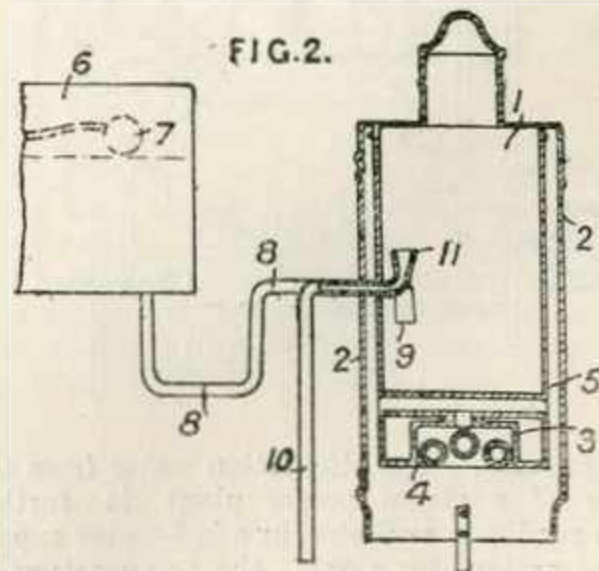


Heating air.—An air-heating and ventilating apparatus for factories &c. comprises a vertical cylindrical casing *A* fitted with a section-built column radiator *B* and with a fan *C* driven by a turbine *F* enclosed in a chamber *E*. Steam enters the chamber through a nozzle *G* and drives the turbine, the exhaust passing through the pipe *I* into the radiator *B* for heating the air which is forced downwards through the casing by the fan *C*. Baffles *L* are fitted within the casing, and a screen *O* and bell-mouth deflector *K* at the inlet and outlet ends respectively.



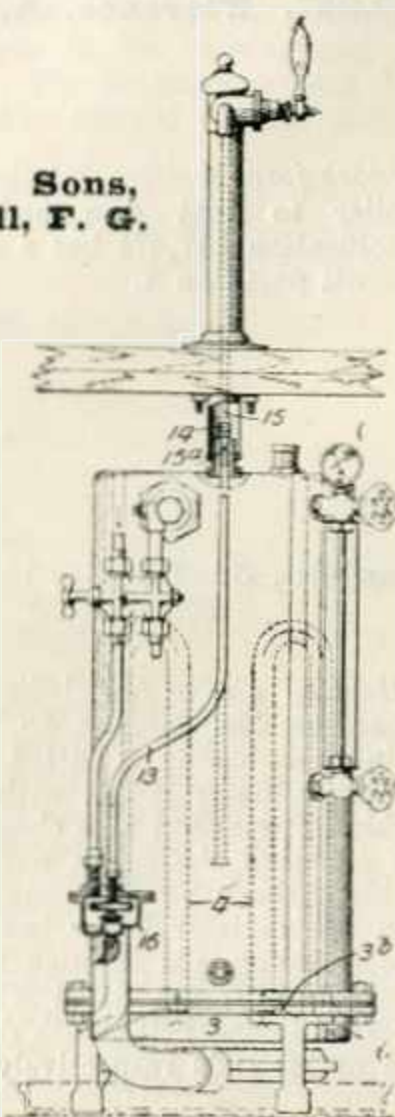
122,387. Darby, E. Nov. 19, 1918.

Water supply and delivery.—In a gas or oil heated water heater, the inlet pipe 8 is arranged to project downwardly at 9 inside the boiler 1 and to terminate slightly below the middle of the boiler, while the outlet pipe 10 is arranged to project upwardly at 11 and to terminate slightly above the middle of the boiler. Preferably both pipes connect with the boiler near its mid-point and have short projecting portions 9, 11. A constant level of water within the boiler is maintained by means of a supply tank 6 fitted with a ball valve 7. The boiler is surrounded by a casing 2 and provided with transverse water-tubes 4 and smoke-tubes 5 near its base.

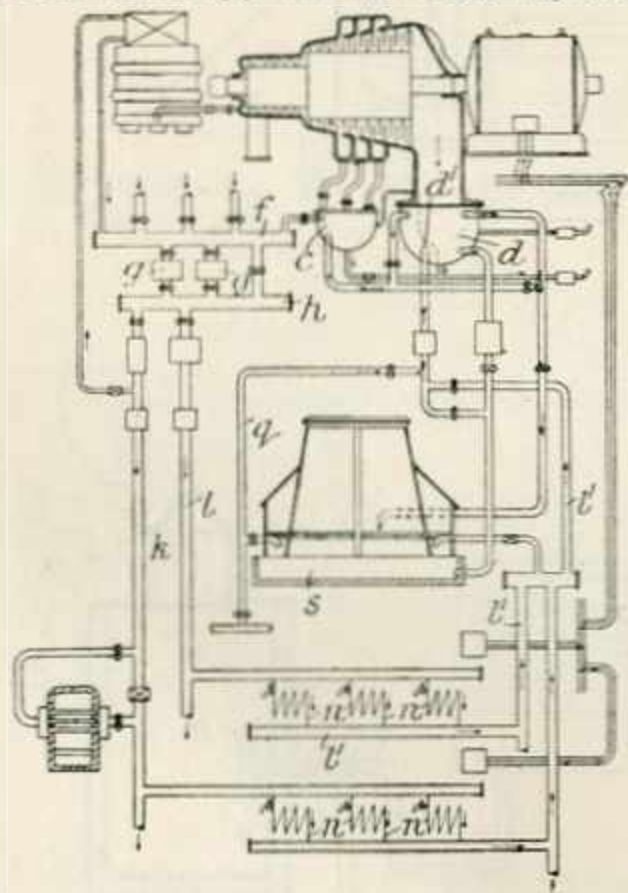


122,597. Still & Sons, W. M., and Still, F. G.
Aug. 27, 1918.

Block - form boilers. — In a gas-heated boiler of the kind described in Specification 10848/03, one limb of each of the U or like shaped heating tubes 4 is connected to a tube-plate 3^b and the other limb is bent outwardly and connected to the vertical wall of the dished base 3.



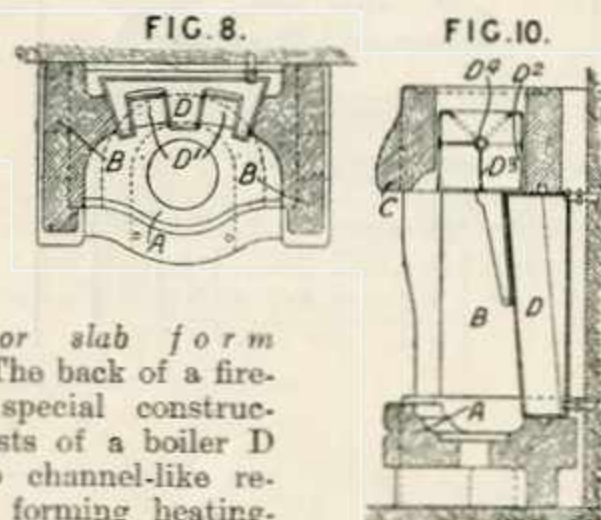
122,720. Selvey, W. M. Feb. 14, 1918.



Heating water.—The circulation water from the condenser of a steam power plant is further heated to render it available in a hot-water supply or heating system by steam, the temperature of

which has been lowered below that corresponding to atmosphere pressure by use as a motive fluid. The cooling water from the condenser *d* of a turbine is passed through an auxiliary condenser *c* receiving steam from intermediate stages of the turbine. The heated water flows into a reservoir *f* and then through separators *g* into a reservoir *h*, from which it is drawn by pumps and forced through the pipes *k*, *l* of the supply or heating system *n*. Make up water is supplied to the return pipe *l'* of the system through a branch *q* from the main. The water may pass through an independent section *d'* of the condenser, the body of the condensing water being drawn from the pond *s* of the cooling tower. The temperature of the water passing through the auxiliary condenser may be maintained constant by thermostatically operated valves, which so control the supply of steam that it is drawn from a higher or lower belt of the turbine. The reservoir *f* may receive hot water heated by waste heat from other sources.

122,999. Menzies, C. July 31, 1918.



Block or slab form boilers.—The back of a fireplace of special construction consists of a boiler *D* with deep channel-like recesses *D'* forming heating-flues.

123,307. Trivero, E. Feb 9, 1918, [Convention date]. Void [Published under Sect. 91 of the Act].

Internally-fired boilers. — The flue gases from the grate 38 pass up the furnace flue 4, which is fitted eccentrically in the body 3, and, if the damper 30 is closed, traverse the series of flue tubes 23, 35, 34, 32 before arriving at the chimney 31. In their passage, the water in the drum 6 depending from a tank 7 and that in the space between the outer wall 3 and the furnace tube 4 is heated and some heat is imparted to the under side of the tank 7 and the supply tank 14. A circulation of water takes place from the top of the boiler through tubes 11 to the tank 7 and through tubes 19 back to the boiler 3. The boiler is fed through the pipe 14' and hot water is drawn off from the cock 15. The flues 33, 35 and 32, 34 are connected at their lower ends

by headers 37, 36. If the damper 30 is opened the flue gases pass direct to the smoke stack by the conduit 26.

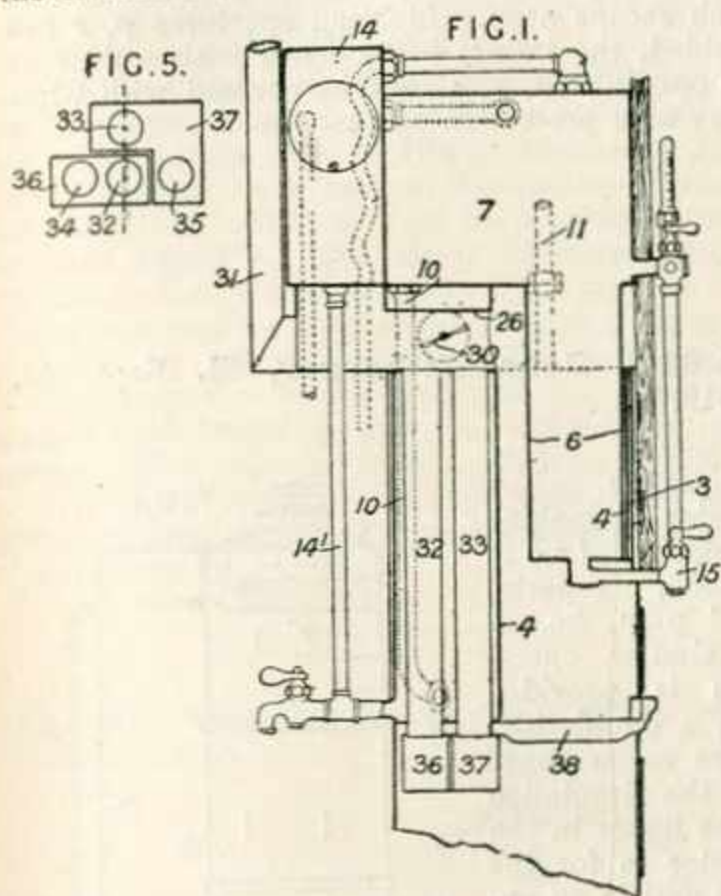
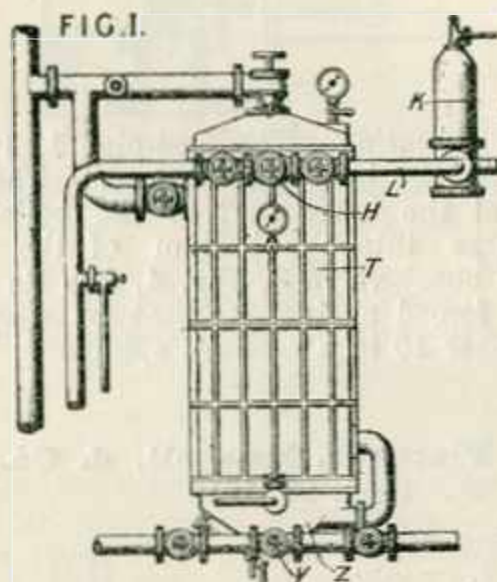


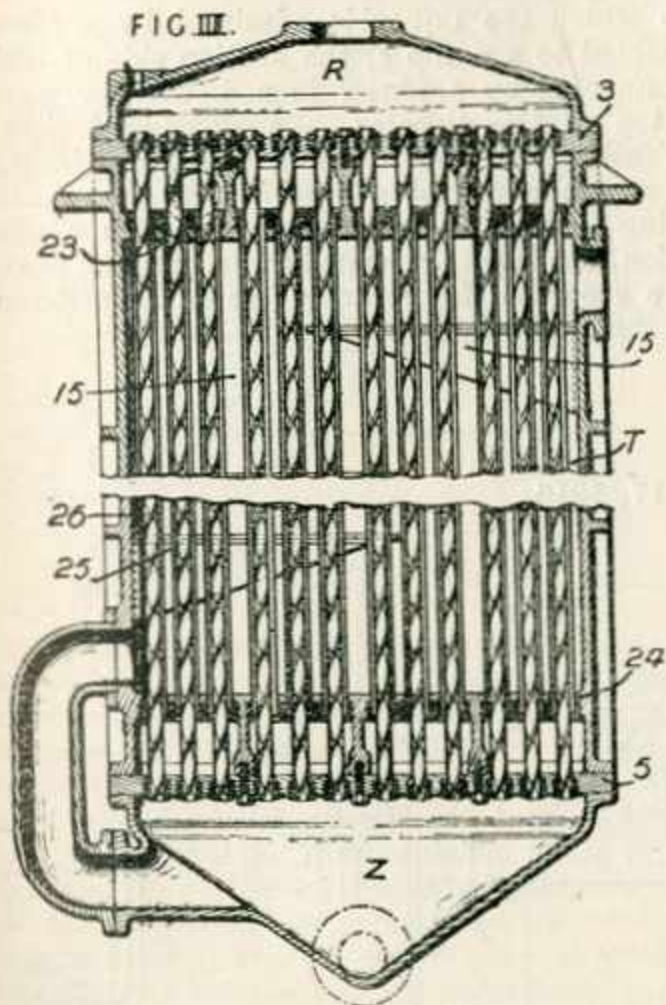
Fig. III., connected to upper and lower spaced tube-plates 3, 23 and 5, 24. The water enters the space between the upper tube plates and flows downwards through the annular spaces between the tubes to the space between the lower tubes plates. Steam enters at the upper header R and at the upper part of the casing and flows downwards through the inner tubes and around the outer tubes. The inner tubes are fitted with helical retarders. Baffles 15 give the steam in the casing a zigzag course. The steam is dis-



charged from the lower header Z through a cock Y, Fig. I., and is taken to the float tank of the feed-pump, the auxiliary condenser, or to the auxiliary air-pump. Water may pass directly to the boiler feed-pipe L through a by-pass valve H. The feed-pipe is fitted with a shock-absorbing air-vessel K.

Reference has been directed by the Comptroller to Specifications 5917/00 and 15359/04.

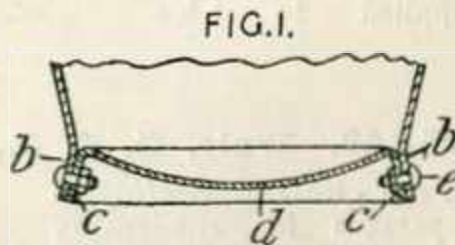
123,354. Shiraki, T. Jan. 2, 1918.



124,390. Smith, F. Oct. 24, 1918.

Boiling-pans.—

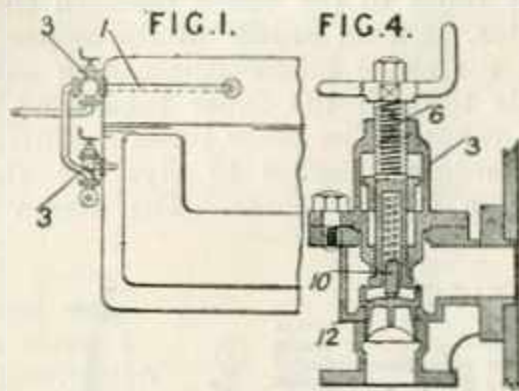
A sheet-metal bucket, boiling-pan, or like vessel is made with a detachable bottom d, which may be secured in position by screw-bolts e passing through flanges such as b, c and provided with nuts. Packing-material may be inserted between the parts. In a modification, the flanges are vertical and the flange c is continued under and up the outside of the flange b. In another construction, studs on the flange b engage in bayonet-slots in the flange of an upwardly-dished bottom.



Feed-water, heating.—A feed heater consists of a casing T containing concentric tubes 25, 26,



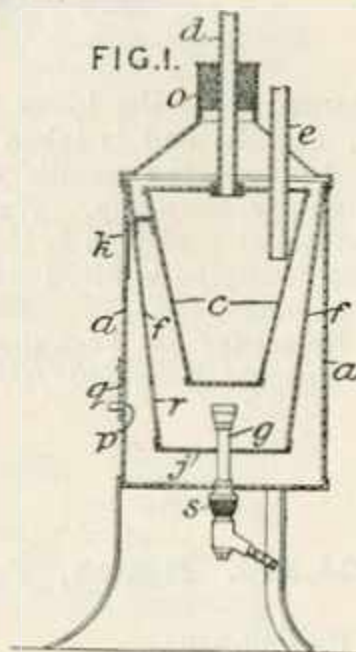
124,425. Basarrate, J. de, and Casamitjana, J. March 4, 1918, [Convention date]. Void [Published under Sect. 91 of the Act].



Feed-water, heating.—The feed-pipe 1, Fig. 1, is led through the boiler steam-space. The pipe may enter at the lower part of the boiler and may discharge into the bottom of the water space. The check-valve 3, Fig. 4, has its valve member 12 forced against its seat by a spring-plunger 10 in a screwed spindle 6.

124,674. Fletcher, Russell, & Co., and Banks, W. Sept. 27, 1918.

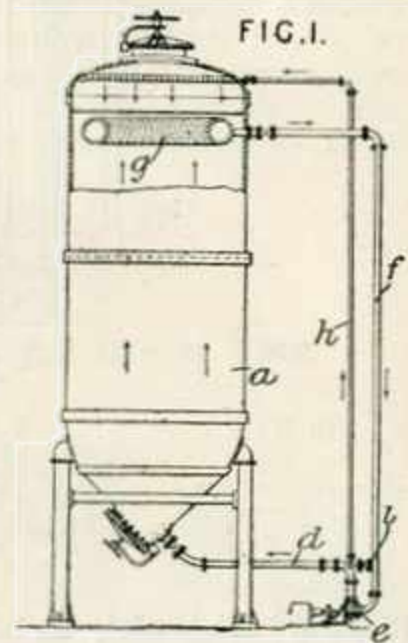
Portable and small liquid-heaters.—Apparatus for maintaining a circulation of hot water, especially through the radiators and cylinder jackets of motor-vehicles during frosty weather, comprises an outer casing *a* fitted with a baffle casing *f* which supports a water vessel *c* provided with flow and return pipes *d, e*, a burner *g* being fitted in the bottom of the casings *a, f*. Air is supplied to the



burner through an opening *k* and the gauze bottom *j* of the baffle *f*, and is thus prevented from mixing with the products of combustion, which escape at *o*. Lighting apertures *p, r* are provided, the former being fitted with a door *q*. The openings *k, o, s* may be covered with wire-gauze as a protection against fire.

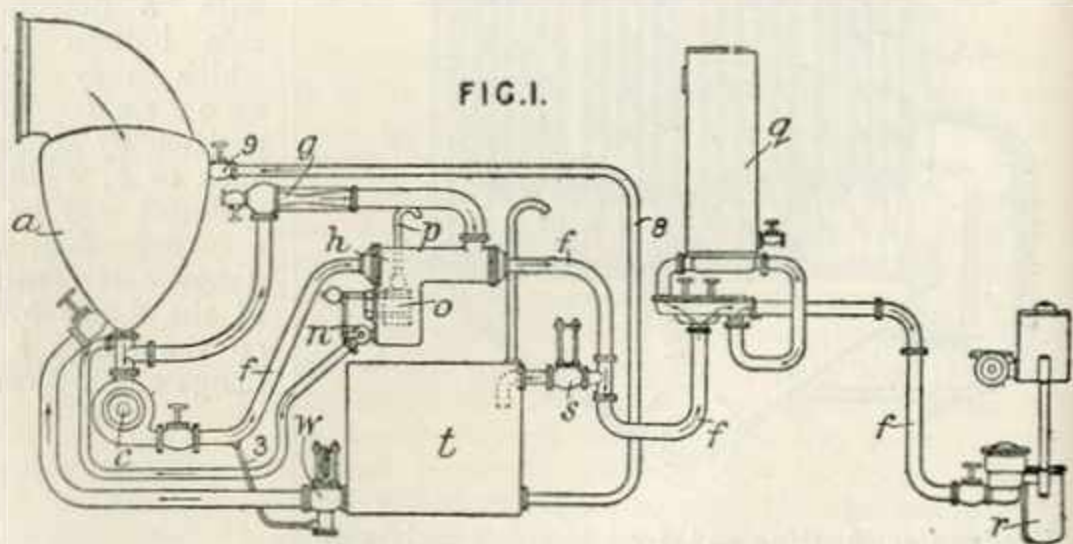
124,676. Schaufelberger, E. Sept. 27, 1918.

Digesters.—A digester for making cellulose from bamboo, esparto, wood pulp, &c. or for similar operations is provided with a circulating-device so arranged that the circulation of the liquor in the digester is for the most part in an upward direction, while there is also a downward circulation in the uppermost part of the digester. Fig. 1 shows a digester *a* to which the liquor is admitted by a pipe *d* connected to a pump *e*, the suction side of which is connected by a pipe *f* to a distributor *g* near the top of the digester. A downward flow is provided above the distributor *g* by admitting liquor at the top of a pipe *h*. Steam or other heating-medium is introduced at *i*. In a modification, the liquor is heated in an external heater, and a separator for removing scum is introduced into the system.



125,149. Weir, G. & J., and Weir, W. June 17, 1916.

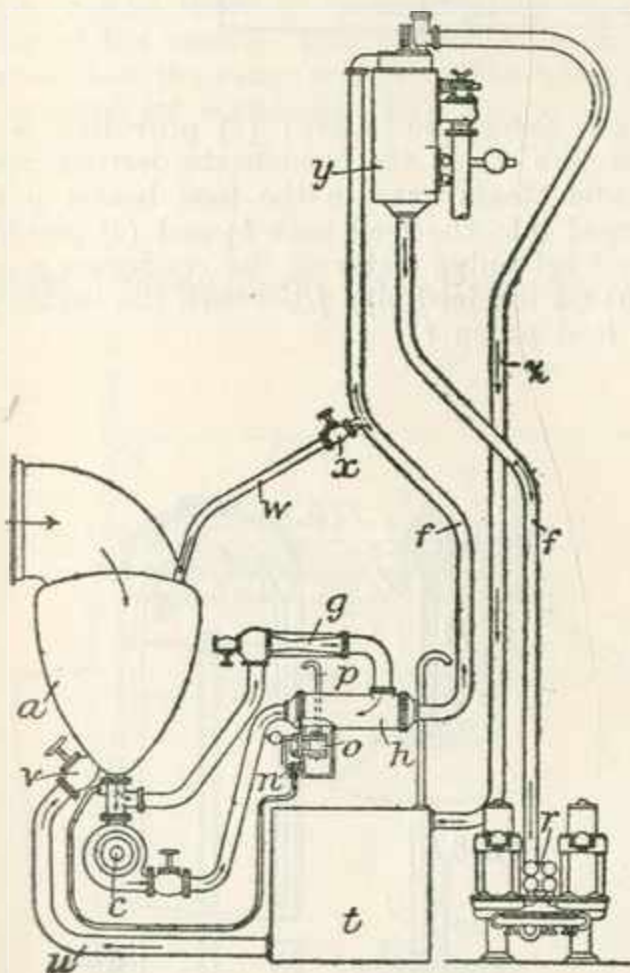
Feed-water, heating.—Apparatus for condensing steam and heating boiler feed water comprises (1) a pump *c* withdrawing condensate from the condenser *a* and discharging it through a feed pipe *f* to the feed pump *r*; (2) a surface feed heater *h* which is situated on the feed-pipe *f* and through which passes the whole of the condensate discharged by the pump *c*; (3) a steam jet *g* withdrawing air from the condenser and discharging to the feed



heater *h* where the steam is used for heating purposes, (4) a feed tank *t*, to which water is admitted from the feed pipe *f* through a loaded valve *s*, and which discharges either automatically under the control of a valve *w* to the suction side of the pump *c* or to a pump discharging to the feed pipe *f* through a loaded non-return valve, and (5) a return pipe *8* with a hand-controlled valve *9* leading water back to the condenser either from the feed tank *t* or from the discharge from the feed heater *h*. The air is discharged from the heater *h* to the atmosphere by a pipe *p*; the condensate may be discharged through a valve *n* controlled by a float *o* either to the suction side of the pump *c* or to the feed tank *t*. A second surface feed heater *g* may be included in the system. The valve *w* is controlled by a piston or diaphragm actuated by the pressure transmitted through a pipe *3* from the discharge side of the pump *c*.

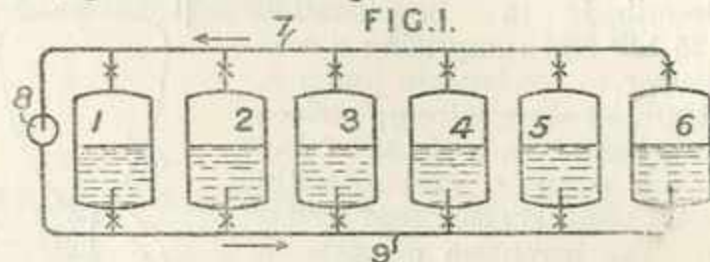
condensate is discharged through a valve *n* controlled by a float *o* to the suction side of the pump *c*. Excess water from the heater *y* passes by a pipe *z* to a feed tank *t*, and thence through a pipe *u* fitted with a hand-controlled valve *v* to the suction side of the pump *c*.

125,150. Weir, G. & J., and Weir, W.
June 17, 1916.



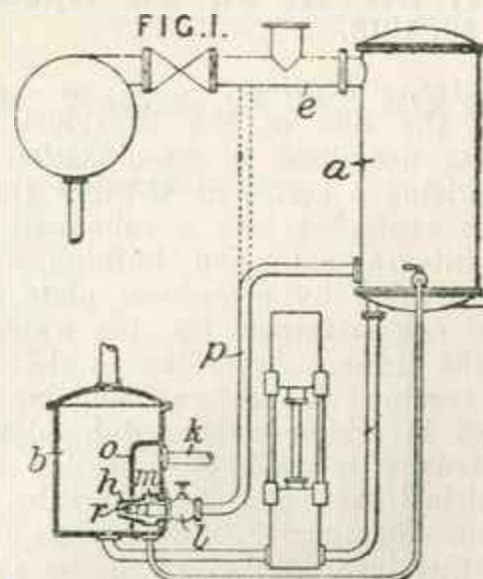
Feed-water, heating.—Apparatus for condensing steam and heating boiler feed water comprises a pump *c* withdrawing condensate from the condenser *a* and discharging the whole of it through a surface feed-heater *h* and a direct contact feed-heater *y* situated on the feed-pipe *f* leading to the feed-pump *r*, together with a steam jet *g* withdrawing air from the condenser and discharging to the feed-heater *h*, where the steam is used for heating purposes, and a return pipe *w* with a hand-controlled valve *x* leading water back to the condenser from a point on the feed pipe *f* between the heaters *h*. The air is discharged from the heater *h* to the atmosphere by a pipe *p*; the con-

125,368. Frey, E. Wirth-. April 12, 1918, [Convention date].



Heating liquids.—In apparatus of the kind in which the vapour of a liquid in a heated vessel is drawn off and led into direct contact with a liquid in one or more other vessels, the vessels are so interconnected that any one of the vessels may be heated by the vapours from the other or any one of the other vessels. A number of vessels 1 - - 6 are connected to common draw-off and delivery pipes 7, 9, cut-off cocks being fitted in the connexions between the vessels and the pipes. Air may be forced into the hot liquid in a vessel to assist the evaporation. In place of a compressor or fan 8, the vapour may be drawn into a vessel to be heated by lowering the vapour pressure by means of a pump.

125,449. Morison, D. B. Aug. 3, 1916.
Addition to 3499/12.



Feed-water, heating.—In an exhaust-steam feed-heating apparatus comprising primary and secondary heaters arranged as described in the parent Specification, the primary heater is placed in free communication with the secondary heater, so that at low loads, when the quantity of heating steam is relatively small, no resistance is offered to its flow to the secondary heater, and the back pressure in the exhaust system is reduced. The pipe *p* conducting heating steam from the primary

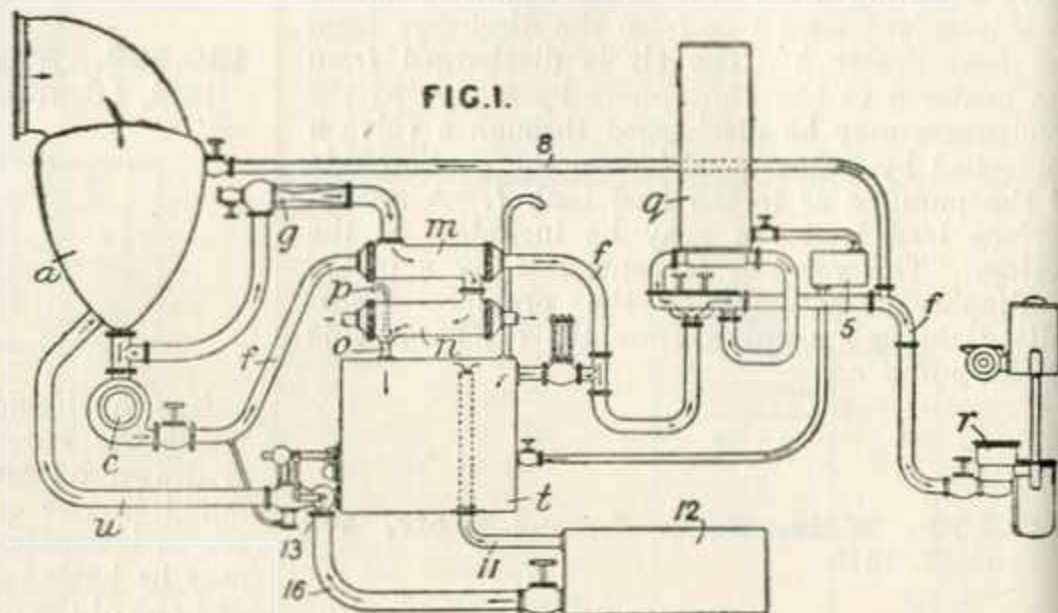


heater *a*, or direct from the exhaust-supply pipe *e*, into the secondary heater *b* terminates in a nozzle *r* formed of stepped cones surrounded by a conical tube *h* having water inlet openings *m*.

The nozzle projects through a partition *o* forming a compartment into which the water is supplied by a pipe *k*. A shut-off valve *l* is fitted in the pipe *p*. Specification 15413/13 is referred to.

126,014. Weir, G. & J., and Weir, W. Oct. 24, 1916.

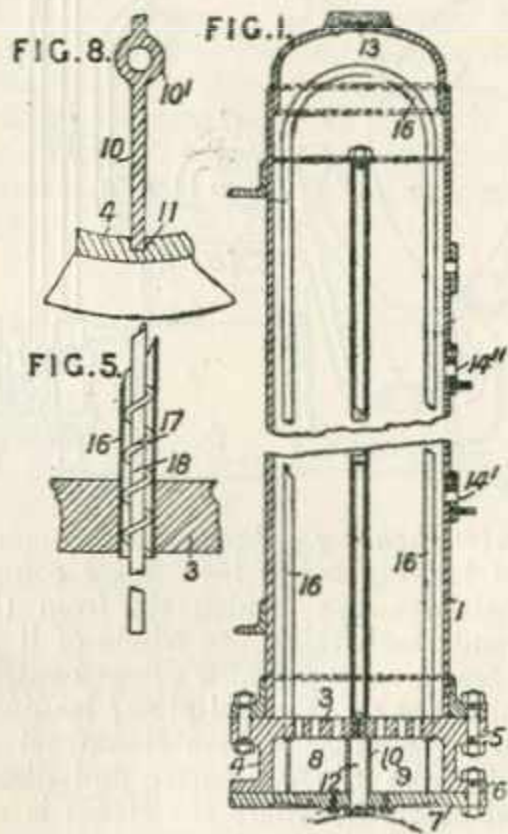
Feed-water, heating.—Relates to apparatus for condensing steam and heating boiler feed-water of the kind described in Specification 125,149 and comprising a condenser *a*, condensate pump *c*, steam-jet air ejector *g*, surface feed heater *m*, feed tank *t* and a feed pump *r*, with or without a main surface feed heater *q*. The invention consists in (1) using a combined feed-heater *m* and condenser *n* such as described in Specification 15884/05, the residual air being discharged to the atmosphere through a pipe *p*, and the condensate being led to the feed tank *t*, through a pipe *o*; (2) providing a reserve feed tank 12, to which water overflows from the feed tank *t* through a pipe 11, and which communicates by a pipe 16 with the pipe *u* returning water to the condenser, a three-way cock 13 being fitted at the junction of these pipes in such manner that under the control of a float in the feed tank *t*, it allows of the withdrawal of water from either of the tanks *t*, 12 upon the opening



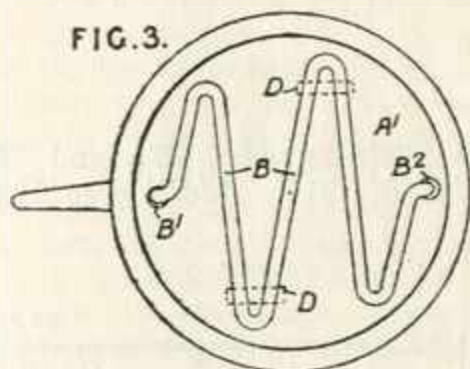
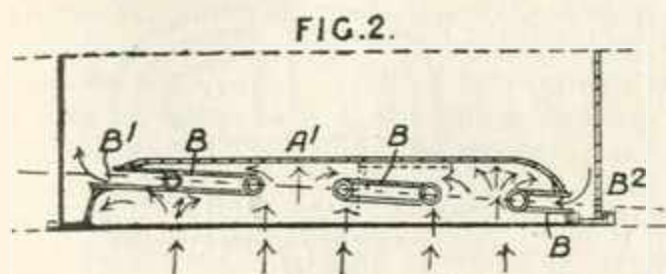
of an automatic valve; (3) providing a filter 5 through which the condensate derived from the exhaust steam used in the feed heater *q* is discharged into the feed tank *t*; and (4) providing a pipe 8 returning water to the condenser *a* from a point on the feed-pipe *f* between the heater *q* and the feed pump *r*.

126,102. Cammell, Laird, & Co., Carter, Sir G. J., and Spencer, D. March 30, 1918.

Feed-water, heating. — In a feedwater-heater or the like of the Berryman type, for example as described in Specification 1966/76, and comprising a series of U-tubes the ends of which are expanded into a tube-plate provided with an integral extension forming a chamber which is divided by a vertical plate into inlet and outlet compartments for the water passing through the tubes. According to the invention, which is confined to heaters using high-pressure steam and in which a steel tube-plate with a forged extension is used, the chamber formed by the cylindrical extension 4 of the tube-plate 3 is divided into chambers 8, 9 by a plate 10, Figs. 1 and 8, fitting into notches 11 in the extension 4 and formed with a boss 10' through which passes a securing-stud 12 which holds the cover-plate 7. The chambers 8, 9 are provided with separate inlet and outlet connexions respectively. The tubes 16 are fitted with retarders comprising wire 17, Fig. 5, coiled helically on rods 18. The steam is admitted at 13. Alternative outlets for condensed steam are provided at 14', 14'', and a third outlet formed through the body of the tube-plate.

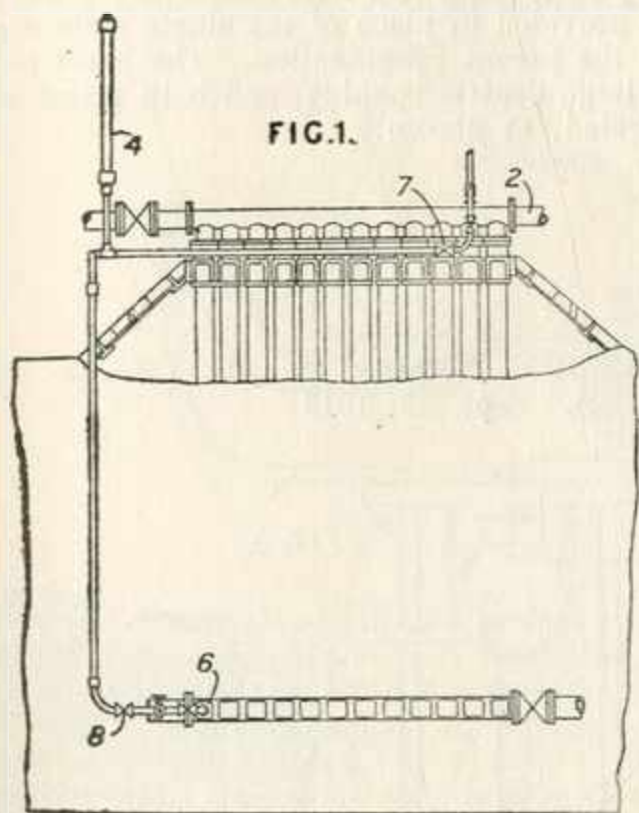


126,452. Hill, J. N. May 8, 1918.



Block-form boilers.—A boiler &c. has in its bottom a recess A^1 , within which are arranged one or more zigzag tubes B communicating with the interior of the vessel. One end B^1 of each tube is higher than the other end B^2 . The tubes may be supported by connexions D .

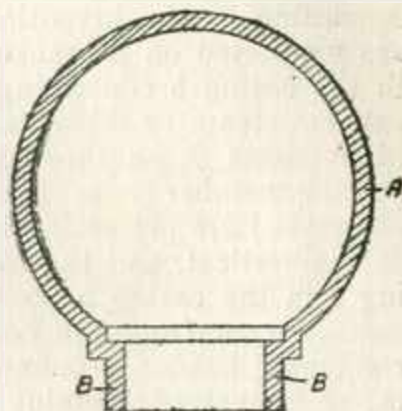
126,884. Donaldson, A. Sept. 18, 1918.



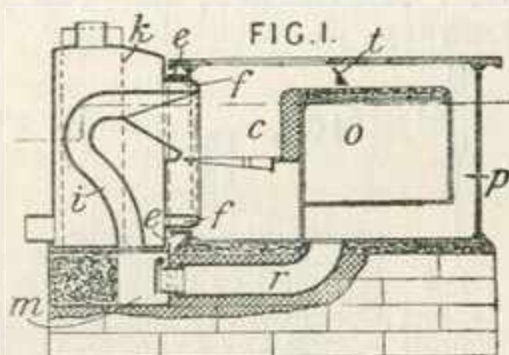
Feed-water, heating.—In an arrangement to bypass a small quantity of heated feed water to the cold water inlet of an economizer on the working stroke of the pump, water from the delivery header 2 is forced past a non-return valve 7 and creates a pressure in an air chamber 4. On the return stroke, the air pressure delivers the water through the non-return valve 8 into the inlet header 6.

127,070. Packard, F. April 13, 1918.

Washing-boilers.—A steam condenser for attachment to the lid of a gas-heated washing-boiler comprises a stoneware ball-shaped vessel A formed with a screwed shank B for securing it to the lid.

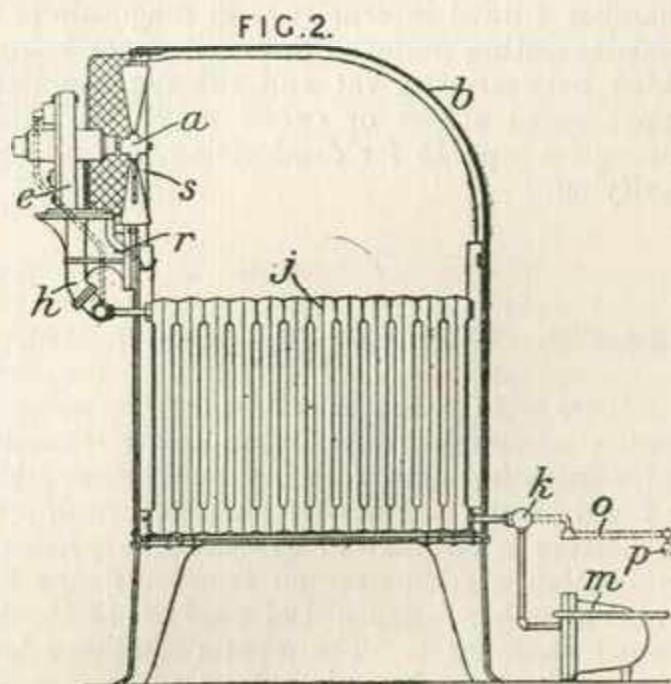


127,507. Linders, O. Dec. 14, 1918.



Block-form boilers.—In a combined cooking-range and water-heater heated by a fire-box c , the gases, when the flue p is closed by the damper t , pass through a partitioned flue i to a damper box m , and thence to the chimney through the flue k . The mouth of the flue i is funnel shaped. The boiler and stove are connected by a water-cooled flange or projection f inserted into the frame e ; the joint is then cemented.

127,706. Nesbit, D. M. May 31, 1918.



Heating air.—Relates to apparatus for heating and ventilating buildings, of the type in which the exhaust steam from a turbine e driving a cir-