PATENTS FOR INVENTIONS

ABRIDGMENTS OF SPECIFICATIONS

CLASS 64 (i)

HEATING LIQUIDS AND GASES

PERIOD—A.D. 1909-15

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1921

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EXPLANATORY NOTE

The contents of this Abridgment Class may be seen from its Subject-matter Index, which 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. For further information as to the classification of the subject-matter of inventions, reference should be made to the *Abridgment-Class and Index Key*, published at the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C.2.

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.

SUBJECT-MATTER INDEX

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

(511) Wt. 33733—2778 500 7/21 H. St.

Heating air and other gases, (*otherwise than in or in immediate connexion with* Furnaces and kilns *and* Stoves and fire-places).

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).

apparatus comprising fans and other circulation-promoting devices. '09. 5638. 19,575. 22,211. 29,937. '10. 9520. 9521. 17,183. 18,262. '11. 25,144. 27,778. '12. 4012. 4036. 5706. 12,599. 22,097. '13. 6233. 8988. '14. 3730. '15. 2177. 7433. 7867. 11,249. 12,872.

by—

circulation of hot fluid, the primary source of heat being distant and immaterial—

other than tubular heaters. '09. 5638. '11. 27,778. '12. 4012. 4036. '13. 2031. 13,257. '15. 11,249.

surfaces for transferring heat, construction of. *See Class* 64 (iii).

tubular heaters. '09. 13,537. 19,575. 22,211. 29,937. '10. 9520. 9521. 20,164. '11. 10,021. 13,613. '12. 5706. 14,606. 22,097. '13. 6233. 8988. 11,645. 21,007. '14. 3730. 13,098. 18,536. 24,264. '15. 12,872.

compression. [*No cases.*]

hot medium directly heated from any source of heat—

other than with liquid as heat-transmitting medium. '09. 23,818. '11. 10,021. '12. 9745. 19,212. 28,259. '13. 21,739. '14. 13,831.

surfaces for transferring heat, construction of. *See Class* 64 (iii).

with liquid as heat-transmitting medium. '09. 23,818. '10. 5019. 17,132. '11. 20,252. '15. 7433. 7867.

processes, compound. '11. 13,613 '14. 13,098.

waste gases and waste heat from furnaces and kilns. *See Class* 51 (ii).

coverings and compositions, non-conductors of heat. *See* Non-conducting coverings &c., [*Class* 64 (ii)]; Plastic compositions, [*Class* 70].

heating air and gases under pressure by burning fuel therein or delivering them into combustion products under pressure. *See Class* 51 (i).

heating by direct contact in packed-tower, rotary, and other closed apparatus having surfaces traversed by flowing liquids. *See Class* 55 (ii).

heating by direct contact with jets or sprays of heated liquids. *See Class* 8 (ii).

heating by electricity. *See Class* 39 (iii).

heating by passage through layer of liquid. *See Class* 55 (ii).

heat-storing apparatus for *See Class* 64 (ii).

miscellaneous—

by waste heat from thermopiles. '15. 7283.

heating gases and vapours by passing through jacket surrounding closed combustion apparatus. '15. 1357.

heating in boiler jacket. '12. 353.

heated in directly-heated cylinders. '14. 12,245.

preventing incrustation. '11. 1832.

Heating air and other gases—*cont.*

obtaining motive power by. *See Class* 7 (i).

pipes and tubes. *See Class* 99 (ii).

radiating and air-heating attachments for lamps and stoves. *See Class* 126.

radiators. *See Class* 64 (ii).

spray-producers and liquid-distributing sprinklers and nozzles. *See Class* 69 (iii).

temperature, controlling, (*including* arrangements of dampers for air current). '09. 5638. 29,937. '10. 9520. 9521. 17,183. 18,262. '12. 12,599. '13. 16,315. 21,007. '14. 3730. '15. 2012. 2177.

thermostats. *See Class* 64 (ii).

utilizing solar and natural heat for. *See Class* 64 (ii).

Heating water and other liquids.

Heating processes and apparatus applicable solely to special purposes are indexed only under separate headings, such as Internal-combustion engines, Carburetting-apparatus, vaporizers, and heaters for, [*Class* 7 (iii)]; Steam-generators, [*Class* 123 (ii)]; Tea &c., Apparatus for making, [*Class* 129].

air for, heating. *See* Heating air &c.

alarms, fire and temperature. *See Class* 47 (i).

boilers—

alarms, water level. *See Class* 123 (i).

annular and concentric, (with no cross water-tubes). '09. 12,906. '10. 11,770. 25,480. '11. 17,083. '12. 22,095. '13. 4785. 15,196. '14. 1826. 2633. 5438. 15,151. 15,679. 21,174. 23,517. '15. 485. 1379. 7356. 11,021. 11,502. 12,676. 14,080.

arrangement and disposition of in stoves and fire-places not solely for heating liquids. *See Class* 126.

baffles, firebox, flue tube, and like. *See Class* 51 (i).

block or slab form, (*other than* annular and concentric *and* internally-fired)—

other than with flue tubes for heating. '09. 3582. 7776. 8910. 12,906. 15,098. 15,396. 20,456. 20,778. 21,349. 25,088. '10. 1123. 7883. 8975. 10,975. 12,980. 28,838. '11. 2300. 7016. 8925. 16,032. 28,010. 29,011. '12. 52. 5400. 5937. 6148. 7557. 9538. 18,255. 29,877. '13. 5846. 6241. 13,909. 15,949. 20,728. 21,597. 25,745. 29,186. '14. 417. 5980. 7641. 9209. 9481. 9875. 10,846. '15. 3193. 4869. 7356. 8995. 11,638. 13,337.

with flue tubes for heating. '09. 8910. 16,481. 20,778. 23,708. 27,522. 29,306. '10. 4362. 6186. 7883. 18,035. 18,754. 22,547. 30,357. '11. 2404. 13,347. 21,550. '12. 19,190. 19,710. '13. 7458. 12,172. 12,535. 20,669. '14. 5553. 18,037. 19,187.

boiling-pans. *See* Washing-boilers &c.

bolts, studs, nuts, and washers for. *See Class* 89 (i).

boxes and cases for enclosing. *See Class* 18.

combinations of different water-heating chambers and tubes of substantially equal heating effect in one boiler, (*other than* internally-fired boilers). '09. 29,917. '10. 1123. '12. 15,193. '13. 1576. 22,051 25,866.

NAME INDEX

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

ERRATA

The following abridgments should be *deleted* :—

A.D. **1909.** Nos. 779. 1212. 1468. 3593. 6158. 6994. 8481. 8894. 12,250. 12,719. 13,102. 14,649. 16,418. 25,353. 26,246.

A.D. **1910.** Nos. 1352. 4296. 4659. 5002.

A.D. **1911.** Nos. 14,468. 18,359. 19,291.

A.D. **1912.** Nos. 2166. 4547. 20,691.

A.D. **1913.** Nos. 620. 1583. 3413. 29,830.

A.D. **1914.** No. 20,267.

Page 61. Abridgment No. **24,617.** After date add *No Patent granted* (*Sealing fee not paid*).

Page 183. Abridgment No. **14,005.** Delete *Void.* [*Published under Section 91 of the Act.*]

CLASS 64 (i).

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.

A.D. 1909.

333. Clapperton, C. M. Jan. 6.

Washing-boilers.—A gas burner *a* is provided with supports *f* arranged to stand upon the ordinary fire-grate under a washing-boiler. The gas-supply pipe *d* passes downwards between two of the fire-bars g^1. In a modification, the supply pipe is arranged to pass through a suitable hole in the fire-door.

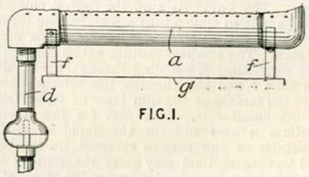


FIG. 1.

767. Morse, A. J. Jan. 12.

Digesters.—Consists in an improved construction of digester for treating garbage and the like, of the kind comprising a rotating tank having a jacket which is supplied with superheated steam, and also means for withdrawing moisture from the tank Figs. 2 and 3 are sectional views of the two ends of the digester. The tank 10 is supported centrally within the outer shell 7, which is provided with stuffing-boxes 14, 21, through which pass pipes 15, 20 respectively. The pipe 15 is connected by a T-coupling 17 to a steam-pipe 5 from a low-pressure superheater, whereby steam is admitted to the jacket 7. Water of condensation is removed by a pipe 18 which passes through the coupling 17 to a steam-trap. The pipe 20 extends into the tank 10 and is provided with a T-head 22 having a pipe 23, which conducts the vapours from the tank through a pipe 25 to a condenser. The T-head is also provided with a perforated disk 24 to permit the escape of any material that may pass into the pipe 23. The temperature within the tank is kept constant by a thermostat 27 connected by a pipe 28 with a controlling-valve in the steam-pipe 5.

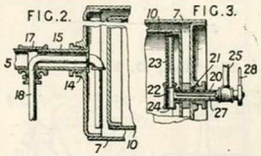


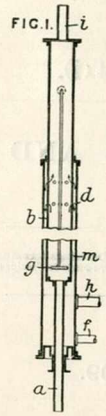
FIG. 2.

FIG. 3.

779. Brücke, O. Jan. 12.

Heating liquids.—Liquids are distilled, heated, or cooled in apparatus employing concentric tubular columns through which an evaporating or cooling medium directly flows. The liquid while rising in one column is subjected to a preliminary treatment by the treating-medium being forced through it in the same direction of flow, and then, on reaching the highest point, passes through overflow openings and runs down in a thin layer on the walls of the columns and is subjected to a further treatment, the treating-medium then travelling in an opposite direction. The apparatus is described mainly for use in oil and grease refining, but is applicable generally. Fig. 1 shows one arrangement. The liquid rises up the central column *b*, being admitted from a tube *a*, and, passing through apertures *d*, trickles down the outer side of the column. The treating-medium enters through the rose distributor *g*, bubbling through the liquid in the tube *b*, and also through the tube *h*, passing over the surface of the thin layer of liquid falling in the annulus *m*. The exit for the treating-medium is at *i* and for the liquid at *f*. The directions of flow may be reversed, i.e. the liquid and treating-medium may enter the annulus first, the thin layer being in this case on the inside of the inner column. In a modification, the direct heating &c. is supplemented by a jacket upon the inner column through which the medium flows.

FIG. 1.



1161. Morison, D. B. Jan. 16.

FIG. 1.

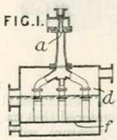
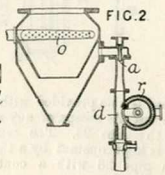


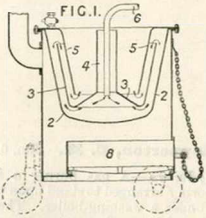
FIG. 2



Feed-water, heating.—A combined condenser and feed-heating system comprises a steam jet *a* withdrawing air &c. from the condenser, and a heater *d* wherein the steam is utilized for heating feed-water in bulk or in spray or jets. A feed-heater of the type described in Specification 22,025/07, [*Class* 122, Steam engines], is shown in Fig. 1 in combination with a diaphragm *f*, for circulating the water. When the feed-water supply falls below the normal, the water may be supplemented by means of a float-controlled valve. A heater *d*, in which the water is sprayed by a turbine wheel *r*, is shown in Fig. 2 as applied to a jet condenser *o*. In the spray and jet heaters, the air &c. is carried away by the water; but in the bulk heaters separate evacuating-devices may be used. According to the Provisional Specification, the water may be delivered into the heater through a vertical pipe open at the top and bottom. Specifications 23,140/07 and 16,358/08, [both in *Class* 122, Steam engines], are also referred to.

1212. Candy, F. P. Jan. 18.

FIG. 1.



Set-pans.—In apparatus for tarring roads, the tar is drawn by a pump from the boiler 2 through a pipe 6, and, for quick heating, is made to circulate in the direction indicated by the arrows by means of liners 3, 5, the liner 3 having a central gas vent 4. The liner 5 may be dispensed with, and baffles comprising flanges connecting the boiler 2 and liner 3 may be used. The fire-box 8 is adapted to hinge or slide outwards so that it can be easily withdrawn.

1468. Bliss, J. Jan. 21.

FIG. 1.

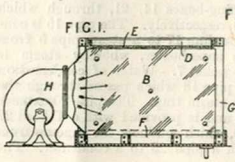
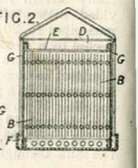


FIG. 2.

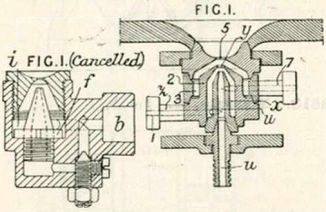


Heating liquids and air.—Air and other gases

flow between substantially vertical plates, down which liquids trickle. Above a number of such plates B, and in contact with their top edges, is a tank D, the bottom E of which is constructed of felt or other porous material. A second tank F collecting the drippings from the plates. The apparatus may be enclosed in a casing G, and the air or other gas be made to circulate by forced or induced draught. A fan H is shown. In a modification, the plates are arranged in sets above one another, and the gas traverses them *seriatim*. The apparatus may be used for cooling, heating, humidifying, or extracting moisture from air, or for cooling or heating water &c.

1781. Pages, Camus, et Cie, and **Bardy, P.** Jan. 27, 1908, [*Convention date*].

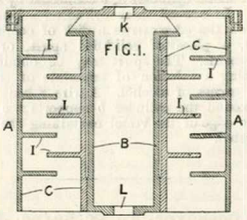
Heating liquids.—A spray-producer in which the angle and the length of the projected jet are regulated by varying the speeds and pressures of the fluids to be atomized, comprises a central chamber or axial duct, and two or more concentric chambers, each having a tangential duct. The axial duct *u* terminates in a chamber *x* with a tangential inlet 1 and a conical end having an orifice *y*. Enclosing the piece 2 is a casing, shown in Fig. 1, the two pieces forming a concentric chamber 3 terminating in a conical end with an orifice 5. The generating-lines of the various conical ends pass preferably through a common point. The supplies are regulated by valves in the supply pipes.



The Specification in the original form, as open to inspection under Section 91 (3) (*a*), comprises also a form of apparatus as shown in Fig. 1 (cancelled), in which a homogeneous fluid is supplied at *b* and divides into two paths; one path, which has a controlling-valve in it, leads to an axial duct in a nipple *f*; the other leads tangentially to a concentric chamber *i*. In a modification, the axial duct is supplied by a separate inlet, and both ducts may be provided with regulating-valves. Owing to the direct mixing and intermediate spreading of the fluids, it is stated that a maximum effect due to the heat contained in the fluids is obtained, thus facilitating saturation, oxidation, reduction, dissociation, combination, decomposition, or other chemical actions according to the fluid used. It is proposed also to use the apparatus for heating or distilling various liquids or gases. This subject-matter does not appear in the Specification as accepted.

2164. Cumming, D. B., and **Douglas, W. S.** Jan. 29.

Feed-water, heating by direct contact with superheated steam. A feedwater-heater A within the steam space of a boiler consists of a central vessel B and two side vessels C provided with baffles I. Steam from the boiler passes through a superheater in the uptake and enters the heater through the opening K in the cover. The feed-water enters the central vessel through the bottom opening L, and overflows the top into the side vessels, in which it mingles with the entering steam and from which it drops into the boiler. The feed-heater may dip below the level of the water in the boiler, or may be connected therewith by pipes. Specification 1124/00, [*Class* 123, Steam generators], is referred to.



2423. Boult, A. J., [*Warchalowski, A.*, and *Mischmaschinen- und Kunstbackofenfabrik Kommandit Ges. Werner & Pfleiderer*]. *April 21, 1908.*

Set-pans.—A portable cooking-apparatus comprises a boiler mounted eccentrically to the grate on a pivot 4 so that any part of it may be brought over the fire The boiler may consist of several tanks 3, arranged so as to form a cylindrical body, with flues between their walls. The tanks may have different weights so that the pivot is outside the

centre of gravity of the boiler. In this case, the boiler may be mounted in a rotatable ring 5, the inner circumference of which is eccentric to the outer circumference.

FIG.1.

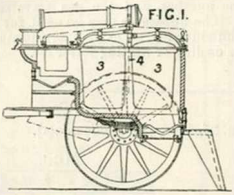
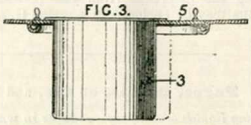
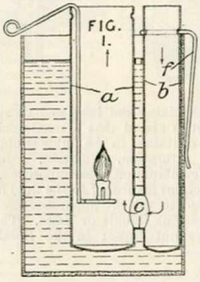


FIG.3.



2613. Kienzle, E. Feb. 3.

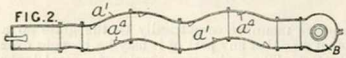
FIG. 1.



Submersible water-heaters.—Apparatus for heating small quantities of liquid to be used, for example, as beverages or for rinsing the mouth, comprises a pair of metal cylinders *a*, *b* connected by a cross-tube *c*. In one of these cylinders, a bent wire resting on the edge carries a disk of combustible material, a piece of solidified spirit, or other heating-means. The spirit may be obtained by introducing a solution of triacetate of cellulose into an excess of alcohol. A wire *f* bent into a groove round the cylinder *b* supports the heater from the edge of the vessel containing the liquid to be heated.

2647. Cockayne, F., Cockayne, J., and **Medcalf, C. E.** Feb. 4.

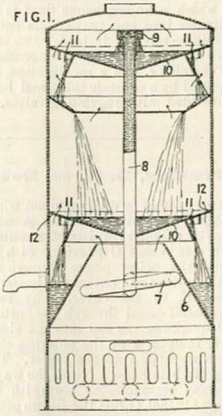
FIG.2.



Feed-water, heating.—The tray fitted in the steam space of Cornish or like boilers is made in sections a^1 secured together to form a long sinuous channel for the water, as shown. A sediment collector B is fitted at the end of the tray. The curved sides of the tray may have angle-pieces a^4 serving as deflectors.

2669. Affleck, G. Feb. 4.

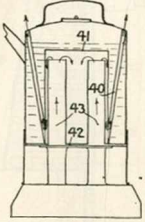
FIG.1.

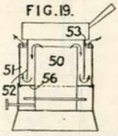


Geysers.—In a geyser of the type having a central vertical water-tube leading to a spraying-device at the top, the water falling down over baffles in the opposite direction to the flow of the combustion gases, the tube 8 has a coil 7 over the burners, and the baffles 10 have holes 11 near their outer edges for the passage of water and are serrated at the outer circumference 12 to allow the passage of the uprising gases. One or more of these baffles may

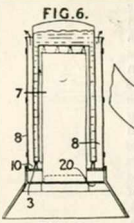
be fitted between the sprayer 9 and the water-holding cone 6. An arrangement of interlocking gas and water taps is described, in which the gas tap cannot be turned on until the pilot-jet is supplied with gas, and on turning it on the water tap is operated also.

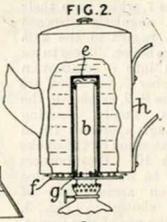
2923. Jowett, H. Feb. 6. [*Cognate Application*, 16,652/09.]

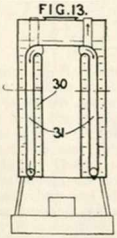


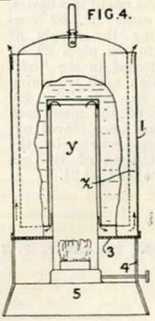


Heating water.—Relates to heating-apparatus in which a hood closely surrounds the chimney of a lamp so as to cause the hot gases to flow downwards in a narrow flue surrounding the chimney, and consists in doubling the path of the gases one or more times, the hood and additional flues in some cases forming part of a water vessel. The hood *e*, Fig. 2, may be carried upon projections *g* upon a flange *f* carried by the lamp chimney *b*, and may fit into a recess in a water-vessel *h* or form part of the vessel. As shown in Fig. 4, sheets of curved metal 1 may be attached to the sides of a kettle or other water-vessel to form the two additional flues *z*, up which the gases ascend, and the chimney or chimneys *y* may pass through apertures in a flanged platform 3, upon which the kettle stands, and which is supported by legs 4 engaging the sides of the reservoir 5. The platform 3 may carry an outer chimney 8, Fig. 6, and the water-vessel may be supported by feet 10 or by projections from the side or top of the chimney, forming, in conjunction with the outer chimney, the additional up-flue. A guard-plate 20 may be provided in all constructions to prevent heating of the oil in the reservoir. The actual chimney may be dispensed with, being replaced by a water vessel 30, Fig. 13, having an uptake and a series of alternating down-flues and up-flues 31 traversing the water space. A kettle or water-vessel, Fig. 17, having a central cavity 41 and the additional flues 40, may be fitted with a flanged false bottom 42 having chimneys 43 fitting over the stove burners, or be used alone on an ordinary stove. In a further modification, Fig. 22, in which the chimney 61 is carried in a cavity in the kettle, and in which the additional up-flues 58 are recessed in its sides,





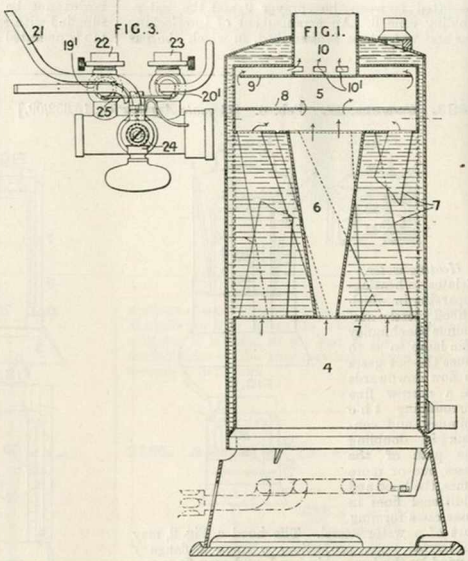




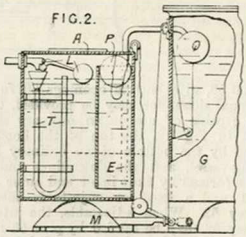
a jacket 59, with bottom openings 60, forming an additional down-flue may be provided, the kettle being capable of use on an ordinary stove. As shown in Fig. 12, the top of the hood may be formed by the bottom of an ordinary kettle or cooking-vessel, and the down-flues and up-flues may be formed by fixed inner and outer chimneys 50, 51 and a fixed or adjustable intermediate chimney 52. When adjustable, the intermediate chimney 52 may be carried by pins 53 resting at the bottom of either of two sets of slots in the top of the chimney 51, and may thus be supported as shown or with its bottom in contact with the platform 56. When supported in the latter manner, a water-vessel as shown in Fig. 17 may be supported over the intermediate chimney, and if the intermediate chimney is removed, this modification is capable of use as shown in Fig. 6.

2990. Affleck, G. Feb. 8.

Vertical boilers.—A vertical water-boiler with an internal fire-box 4, is fitted with a central fire-tube 6 of inverted conical shape, and conical fire-tubes 7, which have their axes angularly disposed with regard to the axis of the boiler. These tubes open into a combustion chamber 5, in which are baffles 8, 9, as shown, the gases finally escaping through apertures 10 in an extension of the smoke stack 10. Two burners may be fitted, controlled by an arrangement of taps shown in Fig. 3. By the use of this device, the cocks 19^1, 20^1 controlling the supply of gas to the pipes 22, 23 are locked in the "off" position until the spring bar 25, borne by the plug of the pilot cock 24 has been moved out of engagement by the turning on of the gas to the pilot jet 21.



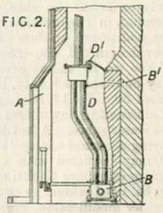
3248. Macnair, J. I. Feb. 10.



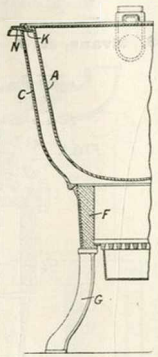
Heating liquids. — In apparatus principally intended for sterilizing water and comprising a vessel A from which the water is transferred under the pressure of generated steam to a vessel G, the time during which the water is boiled before discharge is determined by the height of the pipe E and the size of an outlet to the vessel A for air and steam. A whistle may be fitted to the outlet. The vessel G has a hinged lid. The water-supply may be controlled by a float L, the water entering through a U-pipe T so that it shall not be discharged with the already sterilized water. Floats P, Q turn down the burner when the vessels A, G empty and fill respectively.

3416. Brown, J. J. N. Feb. 11.

Water-tube boilers. —In a hot-water heating-apparatus wherein a tubular device is placed in a fire-grate A so that the hot gases of combustion pass between and up behind the tubes, the boiler is arranged so that these tubes B^1 extend forward as well as upward from the lower drum or header B. A damper D^1 may control the second passage D for flue gases.

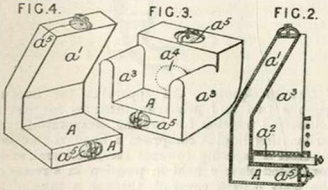


3532. Donald, P. G. Feb. 12.



Washing-boilers.—The body-piece C of a portable copper made in three sections, namely the body C, furnace F, and legs G, is shaped so as to be conveniently cast in a moulding-box ordinarily used for casting a pan of a larger size than that A to be used with it, and follows closely the general contour of such pan. The ring K for supporting the pan A is separate from the flange N on the body part C, and is sunk to receive the pan so as to present an almost flat surface on the top.

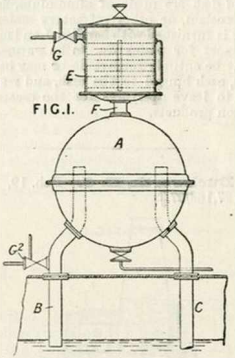
3582. Rutter, J. M. Feb. 13.



Kitchen-range and like boilers.—A boiler for use with parlour or kitchen grates is provided with a sole-part adapted to underlie the grate, and also with a forwardly-extending back and side pieces in direct communication with the sole-part. As shown in Fig. 2, the grate a^2 rests upon the sole-part A, which is connected to the forwardly-extending back a' and to the sides a^3. Hand-holes a^5 are fitted. Fig. 3 shows a modification in which the part a' is omitted. In this form, a flue opening a^4 may be provided. In the form shown in Fig. 4, the side pieces are omitted.

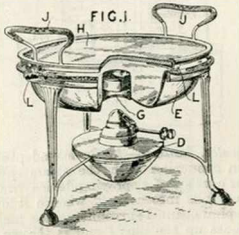
3593. Ross, A. Feb. 13.

Feed-water, heating.—Relates to apparatus of the kind in which conduits extending to different depths within a boiler are connected at their upper ends to a chamber through which the water circulates by convection, and consists mainly in introducing the feed-water into either of the conduits or into a casing which is connected to the chamber as a jet to assist the circulation. In the form of apparatus shown in Fig. 1, the chamber A communicates with the water space of the boiler



by the conduits B, C, and with a casing or drum E by a neck F which contains a float valve. A hot or cold jet of feed-water is admitted by a pump or injector G to the casing E provided with baffles. A second injector G^2, instead of or in addition to the injector G, may deliver the feed to either of the conduits. The valve in the neck F is normally open, but should the chamber A empty itself, the valve will close and the chamber become filled again by syphonic action. In a modification, the chamber A is omitted, and the conduits are connected directly with the casing E. In a further modification, the chamber A is in the form of a coil into which the upper ends of the conduits B, C are formed. The casing E may be omitted, or may be connected to the highest point of the coil.

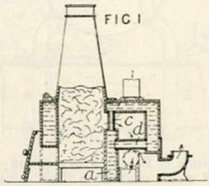
4042. Heath, F. P. Feb. 18.



Portable and small water-heaters.—A chafing-dish comprises a flattish dish E provided with a funnel G, through which the flame and hot gases from a

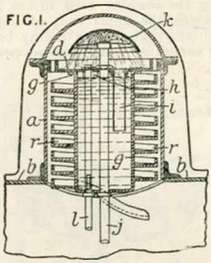
spirit lamp D below it pass, and with a refractory cover H which directs the hot gases downwards on to the contents of the dish before they escape between the edges of the cover and the dish. The cover and dish are made of aluminium, fire-proof china, porcelain, or other refractory material and the cover is furnished with handles J and may serve as a support for plates &c. to be warmed. The cover may be entirely removable, or may be formed in halves, each hinged to the dish, and rests L are provided to leave apertures for the escape of the combustion products.

4095. Duckworth, H. C. Feb. 19. [*Addition to* 27,163/07.]



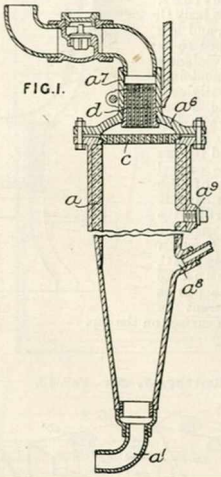
Vertical boilers.—The fire-bridge *a* of the boiler described in the parent Specification, is made separate, in box-like form, and is connected to the water-space proper by vertical and horizontal pipes *c*, *d*.

4285. Wood, J. E. Feb. 22.



Feed-water, heating.—A device adapted to be placed in connexion with the steam space of a generator consists of a spraying-device from which the water falls into a tank, whence it overflows down a spiral channel surrounding the tank. The water passes up the pipe *j* and is thrown against the deflector *k*, whence it falls on to a plate *d* and passes to the tank *g* by the pipe *i*. The tank *g* is provided with an overflow opening *h* leading to a spiral channel *r*. A blow-off pipe *l* is provided. The whole apparatus is enclosed in a cylindrical casing *a* attached to the boiler shell *b*.

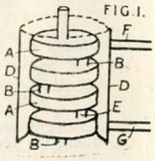
5088. Evans, A. J. March 2.



Heating liquids. — An apparatus for burning gaseous fuel and primarily intended for use in submerged position for heating, evaporating, and carbonating liquids comprises a lined combustion chamber *a* tapering towards its outlet end, and a perforated plate *c* held in position in a recess on the body *a* by a cover a^6, through a tube a^7 on which the combustible mixture is supplied. A perforated block *d* may be fitted to distribute the gas to the burner plate *c*, and the apparatus is so formed that both the block *d* and the plate *c* can be readily removed and replaced. A removable nozzle is fitted at the outlet end of the apparatus, and an opening a^5 is provided for introducing a blow-lamp for starting the burner.

5468. Collins, A. J. March 6.

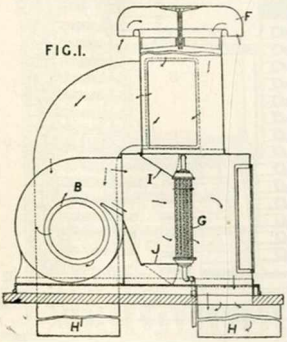
Small water-heaters.—An apparatus for heating foster-mothers &c. comprises a frame-shaped tank, which is supplied with hot water by a pipe F from a boiler D. The boiler D, which also has a return pipe G, is provided with air chambers A, which are connected



to each other by tubes E and also to the atmosphere by tubes B. The air is heated by a lamp &c. placed under the lower tube B.

5638. Keith, J. March 9.

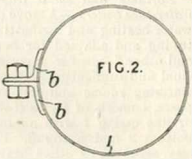
FIG.1.



Heating air.—For heating, cooling, or ventilating ships &c., air is drawn through a deck ventilator F by a fan B and is driven past a heater &c. G to the air trunks H, which distribute it to the cabins &c. Flaps I, J permit of a certain proportion being by-passed without being heated. The air may be simply circulated in stormy weather by screwing-down the ventilator F and opening a valve in the return main H¹ from the cabins.

5779. Russell, C. N. March 10.

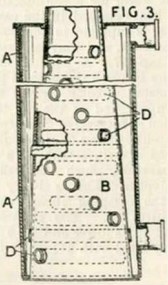
FIG.2.



Feed-water, heating.—The whole or a portion of the length of the straight tubes of economizers, feed-heaters, &c. is protected from the direct action of the flames and hot gases by sheaths comprising thin sheet-metal sleeves placed around the tubes 1 and held in position by bolting together flanges *b* or by folding over the edges of the sheet.

5882. Parker, A. F. C. March 11.

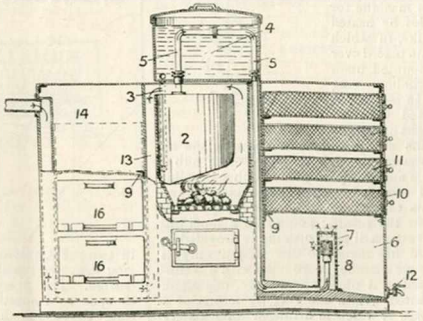
FIG.3.



Vertical boilers.—Boilers for use in heating buildings &c., and for other purposes, are constructed with an outer cylindrical shell A, an inner conical shell B, and straight water-tubes D arranged spiral fashion in the shell B. A gas, oil, or other burner is fitted beneath the boiler.

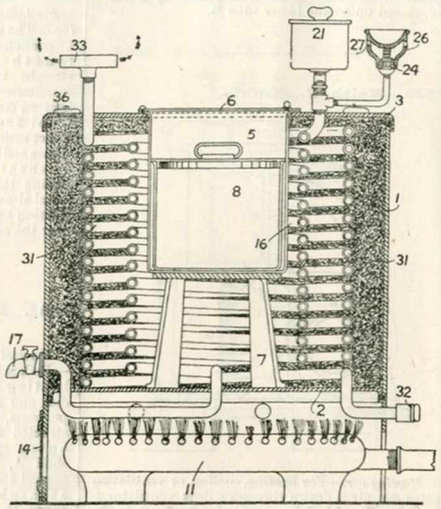
6158. Mederer, G. March 15. *No Patent granted (Sealing fee not paid).*

Feed-water, heating.—In a combined cooking and drying apparatus, comprising steaming-oven 6 for potatoes &c. and drying-oven 14 for fruit &c. heated by the fire-gases in the flues 13, steam is generated in a boiler 2 in the fire-box, and the boiler 2 is connected by a pipe 3 with the feed-water tank 4, through which passes the steam-pipe 5.



6932. Brown, S. March 23.

Portable and small water-heaters; water-tube boilers.—A stove comprising water-heating and air-heating coils of tubing and adapted for heating milk and other foods, for vaporizing medicinal and fumigating preparations, for warming rooms and for other purposes, consists of a closed sheet-metal or like casing 1 with an imperforate bottom 2 and a top 3. Sand, fireclay, asbestos, or other heat-retaining material, filled in through apertures 26, is packed between a water-heating coil 16 and an air-heating coil 31, and between the latter and the outer casing 1. Inset is a central chamber or hot-closet 5 supported by a tripod 7 and fitted with a lid 6. A chamber 8 containing food for infants, invalids, &c. may be placed in the chambers, and after becoming hot is kept warm for a considerable time by the heat retained in the casing. The water is supplied to the coil 16 from a tank 21, and may be drawn off by the tap 17. A portion of the coil passes beneath the bottom plate 2 and is heated directly by the flame. At the upper end of the coil is a spring-loaded safety-valve 24 surrounded by a cup-like casing 26, in which may be placed a disinfectant or a medicinal preparation, such as camphor or eucalyptus. This is slowly vaporized by the escaping steam, and issues through the apertures 27. The air-heating coil 31 may be closed at its lower end by a plug 32, and its upper end is fitted with a T-piece 33. The apparatus is heated by a Bunsen burner 11, or by an oil lamp or other means. The door 14 has an observation hole covered with talc.



6994. Utard, E., and **Gimonet, A.** March 26, 1908, [*Convention date*].

Heating air; heating water.—In a machine for drying bottles by heated air or the like, in which the bottles are placed over nozzles *n* mounted upon a rotating hollow ring constructed in sections *a* each connected with the hub *d* by means of hollow spokes, means are provided for heating the air during its passage through the ring. The hub *d* rotates upon a stationary conical chamber supplied with air and provided with a port which allows the air to pass to the ring sections *a* except when these arrive at the loading point. In a modification, a relatively small port opening is provided so that the fluid has access to one section only at a time. The air chamber is provided with a waste-pipe for draining it of any water &c. deposited. The air is heated within the ring by means of a circular gas-pipe *r*, which is arranged immediately beneath it but does not extend through the arc adjacent to the loading position. For rendering the heating of the air more effective, the air ring may carry a hood *y*, Fig. 7. The hollow spokes are in two parts, united by screw unions so that the air ring may be readily replaced by another when desired. The Specification, in the original form, as open to inspection under Section 91 (3) (*a*) states that the modified form of the machine may

FIG. 7.

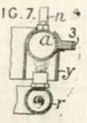
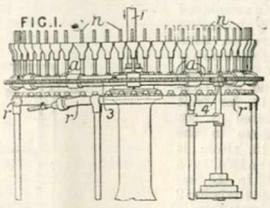
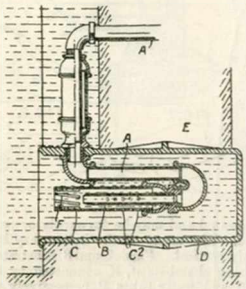


FIG. 1.



be supplied with water for the purpose of washing bottles. This subject-matter does not appear in the Specification as accepted.

7376. Matthews, G. W. March 27.



Heating water.—In a steam nozzle surrounded by a perforated sleeve, such as that described in Specification 4812/02, the perforations are placed opposite the nozzle, and the water that is blown out through the open end of the sleeve receives a rotary motion by means of vanes or other suitable construction in sleeve. The steam-pipe A enters a casing D in a wall E, to which the liquid to be heated has access. The pipe A terminates in a nozzle B, which is surrounded by a sleeve C with perforations C^2 in that part of sleeve which is opposite the steam nozzle. Water enters by the perforations C^2, is heated by the issuing steam, and emerges with rotary motion from the end of the pipe C, which has helical blades F or an equivalent.

7776. Miller, W. April 1.

Kitchen-range and like boilers.—In a boiler for cooking-ranges and the like, the usual side supports are replaced by a central support *a*, forming part of the water space of the boiler. The two separate flues *c*, *d*, thus formed, heat the boiler and also the ovens at the sides. The boiler may be divided into two chambers *j*, *k*, which may have separate pipe connexions for utilizing the water for different purposes. Valves may be fitted in the flues *c*, *d* and also between the chambers *j*, *k*.

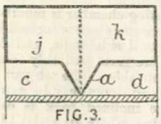


FIG. 3.

8481. Blakeley, W. April 8.

Heating liquids and gases.—Relates to apparatus for heating, cooling, or distilling liquid, including the heating of feed-water for boilers, or for heating, cooling, purifying or enriching gas, of the direct-contact type comprising a tower, such as *a*, containing a series of shallow trays *f* with intervening deflecting-plates *i*, each tray being provided with a central opening *h* through which the liquid falls on to a lower deflecting-plate and the gas rises into the space between the tray and the next higher deflecting-plate. The invention consists in providing means whereby a thin stream of gas is passed through the tower in intimate contact with the surface of the liquid without any throttling of the gas or passage through a layer of liquid. For this purpose, the deflecting-plates are made nearly equal in diameter to the trays, and they are shaped and located with regard to the trays so as to produce an intervening gas passage of approximately constant area, equal to that of the central openings *h* or gas-inlet pipe *b*, the passage taking the form of a cylinder of decreasing height with increasing radius. The liquid is supplied by a sprinkler *m* and is fed continuously from a cistern *n*, or intermittently by the aid of an automatic tippler *p*. Liquid is prevented from falling into the gas-inlet pipe by the provision of a hood *c*. Valves *q*, *r* enable the apparatus to be by-passed, as may be necessary when it is employed as a washer or condenser in a coal gas manufacturing-plant. Each section *e* may be provided with a separate pipe for draining away tar or other liquid. In a modification, a number of trays and deflecting-plates are combined in a single section, each unit supporting the units above it. Concentric ripples are formed during the radial passage of the gas over the surface of the liquid, which add to the efficiency of the apparatus, and in a further modification, the rippling effect is increased by corrugating the deflecting-plates.

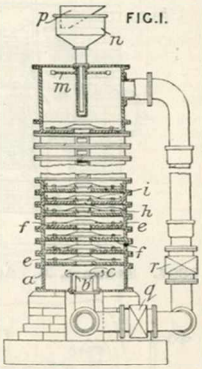


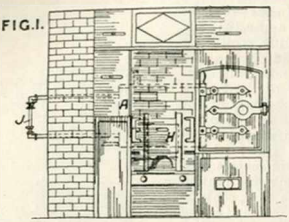
FIG. 1.

8616. Morley, M. E. April 10.

Kitchen-range boilers.—A boiler A is fitted with a water-gauge J so that, in the event of the water-supply failing, the falling level in the boiler can be observed. A damper H is provided to cut off the passage of the flue gases to the boiler, which is

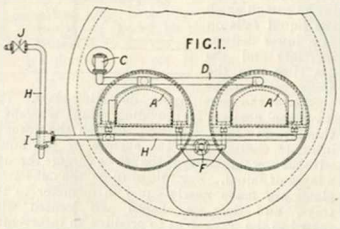
so fitted that it is not in direct contact with the fire.

FIG.1.



8894. Stewart, A. April 15.

FIG.1.



Feed-water, heating. — Relates to a combined water heater and circulator applicable to the furnace fronts of steam boilers, as described in Specification 6727/03, [*Class* 123, Steam generators], and consists in the particular arrangement of connexions affording circulation between the heater and the boiler. The heater A consists of a semi-circular tube or casting located at the mouth of the furnace flue upon the dead-plate. When applied to a Lancashire boiler as shown, the chambers are connected by means of a pipe D to the boiler at C. One end of each chamber is connected to the boiler at F, and the other end of each chamber communicates by means of a pipe H with a pump or injector provided with a check valve I and a stop cock J.

Reference has been directed by the Comptroller to Specification 6727/03, [*Class* 123, Steam generators].

8910. Gibson, W. J. April 15.

Kitchen-range and like boilers.—In order to provide additional heating-surface in domestic fire-place boilers of the type in which an enclosed combustion chamber is formed beneath the boiler, the boiler is provided with one or more straight flues or fire-spaces which pass from front to back, or is formed of chambers connected by water-tubes or passages so as to provide equivalent fire-spaces. Fig. 1 illustrates the provision of a single horizontal flue G to a boiler having a sloping front B, and forming, together with curved fire-bars A, an enclosed combustion chamber A^1. The flues may

FIG.1.

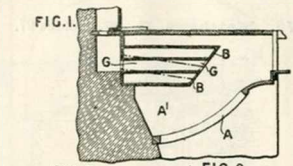


FIG.7.

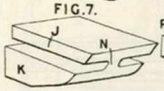
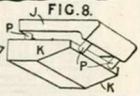


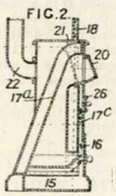
FIG.8.



be duplicated and may be forwardly or rearwardly inclined. The front of the boiler may be wholly or partly vertical. Figs. 7 and 8 illustrate boilers comprising chambers J, K connected by a water-space N and water-tubes P respectively so as to provide fire-spaces. Hand-holes are provided to enable such boilers to be cleaned.

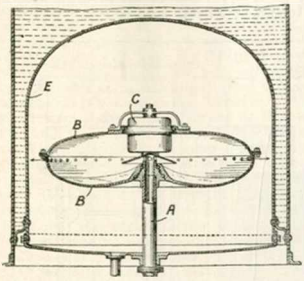
9086. Bell, A. April 17.

FIG.2.



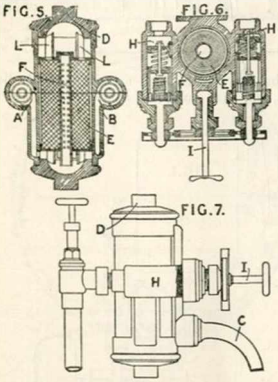
Vertical boilers. — In hot-water boilers in which the water space surrounds, and to some extent overhangs, the furnace in an inclined position, means are provided for utilizing the heat as far as possible, removing deposit from the boiler, feeding air to the furnace, and exposing the fire to view or not; and the arrangement of the upper part of the heating-chamber is modified. In the boiler shown, the water space is formed by rear inclined walls 17^a, vertical side walls, and front walls 17^c, enclosing a fire-grate suitably supported and preferably removable. The ash-pan 15 carries a door 16; or hinged doors may be carried on the outer casing. The inclined back is carried to the top of the casing, where an outlet 18 is provided. Below this upper front part is a charging-door 20. At the upper part of the inclined space, lateral flues 21 lead to the gases, which pass downwards to the outlet 22. A plug for removing incrustation &c. is placed at the bottom of the inclined space below any other part of the water space. An adjustable air-inlet valve 26 is formed in the front of the casing so that the air admitted must pass between the outer casing and the front water space before reaching the fire-grate.

9571. Maude, F. N. April 22.



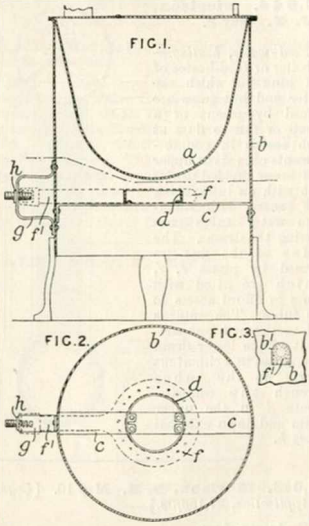
Heating water &c.—Heat is generated by flinging water-spray, sand grains, small pellets, or the like centrifugally from the circumference of a rotating table B against the surface E it is desired to heat. The water, sand, &c. is supplied to the table through a hollow shaft A supporting it. The table is rotated by an electric motor C, and is shown mounted in a locomotive fire-box.

9759. Watkins, W. April 24.



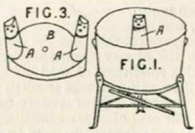
Heating water.—A direct-contact steam water-heater has its mixing-chamber completely filled with a roll of wire-gauze E, which rests on a plate of metal. Steam enters below this plate through the port A, and passes into the chamber through the perforations in the pipe F. Water enters at B above the plate, percolates inwards, and emerges at C in a heated state. Caps D with studs L keep the mixer E in position. Valves H, having spring-pressed faces, may be combined with the heater, such valves being operated simultaneously by the handle I and toothed wheels.

10,233. Simister, S. April 30.



Washing-boilers; set-pans &c.—The annular or similarly-shaped burner for a boiling-pan or wash-boiler fits on a correspondingly-shaped piece of metal, which is supported on a cross-piece attached to the casing. The burner *f* fits on the part *d*, which is secured to the cross-piece *c*. The extending arm f^1 of the burner is made flat at its lower part, and passes through an opening b^1 of similar shape in the casing *b*. The nipple *h* is supported by a bracket *g* attached to the casing. This arrangement allows the burner *f* to be readily removed and replaced in its proper position.

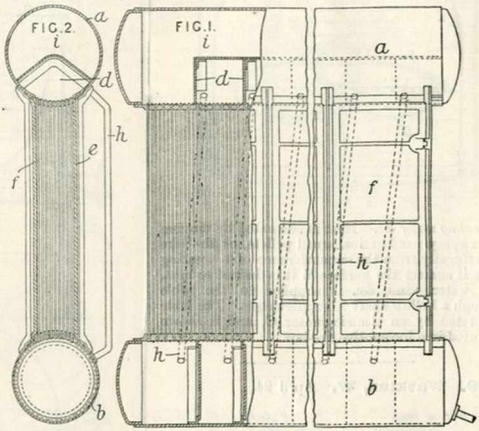
10,891. Bowen, L. May 7.



Washing-boilers.—The articles are carried in a

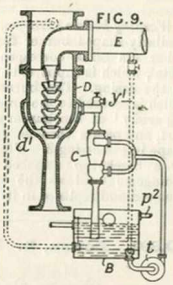
spherical wire cage rotatably mounted and are cleansed by the action of steam and water which issue from side tubes A. These tubes extend from the space beneath a removable false bottom B, which is dished towards the centre, where it is provided with a small grating for the passage of dirt. The upper ends of the tubes are fitted with perforated detachable caps.

10,944. Nicolson, J. T. May 8.

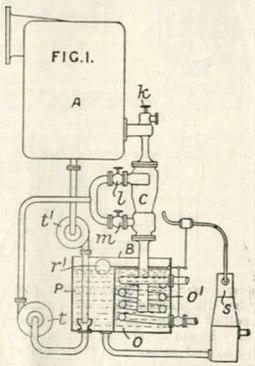


Feed-water, heating.—A boiler or feed-heater of the kind in which the water and hot gases are forced by means of a pump or fan to flow at high speeds in counter-currents consists of upper and lower divided drums *a*, *b* with an intervening flue packed with small-bore water-tubes connecting the drums. The sides of the flue are formed by plates *e*, *f*, which are fitted with doors to afford access to the tubes. The water is fed to the end compartment of the lower drum and passes in a circuitous course up the tubes through the compartments *d* in the upper drum and down external pipes *h*.

11,043. Morison, D. B. May 10. [*Cognate Application*, 27,153/09.]



Feed-water, heating.—Relates to a condenser system, such as that described in Specification 16,358/08, [*Class* 122, Steam engines], in which the condenser is evacuated by a water-jet ejector (alone or in combination with a steam jet) which discharges into a circulating-tank into which water of condensation is also discharged, and in which means are provided for the adequate supply of water to the ejector from the circulating-tank under varying conditions of load in the condenser. Owing to its repeated passage through the system, the water becomes heated and is used as feed-water. In the case of a jet condenser, any water suitable for use as feed-water may be admitted to the circulating-tank. The ejector comprises a number of nozzles each separately controlled by hand, and may comprise a water-spraying device

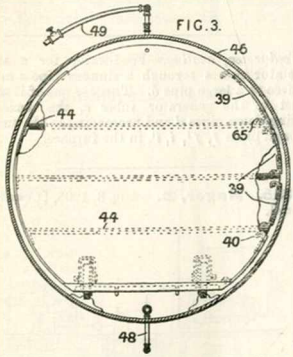


and one or more solid or annular water-jet devices in series or in parallel with each other, the steam

jet, when used, being arranged so as to discharge to the water ejectors. The steam used may be exhaust steam from any source. An example of the general arrangement of the plant, Fig. 1, comprises a condenser A, an ejector C consisting of a steam jet s together with water spray and jet devices supplied with water by the pipes l, m, and a circulating-tank B divided into compartments O, P, the water being discharged from the ejector compartment O, overflowing therefrom to the compartment P, and being returned to the ejector by a pump t. Water of condensation is withdrawn from the condenser by a pump t^1 or an ejector operated by water or exhaust or other steam, and is discharged in such a way that its momentum assists the action of the pump t. The water of condensation may also flow or be forced into the ejector and discharged thence to the tank B. When the level of the water in the compartment P falls, a float r^1 simultaneously throws a cooling-coil O^1 into action and cuts the steam from a feed-pump S, withdrawing water from the compartment P. The water-controlling valves may also be placed in a pipe branching from the discharge side of the pump t instead of being in direct communication with the tank B. In a modified arrangement for use with a jet condenser D, Fig. 9, the tank B is supplied by a pipe y^1 with water from the injection pipe E, where this is suitable for use as feed-water; in other cases, a pipe p^2 supplies water suitable for feed purposes.

12,250. Clark, M. C. May 24.

FIG. 3.

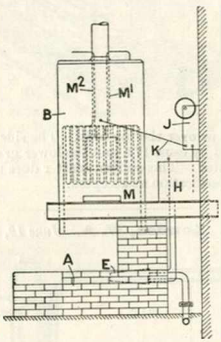


Digesters.—In apparatus for devulcanizing waste rubber by treatment with steam, a truck is provided with perforated shelves to ensure complete permeation of the mass by the steam. One side of the truck is formed of detachable plates to allow the insertion and withdrawal of the shelves. The prepared stock is fed to the floor of the truck until the level of the first shelf 44 is reached. This shelf is inserted, brackets being fixed to the end of the truck for its support, and the side plate 39 is placed in position and secured by pins 65 and hooks 40. Material is fed on to this shelf, and so on. When the truck is full, it is run into a steam-chamber 46. Steam, admitted by the pipe 48 permeates the mass and leaves by the pipe 49. The perforated shelves prevent the bedding down of the rubber into a compact mass.

12,450. Herzfeld, R. May 26. *Drawings to Specification.*

Heating water.—In a plant for producing electricity and hot water for domestic purposes, high-pressure steam on its way from the boiler to the water-heater is utilized in a steam-engine coupled with a dynamo, which is thus practically continuously driven. This dynamo is of a capacity smaller than that required to supply the demand for electricity direct, accumulators being provided to meet the intermittent electrical demand from the cumulative charge from the small generator.

12,719. Riley, F. May 29.

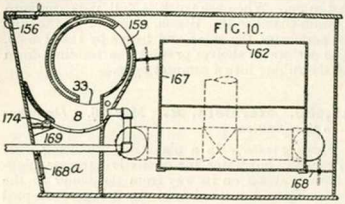


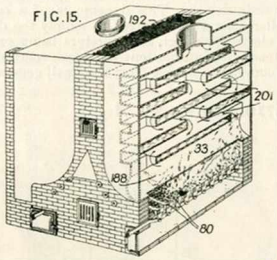
Feed-water, heating.—Water employed for cooling the tuyere E of a smith's forge is conducted to a feed-water tank H and pump J, and passes through a feed-pipe K to a boiler B arranged within the uptake.

12,906. Lee, T. F. F. June 27, 1908, [*Convention date*].

Vertical boilers; kitchen-range and like boilers.—The Specification in the original form, as open to inspection under Sect. 91 (3) (*a*), comprises the low-pressure steam, or hot-water boiler shown in Fig. 15. The shell is formed with a cylindrical chamber 188 and a flue space 201 through which the furnace gases pass along the course indicated by arrows. In a kitchen range, Fig. 10, the boiler is in the form of a hollow cylinder with openings 33, 159 leading respectively from the combustion

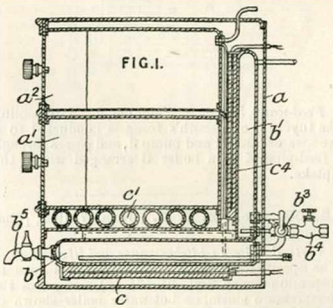
chamber 8 and to the flues round the oven 162. Dampers 167, 168 direct the gases either all round





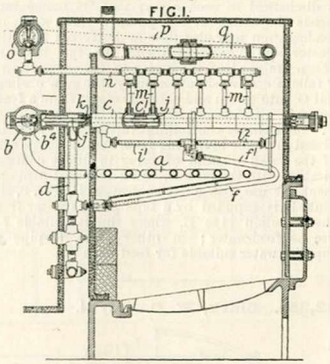
the oven or over the top only. The side grate can be rocked by cams 174, and the lower grate can be reciprocated. This subject-matter does not appear in the Specification as accepted.

12,985. Lowden, W. A. *June 12, 1908*



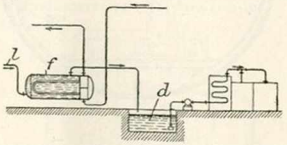
Heating water.—A cooking-stove, shown in vertical section, has boilers b, b^1 placed between an outer casing a and ovens a^1, a^2 for baking and steaming. Electric heaters c, c^1, c^4 are arranged below the boiler b and between the boilers and ovens. The steaming-oven a^2 is placed above the baking-oven, and supplied with steam from the lower boiler b; it also has a perforate false bottom, below which is a drain pipe to the lower boiler. Water is supplied to the boilers by separate pipes, and is drawn off from one or both through a three-way cock b^3 and an ordinary cock b^4, or through a cock b^5. Specification 12,669/08, [*Class* 126, Stoves &c.], is referred to.

13,102. Drummond, C. S. June 3.



Feed-water, heating.—Feed-water for a steam generator passes through a sinuous pipe a in the furnace to a large pipe b. Thence some of it passes direct to the generator tubes c, the remainder passing down pipes d and proceeding to the tubes c through pipes f, f^1, i, i^1, in the furnace.

13,325. Nager, E. Aug. 3, 1908, [*Convention date*].

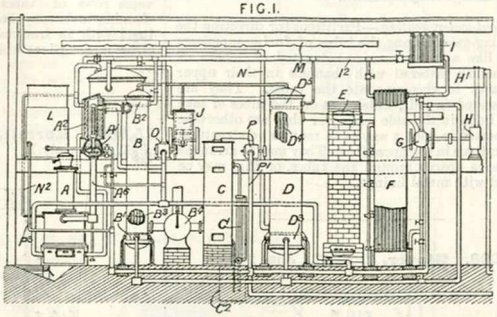


Heating water.—In steam heating-systems provided with an economizer through which the condensation-water is returned to the boiler, the condensation-water before passing to the economizer is used to heat other water. A pipe l brings condensation-water from the steam-traps &c. of the system to a heat-interchanger f, where it heats other water and whence it passes to the feed-tank d.

13,537. Kitchen, J. M. W., and **Bermuth, O. von.** June 9.

Heating water; heating gases.—Relates to a power, heat, and light generating system in which producer gas is used for obtaining heat and light and as fuel for a gas-engine. The heat obtained in cooling the producer gas, and the heat of the jacket water and exhaust gases of the gas-engine are used to heat water for heating purposes, and for producing and superheating steam which is supplied to a steam-engine, the heat of the exhaust of which is used for heating purposes. The gas from the producer A passes on its way to a condenser B through a heat interchanger A^2, through which passes in a counter-current direction air, steam, and hot waste gases to the producer. The producer gas then passes through a scrubber C, and is supplied to a furnace E, a gas-engine C, and a reservoir L. The cooling-water of the scrubber is used circuitously and is pumped through a radiator C^1, which heats the surrounding air for respiration or combustion. The combustion products of the furnace E are mixed with the gas-engine exhaust and supplied to an economizer D from which they pass through pipe N. The condenser B and economizer D are provided with water spaces B^1, B^2, D^3, D^5 connected by tubes B^3, D^4, through which passes the hot jacket water from the engine. The heated water or steam from the condenser B and the economizer D is supplied to the heating system I^2, I, or the steam is supplied to the engine J. The condenser cooling-water is used in the heating system, or its heat is transferred to air for combustion by being passed through an air-heater and water-cooler N. The condensed exhaust steam passes to the hot well C^2, from which it passes through the radiator B^1. The air heated by the system is drawn through an air conduit M by the exhauster O, and is forced to various places for combustion, respiration, or accessory heating.

FIG.1.



14,649. Le Faguays, F. June 22.

Heating air for disinfecting the walls and floors of rooms, furniture, &c. The apparatus used comprises a chamber *a* having a perforated bottom a^1 and fitted with burners *e*. The gases of combustion, and air admitted through the perforations, rise in the flue *b* and pass through the constricted portion b^1 to the pipe *l* fitted with a nozzle. In a modification, air may be supplied above the burners by a fan and the perforations in the bottom of the chamber *a* may be opened or closed by a valve. In a modification for treating carpets &c., shown in Fig. 6, air passes through a trunk *b* heated by burners *e* and furnished with a downwardly-directed nozzle *l* having a slot-shaped opening. The heating-chambers may be surrounded by an insulating covering *c*, and may be enclosed in an outer casing.

FIG.1.

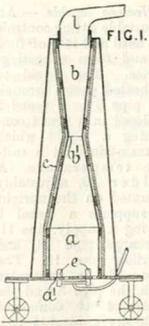
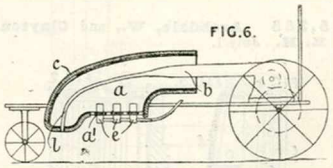


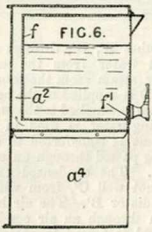
FIG.6.



14,816. Smallwood, L. A. June 24.
Drawings to Specification.

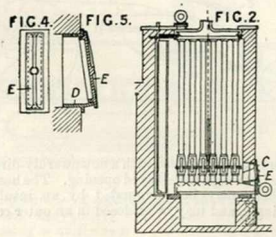
Feed-water, heating.—Partitions for directing the heating-gases among the tubes of fuel-economizers and like apparatus are constructed of blocks of refractory material with channels in their upper surfaces to accommodate the tubes. They are suspended on rods, which rest on the tubes or take into holes in the side walls; or they are otherwise supported in such a way as to require no structural alterations in the apparatus. They may be arranged to leave spaces around the tubes, or they may be fitted with metal linings.

15,098. Glover, J. A. F. June 28.



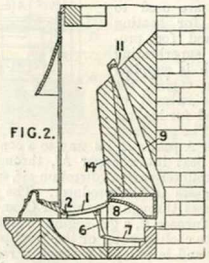
Kitchen-range and like boilers.—A removable water tank *f* fitted in the side of a portable gas or oil-heated cooking &c. oven is secured in position by a notch *f*¹, and is heated by the combustion products passing into the space around it through apertures connecting it with the cooking-chamber.

15,355 Archdale, W., and **Clayton, R. H.** July 1.



Feed-water, heating.—In order to facilitate the cleaning of the tubes of a fuel-economizer, openings C are formed in a side wall opposite to the lower parts of the spaces between the transverse rows of tubes, through which openings cleaning-tools may be inserted. Each opening is lined with an iron casing D having an inclined outer face, against which rests a cover E.

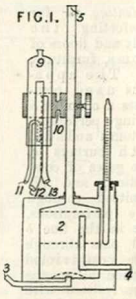
15,396. Horrell, C. R., and **Bowman, H. B.** July 1.



Kitchen-range and like boilers.—A boiler 8 located at the base of the fire-back of an open fire-place, behind which an additional uptake 9 is provided, has a concave under surface.

16,397. Stock, W. F. K. July 14.

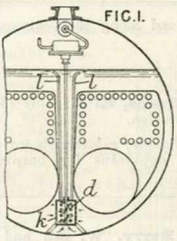
Heating liquids.—An adjustable fitting controls the head and rate of flow to and from a heating-device. The liquid to be heated passes through the pipe 3 to a vessel 2 enclosed in a vessel containing a liquid which is maintained at a suitable temperature. A holder 10, adjustably mounted on the upright 5, supports a vessel 9 having a supply pipe 11, discharge pipe 13, and overflow pipe 12. The pipe 13 is connected with the pipe 3, and the outlet 4 is connected with any apparatus it is required to heat to a fixed temperature.



16,418. Boultbee, H. W., and **Page, J. H.** July 14.

Heating water.—Relates to apparatus for promoting circulation in boilers &c. of the kind in which a mechanically or turbine-driven screw or propeller *d* enclosed in a pipe or cylinder *k* is used for positively moving the water from one place to another. In one form of apparatus, the water is discharged from the cylinder *k* disposed between the furnaces through pipes *l*, which extend upwards nearly to the water-level. The lower end of an open-ended pipe enclosing a propeller may be expanded to a conical form.

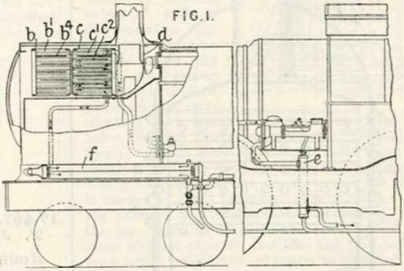
FIG. 1.



16,442. Hardingham, G. G. M., [*Trevithick, F. H.*]. July 14.

Feed-water, heating.—Multitubular chambers for superheating steam and for heating feed-water, placed in the upper part of the smoke-box of a locomotive boiler as described in Specification 19,139/08, [*Class* 123, Steam generators], are arranged tandem-fashion so that the whole of the furnace gases traverse the chambers successively. The tubes b^1, c^1 of the chambers *b*, *c* conduct the furnace gases from the front of the smoke-box to a casing *d* enclosing the nozzle of the blast-pipe. The chambers are preferably provided with baffle-plates b^4, c^2. The feed-water may be heated in multitubular chambers *e*, *f* by the exhaust steam from the feed-pump and engine cylinders before passing to the feed-heating chamber *c* in the smoke-box.

FIG. 1.

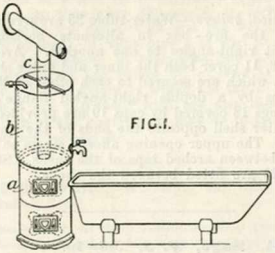


16,481. Maddocks, T. July 15.

Vertical boilers.—Apparatus for heating water for baths comprises a removable circular tank *b* adapted to fit in the open top of a slow-combustion stove *a* and provided with a central flue *c*.

Reference has been directed by the Comptroller to Specification 2629/72.

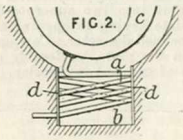
FIG. 1.



16,534. Cook, T. D. July 15.

Feed-water, heating.—A feedwater-heater comprises headers *d* connected by tubes *a*, some of which are inclined to one side and some to the other, while others may be in horizontal layers. As applied to the boiler shown, the heater is in the downtake *b* beneath the boiler *c*, so that the gases pass from the side flues over

FIG. 2.

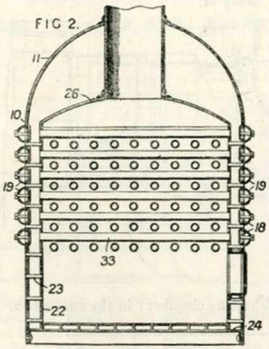


the tubes and along the bottom flue to the chimney.

16,620. Evans, A. J. July 16. *Drawings to Specification.*

Heating liquids; submersible water-heaters.—Relates to apparatus for burning atomized liquid fuel for use, among other purposes, in heating liquids. The apparatus comprises a burner of special construction which projects into an elongated combustion chamber, preferably of wrought iron lined with refractory material. The combustion chamber may be immersed in water or other liquid, the gases being discharged into the liquid or led away by a pipe. In either case, the combustion chamber may be of bent or curved form.

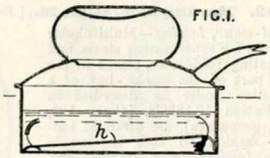
16,801. Berry, W. A., and **Frawley, R. W.** July 19. *No Patent granted (Sealing fee not paid).*



Vertical boilers.—Water-tubes 33 are arranged across the fire-box in alternate horizontal rows at right-angles to one another. Arched tops 26, 11 cover both the inner and outer shells 22, 10, which are secured to each other at their bottoms by a double right-angled flange 24. Openings 18 covered by caps 19 are provided in the outer shell opposite the ends of the water-tubes. The upper opening affords access to the space between arched tops of the shells. Stay-bolts 23 are fitted between the shells.

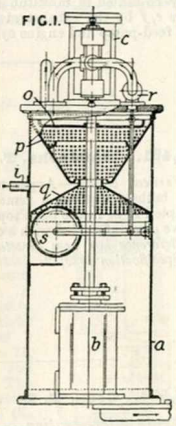
16,934. Sage, W. J. July 20.

Washing-boilers.—A device for promoting convection currents consists of a plate *h* extending at an incline completely across the vessel and dividing it into two superposed compartments, the plate having an opening at each end of its most inclined diameter. Corrugations may be formed on the plate, preferably running in the direction of greatest inclination. The plate may be made in two or more parts capable of being united within the vessel.



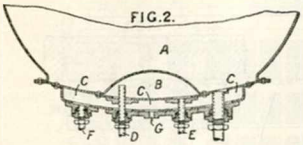
17,467. Bruce, W. J. W., and **Downie, T.** July 27.

Heating liquids.—Water &c., particularly feed-water for steam-boilers, is heated by mingling it with steam in a closed casing containing the feed-pump, which is operated by a steam piston and cylinder carried on the top of the casing. Water enters at the top of the casing *a* containing the feed-pump *b*, and falls through the perforated tray *o* and cones *p*, *q*, mingling with the steam which enters the casing through a pipe *i*. The steam supply to the piston and cylinder *c* operating the feed-pump is regulated by a valve *r*, under the control of a float *s* in the casing.



17,728. Briggs, S. July 30.

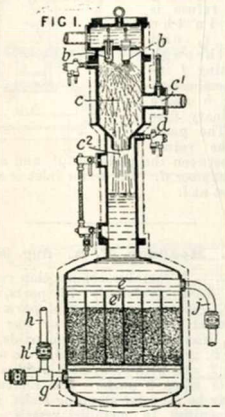
FIG.2.



Washing-boilers, set-pans, and the like.—Under the pan A are arranged two or more steam chambers B, C with separate inlets D, F and outlets E, G. High-pressure steam is first admitted to both or all of the chambers, and, on the boiling-point being reached, one is cut out, for example, C, thus reducing the heating-effect while continuing the use of the high-pressure steam.

17,984. Dales, J. H. Aug. 4.

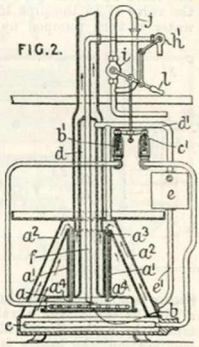
FIG 1.



Feed-water, heating.—In a direct-contact steam feedwater-heater, full-pressure steam is employed so that the water is delivered at boiler temperature. The water is sprayed at *b* into the chamber *c*, the steam entering through the pipe c^1. A de-aerating chamber c^2, with a blow-off valve *d*, and a filter *e*, divided into cells e^1, with a delivery pipe *g*, are provided in the lower part of the apparatus. A pipe *h* and a valve h^1 are fitted to inject high-pressure water in order to cleanse the filter by washing impurities out of the pipe *j*.

18,919. Mackay, R. Aug. 17.

FIG.2.

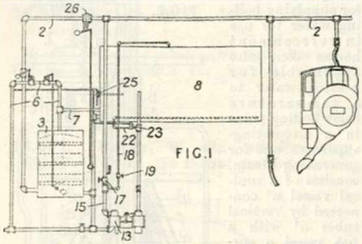


Geysers; water supply and delivery.—A device for supplying boiling water for use in refreshment houses &c., also applicable for heating water to a temperature below boiling-point in a circulating-apparatus, and for generating steam, consists of a conical vessel a^2 connected by vertical tubes a^4 with a flat vessel *a* surrounded by the conical vessel, the tubes a^4 passing through hollow pillars a^1 communicating with the vessel *a* and preserving the tubes a^4 from direct contact with the heating-flame. Small vents a^3 are provided from the pillars a^1 to the tubes a^4. A steam heating-coil *b* may be placed in the vessel *a*, and the whole is heated by a gas burner or other heater *c*. To the vessel *a* is attached a steam-dome *d*, from the top of which steam may be drawn off and from which a pipe d^1 passes to the feed-tank *e*, from which a feed-pipe e^1 passes to the vessel a^2. For drawing-off boiling water, a pipe *f* passes from the vessel *a* up through the dome *d*, and is provided with a tap h^1 operated by a lever *l*, which is also connected to a valve b^1 supplying the coil *b*, a gas valve c^1, and a waste-water valve *i*, so that when the tap h^1 is closed, the steam and gas are cut off and the waste-water valve opened. A vent pipe *j* is also provided. The arrangement is such that the tap h^1 is opened before the valves b^1, c^1, and is closed later. Modifications in which the tap h^1 or the valve *i* are dispensed with are also described. The top of the chamber a^2 may be formed as a stand for teapots &c.

19,378. White, W. Aug. 22, 1908, [*Convention date*].

Feed-water, heating.—Relates to a system of pipes and chambers for washing-out and refilling locomotive boilers as described in Specification 14,840/08, [*Class* 123, Steam generators]. The system is made more compact to adapt it for use in small round-houses and engine sheds. Only one hot-water storage-tank 8 is employed, from which both the washing-out water and the feed-water are taken through the main pipe-line 2. Water, heated in the heater 3 by the blown-off steam conveyed from the locomotive through the pipe-line 2, is forced by a pump 13 through pipes 15, 18 to the tank 8, and circulates through the connexion 7 to the cold-water main 6 back to the heater. When the boiler is to be washed

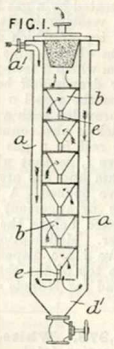
out or refilled, the valve 19 in the pipe 18 and the valve 26 in the pipe line 2 are closed, and the valve 17 in the pipe 15 is opened. The hot water is then pumped up into the pump-line.



Steam is admitted to the hot-water tank through a pipe 22 containing a valve 23, which is controlled by a thermostat 25 in the tank. In a modification, the heater is arranged above the hot-water tank instead of below as shown.

19,413. Walke, C. Aug. 24.

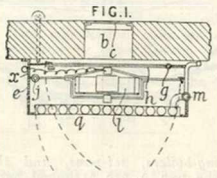
Feed-water, heating.—Feed-water for steam boilers is purified and softened by mixing with it a chemical precipitant and passing it through sections or portions of the economizer and depositing-chambers arranged alternately. Fig. 1 shows a form of depositing-chamber. The feed entering at a^1 passes downwards through the annular space a and then upwards through the conical sides of the perforated funnels or cones b. The pipes e of the cones discharge one into the other, the deposit sliding down the interior of the cones and finally settling in the chamber d^1.



Reference has been directed by the Comptroller to Specifications 3728/75 *and* 20,087/96, [both in *Class* 123, Steam generators].

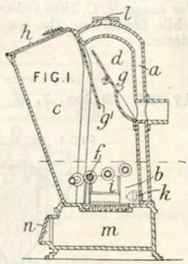
19,575. Barker, A. H. Aug. 26.

Heating air.—An air filter, ventilating-fan, and radiator are hinged to a casing let into one of the walls of an apartment in front of an air inlet. The casing e is arranged in front of the air inlet b protected by a grating c. Inside the casing a filter h is hinged at g, a fan l hinged at j, and a radiator q hinged at m. When it is required to circulate the air in the apartment, side inlets x leading to the back of the fan are opened.



19,678. Bunge, A. E. Aug. 27.

Vertical boilers.—A domestic refuse-destructor and water-heater consists of a water-containing casing a fitted with a water-tube grating f. The refuse is dried in the hopper c, and passes through the grating f into a combustion chamber b above the ordinary fire-grate. The gases from the refuse ascend between the plates g, g^1, and are burnt in the chamber d. The water inlet is at k, and the outlet at l.



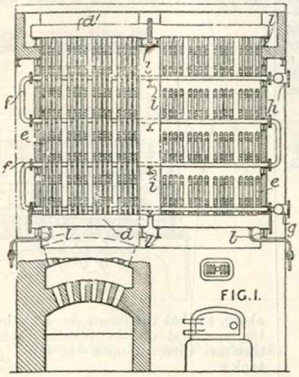
19,867. Headson, F. A. Aug. 30.

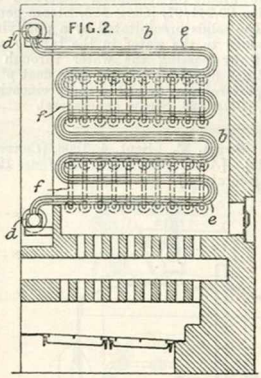
Boilers.—A metallic composition consists of metallic iron, preferably 78 parts, calcium sulphate, gypsum, or plaster of paris 7, Portland cement, calcium oxide, or like binding-agent 2, iron sulphate, calcium oxide, or iron sulphide 8, graphite, black lead, gum arabic, or dextrine 2, and with or without sodium or other silicate or silica 3 parts. The mixture when moist may be used for stopping leaks, joints, or other openings in metallic vessels, such as boilers and pipes, or for plugging holes in metal plates or boiler pipes.

19,978. Cruse, H. Sept. 1.

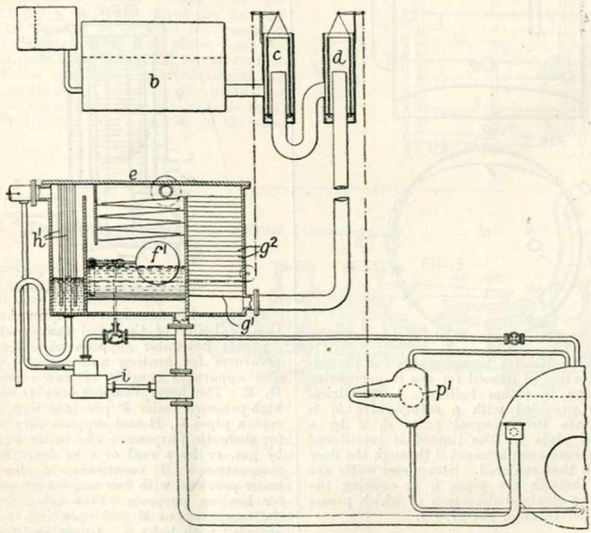
Feed-water, heating.—In a combined superheater and feed-water heater, the sinuous superheater tubes simply rest on the water-tubes and are connected to headers outside the heating-chamber so that any superheated tube or groups of tubes may be withdrawn without disturbing the rest. Steam from the box d is led through the tubes e in the chamber b to the box d^1. The feed tubes f are taken to-and-fro under the

open legs of the tubes *e* and are connected to the inlet *g* and outlet *h*. Girders *i*, *l* outside the chamber *b* support the tubes *f* and the boxes *d*, d^1 respectively.





20,123. Barker, A. H. Sept. 2.



Feed-water, heating.—The water supply to a feed-heating reservoir *e* is controlled by valves *c*, *d* operated by floats f^1, p^1 at the water-levels in the reservoir and in the boiler respectively. A single valve operated by both the floats may be used. In the apparatus shown, the float f^1 also controls the steam supply to the pump *i* between the reservoir and the boiler. The

water is heated by direct contact with steam, which is previously passed through a separator h^1, of the kind, for example, described in Specification 20,244/07, [*Class* 123, Steam generators]. The solids precipitated by a purifying solution added to the water in the tank b are filtered off by passing the water through a grating g^1 and filtering fibre g^2. The float p^1 is arranged preferably as described in Specification 23,154/08, [*Class* 123, Steam generators].

20,245. Brun, F. Sept. 4, 1908, [*Convention date*]. [*Addition to* 25,987/06, *Class* 123, Steam generators.]

FIG.1.

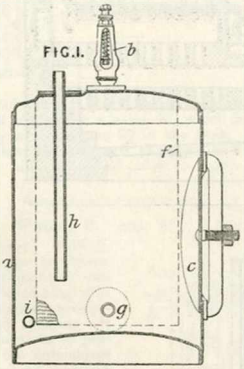
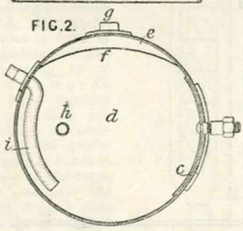


FIG.2.

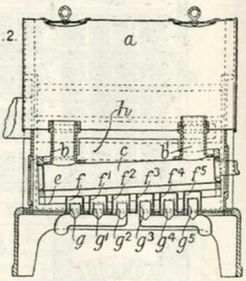


Digesters.—Relates to apparatus for preparing a decoction of linseed for use in preventing incrustation in steam boilers. A cylindrical vessel a, provided with a safety-valve b, is divided into two unequal parts d, e by a perforated plate f. The linseed is introduced into the larger compartment d through the door c, which is then replaced. Steam and water are supplied through the pipes i, h, cooking the linseed, the strained decoction of which passes to the boiler through the pipe g.

20,456. Chubb, H. R. Sept. 7.

Vertical boilers; portable and small water-heaters.—Beneath a tank a and chamber c depends from tubular supports b, b^1. A casing e surrounds the chamber, and is provided with an aperture below and a short wide nozzle h

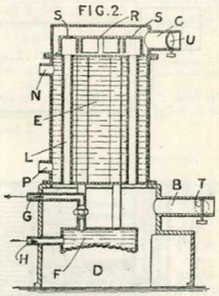
FIG.2.



above, so that the flames &c. from burners g, g^1 impinge first on the tubular chamber c and then are directed upon the lower part of the tank a.

20,750. Fenlon, H. T. Sept. 10.

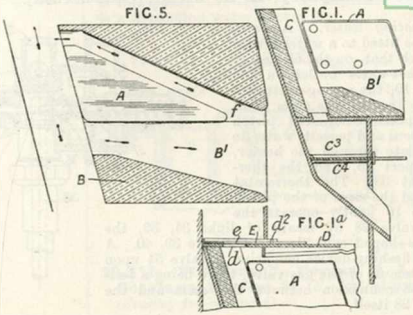
FIG.2.



Boilers.—Consists in an improved construction of boiler of the kind that produces two separate hot-water supplies at different temperatures for heating and domestic purposes. The apparatus consists of two compartments D, E. The lower compartment D contains a high-pressure boiler F provided with flow and return pipes G, H and supplies very hot water for domestic purposes. The boiler F is heated by gas, or by a coal or coke fire. The upper compartment E constitutes a low-pressure boiler provided with flow and return pipes N, P for heating purposes. Flue tubes L traverse the compartment E and open into a cover R provided with holes S. Upper and lower flues C, B are provided, having dampers U, T respectively. The low-pressure boiler may be put out of action by closing the damper U and opening the damper T.

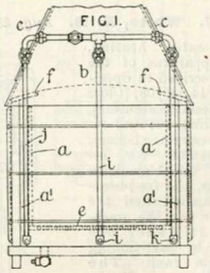
20,778. Napier, Son, & Co., and **McAlpine, G.** Sept. 11.

Kitchen-range and like boilers.— The boiler A of a kitchen range may be rhomboidal in section with flues B^1, C beneath and behind as in Fig. 1, or triangular in section with a third flue *f* above it as in Fig. 5. Cross flues may be formed through it.



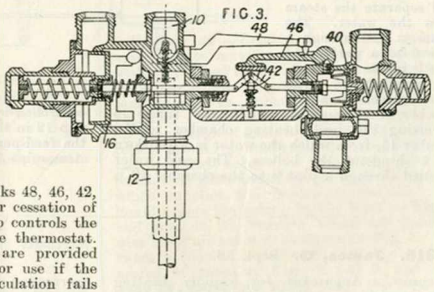
20,881. Edmondson, F., and **Rhodes, J.** Sept. 13.

Washing-boilers.—The articles, placed in a receptacle *a* having a perforated bottom *e*, are cleansed by the circulation of the washing-solution caused by steam issuing from perforated pipes *j*, *k*. These pipes are arranged in the side spaces a^1 between the receptacle and the enclosing vessel, and plates *f* are provided to deflect the ascending liquid over the sides of the receptacle. An additional perforated steam-pipe *i* assists in the preliminary heating of the solution, and a removable hood *b* constructed with a door *c* carries off the steam evolved.



21,016. Humphrey, H. S. Dec. 26, 1908, [*Convention date*].

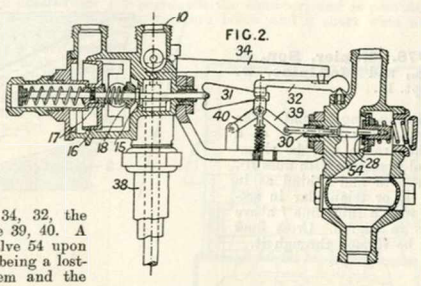
Heating water.—A valve device is so fitted to a water-heater that on the closing of the hot-water outlet on the pipe 10 a valve is opened. When the valve is thus operated by the difference in water pressure, water can circulate through a portion of the heater and the valve device. A thermostat 12 in the circuit controls the supply of fuel by means of links 48, 46, 42, and the gas valve 40. The flow or cessation of water acting on the piston 16 also controls the gas valve in conjunction with the thermostat. Alternative circulation passages are provided connected to the whole heater, for use if the valve controlling the partial circulation fails to act.



21,017. Humphrey, H. S. Jan. 15, [*Convention date*].

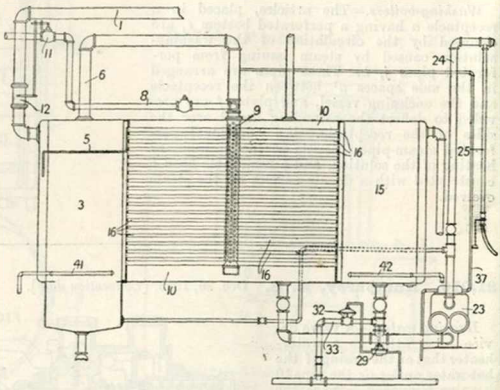
Heating water. — A valve device fitted to a water-heater is such that, on the closing of the hot-water outlet on the pipe 10, the spring-controlled valve 18 upon the stem 17 of the pressure-actuated piston 16 opens and permits water to circulate through the heater, the port 15, and the thermostat 38. The thermostat 38 and the stem of the piston valve 16 jointly operate the gas valve 28 by means of links 34, 32, the wedge-shaped cam 31, and a toggle 39, 40. A pilot flashing-device comprises a valve 54 upon the stem 30 of the gas valve, there being a lost-motion connexion between this stem and the valve 28 itself.

FIG. 2.



21,127. White, E. B. *Aug. 28.*

Feed-water, heating. —In apparatus of the kind described in Specification 14,840/08, [*Class* 123, Steam generators], for washing-out and refilling locomotive boilers, the chamber for receiving the blow-down products, the feed-heating chamber, and the chamber for the washing-out water are formed by partitioning a single tank. The blow-down products conveyed from the boiler by a pipe 1 enter the receiving-chamber 3 over a plate 5, which spreads the products and separate the steam from the water. The steam is led through a pipe 6 to a perforated pipe 9 in the feed-heating chamber 10. The water passes from the chamber 3 through a number of tubes 16 traversing the feed-heating chamber to the chamber 15, from which the water is withdrawn for washing-out the boilers. The cold water supplied through a pipe 8 to the chamber 10 is controlled by a valve 11 which is operated by a flap 12 in the pipe 1. The exhaust steam from the feed-pump 23 is led by a pipe 37 into the steam-pipe 6.

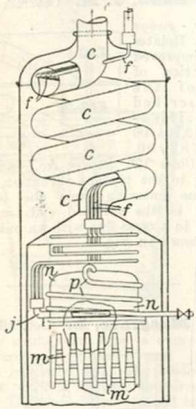


21,315. James, G. Sept. 18.

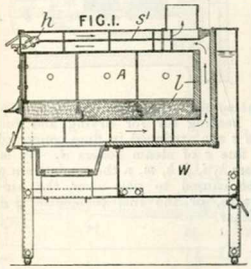
Geysers. — Apparatus for rapidly heating water consists of a coil of water-tubes *f* enclosed in a flue *e*, as described in Specification 13,988/08, in combination with a heated chamber having a dome-shape top *n* and a deeply corrugated bottom *m*, upon which the water from the tubes *f* is sprayed through a perforated pipe *j*. The water is led off through a pipe *p* coiled around the top of the chamber.

(*For Figure see next page.*)

21,315.



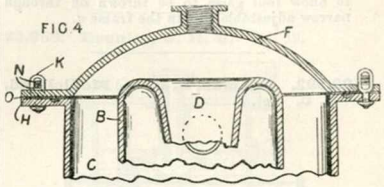
21,349. Benkert, G. A. Sept. 18.



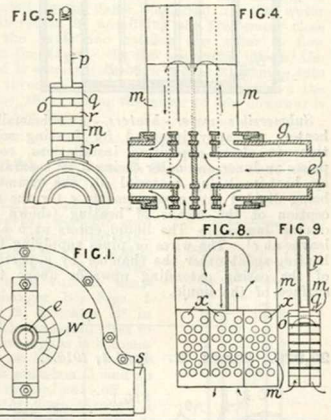
Kitchen-range and like boilers.—In portable baking and fruit-drying ovens, a water cistern W behind the back flue is extended beneath the bottom flue also. The cistern W, where adjacent to the flues, is lined with "Eternit" plates *l* consisting of a mixture of asbestos and slate.

21,607. Sharpe, W. C., and **Sharpe, W. C.** Sept. 22.

Vertical boilers.—A boiler having an annular water space C is provided with a removable cover F, secured to a flange H on the outer wall by studs K with a cotter N and a nut or other suitable fastening. Suitable packing O is interposed. At the top of the inner wall B is a depending water pocket D.



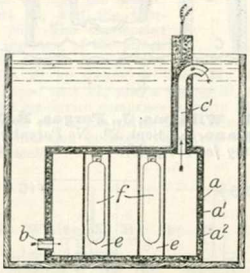
22,211. Williams, J., Forgas, R. J., and **Cosetano, L.** Sept. 29. *No Patent granted (Sealing fee not paid).*



Heating air.—Relates to a rotary radiator applicable to bringing air to any temperature with or without a perfume. It is applicable to dispelling poisonous gases or to regulating the temperature in submarines, carriages, and buildings. Blades *m* consisting of vanes *o*, *p*, *q* for the passage of gases and liquids, respectively, rotate around a stationary hub consisting of two concentric tubes *e*, *g*. The vanes *p* for the passage of gases communicate with the tube *e*, which supplies and discharges the air. The liquid enters the tube *g* by the inlet *w*, Fig. 1, and flows to the vanes *o*, which are provided with cross air-tubes *r*, as shown in Fig. 5. The vanes *o*, *q* on each side of the vanes *p* are connected by tubes *x*, Figs. 8 and 9, and each vane has partitions which cause the liquid to circulate in the manner shown in Fig. 8. The apparatus is enclosed in a casing *a*, Fig. 1, having a mouth *s*. The air forced from the outlet *s* is carried to the inlet end of the tube *e*.

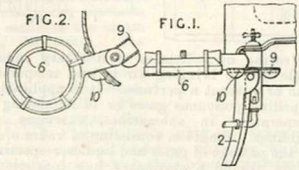
The ends of the vanes *p* are provided with ball valves which may be opened at each revolution to allow foul gases to be thrown off through narrow adjustable slits in the frame *a*.

22,592. Coleman, A. E., and **McClelland, J. C.** Oct. 4.



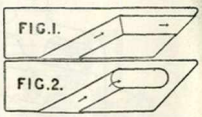
Submersible water-heaters.—A submersible heater, primarily intended for heating solutions in electro-depositing installations, comprises an inner and outer casing *a*, a^1 separated by heat-insulating material a^2, the chamber being divided into compartments *e* for the reception of the means of heating (shown as electric lamps *f*). The liquid enters at *b* and leaves at c^1. The wires or pipes supplying the heating-agent enter the chamber by a portion of the casing extending upwards above the surface of the liquid.

22,979. Slack, H. *April 1, 1910.*



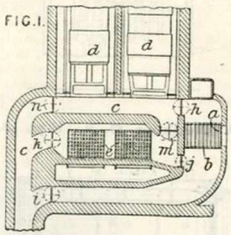
Washing-boilers.—Means for supporting the pivotally-mounted gas jet or ring 6 in its normal position beneath the boiler, or in a position outside the boiler casing for cooking or other purposes, consist of lugs 9, 10 cast or fitted on the leg 2, and each formed with an inclined lip and with a recess in which the neck of the ring can seat. The ring may also be fitted with a foot adapted to rest on the ground.

23,708. Shaw, J. M. Oct. 16.



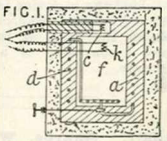
Kitchen-range boilers. — Relates to an improved construction of boiler of the kind described in Specifications 13,904/06 and 18,782/06, [both in *Class* 126, Stoves &c.], and 8910/09. According to the present invention, the boiler has a flue entering from the bottom and extending to the forward end, as shown in Fig. 1, or to a cross-flue with an outlet on each side, as shown in Fig. 2.

23,751. Musgrave, B. Oct. 16.



Heating air; feed-water, heating.—Apparatus *a* for heating air for drying and fuel-economizers *e* are arranged in flues connected to the main flue *c* of steam boilers *d*. By means of dampers *h*, *i*, *j*, *k*, *m*, *n* the combustion products can be caused to pass over the air-heating apparatus, or the fuel economizers, or both, or neither.

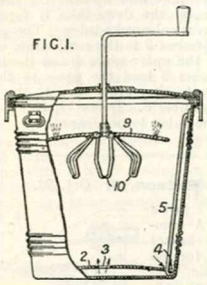
23,818. Bell, G. G., and **Pletts, J. St. V.** Oct. 18. [*Addition to* 22,598/08.]



Heating air &c.—In the electric water-heater described in the parent Specification, the hot-water or steam pipe-coil *d*, which is embedded in a block of iron or other heat-storing material *a* heated by an electric resistance *c*, is continued outside the block of iron &c., into a chamber *f* for heating air or other media. The chamber may be formed either inside or outside the block of iron &c. An electric resistance *k* may be provided inside the chamber.

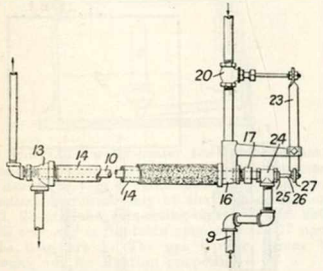
23,832. Paul, F., and **Beaudoin, P.** Oct. 18.

FIG. 1.



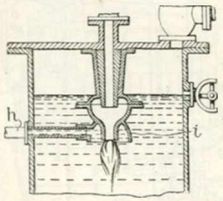
Washing-boilers. — In clothes-washing apparatus of the wash-boiler type, a curved plate 2 having a central orifice 3 and peripheral apertures 4 is placed upon the bottom of the receptacle in order to increase the circulation of the liquid. The plate is maintained in place by guide-rods 5. The clothes are acted upon by a rotary dolly consisting of a perforated disk 9 with depending prongs 10.

23,881. Madsen, G. C. Oct. 18.



Heating water.—A water-heating device comprises a water-pipe arranged inside a steam-pipe, a fitting to which both pipes are fixed at one end, and means whereby the expansion or contraction of the water-pipe operates a valve controlling the steam supply. A water-pipe 10 of copper or brass is arranged within a lagged steam-pipe 14 of iron, both pipes being fixed at one end to a fitting 13. The water-pipe extends at the other end through a fitting 16 and stuffing-box 17 into a T-joint 24 connected with the water-inlet pipe 9. The T-joint is otherwise closed by a plug 25, which is connected to a valve 20 in the steam-inlet pipe through the medium of a rod 26, an adjustable disk 27 on the rod, and a lever 23, which is adjustable on the valve-rod. The expansion or contraction of the water-pipe therefore effects a diminution or increase of the steam supply.

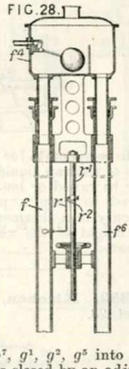
23,953. Brunler, O. H. U. Oct. 19.



Heating water. — The efficiency of a water-heater of the kind in which the heating is effected by a flame immersed in the water is increased by admitting the feed-water close to the flame and causing the water to flow past the flame. In the apparatus shown, the feed is admitted through a pipe *h* opening into an inverted cup *i* arranged directly above the flame, thus causing the water to flow downwards past the flame.

24,182. Forbes, J. S. Oct. 22, 1908, [*Convention date*].

FIG. 28.



Water supply and delivery; portable and small water-heaters.— Apparatus for sterilizing water &c. comprises a tubular heat-exchanger B^1, Figs. 1 and 2, a heater B^2 in which the liquid rises to a discharge as it becomes hot or boils, a receiver A, a wash-box C, and an automatic cut-off D. Water flows through a pipe f^6, valve f^7, pipe f, and a passage through the heat-exchanger B^1 into the heater B^2, where it rises up a tube e^4 past one or two steam heaters e^1 and flows over a weir e^6 into the tubes b^5 of the heat-exchanger B^1, and thence by pipes b^7, g^1, g^2, g^5 into the receiver A. The valve f^7 is closed by an adjustable float f^{11} when the water rises too high. If the float fails to act, the water overflows through pipes f^3, f^2, c and the wash-out box C to the sewer connexion c^3, and if the water rises too high in the receiver A, it overflows a cup g^7 into pipes g^3, f^2. Valves f^7, g^{12}, g^{13} connect the pipes f, b^7, and g^2 respectively with the waste-pipe f^2. The apparatus can be steamed out through the pipe g^5. Steam from the heater e^1 passes to a steam-trap c^2 upon the wash-out box C. The steam-heater e^1 may be replaced by a

gas-heater, flue, and deflector. In modifications, (1) the pipes f, f^3 are side by side, (2) the heater B^2 consists of a steam-jacketed tube, and

FIG.1.

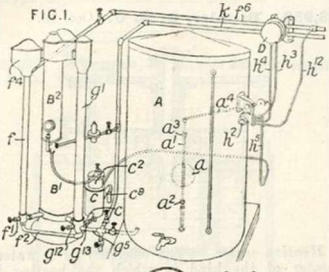
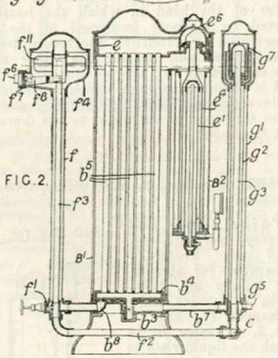


FIG.2.



(3) to compensate for differences in the temperature of the raw liquid, the float-box f^4, Fig. 28, may be raised or lowered by a rod r^1, which is moved to keep a pointer r^2 level with the mercury in a thermometer r in the pipe f, and the height of the weir itself may be similarly adjusted.

24,352. Kitchen, J., and **Brown, H. C.** Oct. 23.

FIG.1

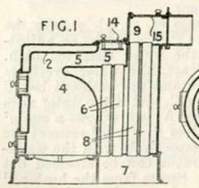
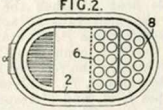


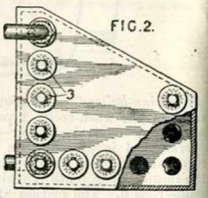
FIG.2.



Vertical boilers.—In a boiler for heating water or generating steam, of the type having an enclosed fire-box with an horizontal water-baffle and a down-take and up-take for the combustion products, the down-take is formed by a series of vertical smoke-tubes. The gases pass from the fire-box 2 to the combustion chamber 5 formed by the water-space 4 and the top of the boiler. Tubes 6 lead the gases to the smoke-box 7, whence they are passed to the flue 9 by way of the tubes 8. Doors 14, 15 are provided to allow the tubes to be cleaned.

24,575. Watson, J. Oct. 26.

FIG.2.



Water-tube boilers. — A combined fire-basket and boiler for use in domestic fireplaces, greenhouses, &c. is constructed with hollow cheeks or side boxes connected together by horizontal tubes 3, not only at the bottom and back but also at the front. The fuel rests directly on the bottom tubes.

24,654. Pearson, G. H. Oct. 27.

FIG.1.

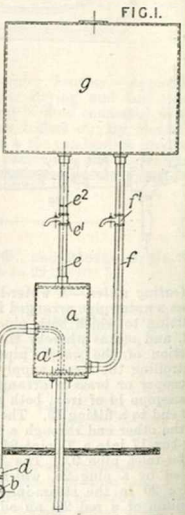
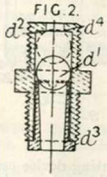


FIG.2.

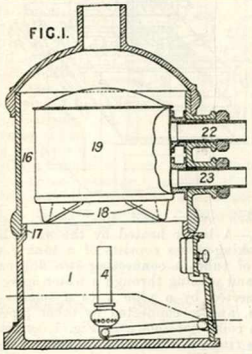


Heating water.—For heating water for the

lavatories of railway carriages, steam from the train-pipe is passed through a self-cleaning valve of the type described in Specification 2559/08, and is reduced to atmospheric pressure before being utilized. A main water-supply tank g is connected to the heater a by pipes e, f. A pipe a^1 in the heater is supplied with steam from the train-pipe b through the valve d which reduces its pressure. In one of the pipes e, f a perforated disk e^2 is placed to retard the circulation and to ensure that the water shall be heated to the required extent. Supplies of hot and cold water may be drawn off at e^1 or f^1. Fig. 2 shows the valve d^1 resting on a sleeve d^3. When the steam is turned on, the valve is raised to its seat d^2 and steam escapes by the restricted aperture d^4.

25,088. Alexander, G. Nov. 1.

FIG. 1.

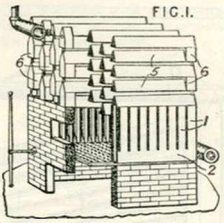


Boilers.—A water-heater for hot-water heating-systems has a cylindrical boiler 19 mounted concentrically in a cylindrical shell 16 making contact therewith only at the pipe connexions 22, 23 and the supporting-lugs 18. The shell fits over and is rotatable upon a flange 17 upon the base-part 1. The gas burner 4 may be swung out for lighting purposes.

25,267. Witmer, J. M. Nov. 2.

Water-tube boilers.—A water-heater is built up of a number of chambers triangular in cross-section, some of which are arranged vertically around a furnace, each chamber having one of its edges directed inwards towards the furnace, and others are arranged horizontally above the furnace. The horizontal chambers 5 are disposed in vertical series, and they communicate with each other through legs 6 at alternate ends of the chambers. The chambers of adjacent vertical series are arranged in different planes, so that the flat under face of each chamber deflects the furnace gases against the inclined faces of the chambers on either side. The lower ends of the vertical chambers 1 forming the sides of the furnace open into common

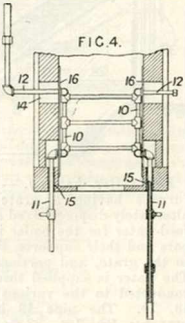
FIG. 1.



passages 2, and their upper ends are connected by lower horizontal chambers 5.

25,353. Hayashi, K. Nov. 9, 1908, [*Convention date*].

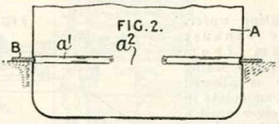
FIG. 4.



Feed-water heating. — Feed-water is supplied by pipes 11 to the water tubes 10 of a mechanically reciprocated agitator arranged above the upper of two superposed steam-boiler-furnace grates and is delivered to the boiler by pipes 12.

25,944. Coleman, G. H. Nov. 10.

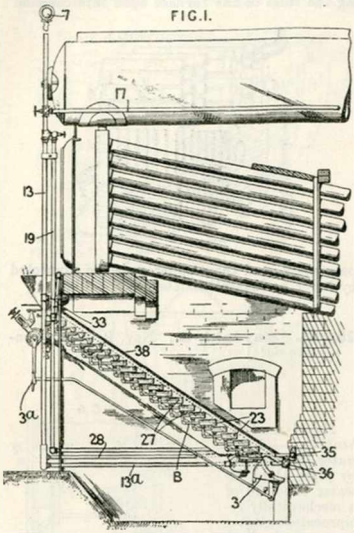
FIG. 2.



Set-pans. — In a container A for heating varnish or other liquid, the supporting-flange B is held in place without the aid of direct connecting-means. Fig. 2 shows the flange fitted into a recess a^1 formed in the side of the container. The flange may be in sections, or in the form of a split ring; in both cases, the ends of the flange are connected together by bolts or rivets. A gap may be left as at a^2 to facilitate the emptying of the vessel.

26,246. Merkel, W. B., and **Fulton, J. S. S.** Nov. 12.

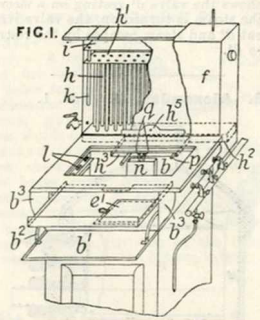
FIG. 1.



Feed-water, heating. — In a steam-generator furnace having a grate formed of sets of alternately-disposed fixed and movable bars, the feed-water for the boiler is heated in the grate bars and their supports, the furnace walls close to the grate, and portions of the fuel hopper. The water is supplied through a pipe 7, and is conducted to the various parts through pipes 13, 19. The pipe 13 is connected through branches 28, 13^a, 33, and 36 to the fixed fire-bars 23, their supports 38, the rear wall of the hopper and the water chamber 35 respectively. The pipe 19 is pivoted at its upper end, and supplies the movable portion of the grate, the bars 27 of which are connected by elbow-pieces B. The supplies to the various parts are independently controlled by suitably-arranged valves, and the main outflow pipe is connected up to the boiler.

27,522. Wills, C. E. Nov. 26.

FIG. 1.



Kitchen-range and like boilers; vertical boilers.—A boiler heated by the waste heat of gas cooking-stoves consists of a tank *f* with a group of tubes *h* connecting two flue passages h^1, h^2 and passing through a water space which is connected by a pipe *k* to a smaller water space *i*, and is connected by other pipes *p* to certain coils, not shown in Fig. 1, surrounding the gas rings in the enclosed space between the hot-plate and the crown of the oven. The combustion products are conducted to the boiler by a flue h^3. Water-heating pipes *q* also pass through a flue *n* to the interior of the oven.

28,071. Muchka, J. Dec. 1.

Heating water.—The exhaust steam from a direct-acting pump is allowed to accummulate in a receiver until a predetermined pressure is reached, after which it flows through a loaded valve into the suction pipe, and heats the water by its condensation. As illustrated in Figs. 1

FIG. 2.

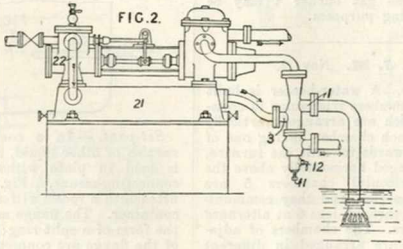
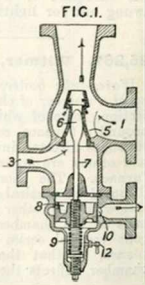


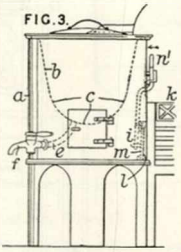
FIG. 1.



and 2, exhaust steam passes by a pipe 22 into a receiver 21, where it accumulates until it can open the valve 6, which shuts off the exhaust pipe 3 from the suction pipe 1. The seat of the valve 6 is formed as a nozzle 5 so that the suction of the pump is aided by the injector effect of the exhaust steam. An adjustable piston 8 is secured to the stem 7 of the valve 6 and controls a port 10 leading to the atmosphere, by means of which any excess of steam can escape from the pipe 3. The adjustable loading-spring 9 is contained in an air-cushioning chamber provided with regulating-cock 12. The apparatus may be used for circulating and heating the water in a tank.

28,415. Hassall & Singleton, and **Smith, A. J.** Dec. 6.

FIG.3.



Washing-boilers are mounted in a casing for use either alone or in combination with a kitchen fire-grate. The boiler *b* rests upon a support *a*. It may have either a round or flat bottom *c*, and has a pipe *e* and tap *f* for supplying a bath. At one side, an opening *i* in the support fitted with a damper *m* opens into a fire-place *k* through a barred passage *l*, so that, if desired, the boiler may be heated by the kitchen fire instead of its own furnace. The damper is fitted with a handle n^1.

28,689. Makin, E. Dec. 28.

FIG.1

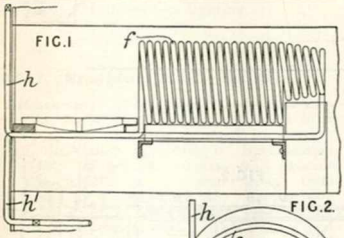
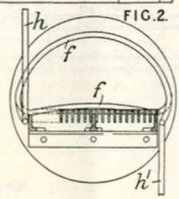


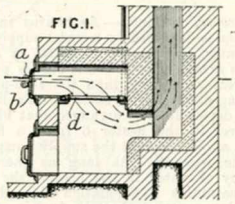
FIG.2.



Feed-water, heating. — A water-tube *f* coiled into a D-shape is placed so as to occupy a part or the whole of the space between the dead-plate and the bridge of a boiler furnace, the inlet branch *h* of the tube being supplied with water under pressure, and the outlet branch h^1 being connected to the boiler water space. The bottom part of the coil serves as a part or the whole of the grate.

28,957. Plischke, A. Dec. 10.

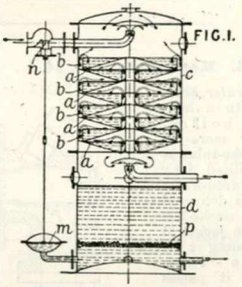
FIG.1.



Water-tube boilers; feed-water, heating.—In a down-draught steam-boiler furnace, stove, or domestic range, the grate *d* is constructed in the form of a continuous water-tube coil, which is connected to a hot-water heating-system, or serves for heating boiler feed-water.

29,098. Muchka, J. Dec. 13.

FIG.1.

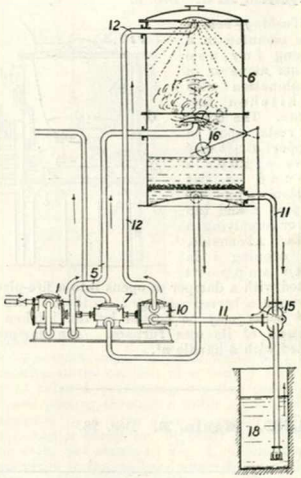


Feed-water, heating.—Apparatus for heating boiler feed-water by direct contact with steam consists of a series of troughs, through which the water flows, and over which the steam passes in the direction opposite to that of the water,

the troughs being so arranged that the steam and water are brought into the closest contact where they are moving fastest. The troughs *a*, *b*, are of triangular cross-section as shown, and are so arranged that the deepest portion of each is over the shallowest portion of the one below it, thus leaving a narrow space through which the steam passes on its way upwards, coming into intimate contact with the water which overflows at the deep end of the trough. Solids are deposited in the troughs, the last traces being removed by a filter *p* in a collecting-vessel *d* at the bottom of the casing *c* containing the apparatus. The supply of water is regulated by the amount in the chamber *d* by means of a diaphragm *m* and valve *n*.

29,099. Muchka, J. Dec. 13.

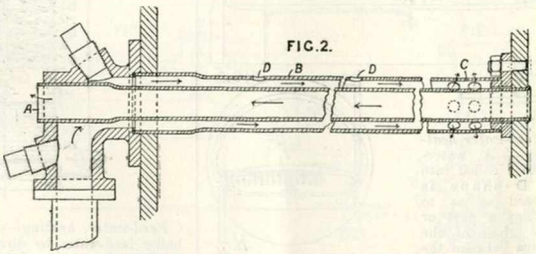
Feed-water, heating. — Apparatus in which feed-water is delivered by a water-supply pump to a heater, and thence removed by a feed-pump, is arranged so that the supply pump 10 is of greater capacity than the feed-pump 7, both being driven by the same steam cylinder 1. A valve device 15 is so arranged that when the water-level in the heater 6 falls, a float 16 operates a valve so that the supply pump draws from the well 18. As long as there is a sufficiency of water in the heater, the supply pump maintains a circulation through pipes 11, 12, thus ensuring that the feed is raised to a high temperature by contact with the exhaust steam delivered by the pipe 5 from the cylinder 1. High-pressure steam may be admitted if required.



29,174. Kendal, R. Dec. 14.

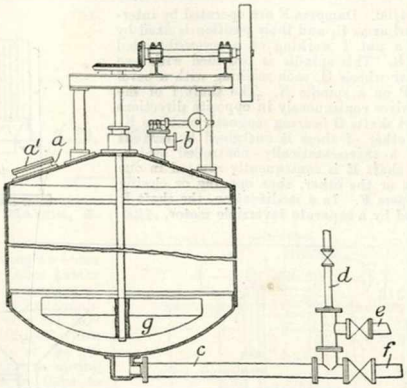
Feed-water, heating. — In a locomotive boiler, one or more of the smoke-tubes A are utilized for heating feed-water which is delivered at the smoke-box end of a jacket B surrounding the smoke-tube. Thence it passes to the fire-box end, where it escapes into the main water space through apertures C. Small apertures D may be made in the length of jacket to allow the escape of steam. In a modification, the feed is delivered at a point intermediate at the ends of the jacket.

FIG. 2.



29,287. McKechnie, A., and **Beasley, F. G.** Dec. 14.

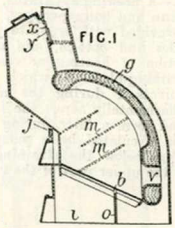
Digesters.—The vessel in which ores, residues, alloys, &c. are treated with solvents under pressure may be of the form shown having an opening *a* with a lid a^1, a safety-valve *b*, an agitator *g*, and a pipe *c* having branches *d*, *e*, for air and steam, and *f* for exit of the liquor.



29,306. Howship, G. O. Dec. 15.

Vertical boilers.—The products of combustion from fuel burnt upon the grate *b* pass partly through a series of apertures *v* in the arched water-chamber *g*, and partly downward through the fuel upon the portion of the grate behind the partition *o* in the ash-pit. Air for combustion passes through a regulator *j* and chambers provided with baffles *m* arranged on both sides of the fire-box, and is delivered to the part *i* of the ash-pit in front of the partition *o*. A baffle *x* is provided normally closing an aperture *y* to enable the stove to be worked with an upcast draught on lighting.

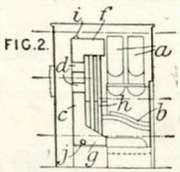
FIG. 1.



29,917. Shorland, F. H. Dec. 22.

Kitchen-range and like boilers.—Relates to a hot-water boiler for supplying hot water to a system of radiators and adapted to a stove which, like that described in Specification 22,285/04, [*Class* 126, Stoves &c.], stands in the middle of a room away from the walls, as in hospitals &c. Specification 1920/82 is also referred to. The boiler consists of a vertical part *c* with flues *d* and projecting parts *f*, *g* connected by vertical tubes *h*, and is set behind the grate *b* and between air-heating chambers and pipes *a*, from which heated air is delivered into the room. Inlet and outlet pipes *i*, *j* lead the water to and from radiators in the corners of the room, or in other places or rooms.

FIG. 2.

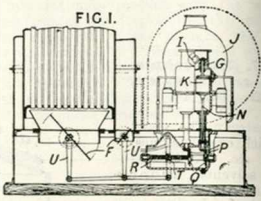


29,937. Stewart, A. W. Dec. 22.

Heating air. — Relates to means for automatically controlling the valves regulating the passage of air through air-heating or cooling appliances as described in Specification 4783/98

and 1904/06. Dampers F are operated by interconnected arms U, and their position is fixed by that of a nut T working on a screw-threaded spindle R. This spindle is provided with two bevel-gear wheels Q, each meshing with a bevel pinion P on a spindle N. The shaft I of the fan J drives continuously in opposite directions two short shafts G bearing magnetic clutches K. One or other of these is energized by current through a thermostatically-controlled switch, and the shaft R is consequently rotated in one direction or the other, thus opening or closing the dampers F. In a modification, the shaft R is rotated by a separate reversible motor.

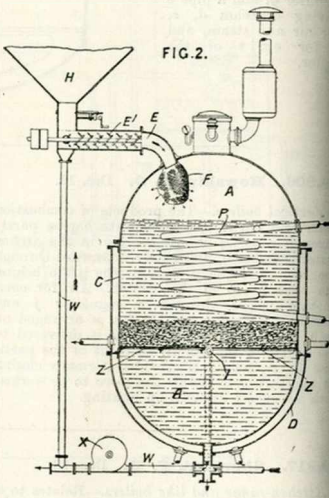
FIG.1.



30,476. Whitaker, G. B. Dec. 30.

Set-pans.—A brewing-apparatus, which serves as a mash-tun and boiling-copper, consists of a vessel A, provided with separate jackets C, D for the sides and bottom, and a coil P for the circulation of heating or cooling agents. Hinged straining-plates Z, which hang loosely on their pivots I during the mashing, are supported horizontally across the tun to retain the hops and form a filter during the boiling. The wort is circulated by a pump or by air pressure from below the straining-plates and returned to the upper part of the vessel.

FIG.2.



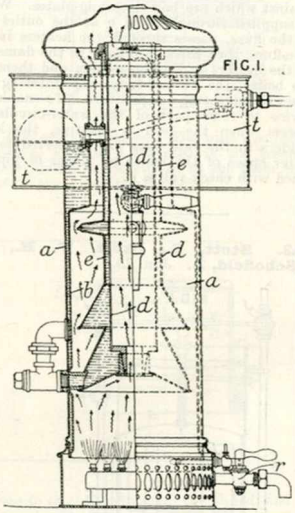
A.D. 1910.

327. Darrah, H. M., and **Martin, J.** Jan. 6.

Geysers.—A water-heater comprising an outer water-holding casing *a*, *b* and an inner heater *d*, *e* of annular cross-section, and preferably of the shape shown, has the innermost cylinder *d* detachably held within the cylinder *e* for ease of cleaning. A water-tank *t* with ball valve stores the heated water. The body of the gas cock *r* may have notches such that a spring blade attached to the plug rests in them to prevent accidental rotation.

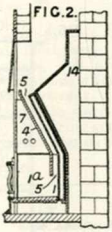
(*For Figure see next column.*)

327.

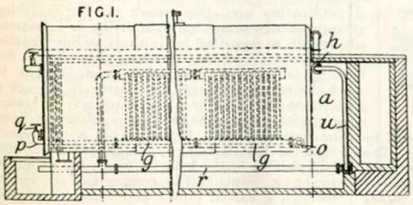


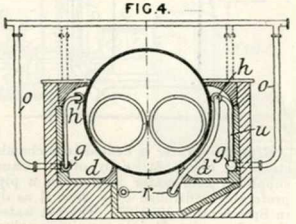
372. Carling, W. T. Jan. 6.

Kitchen-range and like boilers.—The boiler 1 at the rear of an open fire-place has forward extensions 1^a forming the sides of the grate.



565. Eastwood, J. H. Jan. 8. [*Cognate Application*, 12,852/10.]





Feed-water, heating.—A feed-water heating device which is adapted to form part of the water-circulating system when the feed is inactive consists of upstanding tubes connected

to headers arranged in the down-take and side flues of equivalent parts of the boiler. The invention is described in connexion with a Lancashire boiler, but may be applied also to Cornish, Galloway, and other boilers. Multitubular devices are arranged against the outside walls of the side flues *d* and down-take *a* and consist of bottom headers *g*, which preferably rest in recesses in the flue walls connected by means of tubes *u*, which are curved over to conform to the shape of the flue tops, to top headers *h* provided with projecting knobs which rest against the boiler plates. The headers are built up of U-sections with horizontal flanges against which are bolted closing-plates. Water is supplied through pipes *o* at the outlet end of the flues, passes through the heaters in the side-flues, then through pipes *r* in the flame bed to the heaters in the down-take, and thence to the boiler, the water always encountering flue gases of increasing temperature. To enable the device to form part of the water-circulating system when the feed is inactive, the lower headers in the side flues are connected to the water space of the boiler by means of pipes *p* fitted with check valves *q*.

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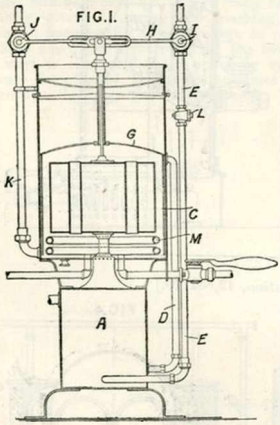
642. Stott, J., Stott, V. H., and **Schofield, L.** Jan. 10.

FIG. 1.

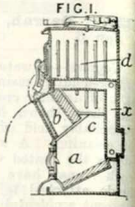


Geysers.—Water is heated in a chamber C by steam in a coil M or by other means. The supply of cold water is through a pipe K is preferably controlled by a float G as described in Specification 1950/07. The hot water passes through a pipe D into a mixing-chamber A where cold water is supplied through a pipe E. The actuating-lever H of the cold-water valve I is operated by the float G in a similar manner to the valve J controlling the supply to the heating-chamber. The mixture is thereby maintained at a constant temperature, which may, however, be varied by adjusting an additional valve L in the pipe E.

1123. Ashley, H. M. Jan. 15. [*Cognate Application*, 16,519/10.]

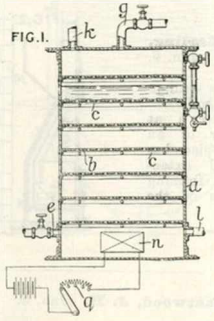
Kitchen-range and like boilers.—A boiler *x* of angular shape, the branches of which may be connected by inclined tubes, is provided in a stove of the type described in Specification 20,225/07, [*Class* 126, Stoves &c.]. The stove comprises a fuel-chamber *a* with front fire-bars, a feed-hopper *b*, a combustion chamber *c*, and a heated-gases chamber *d*.

FIG. 1.



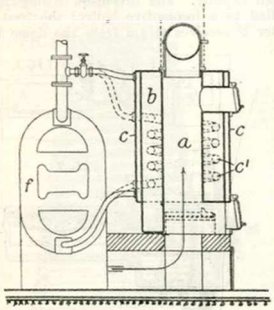
1352. Kemp, A. J., and **Randall, F. W.** Jan. 18.

FIG. 1.



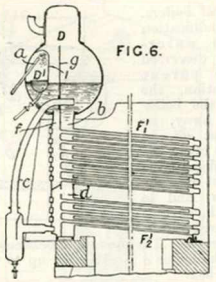
Heating air.—Compressed air for breathing purposes in connexion with diving or submarine vessels, as described for instance in Specification 419/09, [*Class* 113(ii), Ships &c., Kinds &c. of], is purified, humidified, and brought to a desired temperature by passing it through a column of hot water. The water may be heated electrically, and the heating regulated by hand or automatically. Fig. 1 shows a convenient form of humidifying-tank *a* provided with baffle-plates *b*, the holes in which are arranged to break joints. The compressed air enters through a valved pipe *e* and leaves through a valved pipe *g*. The water is supplied through a pipe *k*, and may be drawn off through a pipe *l*. The electric heater *n* is regulated by hand by altering a resistance *q*.

1779. Brägas, K. Jan. 24.



Heating water.—The flue *a* from a hot-water boiler *f* passes through a receptacle *b*. The water therein is also heated by the circulation of water from the boiler *f* in a jacket *c* or through a coil c^1 immersed in the water.

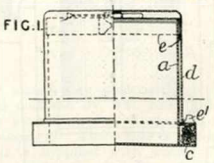
1879. Niclausse, J. & A. Aug. 24, 1909, [*Convention date*].



Feed-water, heating.—The pipe *a* directs the feed to a plate 1 disposed in the steam and water drum D and curved at the lower part to retain the impurities deposited.

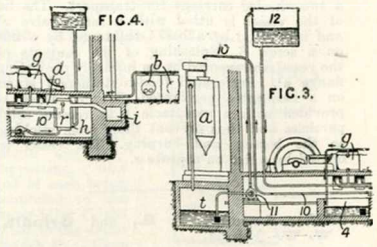
1928. Fazan, D. Jan. 25.

Portable and small water-heaters.—Tins for warming preserved meat, fruit, soup, &c. have two air-tight compartments, one *a* for food having a tearing-strip *e*, and one *c* for combustible material. The compartment *c* is filled with wadding impregnated with spirit, and has holes normally closed by a tearing-strip e^1. A cup *d* may fit loosely over the compartment *a*.



2650. Kihn, N., and **Eisenhütten-Aktien-Verein Düdelingen.** Feb. 2.

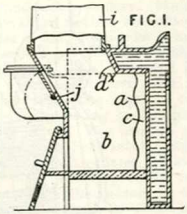
Feed-water, heating; heating water.—Water is heated by the exhaust gases from gas-engines in a tubulous boiler provided with a water-casing, and by passing it through the cooling-jackets of the engine cylinders. A purifier is placed in the circuit of the water, preferably between the tubes and the water casing of the boiler. In the system shown in Figs. 3 and 4, the water passes first through the casing *h* of the boiler *r*, and then is conducted through the pipe 10 to the purifier *a*, from which it passes through the tank *t*, the pump 11, and the tank 12, to the cylinder-jackets *g*, and, after collecting in a reservoir 4, is pumped through the tubes of the boiler. It is then led to the steam-generators *b* or elsewhere. The exhaust gases pass to the boiler through the pipe *d*, and escape into the flue *i*.



3430. Duckworth, H. C., and **Twelve Hours Stove Syndicate.** Feb. 11. [*Addition to* 28,196/08.]

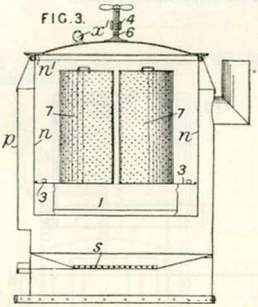
Vertical boilers.—In a modification of the water-heater described in the parent Specification, the top of the boiler is cut away, as shown at d^x, in order to bring the fuel magazine *i* somewhat over the fire-box, and to enable the surface of the shoot *j* to be made steeper. The opening *c* between the baffle *b* and the boiler *a* is extended up to the top of the fire-box.

FIG.1.



3828. Mills, H. St. J. Feb. 16.

FIG.3.



Set-pans.—Comprises a cooking-vessel *n* supported in a casing *p* mounted on trunnions on a two-wheeled carriage for transport. The lid of the vessel is fitted with a safety-valve x^1 and is secured by a bar 4 tightened by a nut on a screw 6. Splashing of the contents of the vessel is prevented by an inwardly projecting flange n^1. Perforated food-containers 7 stand on a removable perforated plate 3, which is provided with a receptacle 1 to receive solid particles and thus prevent them from sticking to the bottom and burning. The vessel is heated by a fire on a grate *s*.

4296. Sweeny, J. S., and **Grindle, W. W.** Feb. 21.

Feed-water, heating.—In a feed-water heater of the injector type for steam boilers, the feed-water is forced in jets into the combining-cone so as to combine with a longitudinal jet of steam in the form of spray and thus become heated rapidly. The invention is described as applied to a locomotive boiler; the feed-water heater F receives steam from the dome D and

FIG.1.

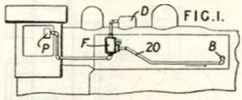
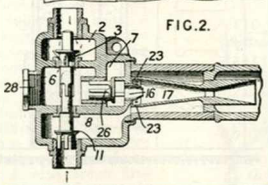


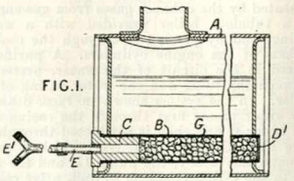
FIG.2.



water from an injector or other pump P, and the steam and water pass together into the boiler by way of a pipe 20 furnished with the usual boiler check valve B. The heater casing is partitioned to form steam-chambers 2, 6, 7 and a water-chamber 8. The steam enters the combining-cone 17 through a nozzle 16, and water under a higher pressure enters the cone through wall ports 23 in the form of radial jets, which are converted into spray by impinging against the walls of the nozzle. The stem of the water-inlet valve 11 is arranged to telescope into an extension of the steam-inlet valve 3, so that the valves are opened by the excess of the water pressure over the steam pressure. An emergency check valve 26 is provided between the steam-inlet valve and nozzle to prevent water from entering the steam-inlet pipe when the pressure in the combining-cone becomes excessive. The valve 26 and its seating are introduced through a hole which is afterwards closed by a plug 28.

4362. Bone, W. A., Wilson, J. W., and **McCourt, C. D.** Feb. 22.

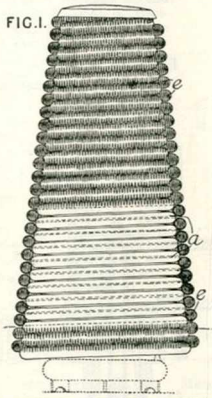
FIG.1.



Heating liquids; feed-water, heating.—An apparatus for heating feed-water and liquids in general comprises a container A traversed by heating-devices consisting of a tube or tubes B containing granular material G in the interstices of which a mixture of gas and air is burned.

4524. Parkinson Stove Co., and **Barralet, T. E.** Feb. 23.

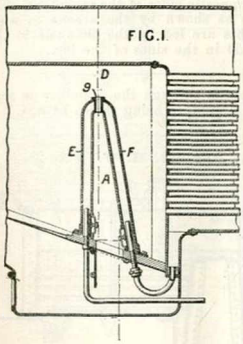
FIG.I.



Geysers.—In coiled-tube geysers *a* of piping the heat of the gases issuing between the convolutions of the coil is absorbed by a conductor *e*, such as spirally coiled wire, perforated tubing, corrugated bands, &c., arranged in metallic contact with adjacent convolutions on the interior or the exterior or on both sides of the coil.

4659. Fairbrother, H., [*Blair-Forth Manufacturing Co.*]. Feb. 24.

FIG.I



Feed-water, heating. — A hollow fire-bridge comprising two slabs E, F enclosing an air-space A is utilized for heating feed-water. Air is admitted to the constricted space D above the fire bridge by tubes 9 to promote combustion.

4790. Ewart, J. W. Feb. 25.

FIG.I.

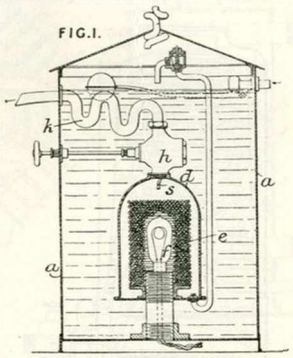
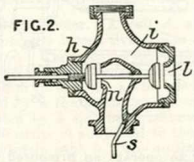


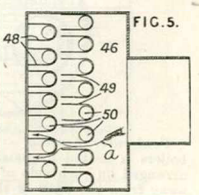
FIG.2.



Heating water.—An electric lamp or other heater *f* is enclosed by, and communicates its heat to, a mass of iron, for example a coil *e*, within a casing *d*. The whole is submerged in a reservoir *a* supplied with water. A valve device *h* regulates the dripping of water upon the heated coil *e* by way of the aperture *l* and tube *s*. The steam thus generated rises through the aperture *n* and mixes with and heats the water entering at the orifice *l*. The heated water is discharged through the pipe *k*.

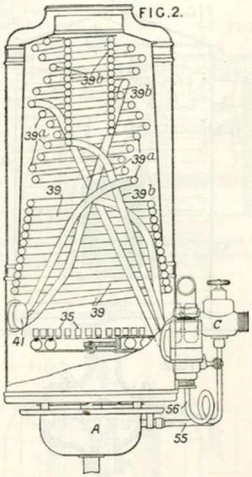
4986. Richardon, G. I. de. Feb. 28.

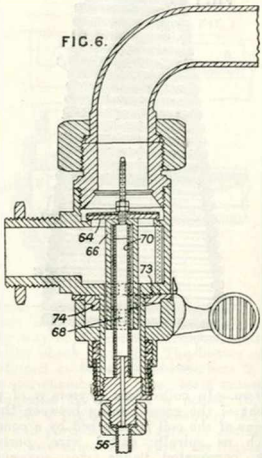
FIG.5.



Geysers. — The heating-surface of a geyser consists of three sets of tubes 39, 39^a, 39^b, Fig. 2, of equal length and self-supporting, one end of each being connected to the water-inlet C, the other to the outlet branch 41. Upon the opening of the the outlet valve, the flow of water raises a valve controlling the passage of water to the tubes 55, 56. That flowing along the tube 55

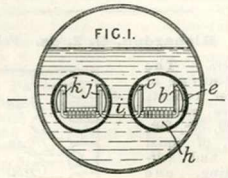
drives a turbine on the shaft of a fan contained in the casing A for feeding air to the burners 35. This fan is supported on pivots spring-pressed against ball bearings, both pivots being lubricated by a single oil-cap. The communication with the tube 56 allows the pressure of





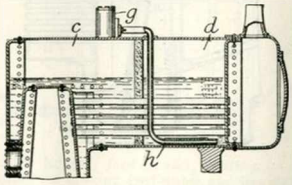
the water to operate an armoured elastic tube 70, Fig. 6, which, lengthening, raises a sleeve 66, bearing the gas-valve 64 and a stop 68, by an amount determined by the position of a cam-surface 74. The cam in one position prevents the valve from rising, and in other positions regulates, the amount of lift. In all positions except the first, a small passage 73 communicates with a slot in the cam open to the gas-supply, to act as a by-pass. The smoke pipe of the geyser is furnished with a cowl of which a vertical section is shown in Fig. 5. Two rows of sheet-metal channels 48, 49 are arranged in staggered order with their open sides pointing outwards and their ends communicating with the atmosphere through holes 50 in opposite sides of the casing 46. The gases escape as shown by the arrows *a*, while back draughts are led by the channels to the apertures 50 in the sides of the box.

5002. Eisele, J. Feb. 28.



Feed-water, heating. — Feed-water for steam-boilers is heated by passing through chambers arranged on each side of the boiler grate and away from the walls of the furnace so that air can pass up behind them and above the fire. Fig. 1 shows the arrangement as applied to a boiler with two furnaces. Ribs *e* space the chambers *b*, *c*, *j*, *k* from the furnace walls. The feed passes through the chambers in series, the connecting-pipes being shown at *h*, *i*.

5019. Perfect, H. V. Feb. 28.



Heating air.—Air is heated by forcing it by a pump *q* into a chamber *d* containing water, which is heated by the products of combustion from a steam-generator *c*.

5826. Glover, T. March 8.

Vertical boilers. — A boiler is built up of sections of the shape shown in Fig. 3, comprising a preferably square tube A, which may be provided with gills Q. The water enters and leaves each segment by the central boss F, which is divided by an inclined web G so that water rising from the segment below is guided into the tube C, and after traversing the tubes A, passes into the tube D on to the upper side of the web and thence to the adjacent upper segment. Screwed plugs M close cleaning-apertures at the corners. Baffles K, L are fitted to alternate segments to cause the gases from the burner R to take a circuitous path. The whole is arranged within a casing J, which may be water-jacketed.

FIG. 3.

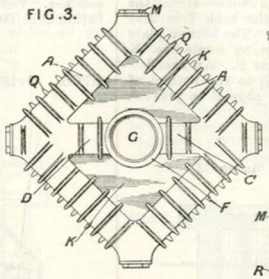
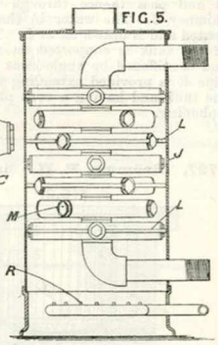
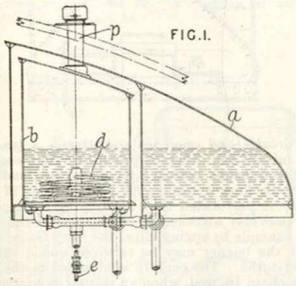


FIG. 5.



5875. Robinson, J. G. March 9. [*Cognate Application*, 10,512/10.]

FIG. 1.



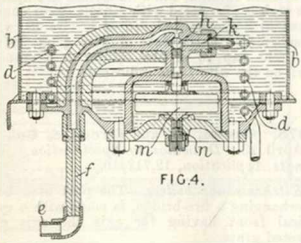
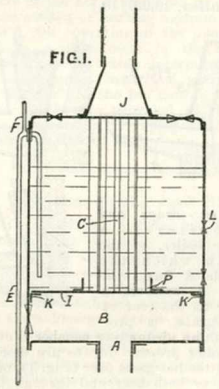


FIG. 4.

Heating water. — An apparatus for heating water for use in railway-carriage lavatories comprises a hot-water tank *b*, Fig. 1, surrounded by cold-water tanks *a*. This arrangement is for the prevention of freezing of the water in the latter. A coil *d*, supplied with steam from the locomotive, heats the water in the tank *b*. The steam-supply pipe *e*, Fig. 4, has a length *f* of reduced bore to reduce the consumption of steam. The steam supply is regulated by a thermostatically-controlled valve *h*, operated by a spindle *k* secured to a sealed expansive drum *m* subjected to the temperature of the water in tank *b*. The action of the valve is adjusted by a screw *n*. The tank *b* is provided with a vent pipe *p*, Fig. 1.

6186. Robinson, G. S. March 12.

FIG. 1.

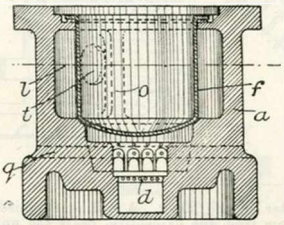


Vertical boilers. — Waste gases from boilers

are led by a flue A into a combustion chamber B and pass thence through tubes C to the chimney J. The water in the tank I is thus heated and is drawn off at L. The bottom plate of the tank is supported on an angle-iron K and is stiffened by angle-irons P. An overflow pipe E is provided extending to the bottom of the tank and having a vent pipe F to prevent siphoning.

7737. Brömme, F. H. March 30.

FIG.2.



Washing-boilers. — The setting of washing-boiler is made of one piece of ferro-concrete. The annular flue *l* between the setting *a* and the boiling-pan *f* is divided by a vertical wall *e*, which compels the furnace gases to pass around the pan before escaping through the outlet *t*. Air is supplied to the furnace *d* through a perforated open-ended pipe *q* passing through the setting.

7883. Gibson, W. J. April 1. [*Cognate Application*, 13,061/10.]

FIG.3.

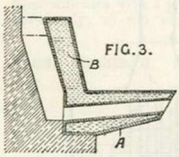


FIG.4.

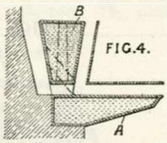
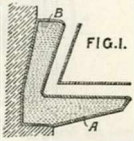
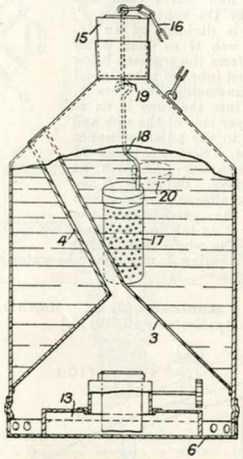


FIG.1.



Kitchen-range and like boilers. — A domestic boiler, of the kind in which the underside A forms the top of a combustion chamber at the rear of the fire-grate, is provided with an upstanding member B at the rear of the boiler proper. Means are described for directing the hot gases over (Fig. 1), or through (Fig. 3), or both over and through the boiler proper, and over one or both faces (Fig. 4) of the upstanding member, or through or both over the face or faces of and through the upstanding member. Various examples are shown. Specification 8910/09 is referred to.

8708. Griffin, P. J. April 11.



Portable and small water-heaters.—A tea-can for miners and others is provided with a conical or dome-shaped bottom 3 from which extend one or more flues 4 leading to the shoulder of the can. A perforated tray 6, carrying a lamp 13, is removably attached to the bottom of the can, for example by spring clips, the lamp being such that the burner may be removed and a candle substituted. The cork 15 is attached to the can by a chain 16, and, when an infuser is employed, the cork is also fitted with a hook 19 for engagement with the hooked end of a wire 18, which is secured to a tin-plate or wire gauge infuser 17. The cap 20 of the infuser is adapted to turn on the wire 18 as indicated.

8975. Green, J., and **Green & Co., W.** April 13. *Drawings to Specification.* [*Cognate Application*, 12,712/10.]

Kitchen-range boilers.—The part of a boiler overhanging a fire-bridge, is made with a cylindrical front having for axis the axis of a pivoted grate.

9281. St. Leger, A. A. H. April 16.

Heating water.—Soft water circulates between