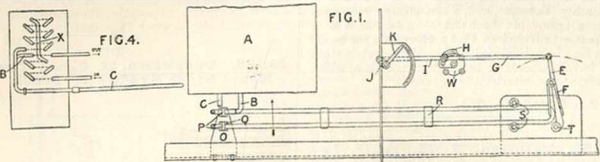


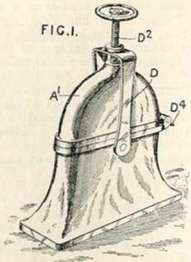
26,910. Sheppee, F. H. Dec. 11.



Thermostats.—Means for regulating and indicating the temperature of superheated steam in an oil-fired flash generator A for a motor road vehicle consists of a U-tube B, C forming an extension of the tubes X, Fig. 4, in the generator, the expansion of the U-tube operating, through a system of levers, either an oil valve W, or a temperature-indicator K, or both together; the U-tube is arranged at the centre of the generator,

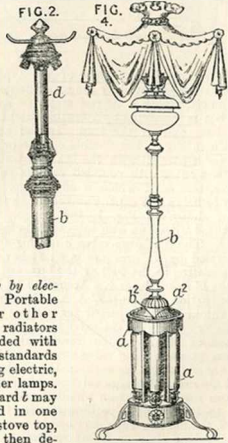
just before the point at which steam is taken off. The tube is fixed to brackets O by lugs Q engaging with flanges P, and slides in clips R and rollers S, the expansion being taken up by a lever F pivoted at T and held against the tube by a spring clip E. The valve is operated by a link H through a pin adjustable in a slotted quadrant G, the indicator K being operated by a link I through a bell-crank lever J.

27,582. Welch, W. H., and Frost & Co., H. Dec. 18.



Digesters.—Vessels for treating substances under steam pressure and particularly vulcanizers are made of a flattened shape with the mouth disposed in a plane substantially at right-angles to the flattened sides for example as shown in Fig. 1, the cross-sectional area of the vessel being small compared with its capacity. The cover A' may be pivoted and is closed tight by means of a yoke D and screw D', which may also be employed for opening the cover by causing the screw D' to impinge upon a tail-piece D'.

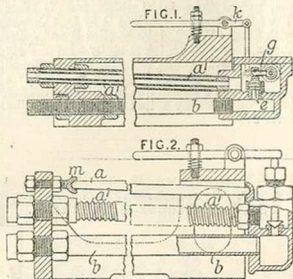
27,697. Jones, A. C., [trading as Messenger & Sons], and Stubbs, S. P. Dec. 21.



Heating by electricity.—Portable electric or other stoves or radiators are provided with pillars or standards supporting electric, oil, or other lamps. The standard l may be formed in one with the stove top, which is then detachable and forms the base of the lamp when it is used apart from the stove. Alternatively it may be provided with a

base detachably secured to the stove top by pins b' engaging in slots a' in a rim on the stove top in the manner of a bayonet joint. The standard is preferably telescopic, and, when electric lamps are used, a removable 'converter' attachment d is preferably provided so that a receptacle for an oil lamp may be substituted for it. The electric stove may have luminous or non-luminous coils a , which are arranged symmetrically around it.

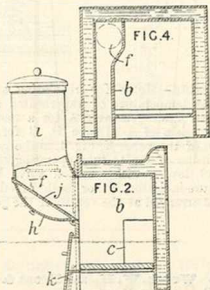
28,182. Paterson, R. H. Feb. 8, 1909.
[Cognate Application No. 12,581, A.D. 1909,
dated May 27.]



Steam-traps.—In a trap of the type in which a valve box is moved by the expansion of a tube in conjunction with a tie-rod strut, or second tube, the box is connected by a flexible discharge tube to the base end of the trap. In the arrangement shown in Fig. 2, the flexible copper or soft metal tube a' is parallel with the brass expansion tube b , and a strut a with rounded ends is held in cup-pieces, one m of which is adjustable. The strut may be below the expansion tube. In the arrangement shown in Fig. 1, the copper tube a' is mounted within an iron tube and fits tightly at the ends. The discharge-valve c in this arrangement is carried by an arm g of a shaft having a coned part seating in the wall of the box, and connected to the blow-off lever k . According to Provisional Specification No. 28,182, A.D. 1908, the trap may be automatically adjusted for varying steam pressures by connecting the valve to a spring-controlled piston or Bourdon-tube device actuated by the steam pressure; the valve stem may be protected by a shield from the rush of the discharge water, and the main discharge valve may be operated by a piston controlled by an auxiliary valve. According to Provisional Specification No. 12,581, A.D. 1909, the flexible tube may be connected to a part of the base-plate or frame extended beyond the valve-box, or it may be connected to one end of a rigid return tube the other end of which is fixed to the valve box; in another arrangement the flexible

tube surrounds the brass expansion tube, and is mounted within a perforated or open casing forming the strat member.

28,196. Duckworth, H. C., and Twelve Hours Stove Syndicate. Dec. 28.



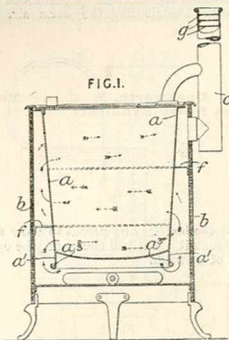
Heating water.—In the fire-box of a water-heating stove of the "box or horseshoe" type for use in greenhouses, motor-car houses, &c., a baffle b or a waterway having an opening c at its rear and lower end, through which the combustion products pass on their way to the flue f at the front of the boiler, is provided to cause the combustion to be gradual. Fuel is supplied from the magazine i , which is furnished with a hinged door h provided inside with an inclined plate j and having its lower end level with the top of the opening c . The baffle or waterway may be of any shape, but is preferably bent as shown in Fig. 4. The draught is regulated in a manner similar to that described in Specification No. 27,163, A.D. 1907, by admitting air through a damper k on the boiler front to mix with the combustion products passing to the flue f . This damper also allows the side ash-pit to be cleared of ashes &c.

28,206. Shaw, J. Dec. 28.

Boiling-pans.—A domestic washboiler is provided at the bottom with a depending rim a' having an upturned lower edge a'' to form an external channel to collect condensation moisture. Baffle-plates f or a helical plate or plates are provided to direct the flow of the combustion gases in the space between the casing b and the boiler a . In the uptake c , wire or perforated metal disks g are placed to prevent down-draught.

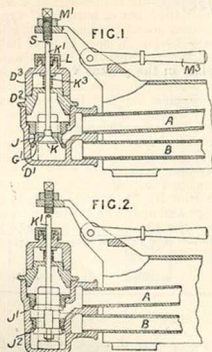
(For Figure see next page.)

28,206.



and opens downwards against the pressure of the fluid, and it is provided with a relief port closed by a relief valve K, also opening against the pressure of the fluid and against the action of a spring K²; in a modification, the relief valve is replaced by an equilibrium valve. An inlet pipe A admits fluid through ports G¹ to a space below the main valve, and, when the tube A contracts, a spindle K¹ carrying the relief valve is forced against an adjustable screw M¹ on a pivoted lever M². The pressure of the fluid on the upper side of the valve, together with the weight of the valve, causes the valve to open, the liquid being discharged through the tube B. The valve casing is formed by three parts D¹, D², D³ screwed together. The valve spindle passes through a stuffing-box L, which is out of contact with the steam. In the form shown in Fig. 2, the equilibrium valve has two faces J¹, J², the tube A opening to the space between the faces. The valve spindle is provided at the top with a steel ball S to reduce friction, and the part D³ may be omitted, the spring being placed above the stuffing-box. According to the Provisional Specification, the valve spindle may be formed in two parts with a loose joint between the parts, and a light spring may be used to open the main valve.

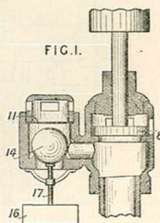
28,215. Goold, W. T. Dec. 28.



Steam-traps.—Relates to modifications of the valve arrangements of steam traps of the Geipel type, such as are described in Specifications No. 7860, A.D. 1893, No. 21,571, A.D. 1894, and No. 12,131, A.D. 1896. The main valve J is cup-shaped

28,353. Andrews, G. C. Dec. 29.

Heating water.—The ordinary weight-loaded release valve 8 of a hot-water or steam heating-system is combined with a supplemental safety device comprising a plate 11, adapted to collapse under a predetermined pressure, and a normally-closed water-inlet valve 14, which automatically admits water to the system from a supply tank in which the device is

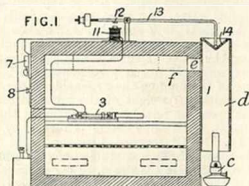


submerged, when the pressure external to the system is in excess of the internal pressure. A float 16 may be arranged with its stem 17 bearing against the lower portion of the ball valve 14. This float should have such a buoyancy that it will assist in unseating the valve but will not in itself raise the valve from its seat. In a modification, the ball valve is made in two parts clamping between them the safety disk 11, the upper portion of the casing being then fitted with a screw plug.

28,546. Bracher, H., and Benzon, C.
Dec. 31.

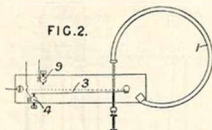
Thermostats.—A temperature regulator and alarm

for incubators consists of a Bowden tube 1 operating a spring contact 3, which engages either with a contact 4 in a bell circuit when the temperature is low, or with a contact 9 in the circuit of a



magnet 11, when the temperature is high. An armature 12 is fixed on a counterbalanced lever 13 carrying a funnel-shaped flap 14, which, when

raised, allows hot air to escape. Air is heated by a lamp *c*, and passes through an opening *e* to a box *f*, divided into channels by perforated walls for uniformly distributing the warm air. The



bottom of the box may be porous to allow air to escape through it. The bell circuit may be opened by means of a switch.

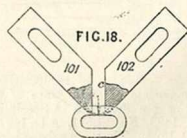
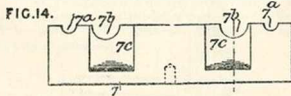
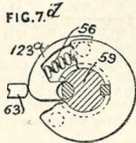
APPENDIX.

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

A.D. 1905.

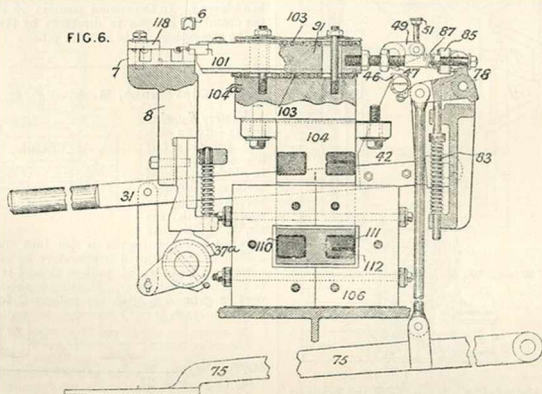
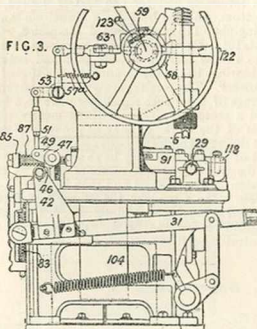
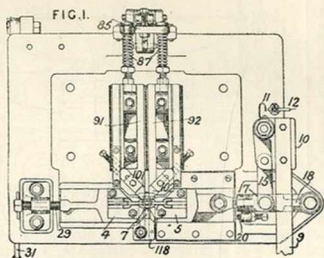
123. Wise, W. L., [Thomson Electric Welding Co.]. Jan. 3.

Heating by electricity.—Chain links, rings, &c. to be electrically welded are formed with gaps at the junctions so that the heating gradually extends from the inner to the outer edge of one side of each link as the weld is being closed by the advancing slide 5. The welds may be lap or scarf welds, and a series of threaded links may be passed over two pulleys and alternate links welded-up and the burrs reduced by the dies 6, 7, the remaining links being operated upon during the second



passage of the chain through the machine and after it has been turned through 90° . The weld-closing and work-locating dies 4, 5 are recessed to accommodate the chain and to grip one link during the

forging process, one being adjusted by means of a screw 29 and the other limited in motion by a screw 20 and reciprocated by the toggles 15, 18, the toggles 15, 10, and the hand-lever 9. After the closing of

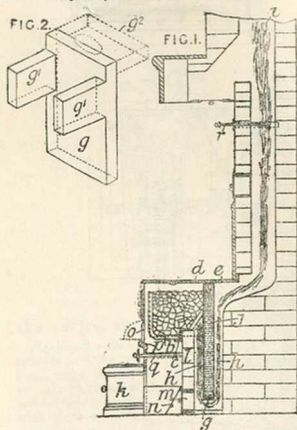


the weld to a predetermined extent, a spring 11 on the toggle 10 engages an adjustable pin 10 and closes the circuit through the controlling-coil 112 of the transformer and through an electromagnetic circuit-breaker in the welding-current circuit. The treadle 75 is now released and the contacts 101, 102 drawn back from the work by a spring 83, then the lever 31 is depressed to raise the die-post 8, by means of the

cam 37a, and to put the upper forging-die 6 in operation, by means of a pawl 46 on the bracket 42, a pawl 47, and levers and rods 49, 51, 53, 63. The die 6 is reciprocated by a spring and a cam 58 on a shaft 59 fitted with a half-round key 123a, Fig. 7^d, which is partly rotated by the spring 56 so as to lock the driven wheel 122 to the shaft 59 when its tail-end is released by the lever 63. Towards the

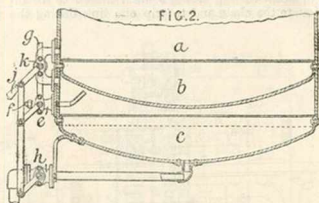
end of the down-stroke of the lever 31, the pawls 46, 47 trip, the spring 57^a returns the lever 63, but the die-post 8 is not raised further. The die 7, Fig. 14, has link-finishing and link-clearance recesses 7^a, 7^b, and recesses 7^c to accommodate the ends of the slides 4, 5, is reversible end for end and, if desired, top for bottom, and is held by a dowel-pin and a clamping-plate 118 in the slotted die-post 8. The contacts 101, 102 are adjustable in angularly-situated grooves in the carriers 91, 92 mounted between roller bearings 103 on the terminal blocks 104^a of the transformer. The carriers are yieldingly advanced by springs 87, a pressure equalizing yoke 85, a lever 78, and a treadle 75. The contacts merely touch the side of the work, or may be grooved so as to hold it down. The forging-die may act by pressure instead of impact, or it may be so arranged that the upper die will deliver one or more blows at each depression of the lever 31 and then be thrown out of action. The secondary 104 of the transformer is threaded through the laminated core 106, and is recessed to receive the primary coils 110, 111 and the controlling-coil 112.

1105. Sayers, A. Jan. 20.



Heating water.—In a kitchen range the boiler is arranged to form a division wall of a downdraught flue at the back. The boiler g , the pipes and connexions of which are protected from the flames by suitably-placed plates, forms the back of the fire-grate and may have wings g' , Fig. 2, forming the side cheeks of the grate, or may have horizontal wings projecting either above the wall l so as to form part of the flue h , or rearwardly into the flue i , as shown in dotted lines at g^2 , Fig. 2.

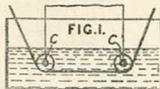
2963. Rance, J. P., and Templer & Rance, Ltd. Feb. 13.



Steam-traps.—Steam separators of the type described in Specification No. 3668, A.D. 1904, [Abridgment Class Steam generators], are provided with means for facilitating the discharge of the grey water. The separator is fitted at the lower part with a transverse partition b , forming a separate settling-chamber c , which normally communicates by a valve k with the main chamber a , and by a two-way valve e with the pipe g , which is connected with the upper part of the separator. The discharge valve is shown at h . The three valves e , h , k are linked together and operated by a hand-lever j . In the second position of the lever, the chamber c is open to discharge by the valve e to the atmosphere, or to a steam pipe.

3032. Claremont, E. A. Feb. 14.

Heating by electricity.—In an electric process for annealing copper, in which the heated metal may be cooled before coming in contact with the air, a continuous wire or band of copper is fed into water and heated to the required temperature by an electric current applied through pulleys C , and is allowed to cool under the water. Brushes or shoes may be used in connexion with the pulleys C for giving greater contact.

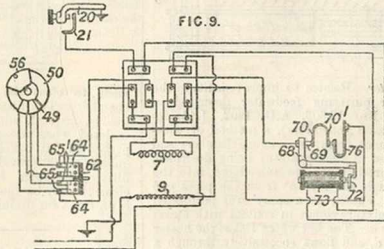
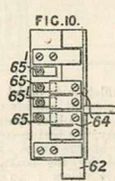
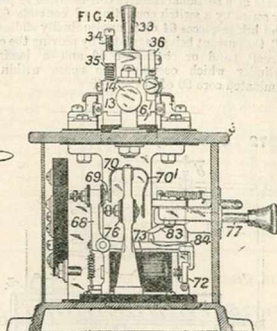
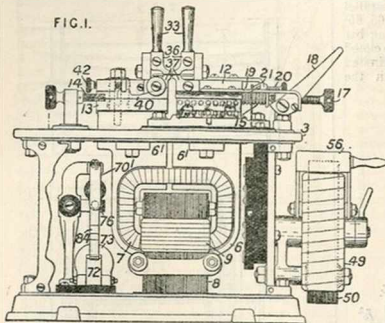


4076. Wise, W. L., [Thomson Electric Welding Co.]. Feb. 27.

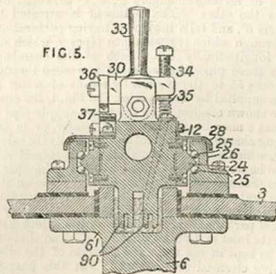
Heating by electricity.—A machine for electrically welding small sizes of iron, brass, german-silver, copper, or other wire is shown in the Figures. The work is held between jaws 37 fixed to slides 12, 13, and jaws 36 fixed to blocks 30, which are mounted on pivots parallel to the line of movement of the slides, and provided with handles 33 and acted on by springs 35 adjustable by means of screws 34. The jaw 37 on the slide 13 is adjusted

vertically by means of a wedge 40 and screw 42, and the slide 13 is adjusted longitudinally on one terminal 6¹ of the transformer secondary 6 by a screw 14. In order that the slide 12 may have

free end movement but no vertical nor lateral play, it is provided with angular side-ribs 24 to engage balls 25, dust being excluded from the bearings by plates 23. The ball races 26 are insulated from

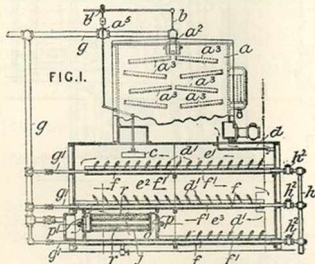


the table 3, and the slide 12 has fingers 90 projecting into a mercury or other cup in the other terminal of the transformer secondary. The slide 12 is retracted by a lever 18 and bent rod 19, and is advanced by a spring 15 adjustable by means of a screw 17. When the slide 12 has advanced sufficiently to weld the work, and adjustable contact 20 engages a spring contact 21 and closes the circuit through an electromagnet 73, Fig. 9, which attracts the catch 72 and releases the lever 68, one end of which is pulled away from the contacts 70 by a spring, thus breaking the circuit through the transformer primary 7. The closing of the automatic cut-out 69, 70 before the hand-operated switch 70¹, 76 in the same circuit is effected by the projections 84, 83, Fig. 4, on the lever 68 and rod 77 when the hand-pressure on the latter is removed and a spring then allowed to withdraw the rod 77 from the flexible part 70¹ of the switch 70¹, 76.



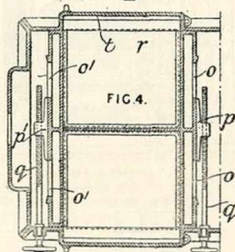
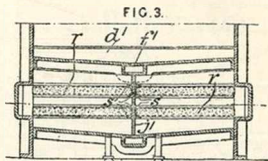
The transformer secondary 6 is threaded through the laminated core 8 and recessed to receive the primary 7. On one leg of the core is a supplemental coil 9 for supplying current to the magnet 73. The primary current is passed through the parts of a sectional reactive coil 49 either in parallel or series by a switch consisting of contacts 65, 65¹ and bridge-pieces 64 on a longitudinally sliding bar 62, the current being regulated by moving the closed circuit band or conductor 56 and a laminated cylinder which occupies the space within the laminated core 50 of the coil 49.

4272. Osbourn, M. P. March 1.



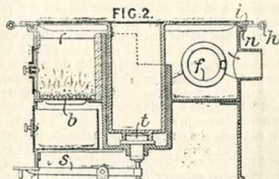
Heating water.—Relates to improvements in the apparatus for purifying feedwater described in Specification No. 12,303, A.D. 1902, [Abridgment Class Steam generators], a method of withdrawing sediment from the settling-chambers and a filter for use in the apparatus being described. Water and precipitants are introduced into the heater *a* through the inlet *a*² from the pipes *g*, *b* respectively. Falling as a spray over perforated pans *a*¹, the mixture comes in contact with steam from the inlet *a*. The hot water leaves the heater by a passage *d*, and flows successively through a series of settling-chambers *e*¹, *e*², *e*³ arranged one above the other. The sediment is arrested by barriers *d*¹, and falls into pans having perforations *f*¹, through which it passes into pipes *f*, which extend longitudinally below each of the chambers. From these pipes the sediment is washed through the cocks *h*² to the main *h* by means of water or steam supplied by the pipes *g*¹. In Fig. 1, the pipes *g*¹ are shown connected to the water-supply pipe *g*. A float *c* may be placed in the heater, or in the settling-chamber, to control automatically the valves *a*², *b*¹, which admit water and chemicals respectively to the heater *a*. The water leaving the chamber *e*³ passes through the filtering-apparatus *j*, shown also in vertical section in Fig. 3 and in longitudinal section in Fig. 4. The filter is divided by a vertical partition *j* into two chambers, which have separate inlet and outlet openings *o*, *o*¹, so that one may be kept in use while the medium of the other is being cleansed or renewed. For this purpose

the inlet and outlet openings are controlled by sliding doors *p*, *p*¹, each provided with a boss engaging a screw *q*, which passes through the side-walls. By means of the screw, the doors can be



made to close the inlet and outlet of either chamber. The filter element consists of crushed quartz, charcoal, mineral wool, or other medium, enclosed, when necessary, in a textile covering and packed in flat boxes *r* of wire gauze. Horizontal guides *s* are provided for the boxes, and the filtering-chambers have doors *t*, so that the elements may be inserted or removed. An outlet is provided for draining either chamber.

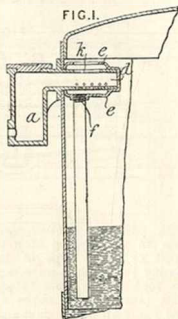
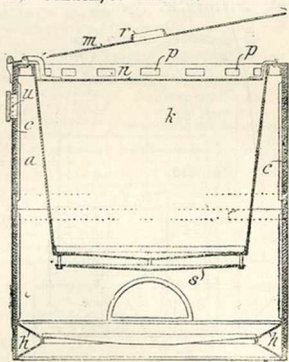
5438. Schmid, J. March 15.



Heating water.—The combustion products from the grate *b* of a cylindrical cooking stove pass round the cylinder, which supports the hot-plates, and heat a coiled-tube boiler *f* connecting two rectangular boilers at the sides of the grate.

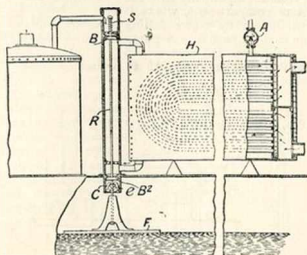
5463. Hamilton, A. W., and McMaster, A. A. March 15.

Heating water.—Relates to modifications in feed-heaters of the type described in Specification No. 1410, A.D.1904, [Abridgment Class Steam generators]. According to the present invention, the feed-receiving chamber *a*, which is of sufficient capacity to provide a body of water between the check valve and the steam space, is fitted outside the boiler. The feed passes from this chamber to the heater, consisting of a chamber *d* perforated on the underside and surrounded by a casing *e*, from which a pipe *f* extends to any desired part of the water space. Live steam enters the casing *e* and chamber *d* through openings *k* at the top.

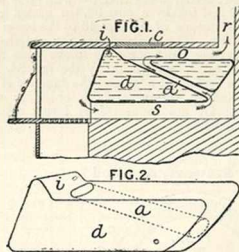

5469. Vinden, J. March 15.


Boiling-pans.—The furnace gases pass round the sides of the vessel *k*, through the openings *p* above the inner lid *n*, and escape through the central chimney opening *r* in the outer lid *m*. The vessel *k* is hung within a lagged casing *c*, which is made in two ribbed sections *a*, *b*, and has a perforated

annular support *h*, on which the firebars rest. The bottom of the cauldron is protected from the flames by a baffle *s*, and a chimney or damper *u* may be provided to regulate the heat or draw off the products of combustion when the lids are opened.

5666. Finch, C. E. March 17.


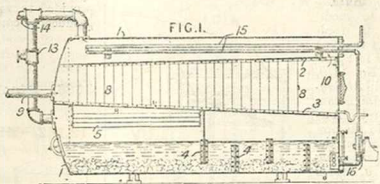
Heating water.—In a gravity-feed apparatus, the feed-tank *H* is fitted with U-tubes through which exhaust steam circulates in order to heat the water.

6107. Wilson, H. March 23.


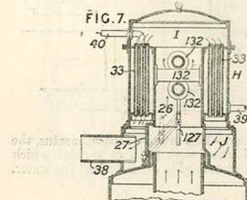
Heating water.—The boiler *d* of a kitchen range, built in as usual over a flue *s*, is traversed by one or more diagonal flues *a* of elliptic, square, or other section. The top-plate of the stove rests upon a hollow ridge *i*, thus forming another flue *o* above the boiler.

7069. **Barker, G.**, [Ferguson Co.]. April 4.

Heating water.—In an apparatus forming a combined condenser and feed-heater the exhaust is delivered by a pipe 9 into the central compartment. Thence it passes through an opening 10 into the top compartment, containing feed-heating coils 15, and finally into the bottom compartment, where it is condensed by water falling from shallow pans 5. A pump 16 withdraws the water and feeds it through the coils 15 to the boiler.

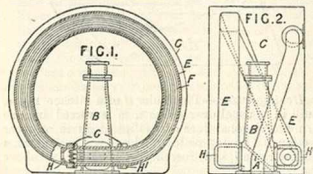


7100. **Suzuki, T.** April 4.



Heating water.—The feed-water-heater H shown in Fig. 7 is placed above a vertical boiler and consists of an annular water chamber with cross water tubes 132 and fed by a pipe 39, the heated water passing by means of the pipe 40 to the lower part of the boiler. The heated gases pass up the flue to the chamber I and down the smoke tubes 33 to the chamber J, and escape by the flue 38. To throw the heater out of action, the dampers 27, 127 are pivoted as shown, and in order to work simultaneously are connected by levers actuated by the handle 26.

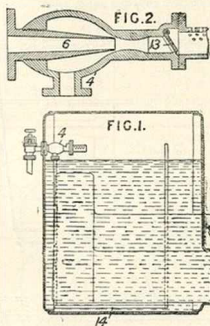
7349. **Stewart, A.** April 7.



Heating water.—An improvement in the invention described in Specification No. 15,497, A.D.

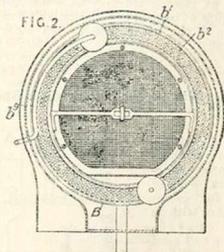
1904, [Abridgment Class Steam generators], consists in the placing of a partition in the exhaust or blast pipe of the locomotive, thus causing the steam to traverse a conduit containing the feed-heating pipes before returning to the blast pipe. Fig. 1 shows a sectional elevation and Fig. 2 a view at right-angles. A partition A, placed diagonally in the blast pipe B, causes the steam to pass around the conduit E containing the feedwater-heating tubes F, which are secured to tube-plates G in the casings H, H'. The water is thus heated by the steam and also partly by the products of combustion passing through the smoke-box C.

8781. **Niblock, F.** April 26.



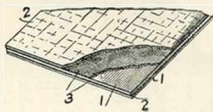
Heating water.—Feed-water entering the boiler through the nozzle 6, Fig. 2, of an injector 4, draws steam through a pipe 14, which extends downwards below the flue of the boiler, and terminates in the steam space, as shown. The outlet end of the injector is fitted with a non-return valve 13.

the rear of the smoke-box. Ashes are removed from the heater by means of the door b' and shoot b'' ; cocks b^c are fitted for washing out the heater.



The feed-water is admitted at the bottom of the annular chamber and delivered from the top through the pipe b^c . The device may be employed as a steam superheater.

14,288. Jacobs, F. D. March 9, [date applied for under Patents Act, 1901].



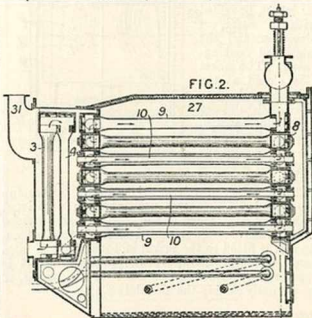
Non-conducting coverings.—Metal plates 1, such

14,433. Lishman, T., and Rioch, R. J. July 13.

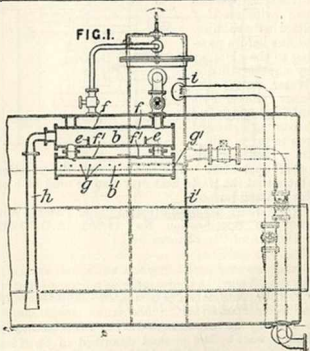
Heating water.—Feed-water is subjected to a preliminary heating in a vessel outside the boiler and to a final heating in one or more vessels situated in the steam space. Impurities are deposited mainly in the external heater. Fig. 1 shows an arrangement in which two vessels b, b' are fitted one above the other in the steam space. They may, however, be placed side by side. Openings for admitting steam are shown at f, f' and for the outlet of the heated feed at g, g' . Sediment is retained in the upper vessel b by partitions e . A pipe h connects the vessel b with the lower part of the water space. The preliminary heater is shown at i . It is provided internally with close-ended tubes supplied with live steam and having perforations opening into the water space. Where the heater i is omitted, as in marine boilers, an additional vessel is fitted in the steam space. In some cases, the preliminary heater may extend downwards into the flue of the boiler. This arrangement is shown by the dotted lines i' .

as sheet steel, are covered on both sides with a fibrous fire-proof material 2, such as asbestos, mineral wool, &c., preferably in sheet form and cemented to the metal base by a weather-proof composition 3 consisting of india-rubber solution and petroleum asphalt, preferably in the proportion of 1 oz. of rubber solution to 1 gal. of asphalt.

14,351. Roggero, E. July 12.

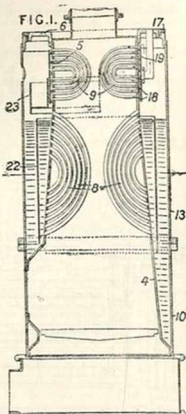


Heating water.—In a water-tube boiler, the furnace gases pass upwards amongst the tubes 9 to the space 27, and thence to the front of the boiler, where they enter the tubes 10. Finally they pass between the tubes 3, 4 of a feed heater to the uptake 31.



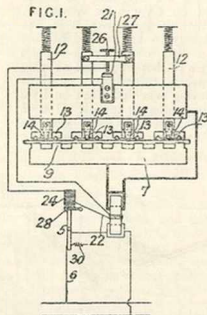
**14,445. Alt-
mann, C. P.**
July 13.

A tank 23, into which the feed-water first enters, wholly or partially surrounds the fire box of a vertical boiler. The water overflowing from the tank passes outside a cylindrical casing 22, which is provided for increasing the water circulation. Specifications No. 13,905, A.D. 1900, No. 3981, A.D. 1902, and No. 6315, A.D. 1903, [Abridgment Class Steam generators], are referred to.

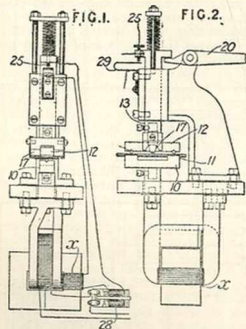


The upper electrode 12 is adapted to rock on trunnions 17 in a recess in a plunger 13 depressed by a spring and raised by a lever 20. The descent of the plunger is governed by the average condition of the welds, the rocking trunnion compensating for inequalities, and, when the required upset has been attained, contacts 25, 29 close the circuit of an auxiliary coil x on the transformer through a circuit breaker 28 which opens the primary circuit. In a modification, two plungers are used connected by a pivoted link which carries the contact-screw.

14,782. Lake, H. H., [Clinton Wire Cloth Co.]. July 18.



14,780. Lake, H. H., [Clinton Wire Cloth Co.]. July 18.

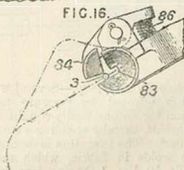
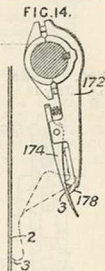
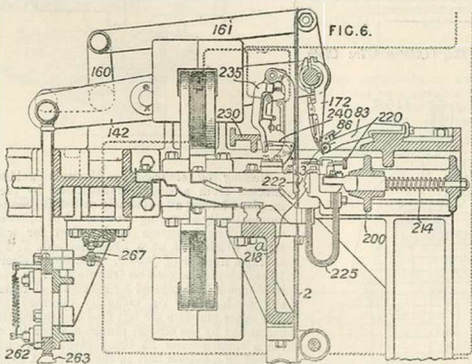
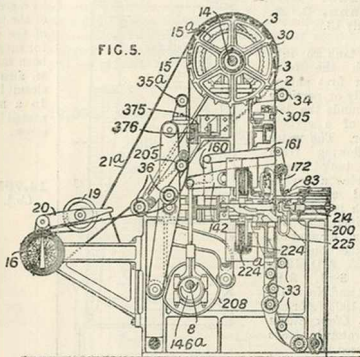


Heating by electricity.—Several welds are simultaneously effected by pressure members having provision for automatically equalizing the pressure at the welds, thereby enabling a single transformer to be used. The invention is described for making double welds in fabric, which rests on a fixed electrode 10, Fig. 1, having two jaws 11, Fig. 2.

Heating by electricity.—Multiple welding is effected from a single transformer by pressure members having an equalizing or rocking action for automatically averaging the amount of upset at the welds. The invention is described for welding fabric, which rests on a fixed electrode 7, Fig. 1, having a number of jaws 9. The upper electrodes 13 are adapted to rock on trunnions 14 in recesses in plungers 12 depressed by springs and raised by any mechanically or manually operated means. The outer plungers are left free and the machine is controlled by the central plungers, a bar 27 carrying a contact-screw 26 being pivoted to one and slotted on a headed bolt in the other. A spring 21 on the frame completes the control circuit at the required average upset and opens the primary circuit. The control circuit contains an auxiliary coil 22 on the transformer and an electro-magnet 24, which trips a catch 28 and releases a switch pivoted at 5, the spring 30 then opening the primary circuit at 6. Modifications are illustrated in which the welding electrodes are arranged in series instead of in parallel.

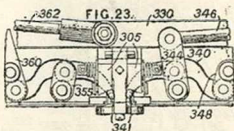
14,797. Lake, H. H., [Clinton Wire Cloth Co.]. July 18.

Heating by electricity. — Relates to machines for making wire fabrics for fencing, lathing, mats, barbed wire, &c., in which transverse stay wires are electrically welded to continuous longitudinal strand wires, and the ends of the stay wires are bent and clipped round the selvage or end strand wires. The strand wires 2 are drawn between straightening-rollers 33, stationary welding jaws 222 and movable jaws 218, over toothed wheels 30, between stationary crimping-jaws carried by a bar 375 and movable jaws carried by a sliding bar 376, and the fabric is wound up on a split drum 16. The transverse stay wire 3 is fed intermittently to the cupped holders 83 by a pair of gripping wheels driven by a ratchet-wheel and a spring pawl, which is carried by a continuously-rotating arm and acted on by a disengaging roller or tappet. One of the gripping feed-wheels can be thrown into or out of action by a



lever and a handle with flat faces on the hub adapted to bear against a retaining spring. A length is cut off the stay wire by the movement of the wire, by means of a cam and levers, against a fixed knife adjustable by a set-screw. This length of stay wire may be subdivided into two or more parts, according to the number of widths or sheets of fabric the machine is required to produce, by additional knives which can be thrown into or out of action by a detachable link. The length of stay wires are transferred

from the holders 83 to the welding jaws by carriers 172 which receive a compound motion, as shown in dotted lines in Fig. 14, by means of linkwork 142, 160, 161 operated by



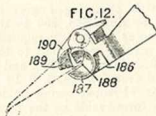
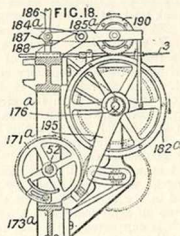
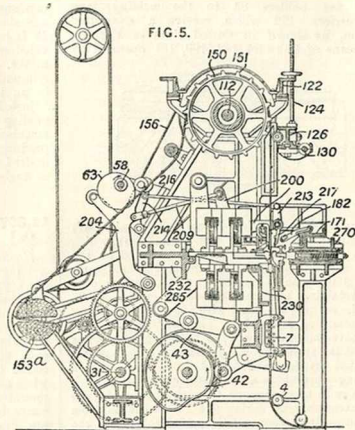
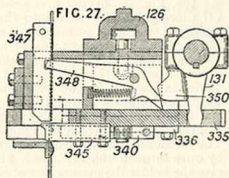
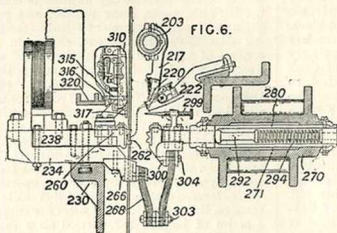
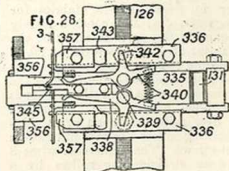
eccentrics 146^a and a double cam on the main shaft 8 acting on rollers carried by a slotted link, which slides on a square block loosely mounted on the shaft and is pivoted to an arm of the bell-crank lever 160. The holders are provided with pivoted wire-retaining segments 84 closed by springs 86 and the carriers are fitted with jaws 178 and spring wire-retaining arms 174. The welding-jaws 218^a are moved simultaneously, to clamp the stay wires against the strand wires, by a sliding cross-bar 200 operated by levers 205 and cams 208, and a welding current is automatically passed through the jaws in succession, or through groups of jaws in succession. A spring 214 forces the movable jaw inwards as soon as the metal softens at the crossing of the wires, and the circuit is broken automatically by an adjustable screw 220 acting on a bell-crank latch 240, thus releasing a pivoted spring arm 235 carrying an electric contact-block. Each pair of welding-jaws is in the secondary circuit of a transformer consisting of a primary coil 224^a within a double secondary coil of thick copper 224. The movable jaw is attached to V-shaped copper plates 225 in the circuit. The primary circuits are closed in succession by a series of cams on the shaft 8, Fig. 5, acting on a series of vertical sliding spring rods 262, Fig. 6, carrying spring contact-pieces 267 and rollers 263. The contact arms 235 are all re-set simultaneously so as to engage with the latches by a cross-bar 230 attached to the operating-rod of the bar 200. Fig. 23 shows an arrangement of levers and linkwork, which is supported by a bar, for bending the ends of the stay wires round the strand wires. Levers 340, provided with operating fingers or pins 341, are connected by links 348, 355 to the frame and are operated so as to give the requisite compound inward and turning movement to the fingers by levers 344, 360, links 346, 362 and a sliding bar 330, operated from the shaft 8 by a crank and bell-crank lever. Pivoted spring guides 305 for the wires 2 are forced aside by the loops of the stay wires when the fabric is moved inwards. The wheel 30, Fig. 5, are grooved to receive the strand wires and formed with teeth to engage the stay wires, and are fixed on a shaft 14, which is rotated intermittently by a pawl and ratchet arrangement and a crank-pin adjustable in a slotted arm of a wheel on the shaft 8. The winding-roll 16 is rotated by an endless band 21^a, a loose pulley 15, and a ratchet arrangement 15^a, so that the pulley can be rotated inde-

pendently by hand for the purpose of taking up any slack in the welded fabric. A tension pulley 19 is held against the band 21^a by a lever 20 provided with a cord or ratchet or other adjustable means. The sliding bar 376, carrying the movable crimping-jaws, is reciprocated by a roller moving in an inclined slot in an adjustable slide bar adjusted by an eccentric. Rollers 34, 35^a, 36 for guiding the wire fabric extend the width of the machine, and the various parts are adjustable for producing fabrics of different kinds. If it is desired to form barbs, the stay wires are cut at an angle.

14,807. Lake, H. H., [Clinton Wire Cloth Co.]. July 18.

Heating by electricity. — Relates to electric welding-machines for making wire fabrics for fencing, lathing, mats, &c., and consists mainly in adjustably mounting the parts to allow of the production of fabrics of varying widths of mesh, and means for welding the wires together, severing the fabric into two or more parts, and bending the ends of the transverse wires and the cut ends round the longitudinal wires. The longitudinal wires are drawn over rolls 4, through adjustably-mounted straightening-rollers 7 carried in brackets connected by set-screws. The transverse wires 3 are drawn between straightening-rollers by a grooved feed-roll engaging with a second roll, the former being actuated by adjustable cranks, connecting-rods, racks, loose pinions, and pawls engaging with ratchet-wheels attached to the feed-roll. An alternative arrangement, shown in Fig. 18, consists of a grooved feeding-wheel 182^a engaging a second wheel 190 driven by a spur-gearing from a shaft 52, and carried by an arm 185^a pivoted at 184^a to a bracket. The wheel 190 is forced downward by a spring 188 acting on cam-surfaces 187 carried by a lever 186. Attached to a shaft 52 is a cam 171^a having an adjustable cam-plate 173^a, which actuates a bell-crank 195, pivoted on shaft 176^a, thus raising the wheel 190 and stopping the feed. The cross-wires are severed by a cutter, operated by a slotted lever, a connecting-rod, bell-crank levers, and cams on the shaft 31. The wires are supported by a series of holders 182, carried on a flange of a beam 171, Fig. 5. Each holder is provided with a lug 186, Fig. 12, having a cup-shaped depression 187 which guides the wire into the aperture 188, the upper part being formed by a segmental block 189 carried by a spring-actuated lever 190. The wires are transferred to the welding-jaws by a series of arms 217, Fig. 6, fixed to shaft 203 carried in bearings in two bell-cranks 200, Fig. 5, which are actuated through the forked lever 204 and link 209 by cams 63 on the shaft 58, driven from shaft 31 by bevel gearing and a spring clutch. The levers 200 together with the arm 213, actuated by cams through the bell crank 214 and link 216, give the holder the motion indicated by dotted lines in Figs. 6 and 12. As each holder follows the path indicated the wire is first engaged by the spring-controlled finger 222 and then by the notched extension 220 being drawn out of the aperture 188 and finally held between the welding-jaws. The

stationary jaws, consisting of a copper bar 260 and a steel contact-plate 262 clamped thereto, are supported by metal bars 234, 238 carried by bolts in dovetail grooves formed in beams 230, 232, Fig. 5. The bars are bolted together and insulated from one another and arranged to allow the transformers to be attached alternately above and below the bars, as indicated in Fig. 5. The contact-plate 304 is connected to the lower of the two bars through the block 266, flexible connectors 268, 303, and block 300. The latter is carried by the squared end

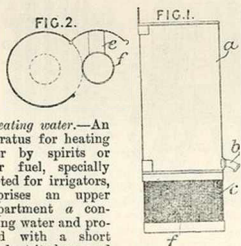


of a bar 292 moving in a cylinder 280, a series of which is carried in a groove 271 formed in a girder 270, Fig 5, reciprocated by levers 285, and

cams 42, 43. The contact-breaker 310 for each pair of welding-jaws is closed by a beam 320, actuated by levers 285, and remains closed during

the advance of the beam 270 until the metal softens and allows the spring 294 to force in the welding-jaw far enough for a screw 299 to strike the extension 317 of a bell crank 315 thus releasing a catch 316 on the contact breaker. The adjustably-mounted coiling and cutting apparatus which may be used for cutting and bending stay wires round adjacent strand wires, are carried by bolts sliding in a groove in a rail 126 supported by screws 124 from a beam 122. Each device consists of a slide 335 reciprocated by the lever 131 in guides 336, Figs. 27 and 28, which carry on their under surfaces two pivoted coiling-fingers 338, 339, formed with extensions 340 and ears 342, adapted to engage projections 343 on the slide. The wires 3 are severed by a knife 345, attached to the carriage, and a knife 347 reciprocated by a spring-controlled lever actuated by a lug 350 on lever 131. The advance of the coiling-fingers bends the ends of the wires and the coiling is completed between heads 350 on the slide and heads 357 on the guides. The shaft 130 is supported in bearings on the beam 126 and is actuated by cams on the shaft 34 through a lever, connecting-rod, and crank. The completed fabric is drawn over grooved wheels 150, provided with teeth 151 to engage the cross-wires, by roll 153^a which is driven by the belt 156 from a pulley on the shaft 112, rotated by a ratchet and pawl. The shaft 112 is actuated by a connecting-rod, an adjustable crank on a shaft, and a loose two-armed crank, bearing pawls.

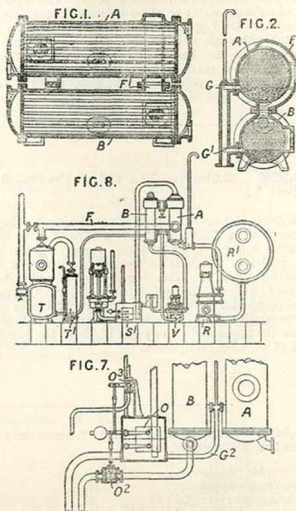
15,575. Braun, W. July 29. No Patent granted (Sealing fee not paid).



Heating water.—An apparatus for heating water by spirits or other fuel, specially adapted for irrigators, comprises an upper compartment *a* containing water and provided with a short tube *b* at its base, and a lower compartment forming a wire-gauze guard *c*. The lower compartment is provided with a hinged door, to which a lamp *f* is attached by means of a bracket *e*, so that ready access to the lamp may be obtained by opening the door.

[Reference has been directed under Patents Act, 1902, to Specification No. 2558, A.D. 1873, [Abridgment Class Hydraulic engineering].]

15,884. Weir, W. Aug. 3.



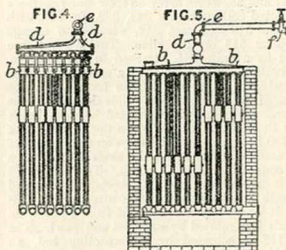
Heating water.—Relates to a combined feed-water heater and auxiliary condenser for dealing with exhaust steam from auxiliary machinery used in connexion with marine propelling-machinery. In apparatus of the kind in which the steam is caused to pass over the entire feed-heating surface before passing into the condenser, a portion of the tube surface of both the heater and the condenser is submerged so that the condensed auxiliary exhaust steam is returned at a low temperature for easy filtration or like purposes. The apparatus is also worked in conjunction with a sea-water evaporator using auxiliary exhaust steam, wherein the steam generated in the evaporator is taken to the feed-heater and auxiliary condenser which is worked at a vacuum to prevent any undue rise in temperature of the feedwater. Figs. 1 and 2 show the feed-heater *A* and the condenser *B* arranged side by side so that the condensed exhaust steam accumulates in the bottom of the feed-heater until it reaches the level of the outlet *G*. Any uncondensed steam flows by the passage *F* to the condenser, the condensed water accumulating here also until it reaches the level of the outlet *G*. The apparatus may be arranged vertically so that the submersion of the tube surface takes place as described in Specification No. 11,846, A.D. 1896, [Abridgment Class Distilling &c.]. A separate steam connexion to the condenser may also be

provided so that part or the whole of the steam may pass through the condenser only. The supply of circulating water to the condenser is regulated by a valve O^3 , Fig. 7, controlled by a float O in a chamber through which the water which has passed through the feed-heater is led. The float may also control a valve O^2 regulating the supply of steam to the pump providing the water supply. In the arrangement shown in Fig. 8, the feedwater

drawn from the main condenser R^1 by the air-pump R passes through the feed-heater A to the feed-tank S^1 . The steam supply F to the feed-heater A is taken from the evaporator T , which is heated by auxiliary exhaust steam. A distilling-condenser T^1 is also provided. A combined air and circulating pump V maintains a vacuum in the apparatus. The drain from the evaporator passes to the condenser B .

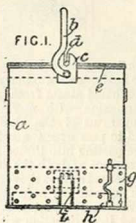
18,233. Roberts, H., and Roberts, J.
Sept. 9.

Heating water.—The pipe d connecting the top boxes b of a fuel-economizer is formed with its interior upper surface inclining upwards towards its outlet e , which is in communication with a blow-off valve f . The top boxes may also be formed with upwardly inclining upper surfaces. The economizer is preferably built up of blocks of tubes so connected in series that the water flows from the upper end of any one block to the lower end of its succeeding block.



20,503. Schmitz, J., and Lummertz-heim, C. Oct. 10.

Portable heaters.—A cooking apparatus for military or tourists' use comprises a vessel a below which is a perforated chamber adapted to receive a lamp h through a door g . The burner i has lateral perforations to spread the flame, and is covered by a cap when not in use. A bolt d on the cover e of the vessel takes into recesses in lugs c and is pressed in place by a strap handle b .

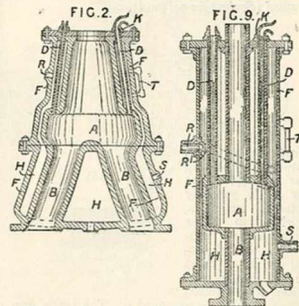


[Reference has been directed under Patents Act, 1902, to Specifications No. 5232, A.D. 1881, No. 13,407, A.D. 1892, Nos. 22,055 and 26,712, A.D. 1898, and No. 5565, A.D. 1901, [Abridgment Class Hollow-ware].]

20,510. White, G. W. J. Oct. 10.

Heating water.—Feed-water is heated in a casing F surrounding an exhaust pipe B , which contains an enlargement A carrying a number of tubes D . In Fig. 2, the invention is shown applied to the bifurcated exhaust pipe of a locomotive, and in Fig. 9 to a simple exhaust pipe. Water enters at

the inlet R , which may be continued inwards in an inclined coiled pipe R^1 , and escapes through the outlet S . The lower part H of the casing serves as



a sediment chamber. The nuts K securing the tubes D may be formed with bell-mouthed extensions, as shown.

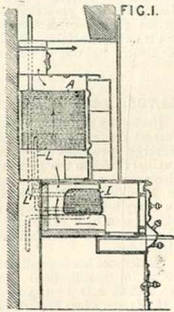
20,769. Mitkevitch, V. Oct. 13.

Heating by electricity.—In electric welding and other electro-metallurgical processes in which an

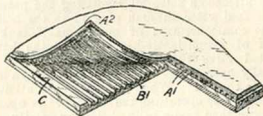
arc is employed, the stability of the arc when using alternating current is secured by applying auxiliary heat to one or both electrodes such as by an oxyhydrogen flame or by an auxiliary arc.

21,030. Miller, W. Oct. 17.

Heating water.—An auxiliary boiler or supply tank is fitted in the flues of a convertible close and open range of the kind described in the specification No. 6379, A.D. 1904, [Abridgment Class Stoves &c.], in place of the oven described in that Specification. Specification No. 1415, A.D. 1891, is also referred to. The auxiliary boiler or tank A is connected to the boiler I in the grate by circulation pipes L, L', and may be of such dimensions that the combustion products pass over its front surface.



angle with those B' on the other, and the sheets being united at the edges A², C, and at intermediate points if necessary, to form air-tight joints.



The air entrapped between the projections may be above atmospheric pressure. The sheets may be made up as tiles, and attached to a backing or laid separately on a flooring.

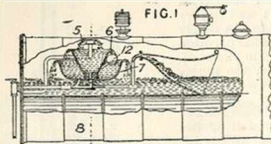
21,832. Joseph, C. S. Oct. 26.

Heating water.—A kitchen boiler, shown in plan in Fig. 3, is built with the feed-cistern from which it is separated by a partition.



23,899. Moffat, W. A. Nov. 20.

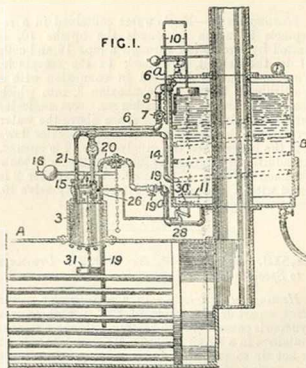
21,467. Howl, O., and Tranter, W. J. Oct. 23.



Heating water.—The apparatus described in Specification No. 19,690, A.D. 1902, [Abridgment Class Steam generators], in which feed-water delivered beneath a hood 5 in the steam space falls into overflows from basins 6, 7, is now provided with a float valve 8 arranged so as to ensure the filling of the inner basin. When the outer basin becomes full, a float 12 closes the valve, which is placed at the outlet from the inner basin.

21,818. Gray, R. K. Oct. 26.

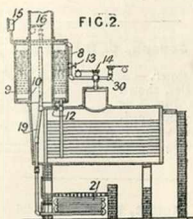
Non-conducting coverings.—Mats and the like having a yielding surface and serving to deaden sound are made of two ribbed rubber sheets, the ribs or projections A¹ on one sheet making an



Heating water.—The feed tank B, arranged around the flue of the boiler A, is supplied with water through pipe 6 provided with a valve 7 controlled by means of a rack 9 carried by the yoke 10 attached to a float 11. The steam-pipe 14, connected to the steam dome 3, passes helically

through the feed tank and terminates above the level of the water therein. The admission of steam to the pipe is regulated by the valve 15 connected to a weighted pivoted lever 16 to which is also attached a valve 20 regulating the passage of the feed-water through pipe 19 to the boiler. At the commencement of operations if tank B is full of insufficiently-heated water, the hand-operated valve 19^a is closed and the lever 16 manually operated to raise the valve 15 to admit steam to the coil. When the water has attained the desired temperature, the valve 19^a is opened and water then passes to the boiler by gravity.

23,899A. Moffat, W. A. Nov. 20.



Heating water.—Feed-water contained in a receptacle 9, which surrounds the uptake 10, is heated by circulation through a pipe 19 and coils 21 in the ash-pit, and back to the receptacle. The apparatus is described in connexion with a multitubular boiler. A connexion 8, into which the safety-valve 14 discharges, communicates through a valve 13 with the space above the water level in the chamber 9, so that the feed-water flows into the boiler when the supply-valve 12 is opened. An additional safety-valve 30 allows steam to blow off when the valve 13 is closed. The chamber 9 is fitted with a pressure gauge 15, a safety-valve 16, and a water gauge.

24,518. Dahl, C. P. A. Nov. 27. Drawings to Specification.

Heating by electricity.—In a self-driving power plant, a part or the whole of the current from a dynamo is passed through heating-coils or resistances contained in a steam boiler or air vessel, the steam or hot air so produced being employed to actuate the engine driving the dynamo. The surplus steam, heated air, electric current, or mechanical power may be utilized for other purposes. At starting, the dynamo is driven by means of a belt and pulley from an outside source, or, in the case of small machines, by a detachable hand-wheel geared to the dynamo shaft, until a sufficient steam pressure is produced in the boiler. The auxiliary

driving-means is then disconnected, the dynamo and engine shafts are connected through a clutch, and steam or air is admitted into the engine cylinder. The dynamo terminals are connected to the resistances &c. through a reversing-switch. The engine may drive a water pump for feeding the boiler. The dynamo may be started by an electro-motor driven by the surplus current from the dynamo of another self-driving plant. The mechanical or electrical energy generated may be used for driving marine engines or motors, road vehicles, railway and tramway vehicles, and factory machinery, or for electric lighting or heating &c.

24,785. Mitkevitch, V. Nov. 30.

Heating by electricity.—Extinction of continuous-current electric arcs in welding and other metal-working processes is prevented by applying auxiliary heat to the negative electrode or to both electrodes, as described for alternating-current arcs in Specification No. 20,769, A.D. 1905. The auxiliary heat may be supplied by an oxyhydrogen blowpipe or by a subsidiary arc. By this means, the arc can be produced without contact of the electrodes.

[Reference has been directed under Patents Act, 1902, to Specifications No. 2339, A.D. 1879, No. 22,233, A.D. 1901, and No. 26,145, A.D. 1903, [Abridgment Class Electric lamps &c.].

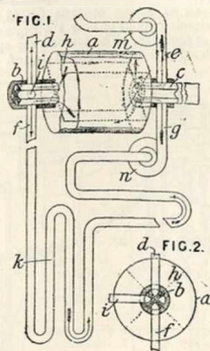
24,925. Davies, R. Dec. 1.

Non conducting coverings.—A stoker's glove or mitten for protecting the hand from heat and injury consists of a closely woven flax or cotton body 1 in two parts, one for the thumb and one for the fingers. An additional thickness 2 of material is applied to the outside, partly by sewing and partly by an adhesive 3 consisting of powdered asbestos or silica in a matrix of glue. The glove may be finished by completely covering it with the adhesive, and further by treatment with solutions of alum, salt, or sodium tungstate. Specification No 27,025, A.D. 1902, [Abridgment Class Wearing-apparel], is referred to.



25,499. Loewenstein, Charles, Prince
do. Dec. 20, 1904, [date applied for under
Patents Act, 1901].

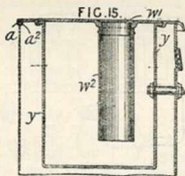
Heating air.—A closed cycle of operation comprises:—admitting compressed cold air to a receptacle, displacing the cold air by hot air which causes the cold air to take its place in a heater, expanding the hot air in a motor, and exhausting through a cooler into the cold-air reservoir. Figs. 1 and 2 show a rotary distributing-chamber *a*, divided into four compartments *b* which are placed by the valves *b*, *c* successively into communication with the cold-air system *m*, *d*, *e*, the hot-air system *f*, *k*, *n*, *g*, and the motor admission-pipe *i*. The chambers may be stationary and controlled by cocks.



A.D. 1906.

1263. Brodie, G. G., and Coleman, A. B.
Jan. 17.

Heating water.—The side boiler *y*, Fig. 15, of a kitchen range is fitted with an internal sleeve *w*, which prevents cold water poured into the boiler from coming into contact with and cracking the sides of the boiler. The tube is closed by a removable cover *w*¹.



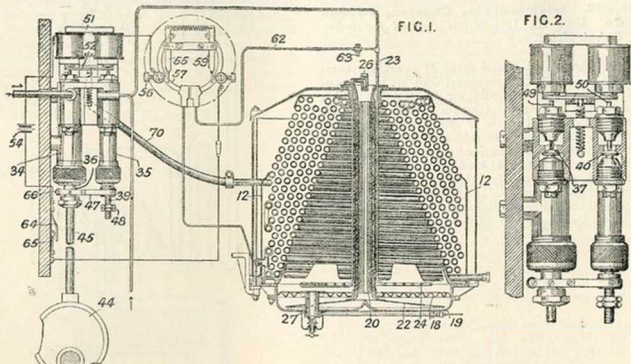
2034. Newcomb, E. C. Jan. 27, 1905, [date applied for under Patents Act, 1901].

Thermostats.—In an instantaneous steam generator the suction valves of the pumps are controlled automatically by the spring armature 52 of an electro-magnet 51. This is in circuit with a battery 54 and a circuit-breaker, consisting of a lever 55 and an adjustable

contact 56. The lever 55 is operated by a Bourdon tube 57 connected with a suitable thermostat, preferably a vapour-tension thermostat, which is subjected to the temperature change in the generator. To prevent the pumps from being brought into action at an intermediate point in their delivery

strokes, a pair of spring contacts 64, 65, which make the circuit only at or near the beginning of the stroke, is provided. The contacts are operated by an insulated part 66 on the arm 47. A second

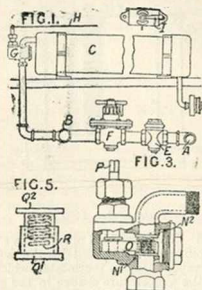
circuit-breaker 59 is provided for use when the pressure in the fuel pipe exceeds a predetermined amount. The Bourdon tube of this breaker is connected by a pipe 62 with the fuel pipe 23; a



valve 63 for preventing pulsations of pressure is fitted in the pipe 62. To ensure that the suction valve 40, Fig. 2, of the fuel pump shall be free to seat itself when the suction valve 37 of the water pump is seated, the valve spindle 49 is made somewhat longer than the spindle 50. A length of rubber hose 70, forming a cushioning-device, connects the delivery pipe of the pump 34 with the feed inlet of the generator. In a modification, the

fuel pump may under certain conditions be controlled independently. The suction valves are then controlled by separate single-pole magnets arranged in series in the circuit. A shunt circuit with a make-and-break device operated by a thermostat is provided so as to cut out the magnet of the water pump when the temperature in the water space of the generator falls below a predetermined amount.

2273. **Laycock, W. S.** Jan. 30.



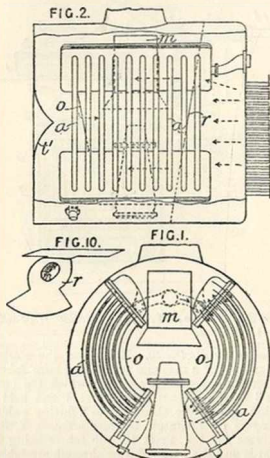
Heating buildings &c.—Consists in a valve G,

Fig. 1, for admitting steam to car heaters. High-pressure steam is taken by a main A throughout the length of the train and is fed through strainers E and reducing-valves F to low-pressure carriage mains B, from which it is distributed to the heaters C by valves G. These valves consist of telescoping disk-pieces Q¹, Q², Fig. 5, pressed by a spring R on to the seatings N¹, N², Fig. 3, over which they are slid by an arm O on the spindle P. The spindle is actuated by connexions H, I under the passengers' control.

2638. **Hermite, P.** Feb. 3, 1905, [date applied for under Patents Act, 1901].

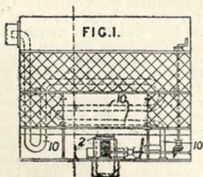
Heating water.—Relates to feed-water heaters of the kind consisting of a system of curved tubes a placed in the smoke-box of a locomotive boiler. The hot gases entering the smoke-box are prevented from passing directly to the uptake m by a transverse inclined baffle r. They pass amongst the tubes a between the sides of the fire-box and

the curved longitudinal baffles o , and then are directed by the curved surfaces h towards the centre of the fire-box. Auxiliary longitudinal baffles may be employed to compel the gases to



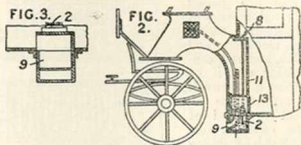
traverse the smoke-box several times before reaching the uptake. The form of the baffle r may be modified as shown in Fig. 10, and transverse vertical baffles may be placed amongst the tubes.

5747. Virag, S., and Goldstein, J.
March 9.



Heating buildings &c.—Carriages, coaches, and other vehicles are heated by means of an oil lamp placed in a space beneath the front of the vehicle or under the seat. The air is admitted to the wick 2 through a passage 9, Fig. 3, which is constructed so that the air does not reach the flame direct, and

the heated gases are carried off through pipes 10, Fig. 1, to the atmosphere. The pipes 10 are arranged to obtain a large heating-surface and are screened from the interior of the vehicle by a



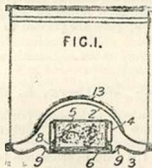
perforated plate 11. The wick of the lamp is adjusted from the handle 8 by gearing as shown in Fig. 1, and the space containing the lamp is closed by a door 13, Fig. 2. In an alternative arrangement, the lamp may heat water in the pipes, which are then placed in communication with a water-holder so that circulation of the water is permitted.

5759. Cowan, J., and Baillie, R. March 9.
Drawings to Specification.

Heating water.—Installations for generating steam are fitted with a feed-heater worked at a pressure greater than that in the boiler; the steam generated in the feed-heater is passed into the super-heater with the steam from the boilers. The feed is supplied to the lower drum from an elevated hot-well or tank by an injector, which is worked by steam from the drum or by superheated steam.

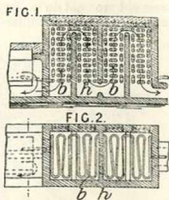
5869. Blechwarenfabrik Limburg (J. Heppel) Ges. March 10, 1905, [date applied for under Patents Act, 1901].

Heating water.—A preserved food tin is provided with a heating-chamber at the bottom formed by an inwardly bulged bottom 2 and a level bottom 3. A heating cartridge 5 of the kind described in Specification No. 11,468, A.D. 1904, rests on a fireclay slab 6 in a supporting ring 4 attached to the bottom 3. A fuse for igniting the cartridge passes through holes 8, 9 to the outside of the vessel. A sieve 13 is placed over the bulged bottom 2. After the contents of the tin have been heated and the tin cleaned, the further heat developed by the cartridge may be used for heating tea, coffee, &c., and the sieve 13 may be used to strain the liquid.



6407. Henningsen, P. March 16.

Heating water by waste furnace gases. The waste gases are passed through a series of chambers *b*, shown in elevation and plan, and each containing a coil of piping *h*. The coil is continuous so that the end of the coils in one chamber opens directly to the coil in the vent chamber. The water to be heated enters the coil in a direction contrary to that of the waste gases. The chambers may be arranged alternatively upon the masonry of the boiler.



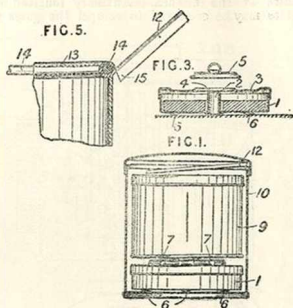
6445. McKerrow, C. A., Hart, W. B., and Mallandain, W. S. March 17.

Non-conducting coverings.—Packings and pads for use as sound and vibration insulators in railway coaches, motor-cars, trams and other vehicles, permanent-way chairs, engine and other foundations, &c. are composed of layers of felt or cloth, waterproofed throughout, coated with cement or other adhesive material, and arranged alternately with layers of a cushioning-substance, so that a partial reflection of the sound waves is obtained at the junctions between the different media. The cushioning-substance may be cork, cork powder, ground rubber waste, ground rubber substitutes made from oils, india-rubber sheets, sawdust, mineral substances, &c., and the felts or cloths may be woollen felts, cotton or woollen cloths, or composite cloths consisting of wool, cotton, hemp, flax, wood fibres consisting largely of cellulose, hair, or mixtures of any of these, with or without a filling or weighting substance. The built-up pads are pressed to the required size and dried.

7943. Heltberg, A. H. April 2.

Heating water.—A portable cooking-apparatus for use by tourists, soldiers, and others during excursions, journeys, &c. consists of a saucepan 10, Fig. 1, a solid-hydrocarbon lamp or burner 1, and a fuel-storing can 9, all adapted to be packed together as shown. The burner consists of a shallow vessel 1, Fig. 3, with a central air-supply inlet 2, projections 6 being raised upon the vessel to allow the air to flow beneath it. The vaporized fuel burns at the outlet 4 in the cap 3, and may be extinguished by a lid 5. The cap 3 is fitted with folding supports 7, Fig. 1, which engage with the edges of the recessed bottom 6 of the saucepan. A folding handle 12, Fig. 5, is formed with stops 15, and is attached

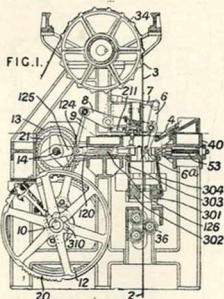
to the rim by bending the material at its end round the stiffening-wire 14 in the upper edge 13.



10,879. Lake, H. H. [Clinton Wire Cloth Co.]. May 9.

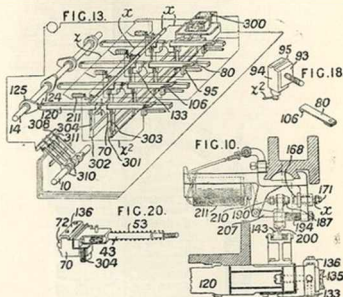
Heating by electricity.—Relates to the electric-welding part of a machine for making wire fabrics, the machine shown being one in which the cross-wires 3 are taken from the holders 4 and held in position against the strand wires 2 during welding by fingers 6^a, operated by levers &c. 6, 7, 8, 9 and cams on the shaft 10, the fabric being fed forwards and the wire 2 drawn through straightening-rolls 36 by toothed wheels 34. The shaft 10, which is shown displaced in Fig. 13, completely rotates a shaft 14 during one-half of each revolution, and locks it during the other half, by gears 12, 13. During the dwell of the shaft 14, the slide 40 carrying the front dies 72 is moved from the work, retained in that position while the strand wires are fed forward and a new cross wire positioned, and again moved to the work by eccentric rods, eccentrics on sleeves on the shaft 14, and intermittent gears 21, 20. During the dwell of the slide 40, cams 125 on the shaft 14 advance the back dies 135 in turn, a switch 308, 311 in the transformer primary circuit being simultaneously closed by cams 310 on the shaft 10. Each die 72, 135 is secured by a clamp 136 to an insulated copper block 70 or 133, the latter being carried by a slide 120, fitted with a roller 124 to engage the cam 125 and slotted to receive a retracting-spring 126. Each slide 120 carries an adjustable block 143 for moving the contact 187 into engagement with the spring-mounted contact 168, both these contacts being slit at 190 and 171 to receive bus-wires *x* in the primary circuit of the transformer, these wires being retained by nuts. Each plunger 43, carrying a block 70, is laterally adjustable in the slide 40, and is pressed forwards by a spring 53 as the work softens, until the part 95, Fig. 18, of the plate 94 mounted on an insulating-block 93 engages the part 106 of a leaf

spring 80. This closes an additional secondary circuit z, z' of the transformer 300 and causes the electro-magnet 211, corresponding to the pair of



operating welding-jaws, to attract its armature 210, rock the lever 207, and lift the catch 200, and consequently to allow the springs 194 to open the switch 187, 168 in the transformer primary circuit. The transformer main secondary has extended terminals 301, 302 forming bus-bars connected with

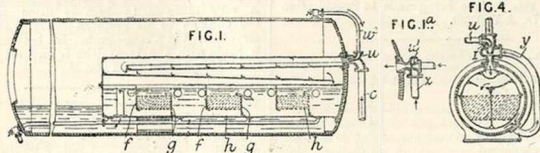
the welding-jaws by flexible copper-bars 303, 304 depending from the jaws. The machine may have a transformer at each end, each being connected with half of the welding-jaws.



11,351. Schäfer, C. May 15.

Non conducting coverings.—Wire netting is covered with a mixture of chalk and honey, with or without glue, for the manufacture of fire proof theatre decorations.

12,942. Schulz, R. Aug. 9, 1905, [date applied for under Patents Act, 1901].



Heating water.—Relates to modifications in the apparatus described in Specification No. 8004, A.D. 1900, [Abridgment Class Steam generators]. According to the present invention, the perforated pipe in the top of the apparatus is replaced by an injector nozzle in which the cold feed is subjected to a preliminary heating by direct contact with steam or hot boiler water. In the arrangement shown in Fig. 1, the nozzle u serves as a feeder and heater, steam being supplied by a

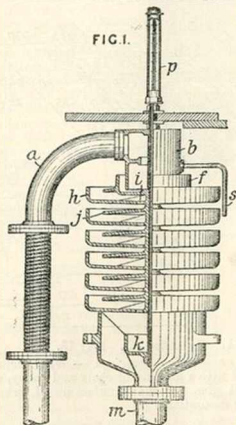
pipe w ; the cold feed is drawn up through a pipe c . Fig. 1^a shows a modification in which the feed supplied to the nozzle u draws hot water from the boiler through a pipe z . Fig. 4 shows the apparatus arranged in a separate vessel outside the boiler. A pipe y connects the bottom of the vessel with the injector I . The steam nozzle is shown at u . Both steam and hot water may be used in this case. Filters h are fitted between the baffles f, g , Fig. 1.

13,367. Wilkinson, G. June 11.

Heating water.—Air is separated from feed-water by interposing a chamber of larger cross-section than the feed-pipe between the feed-pump and the steam space, but preferably within the boiler shell. The feed-pipe a delivers into the de-aerating box b , in which the air collects, being then removed through a pipe leading outside the

boiler. The box depends into the tray f so as to form a water seal, suitable pressure-equalizing pipes s being fitted. Overflowing from the tray f , the water traverses a series of inclined surfaces consisting of disks j and trays h , the latter having annular openings i . From the settling-chamber k , the feed-water overflows into a stand-pipe m , terminating near the blow-off aperture at the bottom of the boiler. In order to determine the

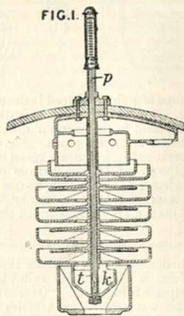
temperature of the water in the settling-chamber, a direct-reading or a recording thermometer *p* is placed in a mercury bath contained in a tube pass-



ing centrally through the heater, reference with regard to this feature being made to Specification No. 13,367A, A.D. 1906.

13,367A. Wilkinson, G. June 11.

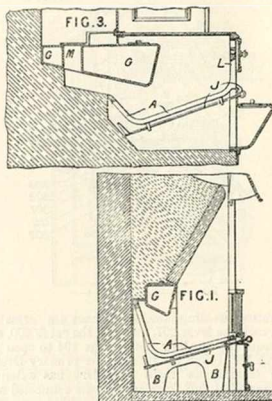
Heating water.—In internal feed-water heaters of the direct-contact type, a thermometer is employed to indicate the temperature of the water after its passage through the heater. As shown applied to the apparatus described in Specification No. 13,367, A.D. 1906, the thermometer *p* dips into mercury contained in the tube *t*, which extends into the receiving-vessel *k*.



13,904. Gibson, W. J. June 18.

Heating water.—Open fire-places, kitchen ranges, &c. are fitted with trough-shaped grates as shown,

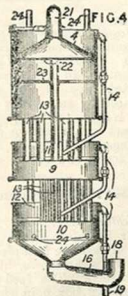
and with boilers which are placed above the lowest parts of the grate bottoms. The grate *A*, Fig. 1, is carried by feet *B* and is shaped so that a chamber is formed at the back; in this chamber, the



air passing into the fire is heated. The boiler *G* is preferably made with a sloping front and back. A rake movable in lugs is fitted to enable the clinkers to be removed. Fig. 3 shows the arrangement in a range grate; the bottom grate *A* is made with the front bars *L*, and the boiler *G* has a damper-controlled flue *M*.

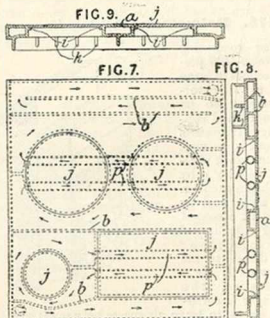
14,175. McIntyre, W., and Young, O. G. June 20.

Heating water.—A combined condenser and water-heater comprises a number of elements each consisting essentially of vertical radially-disposed steam-tubes 13, an open water trough 11, and a steam-condensing chamber 9. The uppermost condensing-chamber is provided with a flaring part 4 and screens 22, 23 for the uniform distribution of the steam entering by the pipe 21. Overflow pipes 14 for the water lead from one trough to another, the lowest one leading into the



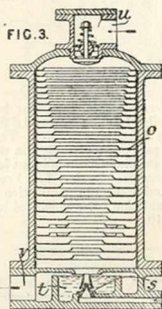
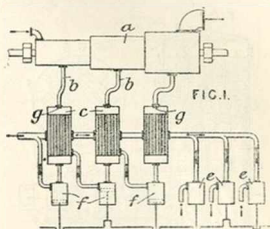
pipe 16 which is provided with an air-discharge pipe 18 and a water outlet 19. Part of the air is removed by draught pipes 24 communicating with the chamber 10. A valved sediment pipe is also provided.

14,430. Pirrie, J. M. June 23.



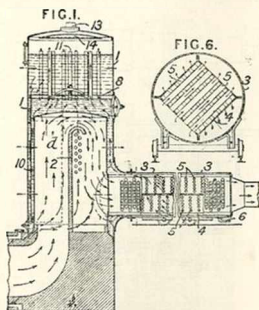
Heating water.—The hot-plate of a gas or like stove is constructed in one with or in close contact with a shallow or flat boiler, which, further, is provided with baffling and heat conducting ribs &c., so that as much as possible of the waste heat is utilized. Figs. 7, 8, and 9 show, in plan and sections, one form of the invention, in which the heater comprises portions cast in one with the hot-plate *a* and divided up by partitions *b*, and other portions formed by cast-in tubes *p* extending across the apertures *i*. The apertures *i* are normally closed, to prevent the escape of hot gases, either by the cooking-vessels placed over them or by lids *j*. The whole or part of the combined hot-plate and heater may be separate from the remainder of the hot-plate to allow for expansion, and is then supported in such a way as to prevent the escape of hot gases. Ribs such as *k*, or bars cast-in or placed loosely across the apertures *i*, may be employed to increase the transference of heat to the water. One or more of the heater tubes may be arranged around the edge of and underneath the hot-plate to serve as a baffle. Several modifications are described. In one, the pipes *p* are not used; in another, the heater consists entirely of pipes in series held in close contact with saddle-shaped ribs on the hot-plate, while in a third the water is contained between a corrugated plate and the hot-plate. The different sections of the heater are preferably always in series. The heater may also form part of the oven hot-plate, and, according to the Provisional Specification, may also be applied in the oven.

14,692. Ferranti, S. Z. de. June 27.



Heating water.—In steam-turbine installations, the feed is heated in stages by steam taken from points of different pressure in the turbine. The usual feed-heater in the uptake may then be utilized for heating the furnace air supply. Fig. 1 shows one arrangement. The heaters *c* are of the ordinary tubular type and are connected with the turbine *a* by pipes *b* fitted with check valves *g*. Pumps *e* deliver the feed from the hot well or regenerator through the heaters *c* in series. The condensed steam from each heater is fed by a pump *f* into the main feed, preferably at a point in advance of the heater. All the pumps *e, f* are driven from one shaft, as shown. Heaters of the jet-condenser type, or of the ejector-condenser type, may be used in place of the heaters *c*. Fig. 3 shows a form of heater for use when a large number of heaters are employed. It is provided with annular trays or dishes *o* having their inner edges turned up so as to catch and hold the water. The feed enters through a nozzle *s* in a liquid seal *t* and passes away through an opening *v*. The steam enters at *u*.

15,036. Schmeil, J. July 2.



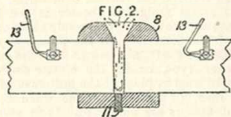
Heating water.—A steam generator is composed of a vertical boiler 1 and an horizontal flue boiler 3 which serves as a feedwater-heater. The products of combustion pass over the baffle 2 in the chamber *d* and traverse the flue 4, of sufficient length, provided with cross water-tubes 5. Feed-water is supplied at 6 and passes in the direction shown by the arrows, circulation being enhanced by tubes 11 and jackets 8, 10.

15,094. Thomson, R. July 3.



Heating water.—In a cooking range the boiler consists of a copper cylinder with inwardly-dished ends *o1*, *o2*, Fig. 4.

15,126. Jacobs, C. F. July 3.

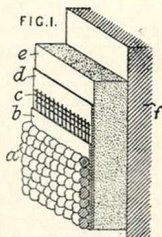


Heating by electricity.—A process for unizing metals, especially suitable for rails for electric railways &c., consists in placing a mould 8 around the ends to be joined, and filling the latter with an electrolytic flux. The rails are then heated electrically, leads 13 being provided for this purpose. The plug 11 is then removed

and the flux is replaced by molten metal. The plug 11 may be dispensed with, the metal displacing the flux owing to its greater density. The electric current is cut off just before the metal is poured. A suitable flux consists of equal parts of borax, fluor spar, zinc chloride, and sodium chloride.

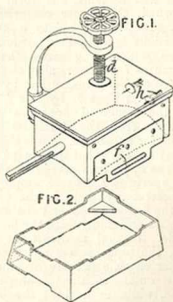
15,175. Dolmetsch, H. July 4.

Non conducting coverings.—To prevent echoes in large halls, a wall covering, stated to be fire-proof and consisting of fragments of cork *a* secured to a canvas or wire-work backing *c* by an adhesive medium *b*, is applied by means of a second adhesive medium *d* either to the plaster *e* or direct to the brickwork *f*. In a modification, the backing *c* is corrugated so as to leave air spaces between it and the plaster or brickwork.



15,499. Binko, L., and Phoenix Electric Heating Co. July 9.

Heating by electricity.—A vulcanizing-apparatus for repairing tyres and other articles comprises a hot-plate of suitable shape to take the tyre &c., and fitted with heating resistances, which are arranged with switches to give different degrees of heat, as required. In one form, the body is made of metal and a chamber is provided for the resistances, which are connected to terminals *h* outside the chamber, which is closed by a lid. The vulcanizer may be connected to the wheel by means of a strap which passes through the slot *f*, or it may stand upon the support, Fig. 2. Specification No. 10,772, A.D. 1903, is referred to.

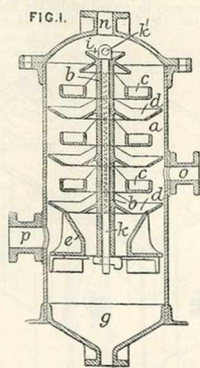


15,771. Patterson, A. July 12.

Heating water.—Water enters the casing *a* at the inlet *n* and comes into contact with steam from the inlet *o* as it falls over a series of troughs *c* and through guide pans or funnels *d* attached to a column *b*. Impurities settle in the troughs *c* or pass down the lowest funnel *e* into the chamber *g*, and the purified water leaves through the outlet *p*. A bolt *k* is fixed within the column *b* by a cotter *i*, and has an eye *k'* for a rope or chain so that all the parts attached to the column may be removed together.

(For Figure see next column.)

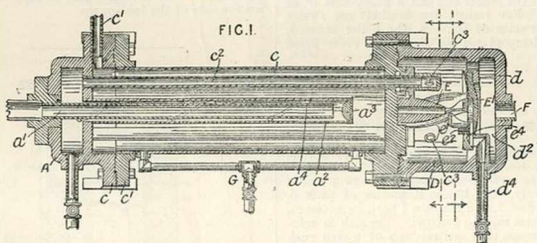
15,771.



16,318. Cöln - Müsener Bergwerks Aktien-Verein. July 22, 1905, [date applied for under Patents Act, 1901].

Heating by electricity.—The process described in Specification No. 14,146, A.D. 1901, [Abridgment Class Metals, Cutting &c.], is applied to dividing, perforating, or forming cavities in metal plates or blocks and the heating is effected electrically. In dividing metal plates, an arc is carried along the plate followed by a jet of oxygen. The oxygen is supplied separately to avoid rapid consumption of the electrodes.

16,656. Gibson, W. A. July 24.



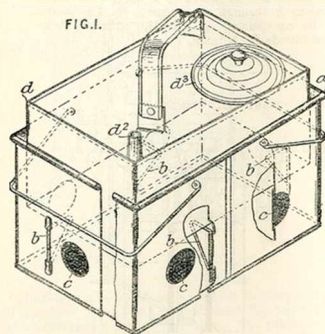
Heating water.—Feed enters the central pipe *a'* and is discharged against the dispersing-plate *a²*. It returns within the pipe *a²*, a circular motion being imparted by the spiral rib *a¹*. From the chamber of the head *A* in which the heavier impurities are deposited centrifugally, it escapes by pipes *c²*, which have outlets *c¹* in the chamber *D*. Steam for heating enters the casing *c* by the pipe *c¹* and water of condensation leaves by the pipe *G*. The chamber *D* is divided by the partition *d* into two compartments, one of which contains a deflector *E* consisting of a conical core with spiral reflecting-blades *e¹* cut away centrally near the concave disk *E'*. The water from the outlets *c²* is discharged at an angle to the blades *e¹* and the lighter impurities are separated centripetally and

directed to the centre of the disk, both by the blades *e¹* and by radial or slightly oblique ribs which extend inward from the flange *e²* of the disk. From the centre of the disk, a passage *e³* leads to a waste pipe *d¹*. The purified water enters the compartment *d²* through apertures at the periphery of the partition *d* and leaves for the boiler through the pipe *F*.

16,806. Creak, A. E. July 25.

Heating water.—A portable apparatus for heating water, intended chiefly for outdoor use, comprises

a box *a*, inside which a rectangular boiler *d* is supported, when in use, by hinged brackets *b*. A spirit burner may be placed under the boiler and the necessary air for combustion is admitted



through gauze-covered apertures *c*. The top of the boiler is preferably inclined, a spout *d*¹ being provided at the higher end and a filling-hole *d*² at the lower. For transit, the brackets are swung against the sides of the box, the boiler lowered, the spirit lamp placed on top, and a cover fitted over all.

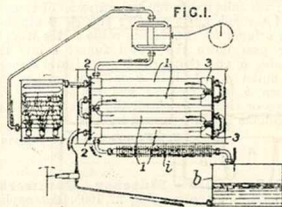
16,869. **Petty, F., and Petty, W.** July 26.

Non-conducting coverings.—A slab for partitions, ceilings, &c. is composed of a composition consisting of the following substances in the proportions stated, namely, coke breeze 6, plaster of paris 6, lime 4, sawdust 2, and asbestos 1 part, by measure, or the asbestos may be omitted. The slab is reinforced by means of a central web of woven rush reeds, which have been previously soaked in alum solution. The slab is sound-, fire-, and damp-proof.

17,550. **Serpellet, L.** Aug. 28, 1905, [date applied for under Patents Act, 1901].

Heating water.—In steam automobiles with instantaneous generators, the exhaust is passed through a tubular or like feed-heater, serving also as a condenser, and thence through a cooler into the reservoir or feed tank. Fig. 1 shows the arrangement. The feed-heater consists of a series of coupled elements 1, each composed of small tubes connected to end chambers 2, 3 and sur-

rounded by a casing. The water and steam pass in opposite directions through the heater. The

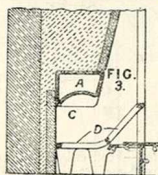


cooler, leading from the heater of the feed tank or reservoir *b*, is shown at *i*.

18,095. **Parkyn, W. J., Bradley, T., and Gresty, J.** Aug. 13. Drawings to Specification.

Heating water.—Hot water, taken either from the outlet end of a feed-heater or the steam water drum, is mixed with the cold feed before it enters the heater. The hot water may be supplied to the suction side of the feed-pump.

18,782. **Gibson, W. J.** Aug. 22.

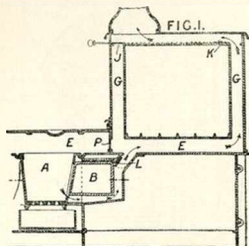


Heating water.—A boiler *A* at the back of the fuel holder of a kitchen range or an open fire-place may have a plain concave underside, as shown in Fig. 3, or a corrugated concave underside.

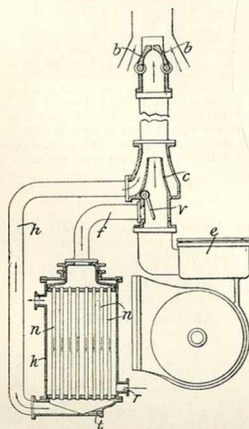
21,239. **Coalbrookdale Co., and Malcolm, W. S.** Sept. 25.

Heating water.—The boiler *B* is set between the grate *A*, Fig. 1, and the oven flues. In a

modification, a horizontal flue passes centrally through the boiler.



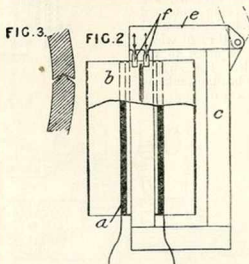
23,015. **Caille, C.** Nov. 4, 1905, [date applied for under Patents Act, 1901].



Heating water.—Relates to apparatus in which part of the exhaust steam of a locomotive passes through a feed-water heater arranged as a by-path in the exhaust passage, and then emerges into the blast pipe below the adjustable opening. The passages *f, h* leading from and to the heater *k* are arranged above and below the central cone *c* of an ejector interposed in the exhaust passage leading from the exhaust chest *e* to the opening *b* of the

blast pipe. The amount of steam passing to the heater is regulated by a flap valve *v*. The exhaust steam passes downwards through tubes *n*, and the condensed water is removed through a tube *t* which may be provided with a steam trap. The feed-water passes around the tubes *n*, being admitted to the casing *k* through an opening *r*. The heater may be constructed so that the exhaust steam passes outside the tubes *n*.

23,269. **Bier, E.** Oct. 20.

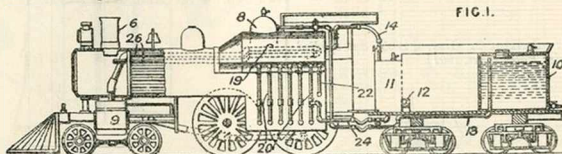
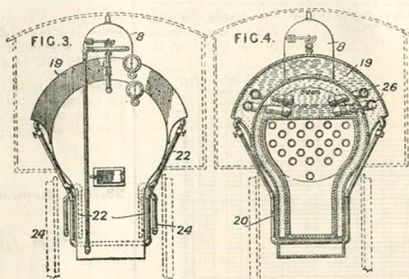


Heating by electricity.—Tubular objects are electrically welded by means of alternating current, the objects themselves forming the secondaries of the welding-transformers. The iron circuit *c*, Fig. 2, of the transformer is hinged at *e* to permit of the insertion and removal of the tube *b* to be welded over the limb surrounded by a primary winding *a*. Wooden blocks and bolts are used to compress the tube joint, and clamps *f* fix the ends of the tube at the joint to the hinged and fixed portions of the core, to impart a slight longitudinal motion along the joint and secure a continuous weld. To increase the resistance at the joint, the edges are beveled, as shown in Fig. 3.

23,829. **Moffat, W. A., and Improved Boiler Feed Co.** Oct. 26.

Heating water.—Feed-water heaters, particularly for locomotive boilers, comprise an arrangement of parts in which a main heating and supply tank, and supplementary heating-tanks, are arranged on the tender, and a feed-water receptacle is disposed above the boiler, steam being supplied to the tanks for heating and pressure. Fig. 1 shows a side elevation of a locomotive, and Figs. 3 and 4 show an end elevation and transverse section, respectively, of the boiler. Water flows as required from the supply tank 10 through non-return valves 12 into the supplementary heating tanks 11 arranged one on

each side of the tender. The flow of water takes place under the action of gravity, or is assisted by steam pressure supplied from the dome 8 through the pipe 13, which passes upwards through the water in the tank. The receptacle 19 arranged above the boiler is provided with a number of heating-tubes 20 which pass under the fire-bars, the end tube being connected to the heating-tanks 11 by pipes 24 through which water is supplied to the receptacle. The supplementary heating-tanks 11 are heated and put

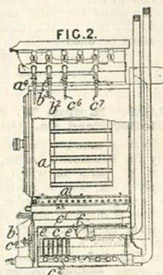


under pressure by steam supplied from the boiler through the pipe 14. Water is supplied from the receptacle 19 to the boiler through feed-pipes 22, which enter the boiler at a point adjacent to upper end of the combustion chamber or fire-box and are extended downwards so that their dis-

charge ends are close to the bottom of the boiler. The exhaust steam from the cylinders 9 is conducted to the smoke stack 6 by a duct 26 passing through the receptacle 19. The various pipes are provided with cocks or valves when required.

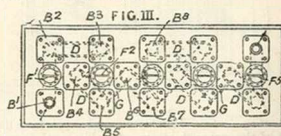
24,244. Wright, J. W. B., and Darwin, H. Oct. 30.

Heating water.—In a combined gas cooking-oven, gas fire, and gas water-heater, the water heater *c* and burner *c'* beneath it may be removable, and are preferably enclosed in a casing *c''*, the top of which may be removed for inspection &c.; the burner is shaped to correspond with the position of flues *e* passing through the water heater. Two gas-supply pipes *c''*, *c''* may be connected



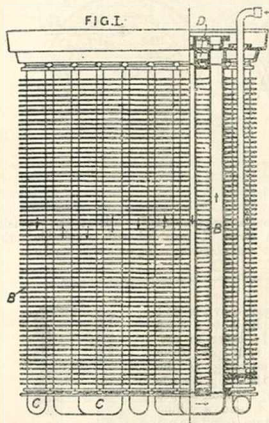
with the burner, so that only part of it may be used. To give access to the burner *c'* for lighting, openings are made in the front of the casing *c''* and in the stove front, the latter being provided with a hinged door *c'*.

24,320. Kablitz, R. Oct. 31.



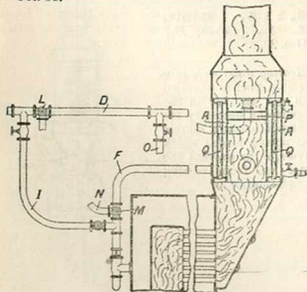
Heating water.—In order to facilitate the cleaning of the exterior surfaces of economizers having U-shaped gilled tubes, the header is formed with a series of apertures which are so arranged among the tubes that from each one a number of tubes can be commanded by the steam or air jet.

The tubes B form a continuous passage by means of the lower bends C and upper connexions D in the header. The cleaning-apertures are shown at F¹ F², Fig. III; it can be seen that from the



aperture F², for example, not only can the pipes B³, B⁴, B⁵, and B⁶ be commanded, but also in an oblique direction the pipes B¹, B², B³, and B⁴. The connexions D may also be connected with each other by secondary channels or pipes G.

24,333. Thomas, J. P., [Thomas, R. P.].
Oct. 31.



Heating water.—The feed-water heater, which is

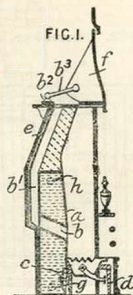
placed in the uptake of a marine or other boiler, consists of an annular water space A, provided with cross water tubes P and smoke tubes Q. The water is led to and from the heater by pipes D, F, and a by-pass pipe I is added together with the necessary valves so as to cut out the heater when desired. Three-way cocks are fitted at L, M to enable the heater to be drained by pipes N when the by-pass is opened. A connexion is made at O with an auxiliary pump for testing the heater before use.

25,101. Reynolds, C. J. Nov. 7. *Drawings to Specification.*

Heating water.—A boiler for kitchen ranges and the like has cross-shaped flues formed in the bottom.

26,545. Florence, A. P. Nov. 22.

Heating water.—A domestic fire place with ordinary fire-clay sides is provided at the back with a wrought-iron boiler *a* which extends to the hearth. An internal flue *b* of rectangular cross-section conveys the hot combustion products to the passage *b'*, the outlet from which to the chimney is controlled by a damper *b'* connected by a link or links *b''* with the movable canopy *f*. According to the Provisional Specification, the boiler may be constructed without flues.



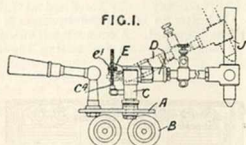
27,311. Thompson, W. P., [Young, E. B.].
Nov. 30.

Heating water.—In order to prevent the hardening of the flue dust or soot upon the tubes of economizers consequent upon the condensation of moisture thereon, a pump, inserted between the feed-pump and the economizer, withdraws water from the latter and mixes it with the entering water so as to raise the temperature within the tubes.

27,749. Lillierap, C. Dec. 6.

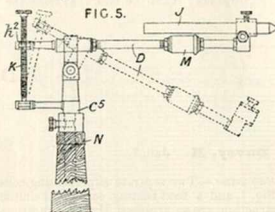
Heating by electricity.—In apparatus for separating metallic structures by melting out rivets or fusing the parts from each other by means of an electric arc, the carbon J, Fig. 1, is carried at the

end of an arm D mounted by a universal joint C on a carriage A provided with rubber tyrol wheels B, the joint being insulated from the carriage by



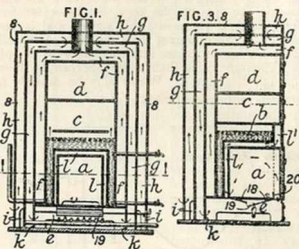
adjusted in height. In a modification, Fig. 5, the arm D is separated from the carbon by an insulator M and is hinged to an arm c' rotatably mounted on

vulcanite &c. The arm D carries at one end a forked piece E engaged by a milled nut e' on a screw c' by means of which the carbon is quickly



an insulating-standard N. Adjustment is obtained by a screw K provided with a suitable rocking nut L' and engaging a lug on a side bracket

28,783. Hamaker, J. I. Dec. 17.

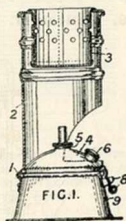


Heating water.—An ordinary oven, a steaming-oven, a boiler, and a warming-chamber are combined in a cooking-stove, between outer casings of which the air for combustion is circulated and becomes heated. The water-heating chamber *b* is separated from the oven by a flue space *l*, and communicates with the steaming-chamber *c* above it.

28,786. Schauer, C. A. Dec. 17.

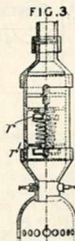
Heating water.—A fumigating-appliance consists of an upper part 2, carrying a receptacle 3 and

connected by a hinge 1 and clip 8 to a lamp 9. In order to prevent spilt spirit from accumulating at the top, the lamp is made with a dome-shaped top 4, and a filling aperture 6 placed below the level of the base of the wick-tube 5. The base of the lamp is larger than the upper part in order to prevent overturning.



29,115. Boulton, A. J., [Bohon, E.] Dec. 20.

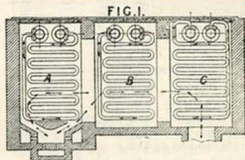
Heating water.—A submersible burner supplied with gas and air in the proportions necessary for combustion has a double beat spring loaded check valve *r, r'* to prevent the water &c. from passing into the supply pipe



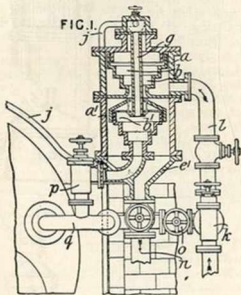
A.D. 1907.

356. Davey, H. Jan. 7.

Heating water.—Two separate superheating-coils A, B, Fig. 1, and a feed-heating coil C, all similar in construction, are so arranged that the heating-gases pass over the coils in series. The feed-heating coil C is fitted between the two sets of super-heaters.



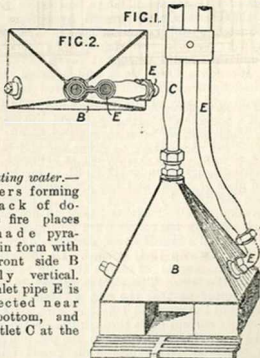
1019. Pollock, J. Jan. 15.



Heating water.—The water in passing through the heater is heated by steam, either live or exhaust. The heater consists of two or more superposed cylinders a , a' , which contain inverted hollow stepped cones b , b' . Steam is led by means of a pipe j into the top of the heater, whence it proceeds in part down the pipe q into the lower cone b' and then by pipes p , g back to the boiler, and in part through narrow openings around the top of the pipe q into the upper cone. The water is pumped up the pipes k , l into the upper cylinder a , where it gradually rises till it flows over into the cone b in a thin layer, and is there heated by the steam travelling down through the holes on the outside of the pipe q . The water and condensed steam then trickle off the dome-like cover of the second cone, and gradually fill up the settling chamber e' and

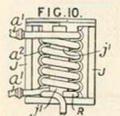
the lower cylinder a' . When the level of the water reaches the top of the cone b' , the water flows down inside the cone in a thin stream and is again heated by steam issuing from the pipe q . Finally, the heated water passes into the boiler by the pipe g . The impurities that settle out can be blown through the pipe n . Water may be directly fed into the boiler by a passage o .

3086. Hirst, A. Feb. 7.

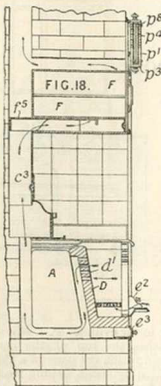


Heating water.—Boilers forming the back of domestic fire places are made pyramidal in form with the front side B nearly vertical. The inlet pipe E is connected near the bottom, and the outlet C at the top

4760. Horne, W. S., Horne, J., and Forrest, E. Feb. 27.

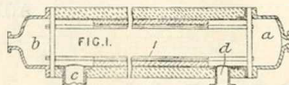


Heating water.—In a combined or convertible coal and gas cooking-range, an auxiliary boiler in connexion with the ordinary pressure back boiler A, Fig. 18, is arranged to be heated by gas. The boiler A is connected by a pipe with coil a' , Fig. 10, heated by a burner R and enclosed by a fire-brick cylinder J, the sides and ends of which are built up of sections



rabbeted together. A fire-brick coil j is arranged within the coil.

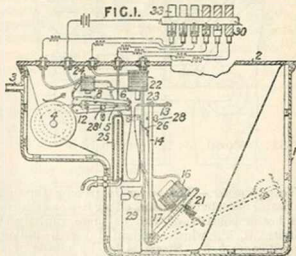
5140. Nicolson, J. T. March 4.



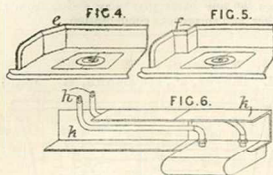
Heating water.—The water to be heated and the products of combustion or exhaust gases from an engine are forced to travel at high velocities and in opposite directions through and between long straight tubes 1, the flue passages, which may be either the spaces between the tubes or the tubes themselves, being of such dimensions that the ratio of their length to their hydraulic mean depth is not less than from 750-1000 to 1. The tubes are enclosed in a casing and open into end chambers or headers a, b , Fig. 1. Water is forced through the tubes from the header a to the header b , while the hot gases under forced or exhaust draught pass through the casing from the inlet c to the outlet d . Similar apparatus serving as an economizer may be connected in series with the generator, the outlet d being connected to the inlet in the economizer casing.

5576. British Thomson-Houston Co., [General Electric Co.]. March 7.

Heating by electricity.—In automatic apparatus for treating an electric conductor containing a refractory material, as in the manufacture of filaments for incandescent lamps, successive portions of the conductor are heated by current in an exhausted chamber and detached. The heating may take place in two stages. The conductor is wound on a reel 4 whence it passes between pads 28, through a fixed eye 5, and between rollers 6 carried by arms 8, which are geared by toothed sectors and are normally drawn together by a spring 12. A clip 13, the upper jaw of which carries an armature 23, is attached to an arm 14 pivoted at its lower end. A pin on the arm works in a slot in a lever 17, which is actuated by an electro-magnet 16 and a spring 21. The chamber 1 is of glass or metal, and has a removable cover 2 made air-tight by cement or by a gasket. In operation, electro-magnets 24, 22, 16 are first excited, whereby the rollers 6 are separated, the arm 14 is moved towards them, compressing a spring 25, and the clip 13 is opened. De-excitation of the electro-magnet 22 allows the clip to seize the end of the wire. The electro-magnet 16 is then de-energized so that the arm 14 falls back and draws out the required length of wire, after which a smaller current flows through the electro-magnet and the arm is raised again to the position shown, the rollers 6 having meanwhile closed together. The wire thus formed into a loop is heated by current supplied through the rollers and clip. The electro-magnet 16 being again strongly excited, the



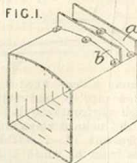
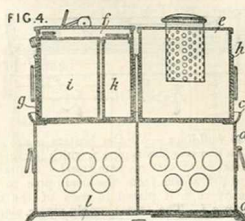
clip approaches the rollers and the finished loop falls into a receptacle 29. The supply of current to the electro-magnets and wire is controlled by a series of disks 33 on a rotary shaft 30, having on their edges contact-plates of the required lengths, adapted to be engaged by brushes connected through resistances to the electro-magnets &c. Two disks each are provided for the electro-magnet 16 and the wire, to allow currents of different strengths to be used.

5590. **Phillipson, B. R.** March 8.*Heating water.*

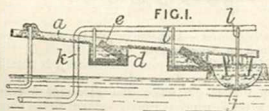
The feed and hot water delivery pipes of a kitchen range boiler are arranged so as to be easily accessible, and so as to avoid their being built into the range brickwork or flues.

In one construction the pipes are

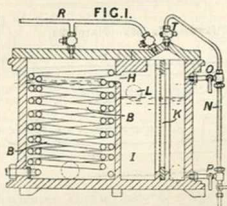
laid in the space between a plate *b*, Fig. 1, which fits between the oven top and the hot-plate, and the usual flue-separating plate *a* which supports the hot-plate. An outlet for the pipes is provided by cutting away an inner corner of the hot-plate and modifying the skirting accordingly, as shown at *e*, Fig. 4, and at *f*, Fig. 5. When the boiler top is close to the hot-plate, an open-fronted casing *k*, Fig. 6, is built into the brickwork at the back of, and above the hot-plate, to contain the pipes *h*, and it is closed at the front by the skirting-plates which extend round the hot-plate near the wall of the recess in which the range is fitted. This casing serves to support the brickwork. Asbestos, slag wool, or other protecting-material may be packed round the pipes.

6230. **Wagner, C.** March 14.

Heating water.—A portable cooking-apparatus comprises a vessel *a*, enclosing heating-lamps and provided with two obliquely enlarging edges *c*, *d*. The edge *c* supports the cooking-pots *g*, *h*, a coffee-pot *e*, a teapot *f*, and coffee and tea canisters *i*, *k*, and the edge *d* supports, by means of a fixed and a spring clip, a frying-pan *l* which may have a folding handle. In a modification, the edge *c* is dispensed with, and the cooking-vessels rest on supports which are pivoted to the inside of the vessel *a* and can be folded into an horizontal position. This enables the cooking-vessels, when the apparatus is not in use, to fit more deeply into the vessel *a*, and, when in use, allows the heat from the lamps to reach the sides of the cooking-vessel by supporting these at such a height that a space is left between them and the top of the vessel *a*.

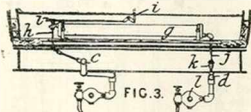
6506. **Kleve, K. A.** March 20, 1906, [date applied for under Patents Act, 1901].6051. **Wood, J. E.** March 13.

Heating water.—Apparatus fitted in the steam space of the boiler comprises inclined trays *a* alternating with settling-chambers *d*. These chambers are provided with a filter *e* consisting of a perforated box filled with coke or the like, the filter being placed in an inclined position, as shown. From the last chamber *j*, the water overflows into the main water space. A pipe *l* connects each settling-chamber with a blow-out pipe *k*.



Heating water.—Feed-water is heated by steam circulated through a double coil *B* from the low-pressure or medium-pressure slide-chest of an engine, and passes through an aperture *H* into a chamber *I*, which is divided into two compartments by a filter frame *K*. A valve is provided for the escape of air which separates from the water in the chamber *I*.

6576. Wild, A. G. March 19.

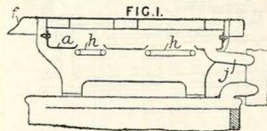


Heating buildings.—All the heaters *g* are connected to a common drain-pipe *d*, which is provided at its lowest point with a steam trap *l*. To prevent back flow of steam from the drain-pipe to the heater, a valve *k* is placed in each of the connecting-pipes *j*. The steam-supply-pipe *c*, sloping from the centre downwards towards each end of the car, is provided with a trap at each end. The regulating-valve *h* of each heater, which can be operated by the passengers through suitable levers *i* as usual, is provided with a by-pass which opens the heater to atmosphere when the valve is turned to shut off steam.

6708. Beaver, C. J., and Claremont, E. A. March 20.

Non-conducting coverings.—Water-resisting mats and carpets, and other coverings such as are used for the deadening of noise, are constructed of a sheet of vulcanized bitumen, that is a compound of the pitch or residues of distillation of vegetable oil, mineral matter, and sulphur; the sheet is faced with a thin sheet of india-rubber or like material, and is backed with canvas or like material. The india-rubber and the canvas are attached to the bitumen by rubber-solution, gutta-percha, cement, fish glue, or the like, and the three sheets are pressed strongly together by suitable mechanical means.

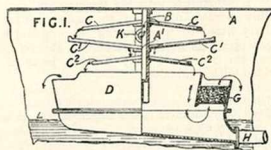
6933. Pirrie, J. M. March 22.



Heating water.—A casing *a* with openings *h* for the burners, specially applicable to the water-heating hot-plate described in Specification No. 14,430, A.D. 1906, [*Abridgment Class Stoves &c.*], is fixed beneath the water-heating hot-plate of a gas cooking-stove so that when the cooking-utensils are in position a hot-air chamber is formed, from which the products of combustion escape through a flue *j*. The casing *a* may be fixed to a flange on the hot-plate, or may

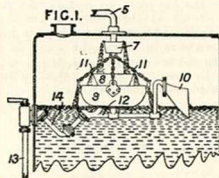
be removably supported on angle-irons. The moulding *f* is formed with openings to allow of the passage of any gases that may escape from the chamber, and so prevent condensation.

9002. Meyer, F., and Cooke, C. April 18.



Heating water.—Feed-water supplied to a boiler *A* by a pipe *K* and hollow support *A'* passes through perforations *B* and flows successively down the inclined trays *C, C', C', C'*, into the central compartment of a settling-vessel *D*, the outer compartment of which contains baffle-plates or a filtering-layer *G* of coke breeze or other suitable material. The settling-vessel is provided with a blow-off pipe *H* for the retained impurities. The trays may be omitted, or slotted or perforated trays used.

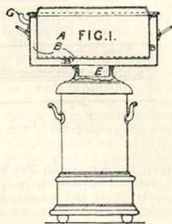
9081. Howl, O., and Tranter, W. J. April 19.



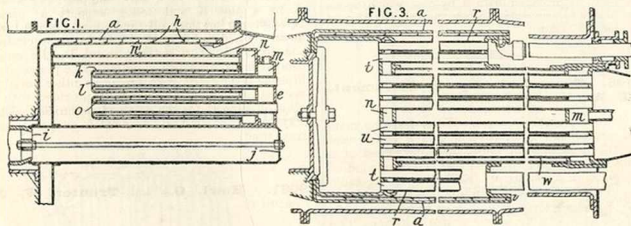
Heating water.—Deposit apparatus of the type described in Specification No. 21,467, A.D. 1905, [*Abridgment Class Steam generators*], is flexibly suspended so as to render its application to marine boilers possible. The feed-pipe *5* enters the receiver *7*, which is rigidly secured to the boiler. The catchers *8, 9, 10* are suspended from the receiver *7* by flexible chains *11*. The blow-off pipe *12* is connected to the exterior pipe *13* by pipes *14*, connected to each other by ball-and-socket joints. A ball-and-socket joint may replace the chains *11*, and, instead of the pipes *14*, a flexible armoured pipe may be used.

9334. Palmer, G. H. April 22.

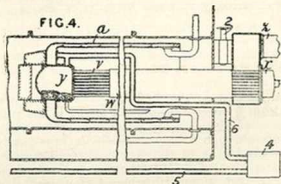
Heating water.—Relates to apparatus for heating, and keeping hot, food &c. by means of waste heat from tea, coffee, and similar urns. A jacketed receptacle A containing the food &c. is placed on the urn so that steam or vapours may circulate in the jacket B, the condensed vapour returning to the urn. The lower part of the outer casing has an opening surrounded by a flange E which fits into the opening in the urn. An outlet pipe G allows excess of steam to escape. The receptacle may be similarly fitted to urns having two openings by providing two flanged openings in the bottom of the receptacle. In a modification, the receptacle may be also jacketed on its upper side provided with a side door.



9578. Nicolson, J. T. April 25.



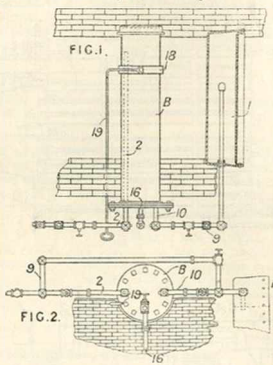
Heating water.—Feedwater-heaters to be placed in the furnace flues of Cornish and like boilers, and constructed in accordance with the principles set forth in Specification No. 5140, A.D. 1907, comprise a double-walled cylinder or its equivalent placed concentric with the flue tube and enclosing elements forming narrow passages for the feed-water and the flue gases. In the construction shown in Fig. 1, the double-walled cylinder *a* provided with helically-disposed angle-irons *h* encloses a number of feed-heaters each consisting of concentric tubes *k*, *l* connected respectively to headers *n*, *m*. The feed-water enters at *m*, flows to the header *n* through the elements, passing along first the inner and then the outer surfaces of the drum and through the tubes *l* to the passage *e*; dust, ashes, &c. thrown off at the sharp turns of the gases are received in spaces provided for the purpose. The dampers *i*, *j* are opened when a through draught is desired. In the form shown in Fig. 3, the drum *a* contains two series of smoke-tubes *t*, *u*, the latter being surrounded by water-tubes *w* connecting headers *m*, *n*. The feed-water enters the header *m*, flows through



the tubes *w* to the header *n*, and thence, through guide-tubes *r* surrounding the smoke-tubes *t*, to the outer annular space of the drum *a* and so to the boiler. The flue gases turn twice as before, flowing through the tubes *t*, *u* in succession. In the arrangement shown in Fig. 4, the water flows from the header *x* to the header *y* through tubes *e* and thence to the drum *a*, while the combustion products pass around the latter and through the tube *w* surrounding the tubes *v*. The header *y* contains granite chippings, coke, or the like to take

up the sediment deposited from the hot feed-water. A damper 2 permits the furnace gases to escape direct to the passage π without traversing the tube π . Water may be withdrawn from the boiler and passed with the feed-water through the feed-heaters, for example as shown in Fig. 4, by means of a pump 4 and pipes 5, 6. The Provisional Specification describes a modification in which three or more double-walled concentric drums are placed within the flue tube, the gases passing in the same devious manner among the drums; or one outer drum and several such sets of concentric drums arranged within it may be employed. Moreover, the dust and ashes collected in a space at the rear of the flue may be removed by opening the space to the fan suction.

10,353. Stevens, R. C. May 3.

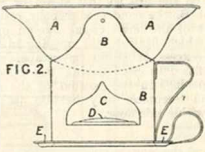


Heating water.—The feed is heated and purified in a drum B located behind the boiler in the path of the waste gases. The water is supplied under pressure through a pipe 2 which extends nearly the whole length of the drum. From the drum the water passes directly to the rear header 1 of the boiler through a pipe 10, which terminates below the level of the water in the header. The water hammer caused by the level falling below the end of this pipe serves as an alarm to the boiler attendant. A by-pass 9 and a blow-out pipe 16 are provided. Soot &c. is removed from the outside of the drum by a steam jet or preferably by a scraper or scrapers 18 operated by a rod 19.

10,465. Drummond, J. May 6.

Heating water.—Apparatus for warming infants' food &c. consists of a comparatively shallow vessel A

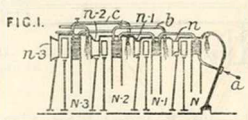
supported by a cylindrical casing B above a spirit lamp D. The vessel A conforms closely to the shape of the feeding-bottle so that only a very small quantity of water is required in it. The



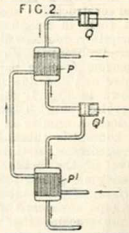
casing B is preferably perforated, and has an opening C through which the lamp is lighted or an extinguisher introduced, and may be hinged or otherwise attached to the lamp-carrier E.

[Reference has been directed under Section 7 of Patents &c. Act, 1907, to Specification No. 8013, A.D. 1887, [Abridgment Class Stoves &c.].]

13,261. Belluzzo, G. June 7.

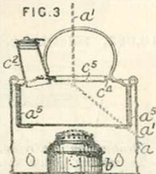


Heating water.—A multiple-expansion elastic-fluid engine has heating-apparatus interposed between the expansion stages which heats a fluid moving in the opposite direction to the primary fluid. Fig. 1 shows the application to a turbine, four of the final stages being shown at n, n-1, n-2, and n-3. The auxiliary fluid enters at a and passes in succession through the heaters N, N-1, N-2, N-3, and so on. It may be used for working another engine or conducted to the boiler after leaving the last heater, or parts of it may be introduced by pipes b, c, &c. into the turbine. The principle may also be applied to a steam or gas engine as shown in Fig. 2. Q, Q' are the engine cylinders and P, P' heaters.

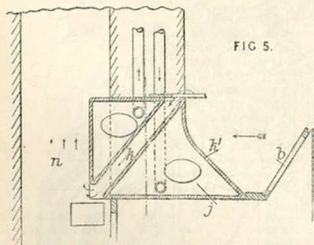
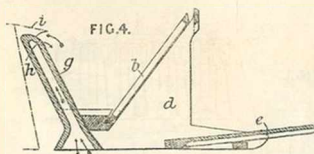


13,787. Hall, W. T., and Axten, C. J.,
[trading as Hall, Bayliss, & Co.]. June 14.

Heating water.—A picnic kettle is provided with a casing *a* having pivoted hooks *a'* adapted to support the kettle over a spirit lamp *b*. When arranging the parts for transport, the kettle is placed at the bottom of the casing *a*, the hooks *a'* are turned down over the kettle, and the lamp is placed on the kettle. The stoppered spout *c'* of the kettle is nearly vertical, and serves both for filling and pouring. A hand-hole *c*, having an air-tight lid *c'*, provides access to the interior of the kettle for cleaning purposes. The whole apparatus is carried by a handle *a'* on the casing.



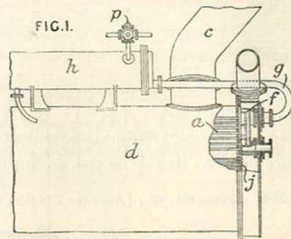
15,689. Portugall, G. J. July 8.



Heating water.—In a V-shaped fire-grate for kitchen ranges &c., Fig. 4, a hollow fire-back *g* is provided, through perforations *h* in which air passes to the fire. A guard-plate *i* is preferably provided to prevent coal, ashes, &c. from falling

behind the fire-back. In a range provided with a boiler, the latter may be placed behind the hollow back *g*, in which case the combustion products pass downwards between the fire-back and the boiler; or the inclined front *k'*, Fig. 5, of the boiler *j* may form the grate back. In the latter case, the internal flue *k* of the latter is preferably inclined downwardly towards the back flue *n* as shown, and may be provided with a damper at its upper end.

16,070. Kerfoot, J. July 12.



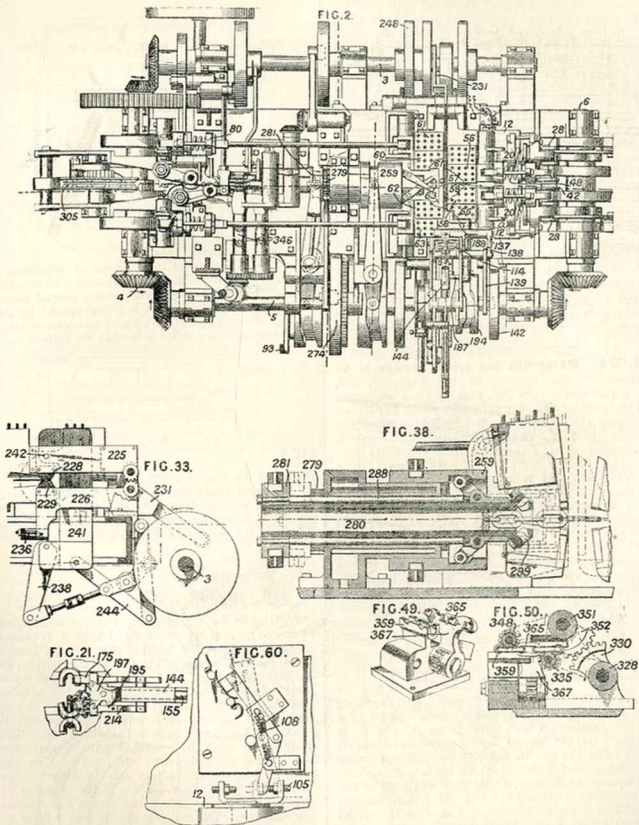
Heating water.—In a system of heating feed-water in stages by steam at different temperatures, the feed-water is at each stage passed through a heater in which it travels backwards and forwards repeatedly, thus ensuring that before leaving the heater, it attains practically the temperature of the steam used at that stage. Fig. 1 shows the system applied in connexion with a multiple-expansion engine. A tubular feed-heater *a*, situated in the top of a condenser *d*, is formed with headers *f*, preferably provided with steam jackets thus causing the water to take a tortuous path through the tubes of the heater. Exhaust steam from a low-pressure cylinder is admitted to the heater by a pipe *c* and passes between the feed-heater tubes to the condenser tubes *j*. An outlet pipe *g* leads the water from the first heater to a second heater *h*, also constructed so that the water flows backwards and forwards across the steam space several times. The second heater is fed with live steam from the boiler, or exhaust steam from the high-pressure or intermediate cylinders of the engine, a multiple-way cock *p* controlling the supplies. The feed-heater tubes are not necessarily made of copper, Muntz's metal, or like good conductor.

16,946. Möllenber, A. Krahmer,
July 24.

Heating buildings.—In a device in which the smoke and steam from a locomotive are led through

such a chain has intergeared cam shafts 3, 4, 5, 6 around it, from which the various parts of the machine are operated. Two blanks are

allowed to fall, one from each magazine 114, on to a table, by fingers controlled by sectors 137, 138, a lever 139, and a cam 142. The blanks are gripped



by jaws 175 on a slide 144 which carries the blanks to the welding-jaws. The jaws 175 are closed by springs 214, and are opened by means of dogs 187, 188 on a shaft rocked by gearing 190, 191 and

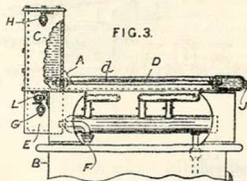
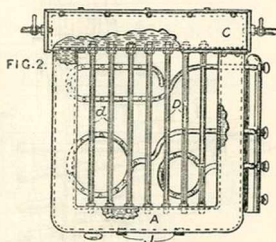
a cam 194. When short-link chains are being made, the threading of a blank through the last-made link is facilitated by having one pair of jaws 175 capable of being turned as shown in Fig. 21,

by means of gearing 197, 195 and a cam-oscillated shaft 155. There are eight welding-jaws, four being on slides 12, 12' which are operated by resilient connexions 20 and levers 28. The jaw-carriers are pivoted, and those of each pair are intergears and are opened and closed by resilient connexions 48, 80 and levers 42. The blanks are first gripped by a pair of the fixed jaws 60, 61 and a pair of the movable jaws 56, 57, and, after the return of the jaws 175 by the other welding-jaws 62, 63, 58, 59. The blanks are brought together, the grip of the welding-jaws being slackened to allow the blanks to adjust themselves, and then tightened again; they are then separated somewhat, being again brought together to complete the welds after the welding-circuit has been closed by a switch controlled by a rod 93 and a cam. The main circuit is broken by the closing of a local circuit through a solenoid switch by means of the switch shown in Fig. 60, in which the full and dotted lines indicate the closed and open positions. The closing is started by an adjustable stop 105 on the slide 12, and is completed rapidly by a spring 108. The welds are swaged and trimmed, and the formation of burr is prevented, by dies 228, 229 arranged between the fixed and movable welding-dies on intergears levers 225, 226, which are opened and closed by a lever 231 and a cam, the swaging pressure being obtained by an adjustable wedge 236 and a cam-ended lever 238 mounted in a link 241 pivoted to the lever 225 at 242 and moved backwards, to permit of the opening of the dies 228, 229, by a rod and a cam 248, Fig. 2. On the opening of the welding-dies, the jaws 299, which have been gripping the chain immediately behind the fixed welding-jaws, retract the work slightly and give it a quarter turn, and, after the threading into position of the next blank, withdraw it. The welding-jaws then grip the work, and the jaws 299 advance and grip it behind the fixed welding-jaws. The jaws 299 are opened and closed by means of a reciprocating sleeve 259, are reciprocated by rods 288 and sleeve 281, and are rotated with the tube 280 by gearing 279 and a cam 274 driven by a pinion on the shaft 5. The chain passes over a ratchet-driven sprocket-wheel 305, after having its welds trimmed by horizontal and vertical pairs of milling-tools; these tools may however be dispensed with.

19,377. Clarkson, J. M. Aug. 29.

Heating water.—The top frame and bars forming the hot-plate of a gas cooking-stove consist of a water-container A and water-tubes D, Fig. 2, in which water is heated by the otherwise waste heat from the gas burners. The container shown in Figs. 2 and 3 forms three sides of the hot-plate, and is connected at its rear end, and by the tubes D to a cistern C; but the cistern may be placed at a higher level, and the tubes D may be placed transversely. Beneath the tank C is a false bottom E, into which the combustion products &c. from the oven B are led by a pipe F. An outlet flue G may be fitted. The hot-plate may be hinged, preferably, as shown in Fig. 3, at the back on

hinges L, the pipes F, G and the water-supply pipe H being fitted with disconnectible couplings to permit this to be done. The apparatus may be used in connexion with the plate-warming hood or canopy

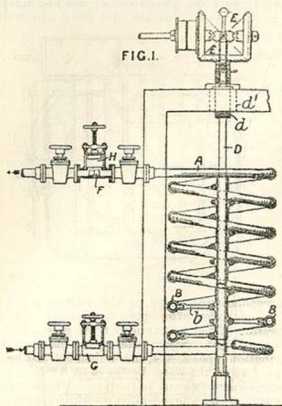


described in Specification No. 30,078, A.D. 1897, [Abridgment Class Stoves &c.]. Cleaning-caps J are fitted on the frame A, and the back of the cistern C is made removable to facilitate cleaning. The bars D have ribs *d* for supporting saucepans &c.

19,846. Mycock, W. Sept. 5.

Heating water.—A feed-water-heater, consisting of one or more concentric coils of tube A, is placed preferably vertically in the path of the heated gases, the feed-water flowing from the bottom to the top. The interior of the tube is cleaned by a loose piston F of leather, rubber, or similar material, which is inserted at a chamber G and travels with the water through the coil till it reaches a chamber H, where it is withdrawn. The chamber H may be provided with a valve for blowing off the sediment carried forward by the piston. Inspection windows may be fitted to the chambers G, H; or a contact in the chamber H may actuate a signal when the piston has reached the chamber. The coil may be formed with connexions for the feed pump at each end, and valves arranged so that the flow of the water through the coil can be reversed and the piston thus moved backwards and forwards. Scrapers B on spring-binged arms *b* remove soot &c. from the exterior of

the tubes, being traversed by a shaft D, which is rotated by gearing E. The shaft is provided with



a screw-thread d of similar pitch to that of the coil, working in a bearing d' with a corresponding screw.

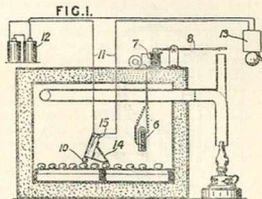
20,267. Hutchinson, T. J., and United Railway and Trading Co. Sept. 11.

Digesters.—To remove the gummy and other matters from bagasse, and to reduce it to half-stuff for paper-making, bagasse is treated with a weak solution of sodium carbonate or sodium hydrate, or with a mixture of the two at about 100°C . or up to a steam pressure of 10 lbs., in a vomiting digester heated by a steam coil. The whole of the top of the digester used is made removable, and the material is discharged against a wall or its equivalent close to the mouth of the digester, so that at the lowest part in the movement the opening for the escape of the material is gradually enlarged. The bottom of the digester may be provided with cocks for running the alkali to suitable receptacles.

20,567. Mücke, G. Sept. 16.

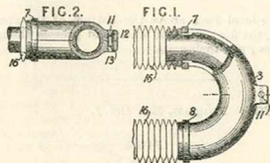
Thermostats.—In an incubator provided with a temperature alarm for indicating when the natural heat of the eggs becomes too great, a thermometer 10 is mounted in a block 15 and is provided with a

bent piece 14 resting on the eggs. The tube of the thermometer is provided with two contacts connected by the wires 11 to a battery 12 and alarm 13. The temperature of the incubator is regulated



by a thermostat 6, which, when the mercury connects the two contacts, excites an electro-magnet 7 and raises a flap 8.

21,097. Nutting, L. E. Sept. 23.

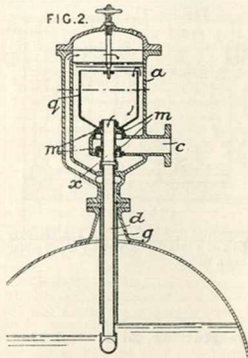


Non-conducting coverings.—The bends of U-shaped superheater tubes are protected by a jacket 3 made in two parts, which are secured in place by binding-rings 7, 8 and pins 11, 12, 13. The space between the jacket and the bend is packed with a mixture of iron filings and wet clay.

21,218. Simonides, B. June 25, [date applied for under Patents Act, 1901].

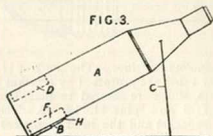
Heating water.—Relates to gravity-feed apparatus of the kind described in Specification No. 19,790, A.D. 1907, [Abridgment Class Steam generators]. The water-supply pipe d , which is enclosed within the steam-pipe g , terminates at the bottom of the receiver a , and is fitted with a sliding tubular end piece x carrying the inlet valves m . An open float q is attached to, or formed integrally with the end-piece. When the water-level in the boiler falls below the bottom of the steam-pipe g , water from the

inlet pipe *c* flows over the sides of the hollow float, and is heated by contact with steam from the boiler before entering the supply pipe. If the



water-level rises above the bottom of the steam-pipe, the float fills with water and presses the inlet valves upon their seats.

21,694. Hogan, R. Oct. 1.

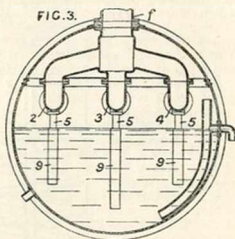


Heating water.—The contents of a workman's flask *A* are heated by a spirit or like lamp *B* fitted to the side, the flask being supported in an inclined position as shown. The receptacle *B* contains felt &c. to absorb the spirit and has a wick *H*; it may be carried in a recess *F*, and may be detachable from the flask, a second one being carried in a recess *D* if additional spirit is required. The handle *C* or a rod hinged to the flask supports it in the required position.

22,025. Morison, D. B. Oct. 5.

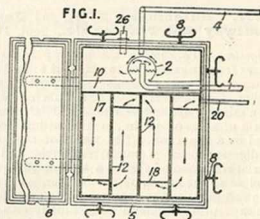
Heating water.—Relates to a combined thermal storage apparatus and feedwater-heater for use in

a system in which a low-pressure engine is worked by the exhaust from a non-condensing engine. When there is an excess of exhaust steam, it is passed into the apparatus and heats the water.

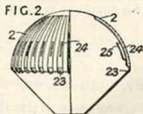


The condensation water of this engine is fed to the main boiler after passing through the regenerator. The construction of the regenerator is shown in Fig. 3. Steam entering at *f* passes to the distribution pipes 2, 3, 4, and is then led just below the surface of the water by the pipes 5 which have a star-like arrangement of nozzles. These nozzles are situated opposite openings in the pipes 9, and when steam is discharged through them an upward current of water is induced which serves to equalize the temperature in the regenerator.

23,365. Baird, A. C. Oct. 23.



Heating water.—Exhaust steam is led into a steam condensing appliance where it is utilized to heat feed water, and where oil is separated. Specification No. 9866, A.D. 1897, [Abridgment Class Steam generators], is referred to. A casing 5, closed by a

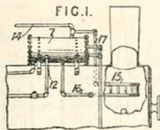


door 6 with lead gaskets and swivelling screw bolts 8, is divided by a partition 17. The upper part contains a fluted dome 2, Fig. 2, supported on an oil-collecting box 10. Exhaust steam passes through a pipe 1 into the dome 2, which has holes 23 round the lower edge of the fluted part, and slits 24 with tongues 25 behind in the concave parts of the fluting. Feed-water at the same time is fed by a pipe 4 over the exterior of the dome. Oil carried by the exhaust steam remains within the dome and falls into the box 10, whence it is withdrawn at intervals. The heated water flows through perforations in the partition 17 into the lower part of the chamber 5. The lower part, which forms a filter, is divided by one or more vertical partitions 12, and the compartments thus formed communicate in series by perforations at the top and bottom of the dividing-partitions alternately, the first compartment communicating with the upper part of the chamber 5 through perforations in the partition 17. Horizontal perforated partitions 18 are fitted across each compartment before the openings in the dividing-wall leading to the next compartment. The four compartments are filled with filtering-media, preferably coke, sawdust, esparto-grass, and asbestos. The heated water escaping from the last compartment by a pipe 20 may pass into another similar apparatus, and finally to a tank fitted with a float for controlling the supply of feed-water to the heaters. The casing 5 and the tank are fitted with stand-pipes 26 open to the atmosphere. In the Provisional Specification it is stated that back pressure is prevented by passing the exhaust first into a chamber where it is allowed to expand.

23,841. **Brown, W. H.** Oct. 29.

Heating water.—

Apparatus for heating feed water, particularly for locomotive boilers, comprises a tubular surface apparatus 7 in which the water is heated by exhaust steam from the cylinders, and a heater 15 disposed in the smoke-box above the blast nozzle and communicating by means of pipes 16, 17 with the water space of the heater 7. The latter consists of a cylindrical vessel having a series of tubes connecting end chambers through which the exhaust steam passes, while the feed-water passes around the tubes, being led in at 12 and passing to the injector by a pipe 14.

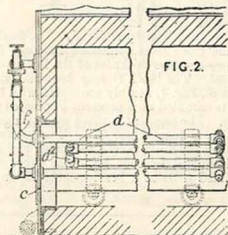
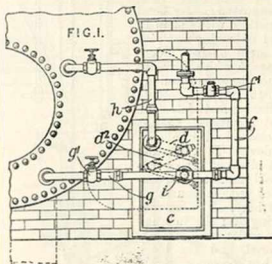


24,281. **Webster, J. H., and Oram, S.** Nov. 2.

Heating water.—In order to facilitate the removal of the pipes *d* placed in the side flues of a Cornish

P 12184

or like boiler for heating the feed-water and for promoting the circulation of the boiler water, they are secured to flue doors *c* and are supported upon hinged plates *i* or upon wheel-carriages

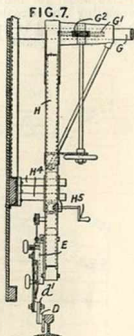


in the flues. The feed-water enters at the bottom of the pipes from the feed-pipe *f* and passes upwards through the pipes to the boiler connexion *h*, the lower boiler connexion *g* being cut off by a valve *g'*. When the pipes are used to promote circulation, both boiler connexions are opened, and a non-return valve *f'* in the pipe *f* cuts off the feed supply. The pipes *d* are coupled to each other by elbow-pieces and short connecting-pipes *d'* arranged in a zigzag manner, as shown. The pipes may be withdrawn by means of a flue door placed at the side of the furnace instead of at the front.

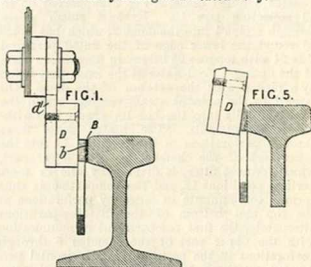
25,206. **Harrison, G.,** [*Electric Railway Improvement Co.*] Nov. 13.

Heating by electricity.—In a method of uniting metals of unequal heat-conductivities and fusing-points, heat from an external source is concentrated on the metal of greater conductivity and lower fusing-point, the other metal being heated chiefly by conduction, so that the contacting edges

of the metals are fused almost simultaneously. The process is particularly applicable to joining copper bonds to steel rails. A laminated copper bond is provided with a strip B, Fig. 1, of brazing-material, the strip having indentations *b* which serve to reduce the area of contact and to provide pockets for fluxing material. The bond is pressed against the cleaned rail by a heating-device D consisting of a block of carbon adjustably mounted and connected with a source of electricity. The current flowing over the junction first melts the brazing-material, and the block D then becomes highly heated so that the heat is conducted through the bond and molten brazing-material. The final position of the block D is somewhat inclined, Fig. 5, so as to preserve the thickness of the lower portion of the bond. The block D may be attached to a conductor *d*, Fig. 7, flexibly connected with a slide E which is mounted on a segment H pivoted about a shaft G. The segment is tilted by worm gearing operated by a hand-wheel H'. The segment is moved along the shaft G by a rack and pinion G', and is guided by rods H'. The process may be performed without a brazing-material, and the

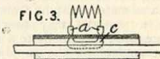


electric current need not pass through the rail &c., the block D merely acting as a heated body.



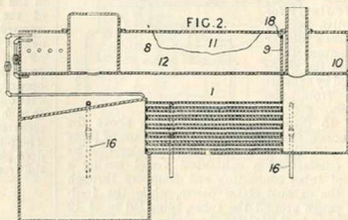
25,272. Evans, W. E., [Allgemeine Elektrizitäts-Ges.]. Nov. 14.

Heating by electricity. — In the welding of superposed portions of metal, such as in cylinders, gratings, pipes, &c., the two electrodes *a* are placed in contact with and on the same side of the work, the circuit being completed through an auxiliary conduct or support *c*. The electrodes may be of equal or unequal area, thus giving two welding places or only one.



25,560. Williams, I. Nov. 18.

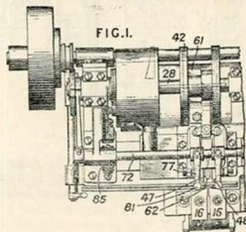
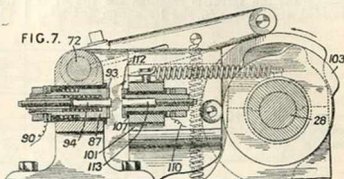
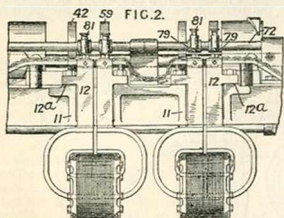
Heating water.—A chamber is constructed above the boiler 1, and is shown as forming part of the boiler structure. Partitions 8, 9 are arranged to divide this chamber into compartments 10, 11, 12 through which the feed passes in series. The openings 18 in the partitions equalize the steam pressure. The water may be heated by causing the furnace gases to pass through tubes extending through the chambers, for example horizontally through the chamber 12, or vertically through the chamber 10. Gravity and automatic feeding devices are arranged. In a modification, a large cylindrical feed chamber is mounted over a series of boilers. The upper chambers are of large capacity, and hence the heated feed-water remains some considerable time, facilitating the deposit of impurities. Various materials may also be placed



in the compartments for this purpose. Blow-off pipes 16 are provided for clearing the compartments of deposits.



26,354. Ryan, M. E. Nov. 28.



Heating by electricity.—A chain-welding machine has stationary electrodes 16, adjustably secured to the secondaries 12 of transformers, water passages being provided for cooling. There are two sets of electrodes, the chain sagging, Fig. 2, between them and being given a quarter turn so that the complete chain is welded in one passage through the machine. Cam-operated longitudinal slides carry transverse slides operated by cams 42, Fig. 1, on which are mounted central jaws 62 for forcing the links against the electrodes. The secondaries 12, Fig. 2, of the transformers have lugs 12^a by which they are secured to brackets 11 on the machine frame. The supply of current is regulated by controllers 85, Fig. 1. These controllers consist of insulated sleeves 87, 107, Fig. 7, the former of which is spring-mounted and the latter of which is fixed on a cam-operated slide 101. The leads 90, 110 are held between washers on the sleeves, and contact-pieces 93, 112 of german silver or other good conductor are fixed at the opposite ends. Carbons 94,

113 are adjustably mounted in the sleeves, the former being spring-pressed, and they first come into contact when the sleeves approach so that the contact-pieces 93, 112 are prevented from damage. To vary the time of action of the current, the operating-cam 103 is formed of two pieces relatively adjustable.

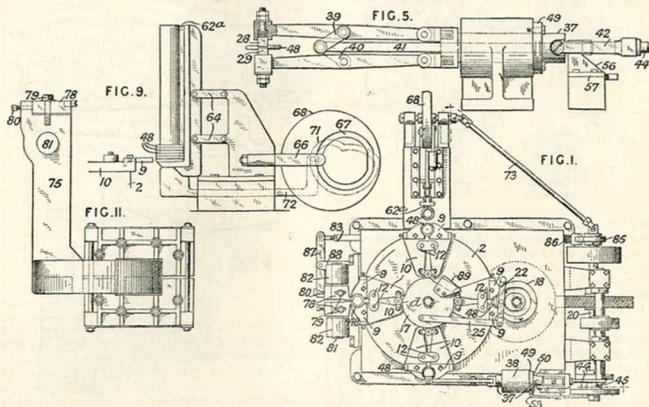
27,095. Ryan, M. E. Dec. 7.

Heating by electricity.—In an electric welding-machine, a turret 2, Fig. 1, intermittently rotated by a ratchet lever and cam, carries four sets of grippers for holding the work 48, comprising jaws 9 adjustable in levers 10, which are pivoted at 12 and operated by a cam 17 through toggle-arms, the cam being oscillated independently of the turret by levers 25, 22, and a cam 18 driven by the shaft 20 through worm gear. The rings &c. to be welded are contained in a magazine, Fig. 9, being kept in alignment by the engagement of their openings with a projecting pin 62^a, and the magazine is reciprocated by a cam 67, and rod 66, and is adapted by links 64 to rise on the inclined surface of a slide 72 into vertical alignment with the gripping-jaws. The slide is then moved forward by the cam 71, so as to lower the magazine until one of the rings is inserted between the jaws, which are then closed on the ring by the cam 17, while the magazine is being withdrawn. The shaft on which the cam disk 68 is mounted is driven from the shaft 20 by a universally-jointed link 73. The gripping-jaws are firmly closed

on the ring by the part *d* of the cam 17, and are brought to a pair of welding electrodes 78. To prevent the formation of scale, the electrodes are rigidly fixed by screws 79 to the secondary part 75, Fig. 11, of the transformer, which carries trunnions 81 mounted in brackets 82, and is actuated by gravity towards the welding field. The transformer is tilted out of contact with the work when the turret is rotating, by a lever 87 pivoted to a standard 88 and connected to a rod 83, which is pressed against a cam 85 by a spring 86. To compensate for wear, the electrodes are made adjustable by screws 80. When the welding is completed, the turret is rotated to bring it to the swaging-hammers for reducing the swell. The hammers consist of spring-controlled hammer faces 28, 29 mounted in arms, which are pivoted to a shaft 37, and are operated through arms 39, 40 and a rod 41 by a clip 42, connected to the shaft 37 and driven by a crank 45 and connecting-rod 44, on which the clip is journaled. The shaft 37 is also oscillated, so that the whole surface of the joint may be acted on, by a cam-operated rod 53, which actuates a plate 49 connected to the shaft 37 by a keyway and moving by slots over screws 50 fixed to

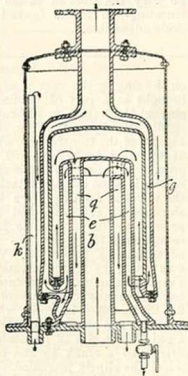
the standard 38. To move the hammers out of action while the turret is rotating, the rod 41 is provided with a block 56, slid by a cam and lever

in a standard 57. The turret is then rotated to its discharging point, cooling sufficiently in the meantime, the discharge being obtained by a cam-plate 89.

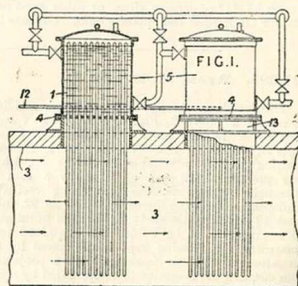


27,302. Rosemeyer, J. Dec. 10

Heating water.—In a feed-water-heater having concentric annular water and steam spaces, the water spaces are enlarged in the upper part of the heater, thus providing a relatively large store of heated water. The water is led into an outer jacket *k* and is withdrawn from the central one *g*, while exhaust steam is passed through annular passages *b*, *e*, *g* in the opposite direction. The various cylinders are removably mounted on each other and on the bed-plate.



27,765. Sidey, D. Dec. 17.



Heating water.—A fuel-economizer has a number of hermetically-sealed tubes 1 containing a little water and extending at one end into a flue 3, through which the waste gases pass, and at the other end into tanks 5 containing the water to be heated, more than half of the length of the tubes extending into the flue 3. The tubes and tanks are arranged so that they are readily detachable

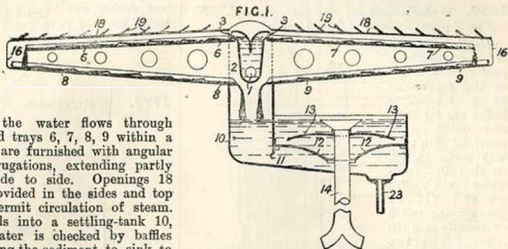
for repairs &c. The tubes are screwed into a tube-plate 4, which forms the bottom of the tank, and is bolted down upon a frame 13 over the flue.

Sediment deposited in the tank is blown off through a pipe 12. The tanks may be situated at one side of the flue, with the tubes horizontal.

28,070. Whysall, J. Dec. 20.

Heating water.—

The water is heated by passing over trays situated in the steam space of the boiler. The feed-water pipe 1 leads into an inlet chamber 2, whence the water flows through mouths 3 over inclined trays 6, 7, 8, 9 within a casing 16. The trays are furnished with angular ribs, or rounded corrugations, extending partly or completely from side to side. Openings 18 with louvers 19 are provided in the sides and top of the casing 16 to permit circulation of steam. The heated water falls into a settling-tank 10, where the flow of water is checked by baffles 11, 12, 13, thus causing the sediment to sink to the bottom. The sediment may be blown off through a pipe 23, and the heated and purified feed-water is delivered by a pipe 14 into the boiler.



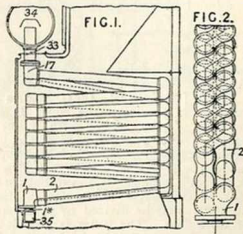
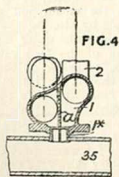
The baffles 12, 13 in the settling-chamber may be replaced by a filtering-medium held between perforated horizontal plates.

A.D. 1908.

924. Dolgolenko, W. Jan. 14

Heating water.—

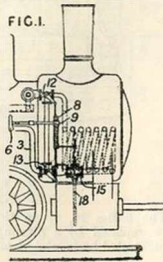
Relates to feed-heater sections of the kind consisting of two or more Belleville elements shaped in the form of flattened helices, the convolutions of one element being arranged in the spaces between the convolutions of the others. Each tube or element 2 communicates separately with the drum 34 and with the feed-collector 35, so that the streams in each element are kept independent of one another for the whole length of



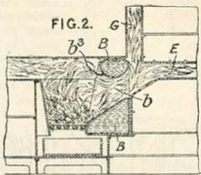
the passage from the collector to the drum. Separate headers 1, 17 and connecting-pieces 1*, 33 may be provided for each tube; but preferably, single headers and connecting-pieces formed with partitions *a*, as shown in Fig. 4, are employed.

1063. Schollmeyer, G. H. Jan. 16. No Patent granted (Sealing fee not paid).

Heating water.—A feedwater-heater 3 situated in the smoke-box of a locomotive boiler has its inlet and outlet pipes provided with two-way cocks 13, 12, so that the feed-water may be passed either through the coil 3 or directly into the boiler. The two cocks are simultaneously actuated through a rack 9 and pinion 8 by a handle 6. As the feed-water is cut off from the coil, a stop-cock 15, also connected to the rack 9, is opened, thus permitting the water in the coil to drain off through a pipe 18. A similar arrangement is provided on each side of the boiler.



1245. Coalbrookdale Co., and Malcolm, W. S. Jan. 18. [Patent of Addition to No. 21,239, A.D. 1906.]

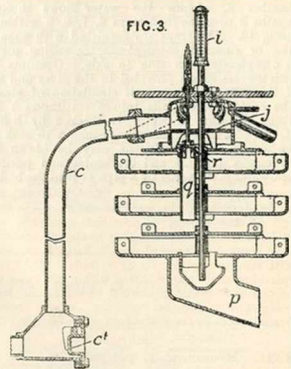


Heating water.—Relates to cooking-ranges &c. of the kind described in Specification No. 21,239, A.D. 1906, [Abridgment Class Stoves &c.], and consists in providing the boiler B at the side or back of the fire-box with a flue *b* of rectangular or other shape in section, the bottom of which is formed by a plane which slopes upwards from about the grate level. The top *b*¹ is made convex as shown. The sides, top, or bottom of the flue may be corrugated to increase the heating-surface, and it may be divided by partitions into two or more flues. The boiler is provided with the cleaning-door and hand-hole described in the Specification referred to above.

1451. Schiessler, J. Jan. 21. Drawings to Specification.

Non conducting coverings.—The submerged metal tube or cylinder 6 which receives submarine sound signals at a ship or lighthouse is sound-insulated, except at its ends, by successive sheaths of rubber, lead, rubber, and brass, and similar layers of materials are used in mounting a microphone and the box containing a resonator.

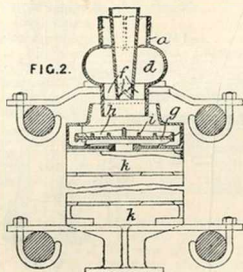
1777. Wilkinson, G. Jan. 27.



Heating water.—The quantity of heat transferred to water in a heater of the tray-and-baffle type, in which the water is heated by direct contact with steam, is varied to suit the varying conditions in the boiler. This may be effected either by varying the area of surface contact between the steam and water, or by varying the time during which the steam and water are in contact, for example by altering the inclination of the plates over which the water flows, or by heating only a portion of the feed-water. The heater may be outside or inside of the boiler. In the arrangement shown, the last-mentioned method is used; water from an inlet *c* passes through perforations in a distributing-plate *j* into the heating-trays, finally escaping through a pipe *p*. A pipe *q*, with a valve *r* operated from outside the boiler, provides a path for water past the upper trays. A thermometer *i* shows the temperature of the outflowing water. The regulation of the valve *r* may be by a thermostat. A flap valve *c*¹ may be fitted in the feed-pipe below the water line to prevent the escape of steam in case of leakage. In modifications, the valve *r* may be replaced by a piston valve in a distribution chamber having outlets leading to

different trays in the heater, or by a sector valve under the distributing-plate *j* controlling the flow through the by-pass pipe *q*.

1889. **Tod, P.** Jan. 28.



Heating water.—The trays *g* in the steam space of the boiler are surmounted by a casing *a* open at the top and bottom and fitted internally with a pipe *d* open at the ends, as shown. The lower end of the pipe *d* is provided externally with inclined ribs *i* arranged zigzag fashion. To prevent splashing, each tray is fitted within an outer tray or casing *k* having a central opening, the whole being secured together by bolts. A pipe leads the heated water to the lower part of the boiler.

2324. **Nicolson, J. T.** Feb. 1.

Heating water.—Relates to water-tube steam generators of the type described in Specification No. 5140, A.D. 1907, [*Abridgment Class Steam*

generators], which are characterized by the employment of flues having a high minimum ratio between their length and hydraulic mean depth, and by the use of high-speed counter-currents of water and furnace gases in the tubes

FIG. 1.

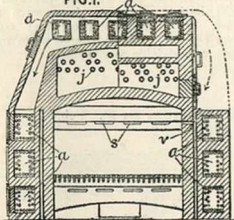
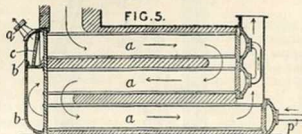


FIG. 5.



and flues. The feed-heating elements are arranged in tiers at the sides of the furnace. Feed-water is forced through pipes *p* into the lower elements and passes upwards through the elements in series to the outlet *q*. The hot gases may be drawn through the flues by a fan connected to the back of the feed-heating sections, or they may be forced through the flues by an air-compressor. The feed-heating elements may be provided with settling-chambers *b*, Fig. 5, containing filtering-screens *c* in order to purify the water before it enters the evaporators.

2381. **Frost, W., and Frost & Co., H.** Feb. 3.

Heating by electricity.—A vulcanizer consists of a flexible band which can be applied to a tyre. Several forms are described. (1) Resistance wires *B*, Fig. 1, are insulated, preferably by D-shaped glass beads, from a metal plate *A*, and are embedded in asbestos, or asbestos and rubber, within a cover *C* of canvas or rubber, which may be vulcanized to the filling. Preferably the plate *A* projects beyond the cover; it may be replaced by gauze. (2) A strip of wire gauze is backed by protective material. (3) Resistance wires are woven into a fabric, at one surface of which

FIG. 1.

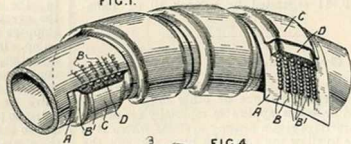
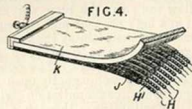
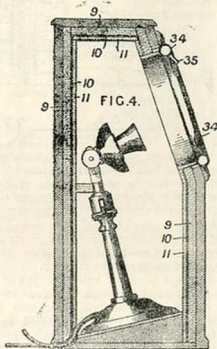


FIG. 4.



they may be exposed. (4) Insulated wires H, Fig. 4, are contained in separate tubes J and soldered to a bar which may be covered by a detachable strip. The tubes, which may be wire spirals, are attached by vulcanizing or otherwise to a cover K. In this and the previous form, a heat-distributing plate or gauze strip may be provided. (5) The vulcanizer may contain a liquid or powder. The resistance wires may have permanent or variable connexions.

2871. Hutton, E. F. Feb. 8.

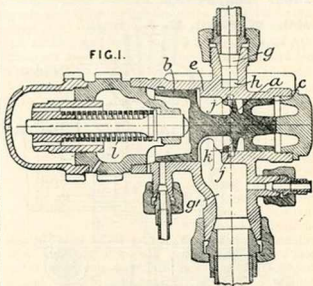


Non-conducting coverings.—To prevent the overheating of telephone conversations, the transmitter of a desk telephone is enclosed in a box provided with a sound-proof lining and with an aperture bordered by a rubber tube, against which the face of the speaker is pressed while talking. The sound-proof lining of the box may consist of two layers of felt 9, 11 separated by a layer 10 of india-rubber.

3169. Gresham, H. E. Feb. 12.

Heating buildings.—Relates to a reducing-valve for delivering fluid at one or other of two predetermined pressures, applicable especially for use in railway-carriage steam-heating systems where it is desirable to allow the steam to blow through the train pipe first at a high pressure and subsequently at a lower pressure for maintaining the temperature in the carriages. The valve *a* has two piston-heads *b*, *c* of different diameters. The outer face of the large piston *b* is permanently open to the atmosphere and is in communication with the outer face of the small piston *c* through a passage fitted with a three-way cock when the valve is

delivering at the higher pressure. In order to adjust the valve for the lower pressure, the three-way cock is operated to put the outer face of the piston *c* into communication with the delivery

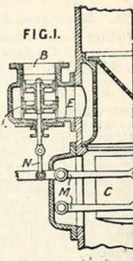


pressure in the outlet *g'*. The inlet pipe *g* terminates in a channel *h* extending round part of the casing and communicating with an annular inner channel *j* through diametrically opposite ports, the fluid being discharged through perforations *k* in the valve *a*. The pressures on the valve act in opposition to a compression coil spring *l* or its equivalent.

3807. Weir, W. Feb. 20.

Heating water.—Relates to feedwater-heaters of the direct-contact type, in which the steam is taken from the low-pressure, receiver and non-return valve is provided for preventing the passage of water to the cylinder in the event of sudden stoppage of the feed-pump. In the present invention, the ordinary non-return valve is replaced by a piston valve or double-beat valve, to prevent noise due to the pulsation of the steam in the pipes.

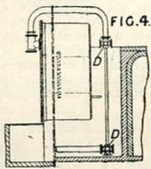
In the form shown in Fig. 1, a float *C* of the displacement type is arranged within the body of the heater above the normal water-level, and is connected by levers *M*, *N* to the spindle of a piston valve *L* working in a passage *B* which communicates with the heater through a passage *E*. Under normal conditions, steam flows freely into the heater, but when the water rises unduly, the float



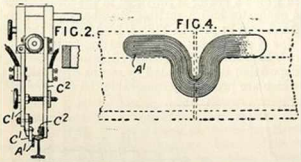
rides and the piston valve closes the passage to the heater. In a modification, the piston valve is replaced by a double-beat valve.

4460. McPhail, E. A. Feb. 27.

Heating water.—A fuel-economizer is placed in the down-take at the back end of a Lancashire, or similar boiler, the object being to prevent, by the heat of the combustion gases in this situation, the deposit of soot on the economizer. Fig. 4 shows its position relatively to the boiler. The headers A, B may be of mild or cast steel or of cast iron. They are provided with flanges D at each end, and may also have intermediate connexions. Either end of each header may serve as an inlet. Holes in the headers opposite to the tubes, and hand-holes are provided for giving access to the interior of the headers, and are closed with plugs.



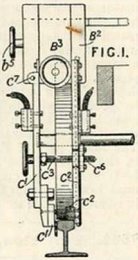
5015. Harrison, G., [Electric Railway Improvement Co.], March 5.



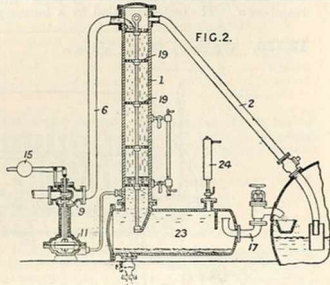
Heating by electricity.—In making homogeneous junctions between two metallic bodies as in bonding rails or similar conductors by an electric current, the bodies are first soldered or brazed together by a heating electric current and then welded by a voltaic arc. This process admits of the efficient use of a laminated or loosely-wound bond. The bond A¹ is clamped to the polished surface of the rail, solder or braze and flux being interposed between the two surfaces. The welding-arm C¹, which may be mounted together with a transformer and rotary converter on a truck having an arm engaging the trolley wire, carries a block c¹ of carbon or other high resistance material. The other arm C² has a copper block c² to rest on the brightly-worn surface of the rail. The bond is first soldered, the block c¹ being in contact with the rail, and the block is then drawn back from the bond to create an arc which welds the bond. The finished bond is shown at the right-hand side of Fig. 4.

5016. Harrison, G., [Electric Railway Improvement Co.], March 5.

Heating by electricity.—In an apparatus for bonding rails or similar conductors by electric welding, soldering, or brazing, a truck is provided with a rail-clamping device comprising two pendent members C¹, C², insulated from each other, movable relatively to each other, and provided with independent electric connexions. The members are connected to a vertical slide B¹, the member C¹ being connected by a hinge c¹. The slide B¹ is vertically adjustable in a block B² which is adjusted transversely by a screw b¹. The member C¹ carries a block of carbon c¹ or other high-resistance material, and the arm C² has a foot c² of laminated copper and rests on the brightly-worn surface of the rail, so that the blocks c¹, c² can be applied with unequal pressures to the bond rail. The members C¹, C² are drawn together by a bolt C³, the nut c³ being insulated from the member C², which is also insulated from the block B². The surface of the rail against which the bond is clamped is abraded to ensure good contact.



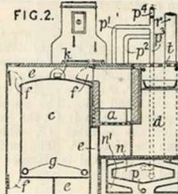
5058. Wyllie, J. March 5. [Patent of Addition to No. 29,565, A.D. 1906.]



Heating water.—In feed-apparatus for boilers and the like of the kind in which the feed-valve 9, Fig. 2, is operated by the weight of water in a stand-pipe 1 acting on a piston or diaphragm 11, as described in Specification No. 29,565, A.D. 1906, [Abridgment Class Steam generators],

the upper part of the stand-pipe communicates with the boiler through a pipe 2 terminating in the boiler at the normal water level, and the feed passes through a separate connexion 17 at the bottom of the stand-pipe. Perforated or serrated horizontal on inclined plates or trays 19 may be placed in the stand-pipe in order to divide the water entering from the supply pipe 6 and expose a large surface to the steam entering from the pipe 2. The impurities in the feed-water are deposited in a settling-chamber 23, which may be provided with baffle plates or screens. Any gases liberated from the feed-water escape from the settling-chamber through an expansion trap 24. The lower part of the stand-pipe, or, as shown in the whole of the stand-pipe, may be expanded to form a storage chamber, which is provided to meet heavy demands for feed-water such as occur in connexion with an electric generating-plant.

7582. Potterton, T. April 6.



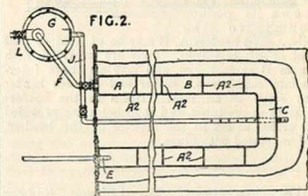
Heating water.—In addition to the ordinary boiler arranged behind the grate *a* in a range, a separate gas-heated boiler *n* is provided beneath a hot-closet *d*, and is connected by pipes with chambers *n'*. The boiler is heated by a burner *p*,

and the products of combustion are preferably conducted away by a flue *r*. Supply and return pipes *p*¹, *p*² from the ordinary boiler are joined to those of the gas-heated boiler.

10,771. Mayhev, A. May 18.

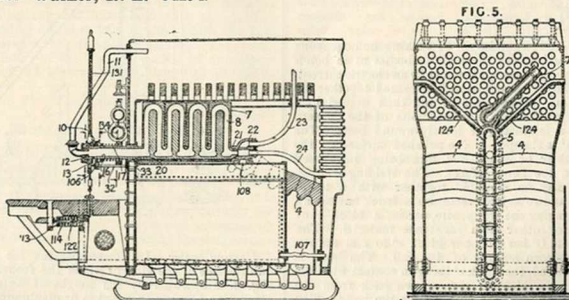
Non-conducting coverings.—A fire-proof fabric consists of a material made from flax, reba or ramie fibre, &c., coated with a composition comprising glue or gelatine, glycerine, chrome alum or bichromate of potash, potato starch and magnesium chloride, to which may be added kaolin &c., a little vegetable oil, and colouring-matter. A compound fabric can be made by building up alternate layers of the fabric and composition.

11,952. Christie, E. J. H., and Neal, T. E. June 2.



Heating water.—Relates to apparatus of the type in which a heater is provided in the steam space of a generator and a settling-chamber on the outside. As shown in plan in Fig. 2, feed enters through a pipe *E* and passes round a heating-trough *A*, *B*, *C*, *B*, in which some of the impurities are deposited, the deposition being assisted by means of partitions *A*² which are preferably removable.

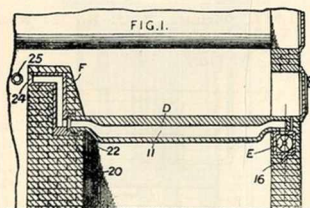
12,158. Walker, R. L. June 4.



Heating water.—A locomotive boiler fire-box is divided at its front portion into two compartments

by a central vertical water-leg 5 surmounted at the rear by an arch 4 and at the front by a pivoted damper 7 provided with a circuitous passage 8, through which feed-water is circulated. The damper is operated by steam or by hand, and causes the gases from one compartment to pass round the rear of the water-leg and over the fire in the other compartment so as to consume smoke in the manner described in Specifications No. 3292, A.D. 1882, and No. 3487, A.D. 1890, [Abridgment Class Steam generators].

12,807. Fleming, J. M., and Chamberlain, H. W. June 15.

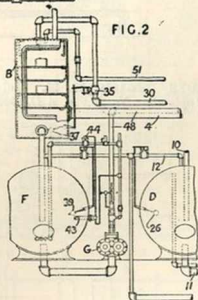
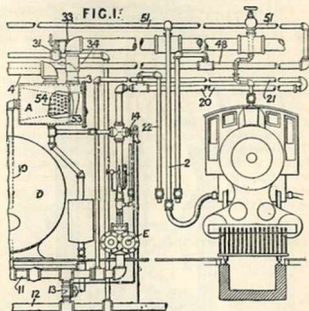


Heating water.—In connexion with steam generator furnaces in which air for secondary combustion is supplied through the hollow fire-bars to the fire-bridge, feed-water may be heated in a pipe 25 which passes in front of the discharge openings 24.

14,840. White, W. July 13.

Heating water.—Relates to a system of pipes and water chambers arranged in a locomotive shed or round-house for emptying or blowing-off and washing-out locomotive boilers, and for refilling the same with feed-water which has been heated by the blown-off products. The steam and water are blown off through a pipe 3, and are conducted to a steam separator A, from which the water is led by a pipe 10 to a collecting-drum D, and from which the steam is conveyed by a pipe 4 to the feed-heating chamber B, Fig. 2. The feed-heating chamber communicates with the cold water main 12 through a pipe 30, which contains a valve 31 adapted to be operated through a flap 34 in the pipe 3 by the flow of the blown-off products. Water for washing-out the boilers is drawn from the drum D through a pipe 11, and is forced by a pump E through a pipe circuit 20, 21, from which depends branches 22 for connexion with the boilers. A thermostat 14 in the outlet pipe of the pump E controls a valve 13, which admits water to the pipe 11 from the cold water main 12. The heated feed-water collects in a drum F, from which it is drawn by a pump G and forced through a pipe circuit 48, 51 containing depending branches 2. A thermostat 43, controlling a valve 44 in a

branch of the steam-supply pipe of the pump G, regulates the temperature of the water in the drum F. Water from the main is admitted to

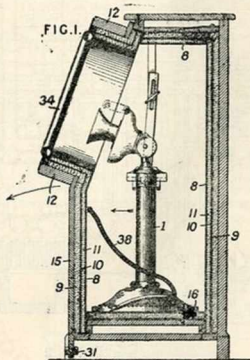


the drums through valves under the control of floats 26, 29. The height of water in the feed-heater is regulated by a float 37 operating a valve 35 in the water-supply pipe.

16,028. Hutton, E. F. July 28.

Non-conducting coverings.—A telephone transmitter is placed in a box similar to that described in Specification No. 2871, A.D. 1908, but the box is provided with a door for the purpose of removing the apparatus, the facial opening in the box being situated on a raised portion, and the box is lined with celluloid or the like. The box has a door 15 with hinges 31, and is lined throughout with layers 9, 11 of felt separated by a lining 10 of rubber or the like and a surface 8 of celluloid or the like to

enable the box to be cleaned. The elliptical extension 12 is similarly lined.



16,072. Haigh, N. N. July 29. [Cognate Application No. 23,974, A.D. 1908, dated Nov. 9.]

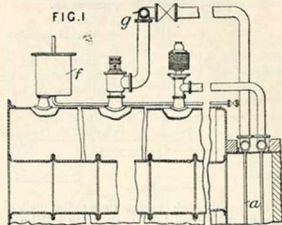
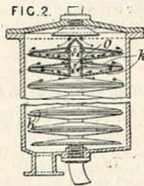


FIG. 2

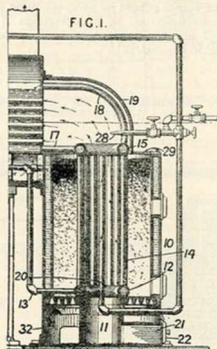


Heating water.—Part of the steam from a superheater *a* placed in the boiler flues is led into direct contact with the feed-water in a heater *f*, and the other part is conveyed to the main steam-pipe *g* between the boiler and the engine.

In the preferred form of feed-heater, Fig. 2, the feed-water flows over a series of concave and convex disks *k*, between which the superheated steam issues

from a central perforated pipe *O*. The feed-water may enter the heater through the perforated pipe, a second pipe being provided for the superheated steam.

18,524. Surrell, J. R. Sept. 3.

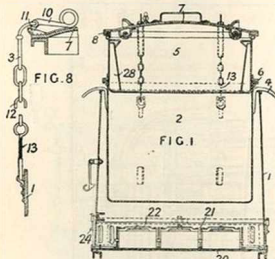


Heating water.—A boiler furnace which can be readily attached to a steam generator is provided with a feedwater-heater which is surrounded by the fuel and forms within it a chamber for the combustion of the gases. Placed centrally within the fuel receptacle 10 and surrounded by the fuel is the feedwater-heater, consisting of upper and lower annular collars 15 and 12 respectively connected by pipes 14. The lower collar 12 is connected to a water supply 13 and the collar 15 to the water and steam spaces of the boiler by pipes 17 and 18 respectively. The heater is attached to a base 11 which is not in communication with the ash-pit 32, but communicates with the external air through the chamber 21 and damper door 22. In modifications, the feedwater-heater consists of a coiled tube extending to the top of the fuel receptacle only, or else into the hood as well.

18,939. Schnyder, J., and Schnyder, L. Sept. 9.

Boiling-pans.—A portable cooking-apparatus comprises a casing 1, on the upper edge of which rests a boiler 2 by means of hooks 4, so as to leave an annular space between the casing and the boiler. The boiler 2 is closed by a second boiler 5, which rests on a packing-ring 6 and is heated by steam passing from the boiler 2 by tubes 28. The boiler 5 is closed by a lid 7 resting on a packing-ring 8 and is fixed in position by chains 12, which connect it to the casing 1. The chains 12 carry curved links 3, on which are loosely pivoted two-armed levers 10, which engage clips 11 fixed on the lid.

The tension of the chains 12 is adjusted by means of screws 13. The bottom 20 of the casing, carrying a spirit lamp 22, is removable through a slide-door 24; ventilation holes, which can be



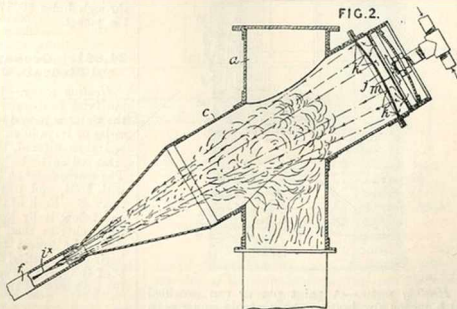
closed by a perforated slide, are provided in the lower part of the casing 1. The apparatus may be pivoted on a carriage and may carry a detachable fire-box instead of the spirit burner. Another boiler may surmount the boiler 5 and communicate with it by tubes 28.

19,139. Trevithick, F. H. Sept. 11. [Cognate Applications No. 20,454, A.D. 1908, dated Sept. 29, and No. 5664, A.D. 1909, dated March 9.]

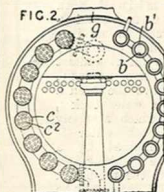
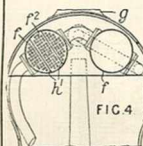
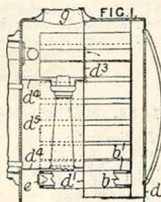
Heating water.—Feed-water is heated in tubular vessels containing smoke-tubes and so arranged in the smoke-box of a locomotive boiler that the smoke-tubes conduct the waste gases to the funnel from the

19,571. Towl, A. Pearce. Sept. 17.]

Heating water.—Smoke from a steam-boiler or other furnace is met in the flue by a series of jets of water converging on a point beyond the flue, which carry the smoke under the surface of water. The flue *a* is met at an angle by a cylinder *c*, at one end of which a series of water-jets issue from holes *k* in a plate *j*, which is so curved as to direct the jets towards a point *i* on the other side of the flue *a*. Behind the plate *j* is a second perforated plate *m*.



front of the smoke-box. Vessels *b*¹, Figs. 1 and 2, containing single smoke-tubes *b* and serving as feed-heaters, may be arranged on one side of the smoke-box, and vessels *c* containing a number of small smoke-tubes *c*² and serving as super-heaters may be arranged on the



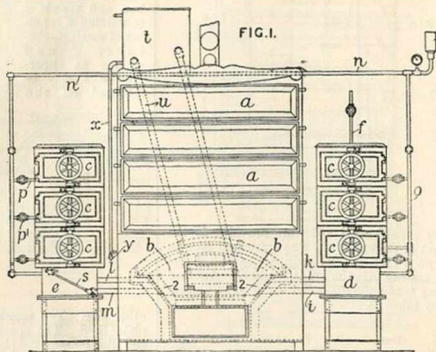
other side. The vessels are mounted in annular plates *d*, *d*¹. The space between the rear plate *d*¹ and the boiler tube-plate is closed by a plate *d*² forming a chamber *d*³, which conducts the gases to the front of the smoke-box. The passage of the gases about and through the heaters is regulated by a damper *d*³ on the annular plate *d*¹ and by adjustable conical plugs *e* at the rear ends of the smoke-tubes *b*. In modifications, one or more vessels *f*, Fig. 4, each divided into three or more compartments by plates *h*¹ and traversed by fire-tubes *f*², are arranged in the upper part of a smoke-box.

The water commingled with the smoke passes down a pipe *f*, leading beneath the surface of water in a reservoir, the water in which, heated by

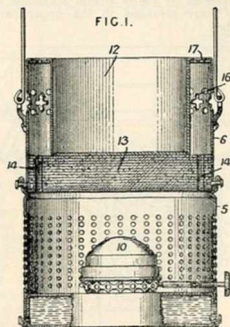
the smoke, may be strained from the impurities of the smoke and passed to the boiler.

21,136. Mabbott, H. E. D. Oct. 7.

Heating water.—A cabinet cooking-oven, in which a vertical series of shelves and doors is arranged above a closed fire-box, is combined with steam cooking-ovens in which food is cooked by the direct contact of live steam. Above the oven *a* is a water tank *t*, in which a supply of hot water is maintained by a pipe *u* which passes into the fire-box *b*. This water may be drawn off by means of a pipe *z* and tap *y*.



23,730. Rose, J. C., and Nicholson, F. E. Nov. 5.



Heating water.—A paint pot or can provided with means for heating the contents comprises a

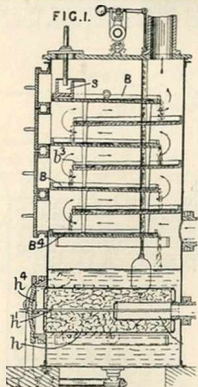
lower perforated portion 5 which carries a lamp 10, and an upper portion 6 secured to the lower portion by a bayonet-joint. The paint receptacle proper 12 fits into the portion 6 in such a manner as to leave an air space between them. Then paint is prevented from burning by an asbestos or like mat 13 having air passages 14. The hot gases escape through holes 16, 17 formed in the outer wall of the jacket.

24,861. Cockayne, J., Cockayne, F., and Medcalf, C. E. Nov. 19.

Heating water.—In apparatus for heating and purifying feed-water by means of exhaust in which the water is passed backwards and forwards over a series of trays in an opposite direction to the steam, and then filtered, the trays and the filter are so arranged as to be easily removable for cleaning. The water enters a tank *s*, where it may be mixed with soda, and passes to the first of a series of trays *B*. Each of the trays *B* is supported on the one below it by legs, the legs at the discharge end being shorter than the others so that the trays slope, the lowest tray *B*⁴ being supported in an horizontal position on ledges. The discharge edges *b*³ of the trays are serrated. A door *h*¹ is provided for withdrawing the filter for cleansing.

(For Figure see next page.)

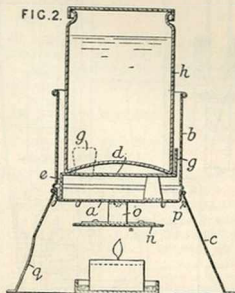
24,861.



25,552. **Dodd, W. R., and Allen & Hanburys.** Nov. 26.

Heating water.—An apparatus in which a substance may be heated, and maintained at a substantially uniform temperature for a considerable time, and especially applicable for the cultivation of bacilli in a culture medium, and used for ex-

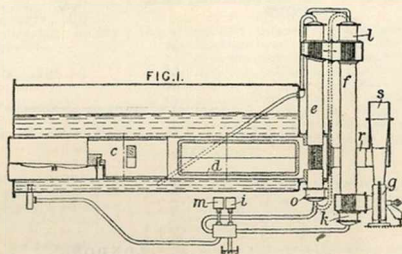
ample in the preparation of soured milk, comprises two horizontal conducting-plates spaced at a suitable distance apart, of which the upper plate supports the receptacle for the substance heated, and the



lower carries an horizontal deflector for spreading the heat from a night-light or the like forming the heating-means. As shown, the lower horizontal plate *a*, to which the deflector *n* is secured by a central bracket *o*, forms the bottom of a cylindrical casing *b*, within which by legs *e*, the upper plate *d* is carried. The receptacle *h* may be retained in place by upturned portions *g* of the upper plate and is preferably provided with a cap. The supporting-stand *c* is conical and provided with air holes *p* and an aperture *g* for inserting the night-light or the like. The apparatus is preferably made of copper.

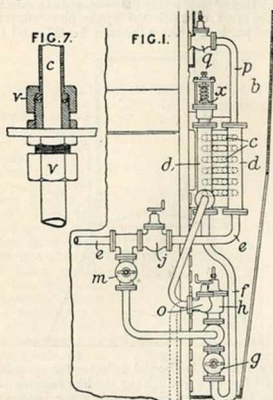
27,269. **Nicolson, J. T.** Dec. 15.

Heating water.—Specification No. 9578, A.D. 1907, [Abridgment Class Steam generators], is referred to. A Cornish or similar boiler is provided with an economizer *f* and an auxiliary evaporator *e*, in which water is forced at a high speed through long and narrow tubes, and hot gases are drawn at a high speed through long and narrow flue passages between the tubes. The ratio of the heating-surfaces of the flues to their cross-sectional area is in all cases not less than 750 to 1, as described in Specification No. 5140, A.D. 1907. Water is forced into the lower header of the economizer by a pump *i*. The water may pass from the upper header *l* of the economizer directly into the boiler, or it may first pass into the lower header *o* of the auxiliary evaporator, where it mixes with hot water drawn from the



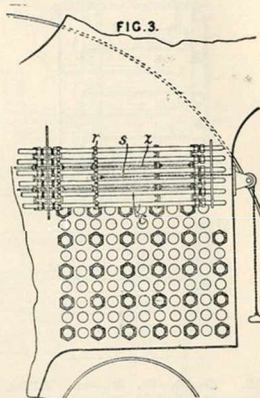
lower part of the boiler by a pump *m*. The hot gases are drawn through the evaporator and economizer by a fan *g*. A by-pass flue *r* leading directly to the uptake *s* is provided for use when lighting-up.

27,760. Harbinger, W. Dec. 21.



Heating water.—A heater in the smoke-box or uptake of a marine boiler has steam and water connexions to enable it to form an auxiliary generator, valves so that it may be cut out, and means for scraping the economizer tubes externally. As shown, the heater comprising tubes *c* connecting headers *d*, is placed in the uptake *b* next the shell of the boiler tubes. A tube *e* connects the heater with the feed pump and the condenser; a tube *f* leads through cocks to the boiler water space; and a tube *p* leads through a cock to the steam space;

a safety-valve *x* is also provided. By opening the cocks *f*, *g*, *h*, only, the water is passed through the heater to the boiler. By opening the cocks *m*, *h* only, the feed is passed direct to the boiler, and the



heater is cut out. By opening the cocks *o*, *g* only, the heater is made to become a part of the steam generator while no feeding takes place. Deposits are removed from the tubes by scrapers *r*, Fig. 3, mounted on the tubes, connected by rods *z*, and moved by a chain *s*. The nuts *v*, Fig. 7, enable the tubes to be removed singly for repairs.

LONDON:

PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, LTD., 34-40, BACON STREET, E.
PUBLISHED AT THE PATENT OFFICE, 25, SOUTHAMPTON BUILDINGS,
CHANCERY LANE, LONDON, W.C.



PATENT OFFICE PUBLICATIONS.

ACTS AND RULES.

- Patents and Designs Act, 1907. 5½d., by post 7d.
Patents and Designs Act, 1908. ½d., by post 1d.
Trade Marks Act, 1905. 3d., by post 4d.
Patents Rules, 1908. 5d., by post 6d.
Designs Rules, 1908. 4d., by post 5d.
Designs Rules, 1908 (second set). 1d., by post 1½d.
Trade Marks Rules, 1906. 5d., by post 6½d.
Register of Patent Agents' Rules, 1908. 1d., by post 1½d.

JOURNALS.

ILLUSTRATED OFFICIAL JOURNAL (PATENTS). Published every Wednesday. 6d., by post 8d. Annual Subscription, including postage, 11. 15s.; Quarterly Subscription, 8s. 9d. CONTENTS:—Official Notices—Applications for Patents—Acceptances of Specifications—Amendments of Specifications—Patents Sealed—Renewal Fees Paid—Patents Void—Applications Abandoned &c.—Specifications &c. Published—Designs Registered—Illustrated Abridgments of Current Specifications—and Reports of Patent &c. Cases.

TRADE MARKS JOURNAL. Published every Wednesday, 6d., by post 8d. Annual Subscription, including postage, 11. 15s. Quarterly Subscription 8s. 9d. CONTENTS:—Illustrations of Trade Marks applied for, and the Names and Callings of Applicants.

1876-1887. Nos. 1 to 500. 1s. each.

1888. Nos. 510 to 561. 1s. 6d. each.

1889-1909. Nos. 562 to 1657. 6d. each, by post 8d.

Subscriptions to the above Journals will not be received for a shorter period than three months, such period to commence on either of the following dates:—

1st January,	1st July, or
1st April,	1st October.

Annual Subscriptions to date from 1st January in each year.

(188) Wt. 7885-2571. 140,000. 6/1910. L. & M. Ltd.

REPORTS of PATENT, DESIGN, and TRADE MARK CASES.

- 1884-1886. 6d. each number, or 10s. per yearly volume.
1887-1888. 1s. each number, or 20s. per yearly volume.
1889-1910. 6d. each number. Price of yearly volumes according to size.
DIGESTS of CASES reported in Vols. I.-V., 1s. each; Vols. VI.-XXVI., 6d. each.
CONSOLIDATED DIGEST OF CASES reported in Vols. I.-X., 5s. per copy, by post 5s. 5d.; Vols. XI.-XVI., 5s. per copy, by post 5s. 4d.; Vols. XVII.-XXII., 5s. per copy, by post 5s. 4d.

PRINTED SPECIFICATIONS OF PATENTS. 1617-1910.

Price per copy 8d., including inland postage. In ordering Specifications the Name of the Patentee, and the Number and Year of the Patent must be given. Specifications are on sale 15 days after advertisement of Acceptance of Complete Specification.

ABRIDGMENT CLASS AND INDEX KEY.

Showing ABRIDGMENT CLASSES and INDEX HEADINGS to which inventions are assigned in the Official Publications of the Patent Office. REVISED EDITION, 1910. 1s., by post 1s. 6d.

ABRIDGMENTS OF SPECIFICATIONS.

- (A).—*Illustrated* volumes of Abridgments of Specifications in accordance with the classification in the ABRIDGMENT-CLASS AND INDEX KEY have been published, or are in course of publication, for nine consecutive periods, dealing completely with all specifications published from 1855 to 1908. There are 146 volumes for each of these nine periods, and the price of each volume is 1s., including inland postage.

List of Illustrated Volumes.

1. ACIDS, ALKALIES, OXIDES, AND SALTS, INORGANIC.
2. ACIDS AND SALTS, ORGANIC, AND OTHER CARBON COMPOUNDS, [including DYES].
3. ADVERTISING AND DISPLAYING.
4. AERONAUTICS.
5. AGRICULTURAL APPLIANCES, FARMYARD AND LIKE, [including the housing, feeding, and treatment of animals].
6. AGRICULTURAL APPLIANCES FOR THE TREATMENT OF LAND AND CROPS, [including Gardening appliances].

7. AIR AND GAS ENGINES.
8. AIR AND GASES, COMPRESSING, EXHAUSTING, MOVING, AND OTHERWISE TREATING.
9. AMMUNITION, TORPEDOES, EXPLOSIVES, AND PYROTECHNICS.
10. ANIMAL-POWER ENGINES AND MISCELLANEOUS MOTORS.
11. ARTISTS' INSTRUMENTS AND MATERIALS.
12. BEARINGS AND LUBRICATING-APPARATUS.
13. BELLS, GONGS, TIGHOONS, SIRENS, AND WHISTLES.
14. BEVERAGES, [excepting Tea, coffee, cocoa, and like beverages].
15. BLEACHING, DYEING, AND WASHING TEXTILE MATERIALS, YARNS, FABRICS, AND THE LIKE, [excepting Dyes].
16. BOOKS, [including Cards and card cases and the like].
17. BOOTS AND SHOES.
18. BOXES AND CASES, [excepting Trunks, portmanteaus, hand and like travelling bags, baskets, hampers, and other wickerwork].
19. BRUSHING AND SWEEPING.
20. BUILDINGS AND STRUCTURES.
21. CASKS AND BARRELS.
22. CEMENTS AND LIKE COMPOSITIONS.
23. CENTRIFUGAL DRIVING, SEPARATING, AND MIXING MACHINES AND APPARATUS.
24. CHAINS, CHAINS, SHACKLES, AND SWIVELS.
25. CHIMNEYS AND FLUES, [including Ventilating-shaft tops].
26. CLOSETS, URINALS, BATHS, LAVATORIES, AND LIKE SANITARY APPLIANCES.
27. COIN-FREED APPARATUS AND THE LIKE.
28. COOKING AND KITCHEN APPLIANCES, BREAD-MAKING, AND CONFECTIONERY.
29. COOLING AND ICE-MAKING, [including Refrigerators and Ice-storing].
30. CUTLERY.
31. CUTTING, PUNCHING, AND PERFORATING PAPER, LEATHER, AND FABRICS, [including the general treatment of paper after its manufacture].
32. DISTILLING, CONCENTRATING, EVAPORATING, AND CONDENSING LIQUIDS, [excepting Steam-engine condensers].
33. DRAINS AND SEWERS.
34. DRYING.
35. DYNAMO-ELECTRIC GENERATORS AND MOTORS, [including Frictional and Influence machines, hand-cranked, and the like].
36. ELECTRICITY, CONDUCTING AND INSULATING.
37. ELECTRICITY, MEASURING AND TESTING.
38. ELECTRICITY, REGULATING AND DISTRIBUTING.
39. ELECTRIC LAMPS AND FURNACES.
40. ELECTRIC TELEGRAPHS AND TELEPHONES.
41. ELECTROLYSIS, [including Electrodeposition and Electroplating].
42. FABRICS, DRESSING AND FINISHING WOVEN AND MANUFACTURING FELTED, [including Folding, Winding, Measuring, and Packing].
43. FASTENINGS, DRESS, [including Jewellery].
44. FASTENINGS, LOCK, LATCH, BOLT, AND OTHER, [including Safes and strong-rooms].
45. FENCING, TRELLIS, AND WIRE NETTING.
46. FILTERING AND OTHERWISE PURIFYING LIQUIDS.
47. FIRE, EXTINCTION AND PREVENTION OF.
48. FISH AND FISHING.
49. FOOD PREPARATIONS AND FOOD-PRESERVING.
50. FUEL, MANUFACTURE OF.
51. FURNACES AND KILNS, [including Blowpipes and blowpipe burners; Smiths' forges and rivet hearths; and Smokes and fumes, Treating].
52. FURNITURE AND UPHOLSTERY.
53. GALVANIC BATTERIES.
54. GAS DISTRIBUTION.
55. GAS MANUFACTURE.
56. GLASS.
57. GOVERNORS, SPEED-REGULATING, FOR ENGINES AND MACHINES.
58. GRAIN AND SEEDS, TREATING, [including Flour and meal].
59. GRINDING, CRUSHING, PULVERIZING, AND THE LIKE.
60. GRINDING OR AB-RADING, AND BURNISHING.
61. HAND TOOLS AND BENCHES FOR THE USE OF METAL, WOOD, AND STONE WORKERS.
62. HARNESS AND SADDLERY.
63. HATS AND OTHER HEAD COVERINGS.
64. HEATING, [excepting Furnaces and kilns; and Stoves, Ranges, and Boilers].
65. HINGES, HINGE-JOINTS, AND DOOR AND GATE FURNITURE AND ACCESSORIES, [excepting Fastenings, Lock, latch, bolt, and other].
66. HOLLOW-WARE, [including Buckets, Pans, Kettles, Saucepans, and Water-cans].
67. HORSE-SHOES.
68. HYDRAULIC ENGINEERING.
69. HYDRAULIC MACHINERY AND APPARATUS, [excepting Pumps and other means for raising and forcing liquids].
70. INDIA-RUBBER AND GUTTA-PERCHA, [including Plastic compositions and Materials of constructive utility, other than metals and stone].
71. INJECTORS AND EJECTORS.
72. IRON AND STEEL MANUFACTURE.
73. LABELS, BADGES, COINS, TOKENS, AND TICKETS.
74. LACE-MAKING, KNITTING, NETTING, BRAIDING, AND PLAITING.
75. LAMPS, CANDELISTICKS, GASALIEHS, AND OTHER ILLUMINATING APPARATUS, [excepting Electric lamps].
76. LEATHER, [including Treatment of hides and skins].
77. LIFE-SAVING, [MARINE], AND SWIMMING AND BATHING APPLIANCES.
78. LIFTING HAULING, AND LOADING, [including Lowering, Winding, and Unloading].
79. LOCOMOTIVES AND MOTOR VEHICLES FOR ROAD AND RAIL, [including Portable and semi-portable engines].
80. MICHANISM AND MILL GEARING.
81. MEDICINE, SURGERY, AND DENTISTRY.
82. METALS AND ALLOYS, [excepting Iron and Steel manufacture].
83. METALS, CUTTING AND WORKING.
84. MILKING, CHURNING, AND CHEESE-MAKING.
85. MINING, QUARRYING, TUNNELLING, AND WELL-SINKING.
86. MIXING AND AGITATING MACHINES AND APPLIANCES, [excepting Centrifugal machines and apparatus].
87. MOULDING PLASTIC AND POWDERED SUBSTANCES, [including Bricks, building and paving blocks, and tiles, and Pottery].
88. MUSIC AND MUSICAL INSTRUMENTS.
89. NAILS, RIVETS, BOLTS AND NUTS, SCREWS, AND LIKE FASTENERS.
90. NON-METALLIC ELEMENTS.
91. OILS, FATS, LUBRICANTS, CANDLES, AND SOAPS.
92. ORDONANCE AND MACHINE GUNS.
93. ORNAMENTS.
94. PACKING AND BALING GOODS.
95. PAINTS, COLOURS, AND VARNISHES.
96. PAPER, PASTERBOARD, AND PAPIER MACHÉ.
97. PHILOSOPHICAL INSTRUMENTS, [including Optical, Nautical, Surveying, Mathematical, and Meteorological Instruments].
98. PHOTOGRAPHY.
99. PIPES, TUBES, AND ROSE.
100. PRINTING, LETTERPRESS AND LITHOGRAPHIC.
101. PRINTING OTHER THAN LETTER-PRESS OR LITHOGRAPHIC.
102. PUMPS AND OTHER MEANS FOR RAISING AND FORCING LIQUIDS, [excepting Rotary Pumps].
103. RAILWAY AND TRAMWAY VEHICLES.
104. RAILWAYS AND TRAMWAYS.
105. RAILWAY SIGNALS AND COMMUNICATING-APPARATUS.
106. REGISTERING, INDICATING, MEASURING, AND CALCULATING, [excepting Signalling and indicating by signals].
107. ROADS AND WAYS.
108. ROAD VEHICLES.
109. ROPES AND CABLES.
110. ROTARY ENGINES, PUMPS, BLOWERS, EXHAUSTERS, AND METERS.
111. SEWAGE, TREATMENT OF, [including Manure].
112. SEWING AND EMBROIDERING.
113. SHIPS, BOATS, AND RAFTS, Div. I.
114. ———— Div. II.
115. ———— Div. III.
116. SHOP, PUBLICHOUSE, AND WAREHOUSE FITTINGS AND ACCESSORIES.
117. SIFTING AND SEPARATING.
118. SIGNALLING AND INDICATING BY SIGNALS, [excepting Railway signals and communicating-apparatus].
119. SMALL-ARMS.
120. SPINNING, [including the preparation of fibrous materials and the doubling of yarns and three wds].
121. STARCH, GUM, SIZE, GLUE, AND OTHER STIFFENING AND ADHESIVE MATERIALS.
122. STREAM ENGINES, [including Details common to fluid-pressure engines generally].
123. STEAM GENERATORS, [excepting Furnaces].
124. STONE, MARBLE, AND THE LIKE, CUTTING AND WORKING.
125. STOPPING AND BOTTLING, [including Bottles, jars, and like vessels].
126. STOVES, RANGES, AND FIREPLACES.
127. SUGAR.
128. TABLE ARTICLES AND APPLIANCES.
129. TEA, COFFEE, COCOA, AND LIKE BEVERAGES.
130. TOBACCO.
131. TOILET AND HAIRDRESSING ARTICLES, AND PERFUMERY.
132. TOYS, GAMES, AND EXERCISES.
133. TRUNKS, PORTMANTEAUS, HAND AND LIKE TRAVELLING BAGS, BASKETS, HAMPERS, AND OTHER WICKER-WORK.
134. UMBRELLAS, PARASOLS, AND WALKING-STICKS.
135. VALVES AND COCKS.



136. VELOCIPEDS.
 137. VENTILATION.
 138. WASHING AND CLEANING CLOTHES, DOMESTIC ARTICLES, AND BUILDINGS.
 139. WATCHES, CLOCKS, AND OTHER TIMEKEEPERS.
 140. WATERPROOF AND SIMILAR FABRICS.
 141. WEARING-APPAREL.
 142. WEAVING AND WOVEN FABRICS.
 143. WEIGHING-APPARATUS.
 144. WHEELS FOR VEHICLES, [excepting Wheels for Locomotives and tramway and traction engines; Railway and tramway vehicles; and Toys].
 145. WOOD AND WOOD-WORKING MACHINERY.
 146. WRITING-INSTRUMENTS AND STATIONERY AND WRITING ACCESSORIES, [including Educational appliances].

LIST OF PERIODS.

- 1855-1866.
 1867-1876.
 1877-1883.
 1884-1888.
 1889-1892.
 1893-1896.
 1897-1900.
 1901-1904.
 1905-1908. (*In course of publication.*)

Volumes in course of publication can be obtained sheet by sheet, as printed, by payment in advance of a subscription of 2s. for each volume including inland postage. The sheets already printed can be seen in the Patent Office Library and in some of the principal provincial Libraries.

1909-1915. (*In preparation.*)

For this period there will be 271 volumes, a full list of which appears in Part I. of the *Abridgment Class and Index Key*.

(B).—Unillustrated volumes of Abridgments of Specifications from 1617 to 1866. For the period before 1855, reference may be made to the unillustrated series of abridgments, but it must be borne in mind that this series is not in accordance with the above classification and does not deal completely with all the published specifications belonging to that period. The price of each volume in this series is 2s., including inland postage.

List of Unillustrated Volumes.

(The numbers within brackets following the titles are the serial numbers of the volumes).

- ACIDS, ALKALIES, OXIDES, AND SALTS. (40.) 1622-1866.
 AERONAUTICS. (41.) 1815-1866.
 AGRICULTURE:—
 ———— Div. I.—FIELD IMPLEMENTS. (61.) 1618-1866.
 ———— Div. II.—BARN AND FARMYARD IMPLEMENTS, [including the cleansing, drying, and storing of grain]. (82.) 1636-1866.
 ———— Div. III.—AGRICULTURAL AND TRACTION ENGINES. (83.) 1618-1866.
 ———— Div. IV.—AIDS TO LOCOMOTION. (7.) 1691-1856.
 AIR, GAS, AND OTHER MOTIVE-POWER ENGINES. (62.) 1635-1866 (*out of print*).
 ANCHORS. (69.) 1796-1866.
 ARTIFICIAL LEATHER, FLOORCLOTH, OILCLOTH, OILSKIN, AND OTHER WATERPROOF FABRICS. (80.) 1627-1866.
 ARTISTS INSTRUMENTS AND MATERIALS. (54.) 1618-1866.
 BLEACHING, DYEING, AND PRINTING CALICO AND OTHER FABRICS AND YARNS. (44.) 1617-1857.
 BOOKS, PORTFOLIOS, CARD-CASES, &c. (43.) 1768-1866.
 BREWING, WINE-MAKING, AND DISTILLING ALCOHOLIC LIQUIDS. (59.) 1634-1866.

- BRICKS AND TILES. (22.) 1619-1899.
 BRIDGES, VIADUCTS, AND AQUEDUCTS. (36.) 1750-1866.
 BRUSHING AND SWEEPING. (74.) 1636-1896.
 CARRIAGES AND OTHER VEHICLES FOR COMMON ROADS. (68.) 1625-1866.
 CARRIAGES AND OTHER VEHICLES FOR RAILWAYS. (46.) 1807-1826.
 CASKS AND BARRELS. (74.) 1797-1896.
 CHAINS, CHAIN CABLES, &c. (90.) 1634-1866.
 COOKING, BREAD-MAKING, AND CONFECTIONERY. (61.) 1631-1866.
 CUTTING, FOLDING, AND ORNAMENTING PAPER. (12.) 1626-1866.
 DRAINS AND SEWERS. (1.) 1619-1866.
 DRESSING AND FINISHING WOVEN FABRICS, AND MANUFACTURING FELTED FABRICS. (91.) 1620-1866.
 ELECTRICITY AND MAGNETISM, THEIR GENERATION AND APPLICATIONS. (15.) 1769-1857.
 ELECTRICITY AND MAGNETISM:—
 ———— Div. IV.—ELECTRIC LIGHTING, IGNITING, AND HEATING. (65.) 1839-1876.
 ———— Div. V.—ELECTRODEPOSITION AND ELECTROLYSIS. (96.) 1805-1876.
 ———— Div. VI.—ELECTRIC MOTIVE-POWER ENGINES AND SIMILAR APPARATUS. (97.) 1837-1876.
 FARRIERY. (53.) 1719-1866.
 FIRE-ARMS AND OTHER WEAPONS, AMMUNITION, AND ACCOUTREMENTS. (104.) 1588-1858.
 FIRE ENGINES, EXTINGUISHERS, ESCAPES, ALARMS, &c. (88.) 1625-1866.
 FURNITURE AND UPHOLSTERY. (39.) 1620-1866.
 GRINDING GRAIN, AND DRESSING FLOUR AND MEAL. (78.) 1622-1866.
 HARBOURS, DOCKS, CANALS, &c. (77.) 1617-1866.
 HINGES, HINGE-JOINTS, AND DOOR SPRINGS. (50.) 1775-1866.
 HYDRAULICS. (32.) 1617-1866.
 ICE-MAKING MACHINES, ICE SAFES, AND ICE HOUSES. (85.) 1819-1866.
 LACE-MAKING, KNITTING, NETTING, BRAIDING, AND PLAITING. (29.) 1675-1866.
 LAMPS, CANDLESTICKS, CHANDELIERS, AND OTHER ILLUMINATING APPARATUS. (41.) 1637-1866.
 LETTERPRESS AND SIMILAR PRINTING. (13.) 1617-1857.
 LOCKS, LATCHES, BOLTS, AND SIMILAR FASTENINGS. (60.) 1774-1866.
 MANUFACTURE OF IRON AND STEEL. (6.) 1620-1866.
 MANUFACTURE OF PAPER, PASTEBOARD, AND PAPIER MACHE. (11.) 1665-1857.
 MANURE. (3.) 1721-1855.
 MARINE PROPULSION, [excepting Sails]. (5.) 1618-1857.
 MASTS, SAILS, RIGGING, &c. (73.) 1625-1866.
 MEDICINE, SURGERY, AND DENTISTRY. (25.) 1620-1866.
 METALLIC PIPES AND TUBES. (70.) 1741-1866.
 METALS AND ALLOYS, [excepting Iron and Steel]. (18.) 1623-1859.
 MILKING, CHURNING, AND CHEESE-MAKING. (72.) 1777-1866.
 MINING, QUARRYING, TUNNELLING, AND WELL-SINKING. (71.) 1618-1866.
 MUSIC AND MUSICAL INSTRUMENTS. (26.) 1694-1866.
 NAILS, RIVETS, BOLTS, SCREWS, NUTS, AND WASHERS. (68.) 1618-1866.
 NEEDLES AND PINS. (45.) 1755-1866.
 OILS, FATS, LUBRICANTS, CANDLES, AND SOAPS. (27.) 1617-1866.
 OPTICAL, MATHEMATICAL, AND OTHER PHILOSOPHICAL INSTRUMENTS. (76.) 1636-1866.
 PAINTS, COLOURS, AND VARNISHES. (50.) 1618-1866.
 PHOTOGRAPHY. (19.) 1839-1866.
 PLATING OR COATING METALS WITH METALS. (23.) 1837-1866.
 POTTERY. (24.) 1626-1861.
 PREPARATION AND COMBUSTION OF FUEL. (30.) 1620-1865 (*out of print*).
 PREPARATION AND USE OF TOBACCO. (42.) 1721-1866.
 PREPARATION OF INDIA-RUBBER AND GUTTA-PERCHA. (16.) 1791-1866.
 PREPARING AND CUTTING CORK, BOTTLING LIQUIDS, &c. (56.) 1777-1866.
 PRESERVATION OF FOOD. (4.) 1691-1855.
 PRODUCTION AND APPLICATIONS OF GAS. (17.) 1681-1858.
 PURIFYING AND FILTERING WATER. (79.) 1675-1866.
 RAILWAYS. (33.) 1803-1866.
 RAILWAY SIGNALS AND COMMUNICATING APPARATUS. (63.) 1810-1866 (*out of print*).
 RAISING, LOWERING, AND WEIGHING. (31.) 1617-1866.
 ROADS AND WAYS. (35.) 1619-1866.
 SADDLERY, HARNESS, STABLE FITTINGS, &c. (34.) 1625-1866.
 SAFES, STRONG ROOMS, TILLS, &c. (64.) 1801-1866.
 SEWING AND EMBROIDERING. (2.) 1755-1866.
 SHIP BUILDING, REPAIRING, SHEATHING, LAUNCHING, &c. (21.) 1618-1860.
 SKINS, HIDES, AND LEATHER. (55.) 1627-1866.
 SPINNING. (28.) 1624-1863 (*out of print*).
 STARCH, GUM, SIZE, GUM, &c. (100.) 1717-1878.
 STEAM CULTURE. (63.) 1618-1856. See also AGRICULTURE, Divs. I. and III.

STEAM ENGINEER. (49.) 1613-1859 (in 2 vols.).
 STEERING AND MANŒUVRING VESSELS. (75.) 1763-1896.
 SUGAR. (85.) 1633-1866.
 TEA, COFFEE, CHICORY, CHOCOLATE, COCOA, &c. (87.)
 1704-1866.
 TOYS, GAMES, AND EXERCISES. (51.) 1672-1865.
 TRUNKS, PORTMANTEAUS, BOXES, AND BAGS. (84.)
 1853-1895.
 UMBRELLAS, PARASOLS, AND WALKING-STICKS. (47.)
 1786-1866.
 UNFERMENTED BEVERAGES, AERATED LIQUIDS, MINERAL
 WATERS, &c. (86.) 1774-1866.
 VENTILATION. (52.) 1832-1893.
 WARMING AND WRINGING MACHINES. (89.) 1691-1896.
 WATCHES, CLOCKS, AND OTHER TIMEKEEPERS. (9.)
 1661-1866.
 WATER CLOSETS, EARTH CLOSETS, URINALS, &c. (63.)
 1715-1896.
 WEARING-APPAREL.—DIV. I.—HEAD COVERINGS. (65.)
 1637-1896.
 ————DIV. II.—BODY COVERINGS. (66.) 1671-1896.
 ————DIV. III.—FOOT COVERINGS. (67.) 1653-1896.
 ————DIV. IV.—DRESS FASTENINGS AND JEWELLERY.
 (68.) 1631-1896.
 WEAVING. (20.) 1620-1859.
 WRITING INSTRUMENTS AND MATERIALS. (37.) 1635-1896.

INDEXES.

1617-1852.

NAME INDEX. 5s. by post 5s. 6d.
 SUBJECT-MATTER INDEX. 2 vols. 10s., by post 10s. 10d.

1852-1863.

NAME INDEX.
 1852-1856, 1864-1870. 2s. 6d. each yearly volume, by post
 2s. 10d.
 1871-1873. 2s. each yearly volume, by post 2s. 3d.
 1874-1883, 1874-1883. *Out of print.*

SUBJECT-MATTER INDEX.
 1852-1855. 5s. each yearly volume, by post 5s. 4d.
 1856-1883. *Out of print.*

1884 and subsequent years.

NAME INDEX.
 1881. *Out of print.*
 1885-1888. 2s. each yearly volume, by post 2s. 4d., 1887.
Out of print.
 1889-1904. See Illustrated Official Journals, Nos. 52, 108,
 160, 212, 255, 317, 370, 423, 475, 527, 579, 631, 683, 735, 789,
 838, 891, 943, 995, 1048, and 1099, 6d. each, by post 8d.
 Journals Nos. 108, 160, 212, and 423, *out of print.*

NUMBER INDEX OF PROCEEDINGS ADVERTISED
 ON COMPLETE SPECIFICATIONS AND PATENTS.
 1901-1909. See Illustrated Official Journals Nos. 687, 739,
 790, 842, 894, 946, 998, 1050, and 1103, 6d. each, by post 8d.

SUBJECT-MATTER INDEX OF ACCEPTED COMPLETE
 SPECIFICATIONS DATED IN THE YEARS
 NAMED.

1881. 7s., by post 7s. 5d.
 1885-1888. *Out of print.*
 1887-1891. 3s. 4d. each yearly volume, by post 3s. 8d.
 1891-1903. 2s. each yearly volume, by post 2s. 4d.

MONTHLY SUBJECT-MATTER INDEX OF AC-
 CEPTED COMPLETE SPECIFICATIONS.
 Consolidated in March, June, September, and Decem-
 ber, 1s. each part. Annual Subscription. 5s., by post
 7s. 6d.

NOTICE.—The above publications are sold at the PATENT OFFICE, 25, Southampton Buildings, Chancery Lane, W.C., and will be forwarded by post on receipt of the price and of the postage (if any is charged). All Subscriptions must be paid in advance. Sums amounting to 6d. or more must be remitted by Postal or Post Office Order, payable to the COMPTROLLER-GENERAL, at the above address. Postage stamps sent in payment of any amount exceeding 5d. will be returned. Deposit accounts may be opened, the minimum deposit being £2.

PATENT OFFICE LIBRARY.

CATALOGUE.

Authors. 1898. 1l. 6s. 0d.; by post, 1l. 6s. 8d.
 ————Supplement I-2 (1898-1909).
 Subjects. 1883. 15s. 8d.; by post, 16s. 2d.
 (*New edition in preparation. MS. may be consulted in
 Library.*)

GUIDES.

- 6d. each, including inland postage.
1. Key to the classifications of the Patent Specifications of France, Germany, Austria, Norway, Denmark, Sweden, and Switzerland. (*Second Edition.*)
 2. Fine and Graphic Arts (including Photography) and Art Industries. Subject List. (*Second Edition.*)
 4. Guide to the Search Department of the Patent Office Library. (*Third Edition.*)
 5. Key to the German Patent Classification, 1900. (*For revised Classification, dated 1904, see No. 1 above.*)
 6. Chemistry and Chemical Technology. Subject List.
 7. Chemical Industries; including Destructive Distillation, Mineral Oils and Waxes, Gas-lighting, Acetylene; Oils, Fats, Soaps, Candles, and Perfumery; Paints, Varnishes, Gums, Resins; Paper and Leather Industries. Subject List.
 8. Class List and Index of the Periodical Publications in the Patent Office Library. (*Second Edition.*)
 9. Domestic Economy, Foods, and Beverages; including the Culture of Cacao, Coffee, Barley, Hops, Sugar, Tea, and the Grape. Subject List.
 10. Textile Industries and Wearing-apparel; including the Culture and Technology of Textile Fibres. Subject List.
 11. General Science Physics, Sound, Music, Light, Microscopy, and Philosophical Instruments. Subject List.
 12. Architecture and Building Construction. Subject List.
 13. Mineral Industries and Allied Sciences. Subject List.
 14. Electricity, Magnetism, and Electro-Technics. Subject List.
 15. Agriculture, Rural Economy, and Allied Sciences. Subject List.
 16. Heat and Heat Engines, (excluding Marine Engineering). Subject List.
 17. Aerial Navigation and Meteorology. Subject List.
 18. Military and Naval Arts; including Marine Engineering. Subject List.
- NEW SERIES.
- AA-BE.—Reference works (Biography; Bibliography; Topography, etc.). Subject List.
 EF-BL.—Patent and Copyright Laws. Subject List.
 Others in preparation.



THE
MUSEUM
OF
ARTS
AND
SCIENCE

