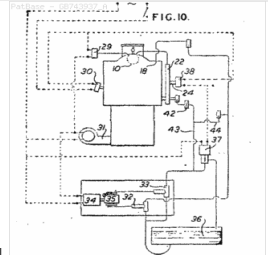
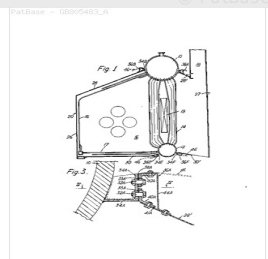


1) Family number: 20140815 (GB743937A)**IMPROVEMENTS RELATING TO STEAM GENERATORS**

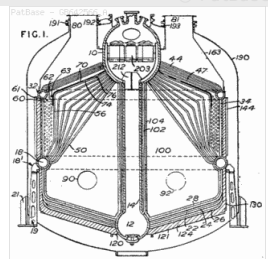
Abstract: Source: GB743937A 743,937. Automatic control systems for boilers. RODGERS and GEARY, Ltd. May 14, 1954 [July 2, 1953], No. 18349/53. Class 38 (4). [Also in Group XIII] In a steam generator comprising two tubulous sections, viz. a water-tube section and a separate forced flow, monotube section from which superheated steam is injected underwater into the water-tube section to evaporate water therein (see Group XIII), the steam pressure is controlled by a device 29 which is responsive to pressure variations in the steam drum 10 and is operable to maintain the pressure at a pre-set value by making or breaking the supply circuit of a motor 31 which feeds oil to the generator furnace burners and of a motor 34 supplying water to the monotube and water-tube sections of the boiler. The water level in the water-tube section is regulated by apparatus comprising an upright standpipe 22 disposed adjacent the boiler and connected at the top and bottom respectively to the drum 10 and to the lower part of the water-tube section so that it contains water to a level corresponding with that in the section. At the water level the standpipe has a branch pipe 24 carrying a level control mechanism 38 having electrical contacts which close when steam reaches a thermally-responsive element in the mechanism and open when the water, which is at a lower temperature, takes the place of the steam, the closing and opening of the contacts controlling the operation of a solenoid valve 37 regulating the flow of water from an auxiliary feed pump 33 which, together with the main pump 32 is driven through a gear-box 35 by motor 34. By means of the gear-box the main and auxiliary pump outputs are adjusted so that together they exceed the evaporative capacity of the burner whereas the main pump alone has an output which is less than this capacity. The main pump delivers water directly to the inlet end 18 of the monotube and, through a restrictor 42, to the watertube section. Normally, the water level in the latter is such that the contacts of mechanism 38 are open so that valve 37 remains open and pump 33 returns water to tank 36. If the level falls and steam reaches the element actuating the contacts they close to complete the circuit to the solenoid of valve 37 which thereupon closes so that pump 33 delivers water through line 43 to the water tube section and through line 44 to augment the supply of water to the monotube section. When the element is again immersed due to the rising water level valve 37 is opened to restore the previous water feed conditions. The boiler is protected against overheating due, for example, to failure of the water supply, by the provision of a thermally-responsive switch 30 connected to one of the tubes of the water tube section, the switch being operable to break the supply circuit to motors 31, 34 if an excessive temperature occurs in the tube. Specification 559,662, [Group XXIX], is referred to.

Probable Assignee: RODGERS AND GEARY LTD**Earliest Publication Date:** 19560125**2) Family number: 20209804** (GB805483A)**IMPROVEMENTS IN AND RELATING TO WATER TUBE BOILERS**

Abstract: Source: GB805483A 805,483. Water-tube steam boiler casings. FOSTER WHEELER, Ltd. Aug. 27, 1956 [Aug. 26, 1955], No. 24603/55. Class 123(2) In a marine-type steam boiler comprising a furnace 16 lined with steam generating tubes 15, 17 extending from a lower water drum 12 to an upper steam and water drum 10 and wherein the combustion gases leave the furnace through two banks of vertical tubes between which is disposed a superheater 19 and discharge from the boiler through a stack 18, the boiler has a gastight metal casing 20 and the top and bottom parts of the drums 10, 12 project respectively through the casing roof 28 and floor 30 whilst their ends extend beyond the casing side plates, expansion joints which allow of vertical and longitudinal movements of the drum 10 and longitudinal movements of the drum 12 with respect to the casing being provided. Sealing boxes 36A, B, E, F which are formed around each joint are supplied with air at a pressure above that in the furnace to prevent leakage of combustion gases into the boiler room. The longitudinal expansion joint between the drum 10 and the casing roof portion to each side thereof is shown in Fig. 3. An angle plate 34A is welded to the drum and the roof portion 28¹ (or 28) is bolted to an angle iron 40A provided with a row of enlarged or inclined and elongated holes 33A through which pass bolts 32A slidably securing the angle iron to the plate 34A. A sealing plate 44A is secured to the easing and to a second angle iron 42A which is also slidably secured to the plate 34A. A similar joint which allows of vertical and longitudinal movement is provided where one side plate of the casing meets the periphery of the drum 10 whilst the joints between the other side plate and the drum 10 and between the floor portions 30, 30¹ and the drum 12 are made directly between a plate welded to the drum and the casing and are covered by a sealing box formed from a U-section channel member, these joints allowing for relative movement in the longitudinal direction only.

Probable Assignee: FOSTER WHEELER LTD**Earliest Publication Date:** 19581210**3) Family number: 19589902** (GB642566A)**IMPROVEMENTS IN OR RELATING TO TUBULOUS BOILERS**

Abstract: Source: GB642566A [Class 123(ii)] A water-tube steam boiler comprises an upper steam-and-water chamber 10 and a lower water chamber 12 which are connected by steam-generating tubes through, for example, intermediate annular headers 18, 32 and also by a large diameter vertical downcomer 14, an annular furnace chamber 100 which surrounds said downcomer and is fixed preferably by a pair of tangentially-directed burners 90, 92, and a superheater tube bank 60-63. The downcomer 14 is screened by a ring of tubes 102 which extends between the chambers 10, 12 and is covered with refractory material 104, and a vortex inhibitor 212 may be located at the top thereof. In the specific construction shown, with intermediate headers 18, 32, tubes 22, 24, 26 covered with refractory 28 connect the chamber 12 and header 18, tubes 34, the two headers, and rings of tubes 50, 56 and 44, 47, respectively, connect the said headers and the chamber 10. The superheater tubes 60-63 extend through the annular passage between the tubes 34 and 56, and a ring baffle 70, preferably provided with spaced openings 74, 76, is supported by the tubes 56 and serves to distribute the furnace gases through the upper part of the boiler. The boiler has an inner sheet metal casing, formed in sections such as 120, 121, 130, 144, 163 and lined with thermal insulation 124, and also an outer air casing 190 with expansion joints 191, 193 and 192 at the flues 80, 81 of the inner casing and chamber 10 respectively. The boiler is supported by structural members 19 through pedestal type brackets 18' welded to the header 18, and the outer casing thereof by members 21 adjacent the members 19. In a modification, not shown, the header 32 and associated tubes are dispensed with, and superheater and economizer tube banks are disposed in the flues which are of arcuate shape. Separators 203, for example of the kind described in Specification 542,610, [Group II], are preferably fitted in the chamber 10.



Probable Assignee: BABCOCK AND WILCOX LTD

Earliest Publication Date: 19500906

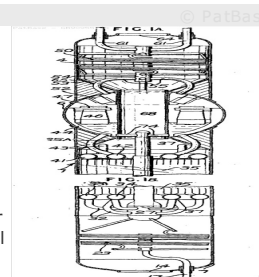
4) Family number: 23080430 (GB909557A)

BOILER FOR THE RECOVERY OF THE HEAT OF A FLUID UNDER PRESSURE

Abstract: Source: GB909557A 909,557. Water-tube steam boilers; superheaters. BABCOCK and WILCOX Ltd. July 14, 1961 [July 16, 1960], No. 25686/61. Classes 123 (2) and 123 (3). A tubulous boiler in which the heating fluid e.g. the coolant gas from a nuclear reactor, is under pressure comprises a pressure vessel through which the fluid passes and has a lower part enclosing an economiser and steamgenerating tube bank, an intermediate steam and water separating drum, part of the wall of which forms part of the wall of the pressure vessel, and an upper part enclosing a steam superheating tube bank, the connections to the drum from the tube banks being enclosed within the vessel. Fig. 1A shows the upper part 4 of a cylindrical pressure vessel together with a spherical steam and water drum 6 and Fig. 1B the lower part 7 of the vessel. Water enters the boiler by a pipe 17 and rises through a helicoidal economiser tube bank 23 into a bulbous chamber 27 in which it mixes with water returned from the steam and water separating drum 6. The mixed water enters a helicoidal steam generating tube bank 35 through risers 32 and headers 33 and 34, the emergent steam and water passing through headers 41 and 42 and riser pipes 43 into an outer annular compartment 44 of the steam and water drum 6. The mixture of steam and water passes into a number of centrifugal separators 46 the water being discharged into the lower part of the drum 6 and returning via pipes 74 and downcomer pipe 37 to the mixing chamber 27. The steam passes through primary driers 47, secondary driers 52 and enters a helicoidal superheating tube bank 50 through riser pipes 53 and headers 54 and 55. Superheated steam leaves the boiler by pipes 61 at its upper end. The heating gases enter the pressure vessel at this end through an opening 64, flow downwardly past the superheating tube bank 50, through a duct 68 which extends through the drum 6, frusto-conical plates 65 and 65A funnelling the gases respectively to and from the duct 68, past the steam generating and economiser tube banks 35 and 23, and leave the vessel through an opening 14 at the lower end. External connections to the steam and water drum 6, e.g. for a level gauge and for balancing pipework between drums when operating boilers in parallel, may be made without passing through the wall of the pressure vessel itself.

Probable Assignee: BABCOCK AND WILCOX FRANCE

Earliest Publication Date: 19610825



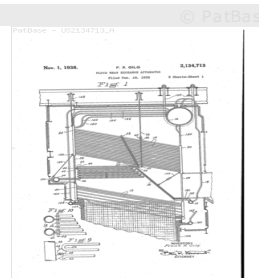
5) Family number: 21625192 (US2134713A)

FLUID HEAT EXCHANGE APPARATUS

Abstract: Source: US2134713A 1. In a water tube steam boiler, a bank of tubes of a superheater having series connected multiple loops, means constituting top supports for the superheater at its ends. metallic intertube connectors rigid with successive tubes of the low temperature section of said bank and forming with said tubes a structure in the nature of a truss, and slip hangers supporting the remaining tubes of said bank from said truss.

Probable Assignee: BABCOCK AND WILCOX CO

Earliest Publication Date: 19381101



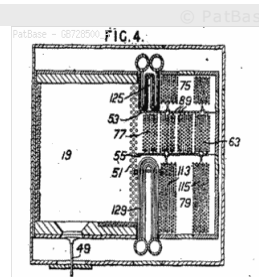
6) Family number: 19686737 (GB728500A)

IMPROVEMENTS IN OR RELATING TO TUBULAR MARINE BOILERS

Abstract: Source: GB728500A 728,500. Water-tube steam boilers; superheating. BABCOCK and WILCOX, Ltd. Jan. 26, 1951 [Jan. 27, 1950], No. 2165/50. Classes 123 (2) and 123 (3). In a superheating boiler three parallelconnected gas passes which lead from a combustion chamber each contain vapour generating tubes, and main and auxiliary superheaters are each confined to a single pass; dampers control the distribution of furnace gases between the passes. As shown, fuel enters the combustion chamber 19 from burners 49 and the hot gases flow laterally through the water tube screen 51 into the three parallel gas passes 75, 77, 79 in each of which a damper controls the gas flow. The passes are separated by baffle walls 53, 55 comprising tubes 89, the spaces between which are filled with refractory material. Pass 75 contains the auxiliary superheater 125 and the vapour generating tube banks 113, 115. Pass 77 contains the tube bank 63. Pass 79 contains the main superheater 129 and the tube banks 113, 115. Cooling air enters the casing at the rear and flows round the boiler to the front where it is fed to the burners. Adjustment of the three dampers together with a fourth associated with an economiser is effected from a single hand wheel, not shown, mechanically connected to the dampers.

Probable Assignee: BABCOCK AND WILCOX LTD

Earliest Publication Date: 19550420



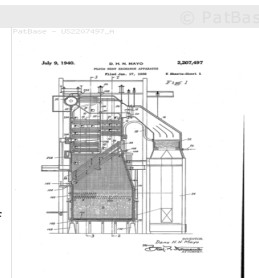
7) Family number: 21264090 (US2207497A)

FLUID HEAT EXCHANGE APPARATUS

Abstract: Source: US2207497A 1. A delayed coking unit charge heater for heating a feedstock to delayed coking temperature comprising a heating vessel having upper and lower radiant heating sections, a vertical tube bank between and spaced apart from opposite side walls of said vessel through which said feedstock is transported, said tube bank comprising a back and forth continuous path of horizontal tubing suspended generally in a first vertical plane in said vessel and extending from an inlet in said upper radiant section of said heating vessel downwardly to an outlet located in said lower radiant section of said heating vessel, and a plurality of burners located in the lower radiant section of said vessel on each side of said tube bank so as to be capable of providing and directing sheets of flame upwardly on opposite sides of said tube bank, said sheets of flame each individually lying in a plane generally parallel to the plane in which said tube sheet is suspended. ,

Probable Assignee: BABCOCK AND WILCOX CO

Earliest Publication Date: 19400709



8) Family number: 19692304 (GB759471A)

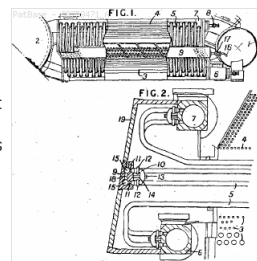
IMPROVEMENTS IN OR RELATING TO STEAM SUPERHEATERS FOR MARINE AND LIKE WATER TUBE

BOILERS

Abstract: Source: GB759471A 759,471. Steam superheaters. SUPERHEATER CO., Ltd., and MELHUISE, H. May 3, 1951 [May 3, 1950], No. 10906/50. Class 123(3). In a superheater, for a water-tube steam boiler, comprising tubular elements 5 extending between steam inlet and outlet headers 6, 7 and wherein each element is formed of at least two U-shaped loops coupled by an inclined connecting bar 9 which is common to all the elements and has passages 11, 11' for effecting communication between the appropriate ends of the loops of said element, the bar 9 is provided with one or more longitudinal drainage ducts 15 which communicate with the passages 11 and also with one another through ducts 18 and is fitted at its lower end with a drain valve 17. The bar 9 may be disposed within the boiler casing 19 or between the plates of the latter, and the tube loops are secured to it by clamps 10, each clamp engaging collars 12 on the two loops and being tightened by a nut 13 on a stud 14 screwed thereinto, or by welding them to stub tubes which are themselves welded to the bar 9. All the loops of an element may be made of mild steel, but preferably the outlet loops are of heat-resisting alloy steel.

Probable Assignee: SUPERHEATER CO LTD

Earliest Publication Date: 19561017



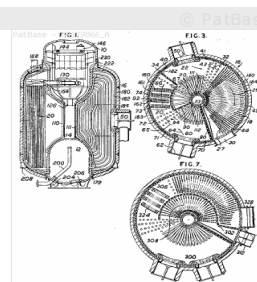
9) Family number: 19827258 (GB679866A)

IMPROVEMENTS IN OR RELATING TO TUBULOUS VAPOUR GENERATORS

Abstract: Source: GB679866A 679,866. Water-tube steam and c. boilers: superheaters. BABCOCK AND WILCOX, Ltd. Jan. 31, 1950 [Feb. 1, 1949], No. 2482/50. Classes 123(ii) and 123(iii) A steam and c. boiler comprises an upper steam-and-water drum 10 and a lower water chamber 12 which are integrally connected by an axial downcomer 14 of large diameter, a bank 18 of steam-generating tubes, a superheater 20, and a surrounding wall 16 which includes a pressure-resistant metal shell 180, having inner and outer layers 182, 184 of thermal insulation, and is provided with one or more openings, for example two, 50, 62 for burners discharging into furnace chambers 22, 60 and one or more gas outlets 30. As shown the tube bank 18 and superheater 20 are screened from the respective furnaces by team-generating tubes 32, 94, the wall 16 by tubes 40...44 and 70...74, and the downcomer 14 by tubes 110...113, all these tubes extending between the upper drum 10 and lower chamber 12; moreover the superheater 20 is screened from the furnace 22 by a baffle or tube wall 34, of the kind described, for example, in Specification 433,834, and similar walls 80 and 90, 92 define the furnace 60. The arrangement is such that gases from the furnace 60 will flow in the direction of the arrows 64...67 through the superheater 20 and then above, below and around the baffle 34 to the furnace 22 where they will mix with the gases therein and flow in the direction 26, 27, through the tube bank 18 to the outlet 30. The superheater 20 comprises banks of tubes 160...163 formed by reversely-bent tubes connected between an inlet header 154, having inlet ducts 144, 146 leading from the steam space of the drum 10, and an outlet header, not shown, with steam take-off 168. Feed-water is supplied to the chamber 12 through an inlet 200, and the drum 10 is preferably fitted with the steam-and-water separator 130 described in Specification 679,867, [Group II] and a vortex inhibitor 126. The boiler is supported by elements 204, 206 associated with the chamber 12 and other elements 208 secured around the shell 180, the lower end of the latter being fixed to the chamber 12 at 179 and its upper end 222 having sliding contact, through a sealing gasket 230, with the drum 10. Several modifications are described, including one, Fig. 7, in which there is provided a single furnace 300, the gases therefrom being divided by a partition 302 to flow through two passes 306, 308 respectively to damper-controlled outlets 328, 312. The pass 306 locates a superheater 324 followed by steam-generating tubes, and the pass 308 a bank of steam-generating tubes only.

Probable Assignee: BABCOCK AND WILCOX LTD

Earliest Publication Date: 19520924



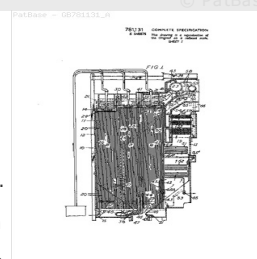
10) Family number: 20426929 (GB781131A)

IMPROVEMENTS IN OR RELATING TO VAPOUR GENERATORS

Abstract: Source: GB781131A 781,131. Water-tube steam boilers; regulating steam temperature. FOSTER WHEELER, Ltd. Aug. 30, 1955 [Aug. 30, 1954], No. 24925/55. Classes 123(2) and 123(3) A water-tube steam boiler has a setting 10 divided internally by water-tube partitions 28, 36 into a reheating furnace 16, a main steam generating furnace 17 and a superheating furnace 18, the furnaces being independently fired by burners 32, 42, 48 respectively. The front wall (not shown) and rear wall 11 of the setting are lined with steam generating tubes 20 which extend from lower headers 22 to upper headers 21, the latter being connected to a steam and water drum 23. The tubes in the lower parts of partitions 28, 36 are offset to provide openings 37, 44 through which combustion gases from furnaces 16, 17 can flow into the lower end of furnace 18. A row of reheater tubes 29 extending from an inlet header 30 line the roof 14 of furnace 16 and the setting side wall 12 so as to be subjected to radiant heating from the burner 32 and terminate in a header 31. Similarly, a row of superheater tubes 43 extend from the drum 23 across the roof of the furnace 18 and then downwardly to form a partition between the furnace and a gas passage 19 to a lower header 51, return tubes 45 from the header alternating with the tubes 43 in the partition and terminating in an upper header 49. The tubes 43, 45 are offset near the bottom of furnace 18 to provide an opening 48A through which the furnace gases, together with those from furnaces 16, 17, flow into the passage 19. The combined gases flow upwardly through the passage in contact with a superheater 62, a convection steam generating section 61 and an economizer 52, 53 to an outlet 66. Tubes 44<1> lead steam from the header 49 to the superheater 62. The disposition of the reheater and part of the superheater so as to be subjected to radiant heat allows the temperatures of reheat and superheat to be maintained at the required value throughout the boiler load range by operating the burners 32, 42, 48 so that the ratio of fuel fed to each of the furnaces 16, 18 to the total fuel required by the unit remains the same irrespective of the load. In modifications, other arrangements of the three furnaces and the common gas outlet passage within the setting are described.

Probable Assignee: FOSTER WHEELER LTD

Earliest Publication Date: 19570814

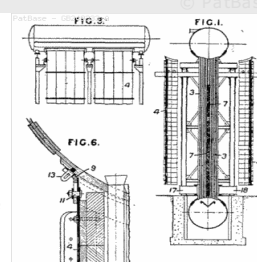


11) Family number: 18221732 (GB249333A)

IMPROVEMENTS IN AND CONNECTED WITH STEAM GENERATORS

Abstract: Source: GB249333A 249,333. Ransomes, Sims, and Jefferies, Ltd., and Garrett, F. A. April 9, 1925. Heating by indirect contact of hot waste gases; joints.-The upper and lower drums of a watertube boiler heated by waste gases and c. are connected by banks of straight tubes 3, each bank being arranged in a separate flue or casing 4 and having a partition 7 so that the gases flow up one side of the partition and down the other. The flues each consist of a two-part casing, the parts being adapted to be moved apart so as to facilitate the inspection and cleaning of the tubes. The upper and/or lower parts of the casings are maintained in gas-tight contact with the drums by flanges 9 which are connected to the casing and drums by bolts 11 and studs 13 engaging with slots in the flanges. Each flue is provided with gas inlet and outlet openings 17, 18 which communicate with the waste-gas mains. The partitions are formed of fillets of micrometresatite or fireclay which either enclose the centre tubes of each bank or fill in the intervening spaces between them. Specification 208,599 is referred to.

Probable Assignee: RANSOMES SIMS AND JEFFERIES LTD



Abstract: Source: GB105692A 105,692. Shaw, C. M. Aug. 5, 1916. Water-tube boilers.-Relates to a boiler comprising sections built up of side drums connected by banks of inclined curved tubes as described in Specification 10412/10. The lower drum F of the top section A is supported by a bracket K riveted to the drum and connected by a pin joint to a bracket J riveted to the lower drum E of the bottom section. The circular drum O may slide upon the bearers 8 supporting it upon the side columns M. The tube holes in the drums are so arranged that the tubes in one transverse row come opposite the spaces between the tubes in the next row. Baffles X, R resting on the tubes compel the gases to pass backwards and forwards across the tubes, as shown. An inclined baffle 2 B V prevents the bases from passing between the tubes to the uptake before passing across the upper bank. A feed-heater or a superheater T is arranged in an extension of the side of the boiler casing.

