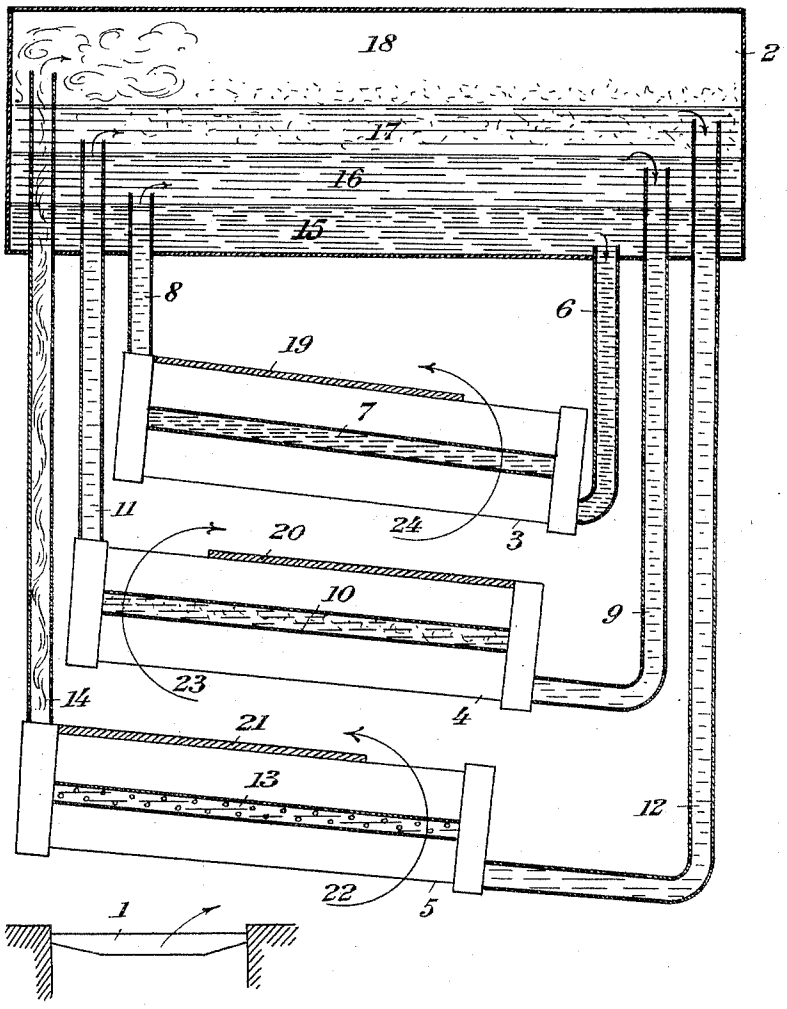
JEAN-BAPTISTE VAN OOSTERWYCK.

WATER TUBE BOILER.

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1,099,136. Patented June 2, 1914.



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JEAN-BAPTISTE VAN OOSTERWYCK, OF LONCIN-ANS, LIEGE, BELGIUM.

WATER-TUBE BOILER.

1,099,136. Specification of Letters Patent. Patented June 2, 1914.

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To all whom it may concern:

Be it known that I, JEAN-BAPTISTE VAN OOSTERWYCK, a subject of the King of the Belgians, and resident of 45 Rue de Bruxelles, at Loncin-Ans, Province of Liege, in the Kingdom of Belgium, have invented certain new and useful Improvements in Water-Tube Boilers with a Single Drum and Multiple Independent Circulations, of which the following is a full and clear description.

The drawback of all steam boilers which are not provided with feed-water-heaters is to bring in contact elements having very different temperatures, the result being to uselessly strain the apparatuses and cause sediments in the tubes exposed to the action of the fire. The means which have been used up to the present, with a view to avoid these drawbacks generally caused water to be carried along.

The present invention relates to a water tube boiler in which the water circulates on a spiral way through a plurality of independent elements, so that the water is successively heated to higher temperatures, completes a cycle, and finally gives the steam off in a free space above the water level in the drum.

The invention consists in feeding the water tubes, grouped in several superposed elements which are independent from each other, from the steam and water drum by means of tubes which start from successively higher levels in the drum and in having these elements discharging their contents into the drum, by means of tubes led through its bottom and ending at successively higher levels.

In the annexed diagrammatical figure given by way of example: 1 is the fire grate.

2 is a water and steam drum.

3 is the top water-heating bundle.

4 is the central water heating element.

5 is the vaporizing bundle.

6 is a tube feeding the bundle 3 with water 15.

7 is one of the tubes of the bundle 3.

8 is a tube discharging hot water 16.

9 is a tube feeding the bundle 4 with water 16.

10 is one of the tubes of the bundle 4.

11 is the tube which discharges the hot water 17.

12 is a tube which feeds water from the level 17 to the bundle 5.

13 is one of the tubes of the bundle 5.

14 is a tube discharging steam.

15 is cold water.

16 is water that has been warmed.

17 is hot water.

18 is steam.

19, 20 and 21 are baffle-plates.

22, 23 and 24 are arrows showing the flow of the gases.

As soon as the boiler is started, the water contained in the drum 2, is automatically separated into layers which are the coldest near to the bottom and the hottest near to the top. From the bottom of the water layer 15, the coldest one, starts the tube 6 which feeds the bundle 3. This water will fill the different tubes which are similar to the tube 7 of this bundle, then, under the action of hot gases, coming from the fire-box 1 it will rise again through the emptying or discharging tube 8 in order to heat the water layer 16 in the drum. From the upper part of this water-layer 16 starts the feeding tube 9 of the bundle 4.

The water coming from the upper part of the layer 16 will go down toward the central heating bundle 4, through all the tubes of which similar to 10 it will flow, in order to rise through the emptying or discharge tube 11 which ends at the lower part of the hot water layer 17. From the upper part of the water layer 17 starts the feeding tube 12 which will lead the water coming from the upper part of the layer 17 into tubes of the vaporizer bundle 5 similar to 13. The steam produced in this bundle which is the nearest to the fire box 1, will be discharged by the tube 14 toward the upper part of the reservoir 2.

The front header of the vaporizer bundle proper 5, can be provided with several tubes connecting it with the steam- and water-drum.

Having now fully described my invention, what I claim is:

1. In a tubular steam boiler, the combination with a sole water and steam drum of a series of bundles of tubes, each bundle constituting an independent element and each being connected with the said drum by means of conduits projecting into the said drum through its bottom and ending each at a different height inside the said drum.

2. In a tubular boiler, the combination with a sole water and steam drum of series of bundles of tubes each bundle constituting

an independent element and each being connected with the said drum by means of conduits projecting into the said drum through its bottom and ending inside the said drum at its rear end, at different heights.

3. In a tubular boiler, the combination with a sole water and steam drum of a series of bundles of tubes each bundle constituting an independent element and each being connected at its ends with the said drum by means of conduits projecting into the said drum through its bottom, those conduits which feed the different elements ending inside of the said drum at successively higher levels and those conduits which discharge the contents of the said elements or bundles into the said drum ending also at successively higher levels.

4. In a tubular boiler, the combination with a sole water and steam drum of series of tubes grouped into elements or bundles independent from each other, each of them being connected with the said drum at its ends through conduits projecting into the said drum through its bottom, those conduits which feed the elements or bundles ending at successively higher levels and those which discharge the contents of the elements into the said drum ending also at successively higher levels, each discharge conduit ending at a higher level than the corresponding feeding conduit.

5. In a tubular boiler, the combination with a sole water and steam drum, of series of tubes grouped so as to form elements which are independent from each other, each of which is connected at its ends with the said drum by means of conduits entering the said drum through its bottom, those conduits which feed the elements ending at successively higher points and those which discharge the contents of the said elements ending also at successively higher points inside the said drum and this in such a way that the discharge tube of each element ends at a higher level than the corresponding feeding tube but at a lower level than the feeding tube of the next lower independent element.

6. In a tubular boiler, the combination with one sole water and steam drum and series of tubes grouped by means of headers in elements which are independent from each other, of conduits connecting the bottoms of the rear headers to the said drum and conduits connecting the tops of the front headers to the said drum.

7. In a tubular boiler the combination with a sole steam and water drum, of series of tubes grouped by means of separated headers so as to form independent elements, conduits connecting each group independently with the said drum and all of said conduits ending inside the drum at different heights.

8. In a tubular boiler, the combination with one sole steam and water drum and series of tubes grouped by means of headers so as to form elements which are independent from each other, conduits connecting the bottoms of the rear headers to the said drum at successively higher levels and conduits connecting the upper parts of the front headers to the said drum and also ending inside the said drum at successively higher levels.

9. In a tubular boiler, the combination with one sole water and steam drum and with series of tubes grouped by means of headers into elements which are independent from each other, conduits connecting the bottoms of the rear headers to the said drum and conduits connecting the upper parts of the front headers to the said drum so that the rear tubes feeding each header end inside the said drum at a level which is lower than that one at which end the discharge conduits.

10. In a tubular boiler, the combination with one sole water and steam drum and with series of tubes grouped by means of headers into elements so as to be independent from each other, conduits connecting the bottoms of the rear headers to the said drum and the upper parts of the front headers to the said drum, the rear conduits and the front conduits ending inside the said drum at successively higher levels, so that, except for that one of the independent elements of which the feeding tubes end at the least distance above the bottom of the drum, the feeding tubes of any element end inside the drum at a greater distance from the bottom of the drum than the discharge tubes of that one of the elements the feeding tubes of which end nearer to the bottom.

11. In a tubular boiler, the combination with one sole water and steam drum and series of tubes grouped by means of headers into elements which are independent from each other, conduits connecting the bottoms of the rear headers and the upper parts of the front headers to the said drum, the rear tubes and the front tubes ending inside the said drum at successively higher levels so that the rear tubes of one of the independent elements end relatively nearer to the bottom of the drum and the discharge tubes at a greater distance from the bottom, the rear tubes of the element next to it at a greater distance from the bottom of the reservoir than the discharge tubes of the foregoing element and the discharge tubes of the second element at a greater distance from the bottom than its front tubes and so on for each complementary element and the front discharge tubes of the last element ending always above the water level into the free space of the water and steam drum.

12. In a tubular boiler, the combination with one sole water and steam drum, series of inclined tubes grouped into elements

which are independent from each other by means of headers which are connected to the said drum by means of tubes ending inside the said drum at successively higher levels as well at the front end of the water and steam drum as at its rear end.

13. In a tubular boiler the combination with one sole water and steam drum, series of inclined tubes grouped into elements which are independent from each other by means of headers which are connected with the water and steam drum by means of tubes which end inside the said drum at successively higher levels and the rear tubes of each element ending nearer to the bottom of the drum than its front tubes and being connected with the rear headers near their bottoms.

14. In a tubular boiler, the combination with one sole water and steam drum of series of inclined tubes, grouped so as to form elements which are independent from each other by means of headers of which the rear ones are connected from their bottoms to the said drum, by means of tubes ending inside the said drum at successively higher levels, and the front headers are connected from their upper parts to the said drum, by means of tubes ending inside the said drum also at successively higher levels.

15. In a tubular boiler, the combination with one sole water and steam drum, of series of inclined tubes, grouped into elements which are independent from each other by means of headers of which the rear ones are connected from their bottoms to the said drum through the bottom of said drum by means of tubes ending at successively higher levels inside the said drum and the front ones from their upper parts, by means of tubes ending inside the said drum also at successively higher levels, the front tubes of each element ending at a higher level than the one at which end the rear tubes.

16. In a tubular boiler, the combination with one sole water and steam drum of series of inclined tubes grouped by means of headers into elements which are independent from each other connected to the said drum by means of tubes ending inside the said drum at successively higher levels so that the rear tubes of one of the elements end all at the same level relatively near to the bottom and the rear tubes of a second element or group at a higher level than that one at which end the front tubes of the first element and so on for each complementary element considered necessary, the front tubes of the last element ending always above the water level into the free space of the drum.

17. In a tubular boiler, the combination with one sole water and steam drum and a furnace, of series of tubes grouped by means of headers into elements which are independent from each other, and mounted like steps between the said drum and the furnace and connected with the said drum by means of tubes ending inside the said drum at successively higher levels.

18. In a tubular boiler, the combination with one sole water and steam drum and a furnace, of series of tubes grouped by means of front and rear headers into elements which are independent from each other, which are mounted like steps between the said drum and the furnace and connected with the said drum by means of tubes ending inside the said drum at successively higher levels and of which tubes the rear ones communicate with the bottoms of the rear headers and the front ones with the upper parts of the front headers.

19. In a tubular boiler, the combination with one sole water and steam drum of series of tubes grouped into elements which are independent from each other by means of front and rear headers mounted like steps between the said drum and the furnace and connected to the said drum by means of tubes of which some are connected to the rear part of the upper header and end inside the drum at one common level relatively near to the bottom and some are connected to the front header and end at one common level at a greater distance from the bottom, the tubes connected to the header underneath at one common level higher than the one at which end the front tubes of the upper header and so on for each complementary element which may be necessary, the front tubes of the element which is the nearest to the furnace ending all above the normal water level in the free space of the said drum.

20. In a tubular boiler, the combination with one sole water and steam drum and a furnace, of series of inclined tubes, grouped into elements which are independent from each other by means of headers mounted like steps between the said drum and the furnace and connected with the said drum by means of tubes ending inside the drum at levels which are successively higher, the rear connecting tubes of each element ending at one common level inside the said drum, which is the farther off the bottom of the drum as the corresponding element is nearer to the furnace and the front connecting tubes of each element ending also at one common level which is the higher as the element is nearer to the furnace and the front connecting tubes of each element ending at one common level which is higher than the level of the rear tubes of each element.

21. In a tubular boiler, the combination with one sole water and steam drum and a furnace of series of inclined tubes grouped into elements which are independent from each other by means of front and rear headers which are arranged like steps be-

tween the said drum and the furnace and connected to the said drum by means of tubes ending inside the drum and for each header at one common level, which level is the higher as the corresponding element is nearer to the furnace and so that the rear connecting tubes of the highest element end at the lowest level, the rear connecting tubes of the element underneath ending at a level which is higher than that one at which end the tubes of the upper element and so on for each complementary element judged necessary and so that the front connecting tubes of the element which is nearest to the furnace end all above the normal water level.

The foregoing specification signed at Brussels this thirty first day of May, 1912.

JEAN-BAPTISTE VAN OOSTERWYCK.

In presence of—
E. LEYD,
CHAS. ROY NASMITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."