

Aug. 30, 1932.

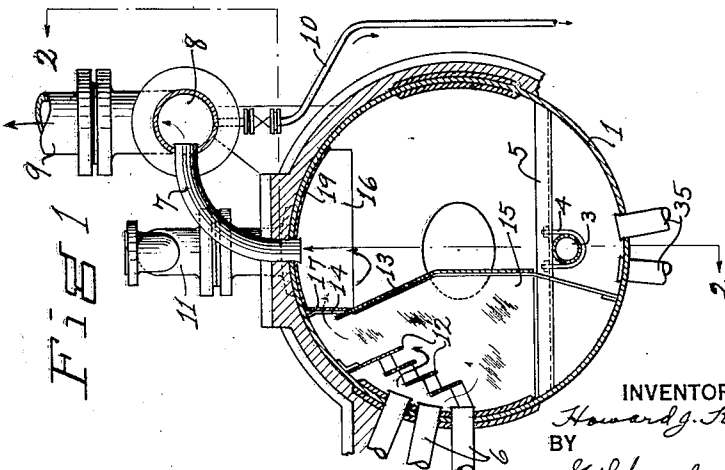
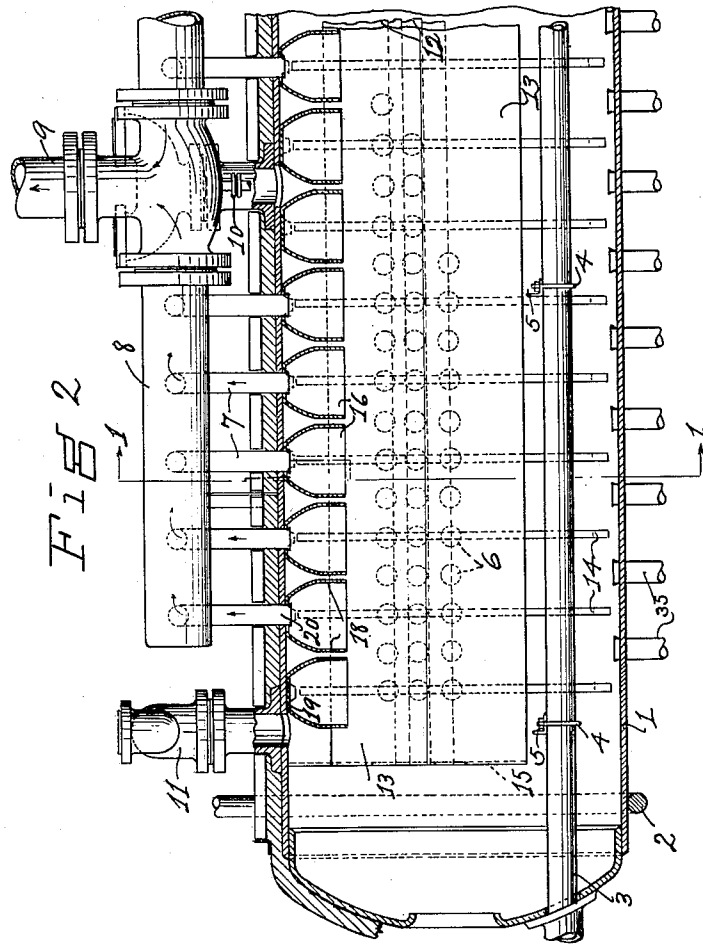
H. J. KERR

1,875,015

BAFFLE FOR STEAM DRUMS

Filed Nov. 27, 1928

6 Sheets-Sheet 1



INVENTOR
Howard G. Kerr
BY
Lifford & Seel
ATTORNEY

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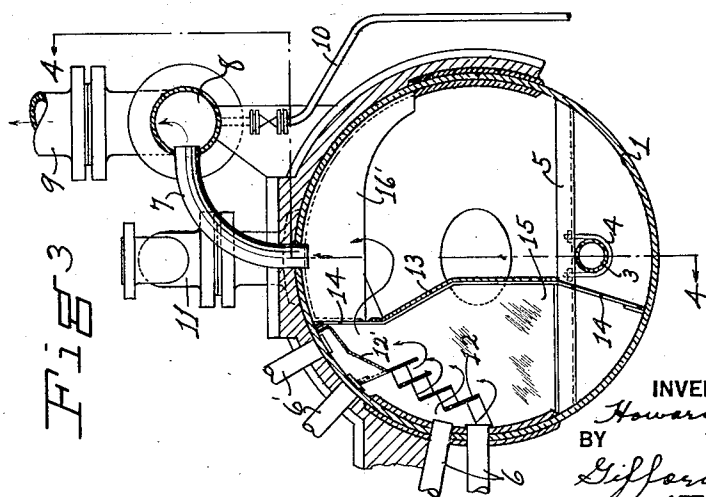
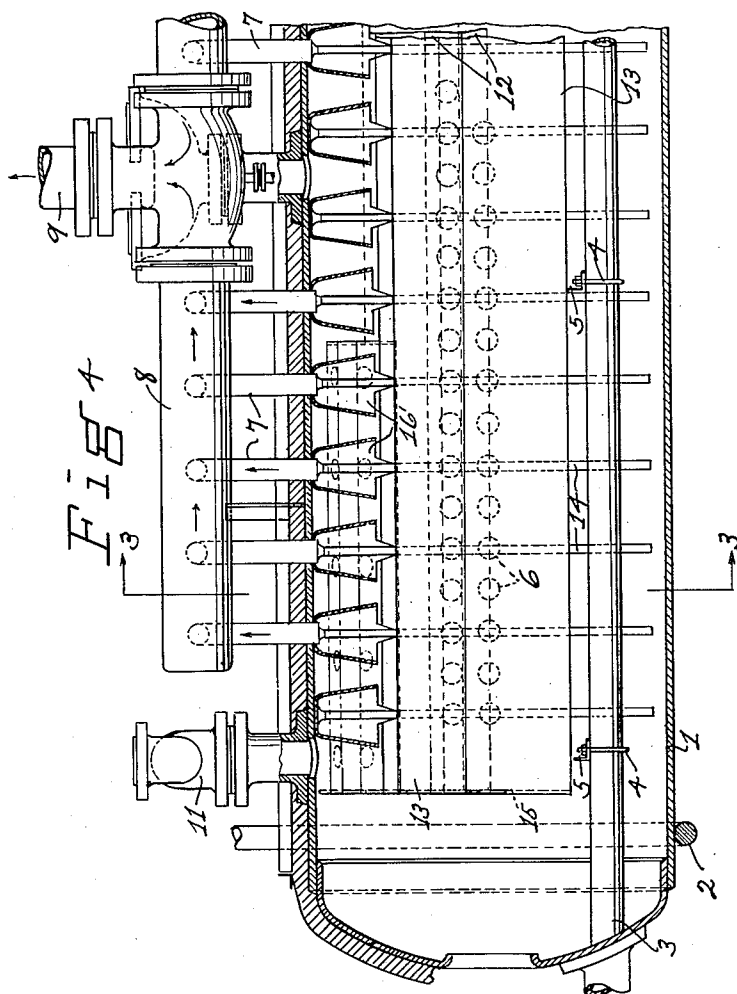
H. J. KERR

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6 Sheets-Sheet 2



INVENTOR
Howard J. Kerr
BY
Gifford & Seel
ATTORNEYS

Aug. 30, 1932.

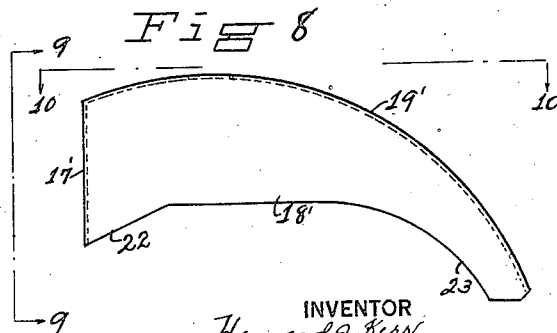
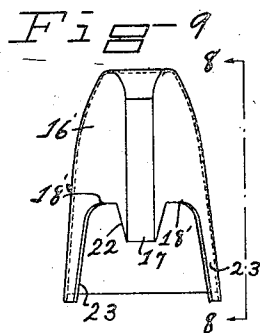
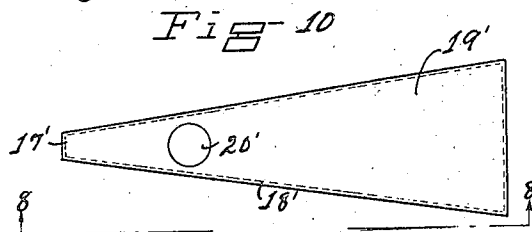
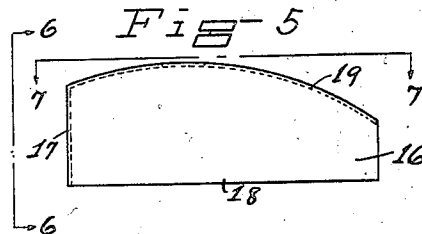
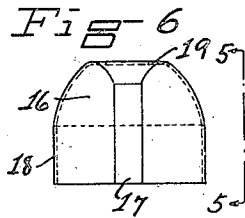
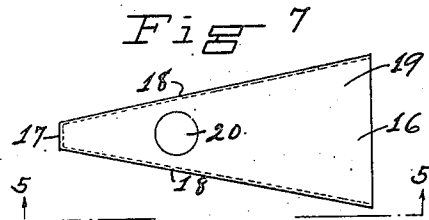
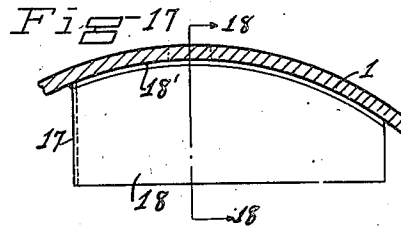
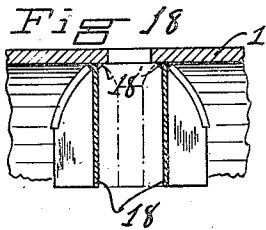
H. J. KERR

1,875,015

BAFFLE FOR STEAM DRUMS

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6 Sheets-Sheet 3



INVENTOR
Howard J. Kerr
BY
Gifford & Scull
ATTORNEYS

Aug. 30, 1932.

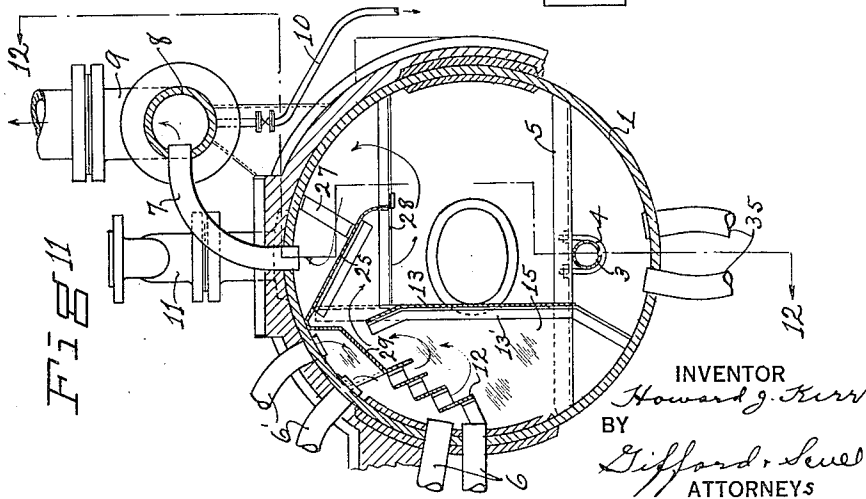
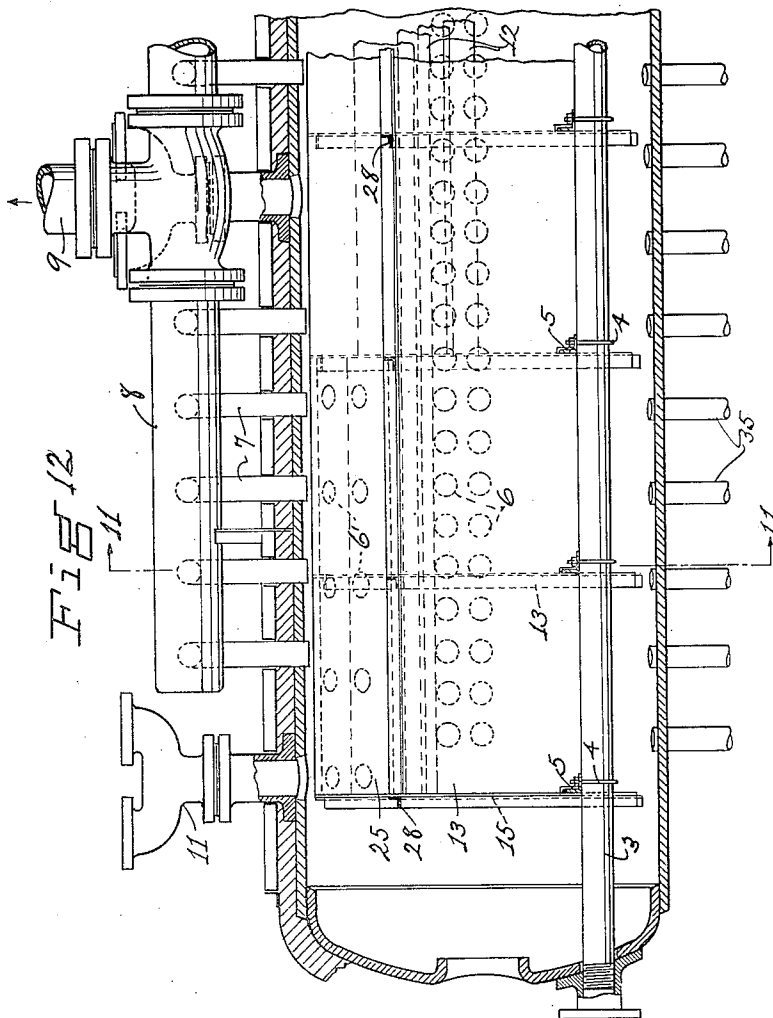
H. J. KERR

1,875,015

BAFFLE FOR STEAM DRUMS

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6 Sheets-Sheet 4



INVENTOR
Howard J. Kerr
BY
Gifford & Seel
ATTORNEYS

Aug. 30, 1932.

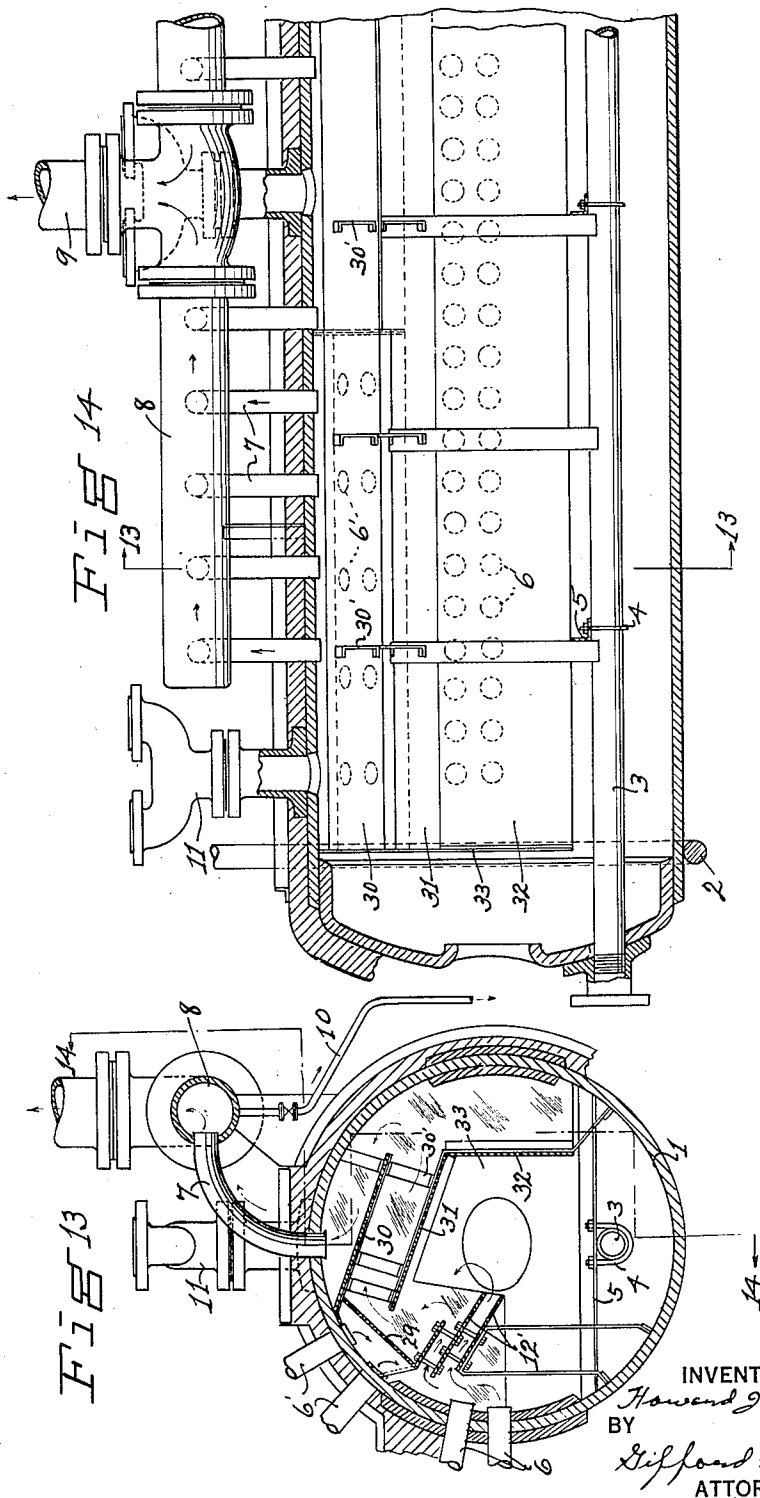
H. J. KERR

1,875,015

BAFFLE FOR STEAM DRUMS

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6 Sheets-Sheet 5



INVENTOR
Howard J. Kerr
BY
Lifford & Seale
ATTORNEYS

Aug. 30, 1932.

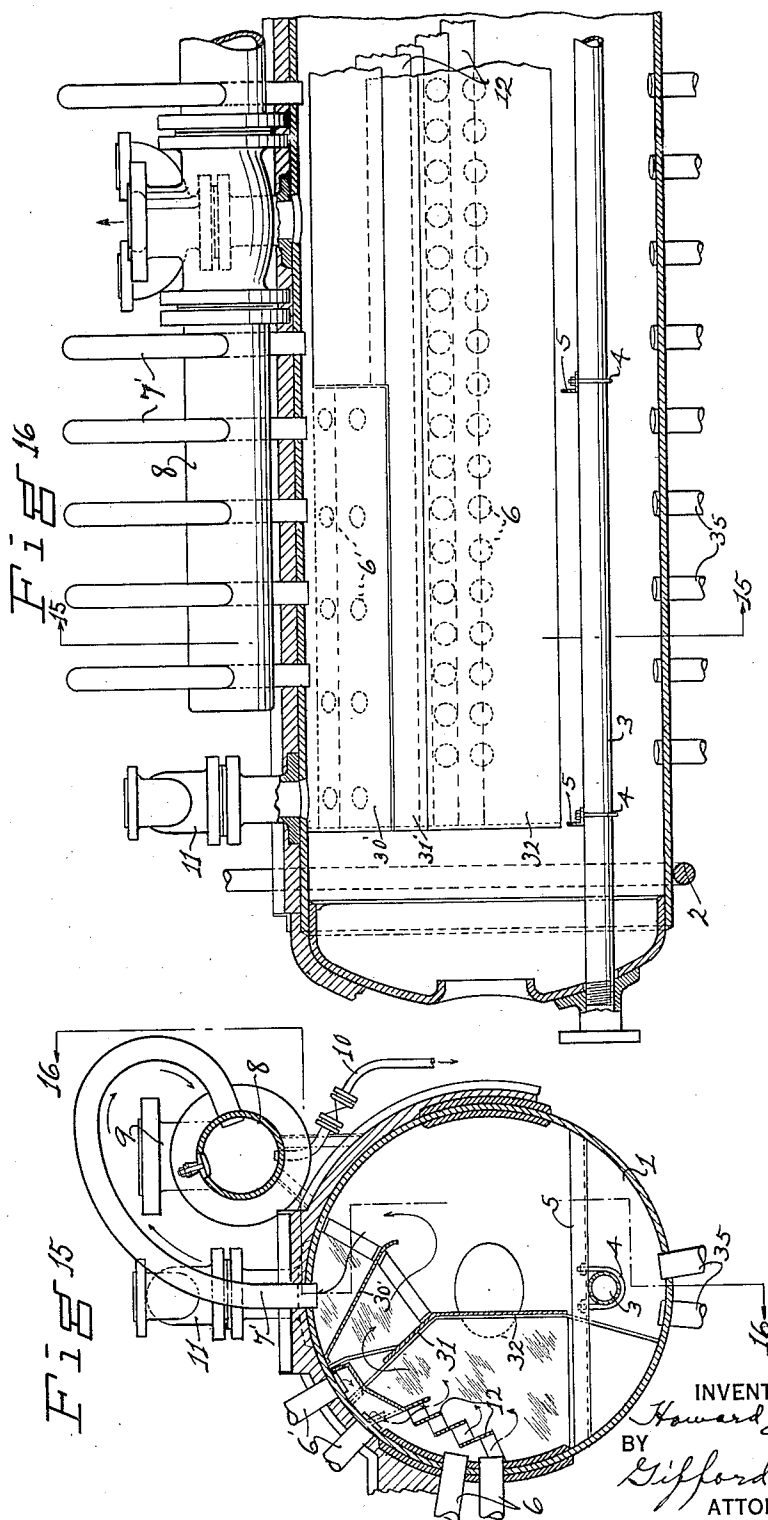
H. J. KERR

1,875,015

BAFFLE FOR STEAM DRUMS

Filed Nov. 27, 1928

6 Sheets-Sheet 6



UNITED STATES PATENT OFFICE

HOWARD J. KERR, OF WESTFIELD, NEW JERSEY, ASSIGNOR TO THE BARCOCK & WILCOX COMPANY, OF BAYONNE, NEW JERSEY, A CORPORATION OF NEW JERSEY

BAFFLE FOR STEAM DRUMS

Application filed November 27, 1928. Serial No. 322,119.

This invention relates to a baffle for the steam and water drum of a boiler to separate the mixture of steam and water from each other and permit dry steam to be withdrawn from the drum. The invention will be understood from the description in connection with the accompanying drawings in which Fig. 1 is a section along the line 1—1 of Fig. 2; Fig. 2 is a longitudinal section through a steam and water drum partly broken away, taken along the line 2—2 of Fig. 1; Fig. 3 is a section along the line 3—3 of Fig. 4; Fig. 4 is a longitudinal section through a modification taken along the line 4—4 of Fig. 3; Figs. 5, 6 and 7 are side, end and plan views, respectively, of one of the details taken along corresponding lines of the several figures; Figs. 8, 9 and 10 are corresponding views of a modification of one of the details taken along similar lines; Fig. 11 is a section along the line 11—11 of Fig. 12; Fig. 12 is a longitudinal section through another modification taken along the line 12—12 of Fig. 11; Fig. 13 is a section along the line 13—13 of Fig. 14; Fig. 14 is a longitudinal section through a modification taken along the line 14—14 of Fig. 13; Fig. 15 is a section taken along the line 15—15 of Fig. 16; Fig. 16 is a longitudinal section through another modification taken along the line 16—16 of Fig. 15; Fig. 17 is a side view showing one of the details, and Fig. 18 is a section along the line 18—18 of Fig. 17.

In the drawings reference character 1 indicates a steam and water drum that is supported by straps 2 passing around the drums near the ends thereof. A feed water pipe 3 leads into the drum and is supported inside of the drum by means of straps 4 from the cross supports 5.

Rows of circulating tubes 6 enter the side of the drum and a mixture of steam and water enters the drum through these tubes. A row of curved outlet tubes 7 for steam leads from the upper portion of the drum 1 to a header or separator 8 from which a steam pipe 9 leads to the steam main. A valved drain pipe 10 is provided at the lower side of the separator 8. Connections 11 for safety valves

are also provided along the upper side of the drum 1.

A shutter type of baffle is located inside of the steam and water drum near the ends of the circulating tubes 6. This baffle comprises a plurality of parallel inclined plates 12 that are spaced apart and supported in position in any convenient manner. The uppermost one of the plates 12 has its upper edge contacting with the inside wall of the drum. A vertically disposed baffle plate 13 is located nearer the middle of the drum than the plates 12. The plate 13 is supported by means of supports 14, and its upper edge terminates short of the drum wall so as to leave a space between the upper edge of the plate 13 and the inside of the drum. The lower edge of the plate 13 extends below the normal water level in the drum 1. End closure plates 15 close the spaces between the ends of the baffle 13 and the drum on the same side of the baffle 13 as the tubes 6. The end plates 15 at each end of the drum baffle close the spaces between the circulating tube side of the drum shell and vertical drum baffle and extend below the lowest water level. The water seals this space at the bottom against the short circuiting of steam. The plates 15 may be made in sections to enable them to be inserted through manholes, and the sections can be assembled after having been inserted.

A row of boxes 16, spaced slightly apart, is located between the end plates 15 near the upper edge of the baffle 13 with the upper edge of the baffle 13 preferably extending slightly above the lower edges of the boxes 16. The boxes 16 (Figs. 5, 6 and 7) may each have a narrow vertical front wall 17 with diverging side walls 18 extending from the front wall and a top or cover 19. The top or cover 19 and the upper edges of the side walls 18 are curved to fit the inside wall of the drum 1 as the boxes are installed with short spaces between them at the upper portion of the drum. Each box may be provided with a hole 20 in the top thereof through which holes the outlet steam pipes 7 extend and are expanded.

Instead of providing the boxes 16 with tops or covers 19, the tops may be omitted

and the upper edges of the side walls 18 may be welded to the inside wall of the drum as shown most clearly at 18' in Figs. 17 and 18. The lower edges of the front wall 17 and side walls 18 are horizontal and flush with each other in the modifications shown in Figs. 5 to 7 and Figs. 17 and 18.

In the modification of the boxes shown in Figs. 8, 9 and 10, the parts corresponding to the boxes already described are designated by the same reference characters with primes. In this modification the front wall 17' extends farther downwardly, and the top 19' extends farther around, the lower edges of the ends of the side walls 18' being extended correspondingly as shown at 22 and 23. The steam and water in the mixture of steam and water entering the drum 1 through the tubes 6 are partially separated from each other by means of the shutter baffle or plates 12, the steam rising and passing over the upper edge of the baffle 13 between the boxes 16, thus separating steam and water. The practically dry steam then passes under the lower edges of the side walls 18 of the boxes 16, and then passes through the tubes 7 to the header 8, and thence through the pipe 9 to the steam main.

In the modification shown in Figs. 3 and 4, the boxes 16' are shown as being longer than the boxes 16 in Figs. 1 and 2, being similar to the boxes shown in Figs. 8, 9 and 10. Also, in this modification water wall tubes 6' of the boiler furnace are shown entering the drum 1 above the tubes 6. A baffle 12' is located in the drum 1 in front of the ends of the tubes 6'.

In the modification shown in Figs. 11 and 12, rows of water wall tubes 6' are also shown as entering the steam and water drum 1 above the tubes 6. In this modification a plurality of strengthening ribs 13' for the baffle 13 are illustrated. An inclined plate 25 is located near the top of the drum with its upper edge contacting with the wall of the drum along a line above the baffle 13, and with its lower edge curved so as to extend substantially vertical. The baffle plate 25 may be supported by means of supports 27 and its lower edge may rest upon cross supports or angle irons 28. A baffle 29 with its upper edge contacting with the wall of the drum may be located in front of the tubes 6'.

In the modification shown in Figs. 13 and 14, the shutter baffles 12' are arranged somewhat differently from those shown in the other views, the plates thereof being fewer in number and wider than those shown in the other views, and located somewhat higher. A sloping baffle plate 30 extends from the drum wall on one side of the center line and its lower edge terminates short of the drum wall on the other side of the center line. A second baffle 31 is located parallel to the baffle plate 30 with its upper edge ter-

minating short of the drum wall and its lower edge connected to a vertical baffle 32 that extends below the normal water level in the drum. Supports 30' are provided for the baffles 30 and 31. End plates 33 are provided extending across the drum at the ends of the baffles 30 and 31. In this modification a baffle 29 is also shown in front of the tubes 6'.

In the modification shown in Figs. 15 and 16 the steam tubes 7' are shown as being much longer than those in the other views and curved around so as to enter the drum 8 on the other side from the drum 1. In this modification the plate 30' is similar to the plate 30 in Figs. 13 and 14 and the baffle plates 31' and 32' are somewhat similar to the baffle plates 31 and 32 in Figs. 13 and 14, but are located on the opposite side of the center line of the drum. By curving the tubes 7' so as to enter the drum 8 on the other side from the drum 1, and so that the convex side of the pipe forms the lower portion thereof where it enters the drum, any water that is unseparated from the steam as it leaves the steam and water drum is further separated by the centrifugal action of the water and steam in passing through the curved pipe, the water entering the drum at the lower side of the pipe.

The shutter baffles described in the different illustrations may be used not only in connection with the other baffles with which they have been illustrated and described, but the plate baffles illustrated in the various modifications may be interchanged in certain instances. Tubes 35 have been shown in some of the modifications at the lower side of the drum 1. These tubes are nipples that connect to downtake headers and it is to be understood that such nipples may be used in any of the modifications.

I claim:

1. In a steam and water drum, a steam and water separator comprising a series of boxes open at the bottom and a baffle plate at one end of said boxes, the upper edge of said plate being spaced from the drum but extending above the lower edges of said boxes, and the lower edge thereof extending below the normal water level therein, steam outlet pipes connected to the respective boxes, and circulators opening into the drum on the side of said plate away from the boxes.

2. In a steam and water drum, a steam and water separator comprising a series of boxes open at and diverging towards the bottom, a baffle plate at one end of said boxes and extending above the lower edges thereof, transverse plates at the ends of the said baffle plate, steam outlet pipes connected to the respective boxes, and circulators opening into the drum on the side of the said baffle plate away from the boxes.

3. In a steam and water drum, a steam and water separator comprising a series of boxes

open at and diverging towards the bottom, a baffle plate at one end of said boxes, and extending above the lower edges thereof, shutter baffles between said baffle plate and
5 the side wall of said drum, steam outlet pipes connected to the respective boxes, and circulators openings into the drum on the side of the said baffle plate away from the boxes.

4. In a steam and water drum, a steam and
10 water separator comprising a series of boxes at least open at one side and a baffle plate at another side of said boxes, one edge of said plate being spaced from said drum but extending at least to the lower open side of said
15 boxes and the lower edge thereof extending below the normal water level in the drum, steam outlet pipes connected to the respective boxes, and steam and water entrances into said drum opposite said baffle plate.

20 HOWARD J. KERR.

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