J. M. COLVEN.

STEAM BOILER.

APPLICATION FILED JUNE 26, 1918.

1,394,969. Patented Oct. 25, 1921.

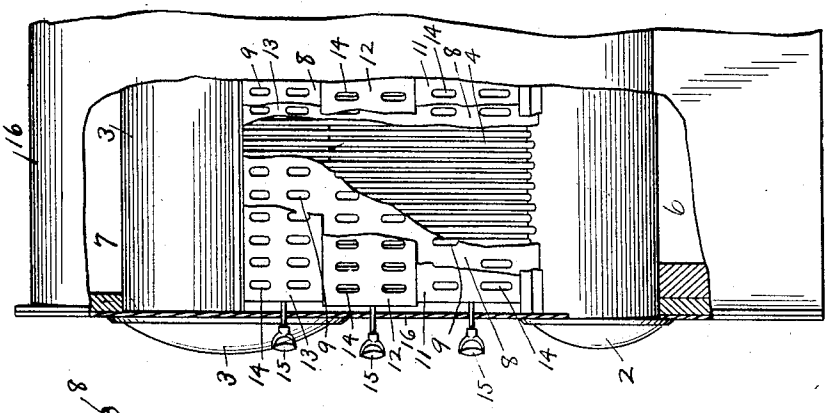


Fig. 2.

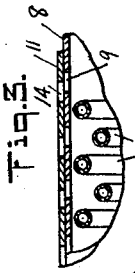


Fig. 3.

Fig. 1.

Fig. 4.

WITNESS

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STEAM-BOILER.

1,394,969. Specification of Letters Patent. Patented Oct. 25, 1921.

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To all whom it may concern:

Be it known that I, JAMES M. COLVEN, a citizen of the United States, and a resident of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

This invention relates to steam boilers, and has especial application to water tube and drum boilers wherein it is desired to regulate the distribution of the heat to the tubes by adjustable baffling means. At present, a common method of regulating boilers is by means of fixed baffles transverse to the tubes. This method does not furnish a very close control, and considerable loss of efficiency occurs because the fixed construction made in the shop does not meet the variations in operating conditions.

According to this invention, a boiler having upper and lower drums connected by inclined tubes is provided with movable regulating means adjacent the bank of tubes, so that the heated gases can be evenly distributed over the entire tube surface under actual operating conditions, instead of according to theoretical conditions as is the case where the baffling is fixed in the shop.

In the accompanying drawings,

Figure 1 is an elevation of a boiler partly broken away, showing the invention,

Fig. 2 is a similar view on the line 2—2 of Fig. 1, and

Fig. 3 is a detail section on the line 3—3 of Fig. 1.

Fig. 4, is a modified form of a detail section similar to Fig. 3, without the stationary plate.

1 represents a boiler consisting of lower drums 2, 2 and an upper drum 3 connected by tubes 4. Between the outer set of tubes and the stack 7 is provided a fixed plate 8 having perforations 9 between the tubes of larger total area than the stack 7. To control the perforations 9, one or more horizontally movable sectional baffle plates 11, 12, 13 are provided, having perforations 14 adapted to register with the perforations 9 and operated by handles 15 extending through the casing 16. The baffle plates slide in suitable angle guides. In small boilers, only the sliding perforated baffle plates may be provided, since the draft can be distributed according to whether the perforations 14 rest directly on the upper row of tubes, or between the tubes. In larger boilers, it is advantageous to provide the stationary perforated plate 8 together with one or more movable plates 11, etc. In some boilers, a single movable sectional baffle at the top will provide the desired regulation, or the lower baffle 11 may be omitted. The lower and upper sliding plates 11 and 13 respectively, are preferably bent at their edges, together with the stationary plate 8, so as to fit the contour of the outer bank of tubes.

Boilers having fixed transverse baffles dividing the tubes into sections for the purpose of distributing the heat, require uniform operating conditions of draft, temperature, fuel, etc. Otherwise, the heat is unevenly distributed, and those sections of tubes in the shortest path of gases between the fire and the stack receive more heat than they will absorb, while the other sections of tubes in longer paths are insufficiently heated. Inasmuch as the draft, working temperature, fuel, and other operating conditions are not always uniform, it can be seen that boilers having fixed transverse baffles set in the shop as the tube banks are built up will not work with uniform efficiency under varying operating conditions. By this invention, the horizontally movable section baffles can be independently adjusted while the boiler is operating so that each section of tubes will be heated to substantially the same temperature. This is determined by means of pyrometers in the several sections. Thus if the gases distribute themselves so as to raise the temperature in the top section too much above the temperature below, the plate 13 will be moved to partially close off the upper section perforations 9. By continuing the adjustments until the temperature in all sections is substantially the same, it will be assured that the maximum heating efficiency is the same in each section without short circuiting of the gases, and without dead spaces being formed. If the fuel or working pressure be materially changed, readjustment may be necessary. Similar regulation can be had where the movable baffles are close to the tubes without the stationary plate 8. As this is a baffling arrangement, the minimum total opening through either of the baffles in adjusted position should somewhat ex-

ceed one-half the area of the stack in a three drum boiler, so as not to affect the draft, as the draft can be regulated by the usual stack damper, not shown.

In a two drum boiler, this area would somewhat exceed the area of the stack.

Although the baffles can be placed between rows of tubes in the bank, or below the bank, it is preferable to place them nearest the stack as shown, because of the lower temperature of the gases beyond the tubes.

Various changes and modifications can be made without departing from the scope of the appended claims.

What is claimed, is:

1. In combination with a boiler having upper and lower drums and having a bank of tubes connecting said drums, baffling means extending from the upper toward the lower drum comprising a baffle adjacent a row of tubes and slidable transversely of the tubes, said baffle having rows of perforations spaced so as to register with the tubes when the baffle is in one position, and to register with the spaces between the tubes when the baffle is in another position.

2. In combination with a boiler having upper and lower drums and having a bank of tubes connecting said drums, baffling means extending from the upper toward the lower drum comprising a plurality of baffles adjacent a row of tubes and independently slidable transversely of the tubes, said baffles having rows of perforations spaced so as to register with the tubes when the respective baffles are in one position and to register with the spaces between the tubes when the respective baffles are in another position.

3. In combination with a boiler having upper and lower drums and having a bank of tubes connecting said drums, baffling means extending from the upper toward the lower drum comprising a stationary plate adjacent a row of tubes and having rows of perforations spaced so as to register with the spaces between the tubes, and a baffle adjacent said plate and slidable transversely of the tubes, said baffle having rows of perforations spaced so as to register with the perforations in the plate when the baffle is in one position, and to register with the spaces between the perforations in the plate when the baffle is in another position.

Signed at New York city, in the county of New York and State of New York, this 18th day of June, A. D. 1918.

JAMES M. COLVEN.