

UNITED STATES PATENT OFFICE

1,921,049

BAFFLE WALL

John J. Tompkins, Chicago, Ill., assignor of one-half to George E. Moore, Chicago, Ill.

Application December 16, 1931. Serial No. 581,391

9 Claims. (Cl. 110—98)

The present invention relates to baffle walls and particularly to a baffle wall suitable for use in boilers. The invention further includes the construction of the baffle wall.

5 Heretofore baffle walls for boilers have been constructed with ropes wound about the boiler tubes and then plastic material is supplied in proper manner to embed the rope so coiled. This construction has proved objectionable as the
10 windings of the rope about the tubes does not provide sufficient strength for the wall between the tubes, consequently, when the tubes are cleaned by turbine or other treating means, vibrations are set up which cause crumbling or chipping of
15 the baffle wall. Another objection to the aforesaid type of wall is that when a tube is withdrawn for replacement, the rope obstructs the opening through the baffle wall occasioned by the withdrawal of the tube making it practically impossible to insert a new tube without cutting
20 away a considerable portion of the rope. This weakens the baffle wall so that in a relatively short time, the wall becomes useless and has to be replaced.

25 The present invention is directed to a baffle wall and a method of making the same wherein the material constituting the wall is suitably reinforced throughout and the formation of the wall about the tubes is such that there are provided
30 in the wall tube openings having smooth surfaces whereby tubes may be readily withdrawn and replaced without damage to the baffle wall. The invention furthermore provides a wall which is not subject to crumbling and chipping during
35 tube cleaning.

The baffle wall of the present invention is not subject to damage or partial destruction during tube replacement or tube cleaning and is so constructed as to be effective for long periods of
40 time.

An object of the present invention is to provide a baffle wall or boilers which is easy and economical to install and which is highly efficient in service.

45 Another object of the invention is to provide a baffle wall for boilers wherein the wall is suitably reinforced throughout its extent to prevent crumbling or chipping during tube replacement.

50 A further object of the invention is to provide a baffle wall so constructed as to form smooth non-obstructed tube openings so that when a tube is withdrawn, a new one may be readily installed without damage to the baffle wall or any part of
55 the same and wherein no part of the walls de-

fining the tube opening offers impedance to the insertion of new tubes.

Another and still further object of the invention is to provide a baffle wall formed with a foundation of ropes or cables disposed in substantially horizontal and vertical arrangement forming a net work about all of the tubes at the place where the wall is installed and suitably connecting the ropes for permanent association by means which serves to unite the ropes with the plastic material applied thereto and constituting a portion of the baffle wall.

The above, other and further objects of the invention will be apparent from the following description, accompanying drawing and appended
60 claims.

An embodiment of the present invention is illustrated in the accompanying drawing and the views thereof are as follows:

Figure 1 is a side elevational view of a water
65 tube boiler of conventional form applied with baffle walls embodying the principles of the present invention.

Figure 2 is an enlarged view partially in elevation and partially broken away and in section
80 to show details of construction and arrangement of parts.

Figure 3 is a sectional view taken substantially in the plane of line III—III of Figure 2.

The drawing will now be explained.

As illustrated in Figure 1, conventionally, a water tube boiler consisting of a drum 1, a bank of tubes 2, a masonry boiler setting 3 providing a combustion chamber 4, smoke box 5 and chimney 6.

The tube bank 2 is provided with a baffle wall 7 extending over a portion of the combustion chamber 4 and an angular baffle wall consisting of the parts 8 and 9, with the part 9 disposed along the bank of tubes and the part 8 crosswise of said bank. Another baffle wall 10 is disposed transversely of the bank of tubes and extends into the smoke box 5 for directing the products of combustion downwardly under such wall and then upwardly to the stack or chimney.

The present invention concerns itself more particularly with the construction of the walls 8 and 10, that is the walls which extend transversely of the bank of tubes and which walls must be positioned on and supported by the tubes in a manner to prevent accidental passage through the walls of the products of combustion.

Figures 2 and 3 illustrate details of the preferred construction employed in constructing a baffle
110

wall in accordance with the principles of the present invention.

For the sake of convenience, the term "strand" will herein be used to designate a rope such as indicated at 11 in Figure 3 and a term "cable" will be herein used to designate a group of ropes, such as appear in Figure 3 as consisting of a plurality of strands 13 forming the cable A and therefore the use of these terms is to be understood as not by way of limitation but simply for the purpose of convenience in description.

A plurality of cables A are made of several strands 13, there being preferably four strands in a cable. The rope applied to this purpose is preferably of heat resisting material, such as asbestos rope.

The cables A are made of two or four of the strand 13 in size such as to pass horizontally between the horizontal tubes in adjacent banks or rows, that is, for instance, as between the tubes in the row 14 and the tubes in the row 15 as indicated in Figure 2. The length of the cables A is such as to span the width of the tube banks 2 and to enable the baffle wall to be finished at its ends.

In the form of cable A illustrated in Figures 2 and 3, a strip 16 of wire mesh material is inserted vertically, as may be observed in Figure 3, between the strands comprising the sides of the cable. The cable 13 and the enclosed mesh strip 16 are secured together by tie wires 17 which are passed about the cable in sufficient number to accomplish the purpose intended.

The tops and bottoms of the cables A as viewed in Figure 3, or the front and rear faces as viewed in Figure 2, are supplied with strips of wire mesh material 18 and 19, the strips 18 and 19 being secured to the cables by bending over some of the cross wires of the strip 16 embedded in the cable A. This construction provides a cable of heat resisting quality and which at the same time is so constructed as to become readily embodied in the plastic material utilized for the wall and serving to bind together the wall in intimate relation to prevent crumbling or chipping during tube replacement or tube cleaning.

The cables A are laid horizontally across the tubes of the bank 2. As before stated, the size of a cable is just sufficient to enter within the vertical distance between the horizontal rows of tubes in adjacent rows, thus filling the space between such tubes where the same are in vertical alignment or staggered.

For filling the spaces between the tubes of a row and between the several vertically spaced cables, there are provided a plurality of short cables B constructed in the same manner as the cables A but these cables as far as the rope is concerned, are long enough to bridge the vertical space between the rows of cable A without overlapping or crossing these cables. The cables B are secured in position by mesh strips 20 on the rear sides of these cables and mesh strips 21 on the front faces of the same. The strips 20 on the rear sides of the cables B lie against the inner surfaces of the rear strips 18 of the cables A while the outer strips 21 of the cables B underlie the outer strips 19 of the cables A, thus securely fastening together the horizontal and vertical cables A and B. The cables B are provided with the same intermediate mesh strips 16 as the cables A and the mesh strips 20 and 21 are secured to the cables B by bending over some of its cross wires of the embedded mesh strips 16.

The cables for forming the foundation of the

baffle wall are laid in the manner just described and all joined together by the mesh strips 18, 19, 20, 21 and 16 so that the foundation of the baffle wall consists of a network of cables of asbestos fiber or the like securely fastened together and for the most part occupying a large part of the spaces between the several tubes of the bank. Where the tubes of one row are vertically staggered with respect to the tubes of an adjacent row, the cables B will have to be inclined to the vertical as illustrated in Figure 2 but were the tubes of the bank so arranged that all of the same are in vertical alignment, then the cables B would be vertical. This, however, is a matter which may be readily adopted for the particular style and arrangement of the tubes bank.

The formation of the cables A and B in the manner heretofore described to provide cables of substantial thickness so that a single layer network of these cables is sufficient as a foundation for a baffle wall.

When the cable network has been installed, which may be done as the tube bank is erected or which may be done in a tube bank which has been completed, plastic material consisting of fire resisting material is applied.

When the foundation has been suitably installed, the material which is applied in plastic form and which later sets is plastered over this foundation structure. This plastic material consists of heat resisting matter, such for instance as asbestos fiber mixed with plaster of paris or some similar cementing material. The plastic material is applied and caused to surround the tubes, filling the spaces between the cables and the tubes, as is indicated in Figures 2 and 3, so that the cables are completely embedded front and back and along the ends top and bottom. The plastic material is plastered closely around the various tubes so that when set, apertures through the baffle wall for the tubes are provided which have clean surfaces and which have the cables so thoroughly embedded in the set material as to offer no obstruction or impedance to the withdrawal of a tube and the replacement of a tube. Furthermore, the baffle wall construction in accordance with this invention does not crumble and chip as the tubes are cleaned by a turbine cleaner or like apparatus. The provision of the wire mesh strips increases the bonding effect between the plastic material and the cable foundation to an extent where an integral baffle wall of efficient character is constructed.

The baffle wall of the present invention allows flexibility throughout the entire wall to take care of an expansion and contraction to which the boiler tubes are subject under many different kinds of boiler operation, without distorting the baffle in any manner such as cracking or crumbling and falling out of parts of the wall.

This wall is of unusual lightness in weight, thus relieving the tubes of excess weight. Furthermore, the tubes expand and contract naturally, hence strain imposed on tubes when baffle walls of castings, tile or concrete are eliminated.

The materials are closely and intimately embedded about the tubes, but do not grip or hold the tubes as do other materials now in use, thus no damage to the tubes.

The invention has been described more or less precisely, but is not to be limited thereby, as changes may be made in the proportion, arrangement and selection of materials, and equivalents may be substituted, without departing from the spirit and scope of the invention.

The invention is claimed as follows:

1. A baffle wall for boiler tubes comprising a foundation structure of fibrous cables laid up in substantially horizontal and vertical rows against the tubes, means for tying together said cables in the form of a network, and plastic material applied over said foundation enveloping said cables and said tying means and filling the spaces between the tubes and the cables. 80
2. A baffle wall for boiler tubes comprising a foundation structure consisting of fibrous cables laid horizontally between rows of tubes, other cables laid between vertical rows of tubes and connecting the first mentioned cables, material applied in plastic form about said foundation structure and the tubes to embed the cables and fill the spaces about the tubes and between the cables, said material on setting binding together the cables filling the spaces about the tubes and when set forming openings through the wall about the tubes and presenting smooth surfaces for the tubes to receive new tubes for replacements. 85
3. A baffle wall for boiler tubes comprising a foundation structure of fibrous cables laid up in substantially horizontal and vertical rows against the tubes, means for tying together said cables in the form of a network, plastic material applied over said foundation enveloping said cables and said tying means and filling the spaces between the tubes and the cables, and wire mesh strips laid along the cables, the mesh strips serving to fasten together the several cables and to prevent chipping or crumbling of the material during tube cleaning as well as tube replacement. 90
4. A baffle wall for boiler tubes comprising a foundation structure consisting of cables inserted horizontally between rows of tubes, every cable consisting of a plurality of strands, strips of wire mesh embedded in said cables between certain of the strands thereof, strips of wire mesh laid along the sides of the cables and secured thereto by engagement with the embedded mesh, and material in plastic form applied about said foundation structure and the tubes and embedding the cables and mesh and closely surrounding the tubes, the mesh binding together the cable and plastic material in substantially solid condition when the plastic material sets, the plastic material when applied flowing about the tubes and into intimate engagement with the same and the spaces between the adjacent cables to form a unitary wall. 95
5. A baffle wall for boiler tubes comprising cables laid in horizontal rows in vertically spaced relation, other cables laid in substantially vertical rows in horizontally spaced relation, the said cables forming a network about the tubes, the cables so laid forming boxes about the tubes, strips of wire mesh laid along front and rear faces of the cables with the strips of the horizontal rows against the outer surfaces of the strips of the vertical rows for securing said several rows together, and plastic material plastered over said foundation structure for forming the baffle wall. 100
6. A baffle wall for boiler tubes comprising a plurality of horizontal cables, short vertically disposed cables between juxtaposed tubes and extending between two adjacent horizontally laid cables, mesh strips against the front and back faces of the vertical cables and crossing the intervening horizontal cables, mesh strips along the front and back faces of the horizontal cables co-extensive with the length of the same, the strips along the horizontal cables overlying the strips along the vertical cables to bind said cables into substantially unitary form, and plastic material plastered over the cable network and bound thereto by the mesh strips. 105
7. A baffle wall construction for application to boiler tubes comprising fibrous cables assembled in network across the tubes, and strips of wire mesh for tying together said cables to form the network and maintain it in position for receiving plaster-like material. 110
8. A baffle wall for boiler tubes comprising a foundation of fibrous cable laid up in substantially criss-cross manner, strips of wire mesh along said cables to retain the same in position, and plastic material plastered over said foundation for completing the baffle wall. 115
9. A baffle wall for boiler tubes comprising a plurality of cables of fibrous material laid against a series of tubes in a bank with the cables spaced by the tubes and with the cables in the same plane, the cables being laid up in substantially horizontal and vertical rows, mesh material overlying said rows of cables for maintaining said cables in position, and plastic material plastered over said cables and mesh material for completing the wall. 120

JOHN J. TOMPKINS. 125

55 130

60 135

65 140

70 145

75 150

CERTIFICATE OF CORRECTION.

Patent No. 1,921,049.

August 8, 1933.

JOHN J. TOMPKINS.

It is hereby certified that the name of the assignee in the above numbered patent was erroneously described and specified as "George E. Moore" whereas said name should have been described and specified as "George R. Moore", as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 19th day of September, A. D. 1933.

(Seal)

M. J. Moore.
Acting Commissioner of Patents.