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BAFFLE FOR WATER TUBE BOILERS AND METHOD OF CONSTRUCTING SAME.

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1,032,697.

Patented July 16, 1912.

2 SHEETS—SHEET 1.

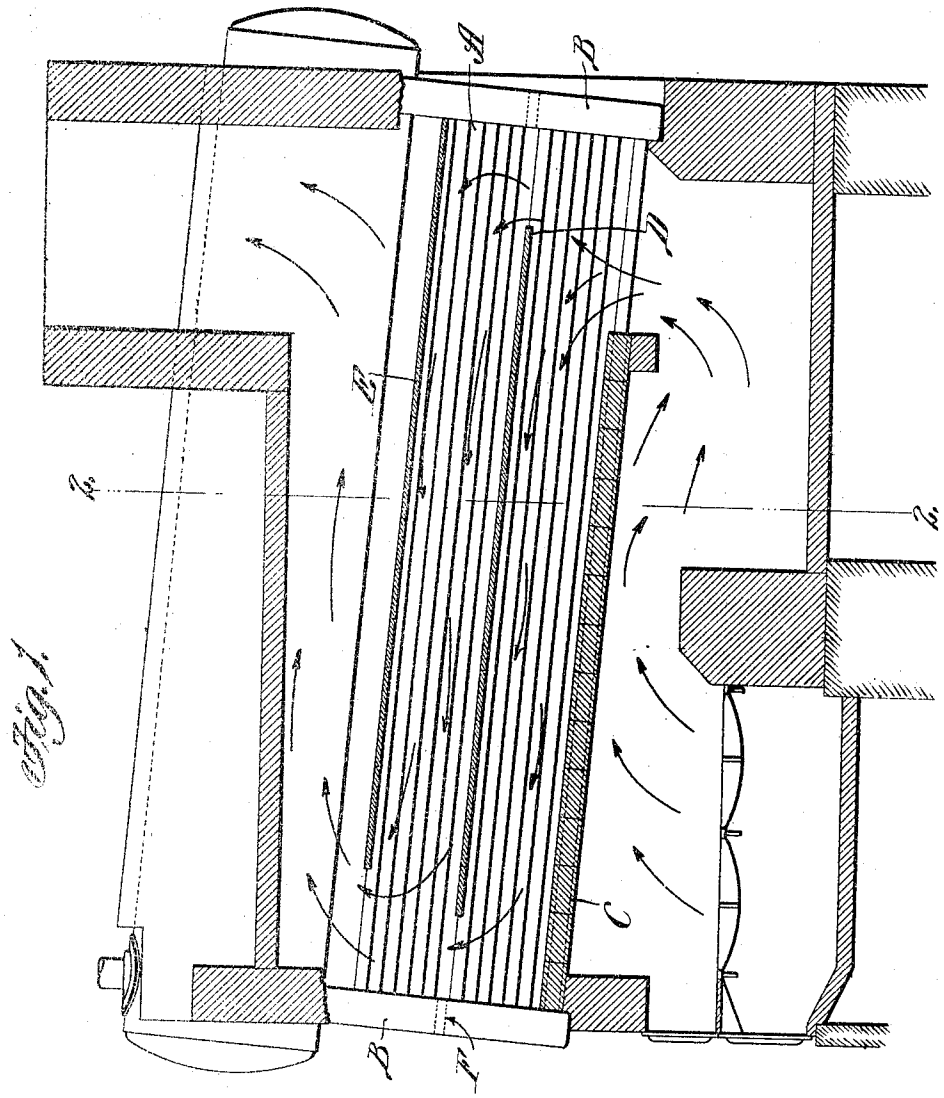

Fig. 1.

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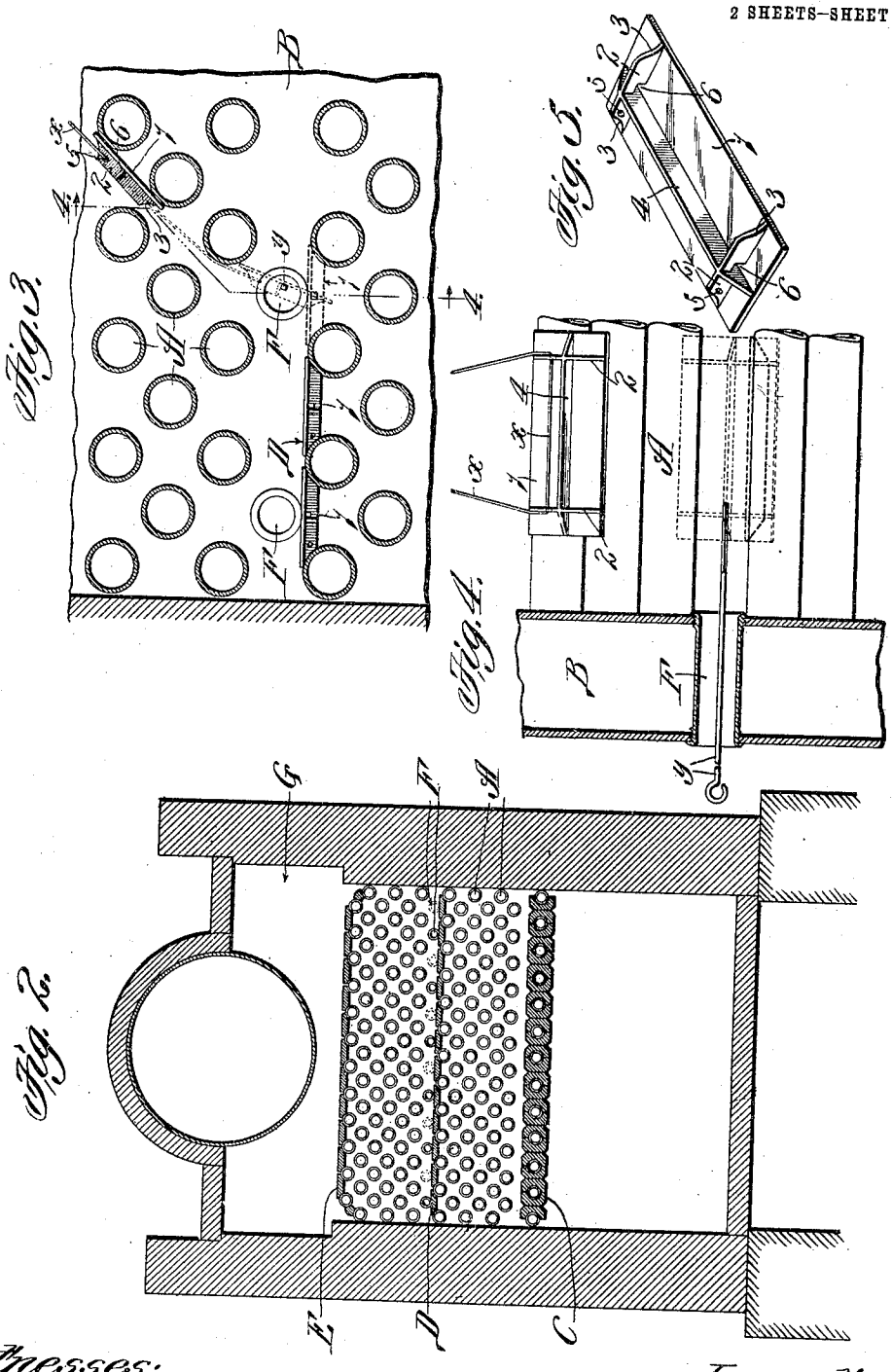

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UNITED STATES PATENT OFFICE.

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BAFFLE FOR WATER-TUBE BOILERS AND METHOD OF CONSTRUCTING SAME.

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To all whom it may concern:

Be it known that I, FREDERICK O. PAHMEYER, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Baffles for Water-Tube Boilers and Methods of Constructing Same, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to water tube boilers, and particularly to water tube boilers of the type in which a horizontally disposed baffle is arranged approximately midway between the top and bottom baffles of the boiler so as to cause the gases to travel longitudinally of the tubes.

Prior to my invention it was the general practice to form the middle baffle of a water tube boiler of baffle tiles or members that were introduced through hollow stay tubes in the water legs of the boiler and then slid longitudinally of the tubes into final position. It is not practicable to use large stay tubes or tubes of relatively great diameter in the water legs of the boiler owing to the construction of the water legs and to the fact that the large stay tubes take up too much of the water-circulating space in the water leg, and therefore the baffle tiles which have heretofore been used were comparatively small and of such design that they could be introduced through the hollow stay tubes. Consequently, a great deal of time was consumed in forming the middle baffle of the boiler on account of the large number of comparatively small tiles that had to be used. Furthermore, two horizontal rows of tubes were required to carry each middle baffle because the baffle tiles had to be arranged in a zig-zag manner between the upper and lower tubes so that the upper ends of the tiles would bear upon the tubes of the top row and the lower ends of the tiles would bear upon the tubes of the lower or bottom row. This, of course, cut down the efficiency of the boiler because the baffle tiles covered so much of the tubes that only a small part of each tube was exposed to the gases on the under side of the baffle. Furthermore, middle baffles made up of small baffle tiles of the character above-mentioned could not be adjusted quickly and easily on account of the great number of tiles and the way they were supported on the tubes, nor could the soot be removed easily from the faces of said baffle owing to the irregularity of said faces, the fact that the baffle could not be adjusted easily being quite an objectionable feature because the most efficient position or location of the middle baffle can only be determined by experiment after the boiler has been in operation for some time.

One object of my invention is to provide a water tube boiler in which the middle baffle can be installed quickly and easily, thus reducing the cost of erecting the boiler.

Another object is to provide a water tube boiler in which the middle baffle can be altered easily while the boiler is in operation, the baffle being formed from members that have a relatively small contact on the tubes, and whose top surfaces are of such design that when assembled they will form a smooth baffle from which the soot can be removed easily.

Another object is to provide a water tube boiler whose middle baffle is carried entirely by one of the horizontal rows of tubes, and which is so designed that the major portion of the surfaces of the tubes which carry the baffle are exposed to the gases on the under side of the baffle.

Another object is to provide a baffle member of novel construction that can be installed or removed easily, that can be altered in position and extent so as to conform to the best operating conditions, and which can be used to form either the top, middle or bottom baffle of a water tube boiler. And still another object is to provide a novel method of constructing the middle baffle of a water tube boiler.

Figure 1 is a vertical longitudinal sectional view of a boiler constructed in accordance with my invention; Fig. 2 is a transverse sectional view taken on approximately the line 2—2 of Fig. 1; Fig. 3 is an enlarged transverse sectional view taken through the tubes illustrating the first step in the method of arranging the baffle members in position; Fig. 4 is a longitudinal sectional view taken through the tubes illustrating the second step in the method of arranging the baffle members in operative po-

sition; and Fig. 5 is a perspective view of one of the baffle members arranged in an inverted position.

Referring to the drawings which illustrate the preferred form of my invention, A designates the tubes of the boiler whose opposite ends are supported by water legs B, and C designates the lower baffle which extends over the combustion chamber. A horizontally disposed baffle D, which I will hereinafter refer to as the middle baffle, is arranged approximately midway between the lower baffle C and the upper baffle E so as to cause the gases to travel longitudinally of the tubes, as indicated by the arrows in Fig. 1. Said middle baffle D is formed from a number of baffle members 1 which are arranged in a horizontal position upon one horizontal row of tubes, as shown in Fig. 3. The baffle members 1 that I prefer to use are formed from cast metal, and consist of a substantially flat plate provided on its under side with a plurality of transversely extending ribs 2 whose ends are curved slightly at 3, as indicated in Fig. 5, so that they will conform to the shape of the tubes A on which they rest. If desired, a longitudinally extending rib 4 may be formed on the under side of the member 1 so as to strengthen said member and interrupt the transverse ribs 2 so that said transverse ribs cannot hook onto the tubes whenever the baffle members are being removed, as hereinafter described, the opposite ends of said strengthening rib 4 being preferably inclined or tapered. Openings 5 are formed in the transverse ribs 2 on one side of the longitudinal rib 4, and non-circular-shaped openings 6 are formed in said ribs 2 on the opposite side of said longitudinal rib so as to facilitate the arrangement of the baffle members 1 in operative position.

The baffle members 1 are not introduced through hollow stay tubes in the water legs of the boiler, as has heretofore been the general practice, but said baffle members are slid downwardly between the tubes into approximate position, as shown in Fig. 3, and are thereafter turned into a horizontal position and placed upon the tubes by means of a bar or other suitable tool which the operator inserts through a hollow stay tube F in the water leg B of the boiler, both water legs being provided with several hollow stay tubes, as shown in Fig. 1, which are arranged a slight distance above the horizontal row of tubes that carry the middle baffle, and the hollow stay tubes in the rear water leg B being arranged in staggered relation to the hollow stay tubes in the front water leg. The space or flue G above the tubes A of the boiler is large enough to enable a workman to enter same. Consequently, the baffle members 1 can be slid downwardly through the tubes, as indicated in Fig. 3. In arranging the baffle members 1 in position the workman first inserts a string or other suitable flexible device x through the openings 5 in the transverse ribs 2 on the under side of a baffle member and then allows said baffle member to slide downwardly between the tubes until it is approximately opposite one of the hollow stay tubes F in the water leg of the boiler at the end of the boiler at which the workman is located, as shown in broken lines in Fig. 3. Another workman then introduces a bar y or other suitable tool provided with a non-circular-shaped end through the hollow stay tube and inserts the end of said tool in the non-circular-shaped opening 6 in one of the transverse ribs 2 on the under side of the baffle member, as illustrated in Fig. 4. Thereafter, said workman rotates the tool y so as to turn the baffle member into a horizontal position, thus causing it to rest squarely upon two of the tubes A. The flexible device x and tool are withdrawn and another baffle member is slid downwardly and thereafter turned into a horizontal position and placed upon the tubes, these operations being repeated until the required number of baffle members have been arranged in position to form a middle baffle D of the desired dimensions. If desired, the flexible device x that is used to position the baffle member may be tied to said member and left attached thereto because as soon as the boiler is fired said flexible device will be burned up. The baffle members are preferably introduced at a point adjacent one of the water legs of the boiler and are then slid longitudinally on the tubes into final position.

The baffle D of the construction above described can be installed quickly and easily on account of the comparatively few members that are required to form the baffle; and another desirable feature of such a baffle is that it increases the efficiency of the boiler owing to the fact that only one horizontal row of tubes are required to carry the baffle, and the baffle members are so designed that all except a small portion of each tube is exposed to the gases on the under side of the baffle. A middle baffle D of the construction above-described can not only be installed quickly and at a low cost, but it can also be removed easily because the members from which it is formed are so designed that the workman can introduce the tool y through the hollow stay tubes, grasp the baffle members and lift them from the tubes and then turn them so that they will slide downwardly into the space beneath the boiler. The top baffle E of the furnace may also be formed from baffle members 1 of the construction above-

described, and if said baffle members were made of refractory material it would also be practicable to use them to form the bottom baffle C of the boiler. Therefore, while my improved baffle member is of greatest value in forming the middle baffle of a water tube boiler it can also be used to form the top or bottom baffle of such a boiler.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A water tube boiler provided with a plurality of horizontal rows of tubes, baffle members arranged in a horizontal position at one end of said horizontal rows of tubes so as to form a baffle, and means on said baffle members for coöperating with devices that are used during the operation of arranging the baffle members in operative position.

2. A water tube boiler provided with horizontal rows of tubes, a baffle carried by one of said horizontal rows of tubes and consisting of a plurality of members, each of which spans the space between two of the tubes of said row, means on said baffle member for coöperating with a device that is used to lower the baffle members between the tubes of the boiler, and means on said baffle members that is adapted to coöperate with a tool used to turn the baffle member into final position after it has been lowered to approximate position.

3. A water tube boiler provided with a plurality of horizontal rows of tubes, baffle members arranged upon the tubes of one of said horizontal rows, longitudinally extending ribs on the under sides of said baffle members provided with upwardly inclined ends, transversely extending ribs on the under sides of said baffle members which lie between the tubes of the row of tubes on which said members are mounted, and openings in said transverse ribs on opposite sides of said longitudinal ribs substantially as and for the purpose described.

4. A method of constructing the middle horizontal baffle of a water tube boiler which consists in sliding baffle members downwardly through the rows of tubes into approximate position, and thereafter turning the baffle members into substantially a horizontal position and placing them upon the tubes which carry them.

5. A method of constructing the middle horizontal baffle of a water tube boiler in which the tubes are arranged in staggered relation, which consists in sliding baffle members downwardly between the tubes into approximate position, and thereafter introducing a tool through an opening in one of the water legs of the boiler so as to engage said baffle members and turn them from a substantially vertical into a horizontal position and place them upon the horizontal row of tubes that carries the middle baffle.

6. A method of constructing the middle horizontal baffle of a water tube boiler which consists in suspending baffle members from flexible devices and lowering them down between the tubes of a boiler into approximate position, introducing a tool through an opening in the water leg of the boiler so as to engage the baffle members, and finally turning said tool so as to arrange the baffle members in an approximately horizontal position and place them upon the row of tubes that carries the baffle.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this thirtieth day of January 1912.

FREDERICK O. PAHMEYER.

Witnesses:
GEORGE R. LADSON,
GEORGE BAKEWELL.