No. 754,342. PATENTED MAR. 8, 1904.

J. PHILP.

HEAT CIRCULATOR FOR BOILER TUBES.

APPLICATION FILED MAY 8, 1903.

NO MODEL.

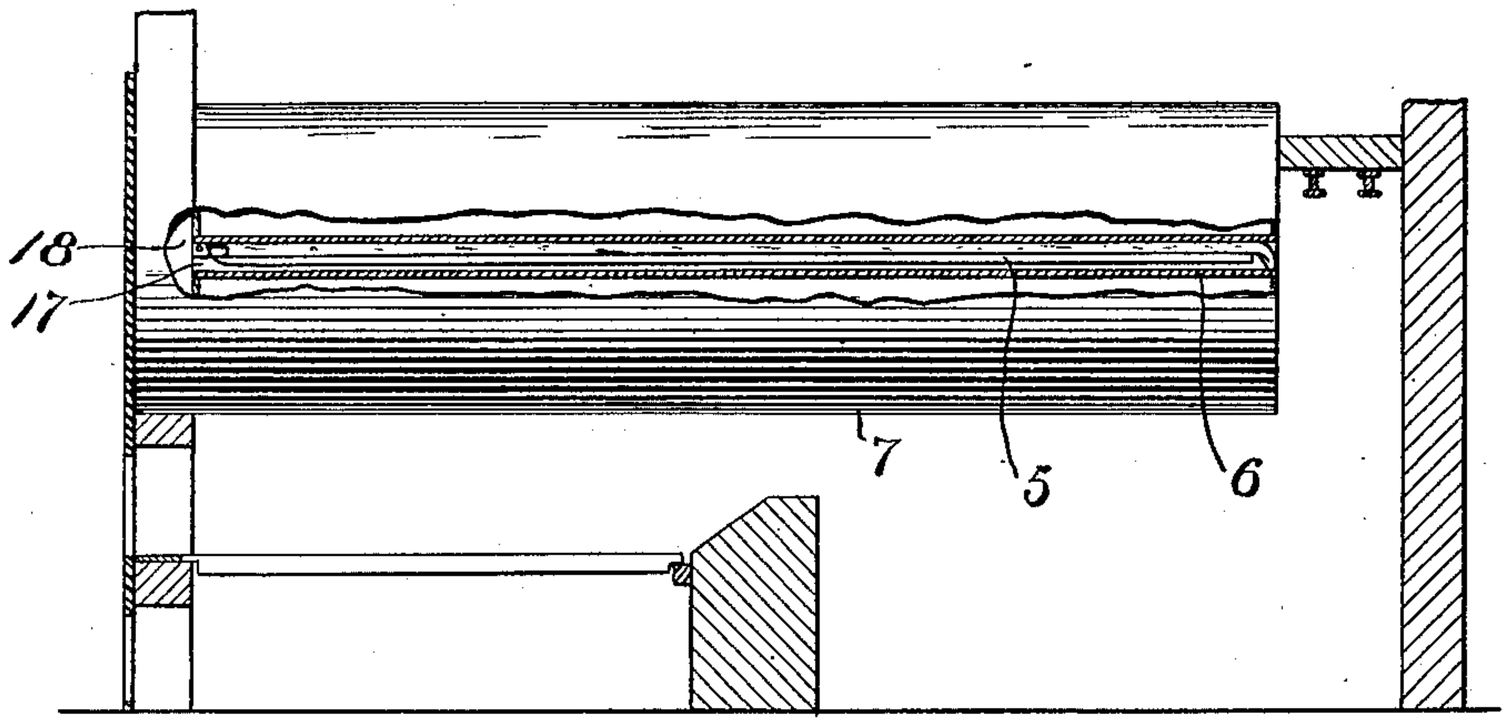

Fig. 1.

Fig. 2.

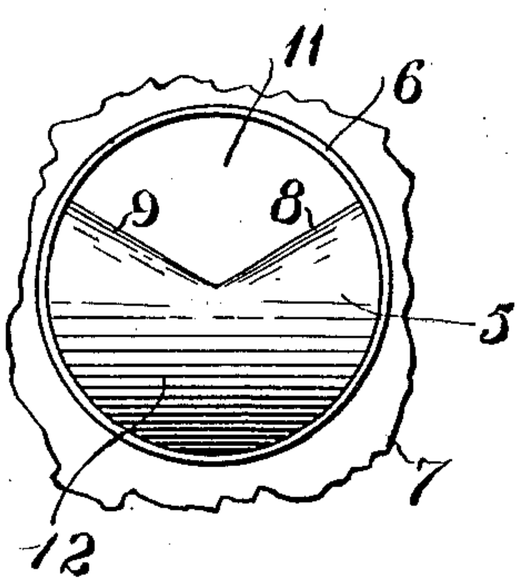

Fig. 3.

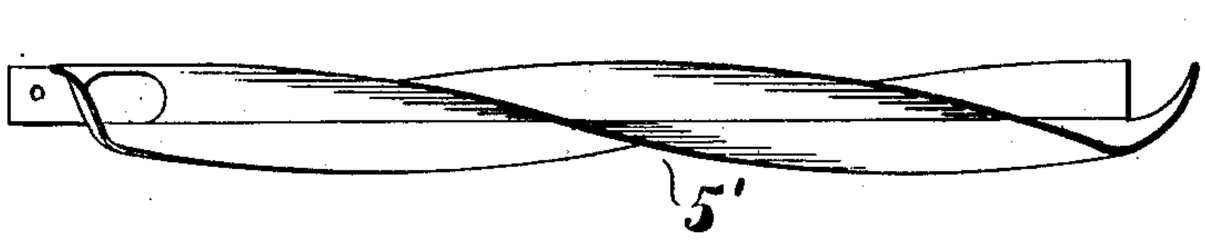

Fig. 4.

WITNESSES:

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No. 754,342. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

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HEAT-CIRCULATOR FOR BOILER-TUBES.

SPECIFICATION forming part of Letters Patent No. 754,342, dated March 8, 1904.

Application filed May 8, 1903. Serial No. 156,288. (No model.)

To all whom it may concern:

Be it known that I, JOHN PHILP, a citizen of the United States, and a resident of New York, in the county and State of New York, have invented a new and useful Heat-Circulator for Boiler-Tubes, of which the following is a specification.

This invention relates to boilers, and especially to that class which are provided with tubes; and the object thereof is to provide means to increase the travel of the heated gas of combustion through the tubes before allowing it to escape up the chimney.

I accomplish the object of my invention by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a boiler with a portion thereof broken away to show my improvement applied to one of the tubes. Fig. 2 is a perspective view of my improved baffle-piece. Fig. 3 is an end view of the tube shown in Fig. 1, on an enlarged scale, the view being taken at the rear of the boiler; and Fig. 4 is a side view of a modified form of construction.

In the accompanying drawings the several parts of my invention are indicated by numerals of reference, and in practice I provide a baffle-piece 5, which I mount in each tube 6 of a boiler 7, only one of which tubes is shown. The piece 5 is made slightly less in length than the length of the tube 6 in which it is provided and is provided with three equal radial flanges 8, 9, and 10 of a radius equal to the interior radius of the tube 6, so that the tube is divided in three substantially equal channels. The first channel 11 is open to receive the gases of combustion at the rear of the boiler as they rise from the fire-box, the other channels being shut off from the inflowing gases by the curved portion 12 of the same diameter as the inner diameter of the tube, so that the gases travel the length of the tube through the channel 11, from which they pass into channel 13 through the opening 14 in the flange 9 and travels back through the tube 6 until it reaches a point adjacent to the rear end of the tube, whence it passes through the opening 15 into the remaining channel 16 and can pass at the end 17 into the chimney 18, so that the gas passes through the tube three times before being delivered into the chimney. In order to make the gas pass from the channel 11 into channel 13, a curved portion 19 is provided, similar to the curved portion 12, except that the flange 9 bisects the under side of said curved portion.

The operation will be readily understood from the foregoing description. Ordinarily the gas passes from the fire-box to the rear of the boiler and then through the several tubes and is delivered to the chimney with only a portion of the heat thereof conveyed to the water in the boiler, owing to the rapidity of the travel of the gas. With this device the gas is made to return upon itself, thereby giving longer time for the extraction of the heat before allowing it to escape into the chimney.

The device will work satisfactorily with any boiler having tubes, but is preferable where induced or forced draft is used, as the area of the line of travel of the gas is reduced, and means should be provided to increase the rapidity of the flow.

In Fig. 4 I have shown a modified form of construction in which the flanges of the piece 5′ are made spiral, so that greater travel is given to the gas than where straight flanges are used, as will be readily understood. The construction is otherwise just the same.

It will be understood that changes may be made in the details of construction without departing from the spirit of my invention, and I reserve the right to make such changes.

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

1. A baffle-piece for the tubes of a boiler, said piece having a plurality of channels, and deflecting means to cause the gas to flow successively through said channels.

2. A baffle-piece for boiler-tubes comprising three radial flanges separating or dividing the tube in which it is mounted into three channels, and deflecting means to cause the gas to flow successively through said channels.

3. A baffle-piece for the tubes of a boiler, said piece having three radial flanges equal in

radius to the radius of the tube, curved portions at each end separating the channels formed by said flanges, and two of said flanges having communicating passage-ways therethrough, for the purpose described.

4. A baffle-piece for boiler-tubes, said piece having radial flanges of a radius equal to the radius of the tubes in which the piece is mounted thereby forming channels, and partitions at the ends of said pieces separating said channels, as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN PHILP

Witnesses:
E. L. LIVINGSTONE,
C. B. HARRIS.