(No Model.)

G. H. DRAKE.

STEAM BOILER.

No. 523,109. Patented July 17, 1894.

Fig. 1.

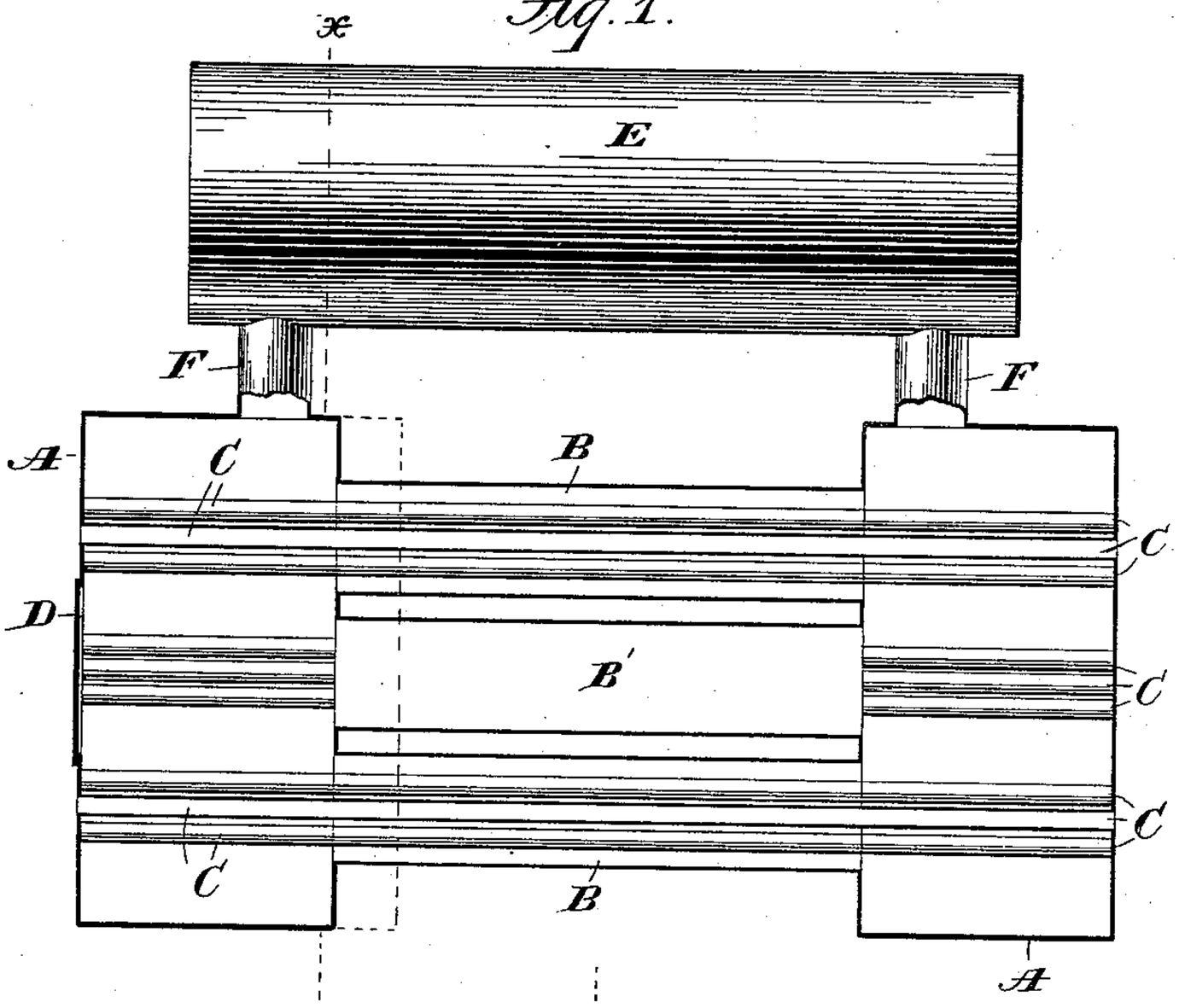

Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE H. DRAKE, OF OMAHA, NEBRASKA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 523,109, dated July 17, 1894.

Application filed April 24, 1894. Serial No. 508,819. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. DRAKE, of Omaha, in the county of Douglas, and in the State of Nebraska, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a boiler constructed in accordance with my invention; Fig. 2 a cross section on the line *x*—*x* of Fig. 1.

Letters of like name and kind refer to like parts in both figures.

The design of my invention is the provision of a steam boiler of large and economical generating capacity, and capable of easy access for cleaning and repairs, and to this end, said invention consists in the boiler constructed substantially as and for the purpose hereinafter specified.

In the carrying of my invention into practice, I employ two short cylindrical drums A and A which constitute water heads, and connect the inner plates or ends *a* thereof, by a number of water tubes B, and B of such diameter as to contain each, several parallel tubes C and C of small diameter that extend between and open through the outer plates or ends of said drums and constitute fire tubes. It will thus be seen that the boiler is a combined water tube and fire tube one, and therefore has a very large heating surface as it combines the advantageous features of both.

Instead of heat being applied only to the under surface of a single large cylinder as in the ordinary fire tube construction, it has effective access to the exterior of a large number of cylinders, and instead of reaching only the exterior of the tubes as in the water tube construction, the interior of said cylinders is also reached, and that very efficiently by reason of the employment of a number of fire tubes within each cylinder.

The tubes or cylinders B and B, are arranged in a circle around a central water tube B′, and with the tubes below the latter situated in a plane to each side of a line passing vertically through the center of said tube B′, so that a space will be left through which the heat can pass directly to said central tube, and after acting upon it, be deflected to the adjacent tubes B.

No fire tubes are placed within the tube B′, and it has such diameter as to permit of a man passing into and through it from end to end of the boiler for cleaning or repair purposes, and to afford access to it a man hole D is provided in the outer end of the rear water head or drum A. By reason of the omission of fire tubes from said tube B′, and the accordingly increased water holding capacity thereof, and its position the circulation of water in the boiler is materially assisted.

Preferably the diameter of each tube B is such that a space will be left around the fire tubes to give access for cleaning or repairs.

It will be apparent that a boiler constructed in accordance with my invention, will possess great strength, as the inner ends of the water drums A and A are connected, and braced by the water tubes B, and B, and the outer ends by the fire tubes C and C. No brace or stay rods are therefore necessary.

A steam drum E of ordinary construction is connected by a pipe F with the top of each water drum A and A.

Having thus described my invention, what I claim is—

1. In a steam boiler, the combination of suitable heads, a centrally located water tube of large diameter connecting said heads, like water tubes arranged around the former tube, and fire tubes extending through the latter tubes, substantially as and for the purpose shown.

2. In a steam boiler, the combination of suitable heads, a centrally located water tube of large diameter connecting said heads, like water tubes arranged around the former tube with the ones below it separated to leave a space directly beneath it, and a number of fire tubes extending through each water tube, except the central one, substantially as and for the purpose set forth.

3. In a steam boiler, the combination of suitable heads, a centrally arranged water tube of large diameter extending from the inner plate of one head to that of the other, like water tubes disposed around the former and also extending between said plates, and

arranged so that the ones below the central tube leave a space directly beneath it, and a number of fire tubes extending from the outer plate of one head to the like plate of the other and through each water tube except the central one, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 17th day of April, 1894.

GEORGE H. DRAKE.

Witnesses:
HUGH W. WILLIAMS,
LEONIDAS H. BRADLEY.