No. 649,320. Patented May 8, 1900.

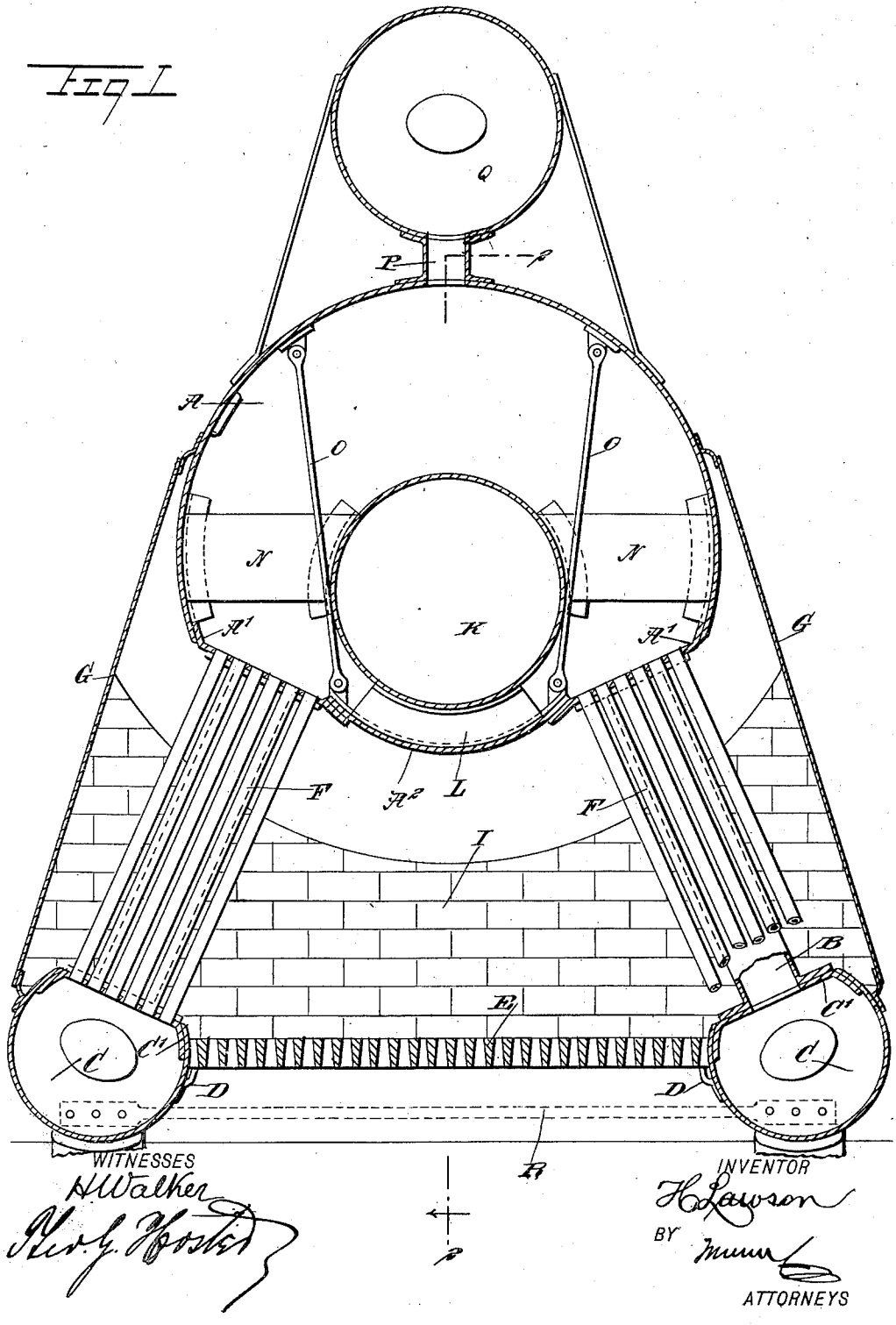
H. LAWSON.

MARINE BOILER.

(Application filed Oct. 4, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig 1



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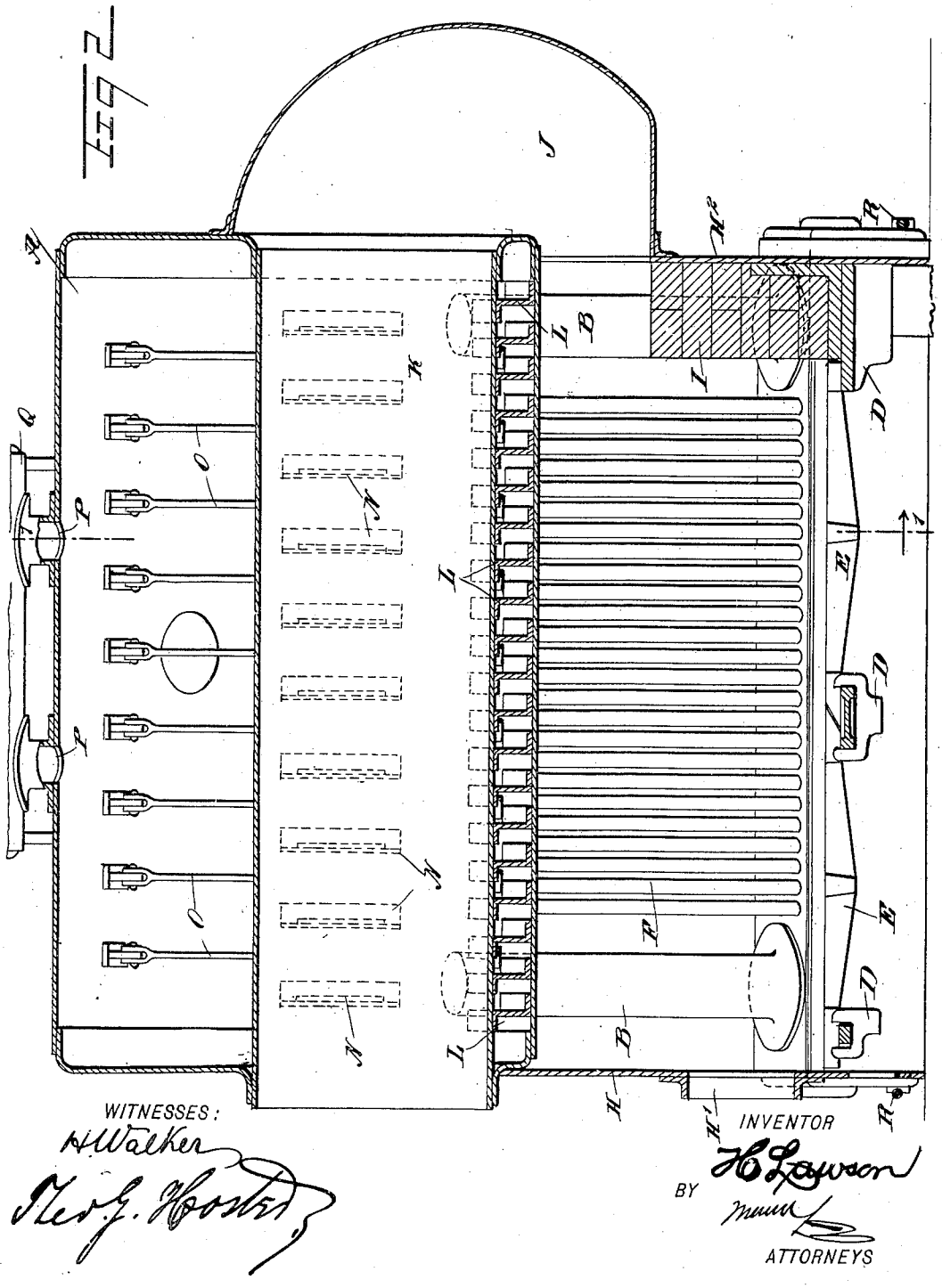

UNITED STATES PATENT OFFICE.

HARRY LAWSON, OF JERSEY CITY, NEW JERSEY.

MARINE BOILER.

SPECIFICATION forming part of Letters Patent No. 649,320, dated May 8, 1900.

Application filed October 4, 1899. Serial No. 732,491. (No model.)

To all whom it may concern:

Be it known that I, HARRY LAWSON, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and Improved Marine Boiler, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved marine boiler which is simple and durable in construction and arranged to provide a large heating-surface and a rapid water circulation to insure a quick generation of steam.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of my invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the viws.

Figure 1 is a cross-section of the improvement on the line 1 1 in Fig. 2, and Fig. 2 is a longitudinal sectional elevation of the same on the line 2 2 in Fig. 1.

The improved boiler is provided with a shell A, made approximately cylindrical in cross-section and formed at its lower end at opposite sides with flat plates A', from which extend downwardly and outwardly the water-return circulating-pipes B, connected with similar flat plates C' on the upper ends of mud-drums C, placed a suitable distance apart, as is plainly indicated in Fig. 1, and adapted to rest on a suitable foundation. The mud-drums C are provided at their inner sides with suitable supports D for a grate E, located a distance above the foundation to form an ash-pit below the grates and a fire-box above the grates. The plates A' and C' are also connected with each other by sets of straight water-tubes F, placed close together, as indicated in Figs. 1 and 2, to form upwardly-inclined side walls for the fire-box, as will be readily understood by reference to the drawings. The sides of the shell A are connected with the sides of the mud-drums C by side plates G, located a distance from the outermost tubes F, and the forward ends of said plates G connect with a front head H, having the usual fuel-door H' for introducing the necessary fuel upon the grate E of the fire-box. The rear ends of the plates G are connected with a rear plate H^2, on the inside of which is arranged a bridge-wall I, built of brick and extending from one plate G to the other, as is plainly indicated in Fig. 1. The top edge of the bridge-wall I extends a suitable distance below the rear end of the shell A, so that the smoke and gases emanating from the fuel burning on the grate E can pass over the said bridge-wall into a combustion-chamber J, attached to the rear plate H^2 and opening into a rear end of a return-flue K, extending through the shell A, near the bottom thereof, to connect at its forward end in the usual manner with the chimney for carrying off the smoke and gases. The ends of the return-flue K are secured to the heads of the shell A, and a portion of the flue K rests on transverse segmental beams L, resting on the bottom portion of the shell A. Transversely-extending braces N connect the sides of the shell A with the sides of the flue K, so that the latter is securely held in position within the shell A. The bottom portion A^2 of the shell A is connected by sling-stays *o* with the top of the shell to relieve the plates A' as much as possible of undue strain and to strengthen the construction of the shell to such an extent as to readily withstand the pressure of the steam generated in the shell. From the top of the shell A lead branch pipes P to a steam-dome Q, from which the steam is taken to the engine or other machinery.

By the arrangement described it will be seen that a very strong and durable shell A is provided and a rapid circulation of the water is established, owing to the large number of tubes F and the return circulating-pipes B, connecting the shell A with the mud-drums C. Furthermore, a large heating-surface is provided, especially as the circulating-pipes B and tubes F are completely surrounded by the heat emanating from the burning fuel in the fire-box, and all the heat generated will be utilized to its fullest extent, as the heat has to pass through the combustion-chamber J and the flue K before passing to the chimney.

By having the plates A' and C' made flat it is evident that the tubes F and pipes B can be readily secured in the usual manner in said plates, and in case it is necessary to remove worn-out tubes it can be readily accom-

plished without disturbing the general construction of the shell A or that of the mud-drums C.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A boiler comprising a shell, a return-flue within the shell, spaced mud-drums extending longitudinally below the shell, a grate between the mud-drums, water-return circulating-pipes connecting the ends of the mud-drum with the shell sets of tubes extending from the mud-drums to the shell between the end circulating-pipes, said pipes and tubes forming with the grate a fire-box, a combustion-chamber at one end of the fire-box and extending over the corresponding end of the return-flue, and means for holding the return-flue in position within the shell, substantially as described.

2. A boiler comprising a shell, a steam-dome connected with the top of the shell, a return-flue within the shell, spaced mud-drums extending longitudinally below the shell, a grate between the mud-drums, water-return circulating-pipes connecting the ends of the mud-drums with the shell, sets of tubes extending from the mud-drums to the shell between the end circulating-pipes, said pipes and tubes forming with the grate a fire-box, a combustion-chamber at one end of the return-flue, to cause the smoke and gases from the burning fuel and the fire-box to pass into the combustion-chamber, side cover-plates extending from the sides of the shell to the outer sides of the mud-drums a distance from the return and circulating pipes, a head at one end of the fire-box and extending to said side plates, a bridge-wall at the other end of the fire-box and likewise extending to the side plates, and means for holding the return-flue in position within the shell, substantially as shown and described.

3. A boiler, comprising a shell, a return-flue in said shell, transverse spaced beams for supporting the crown-sheet in the bottom of the shell, and sling-stays at the sides of the return-flue and connecting the top of the shell with the bottom thereof, substantially as shown and described.

4. A boiler, comprising a shell, a return-flue within the shell, spaced mud-drums extending longitudinally below the shell, a grate between the mud-drums, water-return pipes connecting the ends of the mud-drums with the shell, sets of tubes extending from the mud-drums to the shell between the end circulating-pipes, said pipes and tubes forming with the grate a fire-box, a combustion-chamber at one end of the fire-box and extending over the corresponding end of the return-flue, to cause the smoke and gases from the burning fuel and the fire-box to pass into the combustion-chamber, to and through the return-flue, and transverse braces for connecting the sides of the shell with the sides of the return-flue, substantially as shown and described.

HARRY LAWSON.

Witnesses:
JOHN P. LEWIS,
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