

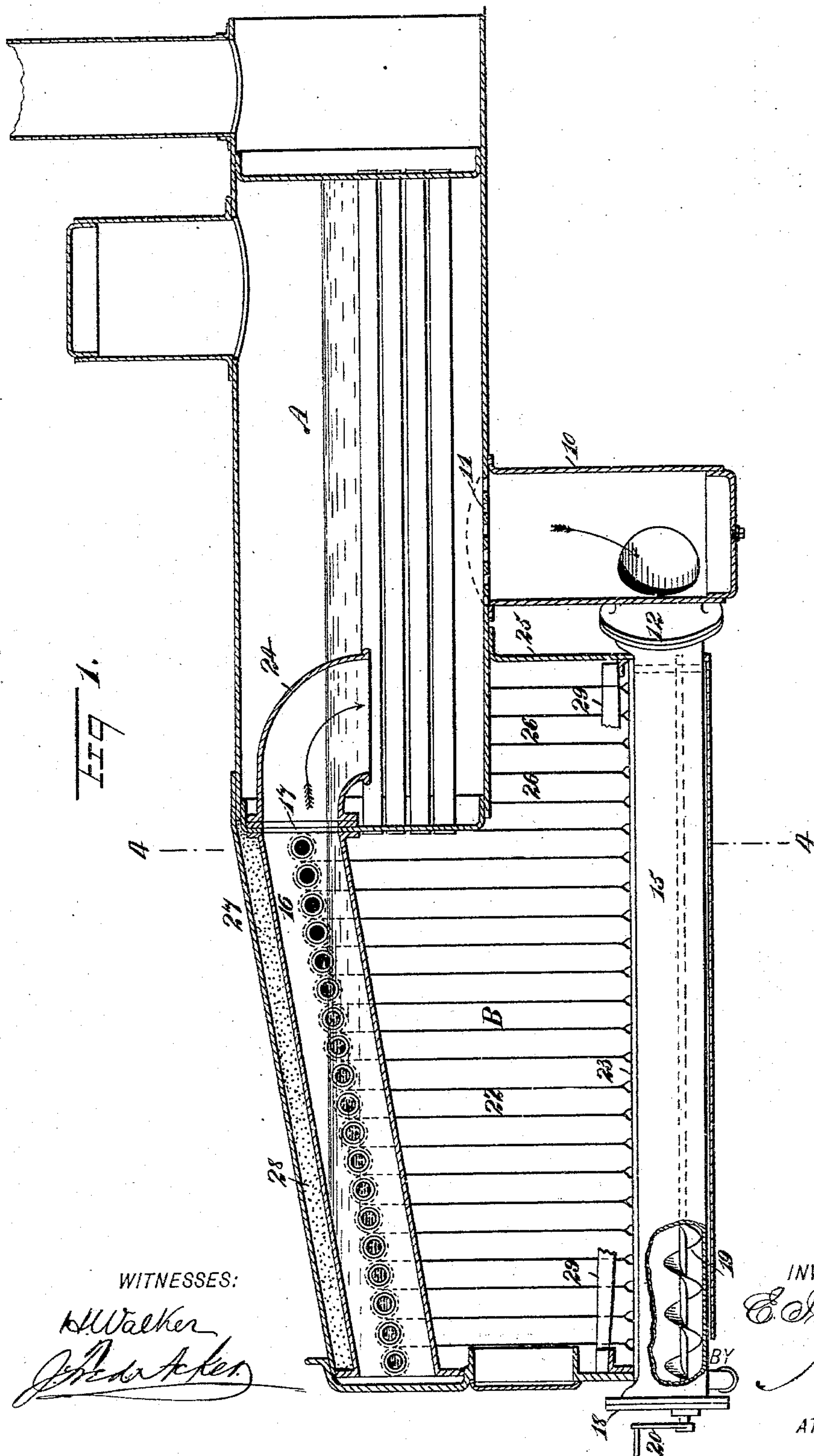
(No Model.)

3 Sheets—Sheet 1.

E. INGLETON.  
FIRE BOX FOR BOILERS.

No. 551,548.

Patented Dec. 17, 1895.



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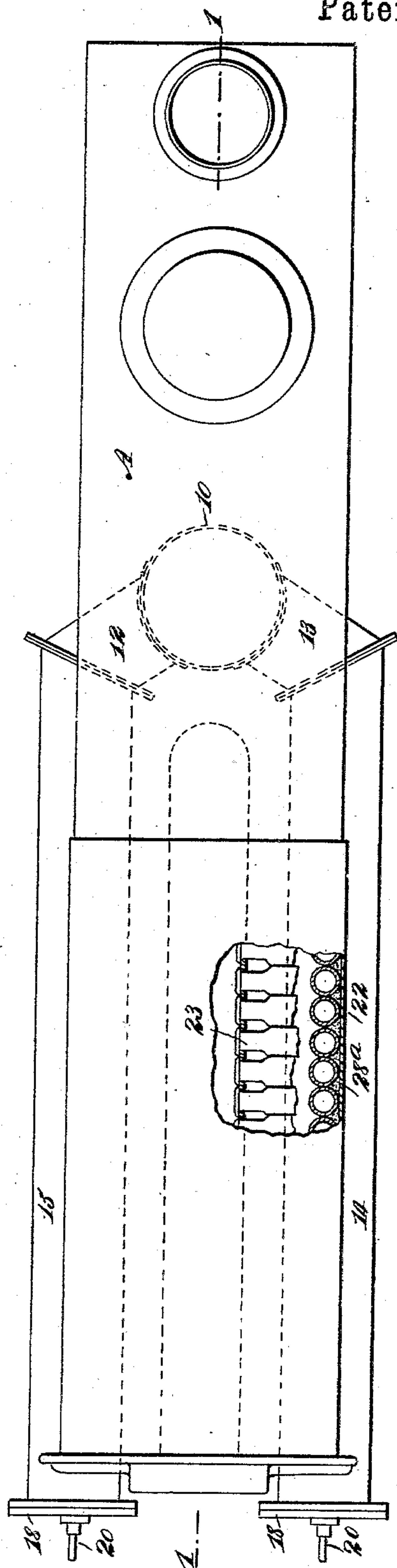


FIG. 2

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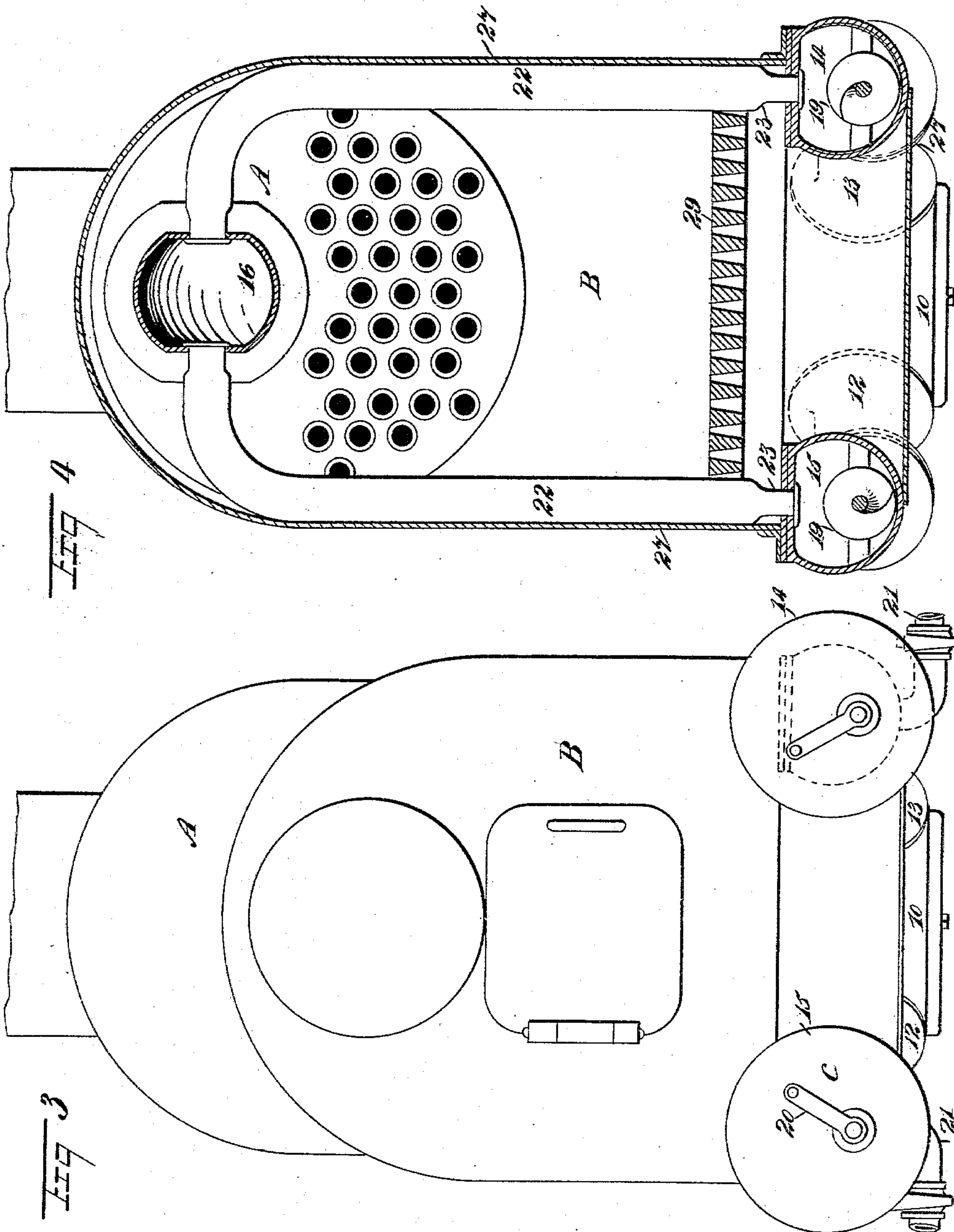
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# UNITED STATES PATENT OFFICE.

EDWARD INGLETON, OF POTTSTOWN, PENNSYLVANIA.

## FIRE-BOX FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 551,548, dated December 17, 1895.

Application filed August 16, 1895. Serial No. 559,521. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD INGLETON, of Pottstown, in the county of Montgomery and State of Pennsylvania, have invented a new and useful Improvement in Fire-Boxes for Boilers, of which the following is a full, clear, and exact description.

My invention relates to an improvement in fire-boxes for boilers of locomotives and traction-engines; and the object of the invention is to provide a tubular fire-box, the fire-box being constructed entirely of tubes with their ends reduced so as to allow them to be brought tight together, making thereby a flame-tight tubular box; and a further object of the invention is to provide for sufficient material between the tubes at bottom and top, or where they enter the water legs or drums, to admit of proper fastening by expanding in the ordinary way.

A further object of the invention is to provide a detachable fire-box, or one which may be expeditiously and conveniently entirely removed from the boiler for cleaning and repairs, and furthermore to so construct the fire-box and so connect it with the interior of the boiler that a perfect circulation of water will be obtained, the nozzle adapted to return water into the boiler being placed under the water-line for the purpose of keeping the fire-box constantly charged, and whereby also under the said construction of fire-box the tubes cannot become short of water so long as there is a reasonable quantity in the boiler, no matter whether the engine is going up a hill or down a grade.

Another object of this invention is to provide cleaning devices for the lower mud-drums or water-legs, whereby the latter may be expeditiously and conveniently cleaned from all sediment, mud, &c.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification; in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal vertical section through the improved fire-box and the boiler to which it is applied. Fig. 2 is a plan view

of the fire-box and boiler, a portion of the jacket of the fire-box and a portion of sundry of the tubes being broken away. Fig. 3 is a front elevation of the improved fire-box, and Fig. 4 is a transverse section taken on the line 4 4 of Fig. 1.

The boiler A is of the type common to traction or locomotive engines, and is provided at the bottom with a water-pocket 10 separated from the interior of the boiler by a grate 11. Two branch pipes 12 and 13 are projected in opposite directions from opposite sides of the water-pocket, being carried outward and forward, as shown in Fig. 2, and each branch pipe is connected with a drum or water-leg, the latter being designated, respectively, as 14 and 15, as is also shown in Fig. 2. These water legs or drums 14 and 15 constitute the lower side portions of the fire-box B, and a third water leg or drum 16 is employed, which is preferably given an upward and a rearward inclination, being connected at its higher end with the head of the boiler, as shown in Fig. 1, the said head having an opening 17 therein communicating with the interior of the afore-said upper drum. The upper drum where it connects with the head of the boiler is provided with a flange, and is secured to said head by bolts or their equivalents, and where the lower drums or water-legs 14 and 15 connect with the branch pipes of the water-pocket flanges the bolts are likewise employed. The lower water-drums are closed at their forward ends by caps 18 or their equivalents, as shown in Figs. 1 and 3, and in each of the lower water legs or drums a screw 19 is journaled, one end of which extends out through the caps of the drums and is adapted to be turned by a crank 20 or its equivalent. These screws are adapted to clean the lower water-legs or mud-drums from mud or other sediment, the said sediment finding escape through valved pipes 21 connected with the lower portion of the forward ends of the said drums.

The construction of the body of the fire-box is completed by forming its sides of a series of circulating-tubes 22, and these tubes are placed so close together as to form a flame-tight joint between them. All of the circulating-tubes are provided with reduced upper and lower extremities 23, and the lower re-



duced ends of the circulating-tubes are made to enter the lower water-legs or mud-drums, while the upper ends of the said tubes are entered into the upper water-leg 16, and the said circulating-tubes are secured in the water-legs by expanding their reduced ends in the ordinary way.

By reducing the ends of the circulating-tubes sufficient material is left between the tubes in the water-legs to admit of an expander being used, and consequently an exceedingly tight and economical joint can be obtained. At the same time the bodies of the tubes come close together and form a fire-tight side and top to the fire-box, since, as shown in Fig. 4, the circulating-tubes are carried vertically upward from the lower mud-drums or water-legs, and are then curved inward to a connection with the upper water-leg which is located at the central portion of the fire-box.

A nozzle 24 is made to surround the opening 17 leading into the upper water-leg from the boiler, and the said nozzle is curved downward to such an extent that its lower end will be below the water-line. The object in carrying this nozzle down below the water-line is for the purpose of keeping the tubes of the fire-box always charged with water. The throat-sheet 25 is carried some distance beneath the boiler and somewhat near the water-pocket, and short tubes 26, which are not circulating-tubes, form the rear side portions of the fire-box. As stated, however, these short tubes are not circulating-tubes, and are capped at their upper ends, their lower ends, however, being expanded in the lower water-legs or mud-drums in the same manner as the circulating-tubes. They are simply intended to complete the sides of the fire-box back as far as the throat-sheet. The object in placing the throat-sheet so far back under the boiler proper is to protect it from fierce fire, and for the same reason these short tubes are not seriously exposed. Hence the want of circulation is not important.

When the boiler has received its proper quota of water, all of the circulating-tubes will have been filled for practically their entire length, and as soon as ebullition takes place in the boiler every circulating-tube will be filled with water from end to end, and likewise the upper water-leg throughout its entire length. The fire-box is provided with a jacket 27, and between the jacket and upper drum a backing 28 of asbestos or other fireproof material is located, and a similar backing 28<sup>a</sup> is placed between the circulating-tubes and the vertical walls of the fire-box jacket, as shown in Fig. 2.

It will be observed that the circulation in this fire-box will be complete, since the water entering at the lower water-legs will pass up the circulating-tubes into the upper water-leg and thence back into the boiler. Any approved form of grate 29 may be employed for the fire-box.

One of the advantages of this fire-box is

that it may be readily removed from the boiler for cleaning or for repairs, and this is accomplished by breaking three joints only—namely, removing the bolts from the flanges of the water-legs where they connect with the head of the boiler and with the branches from the water-pocket.

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

1. In a fire box for boilers, the combination of two horizontal water legs arranged upon opposite sides of the fire box at its bottom, a single water leg arranged longitudinally in the middle line of the fire box at the top, and two separate series of water tubes, each series being arranged upon one side of the fire box with their tubes in tight juxtaposition, both ends of said tubes being reduced in size, and their lower ends entered into and expanded within the lower water legs, and their upper ends bent inwardly, reduced, and entered into and expanded within the sides of the middle water leg at the top of the fire box, substantially as and for the purpose set forth.

2. In a fire box for boilers, the combination of two horizontal water legs arranged upon opposite sides of the fire box at the bottom, a single inclined water leg arranged longitudinally in the middle line of the fire box at the top and having its lower end at the front of the fire box and its upper end communicating with the boiler, and two separate series of water tubes, each series being arranged upon one side of the fire box with their tubes in tight juxtaposition, both ends of said tubes being reduced in size, and their lower ends entered into and expanded within the lower water legs, and their upper ends being bent inwardly, reduced, and entered into and expanded within the sides of the middle water leg at the top of the fire box, substantially as and for the purpose described.

3. A detachable fire box chamber comprising two horizontal water legs at the bottom, a middle water leg at the top, both being provided with detachable couplings for the boiler, and two series of tightly juxtaposed vertical tubes connected at top and bottom with the said water legs and forming therewith an integrally removable fire box chamber, substantially as shown and described.

4. The combination, with a boiler, of a fire box, said fire box consisting of lower water legs, an upper water leg connecting with the boiler and provided with a nozzle extending within the boiler below its water line, and tubes forming the sides and substantially the top of the fire box, the said tubes being brought together with a substantially flame-tight connection, having one extremity secured in a lower water leg and the other extremity in the upper water leg, as and for the purpose specified.

5. The combination, with a boiler, its water pocket and branches from the same, of a fire box comprising lower water legs remov-



ably connected with the branches of the water  
pocket, an upper water leg removably con-  
nected with the head of the boiler, and tubes  
connected with the upper and lower water  
5 legs, forming the sides and substantially the  
top of the fire box, whereby upon disconnect-  
ing the water legs from the boiler the fire box

may be removed therefrom for cleaning pur-  
poses or for repairs, substantially as shown  
and described.

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Witnesses:

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