

(No Model.)

T. CLIFFORD.  
FURNACE ATTACHMENT.

No. 467,157.

Patented Jan. 19, 1892.

Fig. 1.

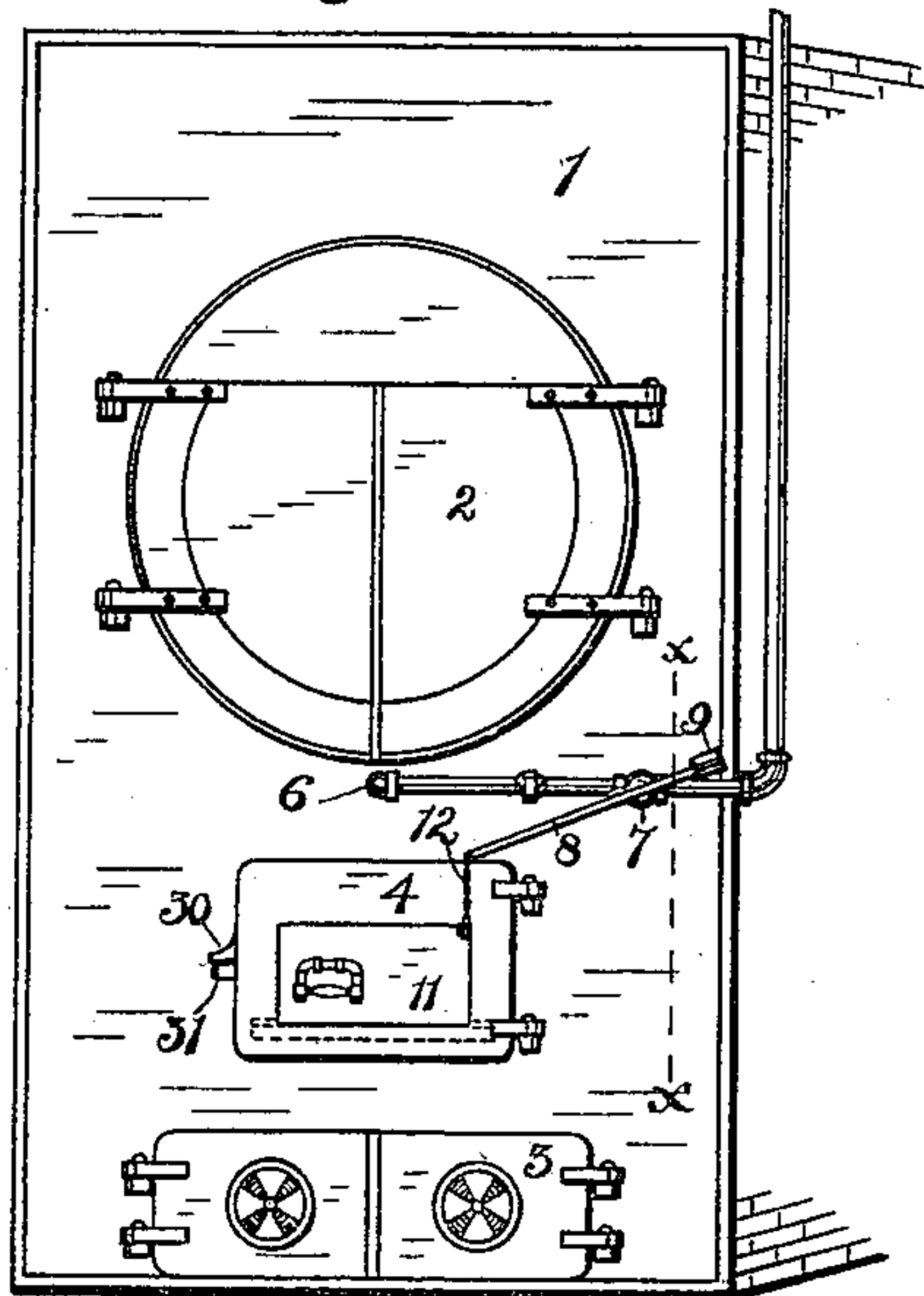


Fig. 2.

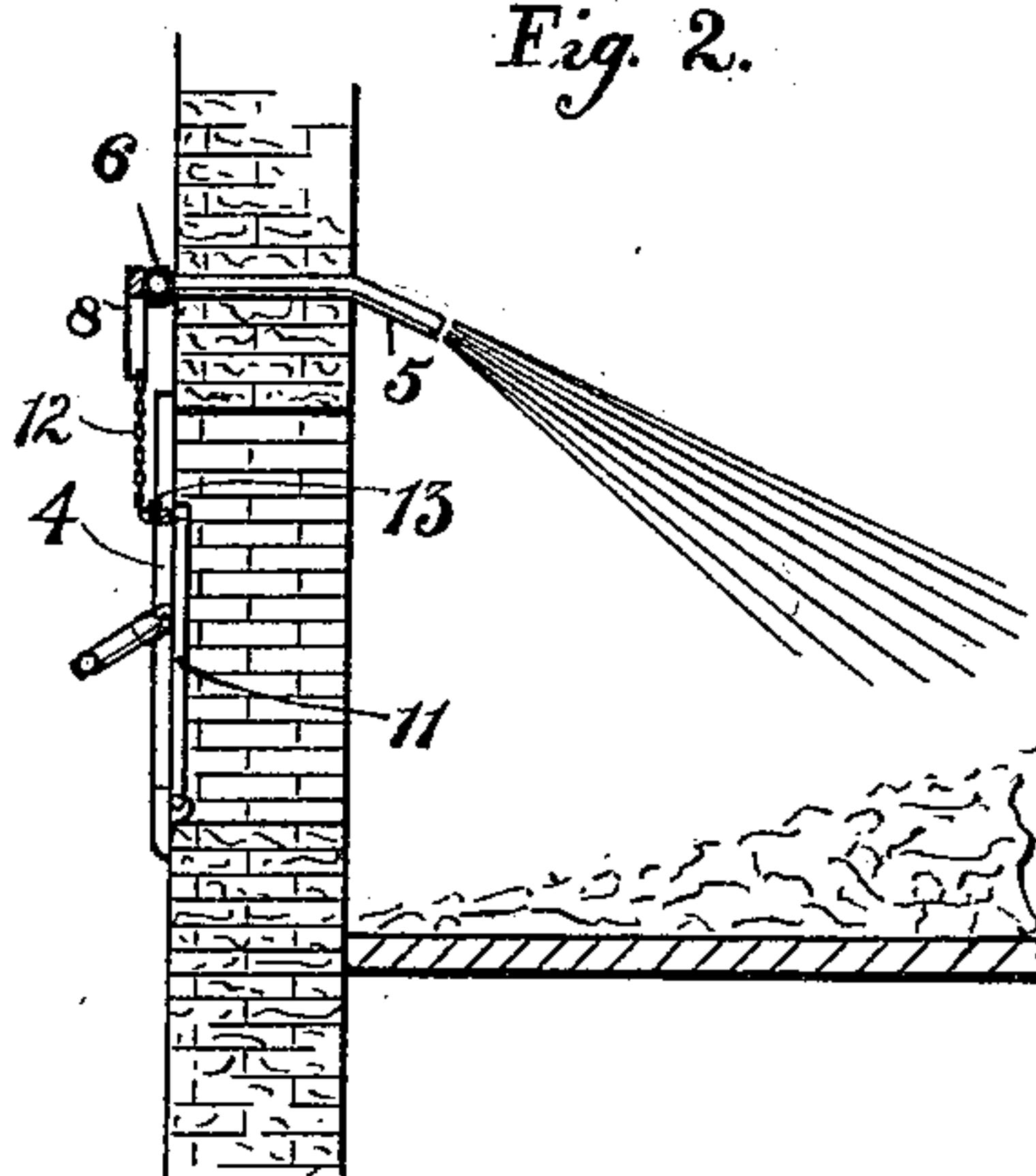


Fig. 3.

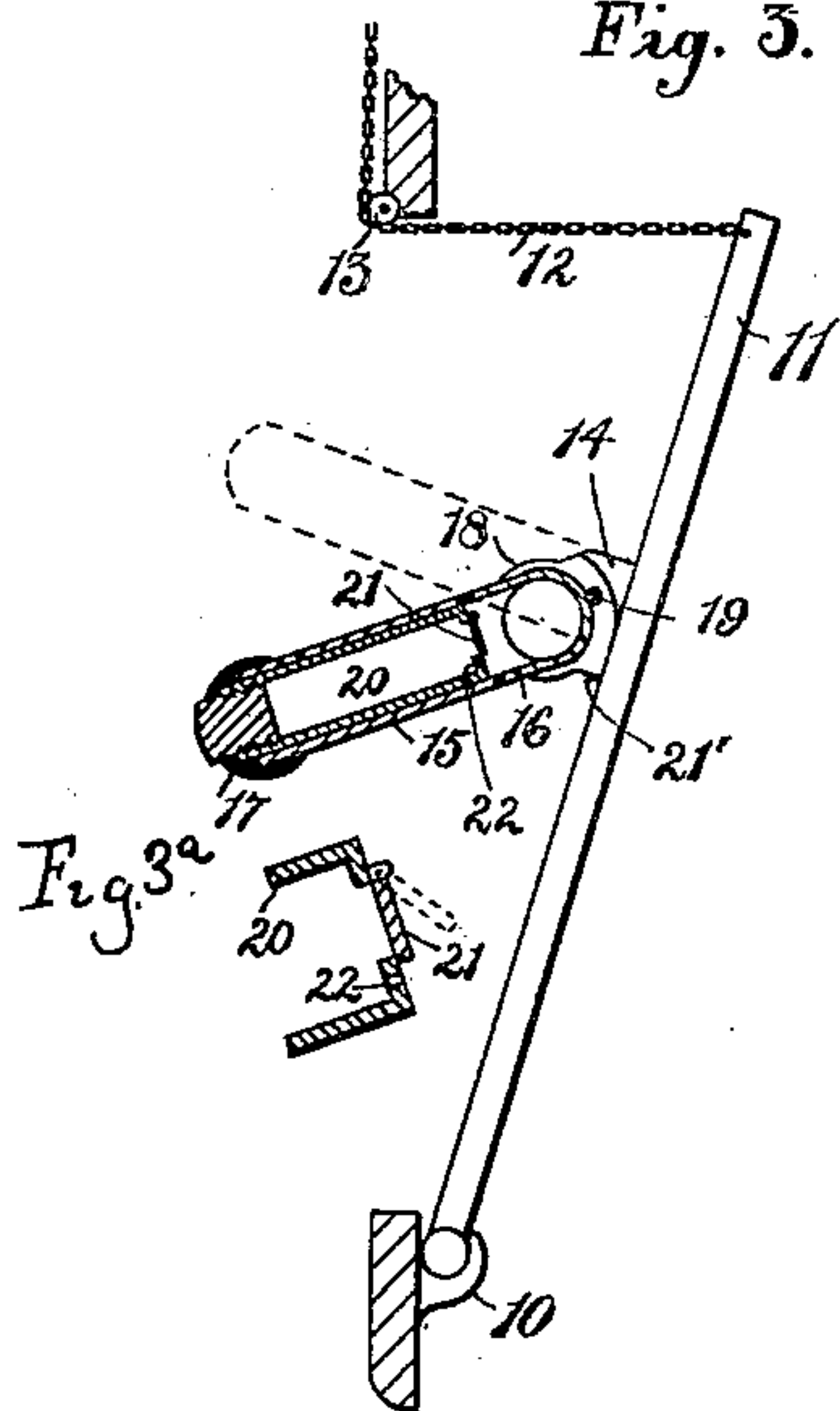
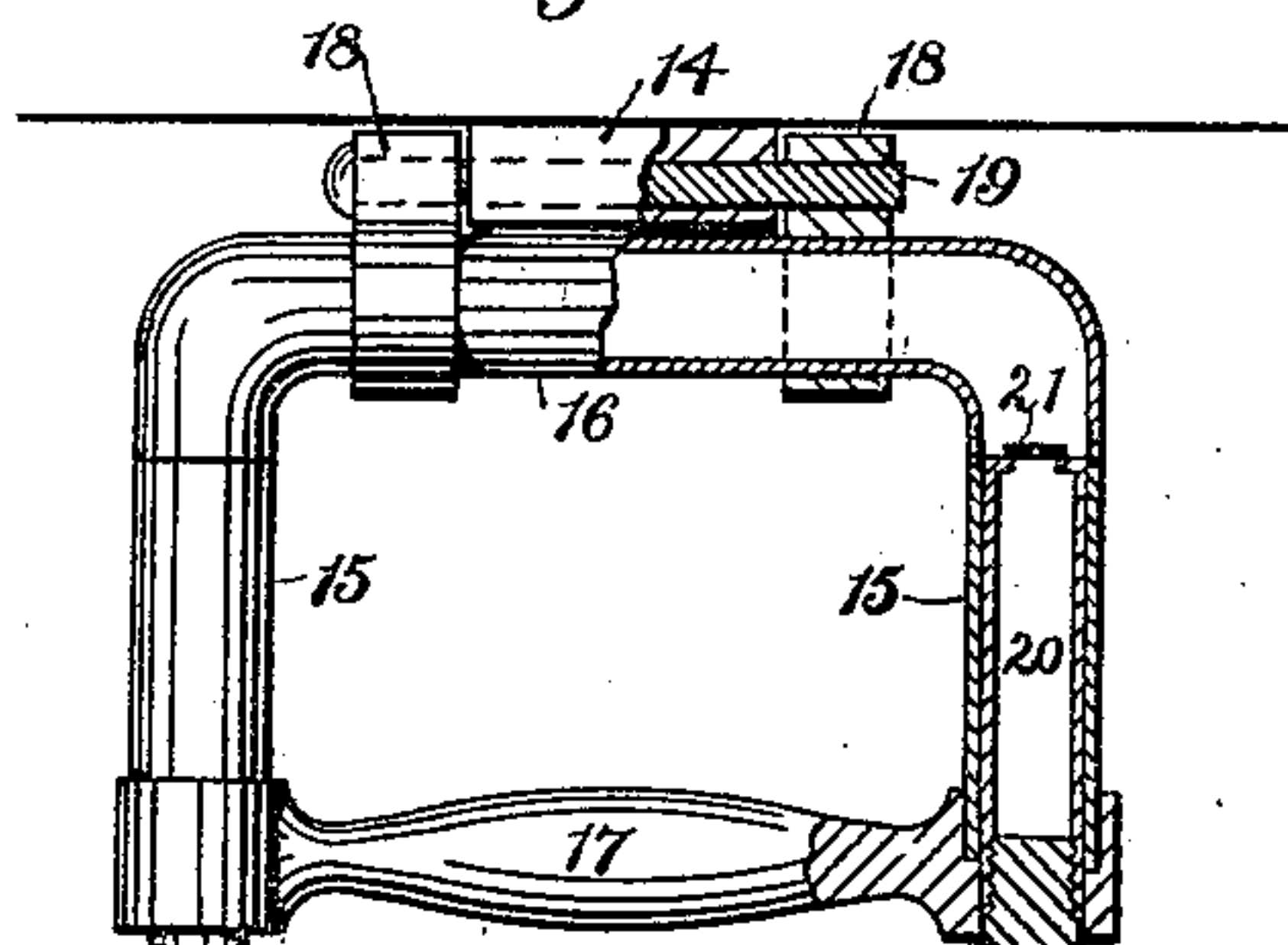


Fig. 4.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

THOMAS CLIFFORD, OF ROCHESTER, NEW YORK.

## FURNACE ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 467,157, dated January 19, 1892.

Application filed May 6, 1891. Serial No. 391,784. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS CLIFFORD, of Rochester, in the county of Monroe and State of New York, have invented certain new and  
5 useful Improvements in Furnace Attachments; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this  
10 specification, and to the figures of reference marked thereon.

My present invention has for its object to provide an attachment for steam-boiler and other furnaces, whereby when the fresh fuel  
15 is placed therein a steam-jet will be turned on over the fire and whereby, also, air will be admitted over the fire for a length of time sufficient to effect the complete combustion of the black smoke usually rising from fresh  
20 fuel, and then automatically shut off both the steam and air; and it has, further, for its object to supply mechanism whereby either the air alone or the steam alone may be turned on and then shut off automatically; and to these  
25 ends the invention consists in certain improvements in construction and combinations of parts, all as will be hereinafter described, and the novel features pointed out in the claims at the end of this specification.

30 In the drawings, Figure 1 is an elevation of a steam-boiler furnace provided with my invention; Fig. 2, a longitudinal section on the line *xx* of Fig. 1; Fig. 3, a view of the auxiliary door and handle; Fig. 3<sup>a</sup>, a detail view;  
35 Fig. 4, a sectional view of the handle.

Similar reference-numerals indicate similar parts.

1 indicates the usual masonry boiler-setting, 2 a steam-boiler of any desired construction, and 3 the ash-pit doors, as usual. The  
40 furnace-door 4, which, however, is of a peculiar construction, is located as usual, and just above it is arranged a steam spray or jet 5 in a steam-pipe 6, adapted to throw a spray  
45 of steam over the fire, as in Fig. 2, said pipe connecting with the boiler. Arranged in the pipe 6 is a valve or cock 7, having a lever 8 connected to its stem, on one end of which is mounted a weight 9, tending to turn said stem  
50 so as to close the valve and prevent the passage of steam to the jet or spraying device 5.

The furnace-door 4 is provided with a lug

30, engaging a catch 31 on the casing and a central opening, and on its rear side with lugs 10, forming bearings for corresponding lugs 55 on a supplemental door 11, arranged on the inner side of door 4 and adapted to close against the latter. To this door 11 is connected one end of a chain 12, passing over a small roller or pulley 13, and connected at its  
60 other end to lever 8, which latter projects over door 4 a little distance inside the hinges, so that when the lever 8 is in normal position with the valve 7 closed the supplemental door is closed; but when said main door 4 is opened 65 the chain will be pulled and the lever moved down, turning on the steam, and when said door is closed the weight 9 would immediately cut off the steam; but as it is desirable not only that the steam-jet be permitted to  
70 operate, but that air enter over the fire for a short time after fresh fuel is placed upon it, I provide an arrangement for accomplishing this, preferably located upon the supplemental door and constructed as follows: On the  
75 front of the door 11 are formed two lugs 14, to which is pivoted, by means of lugs 18 and pin 19, a handle embodying the two side tubes 15, the hollow connecting portion 16, and the outer connecting-piece 17, preferably of  
80 wood. The tubes 15 are preferably provided with stationary inner tubes 20, having valves 21 at the end thereof opening toward the door, and also with a small by-pass or opening 22, affording a small, though free, passage  
85 between opposite ends of the tubes. Within the tubular handle is placed a quantity of mercury or other fluid sufficiently heavy to operate the door 11 on its hinges when thrown onto the opposite sides of the pivotal center, 90 and the handle is so arranged that the lower portions of the side tubes 15 will project in front of the pivotal center and in a lower plane than the upper connecting-tube 16 when the door 11 is open, said handle being pre- 95 vented from moving too far down by a lug or projection 21' engaging the door.

The operation will now be apparent. The parts being in position, with the door 11 held closed by the mercury, which is in the lower  
100 part of tubes 15 forward of the pivots, and the steam turned off, the fireman, when he wishes to place fuel on the fire, grasps the handle and by means of it raises the lug 30



out of engagement with the lug 31, as usual, this operation causing the mercury in the tubes to open valves 21 and pass to the connecting-tube 16 of the handle, and pulling  
 5 open the door turns the steam into the spraying device or jet 5 by opening the valve in the manner described, said steam assisting in retarding the exit of the black smoke and causing it to, in a measure, be consumed, as  
 10 is well known. The door is then closed, as usual; but as the mercury in the handle is held by the valves in the rear of the pivots of door 11 the latter and the steam-valve are held open and air admitted over the fire; but  
 15 the lower ends of the tubes 15 being below the connecting-tube of the handle the mercury gradually leaks back into these lower ends through the by-passes 22 until there is a sufficient amount to overweight the door 11,  
 20 when the latter will be tilted forward and closed, and the steam will at the same time be cut off from the jet by the slackening of the chain. The length of time the steam and air are admitted after the door is closed can be  
 25 regulated by adjusting the apertures of the by-passes or by adjusting the weight 9, as will be understood.

While I have shown and prefer to employ a double tubular handle containing the mer-  
 30 cury, it will be understood that a single tube could be employed with a valve and by-pass therein, and other modifications in construction could be employed, and therefore I do not desire to be limited to precisely the con-  
 35 struction shown in the drawings. For instance, it is obvious that, if desired to control merely the steam-jet supply by the handle used for operating the supplemental door without using the latter as a door for admit-  
 40 ting air to the furnace, a partition could be placed inside said door, or a tilting support for the handle constructed essentially like the door could be used, but without governing the entrance of air. However, I prefer the  
 45 whole arrangement substantially as specified, and it will undoubtedly be found in practice to be most advantageous.

I claim as my invention—

1. The combination, with the main furnace-door, of the pivoted operating-handle mounted 50 upon a pivoted support on the door, said handle being adapted to contain a liquid and provided with a valve and by-pass, a steam-jet operating in the furnace, a valve controlling it, and connections between said valve 55 and the handle, substantially as described.

2. The combination, with the furnace-door having the opening therein, of the movable supplemental door thereon, the pivoted operating-handle for controlling the operation 60 of the supplemental door, and main doors adapted to contain a liquid and a valve and by-pass therein, substantially as described.

3. The combination, with the furnace, the steam spraying device and the valve control- 65 ling it, and the door having the opening therein, of the supplemental door hinged thereon, the pivoted operating-handle for controlling the operation of the supplemental and main doors, adapted to contain a liquid, a valve 70 and by-pass therein, and a connection between the supplemental door and steam-valve, substantially as described.

4. The combination, with the main furnace-door having the opening therein, of the sup- 75 plemental door hinged thereon, the pivoted hollow operating-handle for controlling the operation of the main door and extending across the pivotal center of the supplemental door, having the valve and the by-pass therein, 80 substantially as described.

5. The combination, with the door having the opening, the supplemental door thereon, and the hollow pivoted operating-handle for controlling the main and supplemental doors, 85 having the valve and by-pass therein, of the steam-jet in the furnace, the valve controlling the passage of steam to said jet, the weight for turning said valve, and the chain connected to the valve and supplemental door, substan- 90 tially as described.

THOMAS CLIFFORD.

Witnesses:

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