

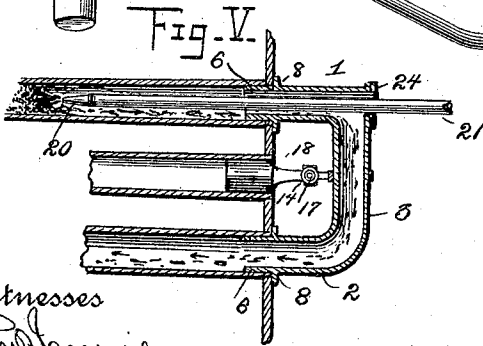
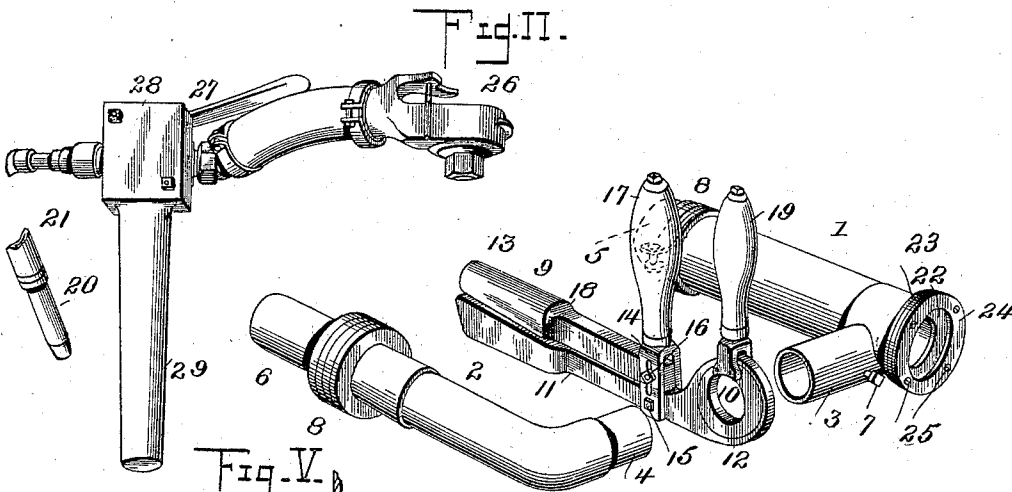
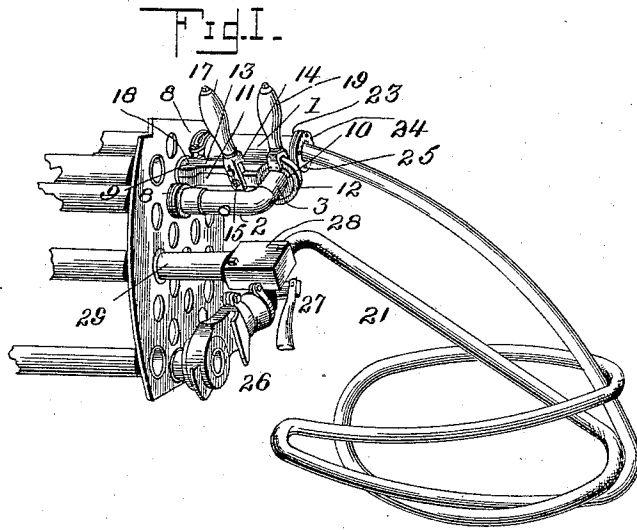
(No Model.)

2 Sheets—Sheet 1.

C. F. THOMAS.
FLUE CLEANER.

No. 534,928.

Patented Feb. 26, 1895.



Witnesses
John H. Allen
Walter E. Allen

Inventor
Christopher F. Thomas.

By *Knight Bros*
his Attorney

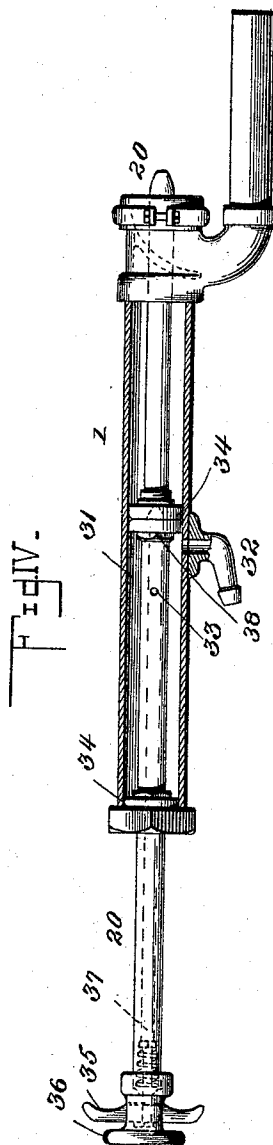
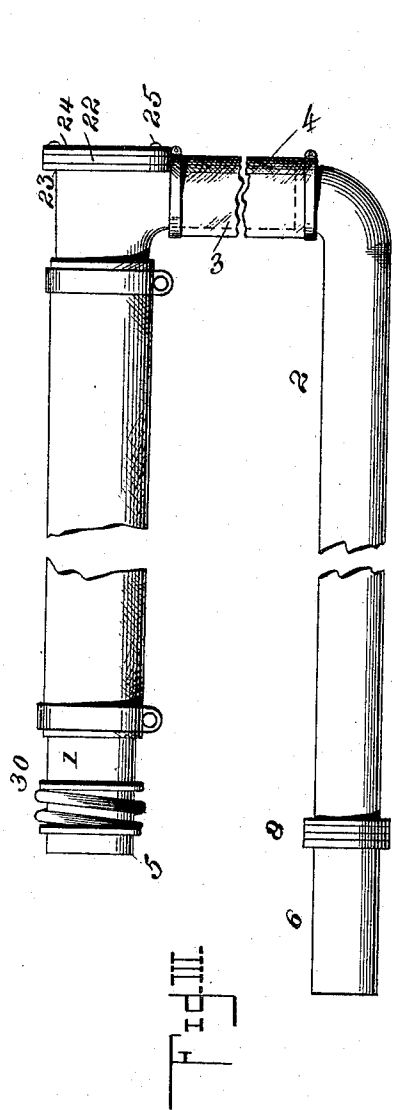
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FLUE CLEANER.

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Witnesses
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UNITED STATES PATENT OFFICE.

CHRISTOPHER F. THOMAS, OF ALEXANDRIA, VIRGINIA.

FLUE-CLEANER.

SPECIFICATION forming part of Letters Patent No. 534,928, dated February 26, 1895.

Application filed April 30, 1894. Serial No. 509,582. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER F. THOMAS, a citizen of the United States, residing at Alexandria, in the county of Alexandria and State of Virginia, have invented certain new and useful Improvements in Flue-Cleaners, of which the following is a specification.

My invention relates to a device for opening up obstructed flues of fire-tube boilers, or for analogous uses, and consists primarily of a blast nozzle in combination with a surrounding cylinder or duct which is adapted to communicate with the obstructed flue in rear of the blast and having an extension for entering an adjacent open flue, whereby the dust or other material displaced by the blast, is forced by the escaping current out of the obstructed flue, and through the cylinder and open flue into the smoke box at the front of the engine.

My invention consists further in certain novel details of construction which adapt such a device for convenient and ready use in carrying out the operation above described.

In the accompanying drawings:—Figure 1 is a perspective view showing a portion of a tubular boiler with the preferred form of my invention applied thereto as it is in use. Fig. 2 is a perspective view showing the several parts of the device detached. Fig. 3 is a plan of a modification in which the parts are elongated to permit them to be manipulated from outside of a furnace door. Fig. 4 is a further modification showing a device of simplified construction which is likewise adapted for use from the outside. Fig. 5 is a horizontal section showing the application of the device.

Referring to Figs. 1 and 2:—1 and 2 represent a pair of cylinders which are adjustably connected by telescoping tubes 3, 4 which adapt them to be spaced apart the proper distance to permit their forward ends 5 and 6 to enter two of the flues of a fire-tube boiler, the cylinders being held to such adjustment by means of a set screw 7 and the ends 5 and 6 being provided with packings 8 to make tight connections with the flues which they enter. In order to hold the cylinders 1 and 2 in proper position and to force their packings firmly against the mouths of flues in which they are inserted I provide a support-

ing bracket 9 which may be inserted in a flue intermediate of those occupied by cylinders 1 and 2, and which has a bearing 10 for the reception of the tube 4 of the telescoping connection 3, 4. The bracket 9 consists of a lower arm 11 having at its rear end a ring 12 which surrounds the bearing 10, and upon which slides a wedge 13, mounted by means of a lever 14 fulcrumed in the arm 11 at 15, connected to the wedge 13 at 16 and having a controlling handle 17. The arm 11 and wedge 13 are enlarged at 18 to better adapt them to engage in the mouth of the flue, and, as will be readily seen, upon rocking the lever 14 upon its fulcrum 15, the wedge 13 is thrust forward and the supporting bracket becomes firmly wedged in the end of the flue.

The periphery of the bearing 10, which is surrounded by ring 12, is eccentric to the central opening of said bearing which receives the tube 4, and said bearing 10 is provided with a handle 19 by which it may be rotated upon the tube 4 and within the ring 12. In thus rotating the bearing 10, by throwing the handle 19 toward the fire-tubes, the salient point of the cam or eccentric passes to the rear and the bearing 10 thrown forward, and inasmuch as the supporting bracket has previously been firmly embedded in one of the flues, this movement of the eccentric bearing 10 causes the tubes 1 and 2 to be forced forward until their packings 8 insure an air-tight connection between ends 5 and 6 and the fire-flues which they enter.

Having thus securely located the tubes 1 and 2 with relation to the fire-tubes or flues, a blast nozzle 20, on a hose 21, is projected through the cylinder 1 until it comes into contact with the obstruction in the flue to be cleaned. The blasting medium is then admitted through said hose and nozzle, and the obstruction attacked thereby. The material which is disintegrated by the blast, is drawn off by the escaping draft or current, back through the cylinder 1, through the coupling 3, 4 to the cylinder 2, and thence through an open flue to the smoke box of the locomotive.

The hose 21 is preferably flexible and may be constructed of the ordinary air brake hose. In order to insure an air-tight connection at the entrance of said hose 21 into the cylinder 1, I provide a centrally perforated diaphragm

22, held in place upon the outer end of cylinder 1, by means of a flange 23 on the cylinder and the clamping ring 24, which is secured to said flange by screws 25.

5 To control the admission of the blasting medium into the hose 21, I employ any suitable connection, such, for instance as an ordinary air-brake coupling 26 which may be connected to the train pipe of a locomotive if
10 compressed air is to be used as the blasting medium, or it may be connected to any other source of blasting power, such for instance as a steam generator or a steam pipe on a locomotive. Between the coupling 26 and hose
15 21 may be inserted a controlling valve 27. I find it convenient in practice to mount this valve upon a block 28 and to provide said block with a leg 29 which may be conveniently thrust into any one of the adjacent boiler
20 flues to support the parts for manipulation.

Referring to the modifications shown in Figs. 3 and 4, it will be observed that my device may be adapted for use by an operator from without the furnace door, the device
25 being held in position by the operator pressing it against the tubes instead of having it forced to such position by the mechanism which I have described with reference to Figs. 1 and 2.

In the former of the two modifications it will
30 be observed that the cylinders 1 and 2 are considerably elongated so as to render them convenient for reaching in through the furnace door and they are provided with spring packings 30 which adapt them for making
35 tight connections as they are forced against the flues. In this form the cylinder may have a telescopic connection 3 and 4 as do the corresponding parts shown in Figs. 1 and 2.

In the modification shown in Fig. 4 the blast
40 cylinder 1 and the conveyer cylinder 2 are fixedly connected at such distances apart that the conveyer cylinder will always enter the flue adjacent to the obstructed tube in which the blast is inserted. This form also differs
45 from the others heretofore described in this, that the blast nozzle projects through the elongated cylinder 1 and is made extensible therein, and cylinder 1 has a chamber 31 to which the blasting power is communicated
50 through an inlet nozzle 32 and the blasting medium passes through from the chamber 31 into the elongated blast nozzle 20 through one or more perforations 33. The chamber 31 is formed by pistons 34, through which the
55 nozzle 20 passes as shown and in which it makes tight connections by any suitable means.

35 represents a handle for manipulating the instrument and 36 a hand-wheel on a valve
60 rod 37 which projects forward and terminates at 38 in the forward piston 34 where it acts in connection with a suitable seat to control the passage of the blasting medium.

While the principles of operation of the
65 forms of my device shown in Figs. 3 and 4 are similar to those of the forms shown in Figs. 1 and 2, they are much simpler in con-

struction and in some cases might be desirable for use, but as before stated, the form shown in Figs. 1 and 2 are preferable, because
70 adapted for mounting in position and operation for any necessary length of time without being held by the operator.

In the form shown in Fig. 3, the cylinder 2, may be supported in the open flue by its ex-
75 tension or end 6 which enters said tube, and the connection 3, 4, may be replaced by any flexible coupling which will leave the blast cylinder free for application to any tube within a certain radius. So also any equiva-
80 lent mechanical devices may be substituted for other parts, as, for instance, the means for sliding the wedge 13 over the arm 11, and the eccentric connection 10, 12 may be substituted by any well known mechanical de-
85 vice which will give the necessary control of the movements of these parts, and cause the expansion of the supporting bracket in the flue, and draw the cylinder up to the flues.

It will readily be seen that after the direct
90 impingement of the blast, has effected an opening through the obstruction the disintegrated material will then pass forward in the direction of the blast, but until this takes
95 place the confined power of the current escapes back through the blast cylinder and out through another flue, and carries the loosened material with it, in addition to exerting a reactive power on the accumulation
100 in rear of the nozzle.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a device for cleaning fire-tubes of
105 boilers, the combination of a cylinder constructed at one end for application to the tube to be cleaned, and having a diaphragm at the other end, and also having an escape-tube for the displaced obstructing material, and a blast tube inserted in the cylinder through
110 the diaphragm and extending forward for directing the blast against the obstruction, substantially as explained.

2. In a flue cleaner, the combination of the direct acting blast-nozzle constructed to di-
115 rect a jet or blast upon the obstruction to be attacked, the surrounding cylinder terminating short of the nozzle and affording an escape for the confined blasting current and the material drawn out thereby, and the lateral
120 passage extending from said cylinder to an adjacent open flue of the boiler, as and for the purposes explained.

3. In a flue cleaner, the combination of the direct acting blast-nozzle, the surrounding
125 cylinder terminating short of the blast and affording an escape for the confined blasting medium, and the material carried thereby, and a cylinder constructed to enter an adjacent flue of the boiler, and having connection
130 with the blast cylinder, substantially as and for the purpose set forth.

4. In a flue cleaner, the combination of two cylinders suitably connected together, and

having means for connecting them with two of the flues of a fire-tube boiler; one of said cylinders having introduced through it a blast-nozzle substantially as and for the purposes set forth.

5 5. In a flue cleaner, the combination of two parallel cylinders adjustably connected together, and constructed to make connection with two of the flues of a fire-tube boiler, and
10 a direct acting blast introduced through one of said tubes substantially as and for the purposes set forth.

15 6. In a flue cleaner, the combination of the blast cylinder, and the supporting bracket for holding the cylinder in place, connected with said cylinder and constructed to firmly grip in one of the boiler flues substantially as and for the purposes set forth.

20 7. In a flue cleaner, the combination of the blasting and outlet cylinders and their connecting tubes, and the supporting bracket consisting of the arm for entering an intermediate flue, and the adjusting connection between the connecting tube and arm, where-
25 by the cylinders are thrust forward, substantially as and for the purpose set forth.

8. In a flue cleaner, the combination of the

blast and outlet cylinders, and the tubes making connection between them, and the supporting bracket having means for engaging 30 an intermediate flue, and having the eccentric connection with the connecting tube, whereby the cylinders may be thrust forward against the flues, as explained.

9. In combination with a flue cleaner, the 35 supporting bracket consisting of the lower arm adapted to enter a flue and the sliding wedge with means for projecting it, mounted on the lower arm, as and for the purpose set forth.

40 10. In combination with a flue cleaner having the laterally projecting tube; the supporting bracket consisting of the eccentric having bearing on said tube, the arm for entering the flue, having a ring surrounding the 45 eccentric, and the sliding wedge having a controlling lever fulcrumed on the bracket arm, all substantially as and for the purposes set forth.

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