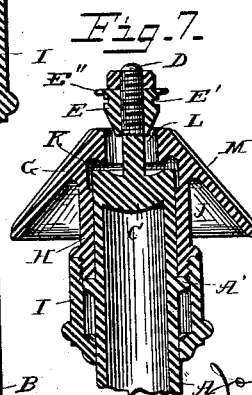
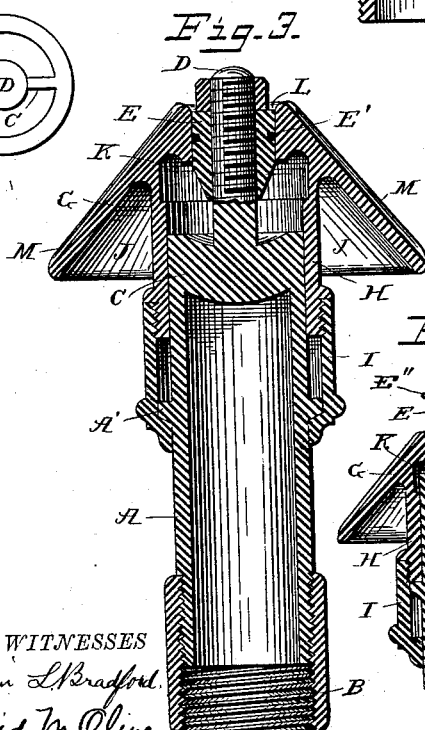
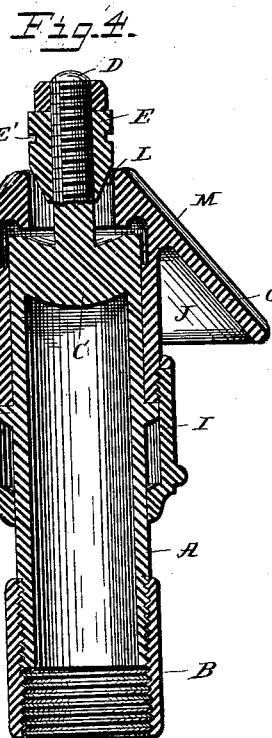
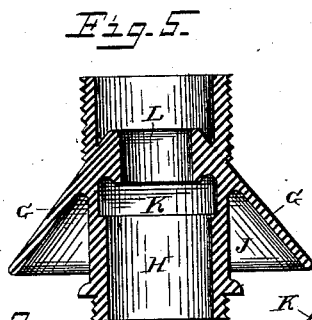
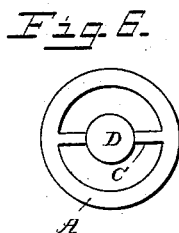
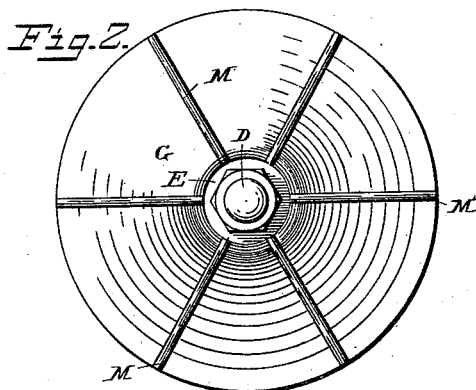
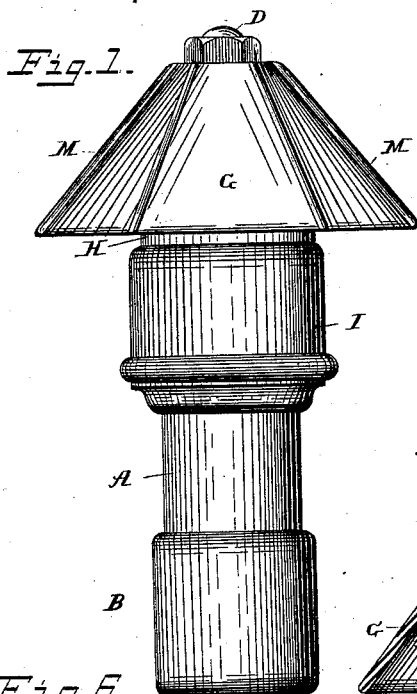


(No Model.)

J. H. WEITMYER.  
BOILER FLUE CLEANER.

No. 347,145.

Patented Aug. 10, 1886.



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# UNITED STATES PATENT OFFICE.

JOHN H. WEITMYER, OF HARRISBURG, PENNSYLVANIA.

## BOILER-FLUE CLEANER.

SPECIFICATION forming part of Letters Patent No. 347,145, dated August 10, 1886.

Application filed May 8, 1886. Serial No. 201,548. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN H. WEITMYER, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Boiler-Flue Cleaners, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in boiler-flue cleaners, and it is of that class which inject steam into the flues for the purpose of removing the accumulations therefrom; and it has for its objects, first, to provide an injector in which the steam-orifice shall be opened for the injection of the steam into the flue by the simple act of pressing the injector itself against the flue; second, to provide for closing the injecting-orifice by the action of the steam itself when the injector is removed from the flue; third, to provide a valve by which the steam-orifice may be enlarged or diminished to admit of the passage of a greater or less volume of steam; fourth, to provide an injector in the construction of which the amount of resisting pressure is fixed.

In the accompanying drawings, forming a part of this specification, and on which similar letters of reference indicate the same or corresponding features, Figure 1 represents a side elevation of my improved flue-cleaner; Fig. 2, a plan view thereof; Fig. 3, a vertical sectional view of the same, showing the steam-orifice closed; Fig. 4, a like view showing that orifice open; Fig. 5, a like view showing a modified form of construction; Fig. 6, a plan view of the inner tube or cylinder, the cross-bar, and the threaded stem; and Fig. 7, a sectional view showing a modified form of valve.

The letter A designates a metallic tube or cylinder, to one end of which a suitable coupling, B, is attached, by a screw-thread or otherwise, for the purpose of forming a steam-connection with the steam-space of a boiler. This tube, at a suitable point, is provided with an annular peripheral bead or shoulder, A', which serves as a stop and as a means of effecting a tight joint with an adjacent part, presently to be described, and without the use of packing of any kind. Across one end of this tube or cylinder stands a bar, C, a space being left at

either side thereof for the free passage of steam, and from this bar extends a stem, D, having a threaded periphery. Upon this stem is fitted a valve or plug, E, which is adjustable up and down on the stem by means of the thread, and the inner end of which is of tapering form, the function of which taper is to deflect the steam radially; so as to cause it to engage more forcibly against the inner wall of the boiler-flue. A jam-nut is further, by preference, provided, which serves to secure the valve against accidental play on the stem. The valve may be provided with an annular groove, E', to form a steam or water packing.

The letter G designates a conical shell, provided with a sleeve, H, which fits snugly to the exterior of the tube or cylinder A, and which slides to and fro thereon. To the sleeve H is connected, as by a screw-thread, a cup, I, one end of which snugly embraces the cylinder or tube. When the steam-orifice is closed, as in Fig. 3, the cup I abuts against the shoulder or bead A', and thus affords a tight joint in addition to the contact between the exterior of the tube A and the interior of the sleeve H. On the other hand, when the steam-orifice is open, as in Fig. 4, the end of the sleeve H abuts against the opposite face of the shoulder or bead A', and serves the same purpose—that of further preventing the escape of the steam. The interior of the shell is hollowed out at J, for the purpose of economizing in metal and of making it lighter. It is also provided with an annular chamber, K, adjacent to the end of the cylinder or tube, A, the purpose of this chamber being to afford a surface against which the steam will act to force the shell outward so as to close automatically the steam-orifice, which closing occurs instantly the pressure of the shell against the flue is discontinued, and before the nose of the shell is removed from within the flue. The shell is further provided with an orifice, L, which is the steam-orifice to which allusion has been made, and which is fitted to the shape and size of the cylindrical portion of the valve E, as clearly seen in Fig. 3. The size of the mouth of the orifice is determined by the adjustment of the valve upon the stem D. The exterior of the shell has a series of raised edges, M, which fit against the inner walls of the boiler-flues, leaving a thin passage between the said walls and the

exterior proper of the shell. The violent passage of the steam into the flues creates a draft which induces an inrush of air.

The object in admitting the air is to clean the flue between the shell and that portion which the steam first reaches, being a space generally of from 3 to 4 inches. It is found that the violent inrush of air coming in contact with the flue at the very end of it serves to remove accumulations at the point designated, which is where the steam either does not act at all or acts with but little effect.

As further explaining the operation, I desire to observe that upon placing the shell against the end of the boiler-flue and pressing the cylinder or tube A in that direction, the shell being arrested by the flue, the valve is projected into the flue and the steam-orifice L opened. The act of drawing the cleaner from the flue causes the pressure of the steam acting on the inner face of the chamber K to force the shell outward, and thus close the steam-orifice by sliding that orifice over the cylindrical portion of the valve, which closing occurs before the shell is removed from the flue.

The object in automatically cutting off the flow of steam from the orifice is to prevent the escape of the steam during the time of changing the cleaner from one flue to another, as also to avoid the necessity of stopping the supply of steam from the boiler, at each change. Furthermore, this prevents liability of injury to the operator should the cleaner be accidentally dropped or should the operator trip or fall. It also economizes in time and aids the operator in the performance of his work.

In Fig. 7 the valve is seen as provided with an annular flange, the object of which is to prevent the escape of the steam, should there be a slight leakage between the cylindrical portion of the valve and the orifice L, as the flange, when the orifice is closed, fits well down upon the end of the shell. This brings four surfaces in positive contact when the orifice is closed—namely, the flange E' against the end of the shell and the cup I against the bead A'.

A further modification is shown in Fig. 5. Here a short sleeve is formed on the shell, near the end thereof, for the purpose of connecting with the cleaner any of the known forms of nozzles used in flue-cleaning.

It will be observed that the passage of the steam is essentially in a direct line after it enters the cylinder until it reaches the conical portion of the valve, which is an advantage.

I do not confine myself strictly to the construction of the flue-cleaner as shown and described in Figs. 3 and 4, as the same may be constructed as seen in Fig. 7. Instead of forming the orifice L with parallel walls, and the valve of corresponding shape, I may substitute a tapering orifice and a tapering valve. The object of this tapering form is to effect a more certain steam-tight joint between the

valve and orifice, similar to the joint between the shoulder A' and the cup. This also causes a greater deflection of the steam during the operation of cleaning the flues than when the walls of the orifice are parallel.

The invention is equally applicable and useful for injecting water as for injecting steam.

The cleaner may be constructed so that it can be operated with ease against the highest steam or water pressure—say a pressure of one hundred and twenty-five pounds. The resistance could be reduced to five pounds, if desired, simply by enlarging the orifice, which would decrease the area of the face in the chamber K.

I am aware that it is not new to provide the exterior of the conical shell in flue-cleaners with grooves; but in my device I construct raised edges on the shell.

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

1. In a flue-cleaner, the combination, with the cylinder having an adjustable valve at one end, of a conical shell having a cylindrical portion fitted to work back and forth in the cylinder, and having a steam-chamber into which the steam fills, and by which the shell is normally forced outward, and an escape-orifice leading from said chamber, the latter fitting the valve or not, according to the position of the shell with respect to the cylinder.

2. In a flue-cleaner, the combination, with a cylinder having an annular head and an adjustable valve, of a cup constructed to engage the head, and a conical shell having a sleeve fitted to the cylinder, connected with the cup, and adapted to fit against the head, and also having a steam-chamber into which the steam fills to force the shell normally outward, and an escape-orifice leading from the chamber, the latter fitting the valve or not, according to the position of the shell with respect to the cylinder.

3. In a flue-cleaner, the combination, with the cylinder having an annular head, a cross-bar and threaded stem, and an adjustable valve fitted upon said stem, of a cup fitted to the cylinder and adapted to abut against the head, and a conical shell having a sleeve fitted to the cylinder, adapted to abut against the head, and connected with the cup, and also having a steam-chamber into which the steam fills to force the shell normally outward, and an escape orifice leading from said chamber, the latter fitting the valve or not, according to the position of the shell with respect to the cylinder.

4. In a flue-chamber, the combination, with a cylinder having a cross-bar and a threaded stem, and a valve having a conical portion fitted to the stem and a jam-nut, of a sliding conical shell having an escape-orifice into which the valve fits or not, according to the position of the shell, and having a chamber from which the escape-orifice leads, and in which the steam fills to normally force the shell outward.

5 5. In a flue-cleaner, the combination, with a cylinder having an annular bead, of a conical shell having a sleeve fitted snugly to the cylinder, and a cup connected to the sleeve and fitted snugly to the cylinder, the sleeve and cup being adapted to abut against the bead.

10 6. In a flue-cleaner, the combination, with the shell having an orifice, of a cylinder having a valve provided with an annular bead which fits down upon the shell when the valve is within the orifice.

7. In a flue-cleaner, the combination, with a shell having a steam-chamber, an orifice leading therefrom, a sleeve, and a cup connected

to the sleeve, of the cylinder having the annular bead against which the cup is adapted to fit, a cross-bar, and threaded stem, and a valve provided with an annular bead which fits down upon the shell when the valve is within the orifice, while the cup fits against the bead. 15 20

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. WEITMYER.

Witnesses:

C. A. EHLER,

STEWART P. KEELING.