

(No Model.)

2 Sheets—Sheet 1.

F. L. McGAHAN.

FLUE CLEANER.

No. 391,173.

Patented Oct. 16, 1888.

Fig. 2.

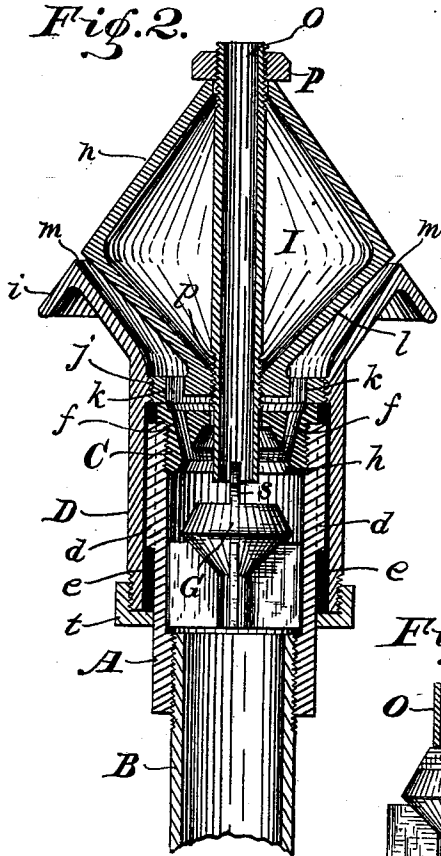


Fig. 3.

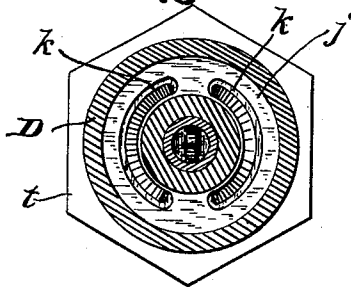


Fig. 1.

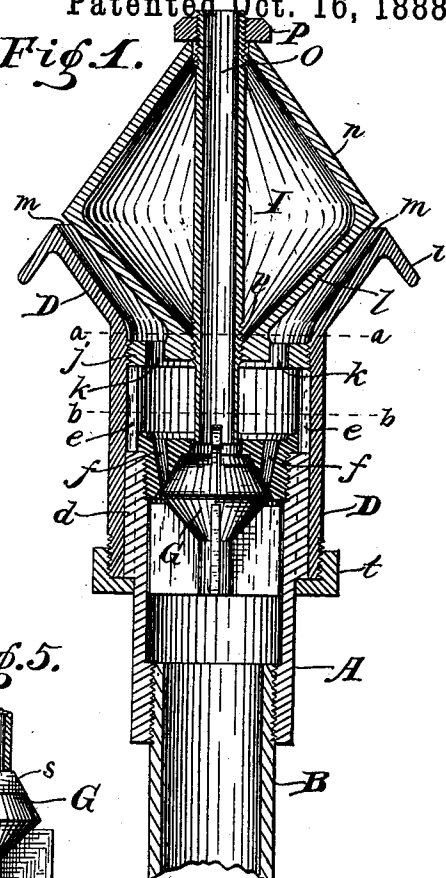


Fig. 4.

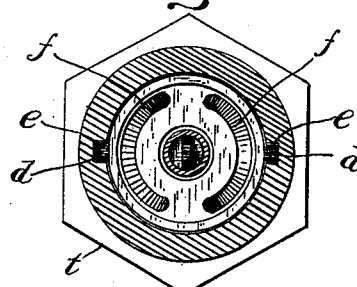
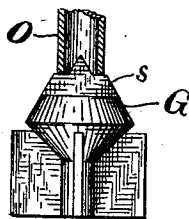


Fig. 5.



Witnesses.

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(No Model.)

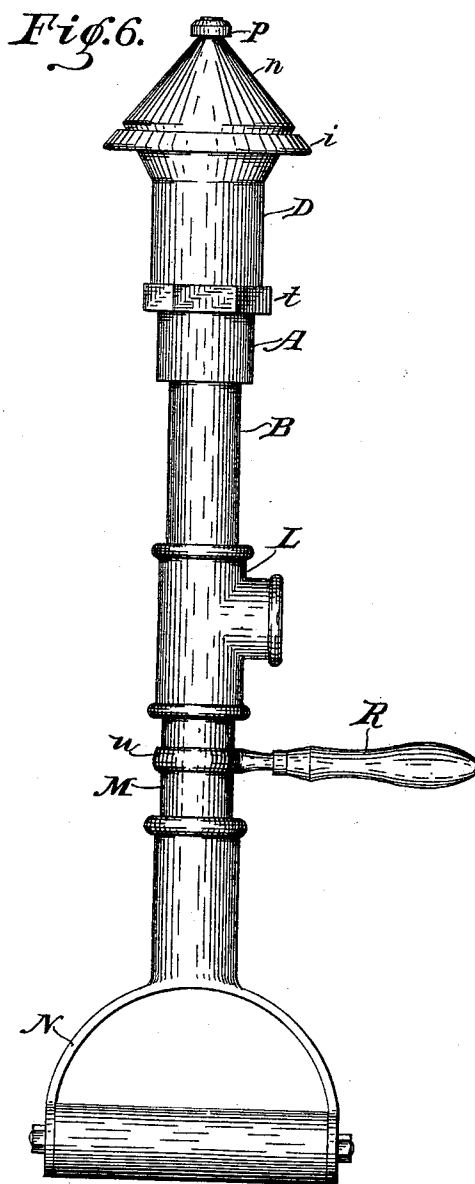
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UNITED STATES PATENT OFFICE.

FRED L. MCGAHAN, OF INDIANAPOLIS, INDIANA.

FLUE-CLEANER.

SPECIFICATION forming part of Letters Patent No. 391,173, dated October 16, 1888.

Application filed July 20, 1888. Serial No. 280,522. (No model.)

To all whom it may concern:

Be it known that I, FRED L. MCGAHAN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Improvement in Flue-Cleaners, of which the following is a specification.

My invention relates to an improvement in that class of flue-cleaners in which the flue is cleaned by means of an annular jet of steam discharged through a suitable nozzle, by means of which the steam is directed against and along the interior walls of the flue, the discharge of the steam into the flue being controlled by a valve, which is automatically closed by the steam-pressure when the cleaner is removed from the flue, the nozzle consisting of two tubular sections, one sliding over the other, the outer section containing the discharge port or ports and the inner section containing the valve and its seat, all as hereinafter described.

The objects of my improvement are to prevent the escape of steam between the two nozzle-sections without the use of packing, to provide means for guiding the nozzle into the flue, and to so construct and arrange the several parts that the device may be easily and cheaply manufactured.

The accompanying drawings illustrate my invention.

Figure 1 is a central longitudinal section of the nozzle, showing the valve closed. Fig. 2 is a like section showing the valve open. Fig. 3 is a transverse section at *a*, Fig. 1. Fig. 4 is a transverse section at *b*, Fig. 1. Fig. 5 is a side elevation of the valve, the view being at a right angle to that shown in Figs. 1 and 2. Fig. 6 is a side elevation of the entire cleaner on a reduced scale.

The nozzle consists of an inner tubular section, A, threaded at one end to receive the steam-pipe B, and having the other end closed by the plug C, and an outer tubular section, D, adapted to slide over section A, and having a removable central portion, I. On opposite sides of A are a pair of narrow longitudinal ribs, *d d*, which fit so as to slide easily in corresponding grooves, *e e*, formed in the interior of section D. The purpose being to pre-

vent one section from turning on the other. On the inside of plug C is a conical valve-seat, *h*, from which two annular openings, *ff*, extend through the plug. Said openings *ff* are closed by a valve, G, which slides freely in the tubular section A. The outer end of the section D of the nozzle is flared outward, and is provided with a backwardly-inclined tapering flange, *i*. The outer end of the straight portion of D is closed by a plate, *j*, which is screwed therein, and is provided with annular openings *k k*, corresponding to the openings *ff* in plug C. The inner surface of plate *j*, near its outer edge, and the corresponding portion of the outer surface of plug C are turned true and ground so as to make a steam-tight joint when pressed together, the purpose being to prevent the escape of steam into the straight portion of D when the valve G is open. Secured to the center of plate *j*, or preferably formed integral therewith, is a hollow deflector, I, having oppositely-inclined inner and outer conical surfaces. The inner conical surface, *l*, forms, with the interior surface of section D, a narrow outwardly-inclined annular steam-passage, *m*. The outer conical surface, *n*, forms a continuation of the outer tapered surface of the flange *i*, and is for the purpose of guiding the nozzle in entering the flue.

Valve G is connected with the plate *j* and deflector I by means of a stem, O, which is secured rigidly to the plate and deflector by means of screw-threads at *p*, and a check-nut, P, the inner end of the said stem resting against the outer end of the valve. It is desirable in the larger sizes of this class of flue-cleaners to have a central jet of steam which shall be auxiliary to the annular jet, and for this purpose the stem O is made tubular, as shown, the valve G having on its forward end a thin flange, *s*, which rests against the end of the tube, the arrangement being such that the steam, after passing the valve, may pass freely into and through the stem. In the smaller sizes the central jet is omitted, stem O being in that case made solid. Section D is retained on section A by means of a screw-cap, *t*, which also limits the outward movement of section D by coming in contact with the lower ends of the ribs *d*.

L is a T-coupling secured to the steam-pipe B.

M is a short rod or tube terminating in a bow-handle, N. A straight handle, R, is secured to M by a clip, u.

The cleaner is connected with the boiler or other source of steam-supply by means of rubber hose or other suitable tubing (not shown) secured to the lateral branch of the T-coupling.

The operation of my device is as follows: Steam having been admitted to the pipe B, valve G is forced to its seat *h*, thus closing the openings *ff* in plug C, and at the same time sliding section D of the nozzle forward by contact with tube O, as clearly shown in Fig. 1. It will be observed that in this position there is no opening from section A through which steam may escape. The operator, now grasping the handles N and R, introduces the tapered end of section D of the nozzle into the open end of the flue until the flue is closed, the end thereof resting against the flange *i*. A smart thrust forward now forces the body of the cleaner and section A still farther forward, and, section D being held stationary, valve G is forced open, as shown in Fig. 2, thus permitting the steam to pass with sudden force through openings *ff* and *kk* and the annular passage *m*, and also through stem O, into the flue and along its interior walls, thus removing all deposits of soot and ashes. When the cleaner is removed from the flue, the parts are automatically returned by the pressure of the steam to the position shown in Fig. 1. It will be observed that the section A must move forward in section D until the outer surface of plug C comes in contact with the inner surface of plate *j*, and, these surfaces forming a steam-tight joint, no steam can escape into the straight portion of D.

In this class of flue cleaners as heretofore constructed attempts have been made to prevent the steam from escaping between the two sections, first, by making a very close fit between the sliding surfaces of the sections, and, later, by the use of packing, as in an ordinary

stuffing-box. The first method has been found impracticable on account of the unequal expansion of the two sections, and in the later method the packing soon becomes hard and leaky. In my construction these difficulties are avoided, sections A and D fitting each other so as to slide easily one upon the other at all temperatures, and the escape of steam backward between the sections being effectually prevented, as heretofore described.

I claim as my invention—

1. In a flue-cleaner, the outer nozzle-section having a straight and a flaring portion and an annular steam-passage formed in its flaring portion, the perforated plate arranged at or near the junction of said straight and flaring portions, the inner nozzle-section adapted to slide within said outer section, the perforated plug closing said inner section and adapted to form a steam-tight joint with said plate and having on its reverse side a valve-seat, the valve, and a stem secured in said plate and engaging said valve, all combined and arranged to co-operate substantially as specified.

2. In a flue-cleaner, the combination of the outer nozzle-section having interior longitudinal grooves, the inner nozzle-section adapted to slide in said outer section and having longitudinal exterior ribs engaging said grooves, the perforated plug closing said inner section, the perforated plate arranged in the outer section, and the cap screwed on the end of the outer section and arranged to slide over the inner section and limiting the movement of the outer section thereon, all arranged to co-operate as and for the purpose specified.

3. In a flue-cleaner, the combination, with the flared tubular section D, having flange *i*, and the plate *j*, of the deflector I, having the oppositely-inclined conical surfaces *l* and *m*, all arranged substantially as and for the purpose specified.

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Witnesses:

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