

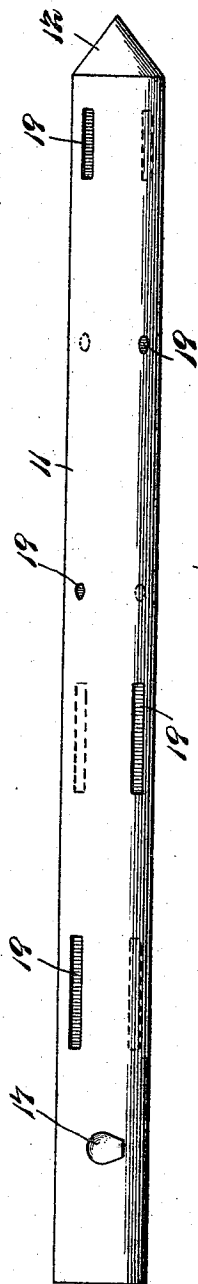
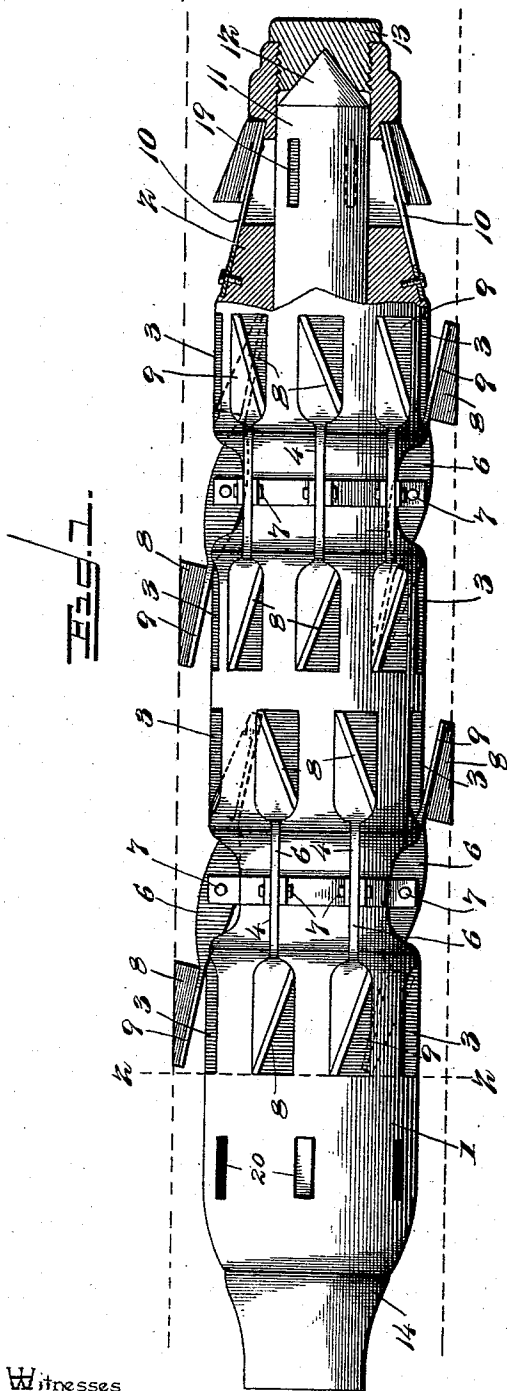
(No Model.)

2 Sheets—Sheet 1.

R. H. BLACK.
FLUE CLEANER.

No. 572,740.

Patented Dec. 8, 1896.



Inventor

Witnesses

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By *W. S. Attorneys,*

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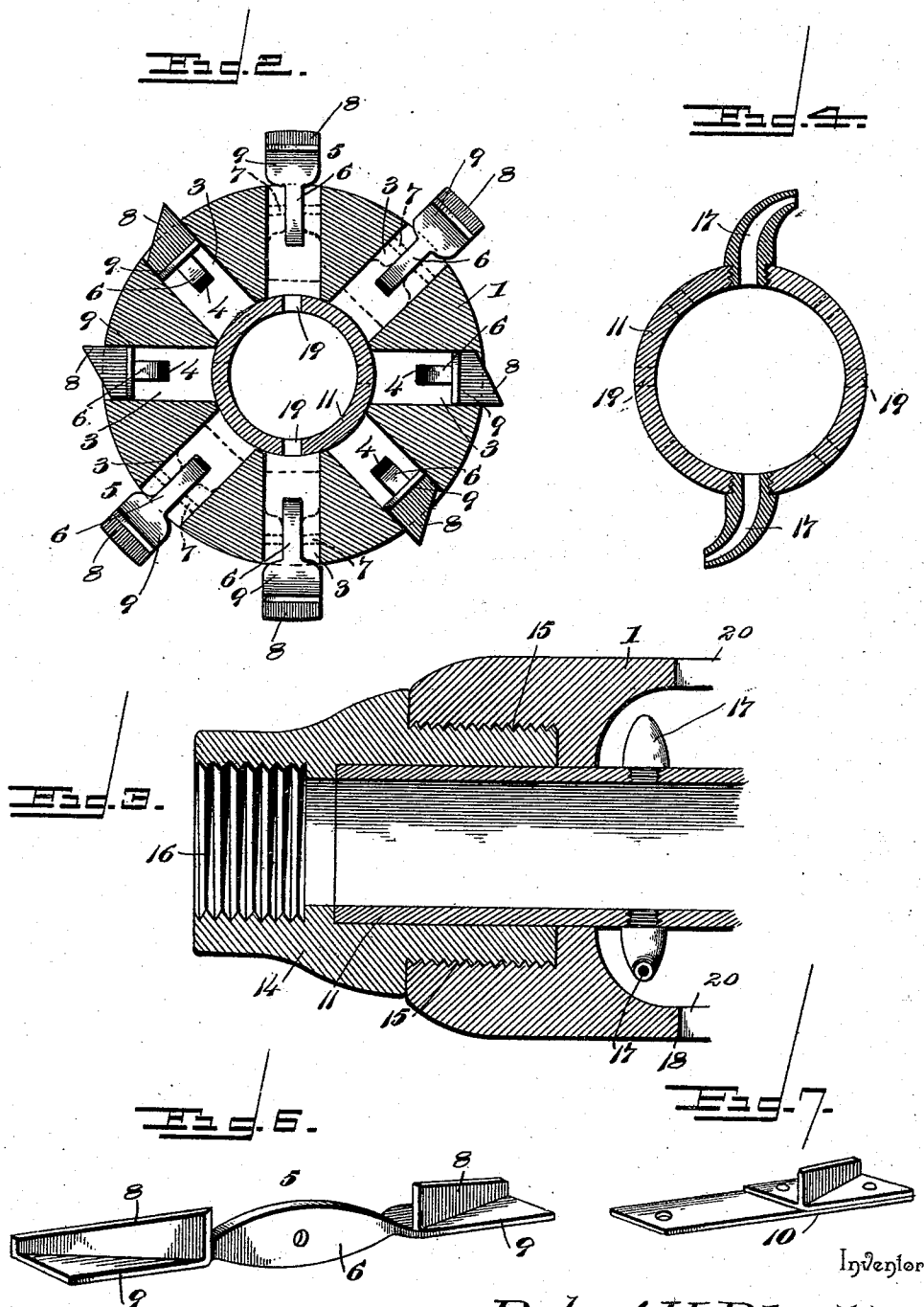
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UNITED STATES PATENT OFFICE.

ROBERT H. BLACK, OF HOMESTEAD, PENNSYLVANIA.

FLUE-CLEANER.

SPECIFICATION forming part of Letters Patent No. 572,740, dated December 8, 1896.

Application filed April 18, 1896. Serial No. 588,094. (No model.)

To all whom it may concern:

Be it known that I, ROBERT H. BLACK, a citizen of the United States, residing at Homestead, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Flue-Cleaner, of which the following is a specification.

This invention relates to flue-cleaners, and has for its object to provide an efficient tool which may be advanced longitudinally through the flue to be cleaned, the said tool comprising a number of radially-movable chippers operated alternately by steam, compressed air, or other fluid-power controlled by a revoluble valve mounted in the tool-shell and provided with ports for directing the steam or other fluid in the proper course or courses.

Other objects and advantages of the invention will appear in the course of the subjoined description.

The invention consists in an improved flue-cleaner embodying certain novel features and details of construction and arrangement of parts, as hereinafter fully described, illustrated in the drawings, and finally incorporated in the claims hereto appended.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of the improved flue-cleaner. Fig. 2 is a cross-section taken on the line 2 2 of Fig. 1. Fig. 3 is a detail longitudinal section showing one method of actuating the rotary valve. Fig. 4 is a detail cross-section through the valve. Fig. 5 is a detail view in elevation of the valve. Fig. 6 is a detail perspective view of a double chipper. Fig. 7 is a similar view of a single spring-retracted chipper.

Similar numerals of reference designate corresponding parts in the several figures of the drawings.

Referring to the accompanying drawings, 1 designates the main body of the flue-cleaner, which is in the form of a hollow cylindrical shell of suitable length, the same being provided with a tapering or cylindro-conoidal advance end 2. This shell is provided at numerous intervals throughout its length with radial openings 3, connected in pairs by longitudinal passages 4.

5 designates a double chipping-tool, cutter, or hammer, which comprises a central web

portion 6, adapted to lie within one of the longitudinal passages 4 and to be fulcrumed therein upon a pin or pivot 7. Upon each side of the central web 6 is arranged a chipper, cutter, or hammer 8, which is preferably disposed obliquely to the web 6 and provided with a broad base 9, which corresponds in outline or contour to the radial opening 3 in which it oscillates. The active edge of the chipper 8 is inclined relatively to the base 9, so that when thrown outward against the inner surface of the flue to be cleaned said working edge will be practically parallel with such inner surface of the flue, so as to contact therewith throughout its length. A double chipping-tool is thus formed, which is pivoted at a central or intermediate point, so that as one end of the tool is moved outward the opposite end is moved inward.

Another form of chipping-tool is shown at the tapered advance end of the cleaner, in which the chipper 8 is mounted upon the free end of a retracting-spring 10, secured to the main body or shell 1, the said chipping-tool moving radially in a recess therein similarly to the double chippers before described. Any number of these double or single chippers may be employed at suitable intervals throughout the length of the cleaner, and they are preferably arranged in circular series, as shown in Fig. 2. Within the bore of the body or shell 1 is arranged a valve 11, in the form of a tube, extending longitudinally through the cleaner and having its front end closed and formed with a cone or bearing-point 12, which is received in a bearing-cone 13, stationary at the front end of the cleaner and preferably having a threaded connection therewith, whereby it can be removed, so as to allow of the removal of the valve 11. The opposite end of the valve 11 has its bearings in a thimble or coupling 14, having a screw-threaded engagement with the rear end of the cleaner, as indicated at 15, the thimble or coupling being itself threaded, as at 16, to receive the threaded end of a pipe or tubular handle, by means of which the cleaner may be inserted in and advanced through the flue to be cleaned and manipulated therein, so as to bring the chippers into contact with every portion of such flue. This pipe or handle also serves to admit the steam or other fluid for the purpose

of rotating the valve and actuating the chipping-tools.

In order to actuate the tubular valve by steam-power, it is provided, preferably at points diametrically opposite, with discharge-nozzles 17, projecting radially therefrom and having their ends deflected reversely and tangentially, as shown, so that as the steam escapes therefrom and meets with the resistance of the surrounding air the valve will be caused to rotate in its bearings. The main body or shell 1 is formed with an internal recess or cavity 18, in which the discharge-nozzles 17 rotate. The valve 11 is provided, preferably at diametrically opposite points, with ports 19, and a pair of such ports is arranged in transverse alinement with each circular series of chippers 8, said ports being adapted to communicate with the openings 3 in diametrically opposite pairs as the valve rotates. The object in throwing the chippers outward in opposing pairs is to centralize the cleaner within the flue upon which it is operated. The broad base 9 of each chipper moves for the major portion of its stroke within its respective opening 3, but just before reaching the end of its stroke, the said base moves beyond the periphery of the body or shell 1, as shown in Fig. 1, thus enabling the steam or other fluid to exhaust at the very point where the chipper strikes its blow, the scale thus being carried off by the force of the current. The ports 19 may be of any size or shape according to the nature of the fluid used for actuating the chippers, and they are arranged so that the ports of one series of chippers alternate with those of the adjacent series, thereby causing the double chipping-tools to vibrate alternately in opposite directions. It will be apparent that instead of rotating the valve 11 by steam-power, as above described, it may be actuated by any suitable mechanical or other contrivance arranged exteriorly of the flue and having communication with the valve through the pipe or tubular handle hereinabove referred to. It will also be apparent that the particular form and disposition of the chippers may be changed and that the relation between the ports 19 and the chipping-tools may be varied. Other ports 20 are provided for the exhaust-steam from the nozzles 17. If desired, the chippers may be set in a skeleton frame or casing and operated in a similar manner. Such a frame or casing would be especially desirable and

perhaps requisite where the scale or incrustation is of a soft nature, requiring a stream of water to wash it away as it is loosened.

Other changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. The combination with the main body or shell having the central bore, as described, and provided with radial openings communicating therewith, of a series of radially-movable chippers or hammers arranged in said openings, and a revolving valve arranged in the bore and operating substantially as described.

2. The combination with the outer shell, of the rotary valve mounted therein, provision for actuating the valve, and the chippers or hammers connected with the outer shell and adapted to be actuated, substantially as described.

3. The combination with the outer shell provided with radial openings arranged in longitudinally-alined pairs, of the double chippers fulcrumed on the shell intermediate said openings, and the rotary valve arranged within the shell and provided with alternately-disposed ports for actuating the chippers alternately in opposite directions, substantially as described.

4. The combination with the outer shell provided with the circular series of radial openings as described, of a rotary valve located within the shell and having a port communicating successively with said radial openings, and the radially-movable chippers or hammers working in said openings, substantially as described.

5. The combination with the outer shell, and the radially-movable chippers or hammers, of the rotary valve journaled in the shell, and one or more discharge-nozzles communicating with the valve, extending radially therefrom and having their extremities deflected tangentially, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ROBERT H. BLACK.

Witnesses:

FRANK EVANS,
CHARLES EVANS.