No. 803,562. PATENTED NOV. 7, 1905.

G. W. DEAN.

FLUE CLEANER.

APPLICATION FILED MAR. 1, 1904.

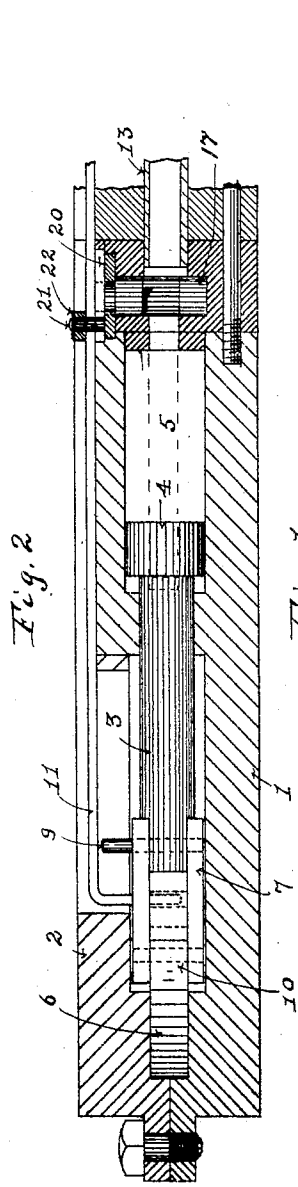


Fig. 2

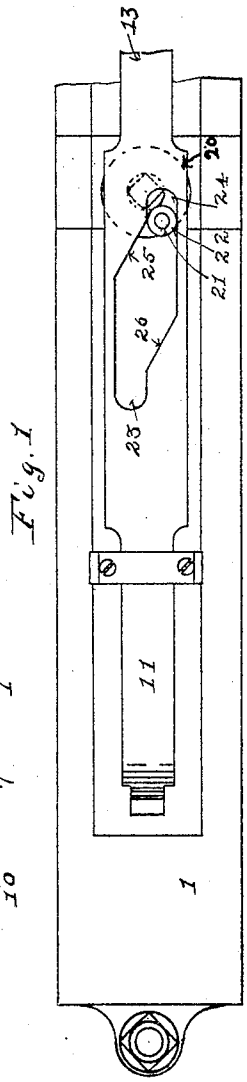


Fig. 1

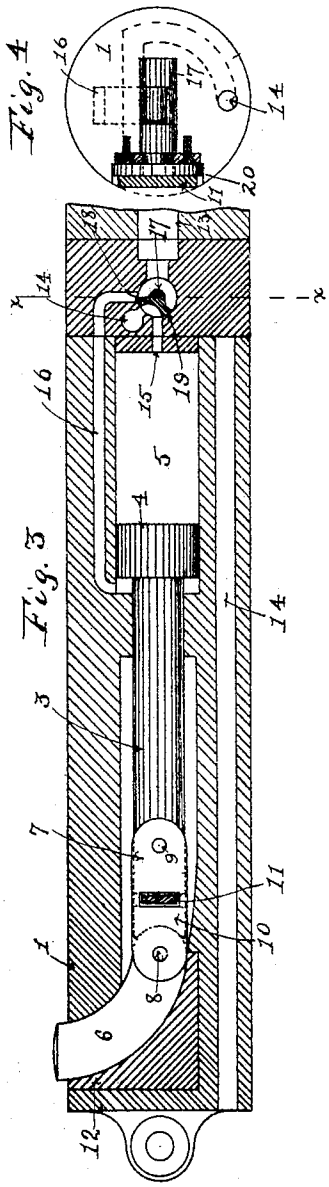


Fig. 3

Fig. 4

Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE W. DEAN, OF FORT ERIE, CANADA, ASSIGNOR OF ONE-HALF TO THE SHERWOOD MANUFACTURING COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

FLUE-CLEANER.

No. 803,562. Specification of Letters Patent. Patented Nov. 7, 1905.

Application filed March 1, 1904. Serial No. 195,959.

To all whom it may concern:

Be it known that I, GEORGE W. DEAN, a subject of the King of England, residing at Fort Erie, in the county of Welland, Province of Ontario, and Dominion of Canada, have invented a new and useful Improvement in Flue-Cleaners, of which the following is a specification.

My invention relates to flue-cleaners, and more particularly to that class of flue-cleaners commonly known as the "rapper" or "knocker" type.

The object of my invention is to provide effective and desirable mechanism which is always positive in action, not liable to get out of order, and in which the length of stroke producing the hammer-blow is long and possessing sufficient force.

The object of my invention is to further provide a novel and desirable construction of a piston and valve and means for actuating the valve.

Referring to the drawings herewith, Figure 1 is a plan view. Fig. 2 is a section taken longitudinally at right angles to Fig. 1. Fig. 3 is a similar section at right angles to Fig. 2, and Fig. 4 is a section on the line *x x* of Fig. 3.

1 and 2 represent the two sections forming the main body, which are properly secured together.

3 is a piston-rod, and 4 is a piston-head which plays in the cylinder 5. Mounted upon the outer end of the piston-rod 3 is a hammer 6. This hammer is pivotally secured to said piston-rod 3 by means of links 7 and pins 8 and 9. The end of the piston-rod 3 is squared and the adjacent end of the hammer is semicylindrical. Within the space thus formed, as shown in Fig. 3, is fitted a block 10, which is concave upon one end to conform to the semicylindrical conformation of the hammer and which is squared at the other end. Between the squared end of the piston-rod 3 and the squared end of the block 10 is inserted the bent-down portion of the driving-plate 11. This construction is provided to take the shock of the blow from the pins 8 and 9 and the plates through which they take, so that the thrust of the piston through the block 10 and the bent-down portion of the driving-plate makes the blow a solid blow. The hammer 6 is curved upon a segment of a true circle and is substantially a quadrant and by the link construction described is capable of free motion over a limited arc of a circle. As the thrust of the hammer 6 is considerable and tends to produce more or less wear, I provide a steel die 12, upon which the outer surface of the hammer 6 rides, thus reducing the friction and also the wear.

I will now describe my improved valve and its connections.

13 is an inlet for the steam, and 14 is the exhaust-port.

15 is an inlet-port leading to one end of the cylinder-chamber, and 16 is the inlet-port leading to the other end of the cylinder-chamber. At the junction of these two ports is pivotally mounted a valve 17, which is clearly shown in Fig. 3. This valve has two rotating wings 18 and 19 so positioned that when the piston-head 4 is in the position shown in the drawings the wing 18 will connect the steam-inlet and the port 16 and connect the port 15 with the exhaust-port 14. Upon the opposite movement the wing 19 will connect the inlet with the port 15 and the wing 18 will connect the port 16 with the exhaust 14. The valve 17 is rotated in the following manner: Secured to its head is a disk 20, carrying a pin 21, which in turn carries a roller 22. The driving-plate 11 has a slot cut in it, having the end portions parallel to its length, as shown at 23 and 24, and having its medial portions inclined, as shown at 25 and 26.

The operation is as follows: Assuming the parts to be in the position shown in the drawings, steam will enter the port 16 and force the cylinder-head 4 to the right. This will carry the hammer 6 down and will carry the driving-plate 11 (which is in engagement with the piston-rod, as aforesaid) also to the right. This movement of the driving-plate 11 will cause the inclined portion 26 to strike the roller 22 near the completion of the piston-stroke and will rotate the valve 17 upon its axis, so as to connect the steam-inlet with the port 15 and to connect the port 16 with the exhaust-port 14 ready for the next movement. This will result in applying steam-pressure at the opposite end of the cylinder and will force the cylinder-head to the left, whereby near the end of the stroke the incline 25 will strike the roller 22 and reverse it to the position shown in the drawings. In the meantime the hammer 6 will have pro-

duced a stroke upon the inner surface of the flue at substantially right angles to the axis of the flue, thus accomplishing the purpose for which the device is intended.

It will be seen that my device is exceedingly simple and not likely to get out of order, that it is strong, and that the action is positive, giving a solid blow with the combined momentum not only of the hammer 6, but the block 10 and the piston and the piston-head.

Having thus described my invention, what I claim is—

1. In a tube or flue cleaner, the combination with a piston and means for causing reciprocation thereof, of a rapper or hammer moved as an entirety by said piston, and a casing provided with a guideway having straight and curved portions forming continuations of each other, in which the hammer or rapper is adapted to travel.

2. In a tube or flue cleaner, the combination with a piston and means for causing reciprocation thereof, of a curved rapper or hammer, a flexible connection or joint between the rapper or hammer and the piston, said rapper or hammer being moved as an entirety by said piston, and a casing provided with a guideway having straight and curved portions constituting continuations of each other in which the hammer or rapper travels, and said curved portion of the guideway being of substantially the curvature of the hammer.

3. In a tube or flue cleaner, the combination with a piston and means for causing reciprocation thereof, of a curved rapper or hammer connected to and moved by the piston as an entirety, and a casing provided with a guideway having a curved portion in which the hammer is adapted to travel, and a curved wear-plate constituting a facing for the wall of said curved portion of the guideway.

4. In a tube or flue cleaner, the combination with a piston or rod, of a hammer or rapper adapted for movement as an entirety, links pivotally connecting the hammer and the rod, and a block interposed between the rod and the hammer and bearing against them.

5. In a tube or flue cleaner, the combination with a piston or rod, of a hammer or rapper adapted for movement as an entirety, links pivoted to the hammer and the rod and located in separate arrangements, and a block having curved faces matching and bearing against similar portions on the rod and hammer, said block being loosely positioned between the hammer and rod and between the links.

6. In a flue-cleaner, a circularly-curved hammer whose head is adapted to project at right angles to the surface of the flue-cleaner, a circularly-curved die upon which said hammer rides, and means for actuating the said hammer.

7. In a flue-cleaner, a circularly-curved hammer whose head is adapted to project at right angles to the surface of the flue-cleaner, a circularly-curved die upon which the said hammer rides, a piston adapted to travel upon the axis of the said flue-cleaner, a piston-rod, means for actuating the said piston, and a link connection between said hammer and said piston-rod comprising two plates which at one of their ends are each pivoted to the said piston-rod and at their opposite ends are each pivoted to the said hammer, an intermediate block inserted between said plates which bears directly against said hammer at one end and mediately against said piston-rod at its opposite end.

8. In a flue-cleaner, a circularly-curved hammer whose head is adapted to project at right angles to the surface of the flue-cleaner, a circularly-curved die upon which said hammer rides, a piston adapted to travel upon the axis of the flue-cleaner, means for actuating the said piston, a piston-rod, a driving-plate secured to the end of said piston-rod and a link connection between said hammer and said piston-rod comprising two plates which at one of their ends are each pivoted to the said piston-rod and at their opposite ends are each pivoted to the said hammer, an intermediate block inserted between said plates which bears directly against said hammer at one end and directly against the said driving-plate at the opposite end.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

GEORGE W. DEAN.

Witnesses:

JOSEPH H. MOREY,

S. BROWN.