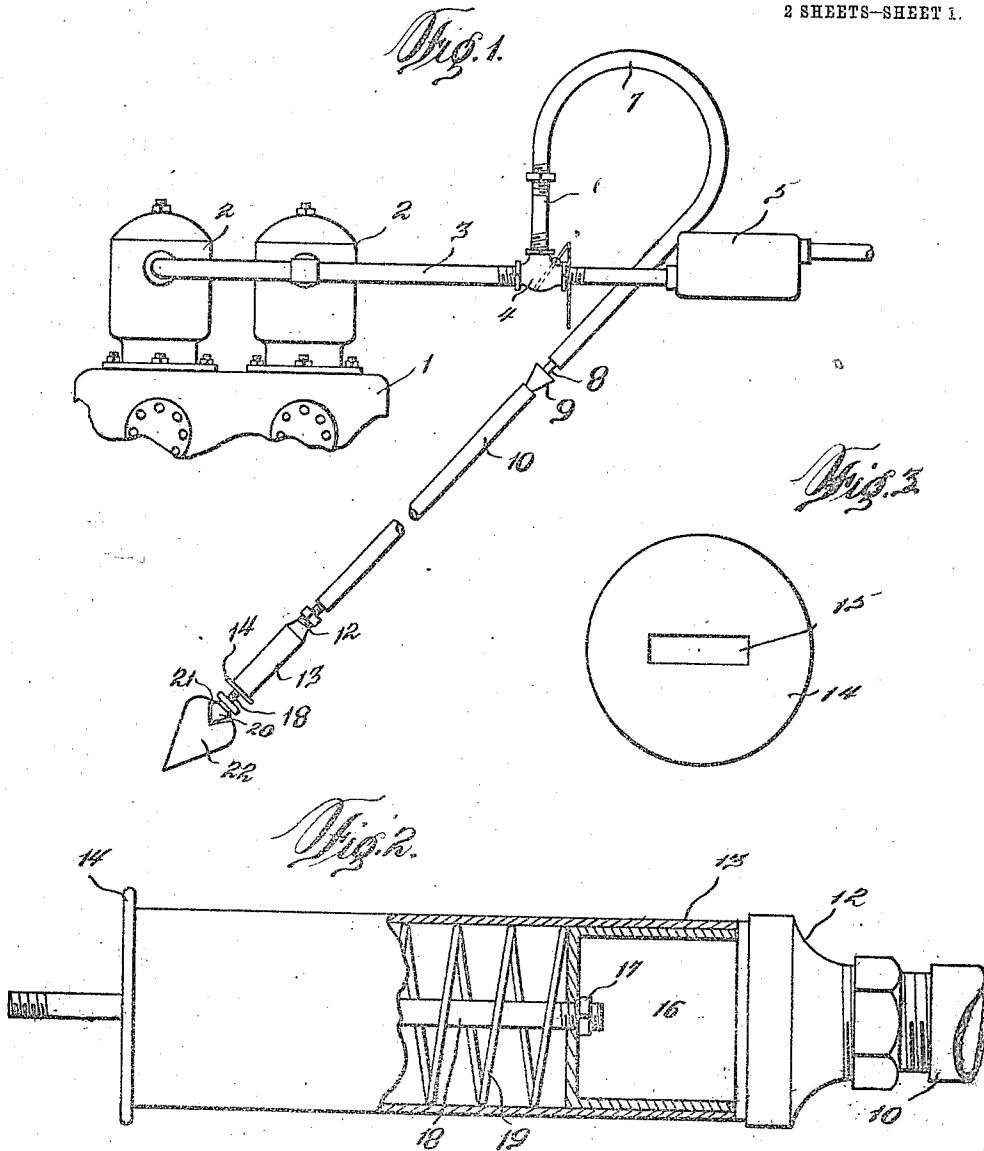


J. M. CHRISTINE.
ATTACHMENT FOR OPERATING DEVICES BY RECIPROCATING MOVEMENTS.
APPLICATION FILED APR. 21, 1910.

1,041,428.

Patented Oct. 15, 1912.

2 SHEETS-SHEET 1.



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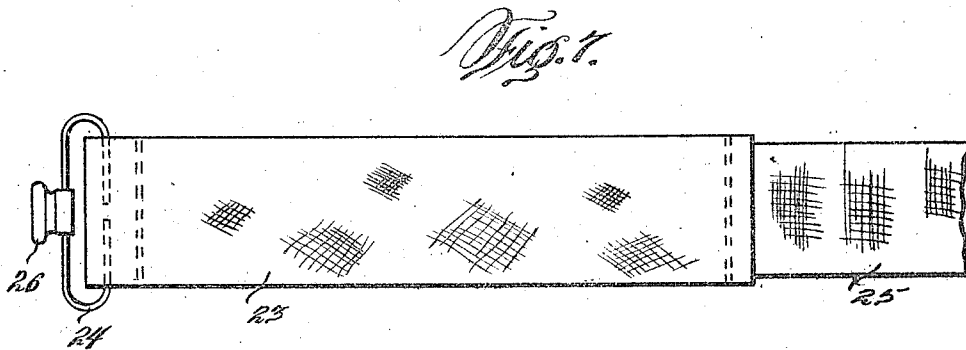
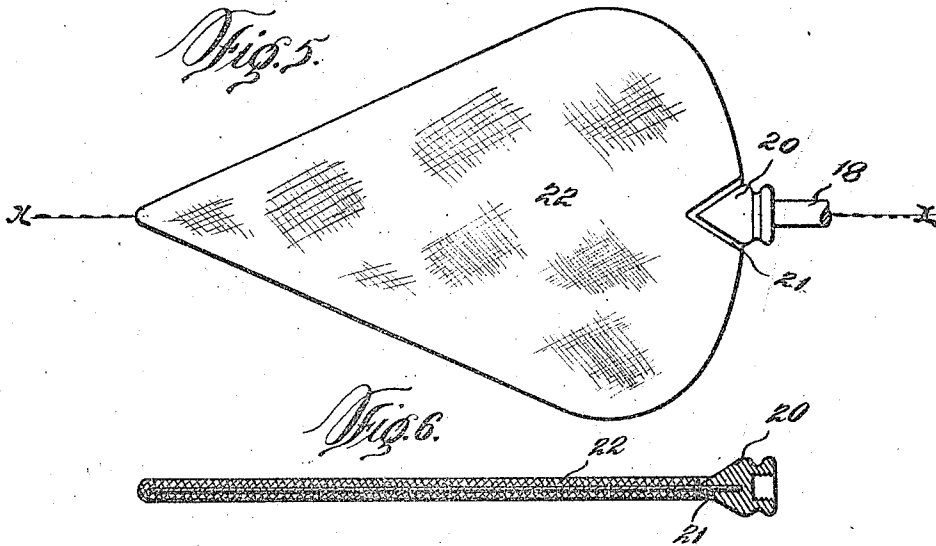
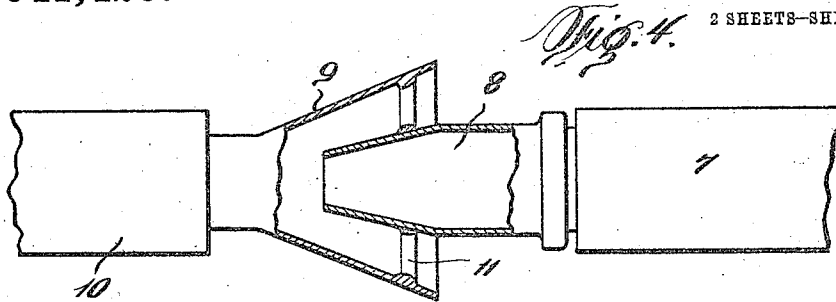
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UNITED STATES PATENT OFFICE.

JOHN M. CHRISTINE, OF BRADDOCK, PENNSYLVANIA.

ATTACHMENT FOR OPERATING DEVICES BY RECIPROCATING MOVEMENTS.

1,041,428.

Specification of Letters Patent.

Patented Oct. 15, 1912.

Application filed April 21, 1910. Serial No. 556,790.

To all whom it may concern:

Be it known that I, JOHN M. CHRISTINE, a citizen of the United States of America, residing at Braddock, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Attachments for Operating Devices by Reciprocating Movements, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to attachments for operating devices by reciprocating movements, and relates more particularly to devices of this character adapted to be connected up to utilize the exhaust from a motor such as a steam, gas or internal combustion engine, the attachment being particularly adapted to operate cleaning or polishing devices for motor vehicles.

The objects of my invention are to provide a device which will be reciprocated by the action of the exhaust impulses cooperating with means tending to place the mechanism in position where a succeeding impulse may provide a reciprocating movement, the impulses actuating the mechanism in one direction; to provide a device in which the mechanism will be operative regardless of the number of impulses per unit of time; to provide a device which is simple and efficient in operation, durable in construction, and which can be manufactured at a relatively low cost.

With the above and such other objects in view as may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts to be hereinafter specifically described and then claimed.

Reference will now be had to the drawings forming part of this specification, wherein there are illustrated the preferred embodiments of the invention, but it is to be understood that the structural elements thereof can be varied or changed, as to the size, shape and manner of assemblage without departing from the spirit of the invention.

In the drawings:—Figure 1 is a side elevation of a cleaning device in accordance with my invention, showing the same in connection with the exhaust of an engine, Fig. 2 is an enlarged side elevation of a cylinder of the device, partly broken away and partly in section, Fig. 3 is an end view

of the cylinder, Fig. 4 is an enlarged side elevation of an exhaust of the cleaning device, partly broken away and partly in section, Fig. 5 is an enlarged plan of a cleaning head adapted to form part of the device, Fig. 6 is a longitudinal sectional view taken centrally of Fig. 5, Fig. 7 is a plan of a cleaning or polishing strap forming part of the device.

In the accompanying drawings the reference numeral 1 denotes an engine having cylinders 2 provided with an exhaust pipe 3 having a valve 4 of the two-way type and a conventional form of muffler 5.

Connected to the valve 4 by a pipe 6 is a hose or flexible pipe 7 having the end thereof provided with a nipple 8. The nipple 8 extends into the funnel shaped end 9 of a section of hose 10, the funnel shaped end 9 being connected to the nipple 8 by a spider 11. The end of the hose section 10 is detachably connected to the cap 12 of a cylinder 13, the opposite end of said cylinder being closed by a head 14 having a transverse slot or elongated opening 15 formed therein.

Movably mounted in the cylinder 13 is a cup-shaped piston 16 and detachably connected to said piston, as at 17 is a piston rod 18 adapted to extend through the slot 15 of the cylinder head 14. Encircling the piston rod 18 between the head 14 and the piston 16 is a coiled expanding spring 19, the object of which will presently appear.

Detachably mounted upon the outer end of the piston rod 18 is a head 20 and connected to said head is a heart-shaped flexible metallic plate 21 covered by a piece of fabric 22, as felt or flannel, the head 20, plate 21 and fabric 22 constituting a polishing and cleaning head.

In lieu of the cleaning and polishing head a strap can be used, comprising a piece of fabric 23 having one end thereof provided with a link 24, and attached to the opposite end is a piece of flexible rubber 25. The link 24 is provided with a head 26, whereby it can be connected to the end of the piston rod 18.

The valve 4 is normally open whereby the exhaust from the cylinders 2 can pass through the muffler 5, and when it is desired to use the polishing device, the section of hose 7 is attached to the pipe 6 and the valve 4 closed, whereby the exhaust will be deflected into the section of hose 7. As

the exhaust passes through the nipple 8 into the section of hose 10, the cup-shaped piston 16 will be moved forwardly, placing the spring 19 under compression, consequently the heart-shaped polishing head will be moved forwardly and after the exhaust has spent itself, the spring 19 will restore the polishing head and piston 16 to their normal position with the exhausted air passing out through the funnel shaped end 9 of the section of hose 10. As will be readily understood, the successive impulses of the exhaust will gradually fill up that portion of the attachment beyond the end 9, after which the succeeding impulses will be delivered upon the cushion so formed and will quickly exhaust out through the annular space surrounding the nipple 8, such impulses acting on the piston 16 through the cushion provided by the exhaust gases located in the section 10. As will be readily understood, the spring 19 tends to return the piston to initial position, the time required to do this being dependent upon the spring itself, and necessarily being substantially the same at all times. Consequently, when the pressure of the impulse causes the piston to move forwardly to compress the spring, the spring will, if a sufficient amount of time is given, return the piston to its initial position; when this action takes place, the length of reciprocation of the cleaning element is at its maximum. By reason, however, of the fact that the spring presents a time element requiring a fixed period, such maximum movement would necessitate the running of the motor at an exceedingly low speed, without materially increasing the polishing effect. This relatively slow movement, while possible with a motor having the exhaust impulses of considerable time intervals is not a favorable result when an attempt is made to place the attachment on a motor having a plurality of cylinders delivering the exhaust to a common outlet, a construction in which the explosions are so rapid as to prevent the provision of a sufficient length of time for the piston to return to its normal position. This fact is taken care of in the present instance by the facility to operate the attachment with equal and in reality superior results, by automatically shortening the stroke of reciprocation of the piston and increasing the number of strokes per unit of time, this action being obtained by reason of the fact that the time of successive impulses is shorter than that required for the spring to return the piston to its normal position, with the result that the succeeding impulse becomes effective on the piston before it has returned to its normal position. Obviously, the greater the increase in impulses per unit of time, the shorter will be the stroke of the piston; each impulse, however, providing for the stroke. In this man-

ner, the motor can be run at high speed, and the vibrating movement of the cleaning attachment be had at a corresponding high speed with short strokes, enabling the attachment to more rapidly produce the cleaning effect as well as the polishing effect. At the same time, the high speed developed does not provide excessive vibration to the attachment itself (the cylinder), since the direction of movement of the piston corresponds to the direction of vibration or reciprocation of the cleaning attachment, so that all movements are substantially in a single plane.

When the cleaning or polishing strap is to be used, the cylinder 13 can be held in one hand and the end of the strap held by the other hand, thereby permitting of considerable pressure being brought to bear upon the material to be cleaned or polished, while the flexible strap will conform to the contour of the material. The flexible rubber 25 being held in the hand and the cylinder in operation, the piece of polishing fabric can be easily moved back and forth, thereby permitting of both hands being held stationary. It is in this connection that I do not care to confine myself to the material used either in connection with the polishing head or the polishing strap.

It is apparent from the foregoing that my polishing device can be made part of an automobile equipment and with the automobile stationary and the engine in operation, the most intricate parts of the automobile can be thoroughly cleansed.

Having now described my invention what I claim as new, is:—

1. An attachment adapted to be connected to the exhaust pipe of a motor having an intermittent exhaust, said attachment being operated by the successive impulses of the exhaust and comprising a cylinder, a piston movably mounted in said cylinder and actuated in one direction by the exhaust from the motor, a rod connected to and moving with the piston and projecting from one end of the cylinder and adapted to have a work performing element attached to and movable with the projecting end thereof, means located in said cylinder for operating said piston in the opposite direction, a connection between said cylinder and the exhaust pipe of the motor, and means within said connection to constitute the sole exhaust from the motor when the attachment is in operation, said means and connection providing impact pressure from the exhaust to the piston in the direction of flow of the exhaust, said point of exhaust being located substantially at the point of application of pressure.

2. An attachment adapted to be connected to the exhaust pipe of a motor having an intermittent exhaust, said attachment being

operated by the successive impulses of the exhaust exerted by impact in the direction of exhaust flow and comprising a cylinder having a piston, said piston being operatively connected to a work-performing device to provide reciprocations to said device, connections between the cylinder and the pipe for the passage of exhaust to the cylinder to actuate said piston in one direction, means within the cylinder for moving the piston in the opposite direction, and an exhaust release element between the piston and exhaust pipe for the escape of exhaust under the action of said means, said element being located substantially at the point of impact and operative between successive impulses of the exhaust.

3. An attachment adapted to be connected to the exhaust pipe of a motor having an intermittent exhaust, said attachment being operated by the successive impulses of the exhaust exerted by impact in the direction of exhaust flow and comprising a cylinder having a piston, said piston being operatively connected to a work-performing device to provide reciprocations of said device, connection between the cylinder and the pipe for the passage of exhaust to the cylinder to actuate said piston in one direction, a spring within the cylinder in advance of the piston for moving the latter in the opposite direction, and an exhaust-release element for the escape of exhaust under the action of said spring, said element being located substantially at the point of impact and operative between successive impulses of the exhaust.

4. An attachment adapted to be connected to the exhaust pipe of a motor having an intermittent exhaust, said attachment being operated by the successive impulses of the exhaust exerted by impact in the direction of exhaust flow and comprising a cylinder having a piston, said piston being operatively connected to a work-performing device to provide reciprocations to said device, connections between the cylinder and the pipe for the passage of exhaust to the cylinder to actuate said piston in one direction, means within the cylinder for moving the piston in the opposite direction, and an exhaust release element between the piston and exhaust pipe for the escape of exhaust under the action of said means, said element being located substantially at the point of impact and operative between successive impulses of the exhaust, said exhaust release element having its exhaust exit annular with respect to the path of travel of the exhaust in its work-performing movement.

5. An attachment adapted to be connected to the exhaust pipe of a motor having an intermittent exhaust, said attachment being operated by the successive impulses of the exhaust, and comprising a reciprocating ele-

ment adapted to perform work in both directions of its movement and having its movements in one direction provided by the exhaust impulses exerted by impact in the direction of exhaust flow, variations in number of exhaust impulses per unit of time providing variations in length of reciprocations of the element, the working capacity of the element remaining unimpaired by such variations in length and means for exhausting the exhaust flow substantially at the point of impact.

6. An attachment adapted to be connected to the exhaust pipe of a motor having successive intermittent exhaust flow, said attachment comprising a reciprocating element adapted to perform work in both directions of its movement and having its movements in one direction provided by the exhaust impulses exerted by impact in the direction of exhaust flow, and means within the flow path to the element for exhausting the exhaust flow after each impulse and after it has functioned with respect to the element, said means being located substantially at the point of impact of the exhaust.

7. An attachment adapted to be connected to the exhaust pipe of a motor having successive intermittent exhaust flow, said attachment comprising a reciprocating element adapted to perform work in both directions of its movement and having its movements in one direction provided by the exhaust impulses exerted by impact in the direction of exhaust flow, and means within the flow path to the element for exhausting the exhaust flow after each impulse and after it has functioned with respect to the element, the number of impulses per unit of time controlling the length of the reciprocations of the element, said means being located substantially at the point of impact of the exhaust.

8. An attachment adapted to be connected to the exhaust pipe of a motor having successive intermittent exhaust flow, said attachment comprising a reciprocating element adapted to perform work in both directions of its movement and having its movements in one direction provided by the exhaust impulses exerted by impact in the direction of exhaust flow, and means within the flow path to the element for exhausting the exhaust flow after each impulse and after it has functioned with respect to the element, the number of impulses per unit of time controlling the length of the reciprocations of the element, variations in number of impulses varying the length of reciprocation, said means being located substantially at the point of impact of the exhaust.

9. An attachment adapted to be connected to the exhaust pipe of a motor having successive intermittent exhaust flow, said attachment comprising a reciprocating ele-

ment adapted to perform work in both directions of its movement and having its movements in one direction provided by the exhaust impulses exerted by impact in the
5 direction of exhaust flow, and means within the flow path to the element for exhausting the exhaust flow after each impulse and after it has functioned with respect to the element, the number of impulses per unit of
10 time controlling the length of the reciprocations of the element, variations in number of

impulses varying the length of reciprocation in correspondence, said means being located substantially at the point of impact of the exhaust.

In testimony whereof I affix my signature. 15
in the presence of two witnesses.

JOHN M. CHRISTINE.

Witnesses:

JOHN M. IRWIN,
DAVID FURNIER.