H. H. HARROLD.

PUMP FOR VACUUM CLEANERS.

APPLICATION FILED MAY 24, 1912.

1,067,812. Patented July 22, 1913.

FIG-6-

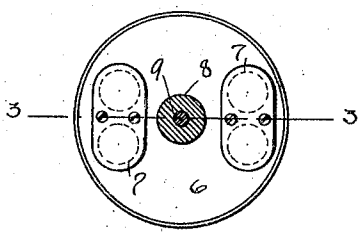


FIG-1

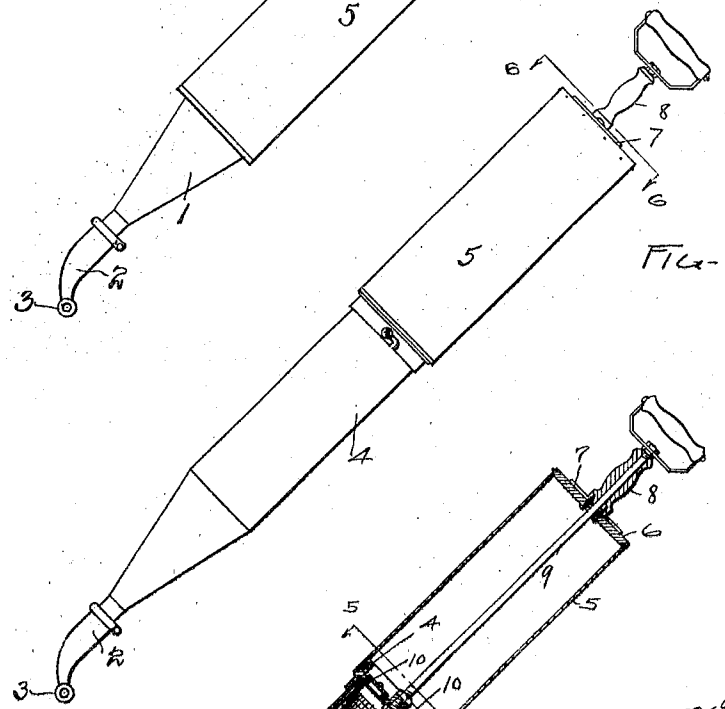


FIG-2

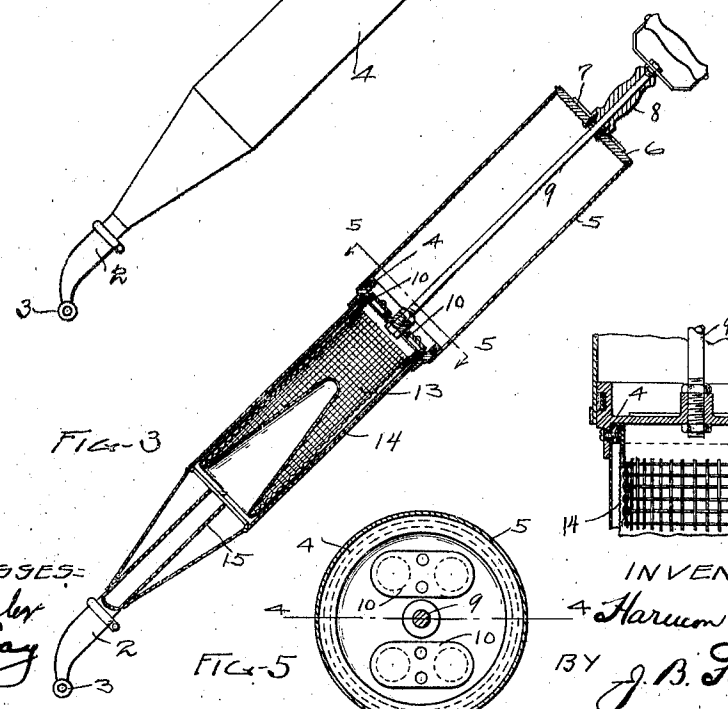


FIG-3

FIG-4

FIG-5

WITNESSES:

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PUMP FOR VACUUM-CLEANERS.

1,067,812. Specification of Letters Patent. Patented July 22, 1913.

Application filed May 24, 1912. Serial No. 699,380.

To all whom it may concern:

Be it known that I, HARMON H. HARROLD, a citizen of the United States, and a resident of Canal Dover, county of Tuscarawas, and State of Ohio, have invented a new and useful Improvement in Pumps for Vacuum-Cleaners, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relates to vacuum cleaners, and more particularly to that type of cleaners which are adapted to be operated by hand. Various cleaners of this type are now in more or less general use, but I have found that the majority of these are not only extremely inconvenient to operate, but are also difficult to manipulate by reason of the considerable amount of power necessary to create the suction.

The present machine is adapted to efficiently clean a surface with but little exertion on the part of the operator, and is so made that it is extremely convenient and easy to handle. It may, of course, be modified adapting it to different types of work, and the cleaning of surfaces such as floors is but one of the many operations which my machine is intended to perform.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claim.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—Figure 1 is a side elevation of my cleaner, showing it in its normal or inoperative position; Fig. 2 is a view similar to Fig. 1, but showing the machine fully extended at the end of the operative stroke; Fig. 3 is a section on the line 3—3 in Fig. 6; Fig. 4 is a section on the line 4—4 in Fig. 5; Fig. 5 is a section on the line 5—5 in Fig. 3; and Fig. 6 is a view taken on the line 6—6 in Fig. 2.

My machine consists of a dust reservoir or inlet chamber 1, as it may be called, which is tapered at one end and has attached thereto a suitable nozzle 2 which will preferably have rollers 3 at either end, adapting it more easily to move over the surface to be cleaned, and a suction pump comprising a piston 4 and a cylinder 5 which will be suitably attached to the open end of the dust chamber. The cylinder 5 will be open at its lower end adapting it to engage the piston and to slide over the dust chamber, as shown in Fig. 1. The head 6 of the cylinder will have two flap valves 7 and an apertured handle 8 attached centrally to this head and adapted to receive a manipulating handle 9 passing through the aperture and attached at one end to the piston 4. The latter is attached by means of a bayonet connection, shown in Fig. 2, to the dust chamber. This piston or separable head 4 is also provided with two flap valves 10, and has circumferential grooves on its outer surface which will contain a spring 11 and a packing ring of leather or some other suitable material 12 which will engage the cylinder and prevent the passage of air around the removable head.

In the dust chamber there is mounted a wire screen 13 which is cylindrical in form and is adapted to hold extended a cloth bag 14 which will prevent the dust entering the dust chamber with the air passing out of the same into the suction mechanism. The nozzle 2 will have an extension 15 which will extend into the dust chamber and will tend to prevent the dust from falling back down into this tube, after it has entered this chamber.

The important features of my invention have now been described, and the operation of the same will be taken up.

In machines of this general type, namely, hand operated, it is extremely difficult to manipulate the same for any length of time by reason of the force necessary to operate the suction mechanism at a sufficient speed to draw up the dust from the surface being cleaned. This is particularly true of mechanism in which the suction means comprise bellows, since a bellows does not begin to operate until it has been expanded for about one-third of its total capacity. This necessitates an extremely long stroke, or else the machine must be operated at a very high speed, neither of

which is feasible in hand operated machines; the first on account of the inconvenience, and the second on account of the power required. When the suction mechanism comprises a pump such as the one here shown, there is of course no inefficiency in the operation, air being drawn in throughout the suction stroke. The pump, however, cannot be made of very large diameter, and it is necessary to lengthen the stroke, which means that one of the handles must be separated from the other by a considerable distance at the limit of the suction stroke. This is extremely inconvenient and fatiguing to the operator. Upon an upward movement of the cylinder a vacuum is produced, the valves 7 in the cylinder being closed thereby and the valves 10 in the piston being opened. Air is thus drawn into the dust chamber through the nozzle together with fine dirt and dust which is separated from the air by the cloth bag. The filtered air is drawn into the cylinder during the upward stroke and discharged from it through the valves 7 on the downward stroke. In the present construction I have inverted the suction pump, attaching the piston to the inlet chamber and providing valve mechanism in the same and making the cylinder of sufficient diameter to slide over the entire dust chamber. Thus at least eighteen inches are cut off from the length of the machine when extended, and the operation is made that much more convenient and simple. By means of the bayonet connection between the piston and the dust chamber, it is possible to separate the same instantly when the wire screen and the dust retaining bag may be lifted out and the dust chamber cleaned.

The advantages of my cleaner are its simplicity, ease of assembly and its extremely convenient operation.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by the following claim or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

In a device of the character described, the combination of a cylindrical open-ended suction chamber, a cylinder open at one end and adapted to fit snugly over said suction chamber and to slide thereon; a head adapted to removably engage and cover such open end in said suction chamber; a handle attached to said head, thereby forming a piston member, said head having an external circumferential groove and a packing ring mounted in such groove, said cylinder having an aperture in its closed end adapted to engage said handle, flap valves mounted in said head and said cylinder adapted to provide ingress and egress of air from said chamber upon relative reciprocation of said cylinder and said piston; and a second handle attached to the closed end of said cylinder.

Signed by me this 20th day of May, 1912.

HARMON H. HARROLD.

Attested by—
JOHN STEVENSON,
J. H. BOOTH.