

R. R. SMITH.
PUMP FOR VACUUM CLEANERS.
APPLICATION FILED MAR. 15, 1912.

1,038,222.

Patented Sept. 10, 1912.

Fig. 1.

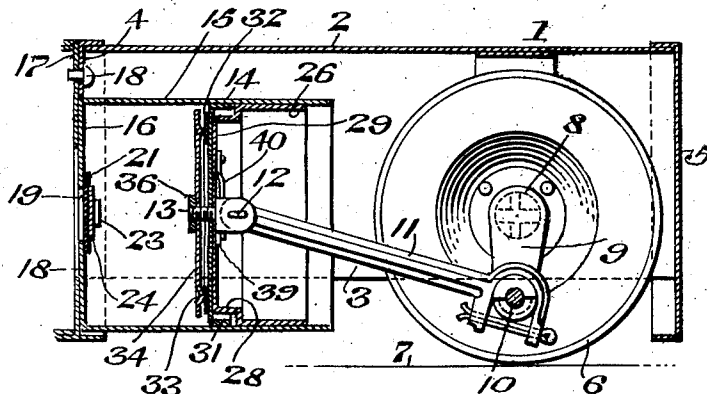


Fig. 4.

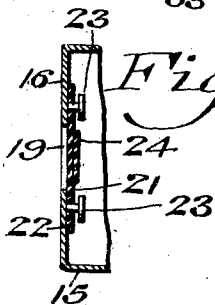


Fig. 2.

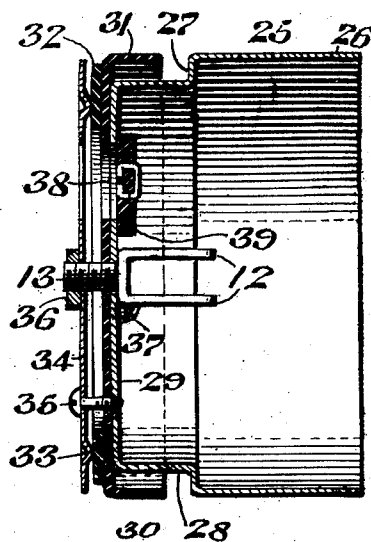
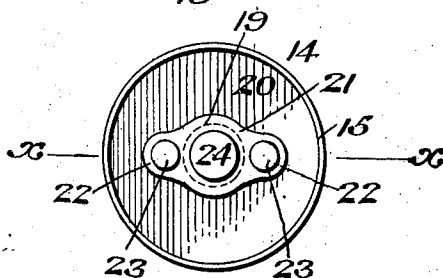


Fig. 3.



WITNESSES

P. F. Nagle
L. Doaville.

INVENTOR

Robert R. Smith
BY *Hedersheim & Gaubert*

ATTORNEYS

UNITED STATES PATENT OFFICE.

ROBERT R. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

PUMP FOR VACUUM-CLEANERS.

1,038,222.

Specification of Letters Patent. Patented Sept. 10, 1912.

Original application filed January 9, 1912, Serial No. 670,208. Divided and this application filed March 15, 1912. Serial No. 683,957.

To all whom it may concern:

Be it known that I, ROBERT R. SMITH, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Pump for Vacuum-Cleaners, of which the following is a specification.

In a contemporaneously pending application filed by me on January 9th, 1912, Serial No. 670,208, of which this application is a division, I have shown and described a novel construction of vacuum cleaner, while the present invention relates particularly to the pumping apparatus therefor and comprises a novel construction of a seamless sheet metal pump cylinder formed with an integral head, which is employed in conjunction with a seamless cylindrical sheet metal pump piston also formed with an integral head, suitable valve mechanism being employed for affecting the suction and discharge of the air according to requirements.

The cylinder and piston construction herein disclosed and claimed is also disclosed in another co-pending application, Serial No. 670,207, filed January 9, 1912.

My invention further consists of a novel manner of assembling the piston members and other novel features as will be hereinafter particularly pointed out in the claims.

It further consists of other novel features of construction all as will be hereinafter fully set forth.

For the purpose of illustrating my invention, I have shown in the accompanying drawing one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a longitudinal sectional view of a portion of a pump for vacuum cleaners, embodying my invention. Fig. 2 represents, on an enlarged scale, a longitudinal sectional view of the piston employed in detached position. Fig. 3 represents an end view of the piston cylinder

looking into the same, the same showing the construction of valve employed. Fig. 4 represents a section on line *x-x* Fig. 3.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates the pump casing having the top portion 2 secured thereto, the depending sides 3, the forward end portion 4 and rear depending wall 5.

6 designates a traction wheel adapted to run or travel upon the surface 7 of the carpet, rug or floor to be cleaned, said wheel being mounted on the shaft 8, having suitable bearings (not shown) carried by the sides 3 of said casing.

9 designates a crank on the shaft 8 carrying the crank pin 10 to which one end of the connecting rod 11 is secured, the other end thereof being pivotally connected to the ears 12 which have the threaded stem 13 projecting therefrom.

The casing, traction wheel or wheels, crank and connecting rod and other adjuncts may be of the usual type and as I make no claim *per se* to the same herein, no further description thereof will be necessary.

14 designates the piston cylinder, which is a cup-shaped seamless cylinder having the cylindrical portion 15 preferably drawn or stamped from sheet metal and having the integral head 16, secured to the wall 17, having the opening 18 therein, by brazing, soldering or other suitable means, said wall being secured to the member 4 by rivets or other fastening devices 18.

19 designates an opening in the cylinder head or wall 16, registering with the opening 18.

20 designates a valve of leather, rubber or similar material, consisting of a central portion 21, having ears 22, sliding on the headed posts 23, projecting inwardly from the cylinder head, it being apparent that said valve has a limited reciprocating movement with respect to the port or opening 19, said valve being stiffened or reinforced by the central button 24.

25 designates the piston having the cylindrical portion 26, the shoulder 27 and the cylindrical portion 28 of reduced diameter, terminating in the wall 29, said piston being drawn or stamped from sheet metal into

seamless, cylindrical cup-shape, the closed end or wall 29 being preferably integral with the body portions 26 and 28.

30 designates a cup packing of indurated fiber or similar material secured to the closed end 29 and having the inturned flange 31 of substantially the same diameter as the portion 26. The flange 31 may be omitted, if desired.

32 designates an annular yielding gasket open in its central portion and pressed upon by the annular rib 33 of the disk 34, which is held in position by the fastening devices 35 and the nut 36 on the threaded stem 13, the latter being prevented from turning by the drop of solder or other abutment 37, as will be understood from Fig. 2. The piston head, cup packing and disk will be firmly secured in assembled position by the nut 36 alone, but I prefer to employ the screws 35 in addition.

The piston head, cup packing and disk have registering openings 38 and the flexible, inwardly opening flap valve 39, secured upon the rear face of the piston head 29 by the arm 40 covers and controls the valve opening thus formed.

The operation is as follows:—It will be understood that the casing 2 and its adjuncts are propelled over the floor, carpet, rug or other surface 7 which it is desired to clean and the contact of the traction wheel or wheels 6 therewith will cause the piston to be reciprocated within the piston chamber, whereupon the valves 20 and 39 will alternately open and close in a manner familiar to those skilled in this art.

It is a desideratum in these devices that the same be very light and practically noiseless and, in addition, it is essential that the same be operated, if possible, without lubrication in the piston cylinder, since in the use of the apparatus for cleaning carpets, rugs, floors and the like, the molecules of dust which are liable to get in the piston chamber will in a short time clog the same and cause the piston to stick if oil is used. I therefore employ the packing 30 of fiber and by the provision of the disks 32 and 34 which are held tightly assembled by the fastening devices common thereto, there is an entire absence of the rattling noise or vibration which frequently occurs in these devices and, in addition, I am enabled to dispense entirely with any lubrication within the piston chamber.

By making the cylinder and piston a seamless sheet metal drawn or stamped structure having an integral head, the same can be produced very cheaply and will be extremely light, strong and durable and the apparatus can be readily transported from one room to another.

It will be understood that in practice a pair of pumping cylinders and pistons are

arranged side by side and a plurality of traction wheels 6 are employed and a suction nozzle is employed in conjunction with a pumping apparatus but as this *per se* forms no part of my invention, I have deemed it unnecessary to show or describe the same in detail.

A great saving in weight and material is obtained by forming the piston and cylinder from sheet metal stamped or drawn into shape and a very slight amount of finishing of these parts is required, since the same are few and simple and are easy to assemble and dismantle and can be readily removed for the purpose of inspection and repairs without necessitating the employment of skilled labor. Furthermore, no lubrication of any of the moving parts is required, as the pistons have fiber cup packings constructed and assembled in the manner shown, said cup packings permitting the piston to reciprocate in its cylinder without lubrication, while the gasket 32 of rubber or similar material interposed between the packing and metallic disk, as 34, which confines these parts, serves to deaden any rattling or other noise caused by the friction between the dry packing and cylinders. The solder or abutment 37 upon the rear face of the piston head prevents the bolt or threaded stem 13 from turning, as is evident, while the screws 35 passing through the disk, packing and piston head insure the true alinement of the valve ports or openings through the same preventing turning of said ports. I preferably connect the connecting rod 11 with the ears 12 by means of a cotter-pin which forms an easy assembled connection which can be as easily disconnected.

It will now be apparent that I have devised a novel and useful construction of a pump for vacuum cleaners, which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description and while I have, in the present instance, shown and described a preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a vacuum cleaner, a seamless sheet metal pump cylinder formed with an integral head, a seamless cylindrical sheet-metal pump-piston formed with an integral end and having the portion at that end reduced in diameter to form a shoulder, a packing fitting upon said reduced portion, and means for securing such packing to the end of the piston, said means comprising a

yielding gasket upon the outer face of said packing, a disk formed with an annular rib bearing against said gasket, and means for holding said packing and disk in assembled position.

2. In a vacuum cleaner, a seamless sheet metal pump cylinder formed with an integral head, a seamless cylindrical sheet-metal pump-piston formed with an integral end and having the portion at that end reduced in diameter to form a shoulder, a fiber cup-packing fitting upon said reduced portion, a circular sheet-metal disk, a yielding gasket interposed between said disk and packing and a bolt passed through the end of the piston, packing and disk and having a nut for drawing said parts together.

3. In a vacuum cleaner, a pump-cylinder, a seamless cylindrical sheet-metal pump-piston formed with an integral end and having the portion at that end reduced in diameter to form a shoulder, a fiber cup-packing fitting upon said reduced portion, a yielding gasket upon the outer face of said packing, a circular sheet-metal disk formed with an annular rib bearing against said gasket, and a bolt passed through the end of the pis-

ton, packing and disk and having a nut for drawing said parts together.

4. In a vacuum cleaner, a seamless sheet metal pump cylinder formed with an integral head, a seamless cylindrical sheet metal pump piston formed with an integral end, a packing fitted upon the integral end of said piston, a yielding gasket located against the outer face of said packing, an outer disk formed with an inner rib bearing against said gasket, and fastening devices common to said piston, packing and disk for securing the parts in assembled position.

5. In a vacuum cleaner, a seamless cylindrical sheet metal pump piston having a head thereon, a packing secured to the outer surface of said head, a yielding gasket upon the outer face of said packing, an outer disk formed with an annular rib bearing against said gasket, and fastening devices common to the end of said piston, packing and disk for holding said parts in assembled position.

ROBERT R. SMITH.

Witnesses:

E. HAYWARD FAIRBANKS,
C. D. McVAY.