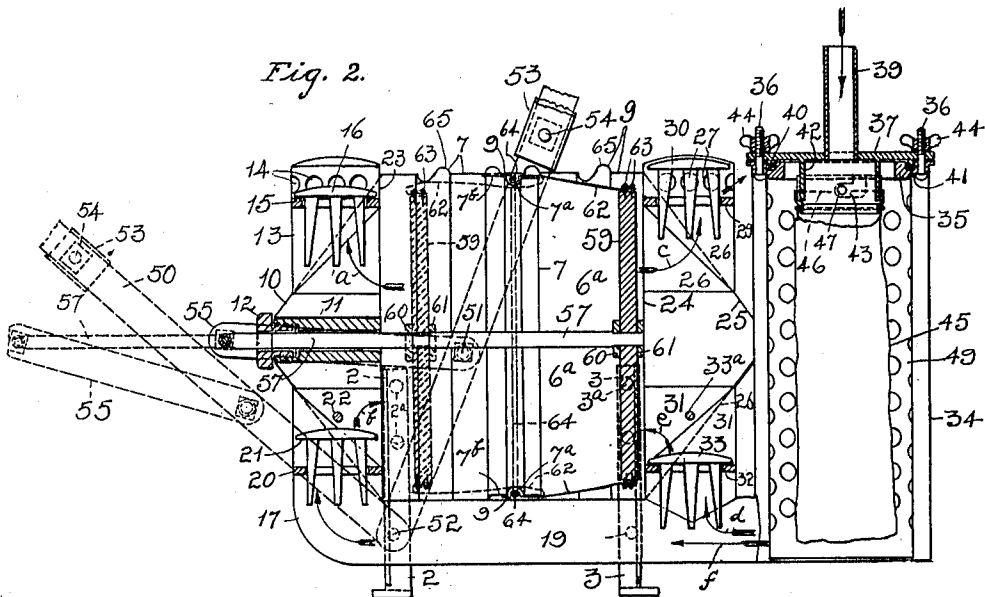
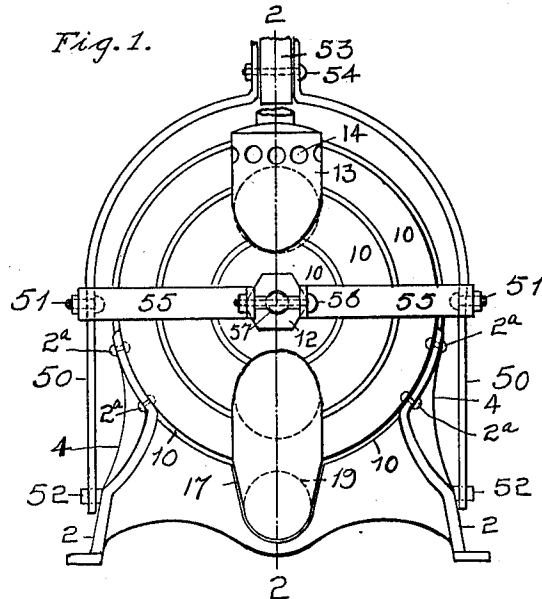


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PUMP FOR VACUUM CLEANERS.
APPLICATION FILED JAN. 27, 1911.

1,020,241.

Patented Mar. 12, 1912.



WITNESSES:

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CHARLES G. WIBORG, OF GALESBURG, ILLINOIS.

PUMP FOR VACUUM-CLEANERS.

1,020,241.

Specification of Letters Patent.

Patented Mar. 12, 1912.

Application filed January 27, 1911. Serial No. 605,001.

To all whom it may concern:

Be it known that I, CHARLES G. WIBORG, a citizen of the United States, and a resident of Galesburg, in the county of Knox and State of Illinois, have invented a new and useful Pump for Vacuum-Cleaners, of which the following is a specification.

My invention has relation to means for cleaning carpets, rugs, furniture, etc., by the application of suction.

A main object of the invention is to provide a novel means for creating the suction.

Another object is to provide increased suctional power.

It is an object to provide a novel casing, which casing is provided with superior means and arrangements of means for both the admission and exhaust of air.

A further object is to provide a device which is not only light but which may be readily carried from place to place.

It is an object to provide a device which is economic of manufacture and which therefore may be sold at a low price; this without sacrificing any of the advantages which accrue from more expensive constructions.

It is an object to so dispose the usual dust-sack that it may be removed and replaced in an instant.

Minor objects will be in part pointed out and in part obvious.

In the accompanying drawings all my improvements are shown as constructed, arranged and embodied in the best way now known to me; manifestly, however, some of these may be used without the others and in machines differing in construction and organization from the one shown. Moreover, while I have illustrated in said drawings and shall herein describe a manually actuated cleaner, it will, without further explanation, be evident that by simple attachments it may be motor-actuated.

The figures of the drawings represent, respectively: Figure 1, a front elevation; and Fig. 2, a vertical, longitudinal central section in the line 2—2 in Fig. 1, some of the parts shown in elevation.

Numerals, each of which indicates the same part in both of the figures, will be employed in order to more clearly explain the invention.

2—2 indicate a forward pair of supporting legs, and 3 a similar pair in rear thereof.

2^a—2^a indicate bolts for securing the hereinafter described casing to the legs 2. 3^a

are similar bolts for securing the casing to the legs 3.

4—4 are braces, and 5—5 are nuts for securing them to the casing.

6 indicates a hollow cylinder, preferably comprising a forward portion 7 and a rear portion 9, which portions create an air chamber 6^a and may be united by soldering or in any other manner. The section 7 is reduced at its rear portion (see 7^b) and is sufficiently smaller than the section 9 as to telescope therewithin; it is provided near its rear end with a peripheral groove 7^a for a purpose hereinafter described. The portion 7 is provided with a conical head 10 which is centrally apertured for the reception of a stuffing box 11 provided with a nipple 12. Fixed to the upper portion of the head 10 and communicating with the cylinder 6 is an elbow 13 provided with exhaust ports or apertures 14. An annular valve-seat 15 is fixed within the elbow 13 and supports an exhaust-valve 16 loosely seated thereon. A bent tube 17 is fixed to the lower portion of the head 26 and communicates with an air-inlet pipe 19 which passes longitudinally of and beneath the casing. The tube 17 is provided with an annular valve-seat 20 which supports an inlet-valve 21 loosely mounted thereon. A pin 22 fixed on the interior of the tube 17 prevents displacement of the valve. A partition 23 at the juncture of the head 10 and casing section 7 is provided with an upper perforation which permits communication between the elbow 13 and chamber, as indicated by the arrow *a*, which indicates also the direction of movement of the air; with a lower perforation which permits communication between the tube 17 and said chamber, as indicated by the arrow *b*, which indicates also the direction of movement of the air; and with a central aperture for the passage of a plunger or piston, presently described. These apertures are only inferentially shown.

A partition 24 is positioned at the juncture of the rear casing-portion 9 and its head 25, which head is preferably conical and provided with a central aperture. Fixed to the upper portion of and communicating with this head is an elbow 26 provided with exhaust ports 27. An aperture in the partition 24, indicated by the arrow *c*, (which indicates also the direction of movement of the air,) furnishes a means of

communication between the elbow 26 and the cylinder. An annular valve-seat 29 in the elbow 26 supports an exhaust-valve 30. Fixed to the lower portion of the head 25 is a tube 31, its lower end communicating with the pipe 19, as indicated by the arrow *d*, and through apertures in its side and through the partition 24 having communication with the chamber 6^a, as indicated by the arrow *c*. The top of the tube 31 is closed. An annular valve seat 32 disposed in the tube 31 supports an inlet valve 33 loosely seated thereon. A pin 33^a prevents displacement of the valve 33.

Fixed to the truncated end of the head 25, and fixed to and having communication with the rear end of the inlet-tube 19 (as shown by the arrow *f*,) is a tube 34 having at its upper end an annular casting 35 which supports bolts 36. A cover 37 provided with a centrally disposed nipple 39 has a downwardly projecting outer annular flange 40 which seats in an annular channel 41 in the casting 35. The cover is provided also with an inner annular flange 42 which is provided with a carved slot 43. Wing-nuts 44 engage the threads of the bolts 36, the stems of which pass through suitable apertures in the cover. A dust-sack 45 is provided at its neck with a ring 46 carrying a pin 47 which together with the slot 43 provides a bayonet joint and serves as a ready but secure means for securement of the sack in place and for its ready removal. A foraminated cylinder 49 is disposed within the tube and prevents the sack or any portion thereof being drawn into the chamber 6^a.

50—50 represent the arms of a bail, pivoted on gudgeons 52 extending preferably from the forward supporting legs. An actuating lever 53 is fixed by bolts 54 between the bent proximal ends of the arms 50. Curved yoke-arms 55 are pivoted at 51 to the bail-arms 50, and at their forward ends are united by a bolt 56 which passes through the apertured T-head of a piston or plunger 57 hereinbefore referred to. The plunger passes through the nipple 12 and packing-box 11, and at its rear end carries a disk 59 secured thereon by nuts 60—61 or in any other suitable manner. One end portion of a flexible and eversible exhaust tube 62, (which is preferably of raw-hide, but which may be of any suitable or desired material,) is suitably secured, as by tacks 63, around the periphery of the disk 59. The forward end portion of the tube 62 is fixed with reference to the cylinder 6 and chamber 6^a, and preferably nearly or quite at its central longitudinal portion. The manner of securement is selective, but I have found the manner illustrated at Fig. 2 to be a most practical one. The said forward end portion is extended past the groove 7^a in the cylinder-section 7. A cord or wire 64 is then brought

over said end portion and drawn taut to draw the material down into said groove, the ends of the wire being secured in any suitable manner. Any other suitable manner of or means for securing one end of the air exhaust-tube 62 may be employed if preferred.

Beads 65 serve to embellish the casing. The cylinder 6 and its heads 10 and 25 comprise what may, for the purposes hereof, be termed a casing.

The operation: Assume the parts to be in the relative positions shown by full lines in Fig. 2, with the disk at its extreme rearward position. By moving the lever 53 to the dotted line position, the operator will, in an evident manner, and through the medium of the bail, yoke, and piston, cause the disk to pass forwardly and through the securing means 64, to its forward position, also shown by dotted lines. In other words, the tube 62 will be everted or turned inside out. Reciprocations of the lever will cause the air to be practically exhausted from the respective ends of the chamber alternately. Indeed, the reciprocations will cause two air chambers to be created—one by the disk 59 and head 10, and the other by said disk and the head 25. The lever being now moved rearwardly; the retreating disk will drive ahead of it the air which had accumulated in the rear chamber 25—10, and said air will be driven through the openings indicated by *c* and *e* in the partition 24. This air pressure coming on top of the valve 33 will hold it more firmly in place than would its own gravity; and said air taking the path of least resistance will cause the valve 30 to raise and permit it to exhaust through the ports 27. Simultaneously with these air-forcing or driving processes, the retreating forward face of the piston, and the tube 62 will cause the air to be exhausted or partially exhausted or "sucked" from the forward chamber 10—59 to create a vacuum or partial vacuum therein. The pressure of the inrushing air (through the elements 39, 45, 49, 34, 17 and 19) is sufficient to raise the valve 21 and permit the air to pass into the vacuum thus formed. The outgoing air, it will be clear, is at this time bearing down upon the valve 33 and counteracting the effect of the inrushing air thereon, whereby the path of least resistance is that above outlined, the valve 21 being held down only by its own gravity.

As the lever is again reciprocated, or thrown forwardly, the valves 33 and 16 will become the active ones, those just previously described remaining at rest. It will be noted that all the valves are normally closed by gravity, and that they work in pairs—the induction valve 33 and eduction valve 16 simultaneously, and the induction valve 21 and eduction valve 30 also simultaneously, but the pairs working alternately.

It will be noted that by providing an eversible tube, the fixed portion of which is at or approximately at the mid-length of the chamber, I secure a great amount of suction by utilizing practically all of said chamber.

The device is of light weight, and by pivoting it near its central portion I attain the greatest portability. The wing-nuts permit of ready access to the dust-sack, and the bayonet lock provides a quick acting means whereby the sack may be removed.

It has not been thought best to encumber this specification and drawings with descriptions and illustrations of modifications or of elements which are neither essential to nor form any part of the invention herein claimed. In fact, it is apparent without such, that numerous changes may be made in the details of construction and by modifications involving only mechanical skill, without departing from the essential spirit and scope of the invention.

Therefore, without limiting myself to particularities, except in such of the claims as are for specific constructions, I claim as new the following, to-wit:

1. A device of the character described comprising telescopic casing-sections, an eversible tube therein, one of its ends fixed approximately midlength of and to said casing, a disk closing its other end, means for reciprocating said disk through said

tube, whereby it is everted, a removable, floating, simultaneously acting induction and a like eduction valve comprising a pair disposed at opposite ends of the casing, communicating therewith and actuatable by reciprocations of said disk, and a second simultaneously acting removable, floating, induction and a like eduction valve comprising a pair disposed at opposite ends of the casing, said pairs working alternately.

2. A vacuum cleaner comprising a casing composed of telescopic sections and conical heads, a plurality of elbows in communication with each of said heads, a removable, floating, induction and a like eduction valve each connected with an elbow in each head, a pipe providing a means of air-communication between said heads, an apertured partition disposed at the junction of each head and the casing, an eversible exhaust-tube disposed within said casing and adapted to alternately actuate an induction and an eduction valve, and means for everting said tube.

In witness whereof I hereunto affix my signature at Galesburg, Knox county, Illinois this 23rd day of January, 1911, in presence of two subscribing witnesses.

CHARLES G. WIBORG.

Witnesses:

H. M. RICHARDS,

WEBB A. HERLOCKER.