R. B. HUTCHISON.

PUMPING MECHANISM FOR VACUUM CLEANERS.

APPLICATION FILED JUNE 24, 1912.

1,067,030.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

FIG. 1.

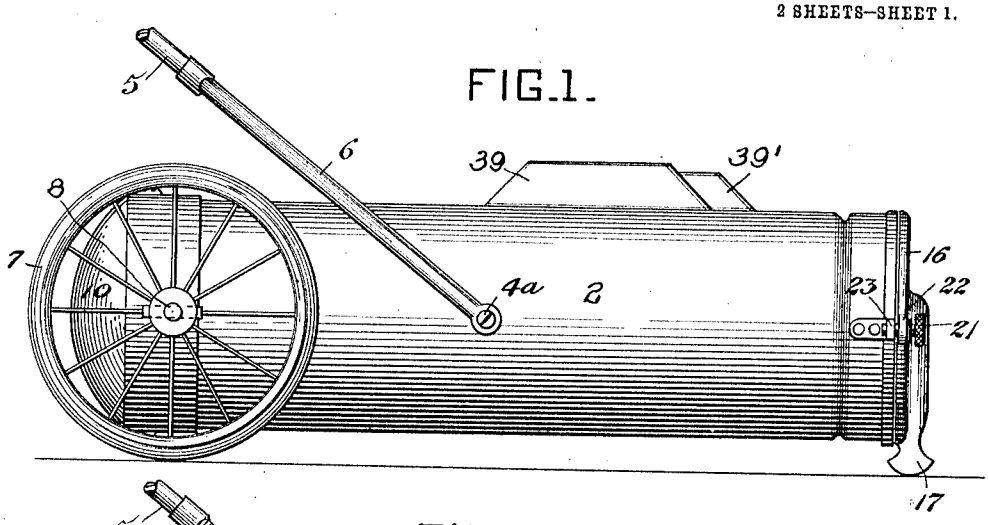


FIG. 2.

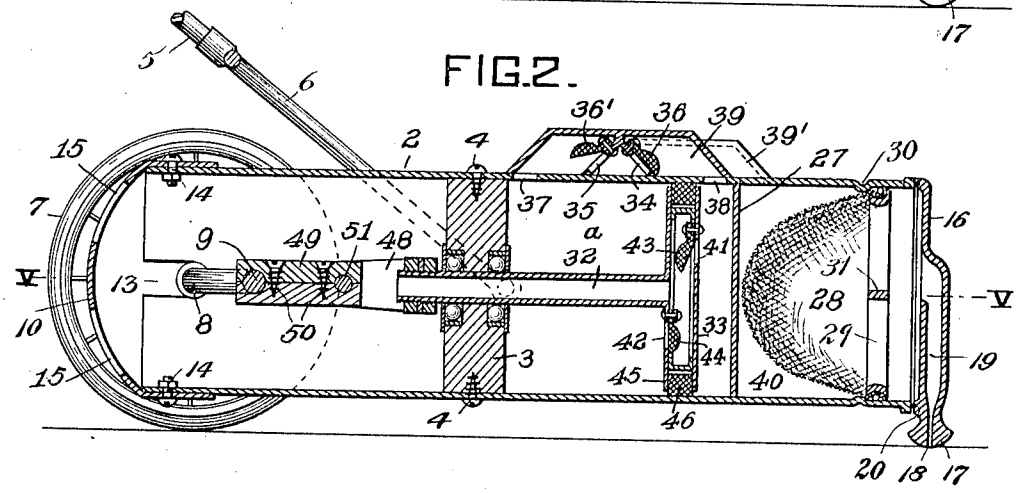
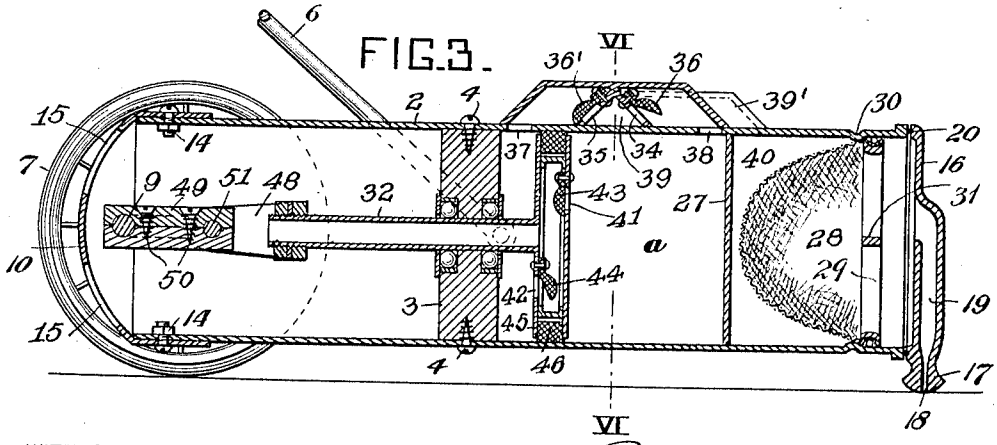


FIG. 3.



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2 SHEETS—SHEET 2.

FIG.4.

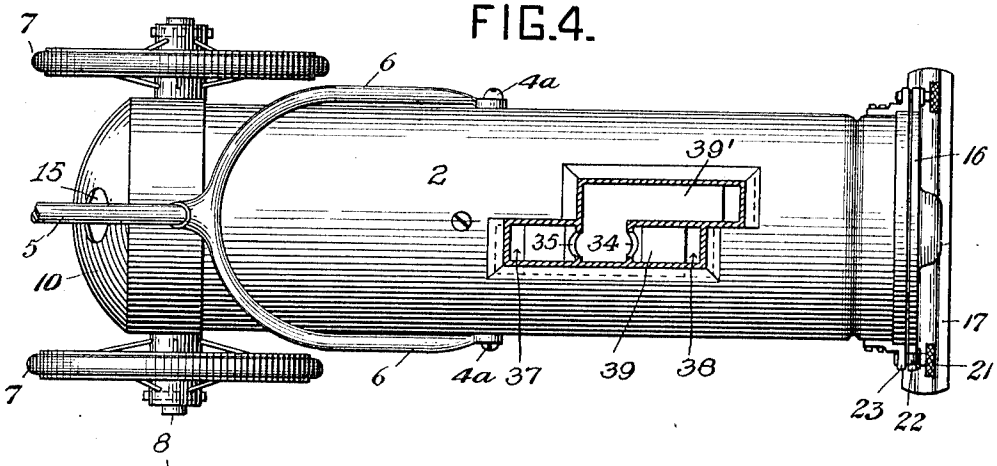


FIG.5.

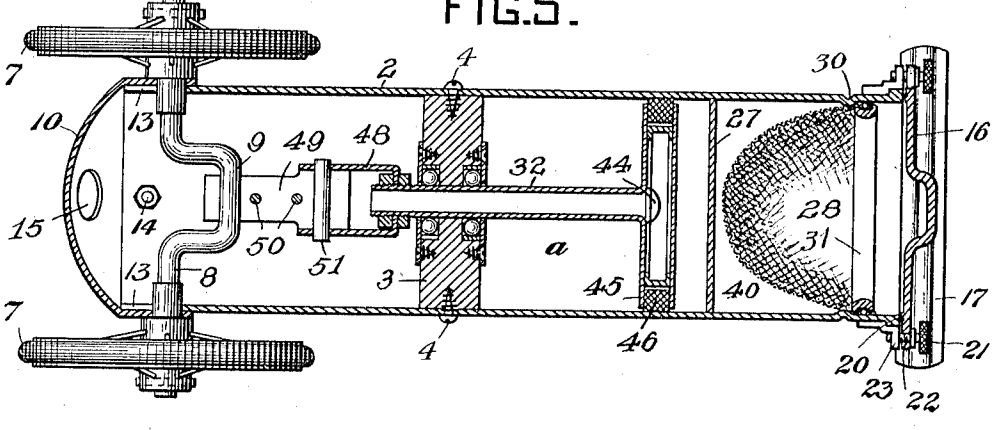
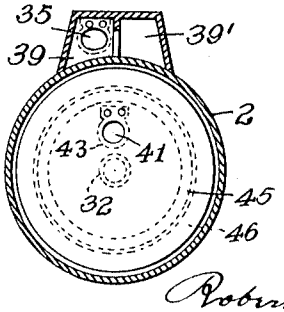


FIG.6.



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PUMPING MECHANISM FOR VACUUM-CLEANERS.

1,067,030. Specification of Letters Patent. Patented July 8, 1913.

Application filed June 24, 1912. Serial No. 705,488.

To all whom it may concern:

Be it known that I, ROBERT B. HUTCHISON, a citizen of the United States, residing at Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Pumping Mechanism for Vacuum-Cleaners, of which the following is a specification.

My invention is an improvement in vacuum cleaners.

It consists of a portable apparatus operable by traction and comprises a hollow cylindrical body or barrel having at its forward end a suction nozzle, at its rear end a pair of supporting wheels and a crank shaft, a plunger chamber between transverse partition walls, a hollow valved plunger and plunger rod extending rearwardly through the rear partition controlling the circulation of induced air currents in operative connection with said crank shaft, a removable dust bag, and an operating handle, together with other features of detail construction and improvement as shall be more fully hereinafter described.

In the drawings—Figure 1 is a view of the device in side elevation. Fig. 2 is a longitudinal vertical sectional view of the device. Fig. 3 is a similar sectional view showing the plunger mechanism in reversed position. Fig. 4 is a plan view of the device, partly in section. Fig. 5 is a horizontal sectional view of the device on the line V. V. of Fig. 2. Fig. 6 is a cross section on the line VI. VI. of Fig. 3.

The body portion of the cleaner consists of a cylindrical barrel portion or case 2 of sheet metal provided at or about its middle with a transverse stationary head 3 fixedly secured to the shell or barrel 2 by screws 4, or otherwise, the device being provided with an operating handle 5 of any desired length having the bifurcated or forked extremity consisting of the sides 6. The terminals of these sides are pivotally connected at about the middle portion of the apparatus by the screws or studs 4^a which extend through the shell or into any suitable attached bearing reinforcements.

The rear portion of the machine is mounted upon wheels 7, 7, the peripheries of which are preferably provided with rubber tires, or otherwise formed to provide for good traction upon the surface of the floor. The wheels 7 are fixedly attached by their hubs to the outer ends of crank-shaft 8 having a middle crank portion 9. The rear end of the cylinder 2 is closed by a cap 10 of sheet metal tightly fitting around the end of the main case to which are fixedly connected the bearings for shaft 8 in the same manner as that shown in my prior application, filed April 10, 1912, Ser. No. 689780. The rear side portions of the shell 2 are slotted, as indicated at 13, for clearance of the bearings so that when the cap is inserted in position, the bearings are fixedly located and the parts are connected in operative relation. The cap 10 is secured upon the rear end of shell 2 by means of bolts and nuts 14, openings 15 being provided through the cap for the double purpose of providing for air circulation and for manipulation of the bolts and nuts in connecting these parts.

At the front end of the casing 2, I provide a removable head 16 having at its lower portion a nozzle terminal 17 longitudinally slotted across its middle portion, as indicated at 18, of ample width to cover the desired floor area, and communicating with the interior of the case by an upwardly and inwardly disposed circulating passage 19. The head 16 is preferably provided around its inner edge with a packing ring 20 of any suitable material set in an annular receiving groove and is tightly clamped against the end of the case by securing screws 21 having finger terminals, as shown, said screws extending through slotted ears 22 projecting outwardly at each side of head 16 and threaded into suitable receiving lugs 23. By this construction, upon loosening the screws 21, the head 16 may be slightly rotated or released for access into the interior, and as readily replaced.

Inwardly beyond the outer end of the case 2 is a transverse imperforate partition 27, soldered or otherwise secured to the case, between which and the outer end of the case is provided a sufficient receptacle 40 for the dust collecting bag 28. Said bag is mounted upon a circular frame 29 which bears inwardly against an inner annular shoulder 30 making a sufficiently tight fit with the interior of the casing to prevent the passage of dust. The frame 29 is provided with a transverse bar 31 by which it may be readily grasped for removal or insertion.

The transverse partition 3, which may be of wood, is preferably of suitable thickness to provide a substantial stationary supporting frame for a reciprocable hollow plunger

stem 32, upon the forward end of which in the suction chamber *a* is fixedly secured or connected the reciprocable hollow head 33. Said head is reciprocably actuated within the suction compartment *a* between partitions 3 and 27. The suction chamber *a* communicates by ports 37 and 38 at each end, and on each side of the reciprocable head 33, with a conduit 39, through ports 34 and 35, respectively, controlled by flap valves 36, 36′. Port 39 leads from the inner side of each of said flap valves, through a supplemental conduit 39′ to the dust chamber 40 at the other side of partition 27.

The hollow head 33 is provided at front and back with inwardly opening ports 41, 42, respectively, controlled by flap valves 43, 44, respectively, and the head is also provided with an annular recess 45 in which is loosely mounted a resilient packing ring 46 of rubber or other suitable material.

The rear end of hollow plunger 32 is connected in any suitable manner, as by a clevis 48 of sheet metal or other suitable material and a two-part link 49, with the crank 9. Link 49 may be of hard wood in halves secured together by screws or bolts 50 embracing the crank 9 and a pin 51 extending through each side of the clevis 48.

For the purpose of maintaining plunger 32 in alinement centrally through the head 3, I provide, at each side of the head surrounding the plunger, series of ball or roller bearings 52, 52, mounted within surrounding bushing rings 53, and retained by cover plates 54, 54. The middle portion of the head 3 snugly embraces the plunger 32 without any unnecessary binding, by which construction a practically air-tight fit is secured.

Due to the ample thickness of head 3 and the alining action of bearing 52, the plunger 32 is retained centrally in position at all times, independent of any lateral thrust due to its connection with the actuating crank 9.

The operation of the device will be readily understood from the foregoing description. The weight of the case 3 and its contents, by the pivotal mounting upon the supporting crank shaft, causes the nozzle to remain in close operative position over the floor surface. By merely manipulating the machine to and fro by its handle the suction plunger 33 is operated back and forth and effects a strong suction at one side and the other in chamber *a*, in each direction, the valves 36, 36′ operating alternately and effecting a continuous flow through conduit 39′ from the dust chamber 40, the dust being arrested in the bag 28 and the incoming air escaping finally backwardly through hollow plunger 32 and openings 15.

The device is very easily manipulated; it is simple and compact in construction, and sufficiently low to be passed under beds or other articles of furniture; and is very durable and strong, and not liable to get out of order.

Having described my invention, what I claim is:—

1. In a vacuum cleaning apparatus, the combination of a portable cylindrical casing having supporting wheels and a connected crank shaft at one end and a suction opening at the other end, a transverse head within the casing having a central plunger stem bearing opening, a transverse partition within the casing between said head and the suction opening providing a suction compartment, a conduit communicating with the suction opening and having valve controlled connections to each end of the suction compartment, and a hollow valved plunger head reciprocably mounted in the suction compartment having a hollow plunger stem extending through said transverse head and connected with the crank shaft, substantially as set forth.

2. In a vacuum cleaning apparatus, the combination of a portable cylindrical casing having supporting wheels and a connected crank shaft at one end and an air receiving chamber provided with a suction opening at the other end, a transverse head within the casing having a central plunger stem bearing opening, a transverse partition within the casing between said head and the air receiving chamber providing a suction compartment, a conduit communicating with the air receiving chamber and having valve controlled connections to each end of the suction compartment, and a hollow valved plunger head reciprocably mounted in the suction compartment having a hollow plunger stem extending through said transverse head and connected with the crank shaft, substantially as set forth.

3. In a vacuum cleaning apparatus, the combination of a portable cylindrical casing having supporting wheels and a connected crank shaft at one end and a removable head having a suction opening at the other end, a transverse head within the casing having a central plunger stem bearing opening, a transverse partition within the casing between said head and the suction opening providing a suction compartment, a conduit communicating with the suction opening and having valve controlled connections to each end of the suction compartment, and a hollow valved plunger head reciprocably mounted in the suction compartment having a hollow plunger stem extending through said transverse head and connected with the crank shaft, substantially as set forth.

4. In a vacuum cleaning apparatus, the combination of a portable cylindrical casing having supporting wheels and a connected crank shaft at one end and a remov-

able head having a suction opening, a packing ring, and securing devices at the other end, a transverse head within the casing having a central plunger stem bearing opening, a transverse partition within the casing between said head and the suction opening providing a suction compartment, a conduit communicating with the suction opening and having valve controlled connections to each end of the suction compartment, and a hollow valved plunger head reciprocably mounted in the suction compartment having a hollow plunger stem extending through said transverse head and connected with the crank shaft, substantially as set forth.

5. In a vacuum cleaning apparatus, the combination of a portable cylindrical casing having supporting wheels and a connected crank shaft at one end and a suction opening at the other end, a transverse head within the casing having a central plunger stem bearing opening provided with ball bearings, a transverse partition within the casing between said head and the suction opening providing a suction compartment, a conduit communicating with the suction opening and having valve controlled connections to each end of the suction compartment, and a hollow valved plunger head reciprocably mounted in the suction compartment having a hollow plunger stem extending through said transverse head and connected with the crank shaft, substantially as set forth.

6. In a vacuum cleaning apparatus, the combination of a portable cylindrical casing having supporting wheels and a connected crank shaft at one end and a suction opening at the other end, a transverse head within the casing having a central plunger stem bearing opening, a transverse partition within the casing between said head and the suction opening providing a suction compartment, a conduit communicating with the suction opening and having valve controlled connections to each end of the suction compartment, a hollow valved plunger head reciprocably mounted in the suction compartment having a hollow plunger stem extending through said transverse head and connected with the crank shaft, and a bifurcated manipulating handle pivotally connected with the casing at each side of its middle portion, substantially as set forth.

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

ROBERT B. HUTCHISON.

Witnesses:
C. M. CLARKE,
FREDK. STAUB.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."