W. J. ACKLEY.

VACUUM CLEANER.

APPLICATION FILED JAN. 12, 1911.

1,004,840. **Patented Oct. 3, 1911.**

2 SHEETS—SHEET 1.

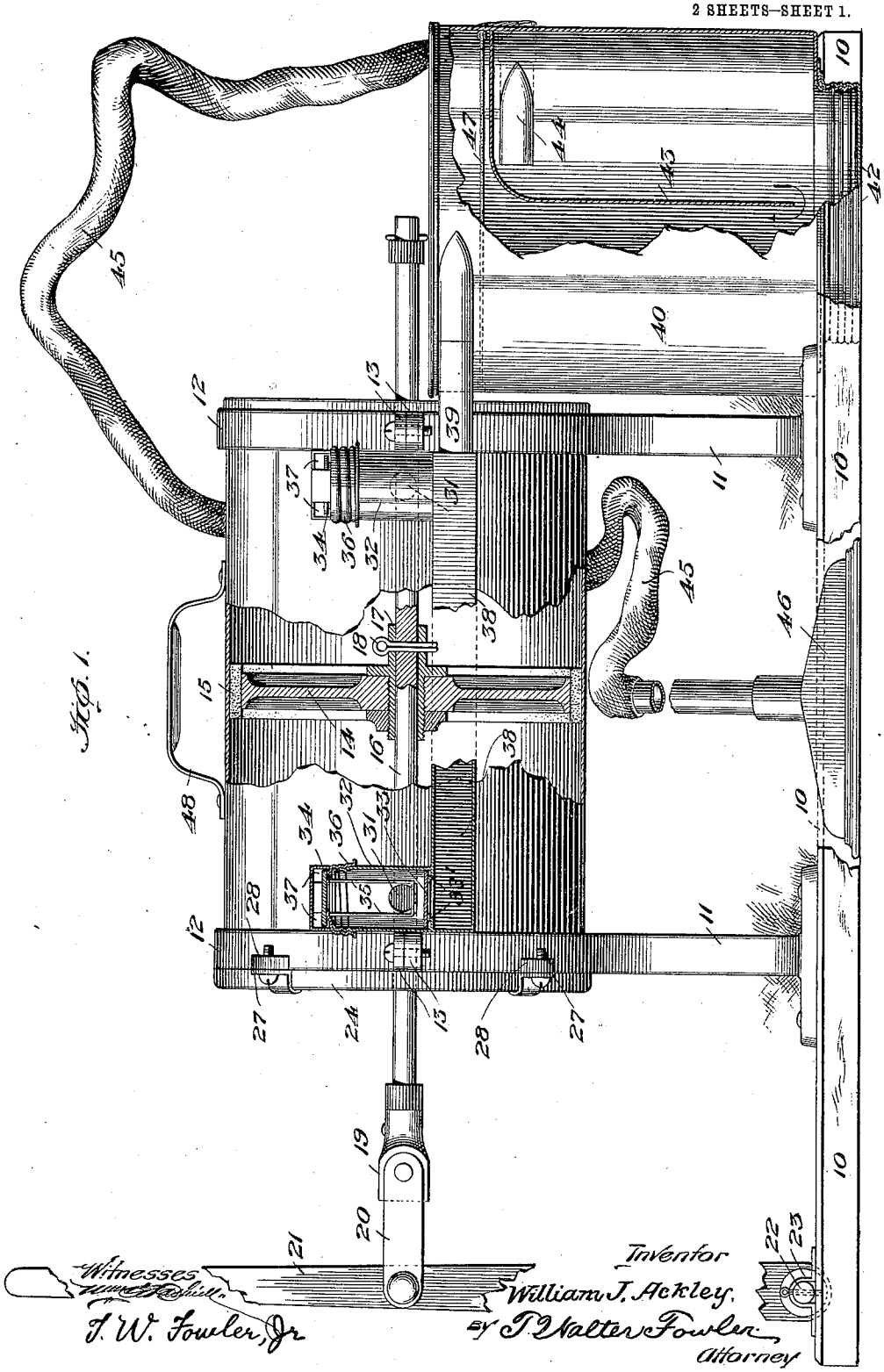

Fig. 1.

Witnesses
F. W. Fowler, Jr.

Inventor
William J. Ackley,
by J. Walter Fowler
Attorney

W. J. ACKLEY.

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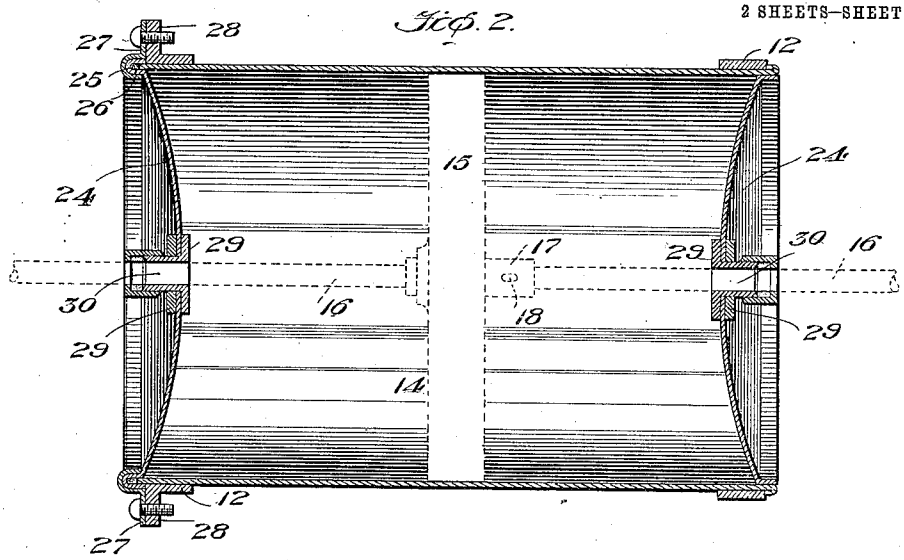
2 SHEETS—SHEET 2.

Fig. 2.



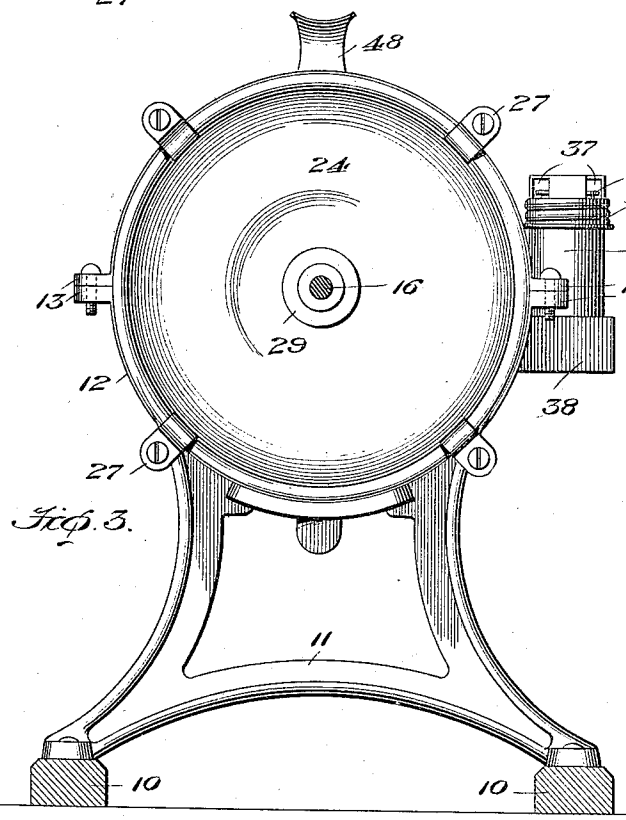
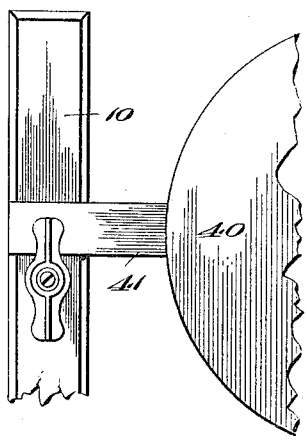


Fig. 3.

Fig. 4.



Witnesses

J. W. Fowler, Jr.

Inventor

William J. Ackley,

by J. Walter Fowler

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM J. ACKLEY, OF BATAVIA, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO STEAM APPLIANCE MANUFACTURING COMPANY, OF BATAVIA, NEW YORK, A CORPORATION, AND ONE-HALF TO HORACE S. PECK, OF BATAVIA, NEW YORK.

VACUUM-CLEANER.

1,004,840. Specification of Letters Patent. **Patented Oct. 3, 1911.**

Application filed January 12, 1911. Serial No. 602,165.

To all whom it may concern:

Be it known that I, WILLIAM J. ACKLEY, a citizen of the United States, residing at Batavia, in the county of Genesee and State of New York, have invented certain new and useful Improvements in Vacuum-Cleaners, of which the following is a specification.

This invention relates to certain novel and useful improvements in vacuum cleaners of the portable type employing a horizontal cylinder with reciprocating piston connecting to a hand-operated lever, said device having complementary means for the extraction of dust from furniture, floors and walls or other surfaces; and a dust-collector or can mounted on the machine and having a removable dust-cap through the medium of which the collected contents of the can may be removed when desired.

An important object of the invention is to provide a machine in which the piston and the suction and exhaust valves are readily accessible and wherein the suction and exhaust are made through the same ports; and where no dust-bag is required, but a metal or other rigid can or receiver is connected to the exhaust mechanism.

A further object of the invention is to obtain by a simple mechanism a powerful suction, while the arrangement of the several parts is such that the machine is readily portable and may be operated with ease.

With the above and other objects in view, my invention consists of the parts and the constructions, arrangements and combinations of parts which I will hereinafter describe and claim.

In the accompanying drawings, forming a part of this specification and in which similar reference characters indicate like parts in the several views, Figure 1 is a side elevation of the machine with parts broken away. Fig. 2 is a longitudinal sectional view of the cylinder showing a portion of the piston rod in dotted lines. Fig. 3 is an end view of the machine with the dust-can omitted. Fig. 4 is a detail in plan showing means for removably securing the dust can.

In carrying out my invention I construct a cylinder of suitable material and size and I arrange the same horizontally with reference to a supporting base. The base is adapted to rest upon the floor and it may consist of parallel strips, 10, suitably rigidly assembled and to which strips are screwed or otherwise fastened the flanged bases of suitable brackets or supports, 11, which in the present case are shown as being located at the ends of the cylinder and have their upper portions fashioned in segmental form to receive the lower portion of the ends of said cylinder, these segmental portions in conjunction with appropriate straps, 12, of cast-iron or other material, completely inclose the ends of the cylinder, said straps and the segmental portions of the standards being provided with flanges, 13, through which screws are passed for the purpose of securing the straps to the standards and thus clamping the ends of said cylinder.

Within the cylinder operates a suitable piston, 14, which in the present case is shown as having a substantially wide packing ring, 15, of felt or equivalent material adapted to make an air-tight fit against the inner wall of the cylinder. The piston is connected to a piston rod, 16, by suitable means; in the present case the connection is shown as including a metal bushing, 17, screwed into the center of the piston and receiving the piston rod and being secured to said rod by means of a cotter-pin, 18, or equivalent fastening, but it is obvious that other means may be employed for attaching the piston to the piston-rod. The piston-rod extends through both ends of the cylinder by which means its movements are accurately guided, and one end of this rod is connected to a head, 19, which in turn is pivotally connected to a link, 20, whose outer end is pivotally connected to an operating hand-lever, 21; the lower end of this lever is pivotally mounted on a shaft, 22, extending transversely across one end of the base and forming a transverse connection between the two parallel strips or bars, 10, which constitute, in the present case, said base, the ends of the shaft being suitably journaled in bearings, 23, secured to said base strips or bars.

The cylinder is preferably constructed

with removable heads, 24. In Fig. 2 I show but one of these heads as being removable, said head being slightly inwardly concaved and having on its inner surface near the outer edge a circumferential groove, 25, to receive edgewise the end of the cylinder proper, said groove having a packing, 26, against which the end of the cylinder impinges to form a tight joint at the point mentioned. The periphery of the removable head may be provided with outstanding lugs, 27, through which pass suitable screws which by engaging flanges, 28, around the adjacent end of the cylinder, provide means by which the head may be tightened at any time, and be removably secured. The centers of the heads are reinforced by inside and outside disks or plates, 29, and one of these plates may have a tubular extension, 30, which forms a guide for the piston-rod, said guide being threaded and forming a part of the stuffing-box, through which the piston-rod operates, there being one of these stuffing-boxes in each end of the cylinder.

In normal position the piston occupies the central portion of the cylinder so as to leave a working chamber upon each side. These chambers connect by single ports, 31, with appropriate casings, 32, which are located upon the outside of the cylinder near the ends and which casings inclose the suction and exhaust valves, 33—34. These valves may be of any appropriate character, but for the sake of simplicity I prefer to construct them of rubber or like flexible disks, the suction valve, 33, of each valve casing seating upon a flange, 33′, and being limited in its inward movement by the bottom of an appropriate metal or other cage, 35, which thus prevents the turning over of said valve. The suction valves, 33, are at one end of the casings, 32, and the exhaust valves, 34, are preferably at the other end, and the casings may be provided with removable caps or covers, 36, in which the exhaust valves, 34, are contained, said caps or covers having the cages, 35, fixed to them and having exhaust openings, 37, said caps affording access to the interior of the casings and to the contained valves; the central portion of each casing communicates with the interior of the cylinder, one at each side of the piston, through the single port, 31.

The lower ends of the valve casings, 32, connect with an air-trunk, 38, which extends from one casing to the other parallel with and on the outside of the cylinder, and one end of this trunk forms a nipple, 39, which is detachably connected with the dust-can, 40. This can is supported in an upright position upon a transverse bar, 41, which forms a cross-connection between one end of the parallel strips, 10, which form the supporting base, the connection between the air-trunk and the can being near the upper end of said can when the can is in its operative position, and the machine is in use. The bar 41 is rigid with the screw cap of the dust can and it is removably secured to one of the parallel strips, 10, by means of a turn-button or similar device as shown in Fig. 4.

The dust-can is composed preferably of metal or other rigid material as distinguished from a flexible bag, and it is provided with a removable screw cap, 42, on the button through which the dust collected in the can may be removed at desired intervals. The can is also provided with a deflector, 43, which consists of a metal plate fixed to one side of the can and extending horizontally inward and then curved downwardly at a point near the vertical center of said can, the purpose of said plate being to deflect the current of dust-ladened air and to cause the dust to enter the can with a whirling motion to thereby facilitate the settling of the dust particles at the bottom of the chamber formed in the can. The suction tube, 44, enters the side of the can at a point just below the horizontal portion of the deflector, and it is connected with the flexible tubing, 45, to which is also connected the tool or element, 46, which is operated by hand over the part to be cleaned. The dust can is also provided in its upper portion, just above the deflector, and below the connection of the air-trunk, 38, with the can, with a fine horizontal screen, 47, of cloth or other material, which is designed to prevent the dust which enters through the suction tube, 44, from passing into the body of the cleaner through the connection of the can with the air-trunk, before mentioned.

To facilitate the movement of the machine from place to place, the cylinder has secured to its central portion an appropriate handle, 48.

By reason of the foregoing construction it will be apparent that the machine may be made so as to be readily portable and that the arrangement of the piston and valves provide for a powerful suction. It is also to be noted that the removable head, of the cylinder gives access to the piston, and that the removable upper portions of the valve casings give ready access to the valves, thus rendering it quite easy to remove and repair these parts. The ordinary fabric bag is also dispensed with as it is found that the metal or other rigid dust can with its removable screw cap affords a better collection of the dust and permits of the injection of the dust-ladened air into the dust can at a point adjacent the deflector so as to induce the whirling action before mentioned; and that the can provides for the employment of a fine screen at the upper end of the can to keep back the fine particles of dust and thus prevent their being drawn into the air-

trunk by the suction produced therein during the operation of the piston.

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

1. In a vacuum cleaner, the combination with a cylinder and its piston and operating means, of a valve casing on the outside of the cylinder near each end thereof, said casings having their lower portions connected to each other, inwardly opening valves in the lower parts of the casings, removable caps for the casings, and inwardly closing valves contained within the caps, said cylinder having single ports connecting with the casings and through each of which ports the suction and exhaust takes place, and said caps having openings in them for the discharge of air directly to the atmosphere.

2. In a vacuum cleaner, the combination with a cylinder and its piston and operating means, of valve casings on the exterior of the cylinder near each end thereof, an air-trunk connecting the lower ends of the casings, inlet and exhaust valves in each casing, said casing connecting with the interior of the cylinder through a single port through which both the suction and exhaust takes place, said casing having removable caps with attached cages extending into the cylinder to a point above the inlet valves and limiting the inward movement of said valves, and said caps carrying the exhaust valves and having openings through which exhaust to the atmosphere takes place.

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

WILLIAM J. ACKLEY.

Witnesses:
HERMAN J. YAEGER,
NEWELL K. CONE.