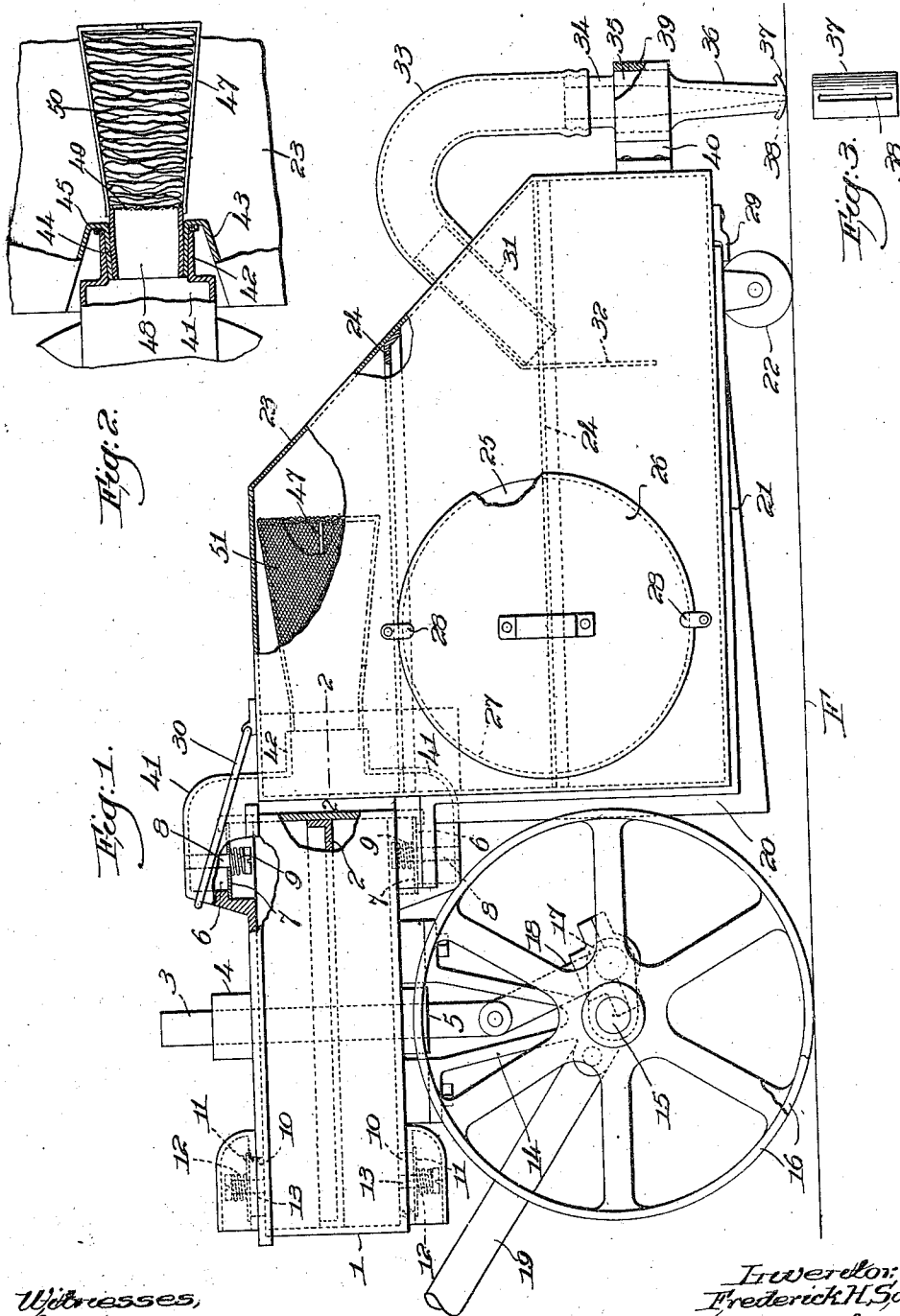


F. H. SANDER.
 PORTABLE AIR SUCTION CLEANING APPARATUS.
 APPLICATION FILED SEPT. 3, 1909.

984,779.

Patented Feb. 21, 1911.



Witnesses,
 Edward St. Allen.
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Inwitness:
 Frederick H. Sander,
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UNITED STATES PATENT OFFICE.

FREDERICK H. SANDER, OF MALDEN, MASSACHUSETTS.

PORTABLE AIR-SUCTION CLEANING APPARATUS.

984,779.

Specification of Letters Patent. Patented Feb. 21, 1911.

Application filed September 3, 1909. Serial No. 516,109.

To all whom it may concern:

Be it known that I, FREDERICK H. SANDER, a citizen of the United States, and resident of Malden, county of Middlesex, State of Massachusetts, have invented an Improvement in Portable Air-Suction Cleaning Apparatus, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention has for its object the production of a simple and efficient portable cleaning apparatus wherein the dust or dirt is sucked into a suitable chamber by forming a partial vacuum therein, by a suitable suction pump, the apparatus being so constructed and arranged that it can be easily pushed back and forth over the surface to be cleaned in a manner similar to that in which carpet-sweepers are operated.

In my present apparatus I have provided means whereby as it is moved about as an entirety, the act of propulsion operates the suction pump, so that the apparatus is traversed bodily back and forth over the surface to be cleaned. Such a portable cleaning apparatus is not necessarily much larger than an ordinary carpet-sweeper, and it can be produced and sold at a relatively small cost, so that it can be possessed by householders for use whenever required.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a view in side elevation and partly broken out of a portable cleaning apparatus embodying my invention; Fig. 2 is a horizontal sectional detail on the line 2—2, Fig. 1, of the separable connection between the suction pump and the detachable dust chamber; Fig. 3 is an under side view of the dust-collecting nozzle.

In Fig. 1 of the drawing the suction pump comprises a cylinder 1 having therein a vertically reciprocating piston 2 rigidly attached to a piston rod 3 extended through suitable stuffing boxes 4 and 5 on the cylinder heads, and herein I have shown the pump as double acting, and provided with two inlet ports and two outlet ports. Each of the inlet ports 6 is closed by a valve 7, preferably made as a thin metallic disk, slidably mounted on a fixed stud 8, and seated by means of a spring 9.

In Fig. 1 I have shown one of the inlet

ports broken out to more clearly illustrate the construction. The upper one of the inlet ports admits air to the cylinder on the down stroke of the piston, and on the up stroke air 60 is drawn into the cylinder through the lower inlet port. The two outlet ports 10 arranged in the opposite heads of the cylinder are controlled by valves 11 seated by the action of springs 12, the said valves sliding 65 upon and being guided by fixed studs 13 in a manner similar to the inlet valves. The outlet valves open outward, while the inlet valves 7 open inward, as will be apparent. The lower cylinder head, in the present embodiment of my invention, is provided with suitable rigidly attached hangers, one of which is shown at 14, to provide bearings for a crank shaft 15, having fixedly attached to its ends, supporting wheels 16, and the crank 75 17 is connected by a connecting rod 18 with the lower end of the piston rod 3, so that rotation of the wheels will effect the reciprocation of the piston 2, and thereby operate the suction pump. A handle 19 is suitably 80 connected with the hangers, and by means of the handle which is broken off in Fig. 1, the apparatus can be moved back and forth over the floor or other surface F to be cleaned. A bracket 20 is rigidly secured to 85 and depends from the pump cylinder, and is provided with a forward extension 21, having connected with it a truck wheel 22, the wheels 16 supporting the weight of the pump. The bracket and its extension 21 detachably support a dust chamber 23, preferably made of sheet metal stiffened or strengthened against collapse in any suitable manner, as by means of internal flanges 24, and in one of the side walls of the dust 95 chamber I provide an opening 25, normally closed by a cap or cover 26, preferably provided with an internal flange 27, to enter the opening 25, and held in place by suitable clips 28.

When a sufficient quantity of dust and dirt has been collected in the chamber 23, the latter can be removed from the rest of the apparatus, and the cover 26 taken off to permit the contents of the dust chamber to be 105 emptied out. The bottom of the dust chamber is provided with a finger 29 adapted to catch under the bracket extension 21, and a swinging loop or bail 30 on the top of the dust chamber is adapted to be swung over 110 into the position shown in Fig. 1, against the wall of the upper inlet port of the pump cyl-

inder to lock or hold the dust chamber in its operative position. Near the forward and lower end the dust chamber is provided with an inlet pipe 31, shown in dotted lines Fig. 1, extending into and inclined toward the bottom of the chamber, and having depending across its lower end a baffle plate 32. A rubber or other suitable flexible tube 33 is permanently connected at one end with the inlet 31, the other end of said tube 33 being attached to a nipple 34 on the body 35 of a depending dust-collecting nozzle 36. The lower end or face 37 of said nozzle is made transversely convex, as shown, and it is elongated and provided with a slot 38 communicating with the bore of the nozzle. The convex end of the nozzle is adapted to travel over the surface to be cleaned, such as a carpet or other floor covering, and in order that the nozzle may accommodate itself to irregularities in such surface, the body 35 is slidably mounted in a bearing 39 forming part of a bracket 40, fixedly attached to the front end of the dust chamber. The nozzle can thus rise and fall slightly as it passes over irregularities in the surface to be cleaned, while at all times the nozzle is in communication with the inlet of the dust chamber.

I have provided a separable connection between the dust chamber and the pump inlets. Referring to Figs. 1 and 2, the inlet ports 6 are connected by a casing 41 provided with a substantially horizontal nose 42, having a slightly tapered or conical bore, as shown in Fig. 2. The rear wall of the dust chamber is set in or made reëntrant at 43 to receive the casing 41, and its nose 42, and such set-in portion of the dust chamber is provided with a tapered, outwardly projecting nipple 44, arranged to slip tightly into the conical bore of the nose 42. I prefer to interpose a rubber or other gasket 45 between the end of the nose and the base of the nipple as shown in Fig. 2, to make a tight joint thereat. By reference to Fig. 2, it will be seen that when the nipple is extended into the nose an airtight connection will be established between the interior of the dust chamber and the casing 41, connecting the pump inlet 6.

When the apparatus is propelled from place to place, the rotation of the supporting wheels effects the operation of the pump and the suction thereof will suck the air into the dust chamber through the nozzle 36, carrying with it particles of dust and dirt of various kinds, the heavier particles dropping to the bottom of the chamber as they impinge against the baffle 32. In order to prevent the dust-laden air from the chamber 23 from passing into the pump cylinder, and then out through the outlet ports thereof back into the room, it is necessary to screen the air in its passage from the chamber to the pump. This may be accomplished in

various ways, but I have found the screening construction herein shown to be very efficient. A wire frame 47, generally conical in shape, is attached at its smaller end to a tapered tube 48 which tightly fits into the nipple 44, the outer end of the tube 48 being covered with a screen 49 of cloth, fine netting, or other suitable material. Within the screen frame 47, I prefer to pack loosely cheese cloth, shown at 50, Fig. 2, the various folds or convolutions of the cloth making an extremely tortuous and indirect passage through the screen. Upon the exterior of the screen frame I wrap two or more layers 51, Fig. 1, of cheese cloth or other suitable screening material, thereby completing the screen.

The greater the suction or draft induced by the operation of the pump, the greater must be the resistance of the screen to the passage of dust therethrough, as the air is drawn into the pump cylinder, and this can be regulated by increasing or decreasing the number of layers of screening material wrapped around the frame 47, and it can also be varied by packing the fabric 50 more or less closely into the frame. The dust screen under ordinary circumstances remains fixed within the nipple 44, and hence will remain in operative position even when the dust chamber 23 is detached from the rest of the apparatus, but when ever it is necessary the screen can be detached from the nipple, removed from the dust chamber, and shaken or beaten to clear the same from accumulations thereon.

From the foregoing description, taken with the drawings, the operation of the apparatus will be apparent. The pump operating to produce a partial vacuum in the dust chamber so long as the apparatus, as a whole, is propelled about the pump. The convex end of the dust-collecting nozzle enables it to surmount irregularities in the carpet or other object to be cleaned, while still remaining in close contact therewith, and the relative movement of the dust chamber and nozzle during the operation of the apparatus also aids in maintaining the nozzle face pressed against the surface from which the dust and dirt is to be removed. By means of an apparatus of this character very heavy or refractory carpets, rugs and other floor coverings can be very thoroughly cleaned, because the air suction withdraws therefrom almost all kinds of dust and dirt, whether in solid and relatively large particles or in very small, light or in finely divided condition.

Various changes or modifications in details of construction and arrangement may be made by those skilled in the art without departing from the spirit and scope of my invention as set forth in the claims annexed hereto.

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

1. In apparatus of the class described, a suction pump having a cylinder and a piston-rod; hangers depending from the cylinder thereof; a crank-shaft rotatably mounted in said hangers and projecting laterally beyond them; a connecting-rod between the piston-rod of the pump and crank-shaft; supporting wheels fixedly attached to the projecting ends of the latter; a bracket attached to and depending from the cylinder and having a forward extension provided with a truck-wheel; a dust chamber detachably mounted on said bracket; means to establish communication between said chamber and the inlet of the pump, and a dust-collecting nozzle carried by the dust chamber and communicating therewith.

2. In apparatus of the class described, a portable suction pump having inlet and outlet ports; supporting wheels connected with the bottom of the pump; means to operate the pump by rotation of said wheels; a bracket fixedly secured to and depending from the pump and having a forwardly-extended foot; a dust chamber detachably mounted on the bracket and seated on its foot, a dust-collecting nozzle carried by and movable relatively to said chamber and communicating with the interior thereof at its front end; and means to establish communication between the inlet port of the pump and the back of the chamber at a distance from the nozzle.

3. In apparatus of the class described, a portable, suction pump having inlet and outlet ports, supporting wheels connected with the pump, means to operate the pump by rotation of said wheels; an L-shaped bracket connected with the pump; a dust chamber detachably mounted on said bracket; a dust-collecting nozzle adapted to travel upon the surface to be cleaned and communicating with the interior of the chamber; means on the latter at its front end to sustain said nozzle while permitting it to move relatively to the chamber; and means to establish communication between the inlet port of the pump and the back of the dust chamber at a distance from the nozzle.

4. In apparatus of the class described, a suction pump having a casing connecting its inlet ports, a detachable dust chamber having a reëntrant portion in its rear wall, to receive the casing, a nose projecting from the casing, a nipple projecting from the reëntrant portion of the chamber, to enter and fit tightly within the nose and thereby establish communication between the chamber and the pump inlets, and a dust-collecting nozzle carried by the said chamber and communicating therewith.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FREDERICK H. SANDER.

Witnesses:

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FREDERICK S. GREENLEAF.