J. J. DUFFIE.

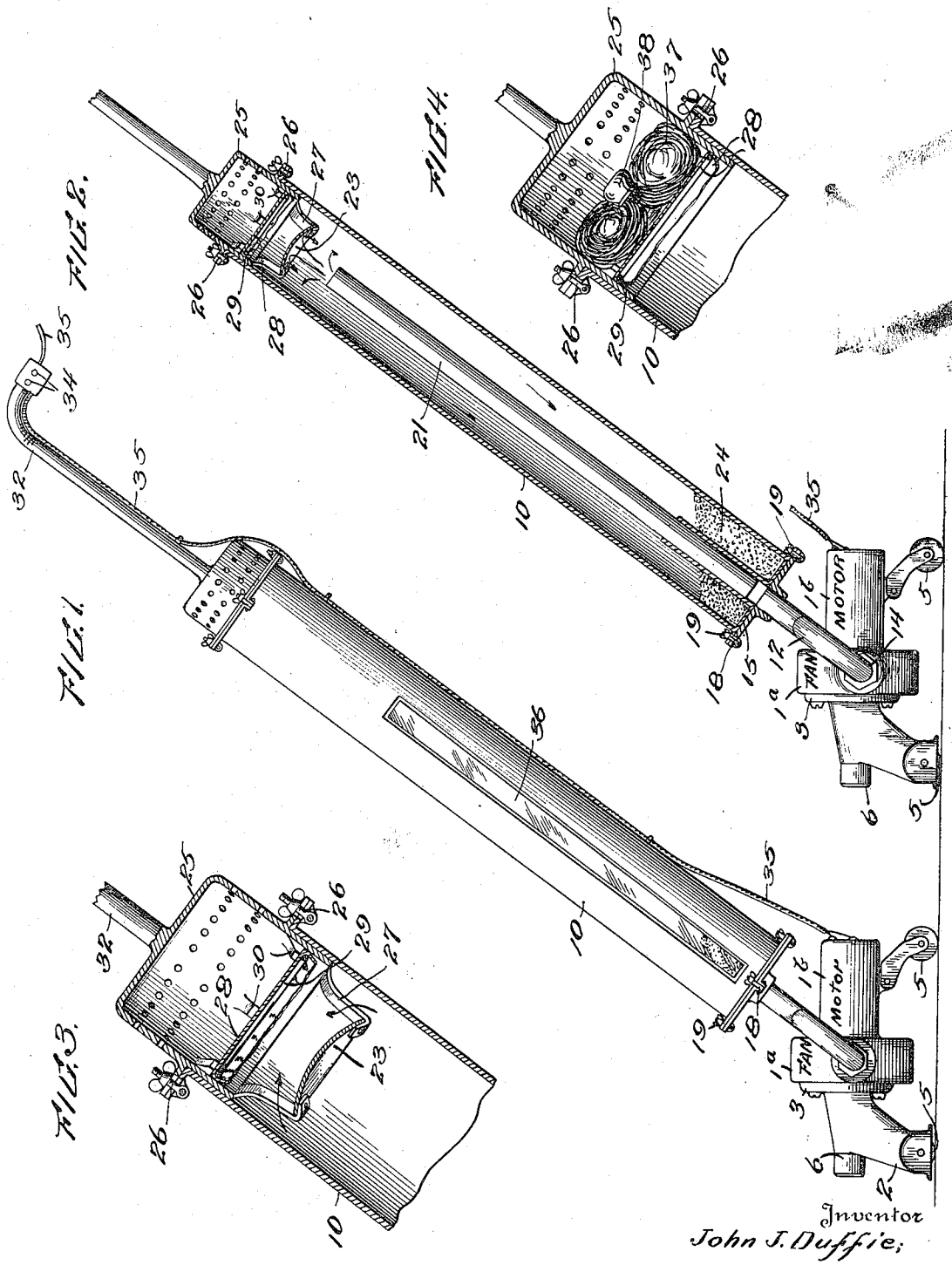
VACUUM CLEANING APPARATUS.

APPLICATION FILED MAR. 30, 1915.

1,230,827.

Patented June 19, 1917.

3 SHEETS—SHEET 1.



Witnesses

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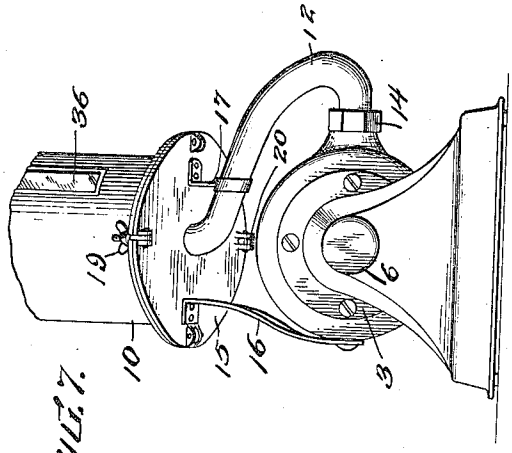


FIG. 7.

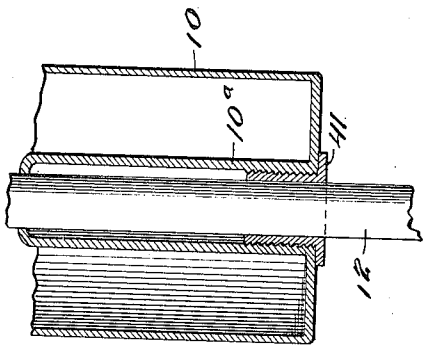


FIG. 8.

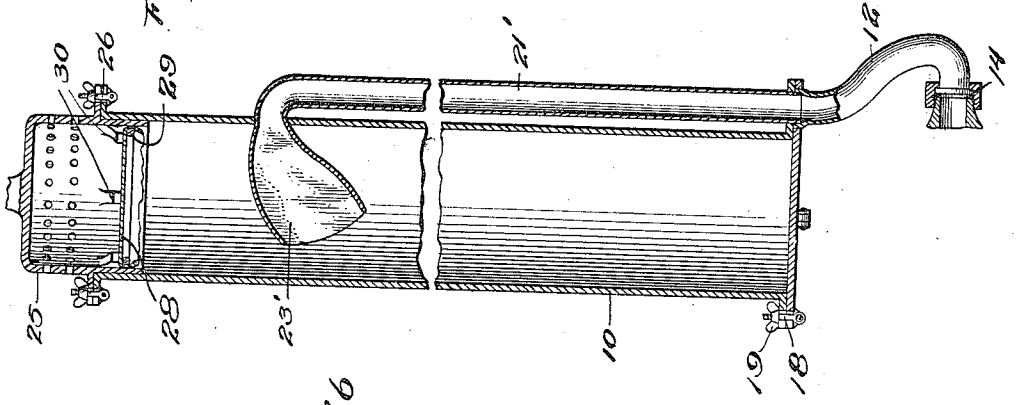


FIG. 6.

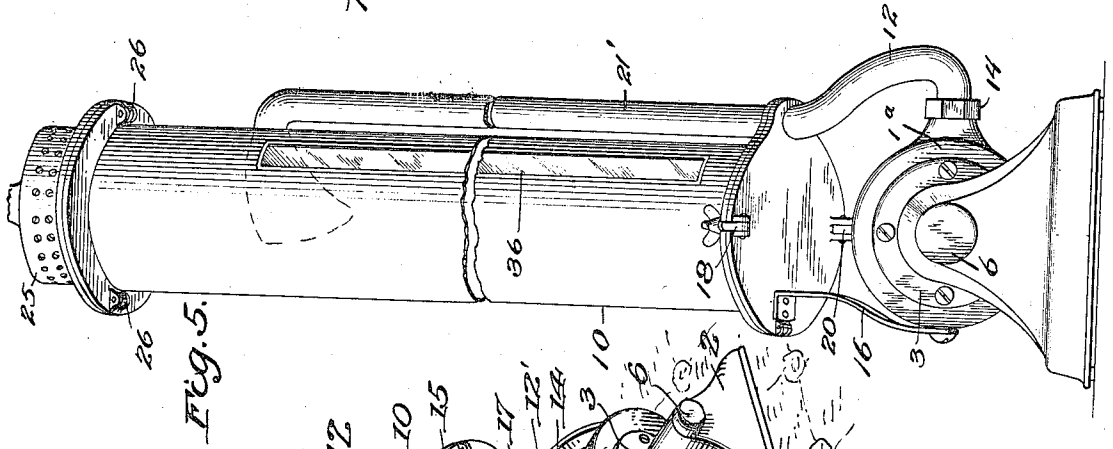


Fig. 5.

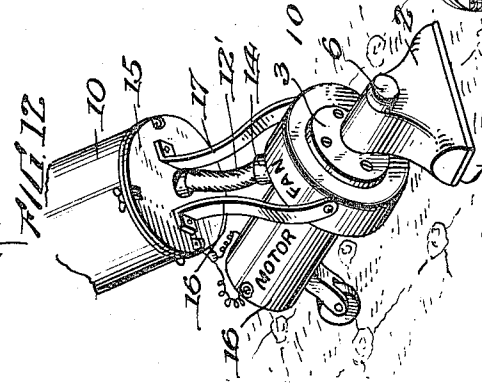


FIG. 12.

Witnesses

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3 SHEETS—SHEET 3.

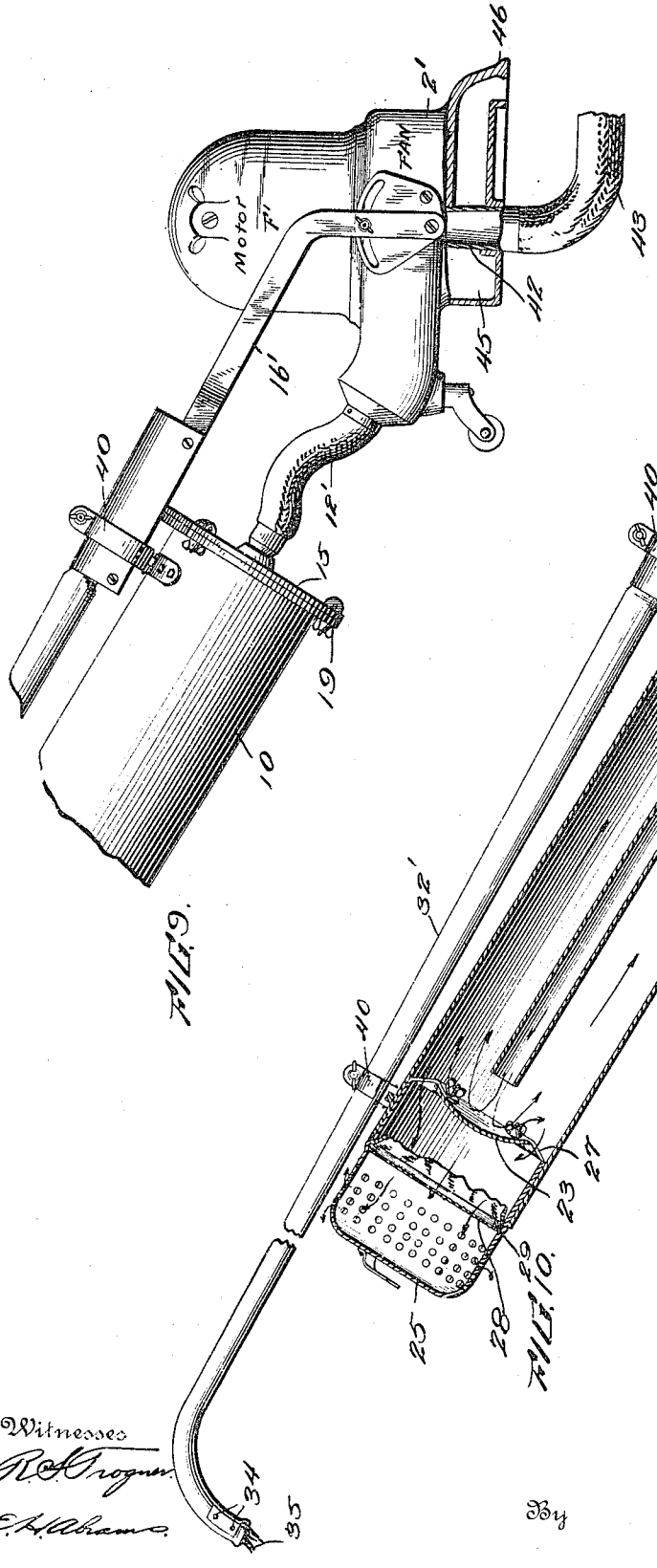


FIG. 9.

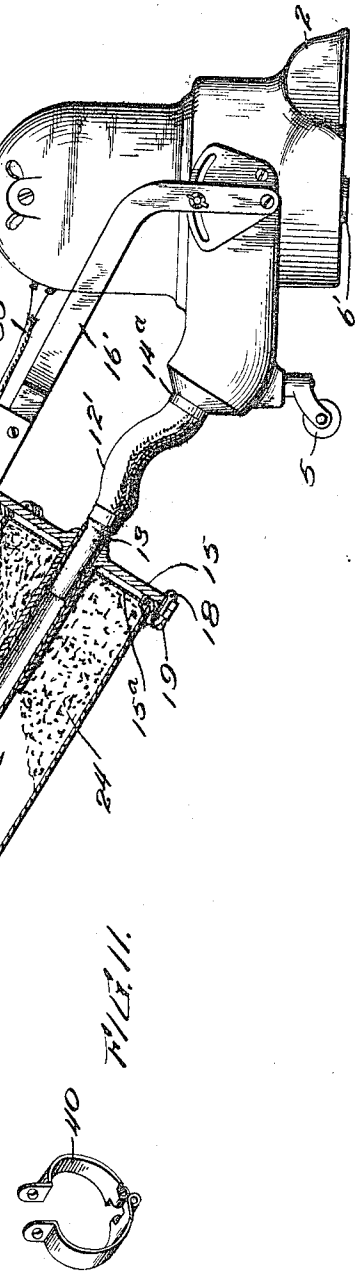


FIG. 11.

FIG. 10.

Witnesses

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34

35

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UNITED STATES PATENT OFFICE.

JOHN J. DUFFIE, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO VACUUM SPECIALTY MANUFACTURING COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF ARIZONA.

VACUUM CLEANING APPARATUS.

1,230,827. Specification of Letters Patent. **Patented June 19, 1917.**

Application filed March 30, 1915. Serial No. 17,970.

To all whom it may concern:

Be it known that I, JOHN J. DUFFIE, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Vacuum Cleaning Apparatus, of which the following is a specification.

This invention relates to portable pneumatic cleaners which are adapted to be moved over the object to be cleaned, as for example, a floor or carpet, the cleaning being effected by a suction device which is preferably driven by an electric motor contained within the casing of the cleaner.

One object of my invention is to provide a portable pneumatic cleaner in which the dust-separator comprises a casing which is preferably swiveled to the casing containing the suction producing apparatus, and which is attached to or constitutes a portion of the operating handle. Portable vacuum cleaners of the motor-operated type, are usually provided with a dust-separating bag of textile material attached to the operating handle, into which the dust-laden air is introduced, the dust and dirt being retained and the air passing out through the pores or interstices of the bag. The bag is subjected to rough usage and rapidly deteriorates when in constant use and moreover the walls of the bag which constitute the separating medium become impregnated with the dirt and impalpable dust drawn from the carpets. To overcome this unsanitary feature and the rapid wear of the bag separator and also to provide a more efficient apparatus I employ a tubular casing, constructed of metal or other suitable material, which forms the dust-collecting receptacle and contains a filtering medium which is readily removable for the purpose of being cleansed or replaced, the casing forming a part of or being attached to the operating handle by which the apparatus is moved over the carpet.

In the accompanying drawings, Figure 1, is a side elevation of a pneumatic cleaner embodying my invention; Fig. 2, is a similar view showing the dust receptacle casing in longitudinal section; Figs. 3 and 4, are enlarged sectional detail views of the upper portion of the dust receptacle; Fig. 5, is a front elevation of a modified form of my cleaner; Fig. 6, is a vertical section of the dust-receptacle shown in Fig. 5; Fig. 7, is a front elevation of the lower portion of the cleaner shown in Fig. 1; Fig. 8, is an enlarged sectional detail of the lower part of modified form of the dust-receptacle; Figs. 9 and 10 are side elevations partly in section of a modified form of my invention; Fig. 11 is a detail of the clamping-ring; and Fig. 12 is a perspective view of another modification of my invention.

I prefer to employ a suction creating apparatus of the electric motor-driven type and which is inclosed in a casing suitably supported so that it may be pushed to and fro over the floor or carpet. I have illustrated such an apparatus in which a fan is mounted within the casing portion 1^a, the motor in the portion 1^b, the suction tool 2, being carried by a removable plate 3, and the whole being mounted upon supporting wheels or casters 5. A removable cap 6, closes the connection for the hose attachment for cleaning curtains, furniture, etc.

I provide a dust-receptacle in the form of a tubular casing 10, which may be made of sheet metal, papier mâché, fiber or other suitable material. This is shown in the accompanying drawings as forming a part of the operating handle by which the cleaner is actuated, but it is evident that it may be merely secured to the handle in a manner to make it rigid therewith. It is desirable that there should be a flexible connection between the suction apparatus which moves over the floor and the casing 10, so that the latter may oscillate or rock with respect to the fan and motor casing to permit the handle, including the dust casing as a part thereof, to accommodate itself to the movement of the operator's hand as the cleaner is moved to and fro. I accomplish this purpose in my preferred form by connecting the dust conduit pipe 12, with the outlet of the fan casing by means of a swivel joint 14 forming a flexible connection, and support a plate 15, on this pipe and a link 16, pivoted to the opposite side of the fan casing. In the form shown in Figs. 1, 2 and 7, the air pipe 12, is bent to enter an aperture in the center of the plate 15 and in this case the plate 15 may be further braced by an angle plate 17.

As shown in Figs. 1 and 2, the dust separator tube 10, is secured to the plate 15, by swinging bolts 18, and locked in position

with wing-nuts 19, the marginal flange on the base of the tube 10 and the edge of the plate 15 being notched to receive the bolts.

A pipe 21, secured within the separator tube or receptacle in any suitable manner, conducts the dust-laden air from the pipe 12 to the upper part of the receptacle and directs it against a deflector plate 23, thereby causing the air currents to turn downwardly in eddies along the sides of the tube, the impact tending to arrest the heavier particles and cause them to fall to the bottom of the tube as indicated at 24.

The top of the dust separator tube is closed by a perforated or apertured cap 25, and may be removably secured by swinging bolts 26, provided with wing-nuts, which fasten the abutting flanges together. The deflector plate 23, is carried by arms 27, carried by the lower rim of the cap. Below the perforations in the cap there is a filtering medium such as a cloth diaphragm 28, held in position by a ring 29 sprung under the lugs 30. Projecting upwardly from the cap is a handle 32, adapted to be grasped by the operator and which may carry a switch 34 to which the electric cable 35 is connected, so that the motor operating the fan may be controlled by the hand. An inspection glass 36 inserted in the casing wall enables one to observe the operation of the cleaner.

I may supplement the filtering medium 28, or substitute therefor, a filtering device comprising a mass of textile strands or cords 37, fastened together by a binder 38. This form of filtering medium is effective filtering the dust from the air and is exceedingly convenient in form as it may be readily removed and washed.

Instead of conducting the dust-laden air from the suction apparatus into the dust separator through a central pipe, I may connect the pipe 12 with a pipe 21′ extending upon the outside and entering an aperture in the side of the separator casing, this pipe preferably terminating in a flaring discharge portion 23′, turned downwardly to serve as a deflector, thereby causing the air to form eddies within the separator which assists in depositing the heavier particles and prevents a direct impact against the filtering medium.

Instead of fastening the separator to a supporting plate 15, carried by the outlet tube 12, as shown in Figs. 1 and 2, the tube 12 may be extended upwardly so that it will perform the function of the pipe 21, and the separator tube 10 may be slipped down over the pipe and carried directly thereby. I have shown how this may be accomplished in Fig. 8, in which a thimble 40 surrounding the pipe supports the tube and may be threaded to an internal nipple 10^a projecting upwardly from the bottom of the tube 10.

The operation will be readily understood from the foregoing detailed description of the parts of the cleaner. As the apparatus is moved to and fro over the floor or carpet, the outlet pipe 12 and the attached dust receptacle or separator tube 10, rock on the swivel joint 14, to accommodate the movements of the operator's hand. The dust-laden air drawn through the nozzle 2, by the fan is forced through the outlet pipe 12 and the pipe 21, into the separator tube, the deflector receiving the impact and causing the air to eddy downwardly, depositing the coarser particles in the bottom of the tube, the air then passing outwardly through the filtering medium which thoroughly cleanses it before passing through the perforations in the cap 25.

When it is desired to empty the receptacle and cleanse the filter, the nuts on the bolts 26 are loosened and the cap is removed, carrying the filter, which can then be taken out. In the form shown in Figs. 1 and 2, the bolts 18, are loosened from the bottom flanges and the tube 10 can then be removed and emptied. In the form shown in Fig. 8, the tube 10 is unscrewed from the thimble 41 and slipped over the end of the tube 12.

The dust receptacle may be hinged at one side as at 20 in Fig. 5, and may then be swung downwardly to discharge the dirt without removing it from the plate 15.

Instead of swiveling the dust conduit pipe 12, to the side of the fan-casing, I may use a flexible hose or tube 12′, of rubber, canvas, or other flexible material as illustrated in Figs. 9 and 10. In this case the dust-receptacle 10, is supported upon the fan casing by making the strap 17, (Fig. 7) the same length as 16, and swiveling it to the opposite side of the casing and moving the dust outlet connection 14 to a different position and connecting the casing and the receptacle by a flexible hose 12′, as shown in Fig. 12; or , as illustrated in Figs. 9 and 10, the receptacle 10 may be suspended from the handle 32′, by means of clamps 40, or other suitable means to secure the handle rigidly to the receptacle, the handle being connected to the casing by pivoted straps 16′. For the purpose of illustrating this modification, I have shown the motor and fan arranged in a vertical axis instead of the horizontal as in the other figures and it is evident that my invention is applicable to either arrangement.

I have shown the dust outlet 14^a at the rear of the fan casing, but it may be placed at any convenient point. The flexible hose or tube 12′ may slip over the outlet and is provided with a metal tapering end 13, adapted to be inserted in the lower end of the inlet pipe 21 of the dust receptacle. The flexible hose or tube 12′ accommodates itself to the oscillating movements of the handle and receptacle, and may be readily withdrawn when it is desired to detach the receptacle. I may provide an auxiliary

pivoted or removable bottom member 15ª which will retain the dirt when the receptacle is removed from the plate 15.

In Fig. 10, I have shown the perforated top 25, frictionally held in the top of the receptacle by a telescopic joint, but it is evident that it may be secured in any other desirable manner.

When it is desired to attach a hose to the suction apparatus for the purpose of cleaning furniture, curtains, etc. a cap 6′ may be removed from the plate secured to the inlet side of the fan casing, and the end 42 usually of metal, of the hose 43, may be inserted into the recess or chamber 45, the inserted part 42, thus constituting a tubular valve to shut off communication between the tool 46 and the fan casing.

The advantages of my invention will be appreciated by those familiar with portable motor-operated pneumatic cleaners of the type in which the suction-creating apparatus is supported upon the floor and movable thereover. The construction of the dust separator prevents any contamination by contact therewith, and is exceedingly compact, the flexible connection between the parts of the apparatus providing for the easy operation of the cleaner and maintaining a rigid connection between the handle and the receptacle. In all of the modifications illustrated, the pivotal movements of the handle and the receptacle about the fan casing are co-axial.

I have described in detail the particular construction shown in accompanying drawings for the purpose of fully disclosing an embodiment of my invention but I am aware that various changes may be made within the scope of my claims and without departing from the spirit of my invention.

I claim:—

1. A pneumatic cleaner, comprising a casing having a suction-nozzle and containing a fan and attached motor, a handle pivotally connected to the casing, a tubular receptacle connected rigidly with the handle, an outlet conduit movably connected to said casing at one end and secured to the receptacle at the other or discharge end, and a filtering medium carried within the receptacle.

2. A pneumatic cleaner comprising a casing having a suction-nozzle and provided with suction-creating apparatus, a tubular dust-receptacle, a handle rigidly secured thereto and pivotally connected to the casing so that the pivotal movement of the receptacle and handle are co-axial, and an outlet-conduit movably connected to said casing, and connecting with said receptacle.

3. A pneumatic cleaner, comprising a casing adapted to move over a surface to be cleaned and having a suction-nozzle, and provided with suction-creating apparatus, a tubular dust-receptacle, supporting means for said receptacle having pivotal connection with said casing, an outlet conduit movably connected to said casing and connecting with said receptacle, and filtering means within said receptacle.

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

JOHN J. DUFFIE.

Witnesses:
EUGENE C. BROWN,
BENNETT S. JONES.