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2,071,982

SUCTION CLEANING APPARATUS

Original Filed April 10, 1931 2 Sheets-Sheet 1

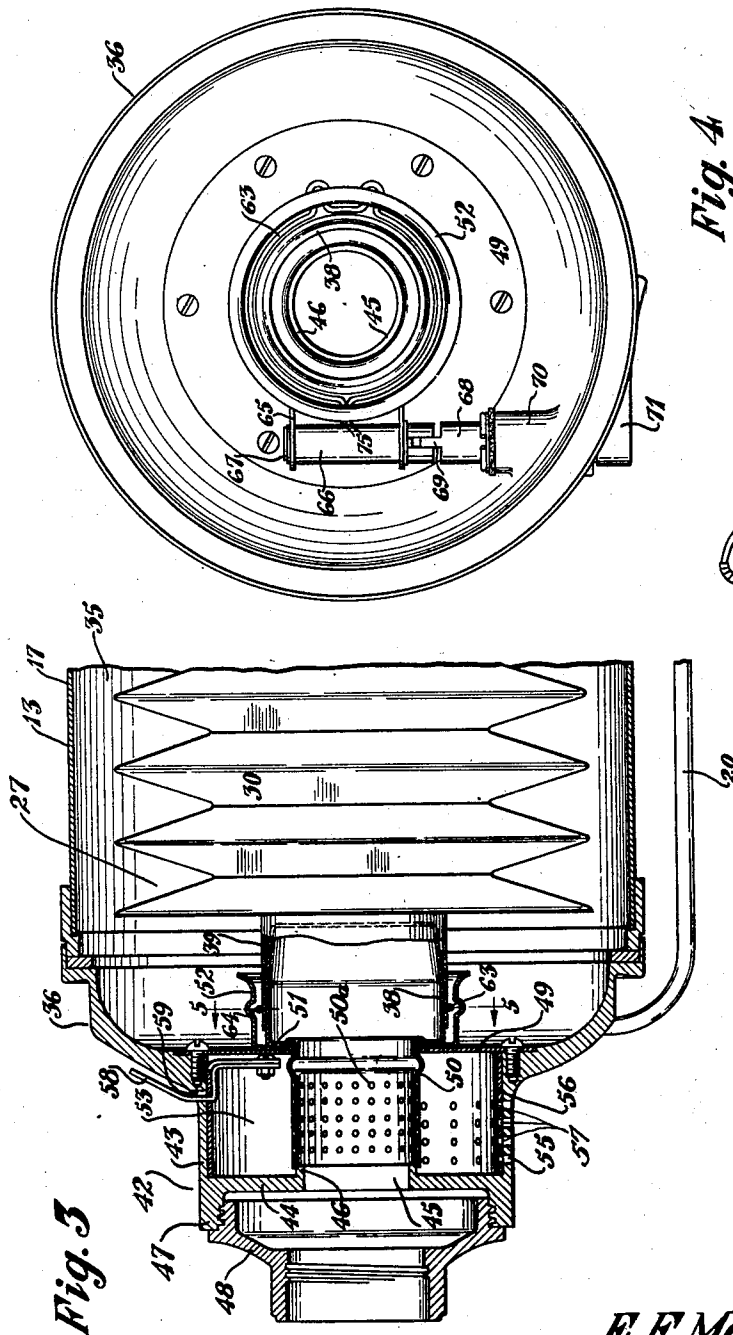


Fig. 3

Fig. 4

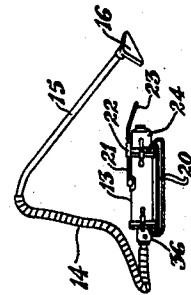


Fig. 1

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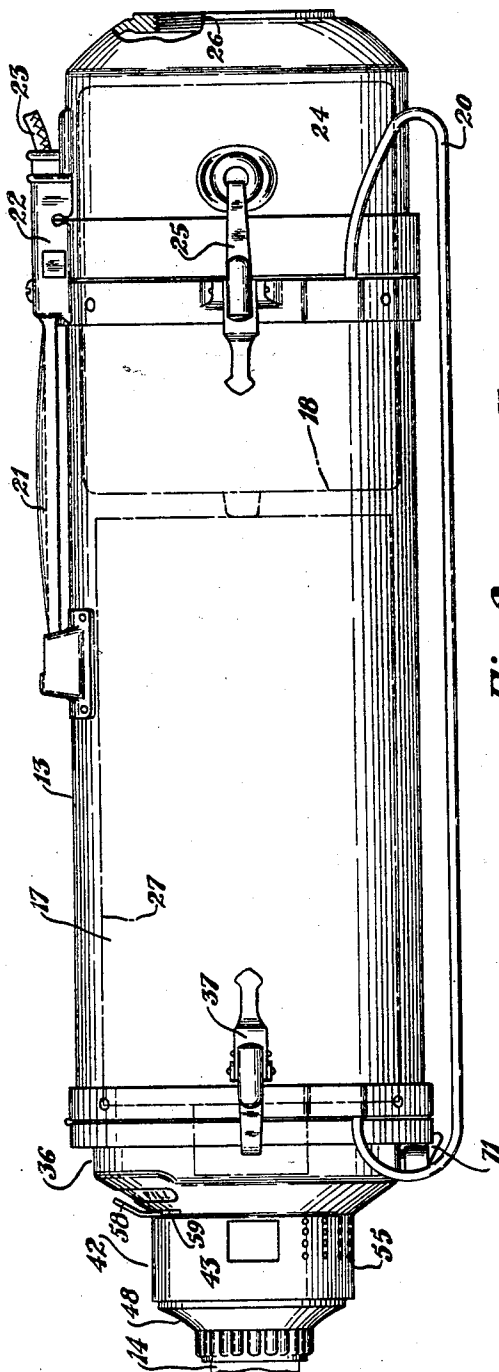


Fig. 2

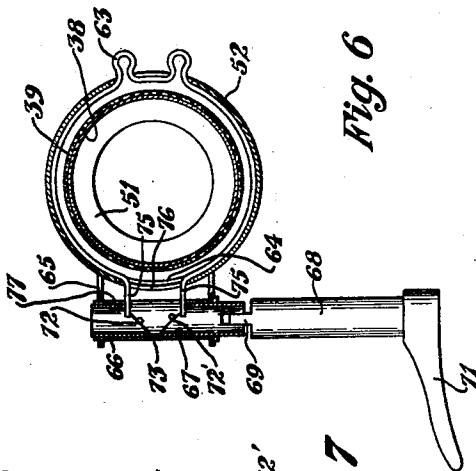


Fig. 6

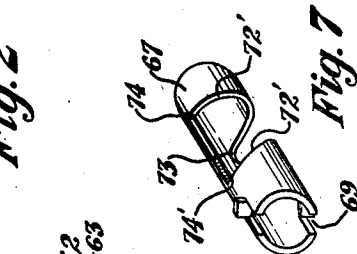


Fig. 7

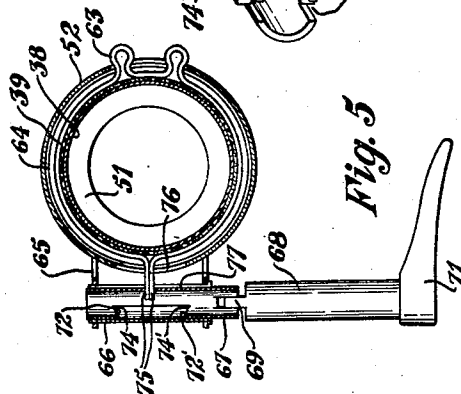


Fig. 5

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UNITED STATES PATENT OFFICE

2,071,982

SUCTION CLEANING APPARATUS

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Original application April 10, 1931, Serial No.
529,136. Divided and this application July 26,
1934, Serial No. 737,053

3 Claims. (Cl. 183—51)

The invention relates to suction cleaning apparatus and more particularly to improvements in dust receptacle connections, and this application is a division of my prior application Serial No. 529,136, filed April 10, 1931, matured in Patent No. 1,970,666, dated August 21, 1934, and entitled Suction cleaning apparatus.

A suction cleaner employs air currents to perform the cleaning operation by utilizing an exhaust fan operated by any suitable means to induce a suctional air flow into a nozzle or other attachment held in contact with or adjacent to the surface or article being cleaned, and to exhaust the air currents issuing from the cleaner into the atmosphere, a dust or refuse collector or receptacle being interposed in the air duct system, in series between the nozzle and atmospheric exhaust, either before or after the fan chamber of the exhaust fan, for filtering or separating dust or refuse entrained in the air currents from the air currents exhausted into the atmosphere.

The efficiency of a suction cleaner is dependent upon the suction created at its nozzle, which in turn is dependent upon the available or effective filtering area presented in the dust collector. Thus, a dust collector including a cloth, fabric or paper filtering bag or receptacle, originally has a certain predetermined amount of available filtering area through which the air currents may pass, the entrained dust or refuse being separated from the air currents and retained within the receptacle, and the finer particles of dust and the like being deposited on the interior surface of the cloth, fabric or paper filtering receptacle.

The deposit of fine particles of dust and the like, during use of the cleaner, on the interior surface of the filtering receptacle, reduces the available or effective filtering area thereof and causes a resistance to the flow of air currents through the air duct system, creating a back pressure in the receptacle, with the result that the suction created by the cleaner at the nozzle, and the consequent efficiency of the cleaner, is decreased.

For sanitary and other reasons, the filtering receptacle providing an increased available filtering area is preferably, though not necessarily, made of inexpensive, tough, porous, filtering paper, so that the receptacle when filled with dust and refuse may be bodily thrown away, destroyed or burned, without being emptied, and may then be replaced by a new filtering receptacle. Accordingly, it is desirable to convenient-

ly remove or detach a filtering receptacle from a suction cleaner, without requiring the filtering receptacle, per se, or its contents, which are to be destroyed, to be touched by the operator, so that the removal and destruction of the same may be accomplished in a sanitary manner.

It is therefore an object of the present invention to provide dust receptacle connections, which may be readily and conveniently operated to release the dust receptacle from connection with the suction cleaner, without requiring the dust receptacle to be touched in any manner by the operator of the cleaner.

These and other objects may be obtained by a construction, preferred embodiments of which are shown in the drawings and hereinafter described in detail, which may be stated in general terms as including in suction cleaning apparatus having an air duct system including inlet means, an exhaust fan, and outlet means, a dust collector in the air duct system including preferably a tubular expansible accordion-pleated filtering receptacle, means for restricting expansion of the receptacle, a connector plate provided with means for clamping the filtering receptacle to one side thereof, and means for actuating said clamping means operable from another side of said plate.

In the drawings,

Figure 1 is a small perspective view of suction cleaning apparatus in operation, in which the present improvements are incorporated;

Fig. 2 is an enlarged side view of the main unit of a suction cleaner equipped with the present improvements, the main unit containing a fan, motor, dust receptacle, the improved connection means, and a vaporizer attachment, the unit being adapted for connection with an air conduit or hose to which a nozzle or cleaning tool may be attached;

Fig. 3 is a fragmentary longitudinal cross section through the main unit illustrating the dust collector, vaporizer, and the improved connection means;

Fig. 4 is an elevation of the improved dust receptacle connection plate looking toward the clamping means side thereof;

Fig. 5 is a detached sectional view of the connector clamping means taken as on the line 5—5, Fig. 3, showing the connector clamping means in clamped position;

Fig. 6 is a view similar to Fig. 5 showing the clamping means in released position; and

Fig. 7 is a perspective view of the operating sleeve of the clamping means.

Similar numerals of reference indicate corresponding parts throughout the various figures of the drawings.

A standard type of suction cleaning apparatus 5 is shown in Fig. 1, which includes a main unit 13, preferably a flexible air hose 14 connected thereto, preferably an extension 15 connected to the hose 14, and a suitable nozzle tool 16.

The main unit 13 includes a preferably tubular sheet metal outer shell 17 and a combined motor and exhauster housing 18 mounted at one end thereof indicated in dot-dash lines in Fig. 2, all mounted on runners 20 forming a movable base for the unit. The unit 13 is also provided 15 with a strap handle 21, while the motor thereof is preferably controlled by an electric switch 22 in circuit with the power supply wires 23. The outer end of the motor exhauster housing is preferably surrounded by a detachable outer 20 shell 24, secured by clamps 25 to the shell 17, and having a central opening 26 in the end wall thereof forming an exhaust outlet for the unit.

The parts, per se, thus far described, form no part of my present invention, but are shown for illustrating one of many types of suction cleaners 25 which may be equipped with the present improvements. It is understood, however, that the present improvements may be applied to other types of suction cleaners, and that the present invention consists in the novel improvements 30 and combinations herein set forth.

The dust receptacle generally indicated at 27 in Fig. 3, and indicated in general outline only by dot-dash lines in Fig. 2, preferably has its end 35 walls connected together by a generally tubular-shaped, axially expandible, bellows-like, accordion-pleated wall 30, permitting compression and expansion of the receptacle in an accordion-like manner, as fully described in my prior application, Serial No. 529,136, matured in Patent No. 40 1,970,666, dated August 21, 1934.

The walls of the dust receptacle 27 are made of a fine mesh filtering material which may be cloth, or fabric; but which is preferably a tough, 45 porous filtering paper so as to present an ideal air pervious filtering medium for the dust collector.

The suction cleaner apparatus shown in the drawings is of a type in which the dust collector 50 is interposed between the nozzle and exhauster fan, the shell 17 thereof having its inlet end provided with a removable or detachable closure connector plate or member generally indicated at 36, clamped to the shell by clamps 37; and 55 the plate 26 is provided with an inwardly extending tubular air inlet neck or sleeve 38, to which the tubular air inlet neck or sleeve 39, of the accordion-pleated receptacle 27, may be clamped preferably in a manner hereinafter described in detail. 60

While I have shown the dust receptacle 27 as being of the bellows-like, or accordion-pleated type, it will be understood that any conventional dust receptacle, which has a tubular neck or 65 sleeve for being connected to the improved receptacle connecting means, may be used without departing from the scope of the present invention.

Thus the shell 17, the closure plate 36 and 70 the receptacle 27 within the shell 17, form a dust collector in which the dust-laden air currents induced by the suction created by the exhauster fan in the exhauster housing 18, are drawn in through the tubular necks 38 and 39, 75 the dust being separated therefrom in the re-

ceptacle 27, while the air currents filter through the porous walls of the same into the compartment 35, formed between the shell 13 and outer surfaces of the receptacle 27 and pass through the motor-exhauster housing 18, the end wall 5 of which may be perforated, and through the exhaust outlet 26 to the atmosphere.

The vaporizer device or attachment generally indicated at 42 in Fig. 3, is preferably formed integrally with the closure plate 36 by providing 10 a tubular extension 43 thereon, closed by an end wall 44, provided with a central opening 45, surrounded by an inwardly projecting annular flange 46.

The outer end of the tubular extension 43 is 15 preferably located at 47 to receive the hose coupling adapter member 48, to which the hose 14 is connected.

A disk plate 49 is attached to the plate 36 at the inner end of the tubular extension 43, 20 while a tubular air duct member 50 extends between the end wall 44, and the disk plate 49, being journaled on the flange 46 at one end and extended through a central aperture in the disk plate 49 at its other end. The member 50 25 is preferably formed integrally with the tubular neck 38 by providing a connecting portion 51 therebetween which serves to clamp the connector clamp guard member 52 to the disk plate 49. 30

An annular toroidal-shaped compartment 53 is thus formed between the tubular extension 43, the end wall 44, the tubular member 50, and the disk plate 49, which serves as a storage compartment for any desired type of crystals or reagent, which it may be desirable to use in the 35 vaporizer attachment.

The tubular extension 43 is preferably provided with a plurality of openings 55 in its lower portion, which form air inlet passages for the 40 compartment 53, while the tubular duct member 50 is perforated as shown at 50a to provide outlet passages communicating between the compartment 53 and the suction cleaner air duct system of which the duct member 50 forms a 45 part, the inlet passages 55, compartment 53, and outlet passages 50a forming auxiliary air inlet passages for the suction cleaner air duct system.

A tubular rotary sleeve valve 56 may be rotatably mounted in the tubular extension 43 and is provided with a plurality of apertures 57 which 50 may be made to register with the apertures 55, when it is desired to use the vaporizer, by means of the operating lever 58 thereof, which projects through a slot 59 provided in the tubular extension 43. 55

The improved dust receptacle connection means within the shell includes the tubular neck or sleeve 38 which extends inwardly from the inner side or surface of the connector plate 36, 60 and the clamp guard member 52 surrounding and spaced therefrom, and the resilient split wire ring member 63 which normally springs outwardly to the position shown in Fig. 6, wherein the wire ring member 63 is seated in an annular recess 64 provided in the guard member 52. 65

A bracket 65 carrying a tubular sleeve 66 is mounted preferably on the guard member 52 and an operating sleeve 67 shown in Fig. 7 is 70 rotatably journaled therein. The rotatable operating shaft 68, coupled with the operating sleeve at 69, extends through the plate 36 and is journaled at 70 (Fig. 4) in the connector plate 36, and is provided at its outer end exteriorly of the shell with an operating handle or lever 71 75

accessibly located on the opposite side of the connector plate 36 from the side from which the sleeve 38 extends, for a purpose which will be hereinafter described.

5 The operating sleeve 67 is provided with matched cylindrical cam faces 72 and 72', which join each other at 73 and are widely separated at 74 and 74'. The split ring clamping wire 63 is provided with finger ends 75 which project
10 through slots 76 and 77 provided, respectively, in the clamp guard 52, and sleeve member 66, and the fingers 75 operatively engage the cam faces 72 and 72'.

15 In connecting a dust receptacle to the connector plate 36, the operating handle 71 is actuated to released position shown in Fig. 6, and the tubular neck 39 of the same is loosely slipped or telescoped over the connector neck 38 accessible at one side of the plate 36, whereupon the
20 operating handle 71 is moved to rotate the operating shaft 68 and sleeve 67 to the position shown in Figs. 3, 4, and 5. In this position, the cam faces 72 and 72' draw the wire fingers 75 together to securely releasably clamp the neck
25 39 to the neck 38 as best shown in Fig. 3. It is pointed out that the outer ends of the neck 38 and of the clamp guard 52 are flared inwardly and outwardly, respectively, to assist in readily telescoping the receptacle neck 39 over the con-
30 nector neck 38 also shown in Fig. 3.

The replacement or renewal of a dust receptacle may be accomplished by standing the cleaner unit on its right hand end, (Fig. 2), releasing the clamps 37, and lifting the connector
35 plate 36 upward from the shell 17 to draw the dust receptacle 27 out of the compartment formed by the shell 17. The plate 36 is then held over a garbage can, ash can, waste paper basket or the like, and the clamping means op-
40 erating handle 71, located on the upper or outer side of the plate 36 is moved to released position so as to release the clamped connection of the dust receptacle 27 to the connector neck 38. The
45 receptacle 27 then drops by gravity into the place of disposal without having been touched in any manner by the hands of the operator, thus avoiding a transfer of dust or germs from the same to the operator.

50 A new receptacle 27 may then be connected to the connector plate 36 and the same assembled in connection with the shell 17 in reverse order, whereupon the suction cleaner may be operated in the desired manner.

The air duct system of the suction cleaning

apparatus shown herein through which air currents are drawn or exhausted by the exhaustor fan, includes the main inlet opening of the nozzle or other tool 16, the tubular pipe or extension
15 15, the hose 14, hose coupling member 48, opening 45, air duct member 50, connector neck 38, dust receptacle 27, compartment 35, motor-exhaustor housing 18, and exhaust outlet 26.

However, all types of suction cleaning apparatus are provided with such an air duct system, but the dust receptacle in many cases is
10 located in the system behind the exhaustor fan rather than in front of the same as shown herein. Accordingly, the improvements herein de-
15 scribed are not limited to the particular relative arrangement of location of the various elements of the air duct system.

I claim:

1. In a suction cleaner dust collector, a tubular shell, an air pervious dust receptacle within
20 the shell provided with a tubular neck, a combined shell closure and receptacle connector member mounted on the shell and provided with a tubular air inlet neck within the shell, means
25 attached to the closure member for releasably clamping said tubular necks together, and means on the member accessible exteriorly of the closure member for actuating said clamping means
30 to release said receptacle.

2. In a suction cleaner dust collector, a tubular shell, an air pervious dust receptacle within
30 the shell provided with a tubular neck, a combined shell closure and receptacle connector member detachably mounted on the shell and provided with a tubular air inlet neck within the
35 shell, clamping means within the shell attached to the closure member for releasably clamping said tubular necks together, and means for operating said clamping means to release said re-
40 ceptacle extending through said closure member and having an operating lever located exteriorly of the closure member.

3. In a suction cleaner dust collector, a tubular shell, an air pervious dust receptacle within
45 the shell, a removable closure member for one end of said shell provided with walls forming an air duct therethrough, means attached to the closure member within the shell for releasably
50 clamping said dust receptacle to said duct walls, and means extending through the closure member operatively accessible exteriorly of the closure member for actuating the clamping means to release said receptacle.

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