April 10, 1934. B. C. BECKER 1,953,944

SUCTION CLEANER

Filed Feb. 6, 1931 2 Sheets-Sheet 1

Fig. 1.

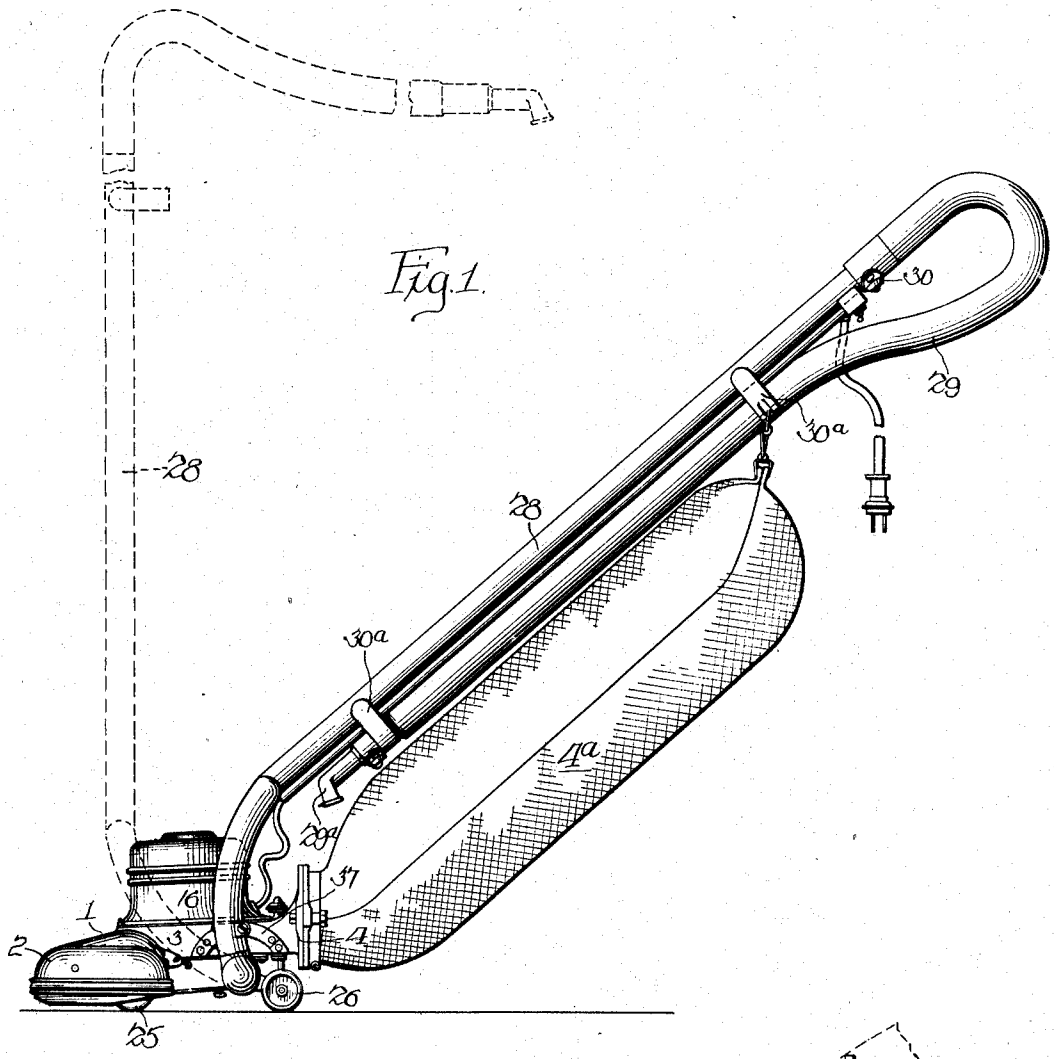
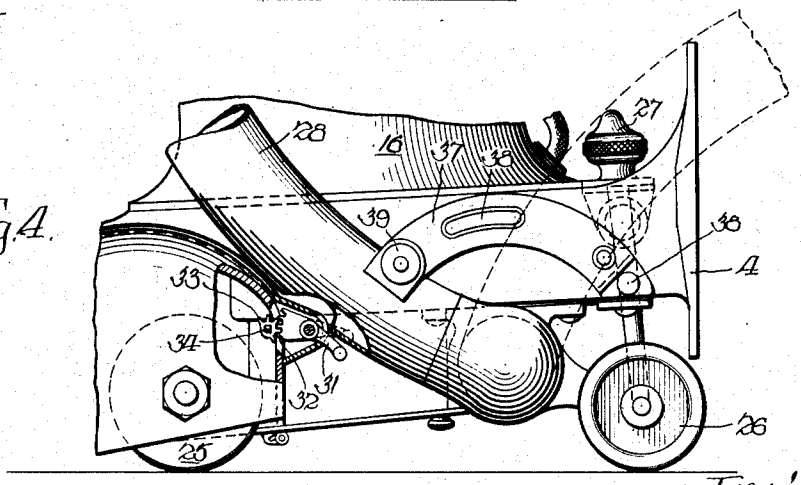


Fig. 4.



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Fig. 2.

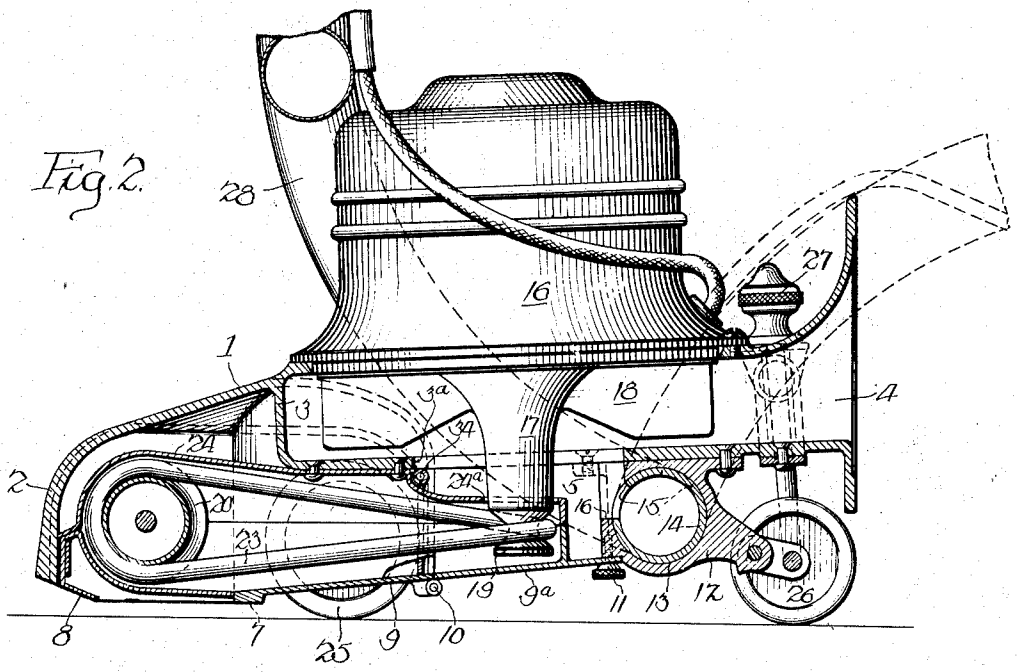
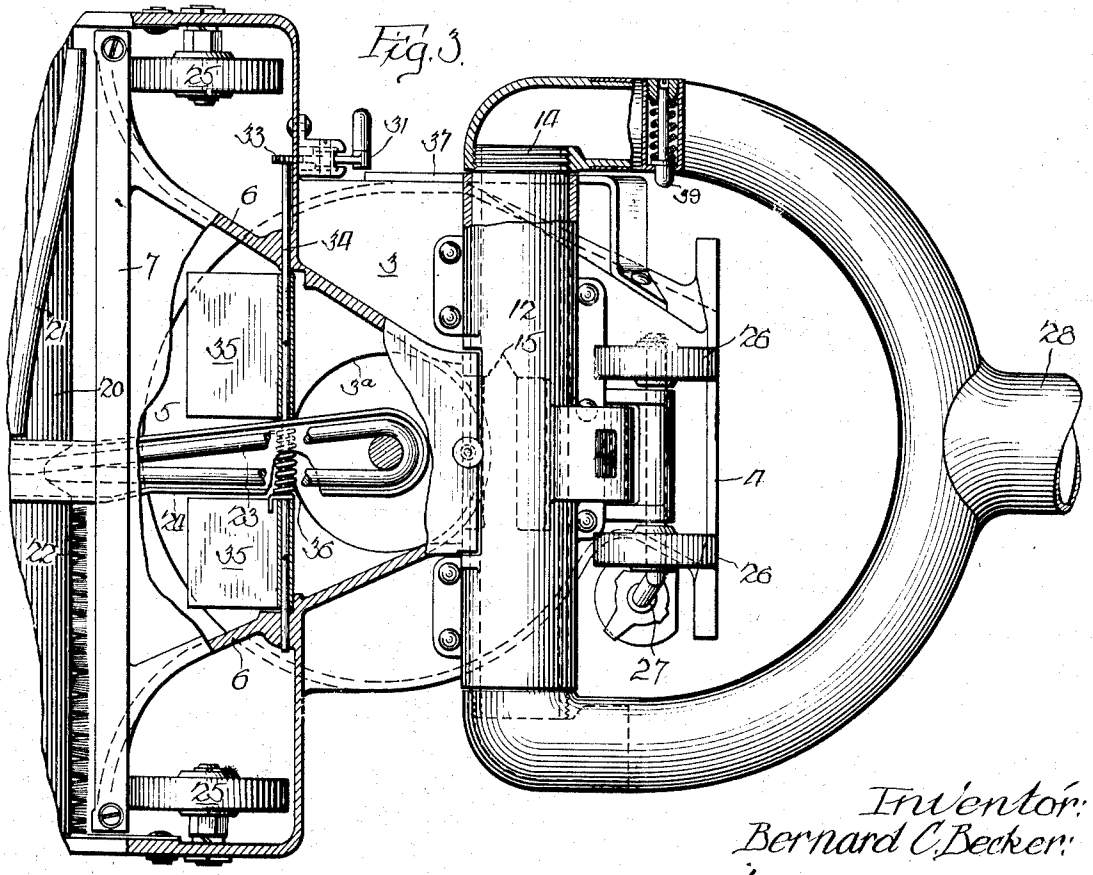


Fig. 3.



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UNITED STATES PATENT OFFICE

1,953,944

SUCTION CLEANER

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Application February 6, 1931, Serial No. 514,007

10 Claims. (Cl. 15—9)

The present invention relates to suction cleaners in general and particularly to improvements therein which function to convert the cleaner from a unit adapted for "on the floor" cleaning to a unit adapted for "off the floor" cleaning. More specifically the invention relates to a new and improved suction cleaner construction in which the dusting tool for use in "off the floor" cleaning is carried by the suction cleaner at all times, and in which the cleaner is converted from one type of cleaning unit to the other with a minimum of effort thru the use of permanently incorporated air-controlling valves which are actuated by movement of the suction cleaner handle which also serves as a conduit.

It is an object of the present invention to provide a new and improved suction cleaner. It is another object to provide a new and improved suction cleaner in which the dusting tools are permanently incorporated. It is a still further object to provide a new and improved suction cleaner in which the converter valves are actuated in a new and novel manner. A still further object is the provision of a new and improved suction cleaner which is instantly convertible from a unit adapted for "on the floor" cleaning to a unit adapted for "off the floor" with a minimum of physical effort. Other and more specific objects will appear upon reading the following specification and claims and considering in connection therewith the annexed drawings to which they relate.

In the drawings in which a preferred embodiment of the present invention is disclosed, and in which the same reference characters refer to the same parts in the various views:

Fig. 1 is a side elevation of the modern suction cleaner embodying the present invention.

Fig. 2 is an enlarged cross section thru the cleaner shown in Figure 1.

Fig. 3 is a bottom view of the cleaner shown in Figs. 1 and 2, with certain parts broken away.

Fig. 4 is an enlarged fragmentary side elevation of the cleaner shown in Fig. 1.

In a suction cleaner constructed in accordance with the present invention a main casting or body 1 is provided which includes a nozzle 2, a fan chamber 3, an exhaust outlet 4 and an air passageway 5 which is defined by vertical walls 6, 6 formed in the main casting 1 which extend rearwardly from the rear nozzle lip 7 to the eye 3a of the fan chamber 3. A bottom plate 9 forms the bottom of the air passageway and carries the rear nozzle lip 7 which defines, in cooperation with front lip 8, the nozzle mouth. Bottom plate 9 is divided substantially on its transverse center line and the rear part 9a is pivoted, relative to the machine and the remainder of plate 9, about a pivot axis 10, being normally secured in the raised position by means of a manually operable threaded member 11 which cooperates with a rigidly carried part of the cleaner. The depending walls 6, 6 end substantially at the rear of inlet 3a of the fan chamber in contact with a valve chamber 12 and provide to that point, in cooperation with bottom plate 9 which also ends there, the air passageway aforementioned. Valve chamber or casing 12 is provided with a transversely-extending cylindrical bore 13 within which is positioned a tubular rotatable valve 14, which has a longitudinal slot 15 adapted to coincide, in one of its angular positions, with a port 16 formed in the valve casing which connects it interiorly with the air passageway.

There is mounted upon the main casting 1, and immediately over the fan chamber 3, a motor casing 16 which houses a suitable driving motor which is not shown. The shaft 17 of the motor extends thru the fan chamber 3, where it carries the suction-creating fan 18, and into the air passageway 5 where is mounted a driving pulley 19, as in the usual cleaner construction. A rotatable agitator 20, comprising beating elements 21 and a brushing element 22, is rotatably mounted within the nozzle 2 and is driven by the driving motor thru a belt 23 which is connected to the pulley 19. To prevent the pulley 19 and the power-transmitting belt 23 from coming into contact with the dirt-laden air stream which enters the nozzle 2 and passes thru the air passageway 5 and into the fan chamber 3 a housing 24 has been provided which extends between the pulley 19 and the nozzle 2, said housing being suffiicently wide to enclose both sides of the belt 23 yet requiring a minimum of space so as not to decrease unnecessarily the size of air passageway 5 for the dirt-laden air stream. Housing 24 is provided at its rear end with an opening 24a in its upper wall thru which the motor shaft gains entrance.

The suction cleaner is movably supported on the surface undergoing cleaning by means of front supporting wheels 25, 25 and rear supporting wheels 26, 26, the latter being pivotally mounted to an extended part of the valve casing 12 and provided with means, indicated generally by the reference character 27, by which they are vertically adjustable relative to the cleaner for the purpose of adjusting the height of the nozzle lips relative to the surface covering undergoing cleaning.

A suitable handle 28 is provided which is pivoted relative to the cleaner proper, as is required for convenient operation, but which differs from the usual suction cleaner handle in that it is formed as a hollow tubular member, and is pivotally mounted relative to the suction cleaner proper thru being forked at its lower end and being carried by the extended ends of the hollow rotatable member or valve 14 carried by casing 12. At its upper extremity handle 28 is connected to a suitable flexible hose 29 which is removably secured thereto by suitable means 30. The hose 29, however, is not detached from the handle 28 in the general use of the cleaner as a floor-cleaning unit but instead is doubled back and under the handle 28, as is clearly shown in Figure 1, where it is held in place by suitable securing means 30*a*, 30*a* which are of any convenient type, such as flexible spring clips. The flexible hose 29 extends substantially the length of handle 28 thereunder and the nozzle 29*a* at its end is positioned substantially adjacent the fork in the handle. The bend or loop formed at the upper end of hose member 29, where it doubles back upon itself to extend under handle 28, serves as a convenient grip for the operator, the member 29 being sufficiently rigid in such a short length as to serve satisfactorily in that capacity. The dust bag 4*a*, which is connected to the exhaust outlet 4 in a common manner, is carried, as in the usual cleaner construction, thru being connected at its upper end to the handle 28.

In the ordinary use of the suction cleaner in "on the floor" cleaning the operator propels the machine with the handle between the position shown in full lines in Figure 1 and a horizontal position. With the handle positioned as shown in full lines in Figure 1 the valve 14 is turned in the valve casing 12 so that the port 15 is spaced from opening 16 which opens to the air passageway 5 and so to the fan chamber 3, and the wall of valve 14 provides a closure for aperture 16. In such position the entire suction created by the fan 18 is directed to the nozzle 2 and results in the drawing of cleaning air between the lips 7 and 8 into the nozzle. With the handle pivoted to the position shown in dotted lines in Figure 1 and full lines in Figure 2, however, valve 14 has been rotated by the handle 28 to such a position that the port 15 coincides with the opening 16 in the casing 12 and the interior of the valve 14, and so the interior of handle 28, is directly connected to the air passageway and so to the fan chamber. In order that the full effectiveness of the suction-creating fan can be directed to the handle 28, and so the dusting tool comprising flexible hose 29 and the nozzle 29*a*, it is necessary that the nozzle 2 be sealed from the inlet 3*a* of the fan chamber. According to the present invention this is accomplished by the same movement of the handle 28 which places the valve 14 in the position in which the port 15 coincides with the opening 16. As handle 28 is pivoted to its furthermost position in the direction of the cleaner nozzle it contacts a short pivoted arm member 31 carried on the main casting 1 adjacent the fan chamber 3. Pivoted member 31 is provided with a toothed inner end 32 which meshes with a pinion 33 carried upon a shaft 34 which extends transversely across the air passageway 5 closely adjacent the underside of the fan chamber 3. Shaft 34 carries, upon both sides of the belt-containing housing 24, gate members 35, 35, which extend between the vertical walls 6, 6 of the passageway 5 and the sides of the housing 24 and which, in their vertical position shown in Figure 2, act as a valve to completely close the air passage 5 leading from the nozzle 2 to the fan chamber. A suitable coil spring 36 is provided centrally of the shaft 34, immediately above the housing 24, which exerts a lifting force on the valve, thru contacting one of the gate members 35, to support the valve normally in the raised position, or that in which members 35, 35 extend closely adjacent the under side of fan chamber 3, where they in no way obstruct the air passageway 5. Upon the pivoting of the handle 28 to its forward position, however, the member 31 is contacted and is pivoted causing the pinion 33 to rotate, and with it the shaft 34, against the resisting force of spring 36. The valve members 35, 35 are pivoted, under the force exerted by the handle, to their vertical position in which they seal the nozzle 2 from the fan chamber and thereby function to direct the entire draft of the suction-creating fan into the handle 28 and hose 29 thru the valve 14.

In order to prevent the accidental conversion of the machine from one type of unit to the other, handle-position-securing means are provided comprising an arcuate sector 37 rigidly carried on the main casting 1 adjacent the exhaust outlet, which is provided with depressed portions, or seats, 38, 38 etc. which are adapted to be contacted by a spring-pressed plunger 39 carried by the handle 28. Plunger 39 functions, in cooperation with the arcuate sector 37, to resistingly maintain the handle in any one of several given positions through the plunger resistingly seating within the depressed portions and requiring a certain force for dislodgment therefrom. With the handle in the dusting-tool-cleaning position, or that shown in dotted lines in Figure 1, the plunger 39 is in cooperation with a seat 38 and cannot be easily or accidentally dislodged therefrom.

In the operation of the suction cleaner constructed in accordance with the present invention as a floor cleaning unit the machine is propelled relative to the surface covering by means of the handle 28, the looped portion of the flexible hose 29 being used as the grip, and the extended end of the hose being positioned along the under side of the handle where it in no way interferes with the operation of the machine. The operator, in pivoting the handle 28, as the machine is moved about upon the covering, only rotates the valve 14 within a certain allowable range which does not serve to connect it interiorly thru the port 15 to the fan chamber. In this relation therefore the suction cleaner constructed in accordance with the present invention operates as a common suction cleaner. If it becomes desirable, however, to clean articles positioned above the supporting surface, such as drapes, curtains, etc., it is only necessary to pivot the cleaner handle to its advanced position, that shown in dotted lines in Figure 1 and, as has been described, the handle then functions to close the nozzle 2 from the fan chamber 3 thru closing the valves comprising members 35, 35 and opens its own interior to the fan chamber through the rotation of valve 14 to such a position that port 15 coincides with slot 16. With the cleaner so arranged functionally it is only necessary for the operator to detach the flexible tubular hose 29 from the underside of the handle 28 and use it as a dusting tool. It is apparent therefore that a machine constructed in accordance with the present invention has many advantages over the ordinary suction cleaner in which it is necessary to detach certain parts and apply certain other parts before the machine is converted from a unit adapted for

one type of cleaning to a unit adapted to a second type of cleaning.

I claim:

1. A suction cleaner comprising a body having a nozzle, a fan chamber, and an air passageway therebetween, a driven fan in said fan chamber creating a reduced pressure therein, a hollow handle pivoted to said body, a rotatable tubular valve interiorly connected to said handle and in certain angular positions to said passageway, characterized by the fact that said valve is rotated by the pivoting of said handle.

2. A suction cleaner comprising a body having a nozzle, a fan chamber, and an air passageway therebetween, a driven fan in said fan chamber creating a reduced pressure therein, a hollow handle, pivoted to said body, a valve interiorly connecting said handle to said fan chamber in certain handle positions, and valve means positioned in said air passageway and operable by said handle to seal said nozzle from said fan chamber in certain handle positions.

3. A suction cleaner comprising a body having a nozzle, a fan chamber, and an air passageway therebetween, a driven fan in said fan chamber creating a reduced pressure therein, a pivoted hollow handle connected to said body, a rotatable valve interiorly connecting said handle to said fan chamber in certain handle positions, a pivoted valve in said air passageway, and position-controlling means for said pivoted valve outside said passageway adapted to be operted by said handle.

4. A suction cleaner comprising a body having a nozzle, a fan chamber, and an air passageway therebetween, a driven fan in said fan chamber creating a reduced pressure therein, a pivoted hollow handle connected to said body, a rotatable valve interiorly connecting said handle to said fan chamber in certain handle positions, a pivoted valve in said air passageway normally maintained in open position, and operating means for said pivoted valve outside said passageway to close said valve upon receiving an operating force from said sandle.

5. A suction cleaner comprising a body having a nozzle, a fan chamber, and an air passageway therebetween, a driven fan in said fan chamber creating a reduced pressure therein, a handle pivotally connected to said body, pivoted valve means in said passageway normally resistingly maintained in open position but adapted to seal said nozzle from said fan chamber, and means external of said passageway in the path of said pivoted handle and adapted to be actuated thereby to close said valve.

6. In a suction cleaner, suction-creating means, a source of cleaning air adjacent the supporting surface connected to the suction-creating means, a second source of cleaning air spaced from the supporting surface connected to the suction-creating means, valve means between said sources and said suction-creating means, a freely pivoted handle connected to said valve means and controlling the relationship thereof to said sources, and means to prevent unintended displacement of said handle from certain valve-controlling positions.

7. In a suction cleaner, a body including a fan chamber, a nozzle interiorly connected to said fan chamber, a suction-creating fan in said fan chamber, a hollow member pivoted to said body and interiorly connected to said fan chamber, and a valve between said member and said fan chamber connected to said member and positioned thereby, characterized by the fact that in certain angular positions of said member said valve seals said member from said fan chamber while in other angular positions it opens said member to said fan chamber.

8. In a suction cleaner, suction-creating means, a body including a valve chamber open to said suction-creating means, a hollow conduit movably connected to said body and to said suction-creating means thru said valve chamber, and a valve positioned in said chamber and adapted to open and seal said conduit to said suction-producing means, said conduit being operatively connected to said valve to move it to open or closed position upon being itself moved to certain positions relative to said body.

9. In a suction cleaner, suction-creating means, a body including a valve chamber open to said suction-creating means, a hollow conduit pivotally connected to said body and to said suction-creating means thru said valve chamber, and a valve connected to said conduit positioned in said chamber and adapted to open said conduit to said suction-creating means with the conduit in a certain position and to seal said conduit from said means with said conduit in a second position.

10. In a suction cleaner, suction-creating means, a body including a nozzle connected to said suction creating means, a handle pivotally connected to said body, a valve positioned between said nozzle and said means, automatic means to operate said valve to close said nozzle from said suction-creating means upon the adjustment of said handle to a certain position, and automatic means to operate said valve to open said nozzle to said suction-creating means upon the removal of said handle from that position.

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