March 20, 1945. C. H. TAYLOR 2,372,033

SUCTION CLEANING APPARATUS

Filed Jan. 13, 1943 2 Sheets-Sheet 1

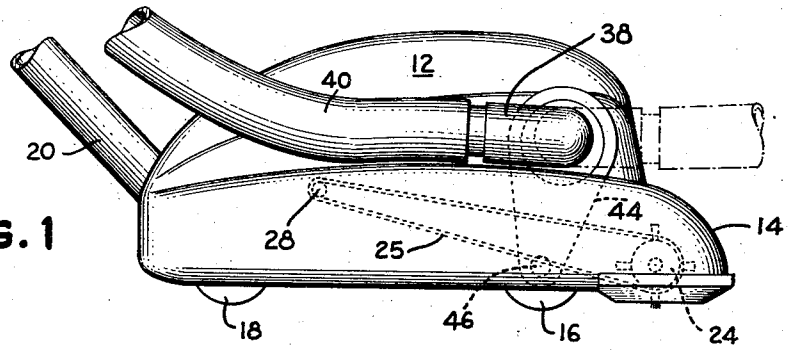


FIG. 1

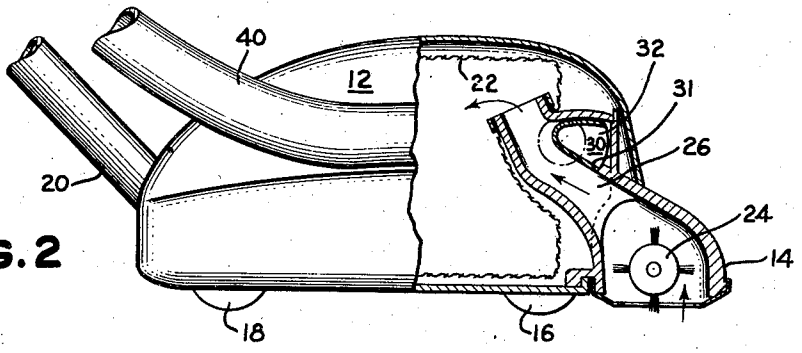


FIG. 2

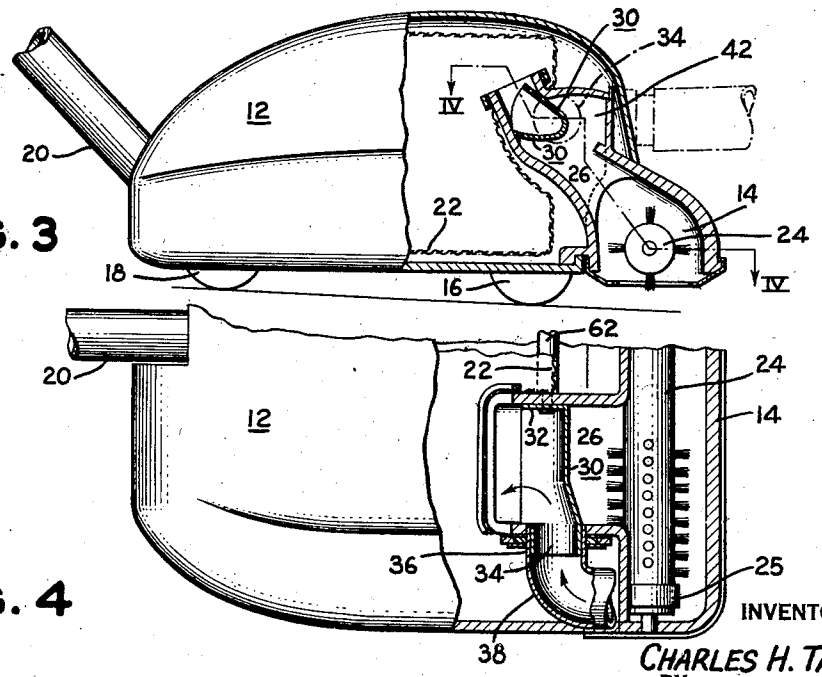


FIG. 3

FIG. 4

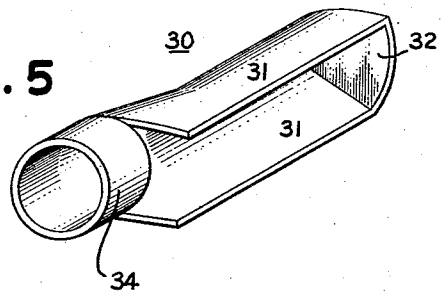
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SUCTION CLEANING APPARATUS

Filed Jan. 13, 1943 2 Sheets-Sheet 2

FIG. 5



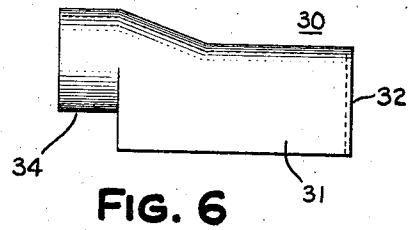


FIG. 6

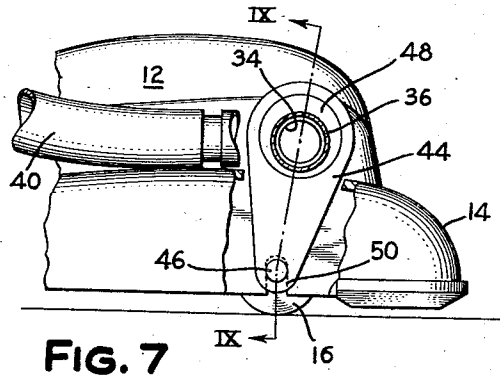


FIG. 7

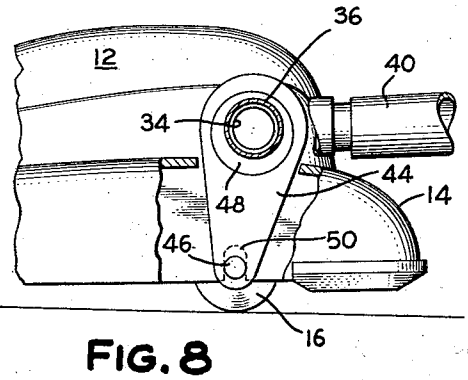


FIG. 8

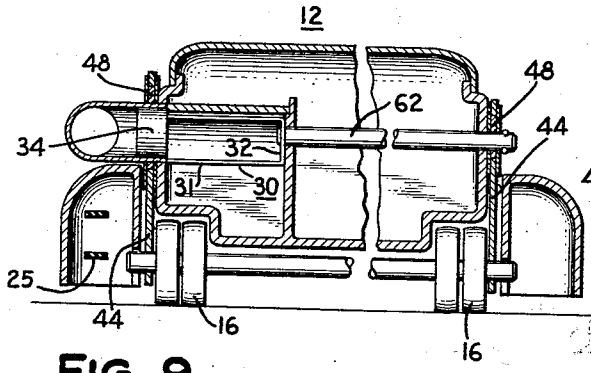


FIG. 9

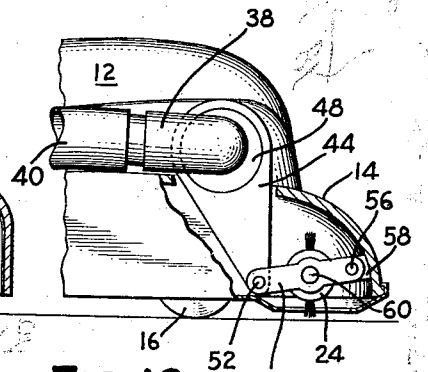


FIG. 10

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SUCTION CLEANING APPARATUS

Charles H. Taylor, Springfield, Mass., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application January 13, 1943, Serial No. 472,209

4 Claims. (Cl. 15—9)

My invention relates to a suction cleaner, and more particularly to a suction cleaner which is adapted for on-the-floor or off-the-floor operation and for operation as a handle-propelled cleaner or as a tank-type cleaner.

An object of my invention is to provide an improved cleaner of the type set forth.

A further object of my invention is to produce a suction cleaner of the type set forth which can easily and quickly be converted from floor cleaning to attachment cleaning.

A still further object of my invention is to provide an improved valve mechanism for a convertible suction cleaner in which the attachment hose or connection may be permanently carried by the cleaner so as to be available for instant use.

A still further object of my invention is to produce an improved construction of a convertible cleaner which is easily operated and inexpensively produced and assembled.

A characteristic feature of my invention is that movement of the attachment hose or connection from its inoperative to its operative position automatically diverts the suction from the conventional floor-contacting nozzle to said attachment hose or connection and vice versa.

A further characteristic of the invention is that the movement of the attachment hose or connection from its inoperative to its operative position also automatically raises the floor nozzle of the cleaner, or the rotary agitator usually mounted in said nozzle, out of contact with the supporting surface while the cleaner is used on walls, furniture, and the like.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a diagrammatic view, in side elevation, of a suction cleaner embodying this invention;

Fig. 2 is a view similar to Fig. 1 with a portion of the outer casing broken away to show details of construction, certain parts being omitted and others shown in section;

Fig. 3 is a view similar to Fig. 2, showing the position of the parts when the cleaner has been converted from on-the-floor to off-the-floor cleaning;

Fig. 4 is a view partly in section on line IV—IV of Fig. 3;

Fig. 5 is a perspective view of a valve member constituting part of my invention;

Fig. 6 is a top plan view of the valve shown in Fig. 5;

Figs. 7 and 8 are fragmentary views, partly in section and partly in elevation, showing means for lifting the nozzle when the suction cleaner is converted to off-the-floor cleaning;

Fig. 9 is a fragmentary sectional view on line IX—IX of Fig. 7; and,

Fig. 10 is a view similar to Fig. 7, showing a modified construction.

Referring specifically to the drawings and more particularly to Fig. 1, there is shown a suction cleaner 12 having a nozzle 14 and supporting front and rear wheels 16 and 18. The cleaner 12 is also provided with a suitable propelling handle 20 and a fan-motor unit (not shown) for creating suction through the nozzle 14 and into a filter bag 22. In the nozzle 14 is located the usual brush roll 24 which is rotated by a belt 25 which in turn is driven from the shaft 28 of the motor.

Connecting the interior of the nozzle 14 with the interior of the dust filter bag 22 is a passage 26 which is best seen in Figs. 2 and 4. In floor cleaning, the suction created by the fan-motor unit draws the dirt-lader air upwardly through the nozzle 14 and the passage 26 into the bag 22, in the direction of the arrows in Fig. 2. The filtered air is exhausted, after passing through the bag 22, in any suitable manner (not shown).

In order to be able to convert the machine from the hand-propelled type to the tank type, or from on-the-floor to the off-the-floor cleaning, I provide the valve member 30, which is best seen in Figs. 5 and 6, and which comprises an elongated body 31, generally U-shaped in cross section, having one end 32 thereof closed and having a neck or connecting nipple 34 at the other end thereof. As will be seen from Figs. 3 and 4, the valve 30 is disposed transversely of the passage 26 with the connecting nipple 34 of said valve extending through a suitable opening in the side of the casing 12 to be engaged by the end 36 of an elbow fitting 38. To the other end of the fitting 38 is connected one end of a flexible hose 40, the other end of which is adapted to be connected to any desired cleaning tools. When not in use, the hose 40 is disposed in the position shown in solid lines in Figs. 1 and 2 and is detachably carried by the handle 20 in any desired manner. The fitting 38 may be detachably connected to the casing 12 or to the end 34 of the valve 30, or, alternatively, the hose 40 may be detachably secured to the fitting 38 as may be desired.

Referring now to Figs. 2 and 3, it will be seen that the structure of the internal walls is such as

to provide a pocket 42 in which the valve 30 is disposed, when the cleaner is used for floor nozzle cleaning, so that one of the side walls 31 of the valve 30 forms a continuation of the inner wall of the nozzle 14 and the passage 26. In this position, the valve 30 in no way obstructs the flow of air through the nozzle 14 and the passage 26 and, since the hose 40 is carried by the handle 20, the entire cleaner is operated as a conventional floor cleaner. When it is desired to convert the cleaner, it is merely necessary to detach the hose 40 from the handle 20 and to move the hose 40 to the position shown in broken lines in Figs. 1 and 3, or the position shown in solid lines in Fig. 8. Since the fitting 38 is fastened to the nipple 34 of the valve 30, the latter is rotated about a horizontal axis, in clockwise direction, from the position shown in Fig. 2 to the position shown in Fig. 3. It will be noted that in this position, the valve 30 obstructs the passage 26 to prevent the flow of air through the nozzle 14. The suction created within the dust bag 22 is now diverted to the cleaning tool (not shown) at the other end of the hose 40. The dirt-laden air, drawn through this cleaning tool by the suction-creating device, now flows through the hose 40 and the fitting 38 into the valve 30, the open side of which is in registration with the upper, open end of the passage 26 which leads into the filter bag 22. The path of flow of the dirt-laden air is shown by the arrows in Fig. 4.

In order to prevent the damage, commonly known as brush burn, which may result from the rotation of the brush roll 24 at high speed against the same spot of the floor covering on which the cleaner rests, I provide means, operable by the conversion of the cleaner, to raise the brush roll 24 out of contact with the floor covering. This may be done by raising the entire nozzle in which the brush roll is mounted, or it may be done by raising the brush roll itself independently of the nozzle.

One form of means for raising the nozzle relative to the floor covering is shown diagrammatically in Figs. 1, 7, and 8. It will be seen from these figures that this means includes a link 44 connected at its lower end to the shaft 46 which supports the front wheels 16, and connected at its upper end to the nipple 36 of the fitting 38. The link 44 is adapted to be actuated by a cam or eccentric 48 which is rotatable with the elbow 38. The shaft 46 supporting the front wheels 16 is mounted for vertical movement in a slot 50. With the extension hose 40 in the position shown in Fig. 7, and with the cleaner used for floor cleaning, the shaft 46 is in its uppermost position in the slot 50, the wheels 16 are in their uppermost position, and the nozzle 14 is depressed to effect normal contact with the floor covering. When the hose 40 is in the position shown in Fig. 8 and the valve 30 has been rotated to divert suction to the hose 40, the cam or eccentric 48 is also rotated to the position shown in Fig. 8, thus actuating the link 44 downwardly to depress the wheels 16 and correspondingly elevate the nozzle 14.

In Fig. 10, I show one form of means for elevating the brush roll 24 independently of the nozzle 14. This means includes the same link 44, which instead of being connected to the front wheels 16, is pivoted at 52 to a lever 54 which is also pivoted at 56 to a bracket or the like 58 carried by the nozzle 14. The brush roll 24 is journaled at 60 in bearings carried by the link 54. In this construction, the position of the cam or eccentric 48 is reversed so that, when the hose 40 is in the position shown in Fig. 10 and the cleaner is used for floor cleaning, the link 44 is depressed by the cam 48 to depress the lever 54 and thus bring the brush roll 24 into contact with the floor covering. It is obvious that if the hose 40 is rotated into the position shown in Fig. 8 to rotate the cam 48, the link 44 is moved upwardly to raise the lever 54 and thus lift the brush roll 24 out of contact with the floor covering while the cleaner is used for off-the-floor cleaning.

In order to exert the elevating action of the link 44 and cam 48 on the front wheels 16 on both sides of the cleaner, an extension shaft 62 is secured to the closed end 32 of the valve 30, said shaft 62 being rotatable with said valve and being provided at its other end with the same mechanism.

It will be seen from the foregoing that whenever the cleaner is used for normal floor cleaning through the nozzle 14, the nozzle is automatically adjusted for proper floor contact, and conversely, that whenever the cleaner is converted, the nozzle or the brush roll is elevated to prevent damage to the carpet being cleaned.

It will further be seen that, by means of the converting mechanism provided, the cleaner can be used as a handle-propelled cleaner or as a tank-type cleaner both on floor coverings in the usual manner or for off-the-floor cleaning as may be desired.

While I have shown my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In a suction cleaner, a casing having a floor nozzle, a suction-creating device and a passage connecting said nozzle and said suction-creating device, there being a through opening in a wall of said casing leading to said passage, a tubular valve member rotatably mounted transversely of said passage, said valve member having an open end which is offset with respect to the body of said valve member and seated in said opening, there being a side opening in one side of said valve member extending parallel with its axis of rotation, and an attachment hose connected to the offset end of said valve member and adapted, in one position of said valve, to communicate with said suction-creating device through said valve and said side opening, said valve member and said hose being so constructed and arranged that when said hose is moved to one position, said valve member is rotated into a position obstructing said passage to divert suction from said nozzle to said hose through said side opening, and when said hose is moved to another position, said valve member is moved to a non-obstructing position and said side opening is closed to divert suction from said hose and to restore suction through said passage to said nozzle.

2. In a suction cleaner, a casing having a floor nozzle, a suction-creating device in said casing, and a passage connecting said nozzle and said suction-creating device, there being a recess formed in a wall of said passage and extending transversely thereof, a hollow valve member having a side opening and an end opening, means mounting said valve member for rotation, about the axis of said end opening, into a first position in which said valve is seated in said pocket, and

into a second position in which said valve obstructs said passage, said valve being so constructed and arranged that in said first position, a side wall of said valve member closes said pocket and forms a continuation of said wall of said passage, and in said second position said side opening establishes communication between said suction device and the interior of said valve member, and an attachment hose communicating with the interior of said valve member through said end opening.

3. The structure recited in claim 2 in which, when said valve member is in said first position, said side opening is closed by a wall of said pocket to prevent communication between said hose and said suction-creating device.

4. In a suction cleaner, a casing having a floor nozzle, a suction-creating device in said casing, and a passage connecting said nozzle and said suction-creating device, a valve member disposed transversely of said passage and including a body portion having a side opening therein, there being an opening in a side wall of said casing leading to said passage through said side opening, means mounting said valve member for rotation on a horizontal axis concentric with the center of said second-mentioned opening into a first position in which the body portion of said valve obstructs said passage and establishes communication between said suction-creating device and said openings, and into a second position in which the body portion of said valve does not obstruct said passage and in which said side opening is closed by a wall of said passage and said second-mentioned opening is shut off from said suction-creating device and communication is re-established between said nozzle and said suction-creating device.

CHARLES H. TAYLOR.