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C. H. TAYLOR

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SUCTION NOZZLE HAVING A VARIABLE OPENING

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FIG. 2.

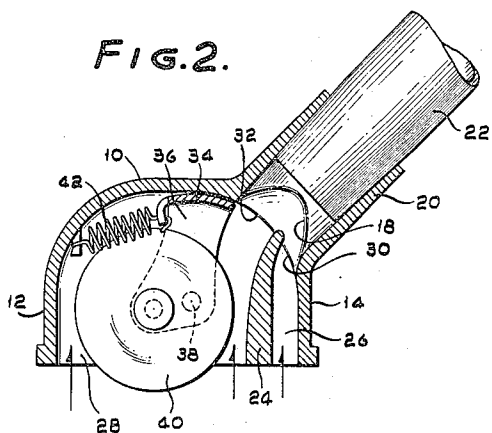


FIG. 3.

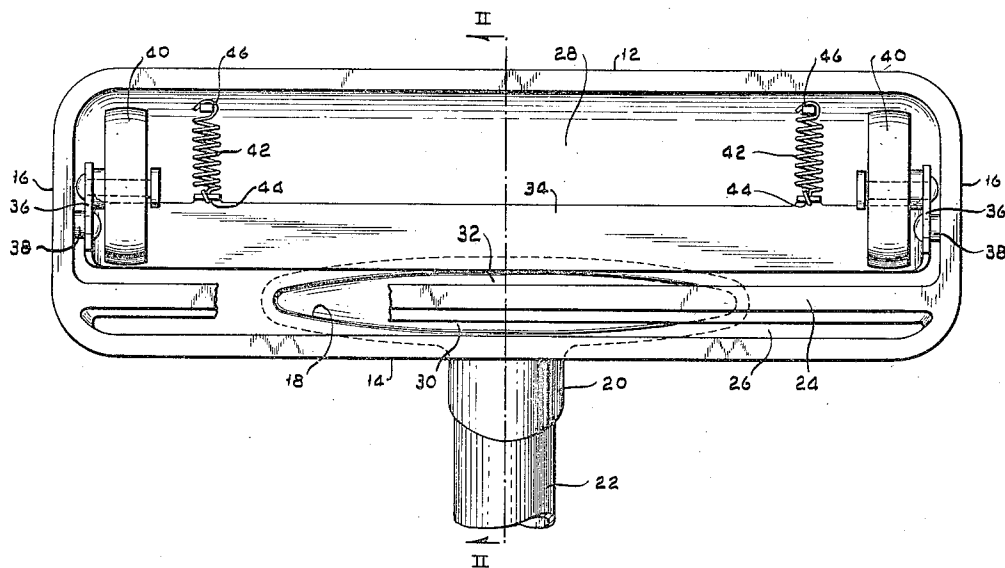
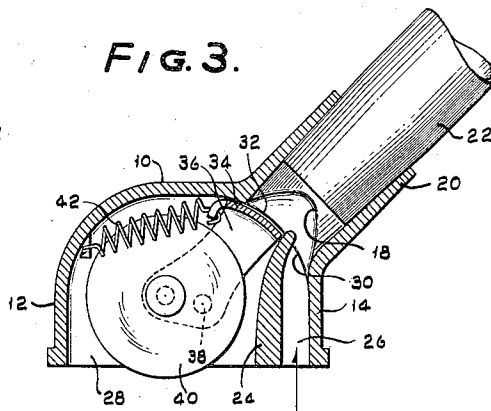


FIG. 1.

WITNESSES:

E. H. Lutz.
V. W. Kovich

INVENTOR
CHARLES H. TAYLOR

BY R. J. Gisinger
ATTORNEY

UNITED STATES PATENT OFFICE

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SUCTION NOZZLE HAVING A VARIABLE OPENING

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

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1 Claim. (Cl. 15—360)

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My invention relates to a suction cleaner and has for an object to produce an improved floor tool or suction nozzle for such cleaner.

A further object is to produce an improved suction nozzle structure whereby lint, hair or other types of dirt, which tend to adhere to the surface being cleaned, can be more readily removed.

A still further object is to produce an improved nozzle which can be operated without any skill, with little effort, and without interrupting the cleaning operation.

A still further object is to produce an improved nozzle of the type set forth without materially adding to the weight or cost of the nozzle and without increasing the size, or in any way affecting the shape or appearance, of the nozzle.

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

Fig. 1 is a bottom plan view of a suction cleaner nozzle embodying the invention;

Fig. 2 is a section on line II—II of Fig. 1, showing the position of the parts when the nozzle is used for ordinary cleaning operation; and

Fig. 3 is a view, similar to Fig. 2, showing the position of the parts when the nozzle is adjusted to facilitate removal of lint, hair and similar types of dirt.

Referring to the drawings, there is shown a suction cleaner nozzle formed of an upper wall 10, side walls 12 and 14, and end walls 16. The upper wall 10, the side walls 12 and 14, and the end walls 16 are suitably shaped so as to define a hollow body having the desired contour and appearance, and having a bottom mouth or inlet opening extending substantially the entire length and width of the underside of the nozzle. In the upper portion of the nozzle, there is provided an outlet opening 18 which connects the interior of the nozzle with a nipple 20. The nipple 20 is adapted to be connected to the low pressure side of the fan motor unit of a suction cleaner, either directly, or by means of a tubular member 22. When so connected, air moved by the fan motor unit flows into the nozzle through the entire bottom mouth thereof, as indicated by the arrows in Fig. 2.

A nozzle constructed as thus far described, will be satisfactory for ordinary cleaning operation in that the velocity of the stream of air flowing into the nozzle, over the entire area of the bottom inlet opening, will be sufficient to pick up

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dust and most types of loose dirt. When, however, hair, lint, or other types of dirt which tend to adhere to the surface being cleaned, or which are relatively heavy, are encountered, the velocity of the air stream entering the nozzle may not be sufficient to lift such dirt and it becomes necessary to interrupt the cleaning operation while such dirt is loosened or removed manually.

For the purpose of carrying out my invention, the interior of the nozzle is divided into two separate compartments both of which communicate with the source of suction and with the bottom nozzle inlet, and one of which is preferably smaller than the other. Means is also provided for selectively permitting the air moved by the fan motor unit to flow into and through both of said compartments or for confining the air flow to one, and preferably to the smaller, of the two compartments.

As shown, the nozzle is provided with a wall or partition 24 which is preferably disposed parallel to, and relatively near, the side wall 14 so as to divide the bottom inlet opening and the interior of the nozzle into a smaller compartment 26 and a larger compartment 28. The partition 24 also extends upwardly to, or into, the lower portion of the outlet opening 18 so as to divide it into two adjacent passages 30 and 32 which correspond to, and communicate with, the compartments 26 and 28, respectively.

I also provide a shutter which is movable, at will, to close one of the openings 30 or 32 so as to confine the flow of air moved by the fan motor unit to one of the compartments 26 or 28. As illustrated, the shutter is arranged so as to close the passage 32 and thus confine the air flow to the reduced compartment 26. The shutter is preferably in the nature of an elongated strip 34 which is slightly curved so as to conform to the curvature of the adjacent portion of the upper wall of the nozzle. The elongated strip 34 terminates in, or is provided with, pendant end tabs or walls 36 which are pivotally mounted on the end walls of the nozzle by means of pivot pins 38. The shutter is thus rotatable in either direction about the axis of the pins. To the end walls 36 of the shutter 34 are journaled a pair of wheels 40 by means of which the nozzle is moved over the surface to be cleaned. The wheels 40 are disposed in, and project downwardly through, the bottom inlet opening of the large compartment 28.

The shutter 34 is normally biased in counterclockwise direction, as viewed in Figs. 2 and 3,

by a pair of springs 42 which are connected to the shutter at 44, and to the side wall 12 of the nozzle at 46. The force of the springs is such that, when no pressure is exerted on the nozzle, the shutter is rotated about the pivot pins 38 to the position shown in Fig. 2 in which the shutter does not obstruct the passage 32. Rotation of the shutter in counterclockwise direction about the pivot pins 38 depresses the wheels relative to the nozzle and thus spaces the bottom edge of the nozzle to a predetermined extent relative to the surface being cleaned. Due to the fact that the air now flows into the nozzle over the entire area of the bottom inlet and out from the nozzle through both of the passages 30 and 32, and due to the fact that the bottom edge of the nozzle is relatively spaced from the surface to be cleaned, the velocity of the air is relatively low. This velocity, however, is enough to enable the air to lift loose and light dirt and is sufficient for normal cleaning operation.

When lint, hair, or other dirt is encountered, and it becomes necessary to increase the velocity of the air stream so as to increase its dirt lifting capacity, the operator exerts downward pressure on the nozzle thus rotating the shutter, in clockwise direction, from the position shown in Fig. 2 to the position shown in Fig. 3. In this position, the opening 32 is closed and, since all the air moved by the fan motor unit must pass exclusively through the reduced compartment 26 and the passage 30, its velocity is increased. Rotation of the shutter in clockwise direction also raises the wheels 40 relative to the nozzle, thus reducing the space between the bottom edge of the nozzle and the surface being cleaned, and further increasing the velocity of the air as it enters the compartment 26. The increase in the velocity of the air by the means referred to increases its dirt lifting capacity as compared with the capacity of the relatively low velocity air stream which flows through the nozzle when the parts are in the position shown in Fig. 2.

When it is desired to return the cleaner to normal operation, the operator relaxes the pressure on the nozzle, thus permitting the springs 42 to return the shutter and the wheels to the position shown in Fig. 2.

It will be noted that the application of the necessary additional pressure to the nozzle can be effected without interrupting the cleaning operation or changing its usual to-and-fro movement of the nozzle over the surface being cleaned. It will also be seen that this is true regardless whether the nozzle forms part of, or is directly carried by, the cleaner casing which houses the fan motor unit, or whether the nozzle is carried at the end of a tubular member which is connected by a conduit or an extension hose to said casing. In other words, the structure described is equally applicable to the handle-propelled type of suction cleaner as well as to the type of cleaner which is known as the tank type and in which only the nozzle of the cleaner is moved over the surface to be cleaned.

It will further be seen that the change in the velocity of the air stream is effected with very little effort and that the provision of the shutter and the biasing springs does not materially add

to the cost or weight of the nozzle and does not affect the shape or appearance of the nozzle. It is also to be noted that the structure illustrated is inexpensive to make and that it is of a rugged and durable structure.

By the structure disclosed, I utilize the habit or natural tendency of the operator to exert downward pressure, when the cleaner passes over but does not promptly remove dirt, to move the shutter and concentrate the suction. Conversely, as soon as such dirt is removed, or as long as the cleaner is operating satisfactorily, the operator will, naturally, move the cleaner back and forth without any special downward pressure. In other words, the operator does not have to learn and remember any special instructions for the proper use of the nozzle.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What I claim is:

A suction nozzle including a hollow body having an air intake opening formed in one portion thereof, an air discharge opening formed in another portion thereof adapted to be connected to a source of suction, partition means in the interior of said body extending from said air intake opening to said discharge opening to divide the same into two separate compartments each having an air intake opening and an air discharge opening, a shutter and means for biasing the same to a first position in which it is out of registration with all of said openings and movable to a second position in which it obstructs one of the said discharge openings, means for moving said shutter comprising a wheel projecting downwardly from said body and adapted to contact the surface to be cleaned and to be raised relative to said body upon downward movement of the latter and a lever pivoted to said body and connected to said wheel and said shutter for moving said shutter to said second position upon such relative upward movement of said wheel, said wheel being further adapted to support said nozzle in both upper and lower positions.

CHARLES H. TAYLOR.

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