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VACUUM CLEANER

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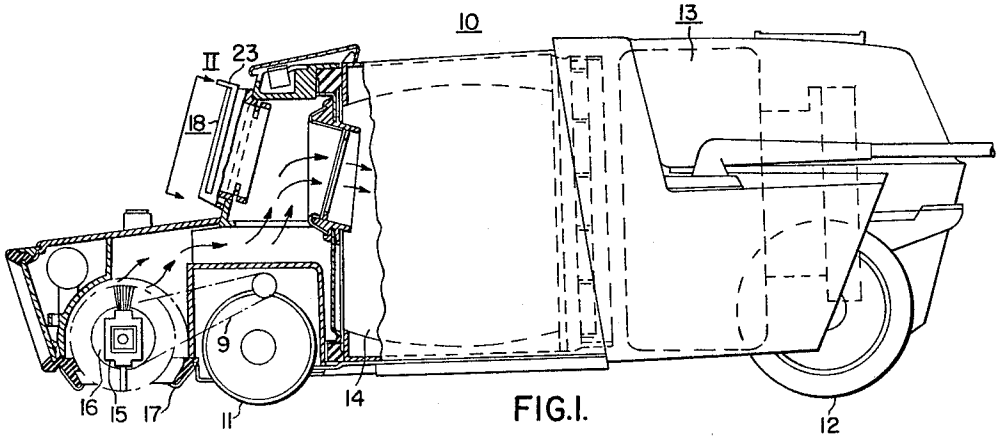

FIG.1.

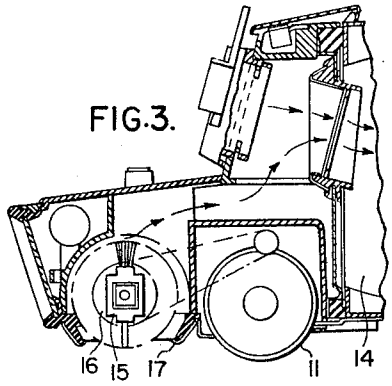

FIG.3.

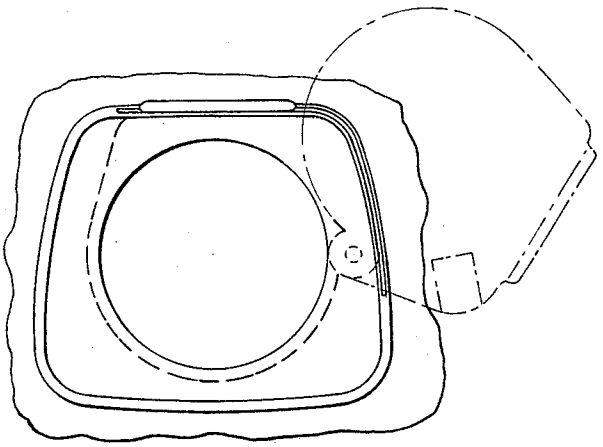

FIG.2.

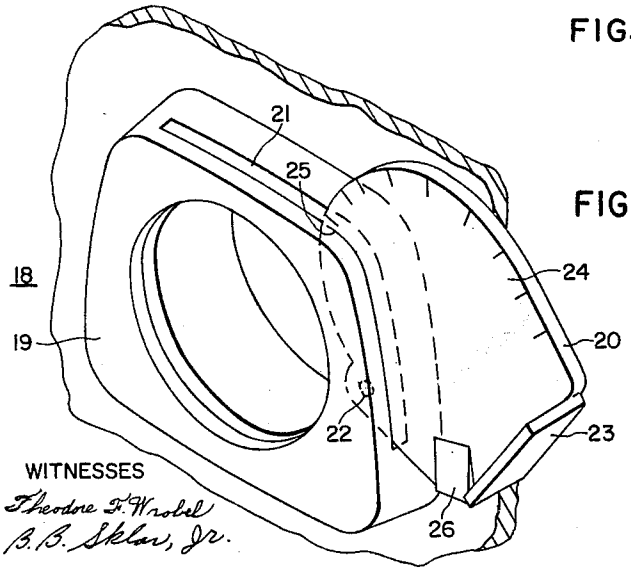

FIG.4.

WITNESSES

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VACUUM CLEANER

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This invention relates, in general, to vacuum cleaners of the type which can be used as a canister cleaner or as an upright cleaner and, more particularly, to an air flow control mechanism for use with a cleaner of this type.

The type of vacuum cleaner herein contemplated employs an enclosed dust container through which dirt-laden air passes before entering a fan. A cleaner of this type may utilize a fan designed to draw only clean air, inasmuch as the air is filtered before it reaches the fan. As is well known to those skilled in the art such a fan is capable of producing a much higher suction than one that is designed to pass dirt-laden air.

Such cleaners are adapted to have nozzles detachably connected thereto through a flexible hose and two sections of rigid pipe, which act as a handle for manipulating the nozzle.

It has been common practice with canister cleaners to rely on straight suction at the nozzle for removing dirt from the surface being cleaned, aided by stationary or floating brushes mounted on the nozzle. Some carpets, however, have proved difficult to clean with straight suction, mechanical agitation being required to release the dirt from the pile of the carpet. This problem has been overcome in prior art upright cleaners by providing a nozzle having a rotary brush or mechanical agitator connected directly to the dust separating and fan unit, the agitator being driven by the motor that drives the fan. The cleaner of this invention combines the high suction of the canister type of cleaner with mechanical agitation common to upright cleaners.

While such an apparatus is effective in cleaning some of the rugs which could not otherwise be properly cleaned, it is unsatisfactory when used on other rugs of this category due to the high suction power. Unlike the canister type of apparatus, upright cleaners and combination cleaners of the prior art have no means for bleeding air from the atmosphere in order to reduce suction power at the nozzle. Consequently, when the rotary brush is being used, full suction power is present at the nozzle. This is undesirable for cleaning some rugs, which, due to their nature, get sucked into or against the nozzle. For example, cotton rugs, plain throw rugs and throw rugs with fringe are affected in this manner.

Accordingly, it is the general object of this invention to provide a new and improved air flow control mechanism for a vacuum cleaner.

It is a more particular object of this invention to provide a new and improved mechanism for controlling suction pressure at the nozzle of an upright vacuum cleaner for permitting optimum operation of the cleaner on all kinds of rugs.

Another object of this invention is to provide a new and improved air flow control mechanism for a vacuum cleaner which can be made inexpensively by simple manufacturing methods.

Briefly, the present invention accomplishes the above cited objects by providing the cleaner with an air inlet member having a throttling member rotatably secured thereto. The throttling member is adapted to be set at various positions along its path of travel for varying the effective size of the air inlet member which in turn varies the quantity of air that can be drawn through the inlet. The inlet member, which is adapted to receive an air conduit when the apparatus is used as a straight suction cleaner, constitutes one of a pair of parallel flow paths, the other being the nozzle of the upright part of the cleaner. By varying the quantity of air flow through the inlet member as described above, the desired suction pressure at the nozzle of the upright portion of the cleaner can be attained. The air inlet member is provided with indicia for indicating the proper setting for the throttling member which depends on the type of surface to be cleaned. For example, the throttling member may be set at a position where it completely obstructs the inlet, which is desirable when cleaning a rug that is heavy in weight. This fully closed position would not be desirable when cleaning a cotton rug which is lightweight or a rug which has a rubber backing. In cleaning these types of rugs, the throttling member would be set at a fully opened or some intermediate position thereby reducing the suction power at the nozzle of the upright cleaner.

Further objects and advantages of the invention will become apparent as the following description proceeds and features of novelty which characterize the invention will be pointed out in particularity in the claims annexed to and forming a part of this specification.

For a better understanding of the invention reference may be had to the accompanying drawings in which:

FIGURE 1 is a side elevational view, partially in section, of a vacuum cleaner incorporating one embodiment of the invention;

FIG. 2 is an enlarged view of the air flow control mechanism, taken on line II—II of FIG. 1;

FIG. 3 is an enlarged fragmentary sectional view of the vacuum cleaner shown in FIG. 1, illustrating the air flow path when the throttling member is in the fully opened position; and

FIG. 4 is a perspective view of the air flow control mechanism.

Referring to the drawings, especially FIG. 1, reference character **10** designates generally a vacuum cleaner supported by front wheels **11** and rear wheels **12**, only one of each being shown. The cleaner **10** is of the type which can be used as a conventional canister cleaner (i.e. employing straight suction) or as a conventional upright cleaner (i.e. employing mechanical agitation combined with suction). The cleaner utilizes a power unit **13**, comprising a motor and a fan driven by the motor, for drawing dirt-laden air into a dirt container **14** wherein the dirt is deposited. Mechanical agitation, for freeing the dirt from the surface being cleaned, is provided by a brush roll **15** which is adapted to rotate with a pulley **16**. Rotational movement is imparted to the pulley by a drive belt **9** driven by a brush motor (not shown).

It will be understood by those skilled in the art that the features of this apparatus pertaining to the straight suction aspect do not form a part of this invention and will not, therefore, be discussed.

The cleaner **10** is provided with a nozzle or air conduit generally indicated at **17** (FIG. 1) through which dirt-laded air is drawn (FIG. 1) as the cleaner is moved over the surface to be cleaned. To vary the quantity of air passing through the nozzle **17**, the cleaner is provided with an air flow control mechanism generally designated **18** (FIG. 1). The control mechanism comprises a member **19** mounted in a wall of the cleaner housing and a generally circular substantially flat throttling member **20** (best shown in FIG. 4).

The member **19**, made from any suitable material, for example, plastic, has a hole or opening therethrough to provide an air flow path which is in parallel with the flow path through the nozzle **17** (see FIGS. 3 and 4). The flow paths illustrated by arrows in FIG. 3 correspond to the dot-dash position of the throttling member shown

in FIG. 2 while the flow path shown in FIG. 1 corresponds to the solid position of the throttling member also shown in FIG. 2.

The throttling member **20**, made, from any suitable material, for example, plastic, disposed in a circumferentially continuous slot **21** (with respect to the opening) (see FIG. 4) in the member **19** is rotatably secured therein by means of a pin **22** (FIG. 4). The throttling member is provided with a tab **23** (FIGS. 1 and 4) for rotating it in and out of the slot **21** to vary the effective size of the opening (i.e. the effective area of the flow path through the member **19**). This results in a variation in the quanitity of air drawn by the power unit **13** through the nozzle **17** whereby the apparatus can be utilized effectively on various rug surfaces. The side walls of the slot **21**, as viewed in FIG. 4, are relatively flexible and being normally spaced apart a distance slightly less than the thickness of the throttling member **20** are effective in maintaining the throttling member in various selected positions along its path of travel.

As viewed in FIG. 4, the throttling member **20** is provided with a calibrated scale **24** adjacent its peripheral edge which may represent the percentage of the total air which is actually drawn through the nozzle **17** or it may indicate the particular type of carpet to be cleaned. To set the throttling member **20**, it is rotated until the desired point on the scale lies adjacent the top of the member **19** adjacent the edge of the slot **21** as indicated at **25** (see FIG. 4). It will be understood by those skilled in the art that the specific indicia associated with the scale may be varied without departing from the spirit of the invention.

To ensure a substantially airtight seal at the air inlet member when the apparatus is used as an upright cleaner, a wedge shaped cam **26** formed integrally with the throttling member **20** coacts with the side walls of the slot **21** to cause the throttling member to abut the side wall of he slot nearest the interior of the cleaner when the throttling member is fully closed.

While there has been shown and described what is at present considered to be the preferred embodiment of the invention, modifications thereto will readily occur to those skilled in the art. It is not desired, therefore, that the invention be limited to the specific arrangements shown and described and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. In a vacuum cleaner having a dust container, motor and motor-driven fan: an air conduit adapted to be moved over a surface to be cleaned and being effective to channel dirt-laden air into the dust container, rotary brush means mounted in said air conduit, said brush being effective to loosen dirt from a surface being cleaned, means including a member mounted on the cleaner and having an opening therethrough providing communication of said dust container with the exterior of the cleaner and constituting a parallel flow path with the path through said air conduit, said member being provided with a circumferential slot delineated by a pair of flexible walls, a substantially flat member adapted for pivotal movement into and out of said opening through said circumferential slot for varying the effective area of said opening to thereby vary the quantity of air flowing through said air conduit, means for pivotally mounting said substantially flat member intermediate said flexible walls, said substantially flat member having a thickness slightly greater than the spacing between said slot defining walls whereby said walls frictionally engage said flat member for retention thereof in a predetermined position.

2. Structure as specified in claim **1**, wherein said flat member is provided with indicia adjacent its peripheral edge and one of said walls has a top edge serving as an index cooperating with said indicia for indicating the type of surface to be cleaned.

3. Structure as specified in claim **2**, wherein said slot is circumferentially continuous with respect to said opening.

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