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AIRFLOW CONTROL FOR VACUUM CLEANER

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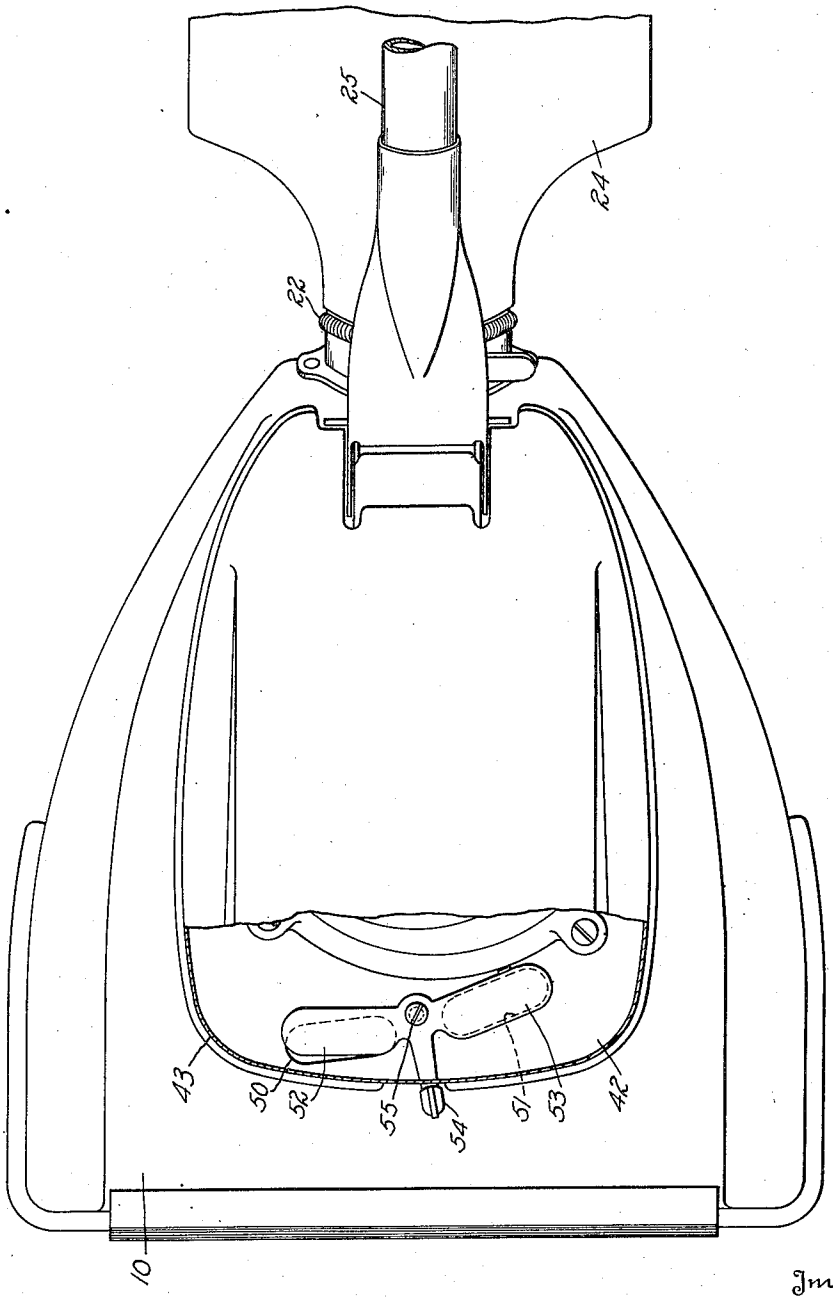


Fig. 1

Inventor
OSCAR M. ANDERSON
By Lindsey & Lindsey.
Attorneys

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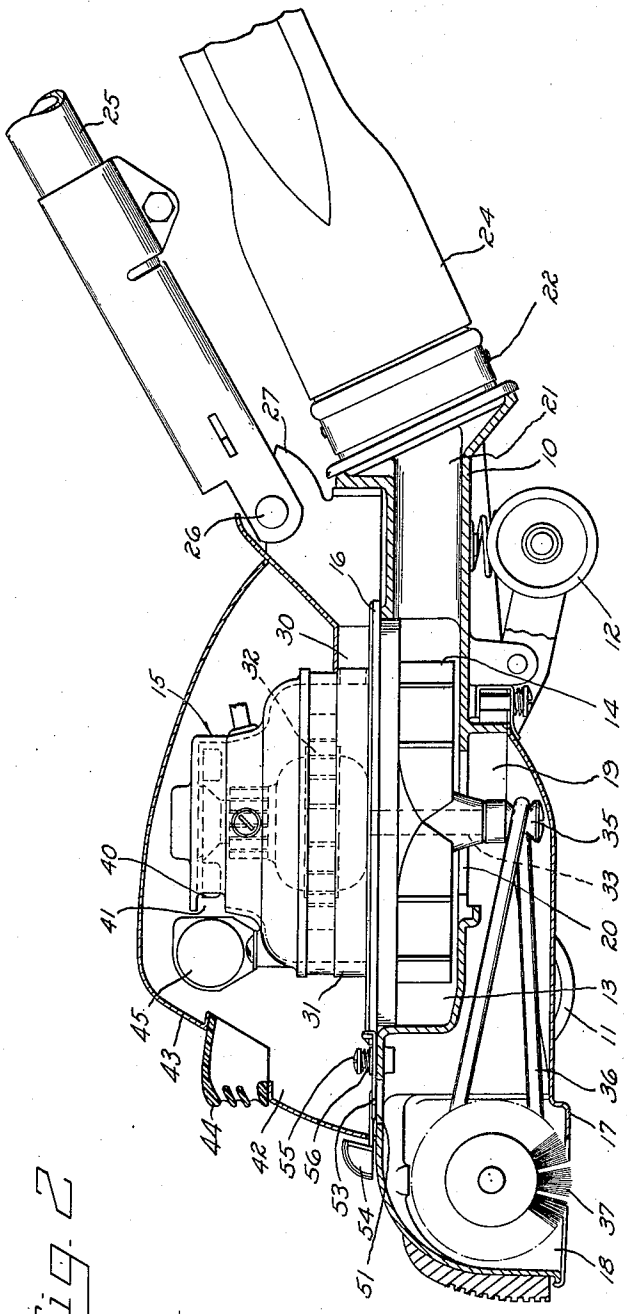


Fig. 2

Inventor
OSCAR M. ANDERSON
By W. Clay Lindsey.
Attorneys

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AIR-FLOW CONTROL FOR VACUUM CLEANERS

Oscar M. Anderson, New Britain, Conn., assignor to Landers, Frary & Clark, New Britain, Conn., a corporation of Connecticut

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4 Claims. (Cl. 15—375)

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This invention relates to vacuum cleaners particularly for household use and so constructed as to be movable by a handle under relatively low pieces of furniture. This type of cleaner comprises, in general, a base supported by wheels close to the floor and providing a suction nozzle in which there is mounted a rotary brush, belt driven by a vertical shaft of an electric motor supported upon the base and driving a suction fan in a suction chamber within the base and connected with the nozzle and with a dust collector bag. The motor is protected by a cover of ornamental design.

An object of the present invention is to make possible the use of an electric motor of such low construction that the cleaner will pass under articles of furniture having relatively small clearance above the floor. This object is accomplished by the provision of manually controlled means for reducing the nozzle suction of the vacuum fan when the use of the cleaner requires very substantial increase in the power consumed by the brush, and for increasing, at the same time, the movement of heated air away from the electric motor so as to improve the cooling thereof. Therefore, when the increase of brush load on the motor is the consequence of application of the cleaner to a thick pile carpet or rug, overheating of the motor can be prevented by reducing the nozzle suction and by improving the cooling of the motor without, at the same time, materially reducing the ability of the cleaner to remove the loosened foreign matter by suction.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings—

Figure 1 is a plan view of a vacuum cleaner embodying the present invention, a portion of the motor cover being broken away; and

Fig. 2 is a longitudinal sectional view of the cleaner.

The vacuum cleaner comprises a base or carriage 10 supported above the floor by a pair of side wheels 11 and a rear wheel 12 and providing a housing or suction chamber 13 for a suction fan 14 driven by an electric motor 15 supported on a plate 16 closing the upper side of the housing 13. The base 10 together with a quick detachable bottom cover plate 17 provides a suction nozzle 18 connected by a passage 19 with the central opening 20 leading to the suction chamber 13. The outlet 21 leads through a quick detachable coupling 22 to a dust collector bag 24 the upper end of which is attached in any suitable manner, not shown, to the handle 25 pivotally connected at 26 with a bracket 27 attached to the base 10.

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Bracket 27 is of hollow construction and provides a conduit for the entrance of air at 30 into the lower portion of the field frame and housing 31 of the motor 15 which encloses an armature 32 and field windings, not shown. Armature 32 is carried by a shaft 33 supported in bearings provided by the housing 31 and the plate 16. Shaft 33 extends below the plate 16 and carries the fan 14 and provides a small pulley 35 connected by a belt 36 with a rotary brush 37 supported in the nozzle 18.

The upper end of shaft 33 supports and drives a motor cooling fan 40 which draws air through the housing 31 and expels heated air through a side opening 41 of the housing and into a chamber 42 within an ornamental cover 43. Cover 43 supports a front louver piece 44 through which air may pass and also by which rays from an incandescent lamp 45 are directed obliquely upon the floor in order to illuminate dark places on the floor, particularly under furniture which the cleaner can reach by reason of its low construction.

While the cover 43 has utility in providing for the protection of the lamp 45 and the motor 15 and in providing for the attractive appearance of the cleaner, it has the tendency of confining the heated air expelled by the motor fan 40. It has been found advantageous to make use of the suction fan 14 to withdraw heated air from the chamber 42. For this purpose as well as another purpose to be described, the bottom wall of the chamber 42, provided by the top wall of the base 10, has two elongated openings 50 and 51 controlled, respectively, by plates 52 and 53 integral with a control lever 54 accessible from the exterior and pivoted about a screw 55 threaded

into the base 10 and confining under its head a hold-down spring 56. In the normal position of the lever 54, shown in Fig. 1, the plate 53 covers the opening 51 and the plate 52 nearly covers the opening 50. Thus, the chamber 42 is connected at least to a limited degree with the suction passage 19.

When lever 54 is located as shown in Fig. 1, the cleaner is conditioned for use on carpets having relatively short pile requiring that the rotary brush 37 consume a moderate amount of power of the electric motor. When the cleaner is used on carpets and rugs of thicker and longer pile, the power consumed by the brush is materially increased. In order to avoid overheating the motor, the lever 54 should be moved clockwise from the position shown in Fig. 1, to open the apertures 50 and 51. Such movement of the lever 54 accomplishes two purposes, namely, (1) reduction in the nozzle suction of the suction fan 14 by increasing the venting of the suction duct 19, thus bypassing the nozzle 18, and (2) increase in the movement of air from the chamber 42 whereby the cooling of the motor is increased. It will be seen that by varying the position of plates 52 and 53, the effective opening of openings 50 and 51 can be varied as desired.

The lever 54 provides for conditioning the cleaner for various kinds of service from the easiest, when the cleaner is used on a relatively smooth floor covering when the brushing effort is the minimum and the vacuum action can be the maximum, to the most difficult, when the brushing effort is the maximum and the vacuum effect can be reduced without materially affecting the ability of the cleaner to pick up foreign material and transfer it to the dust bag. In any kind of service, the motor is being cooled sufficiently to prevent overheating. This makes possible the use of a relatively small motor which can be operated safely for an indefinite period even when the service requires full load operation of the motor. Consequently, the cleaner can be built relatively low so as to pass easily under most of the furniture.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. A suction cleaner comprising a base supported for movement upon a floor and providing a suction chamber, a suction nozzle having a dust receiving opening, a suction duct connecting the nozzle with the suction chamber and a suction chamber outlet connectible with a dust collector, a suction fan in the suction chamber, a rotary brush in the nozzle cooperating with said dust receiving opening, an electric motor operatively connected with the fan and brush having a housing supported by the base, a cover for the motor and housing resting on the base and providing an air chamber about the motor and housing, means forming an air inlet passageway to the motor housing from the exterior of the cover, means forming an air outlet passageway from the housing to the said air chamber, means defining an air passageway between the suction duct and said air chamber, said last named passageway communicating with the suction duct at a point spaced from the dust receiving opening, movable means for varying the effective opening of the last named passageway, and a manually operable handle for moving the movable means extending exteriorly of the cover and base.

2. A suction cleaner comprising a base supported for movement upon a floor and providing a suction chamber, a suction nozzle, a suction duct connecting the nozzle with the suction chamber, and a suction chamber outlet connectible with a dust collector, a suction fan in the suction chamber, a rotary brush in the nozzle, an electric motor operatively connected with the fan and brush having a housing supported by the base, a cover defining a space about said motor and housing and resting on said base, means forming an air inlet passageway between the housing and the exterior of the cover, and an air outlet passageway between the housing and the space within the cover, two apertures in the top wall of said base forwardly of the motor housing and forming connections between the space within the cover and the suction duct, and a plate pivotally mounted on the base between the apertures and providing valves for varying the effective opening of said apertures, said plate having an operating arm extending forwardly through a notch in the cover.

3. A suction cleaner comprising a base supported for movement upon a floor and providing a suction chamber, a suction nozzle, a suction duct connecting the nozzle with the suction chamber and a suction chamber outlet connectible with a dust collector, a suction fan in the suction chamber, a rotary brush in the nozzle, an electric motor operatively connected with the fan and brush having a housing supported by the base, a cover for the motor and housing resting on the base and providing an air chamber surrounding the motor and housing, means for admitting ambient air to said chamber through the motor housing, a passage between the last mentioned chamber and the suction duct, a valve for controlling said passage, a member accessible from the exterior for operating the valve, and means limiting movement of the valve between a position in which the passage is at least partially open to a position in which the passage is substantially fully open.

4. A suction cleaner comprising a base supported for movement upon a floor and providing a suction chamber, a suction nozzle, a suction duct connecting the nozzle with the suction chamber and a suction chamber outlet connectible with a dust collector, a suction fan in the suction chamber, a rotary brush in the nozzle, an electric motor operatively connected with the fan and brush having a housing supported by the base, a cover for the motor and housing resting on the base and providing an air chamber surrounding the motor and housing, means forming an air inlet passageway between the motor housing and the exterior of the cover, and an air outlet passageway between the housing and said air chamber, a cooling fan driven by the motor for causing air to circulate through the housing of the motor and to be discharged into the chamber from the motor housing, two elongated apertures in the top wall of the base and providing connection between the last mentioned chamber and the suction duct, a plate

pivotally mounted on the base between the apertures and providing valves movable to vary the effective opening of said apertures and providing a plate-operating lever which extends to the exterior through a notch in the cover, said notch being of such width that movement of the plate is limited between a position in which both apertures are substantially wide open and a position in which one aperture is closed and the other is partly open.

OSCAR M. ANDERSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
562,908	Nowlen	June 30, 1896
1,209,721	Kirby	Dec. 26, 1916
1,260,282	Harrold	Mar. 19, 1918
2,064,344	Good	Dec. 15, 1936
2,126,383	Grothe	Aug. 9, 1938
2,221,746	Kirby	Nov. 12, 1940
2,244,165	MacFarland	June 3, 1941