

[54] VACUUM CLEANER

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[21] Appl. No.: 38,805

[52] U.S. Cl. 15/359

[51] Int. Cl. A47I 5/34

[58] Field of Search 15/359, 354, 360, 358, 15/333, 361

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[57]

ABSTRACT

A vacuum cleaner comprising a carriage with wheel supports, a motor driven suction unit on the carriage having a motor shaft that is generally horizontal and transverse to the carriage, a nozzle unit mounted on and enclosing the carriage including the wheels and having a brush contacting front end with the nozzle unit being rockable or pivotable for cleaning contact with the floor and spring means normally urging the nozzle unit brush in the downward direction to provide a floating type nozzle for an upright vacuum cleaner which automatically adjusts to different heights of carpet to retain the brush contacting front end of the vacuum cleaner in proper cleaning relation to carpeting on the floor.

4 Claims, 6 Drawing Figures

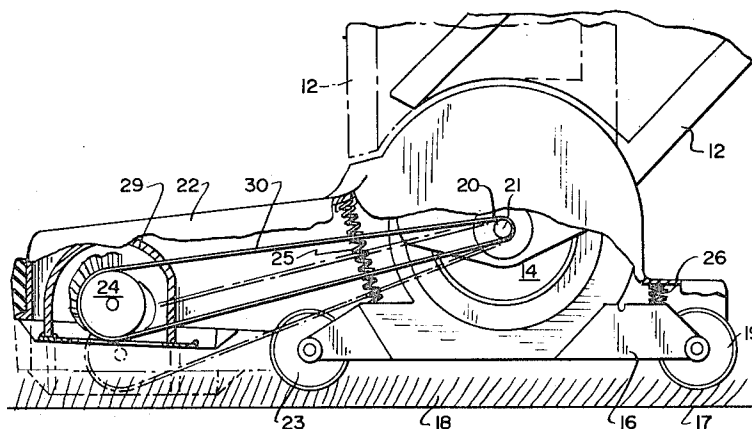


FIG. 2

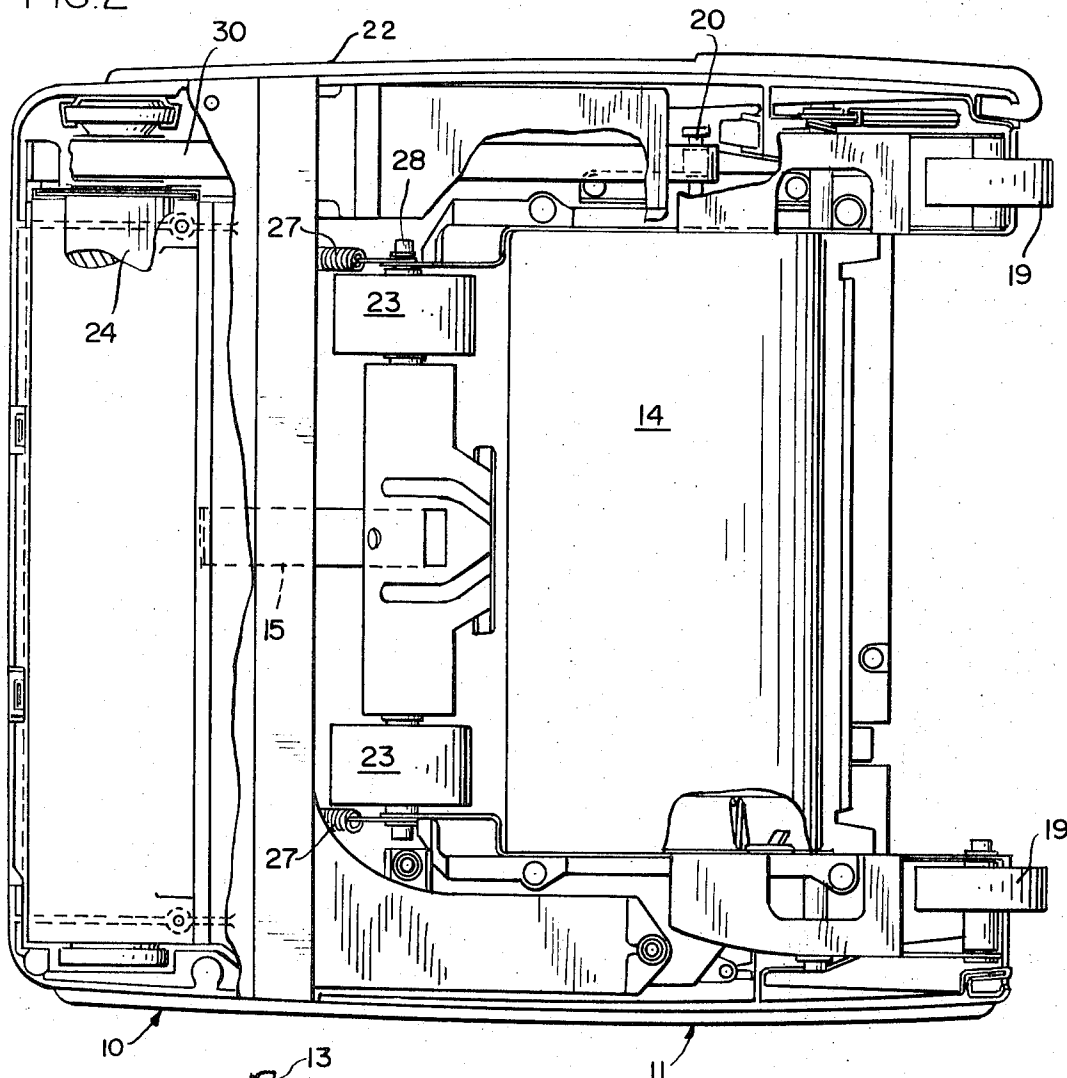


FIG. 1

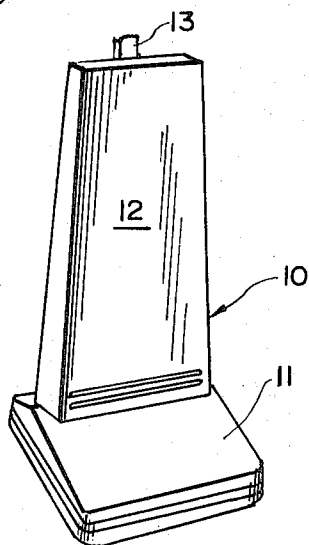
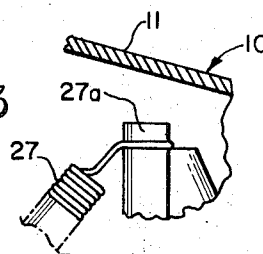


FIG. 3



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FIG. 4

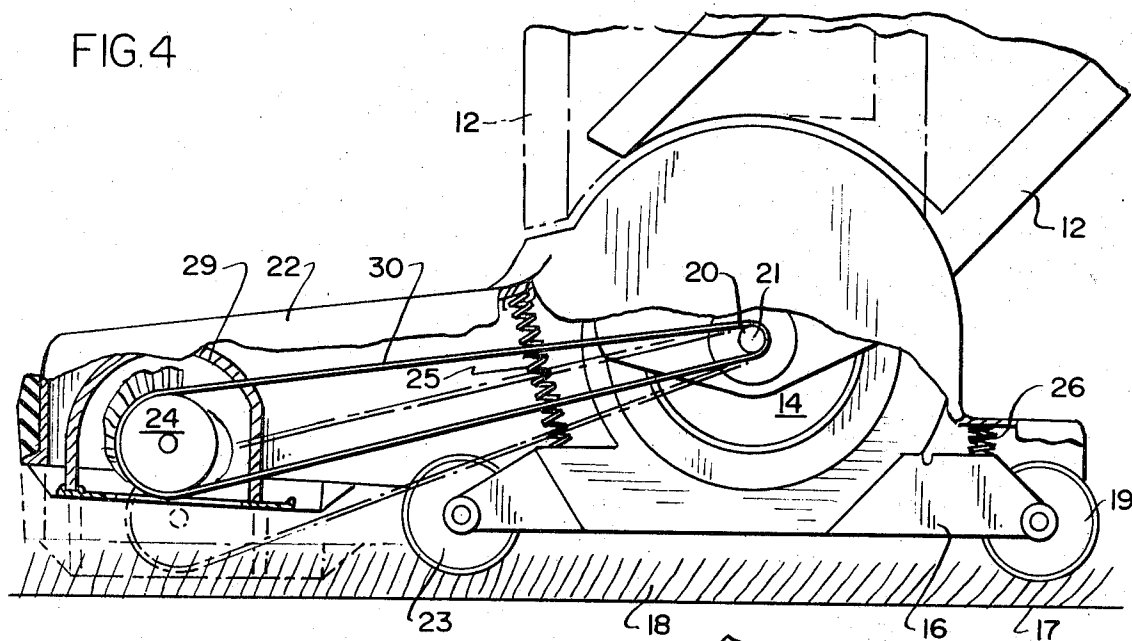


FIG. 5

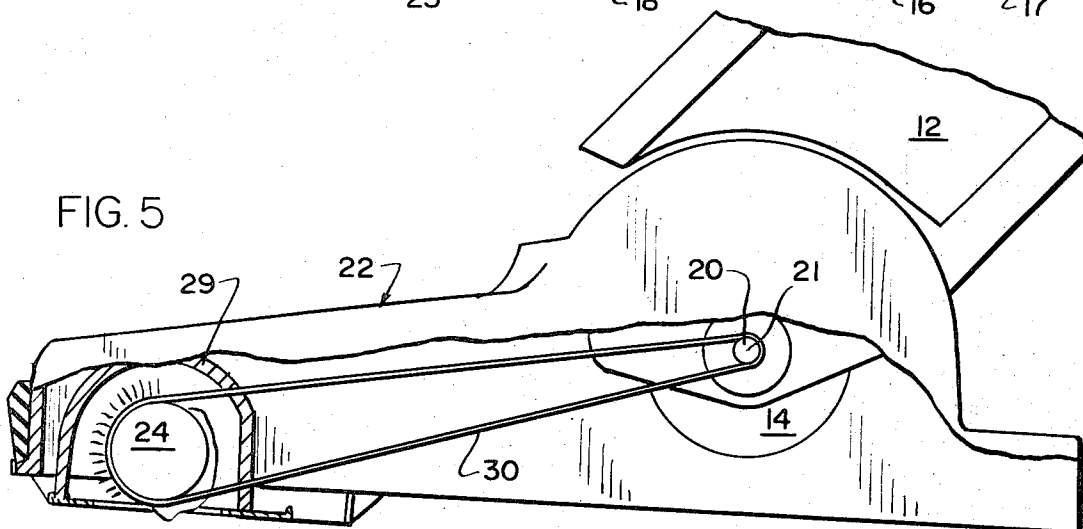
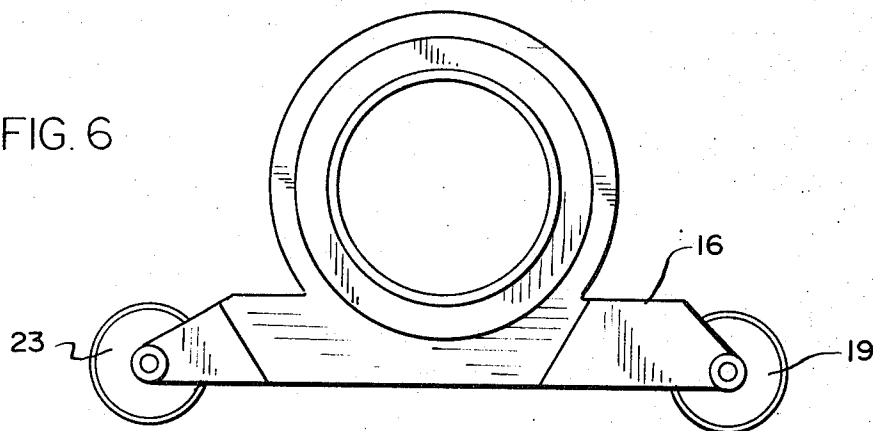


FIG. 6



VACUUM CLEANER

CROSS REFERENCES

Copending applications assigned to the same assignee as the present application disclose and claim features that are illustrated herein. These are as follows.

Erwin E. Nordeen, application Ser. No. 38,803, filed May 19, 1970, now Pat. No. 3,675,268, (PA-3355) discloses and claims the rigid bag housing and motor-fan suction unit which are rotatable together about the axis defined by the motor shaft.

Erwin E. Nordeen application Ser. No. 38,804, filed May 19, 1970 now Pat. No. 3,676,892, (PA-3358) discloses and claims the lifting device illustrated partially in the present application.

One of the features of this invention is to provide an upright vacuum cleaner comprising a carriage that is movable over a floor during cleaning and supported on spaced wheels both longitudinally and laterally of the carriage, a rockably mounted nozzle unit having a brush containing front end mounted on the carriage so as to be rockable for cleaning contact with the floor and with the nozzle unit enclosing substantially the entire carriage including the supporting wheels and spring means normally urging the nozzle unit to provide a floating type nozzle for an upright vacuum cleaner which automatically adjusts to different heights of carpet for proper cleaning contact of the nozzle unit at the front end thereof with the floor.

Other features and advantages of the invention will be apparent in the following description of certain embodiments thereof as illustrated in the accompanying drawings. Of the drawings:

FIG. 1 is a perspective view partially broken away of a vacuum cleaner embodying the invention.

FIG. 2 is an enlarged bottom elevational view of the cleaner of FIG. 1.

FIG. 3 is a fragmentary elevational view partially in section illustrating an internal portion of the vacuum cleaner of FIG. 1.

FIG. 4 is a side elevational view partially broken away of another embodiment of the invention illustrated in simplified form.

FIG. 5 is a view similar to FIG. 4 but illustrating the structure without the supporting carriage.

FIG. 6 is a side elevational view of the carriage of the embodiment of FIG. 4.

As illustrated in the drawings the vacuum cleaner 10 comprises a floor contacting nozzle 11, a rigid filter bag containing housing 12 and a propelling handle 13 attached to the housing at the rear thereof.

As is illustrated more completely in the abovementioned copending application Serial No. 38,803 (3355) the bag housing 12 is attached to a motor-fan suction unit 14 so that the assembly is rotatable about a horizontal axis from an operating position to a storage position when the cleaner is also operable for off-the-floor cleaning. A nozzle lift spring 15 is illustrated in FIG. 2 and this portion of the cleaner is described more fully and claimed in the above noted copending application No. 38,804 (3358).

The cleaner, as illustrated in the embodiment of FIGS. 4-6, comprises a carriage 16 that is movable longitudinally or from right to left, as viewed in FIG. 4, over a floor 17 during the cleaning thereof particularly

during the cleaning of a rug 18 on the floor. The carriage includes wheel support means illustrated herein as a pair of forward wheels 23 and a pair of rear wheels 19 that support the carriage both longitudinally and laterally by supporting the four corners of the carriage.

As explained above, the carriage has mounted thereon the motor driven suction unit 14 that includes a motor shaft 20 transverse to the carriage with the shaft being rotatable about its central axis 21 during operation of the cleaner. The cleaner also includes a nozzle unit 22 which with the associated suction unit 14 and bag housing 12 is illustrated in FIGS. 4 and 5. This nozzle unit is rockably or pivotally mounted on the carriage 16 about an axis which coincides with the motor shaft axis 21. The rocking of the nozzle unit relative to the floor 17 brings it into cleaning contact with the floor so that the nozzle is selfcompensating for floor coverings of varying thicknesses.

As illustrated in FIGS. 2 and 4, the nozzle unit 11 of FIG. 2 and the nozzle unit 22 of FIG. 4 substantially enclose the wheel support means 19 and 23 and thus the carriage 16. In the FIG. 4 embodiment in order to urge the nozzle unit 22 against the floor covering being cleaned at the forward end which contains a rotatable brush 24 there is connected between the front end of the carriage 16 and the adjacent portion of the nozzle unit 22 a tension spring 25 that urges the nozzle unit in a counterclockwise direction about the axis 21 as viewed in FIG. 4. If desired, there may also be provided either in conjunction with or as a substitute for the spring 25 a compression spring 26 between the rear of the carriage 16 and the rear of the nozzle unit 22.

In the embodiment illustrated in FIG. 2, there is provided a pair of tension springs 27 on opposite sides of the cleaner. In this embodiment the wheels 23 are mounted on an axle 28 and the pair of springs 27 are connected at end portions thereof from the ends of this axle beyond the corresponding wheels 23 to the nozzle unit 11 by connecting the opposite ends of the springs 27, respectively, to two bosses 27a located on the vacuum cleaner intake tube (not shown) which is attached to the nozzle unit 11. FIG. 3 illustrates the connection of one of the springs 27 to one of the bosses 27a located on the vacuum cleaner intake tube (not shown) which is attached to nozzle unit 11.

In both embodiments the floor contacting brush 24 which is contained with a front housing 29 that is open at the bottom is driven from the motor shaft 20 by an endless belt 30 in the customary manner.

In the embodiment of FIG. 2 the brush containing nozzle unit 11 is substantially the same as the unit 22 in FIGS. 4 and 5 but differs therefrom in certain minor details, certain of which have been noted.

The nozzle units of both embodiments of the invention have many elements in common some of which have been noted such as the brush drive motor unit illustrated by the belt 30 extending between the motor shaft 20 and the brush 24.

Having described our invention as related to the embodiments shown in the accompanying drawings, it is our intention that the invention be not limited by any of the details of description, unless otherwise specified.

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

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1. A vacuum cleaner comprising: a carriage movable longitudinally over a floor during cleaning thereof; wheel support means for supporting said carriage; a motor driven suction unit on said carriage having a motor shaft extending generally axially horizontally and transversely to the carriage, the shaft being rotatable about its longitudinal axis, said wheel support means including an axle extending parallel to and forwardly of said motor shaft and having a pair of wheels of said wheel support means rotatable thereon; a nozzle unit rockably mounted on said carriage having a brush containing front end rockable on said carriage in a downward direction for cleaning contact with the floor, said nozzle unit substantially enclosing said wheel support means; and a pair of parallel tension springs connected between the opposite ends of said axle outwardly of said wheels on said axle and said nozzle unit urging said nozzle unit in said downward direction.

2. A vacuum cleaner comprising: a carriage movable longitudinally over a floor during cleaning thereof; wheel support means for supporting said carriage both longitudinally and laterally and including a pair of forward wheels; a motor driven suction unit on said carriage having a motor shaft generally horizontal and transverse to the carriage, the shaft being rotatable

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about its central axis, said axis being disposed rearwardly of said forward wheels; a nozzle unit rockably mounted on said carriage having a brush containing front end rockable on said carriage in a downward direction for cleaning contact with the floor, said nozzle unit substantially enclosing said wheel support means; and spring means urging said nozzle unit in said downward direction comprising a tension spring having an upper end connected to the nozzle forwardly of said motor shaft and extending downwardly therefrom intermediate said motor shaft and said nozzle front end, and an opposite, lower end connected to the carriage rearwardly of said forward wheels and forwardly of said shaft axis.

3. The vacuum cleaner of claim 2 wherein said lower end of the spring is connected to said carriage rearwardly of the connection of said upper end to said nozzle.

4. The vacuum cleaner of claim 2 further including a compression spring extending between said nozzle and said carriage rearwardly of said motor shaft below the level of said motor shaft and above the level of said wheel support means.

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