

[54] **VACUUM CLEANER WITH MOVABLE HANDLE STRUCTURE**

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306/16; 287/14

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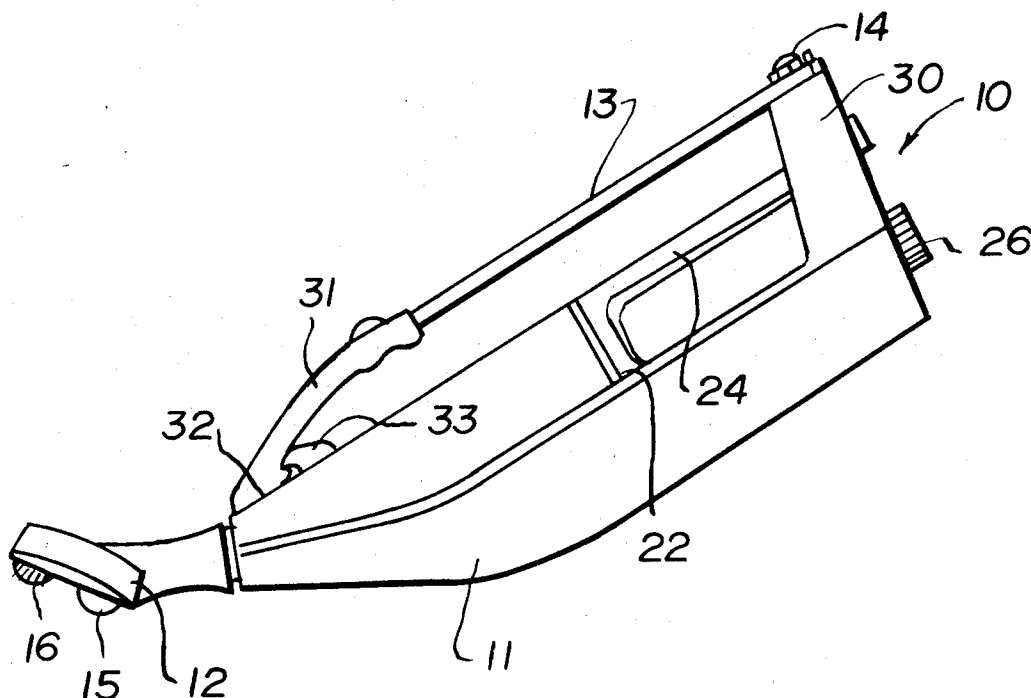
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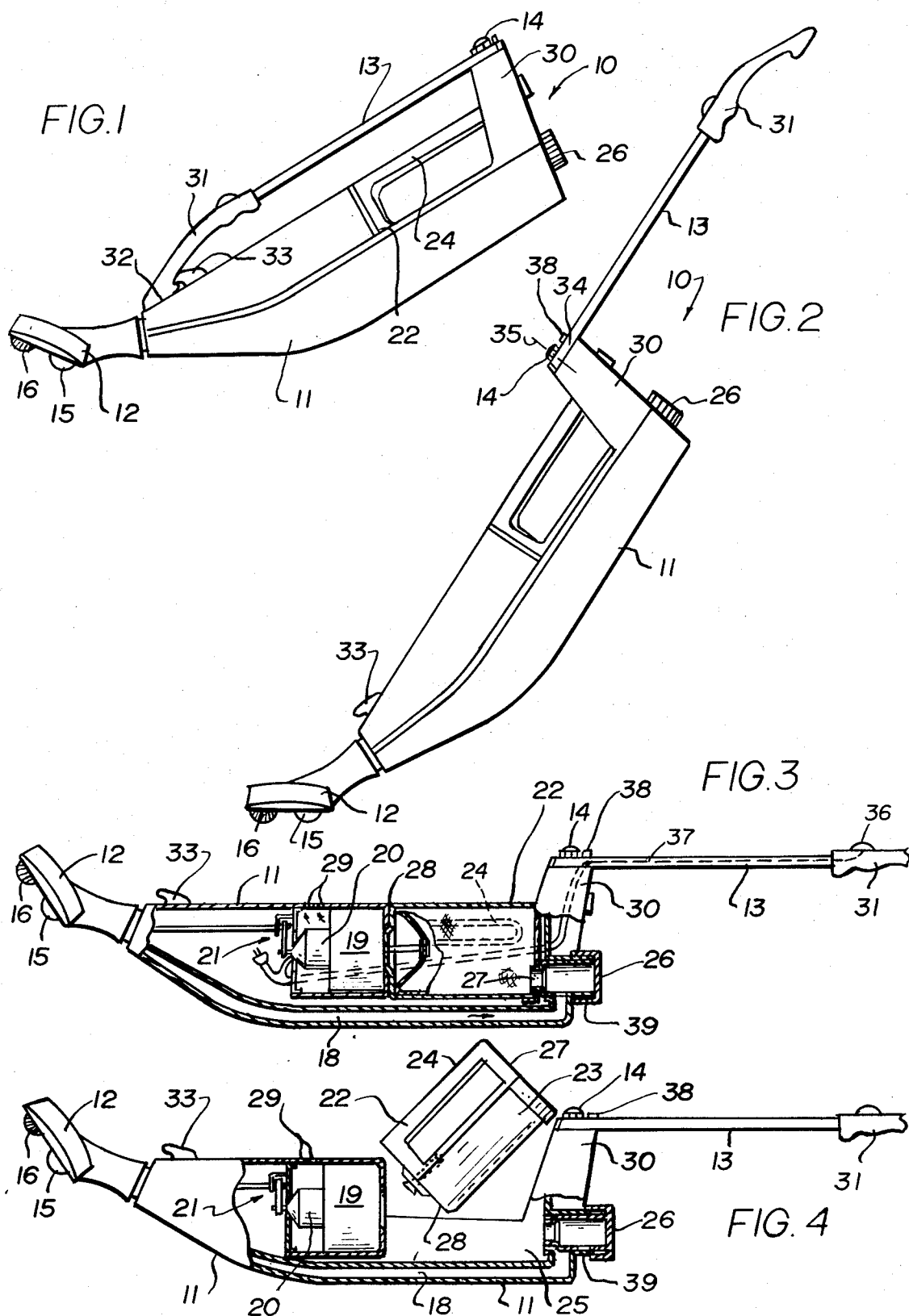
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ABSTRACT

A vacuum cleaner having a handle movably carried on the body for selectively arranging the vacuum cleaner as a floor carried, upright vacuum cleaner, or a portable hand-carried vacuum cleaner. The vacuum cleaner includes a removable dirt box which underlies the handle when the vacuum cleaner is arranged as a portable hand-carried unit.

13 Claims, 4 Drawing Figures





VACUUM CLEANER WITH MOVABLE HANDLE STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to vacuum cleaners and in particular to vacuum cleaners provided with a handle for manipulation of the vacuum cleaner in a cleaning operation.

2. Description of the Prior Art

The conventional upright vacuum cleaner is provided with a handle extending upwardly from the body of the unit for manipulation by the user in moving the vacuum cleaner along the floor to be cleaned, the lower end of the vacuum cleaner being conventionally provided with roller mounted nozzle means. Recently, small portable vacuum cleaners adapted to be hand carried have been developed such as for use in cleaning furniture, draperies, etc. A number of different forms of such vacuum cleaners have been developed wherein different handle structures are provided for use in converting the unit from one to the other of such floor type and hand held type units. Illustrative of such vacuum cleaner structures are the structures shown in U.S. Pat. Nos. to Kirby 1,156,235; Riebel, Jr. 1,884,871; and Foss 2,219,810 and 2,230,077.

SUMMARY OF THE INVENTION

The present invention comprehends an improved vacuum cleaner structure arranged to selectively define a floor carried upright vacuum cleaner unit or a hand carried portable vacuum cleaner unit as desired. The vacuum cleaner structure of the present invention is extremely simple and economical of construction while providing this highly desirable functional feature.

More specifically, the invention comprehends providing a vacuum cleaner having a body, nozzle means, and air flow means, and means for selectively converting the vacuum cleaner from a floor operated vacuum cleaner to a hand held vacuum cleaner including a handle, and means movably connecting the handle to the vacuum cleaner body for selective positioning in a first disposition adjacent the body for manipulating the vacuum cleaner in a hand carried operation and in a second disposition extending away from the body for manipulating the vacuum cleaner in an upright floor carried operation.

The invention further comprehends providing in such a vacuum cleaner, a dirt box which is removably carried by the body subjacent the movable handle when the handle is arranged in the first disposition to define the hand carried unit. The dirt box may be provided with a separate handle for facilitated manipulation thereof independently of the other vacuum cleaner structure. Removal of the dirt box is permitted by movement of the main handle from the overlying relationship herewith when desired.

The vacuum cleaner handle may be pivotally mounted on the body and means may be provided for limiting the pivotal movement to the desired preselected dispositions.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing wherein:

FIG. 1 is a side elevation of a vacuum cleaner structure embodying the invention arranged as a portable hand carried vacuum cleaner;

FIG. 2 is a side elevation of a vacuum cleaner structure embodying the invention arranged as a floor mounted upright vacuum cleaner;

FIG. 3 is a longitudinal section thereof; and

FIG. 4 is a longitudinal section illustrating the removal of the dirt box.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the exemplary embodiment of the invention as disclosed in the drawing, a vacuum cleaner generally designated 10 is shown to comprise a body 11 provided at one end with a nozzle 12 and having movably carried thereon a handle 13 for use in manipulating the vacuum cleaner in the vacuum cleaning operation. The handle is movably connected to the body 11 by a connector 14 so as to be selectively disposed in a first, retracted disposition, as shown in FIG. 1, wherein the vacuum cleaner defines a portable hand carried vacuum cleaner, or in a second, extended disposition wherein the handle is arranged for manipulation by the user with the vacuum cleaner operating as a conventional upright floor carried vacuum cleaner, as shown in FIG. 2.

Nozzle 12 may comprise a conventional nozzle having wheels 15 for movably supporting the vacuum cleaner on a subjacent floor surface. The nozzle may further be provided with a conventional rotating brush 16 for facilitating dirt and the like in the vacuum cleaning operation.

Dirt is picked up by the nozzle through a suction inlet 17, air being drawn through the suction inlet through a duct 18 provided in body 11, by means of a fan 19 driven by a suitable electric motor 20. The motor may further drive a mechanism 21 for rotating brush 16, as shown in FIG. 3.

Air is delivered from duct 18 to fan 19 to a dirt box 22 wherein the dirt entrained in the air is deposited, permitting the filtered air to be expelled from the vacuum cleaner back to the ambient atmosphere by the fan 19. Dirt box 22 is separable from body 11, as shown in FIG. 4, for facilitated disposition of the collected dirt. The dirt box includes a housing portion 23 provided with an upper handle 24 for facilitating the removal and installation of the dirt box in a suitable cradle 25 provided in the body 11. Duct 18 is provided at its distal end with a connector 26 which is adapted to align with an opening 27 in one end of the dirt box 22 when the dirt box is installed in cradle 25, as shown in FIG. 3. The opposite end 28 of the dirt box is made pervious to air flow permitting the fan 19 to draw the air through the dirt box and discharge it through suitable openings 29 provided in the body after the air flows over the fan motor 20 to cool the fan. As shown in FIG. 3, the dirt box has a snug fit in the cradle 25 to provide a substantially airtight connection between duct connector 26 and the fan 19.

As shown in FIG. 1, the handle 24 of the dirt box 22 is disposed subjacent handle 13 when the handle 13 is disposed in the first, retracted position wherein the vacuum cleaner is arranged to define a hand held portable vacuum cleaner. The handle 13 is connected to body 11 by an upstanding support 30 at the rear end of body 11 so as to space the handle 13 superjacent the handle

24 of the dirt box. The distal end of handle 13 may comprise a grasping member 31 which, as shown in FIG. 1, is adapted to abut a surface portion 32 of the body 11 in the retracted disposition of the handle thereby to provide a stable handle carrying means for the vacuum cleaner when thus arranged as a portable hand held cleaner. The body may be provided with a latching element 33 for positively releasably retaining the handle in the retracted disposition.

Connector 14 herein comprises a pivotal connector adapted to mount the end 34 of handle 13 for pivotal movement about an axis 35 perpendicular to the longitudinal extend of handle 13. Thus, the handle is swingable on pivot 14 from the retracted position of FIG. 1 to the extended position of FIG. 2 wherein the grasping member 31 is outermost and spaced substantially from body 11 to provide for facilitated use of the vacuum cleaner as a floor carried upright unit. In such use, the nozzle 12 of the vacuum cleaner is disposed to ride on the subjacent floor surface to pick up dirt, etc. from the floor surface, in the normal upright vacuum cleaning operation.

Control of the operation of motor 20 may be by means of an electrical switch 36 carried on handle 13 adjacent grasping portion 31 and wires 37 may be brought to switch 37 between the pivotally connected end 34 of the handle and body 11, as shown in FIG. 3. A mechanical stop 38 may be provided on body 11 for limiting the pivotal movement of the handle to no more than approximately 180° from the retracted position of FIG. 1 to automatically dispose the handle 13 in the extended position of FIG. 2 and effectively preclude overtensing of the wires 37 at the extension thereof between handle 13 and body support 30.

When it is desired to remove dirt box 22, the user merely swings handle 13 to the extended disposition, clearing the space overlying the dirt box in cradle 25. The connector 26 may then be unthreaded through body portion 39 to the retracted disposition of FIG. 4, permitting the dirt box to be lifted out of the cradle 25 for suitable maintenance and replacement in the cradle. Connector 26 is then threaded back into engagement with the dirt box as discussed above.

The invention has been illustrated in connection with the use of a nozzle 12. Other suitable nozzles may be attached to the lower end of duct 18 as is conventional in the vacuum cleaner art. Thus, for example, in using the vacuum cleaner as a portable unit for cleaning draperies and the like, a suitable modified form of nozzle (not shown) may be utilized as desired.

The ability of handle 13 to be disposed selectively in the retracted position further permits facilitated storage of the vacuum cleaner by reducing the overall length to substantially one-half the extended length, as the handle 13 may have a length substantially equal to the length of body 11.

The vacuum cleaner construction is extremely simple and economical, the various elements of the vacuum cleaner construction being readily formed as of molded plastic providing further facility in the use of the vacuum cleaner in having relatively light weight. The disposition of fan motor 19,20 substantially at the center of body 11 provides for facilitated balancing of the vacuum cleaner in the hand held arrangement while effectively providing a relatively low center of gravity of the vacuum cleaner in the extended arrangement.

The foregoing disclosure of specific embodiments is illustrative of the broad inventive concepts comprehended by the invention.

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

1. In a vacuum cleaner having a body, nozzle means at one end of the body, and means for effecting suction of air through said nozzle, structure comprising: a dirt box removably carried by said body for receiving air from said nozzle and arranged to remove and collect dirt from the air; and a handle movably mounted on said body for selective retracted disposition overlying said dirt box for manipulating the vacuum cleaner and preventing removal of the dirt box from the body in a hand carried vacuum cleaning operation, and extended disposition for use in manipulating the vacuum cleaner in an upright floor carried vacuum cleaning operation.

2. The vacuum cleaner structure of claim 1 wherein said dirt box includes a handle for manipulation thereof independently of said body handle, said dirt box handle being substantially smaller than said body handle.

3. The vacuum cleaner structure of claim 1 wherein said handle is pivotally connected to said body.

4. The vacuum cleaner structure of claim 1 further including means for limiting the movement of said handle on said body to preselected positions corresponding to said retracted and extended dispositions.

5. The vacuum cleaner structure of claim 1 wherein said suction means includes an electric motor and said movable handle carries wiring for controlling operation of said motor.

6. The vacuum cleaner structure of claim 1 wherein said suction means includes an electric motor and said movable handle carries wiring for controlling operation of said motor, said structure further including means for limiting the movement of said handle on said body to preselected positions corresponding to said retracted and extended dispositions preventing excessive twisting of said wiring upon movement of said handle relative to said body.

7. The vacuum cleaner structure of claim 1 wherein said suction means is disposed between said nozzle and said dirt box and said body defines means for conducting air from said nozzle to said dirt box for flow from the dirt box to said suction means.

8. The vacuum cleaner structure of claim 1 wherein said handle has a length substantially equal to the length of said body.

9. The vacuum cleaner structure of claim 1 including an upstanding support on said body, said handle being pivotally mounted to said support to be spaced from said body in said retracted disposition.

10. The vacuum cleaner structure of claim 1 including an upstanding support on said body, said handle being pivotally mounted to said support to be spaced from said body in said retracted disposition and means on said body engaged by the distal end of the handle when the handle is in said retracted disposition.

11. In a vacuum cleaner having a body, nozzle means, and air flow means, means for selectively converting the vacuum cleaner from a floor operated vacuum cleaner to a hand held vacuum cleaner comprising: handle means; and means movably connecting said handle to the vacuum cleaner body for selective positioning in a first disposition adjacent said body for manipulating the vacuum cleaner and preventing removal

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of the dirt box from the body in a hand carried operation, and in a second disposition extending away from the body for manipulating the vacuum cleaner in an upright floor carried operation.

12. The vacuum cleaner means of claim 11 wherein said connecting means comprises pivot mounting

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means.

13. The vacuum cleaner means of claim 11 wherein said connecting means comprises pivot mounting means and means for limiting the maximum pivotal movement of said handle about the pivot axis.

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