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MOTOR AND FAN UNIT MOUNTING FOR VACUUM CLEANERS

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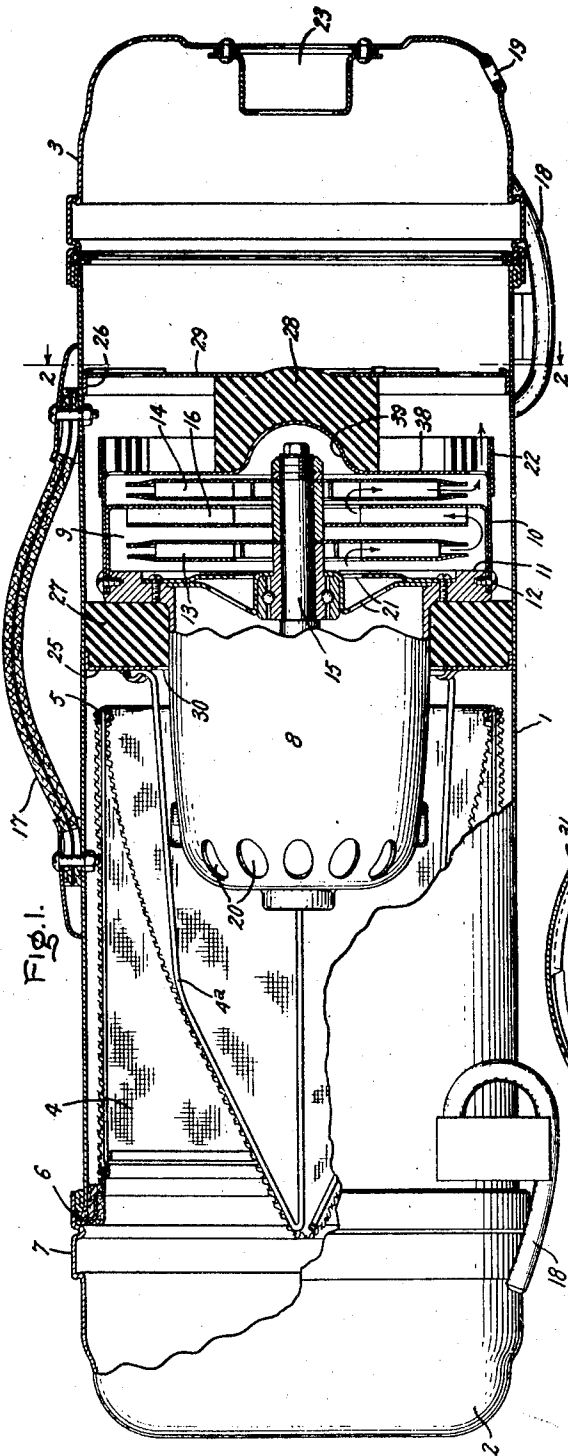


Fig. 1.

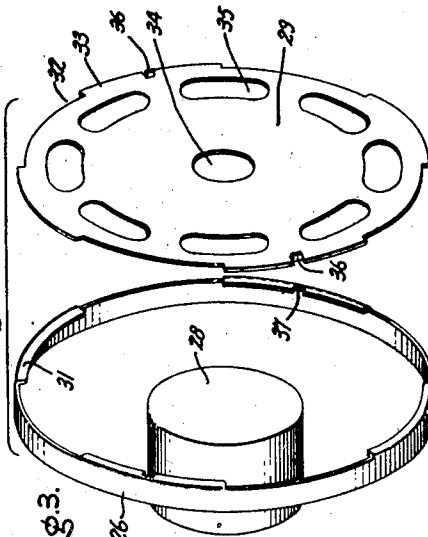


Fig. 3.

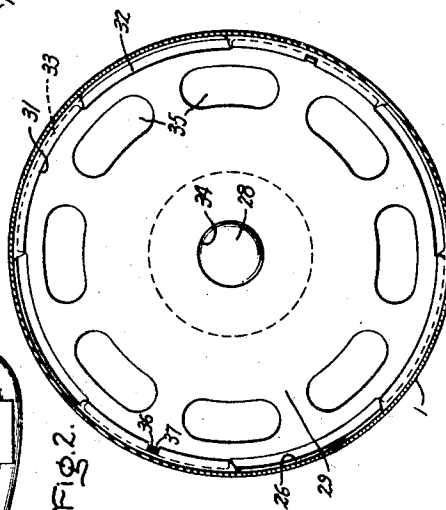


Fig. 2.

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MOTOR AND FAN UNIT MOUNTING FOR
VACUUM CLEANERS

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The present invention relates to vacuum cleaners and especially to vacuum cleaners of the tank type although it is not limited thereof necessarily.

The object of the invention is to provide an improved mounting and holding means for a motor and fan unit of a vacuum cleaner which is simple in construction, enables the unit to be quickly and easily installed in and removed from the vacuum cleaner casing, and can be provided at low cost.

For a consideration of what I believe to be novel and my invention, attention is directed to the following specification and to the claims appended thereto.

In the drawing Fig. 1 is a side elevation, mostly in section, of a tank type vacuum cleaner embodying my invention; Fig. 2 is a sectional view taken on line 2—2, Fig. 1; and Fig. 3 is an exploded perspective view of a locking flange shown in Fig. 2, a disk which locks with it, and a resilient mounting plug.

Referring to the drawing 1 indicates the outer casing of a vacuum cleaner, 2 the cap at the air inlet end of the cleaner and 3 the cap at its exit end. The cap ends are detachably connected to casing 1 by suitable means (not shown) so they may be readily removed. At the air inlet end of the cleaner is an assembly comprising a dust bag 4, an inner wire bag frame 4a and an outer wire bag frame 5. It is held in the casing by an out-turned flange 6 on the assembly position between the end of casing 1 and a bead 7 on the end cap. By removing the end cap, the bag and outer bag frame can be removed from casing 1 for emptying the bag. In casing 1 is a motor and fan unit comprising an electric motor 8 and a two stage centrifugal fan 9. The fan casing 10 is attached to a flange 11 at the right hand end of the motor casing by a ring of screws 12. The two air impellers 13 and 14 of the fan are fixed to motor shaft 15. The stationary diffuser 16 which directs the air from the discharge of the first stage to the inlet of the second stage is fixed to the motor casing flange along with the fan casing. A handle for the cleaner is indicated at 17, legs or skids for supporting it are indicated at 18, and the opening through which the motor lead wires (not shown) enters the casing is indicated at 19.

The structure so far described is a known one and is to be taken as typical as any suitable vacuum cleaner construction. Air enters the cleaner through a central opening in inlet end cap 2 and after passing through bag 4 flows through the motor, entering through openings 20

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and leaving through openings 21. The air then passes through the fan as indicated by the arrows, discharging from the fan casing through a muffler 22 attached to the motor casing and thence through discharge opening 23 in end cap 3. Muffler 21 is shown as being of the type disclosed in the patent to Foldes 2,247,121, January 24, 1941.

My invention has to do with an improved construction and arrangement for mounting the motor and fan unit in casing 1 whereby it may be quickly and easily positioned in and removed from the casing and whereby it is isolated from the casing by vibration absorbing means which prevents vibrations of the motor and fan unit being transmitted to the casing.

According to my invention, I provide in casing 1 two spaced apart holding members 25 and 26 fixed to casing 1 by suitable means, such as by welding, and I mount the motor and fan unit between the two holding members through the intermediary of resilient members 27 and 28 at opposite ends of the fan casing held under compression by a detachable locking disk 29 which is locked to member 26.

Holding member 25 is in the form of a casing flange projecting radially inward from casing 1 at a point just beyond the inner end of bag 4. It divides the casing into a bag chamber and a fan chamber. The flange defines an opening 30 through which the body of the motor projects from the fan chamber into the bag chamber. Holding member 26 is in the form of a locking ring attached to the inner surface of casing 1 and having inwardly projecting circumferentially spaced locking flanges 31. In the present instance four flanges 31 are shown. Disk 29 is provided on its periphery with cut-out notches 32 which define four circumferentially spaced projections 33 adapted to engage beneath flanges 31. The circumferential length of projections 33 are less than the distance between returned flanges 31 and the notches 32 are greater than the circumferential length of flanges 31. By this arrangement disk 29 can be passed through ring 26, projections 33 being in line with the spaces between flanges 31 and then turned circumferentially to bring projections 33 behind flanges 31 to lock disk 29 to the ring. At the center of disk 29 is an opening 34 which assists in supporting plug 28. Also in disk 29 are series of openings 35 for the flow of air. For locking disk 29 to ring 26 to prevent circumferential movement, disk 29 is provided with struck-out tongues 36 which engage notches 37 in flanges 31. The outer end

wall 38 of the fan casing is provided with an outwardly projecting bulb 39 embedded in plug 28.

To assemble the motor and fan unit in the casing, resilient member 27 which may be formed from sponge rubber or other suitable resilient substance may be placed around the motor casing in engagement with flange 11, after which the motor and fan unit may be inserted through the open end of the casing (end cap 3 having been removed) to bring member 27 into engagement with flange 25. Or, member 27 may be placed against flange 25 and the motor unit dropped through it. This may be done most advantageously with the casing 1 standing vertically on its other end. Following this the resilient member 28 which may be in the form of a plug formed of sponge rubber or other suitable means (it having normally the contour shown in Fig. 3) is placed against the bulb 39 at the end of the motor casing after which disk 29 is placed against member 28 and forced down against it expanding the member somewhat after the manner shown in Fig. 1 until the disk has passed beyond flanges 31. At this time projections 33 pass between flanges 31, the latter passing through notches 32. The disk is then turned sufficiently to bring flanges 33 behind flanges 31 as shown in Fig. 2 to lock the disk in place. At the same time that resilient member 28 is being compressed by the insertion of disk 29, the resilient member 27 also is compressed. The arrangement is such that when disk 29 is locked in place, the members 27 and 28 are compressed sufficiently to hold the motor and fan assembly firmly in position. In this connection it will be noted that the fan casing is of smaller diameter than casing 1 so that neither the motor casing nor the fan casing is in direct contact with casing 1. Compression of resilient member 27 forces it firmly against casing 1 as well as against flange 25. This serves to hold the motor and fan unit against radial movement. The unit is held against axial movement by the two members 27 and 28, the fan casing being compressed between them. It will thus be seen that the motor and fan unit is resiliently mounted in casing 1 out of contact with it.

To remove the motor and fan unit from the casing, it is necessary merely to remove end cap 3, press inwardly on disk 29, turn it to bring projections 33 out from behind flanges 31 and remove it along with the member 28 from the casing. The motor and fan unit can then be lifted from the casing.

By my invention, I provide a construction wherein the motor and fan unit can be quickly and easily assembled in the casing and removed therefrom without the use of special tools and without the removal of screws or bolts. At the same time, the motor and fan unit is firmly held by resilient mounting out of direct contact with the casing wall whereby vibrations of the unit are not transferred to the casing.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a vacuum cleaner, an outer casing, an inwardly projecting casing flange which divides the casing into a bag chamber and a fan chamber, a motor and fan unit in the casing comprising a motor having a flange and a fan having a casing

connected to such flange, said motor flange and fan casing being of less diameter than said outer casing, said unit being positioned in the outer casing in spaced relation to the outer casing wall with the motor projecting beyond said casing flange into the bag chamber, a resilient ring positioned between said flanges engaging the motor casing and the outer casing to position the unit transversely in the outer casing, a locking flange in the outer casing spaced from the outer end of the fan casing, a locking disk held by said locking flange, and a resilient member held under compression between the end of fan casing and said locking disk for positioning the unit axially between said casing flange and said locking flange.

2. In a vacuum cleaner, an outer casing, an inwardly projecting casing flange which divides the casing into a bag chamber and a fan chamber, a motor and fan unit in the casing comprising a motor having a flange and a fan having a casing connected to such flange, said motor flange and fan casing being of less diameter than said outer casing, said unit being positioned in the outer casing in spaced relation to the outer casing wall with the motor projecting beyond said casing flange into the bag chamber, a resilient ring positioned between said flanges engaging the motor casing and the outer casing to position the unit transversely in the outer casing, a locking ring in the outer casing having a plurality of inwardly projecting circumferentially spaced flanges, a locking disk having a plurality of spaced projections positioned behind said locking flanges, and a resilient member held under compression between the end of the fan casing and said locking disk for positioning the unit axially between said casing flange and said locking flange.

3. In a vacuum cleaner, an outer casing, an inwardly projecting casing flange which divides the casing into a bag chamber and a fan chamber, a motor and fan unit in the casing of less diameter than said casing, said unit being positioned in the casing in spaced relation to the casing wall with the motor projecting beyond said casing flange into the bag chamber, a resilient ring positioned against said casing flange and in engagement with said unit and the outer casing to position the unit transversely in the outer casing, a ring fixed to the outer casing having a plurality of inwardly projecting locking flanges, a locking disk having flanges adapted to be positioned behind said locking flanges by turning movement of the disk, and a resilient member held under compression between the end of said unit and said locking disk for positioning the unit axially between said casing flange and said locking flanges.

4. In a vacuum cleaner, a casing, an inwardly projecting flange fixed to the inner surface of the casing, a locking ring fixed to the inner surface of the casing in axially spaced relation to said flange, said locking ring having locking projections, a locking disk held by said locking projections, a motor and fan unit, and yieldable means held under compression by said locking disk supporting said unit between said flange and said locking ring and disk.

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No references cited