

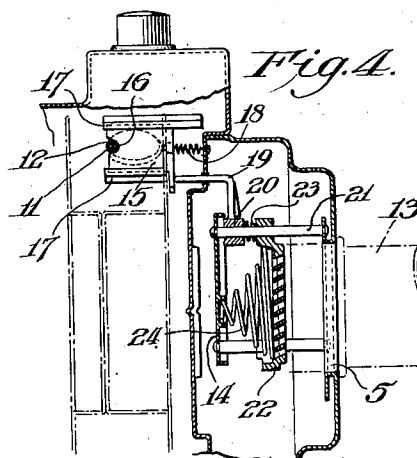
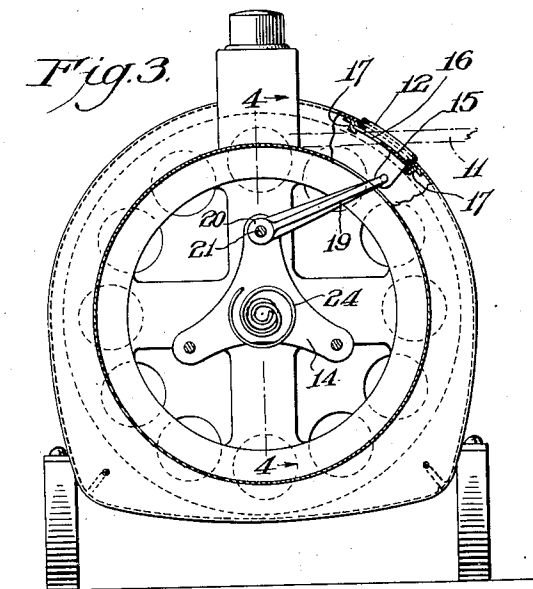
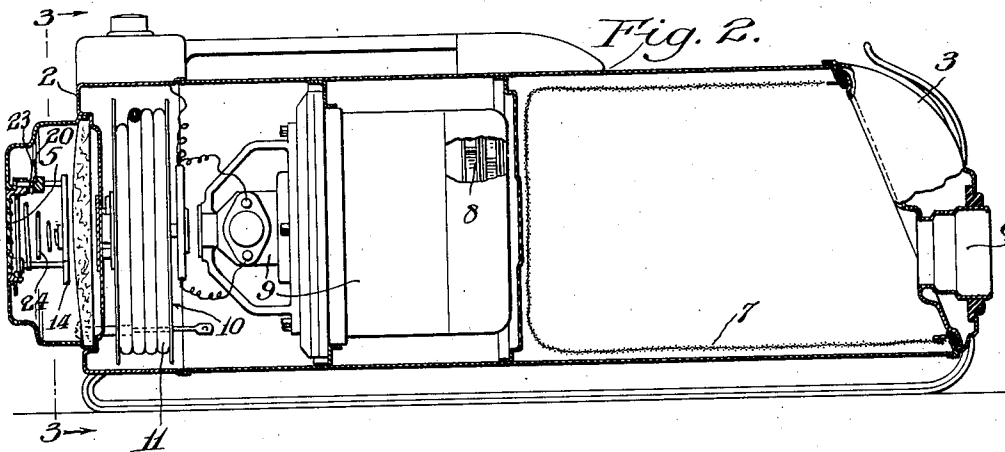
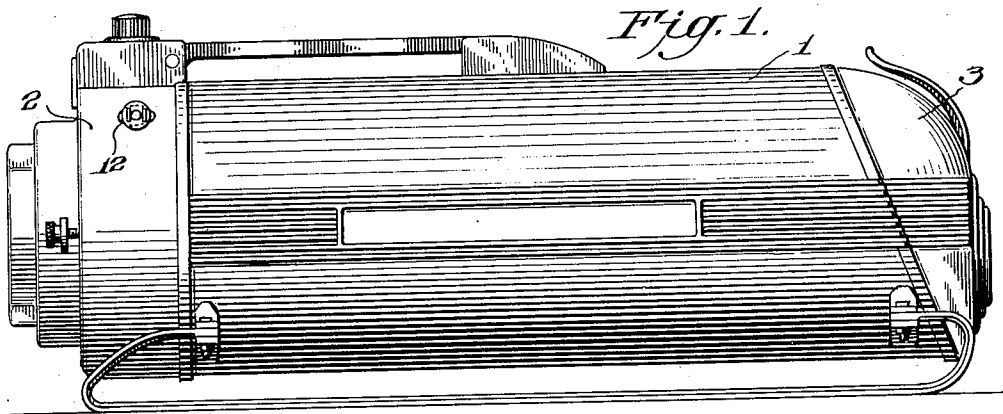
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ELECTRIC VACUUM CLEANER

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ELECTRIC VACUUM CLEANER

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8 Claims. (Cl. 15-16)

The present invention relates to an electric vacuum cleaner, and has for one of its objects a construction of electric vacuum cleaner which is provided with an open end casing having removable end caps and supporting therein a bag, a fan, a motor, and an automatic electric cord take-up device, all of which have a novel relationship to facilitate the installation thereof, to facilitate the automatic take up of the electric cord of the motor in the use of the vacuum cleaner, and to automatically reduce to minimum size the electric cord opening in the casing when the blower hose is attached to the casing.

Another object of the invention resides in the novel construction and operation of a spring operated automatic take-up device within the length of the casing, and supported by an end cap of the casing, so that in the detachment of the end cap, the automatic take-up device is removed from the casing.

Another object of the invention resides in associating with the end of the blower hose a device whereby the electric cord opening in the casing may be reduced to its minimum size so as not to interfere with the efficiency of the blower hose.

A feature of the invention resides in providing a shutter for the electric cord opening which is automatically operated in the attachment and detachment of the blower hose from the air port of the vacuum cleaner casing.

With these and other objects in view, the invention will be better understood from the following detailed description taken in conjunction with the accompanying drawing, wherein:

Figure 1 is a side elevation of an electric vacuum cleaner;

Figure 2 is a vertical sectional view;

Figure 3 is an enlarged sectional view taken on line 3-3 of Figure 2;

Figure 4 is a detail sectional view taken on line 4-4 of Figure 3.

Referring to the drawing, the numeral 1 designates an open end casing, the open end portions of which are closed by two end caps 2 and 3. Each of these end caps may be detachably connected to the casing 1 in any suitable manner, such as by sliding fit, screw-threaded engagement, or the use of additional securing elements.

The cap 2 is provided with an air port 5 and the cap 3 is provided with an air port 6. Arranged in alignment with the ports 5 and 6 and supported within the casing are the necessary cleaning instrumentalities, such as a bag structure 7, a fan structure 8, and an electric motor structure 9.

As a component part of the vacuum cleaner, and positioned within the length of the casing in alignment with the cleaning instrumentalities heretofore described, is an automatic spring operated cord take-up structure 10 provided for automatically winding the electric cord of the motor structure 9 or allowing the cord to extend a variable distance beyond the casing 1 in the use of the vacuum cleaner. This automatic cord structure 10 may be of any suitable design but, preferably, has the structural features illustrated in my co-pending application, Serial Number 366,829, filed November 23, 1940.

The electric cord 11 wrapped upon the reel of the automatic take-up structure passes through an opening 12 in the side of the casing, and it is an important feature of the present invention to automatically reduce this opening to a minimum size when the blower hose 13 is connected to the air port 5. To accomplish this result, in the most efficient manner at minimum expense, I have utilized, in a novel manner, the operation of the usual hose connector 14 for operating a shutter 15 positioned to reduce the opening 12 to its minimum size. This shutter is provided with a recess 16 for encircling the cord 11, and the shutter is slidably supported by guides 17 secured to the interior wall of the casing 1. A spring 18 normally exerts a pressure to move the shutter to a position to uncover the opening and, for the purpose of moving the shutter in the opposite direction to close the same with the exception of the passage created by the cord accommodating recess 16, an arm 19 is provided which bears directly against the shutter and has a hub 20 slidably mounted on one of the rods 21 of the hose connector.

Interposed between the slidably mounted plate 22 of the hose connector and the hub 20 is a buffer spring 23 so that the arm 19 may have a yieldable give to accomplish the proper adjustment of the shutter relative to the electric cord.

Associated with the plate 22 is a spring 24 that exerts a pressure in a direction to force the plate 22 either against the end of the hose 13 when the latter is in place, or to force the plate 22 to be positioned within the air port 5.

From the foregoing, it is apparent that when the blower hose is connected for operation, the cord opening 12 is automatically reduced to its minimum size so that air will be prevented from escaping through the outlet opening 12 which would reduce the efficiency of the blowing action of the hose 13 if not closed.

Of course, it is to be understood that when

the vacuum cleaner is sucking air in through the port 6 in the usual operation of the vacuum cleaner, it is not necessary to change the normal size of the opening 12, and thus the shutter normally remains in an open position to allow the free movement of the electric cord through the opening.

Particular attention is called to the fact that the automatic cord take-up structure is supported by the end cap in a manner that when the end cap is removed from the casing, the reel structure is removed with the cap and supported within the cap. Due to the fact that the cap forms the sole support for the reel, the cap and reel may be quickly assembled as a unitary structure for connection to and disconnection from the vacuum cleaner casing in close proximity to the motor structure so that the proper electrical connections can be quickly accomplished.

Due to the open end construction of the casing, the cleaning instrumentalities may be readily forced into proper position within the casing, and the caps snapped into place. In view of the fact that the reel structure is connected to, and assembled within, the cap, it is a very easy operation to make the necessary electrical connection with the motor whereby the electric cord of the motor may be extended or automatically taken up in the use of the vacuum cleaner.

I am aware of the fact that vacuum cleaners have heretofore been manufactured incorporating an open end cylindrical casing having removable caps and having therein a bag structure, a fan structure, and a motor structure, but I am of the opinion that I am the first to associate therewith throughout the length of the casing an electric cord take-up reel with which is associated a shutter device for reducing to minimum size the cord opening in the casing when the vacuum cleaner is functioning as a blower.

Of course, it is to be understood that the reel device may be of any suitable construction, and may be either manually controlled in its action or automatic in its action and, further, various forms of shutter devices may be utilized to vary the size of the cord opening. Therefore, I do not wish to be limited in my invention except as set forth in the following claims.

What I claim is:

1. An electric vacuum cleaner comprising, in combination: an open end casing; removable caps for the ends of said casing; electrically operated cleaning mechanism arranged within the casing; an electric cord take-up device supported by one of said caps and having its cord passing through an opening in said casing; a hose having one end portion detachably connected to the walls of a port in said casing; and means actuated by said hose end portion in its attachment to the casing for reducing said opening to a minimum size.

2. An electric vacuum cleaner comprising, in combination: an open end casing; removable caps for the ends of said casing; electrically operated cleaning mechanism arranged within the casing; an electric cord take-up device supported by one of said caps and having its cord passing through an opening in said casing; said cap having a port and a closure therefor movable to port opening position; and means for reducing to minimum size the cord opening in said casing

when said closure is moved to port opening position.

3. An electric vacuum cleaner comprising: an open end casing; caps detachably secured to the casing for closing the ends thereof, each of said caps being provided with an air port; a fan driving motor operable to draw air through the port in one cap and to exhaust air through the port of the other cap; an electric cord passing through an opening in the casing to supply current to said motor; an electric cord take-up device mounted within the casing for the withdrawal and retraction of the cord from and into the casing; a hose adapted to be detachably engaged with the air exhaust port; and a device operated by the connection of the hose with said air exhaust port for reducing the cord opening to a minimum.

4. In a vacuum cleaner, a casing having an air port and an electric cord receiving opening; an electric motor within the casing having its electric cord passing through said opening; a hose adapted to be detachably connected to said air port; a connector for connecting the hose to the casing; and means cooperatively associated with said connector for reducing the cord opening to a minimum size in the attachment of the hose with the air port.

5. In a vacuum cleaner, in combination: a casing having an air port and an electric cord opening; an electric motor within the casing having its electric cord passing through said opening; a hose connector associated with said air port for connecting a hose thereto; a shutter for reducing said cord opening to a minimum size; a spring for retracting said shutter to opening position; and a slidably mounted arm actuated by the connector for closing the shutter.

6. In a vacuum cleaner, in combination: a casing having an air port and an electric cord opening; an electric motor within the casing having its electric cord passing through said opening; a hose connector associated with said air port for connecting a hose thereto; a shutter for reducing said cord opening to a minimum size; a spring for retracting said shutter to opening position; a slidably mounted arm actuated by the connector for closing the shutter; and a buffer spring establishing an operative connection between said arm and said connector.

7. In a vacuum cleaner, in combination: a casing having an air port and an electric cord opening; an electric cord take-up device mounted in the casing and having its cord passing through said opening; a hose detachably mounted in said air port; a hose connector associated with said hose; a slidably mounted arm; a buffer spring establishing an operative connection between said arm and said connector; a shutter for reducing the cord opening to a minimum size and operated by said arm; guides for said shutter; and a spring for retracting the shutter to open position.

8. In a vacuum cleaner, in combination: a casing having an air port and an electric cord opening; an electric cord take-up device mounted in the casing and having its cord passing through said opening; a hose detachably connected to said air port; and means for sealing said cord opening and operatively associated with said hose to be automatically operated thereby in the attachment of said hose to the air port.

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