

May 14, 1968

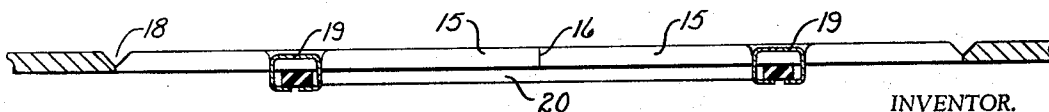
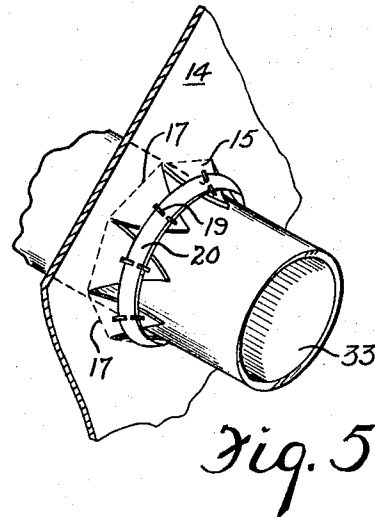
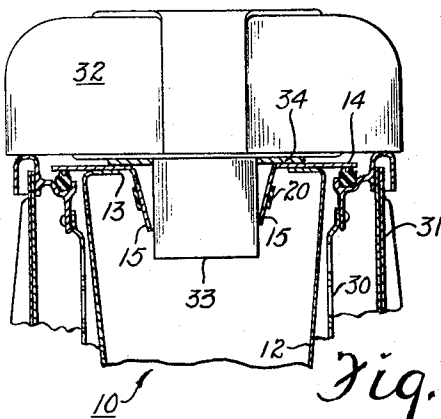
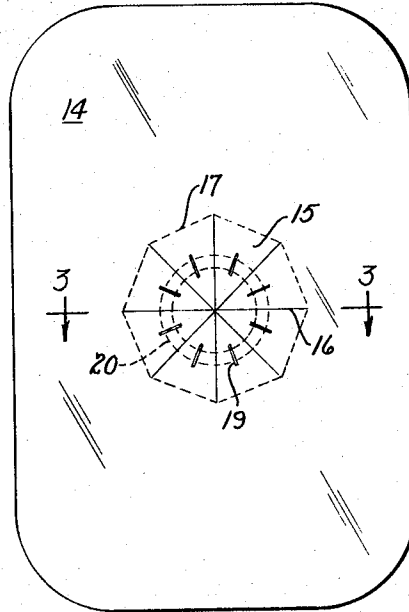
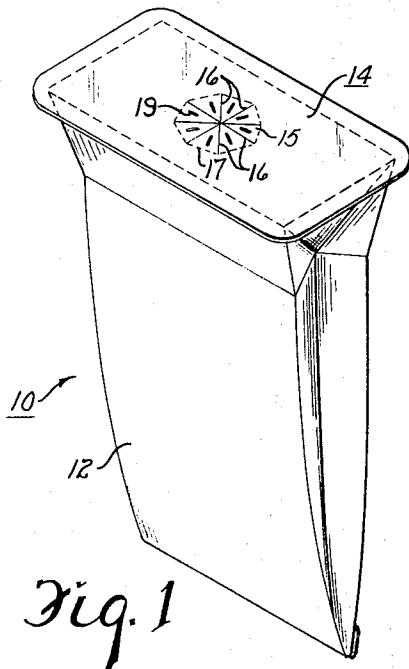
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3,383,030

END CLOSURE FOR VACUUM CLEANER DUST BAG

Filed July 13, 1966

2 Sheets-Sheet 1



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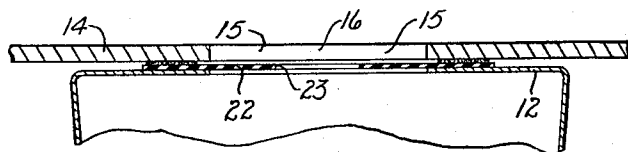
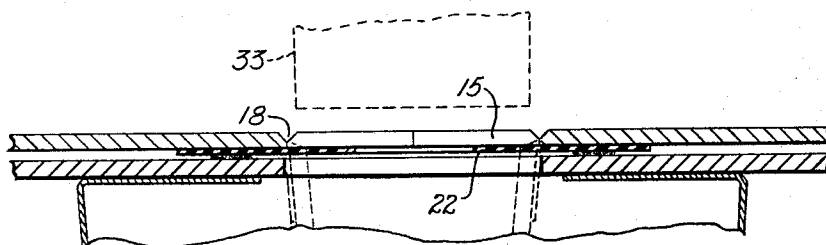
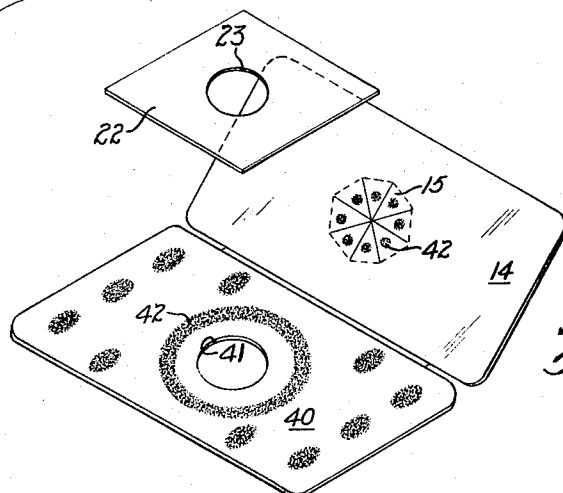
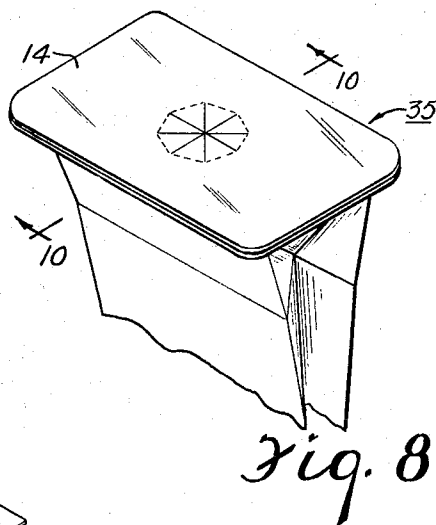
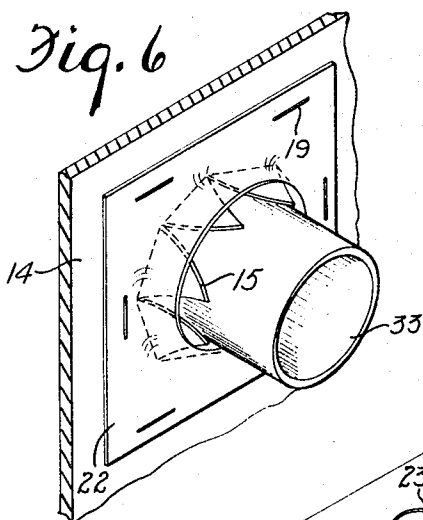


Fig. 7

Fig. 10

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3,383,030 END CLOSURE FOR VACUUM CLEANER DUST BAG

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Filed July 13, 1966, Ser. No. 564,783

10 Claims. (Cl. 229—62.5)

ABSTRACT OF THE DISCLOSURE

A self-closing opening in a sheet of relatively rigid material (a sheet of cardboard, chipboard and the like) in which the sheet is die cut to form a plurality of discrete tabs or flaps and also scored to provide a hinge for each of the tabs. The tabs are pushed to open the aperture in the sheet, and an elastic member, such as a rubber band or a rubber membrane having a central opening therein is attached to the sheet (either directly to the tabs or on the sheet remote from the tabs), so that the tabs are urged to closed position. Thus, when a force pushing on the tabs to open them is removed the elastic member moves the tabs to their position closing the opening in the sheet.

My invention pertains to a disposable dust bag for vacuum cleaners and in particular to a self-sealing end closure for such dust bags.

Disposable dust bags are now in general use for collecting dust, lint, and dirt in vacuum cleaners of the so-called tank-type or canister-type. A conventional disposable dust bag is comprised of a porous paper bag and an attached flat cardboard piece which serves as an end closure for the bag. The cardboard end closure is provided with an opening through which a suction inlet conduit of the vacuum cleaner is inserted to introduce the dust, dirt, etc., directly into the paper bag.

To prevent leakage or spillage of dust or dirt through the bag's end closure, when a filled dust bag is being withdrawn for disposal, it is necessary that the opening in the end closure be self-sealing when the inlet conduit is withdrawn.

Inasmuch as disposable dust bags are used only once and are thrown away when filled, it is desirable to provide dust bags which are inexpensive. Since the end closure contributes significantly to the manufacturing cost of the dust bag, an object of my invention is to provide an end closure which consists of a minimum number of inexpensive parts which can be manufactured in a quick and efficient manner.

According to another embodiment of my invention, an inexpensive dust bag is provided in which the self-sealing opening is protected against damage from burrs, nicks, and like sharp projections on the suction inlet conduit to be inserted into the self-closing opening of the dust bag. For example, in a dust bag having a self-sealing closure such as disclosed in U.S. Patents 2,596,806, 2,596,807, and 2,596,808, the thin elastic membranes, which close the opening in the dust bag when the suction conduit is separated from the bag, can develop a tear resulting from a cut or rupture made by a burr present on the inlet conduit. As a result, dust and dirt which fills the bag will escape during removal for disposal.

Further objects, features, and advantages of my invention will be apparent from the following description of the various embodiments illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view of a disposable dust bag

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having a self-sealing opening in the end closure according to one embodiment of my invention;

FIG. 2 is a view of the rear face (the face inside the dust bag) of the end closure shown at FIG. 1;

FIG. 3 is an enlarged sectional view along the line 3—3 in FIG. 2;

FIG. 4 is a partial sectional view showing a dust bag according to the invention within the tank unit of a vacuum cleaner with the vacuum cleaner's suction inlet conduit protruding through the end closure and into the dust bag;

FIG. 5 is a partial perspective view showing in greater detail a suction inlet conduit protruding through the end closure of a dust bag as illustrated in FIG. 4;

FIG. 6 is a partial perspective view similar to FIG. 5 of another embodiment of my invention;

FIG. 7 is a cross section similar to FIG. 4 illustrating the end closure shown in FIG. 6;

FIG. 8 is a perspective view of a dust bag according to a further embodiment of my invention;

FIG. 9 is a perspective view of the end closure for the dust bag shown in FIG. 8 with the elements thereof disassembled;

FIG. 10 is a cross sectional view taken on the line 10—10 of FIG. 8.

In FIG. 1, reference numeral 10 designates a disposable vacuum cleaner dust bag comprising a porous paper filter bag 12 and an end closure 14 to which the open end of the bag 12 is attached in known manner. The end closure (FIGS. 2 and 3) consists of a relatively stiff material such as cardboard, chipboard, or a plate of suitable synthetic material. Overlying the opening 13 (FIG. 4) in the bag 12 a plurality of die cuts 16 are made in the closure 14 which intersect at a common point and are of equal length measure from this point. The cuts 16 extend through the end closure 14 and form a plurality of discrete wedge-shaped tabs 15 hinged on a line 17 connecting the ends of the associated cuts 16. Where required, the line 17 may be scored, as indicated at 18 in FIG. 3, to provide a hinge for each tab 15. As best seen in FIGS. 2, 3, and 5, a ring 20 of elastic material, such as a common rubber band, is attached to each tab 15 by means of a staple, rivet, or cement. In FIG. 2 and FIG. 3, an ordinary paper staple 17 is illustrated as an inexpensive means for fastening the band 20 to the tabs 15.

Referring now more particularly to FIGS. 4 and 5, the dust bag 10 of FIG. 1 is placed in a suitable perforated canister 30 attached to the tank or vacuum cleaner housing 31. A seat for the end closure 14 is provided in any suitable known manner such as shown in FIG. 4. The vacuum cleaner housing is provided with a pivoted end cap 32 with which the suction conduit 33 is integral. When the end cap 32 is closed, the suction conduit 33 is inserted through the opening defined by tabs 15 and into the interior of the bag 12. As best seen in FIG. 5, the tabs 15 pivot about the hinge line 17, or score line 18, and the elastic band 20 is stretched. When the bag is full of dust, the suction conduit 33 is withdrawn from the bag 12 and the tabs 15 quickly close the opening. The closing movement of the tabs is rapid in view of the small masses involved even though the tension in the elastic ring 20 is small enough to allow the suction conduit to enter the bag with very little resistance.

It may be noted in connection with FIGS. 4 and 5 that a gasket 34 of felt or the like is attached to the end cap 32 and engages closure 14 to prevent dust escaping from the bag during operation of the vacuum cleaner. However, a gasket 34 is required for this purpose with the presently known dust bags as well.

As will be apparent to those skilled in art, only two simple operations are required to provide a closure member for a dust bag, i.e. forming die cuts 16 and attaching the ring 20 to the tabs thus formed. If required, the scoring 18 is made at the same time the cuts 16 are made.

Another embodiment of my invention, which is similar to that described above, is illustrated in FIGS. 6 and 7. In these figures, the end closure 14 has already been die cut at 16 (and scored at 18 if required) to form tabs 15 and in place of the elastic band 20, a membrane 22 of thin elastic sheet material is provided. The membrane 22 is attached to the bag closure 14 by means of staples 17 or equivalent means such as rivets or a suitable adhesive. The membrane 22 is made with an aperture 23. When the membrane 22 is fastened to closure 14 the aperture 23 is substantially coaxial with the point defined by the apex of each tab 15, or the intersection of the cuts 16. As illustrated in FIG. 6, the suction conduit 33 forces the tabs 15 into engagement with the aperture 23 stretching the membrane 22, then when the conduit 33 is removed, the tabs 15 are snapped shut by the elastic membrane. It will be clear from FIG. 6 that the suction pipe 33 engages the tabs 15 as it is inserted or withdrawn from the dust bag. As a result, a burr which is present on the suction pipe may score a tab, but the membrane, which does not contact the suction pipe, cannot be ruptured by a burr causing a tear to develop. A torn membrane of course cannot close the opening and prevent spillage. Further, if the membrane is attached to each of the tabs as indicated in FIGS. 1-5, even if a tear results between a pair of adjacent tabs the elasticity in the membrane between the remaining tabs will still effect a closure movement for each tab.

A third embodiment of my invention is illustrated in FIGS. 8 to 10 in which the end closure, generally designated 35, of a dust bag is composed of a pair of sheets of cardboard, chipboard, etc., which are cemented together as shown in FIG. 8. One sheet 14 of the closure 35 is provided, as before, with tabs 15. A second sheet 40 has an opening 41 which is made large enough to receive the tabs 15 when pushed open by the conduit 33. The two sheets 14 and 40, with the apertured membrane 22 sandwiched therebetween, are united by means of a suitable cement 42. The cement 42 may be applied as indicated in FIG. 9 to unite the sheets 14, 40 of the closure 35, anchor the membrane 22 therebetween, and connect each of the tabs 15 to the membrane 22 if desired. The resulting assembly is illustrated in FIG. 10. The advantages obtained are the same as mentioned above in connection with the embodiments of FIGS. 6 and 7, and the cooperation and operation of the tabs and membrane are the same as stated hereinabove.

In each of the foregoing examples of my invention, the elastic band 20 and membrane 22 have been shown connected with the end closure 14 or 40. However, it is obvious that the membrane may be attached to the dust bag, within the bag or between the bag and the end closure, for operative association with the tabs when they are pivoted into the bag inlet by a suction pipe 33.

I have shown and described several embodiments of my invention. However, I do not intend, by the foregoing, to limit the scope of the appended claims to the specific examples shown.

What is claimed is:

1. An article of manufacture comprising an end closure member of relatively rigid material for a dust bag; said end closure having an aperture therethrough, said aperture being defined by a plurality of intersecting die cuts extending through said end closure for defining a plurality of discrete tabs integral with said end closure and means for rendering said tabs pivotal with respect to said closure member, said aperture being closed by said tabs in a first position substantially within the plane of said end closure and opened by said tabs in a second position at an angle with the plane of said end closure, and elastic means having an opening therein which is substantially coaxial with said aperture, said elastic means being connected with said end closure for engaging said tabs and being tensioned by said tabs in said second position thereof whereby said tabs are urged by said elastic means into said first position closing said aperture.

2. An article of manufacture according to claim 1 wherein said elastic means comprises a rubber band, and means for attaching said band to a plurality of said tabs.

3. An article of manufacture according to claim 2 wherein said rubber band is attached to each said tab.

4. An article of manufacture according to claim 1 wherein said elastic means comprises a sheet of elastic material having said opening therein, said opening being substantially coaxial with said aperture.

5. An article of manufacture according to claim 4 wherein said sheet of elastic material is connected to said end closure remote from said tabs.

6. An article of manufacture according to claim 4 wherein said sheet of elastic material is also connected with at least one of said tabs.

7. An article of manufacture according to claim 1 with the addition of a second end closure member having an orifice therein substantially coaxial with the aperture of said first mentioned end closure; said elastic means being sandwiched between said first mentioned end closure and said second end closure member, and means for uniting the first mentioned end closure, with said second end closure member and the elastic means for defining a composite end closure member.

8. An article of manufacture according to claim 1 with the addition of a porous dust bag member having an inlet, means for attaching said dust bag to said end closure for receiving said tabs in said second position whereby said bag depends from said end closure and said inlet is in alignment with said aperture.

9. An article of manufacture according to claim 7 with the addition of a porous dust bag having an inlet, means for attaching said dust bag to the exposed surface of said second end closure member, said bag depending from said second end closure and having said inlet aligned with the orifice in said second end closure member.

10. An article of manufacture according to claim 1 wherein said end closure consists of a sheet of cardboard; said cardboard having means defining a score line connecting the radial ends of adjacent die cuts for hinging the associated tab.

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