

May 13, 1952

G. E. LOFGREN
SELF-SEALING RECEPTACLE FOR SEPARATING
DUST FROM AN AIR STREAM

2,596,808

Filed April 6, 1949

3 Sheets-Sheet 1

Fig. 1

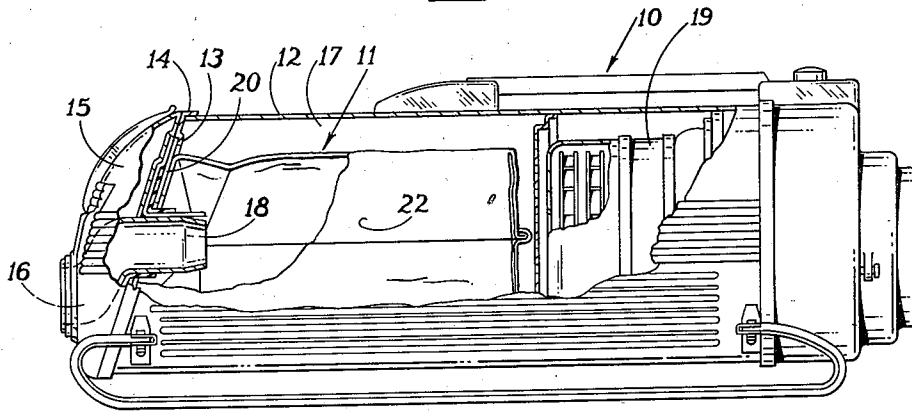


Fig. 2

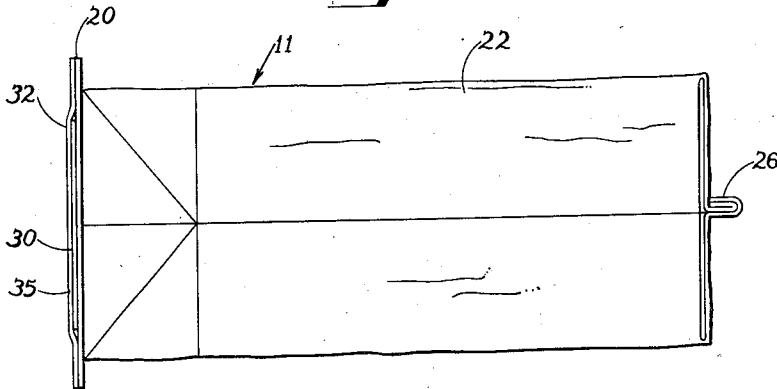


Fig. 3



INVENTOR.

GUSTAF EINAR LOFGREN

BY *Frank J. Novotny*
ATTORNEY.

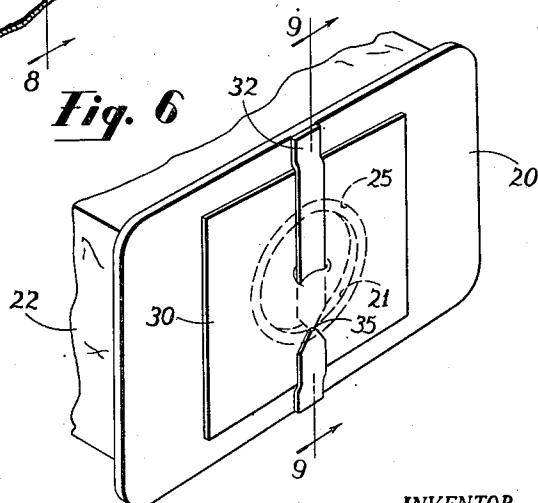
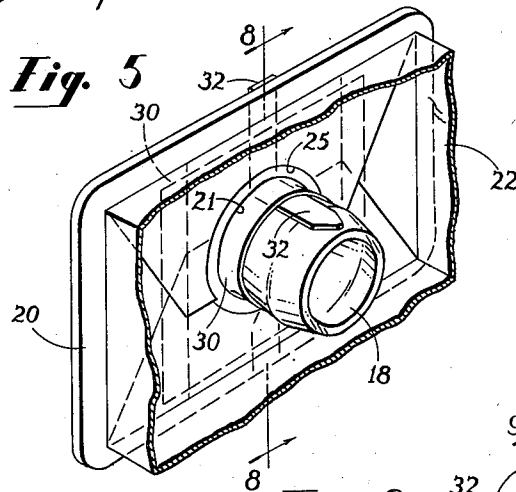
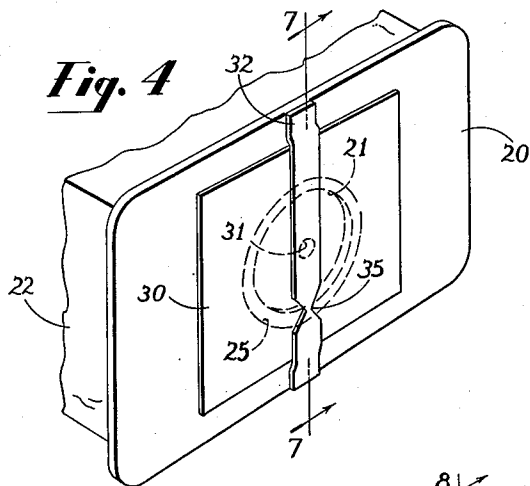
May 13, 1952

G. E. LOFGREN
SELF-SEALING RECEPTACLE FOR SEPARATING
DUST FROM AN AIR STREAM

2,596,808

Filed April 6, 1949

3 Sheets-Sheet 2



INVENTOR.
GUSTAF EINAR LOFGREN
BY *Frank J. Novotny*
ATTORNEY.

May 13, 1952

G. E. LOFGREN
SELF-SEALING RECEPTACLE FOR SEPARATING
DUST FROM AN AIR STREAM

2,596,808

Filed April 6, 1949

3 Sheets-Sheet 3

Fig. 7

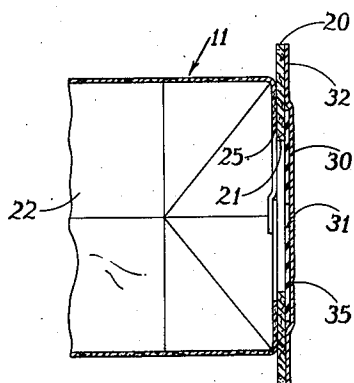


Fig. 8

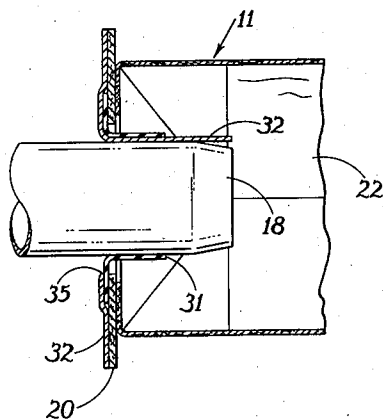
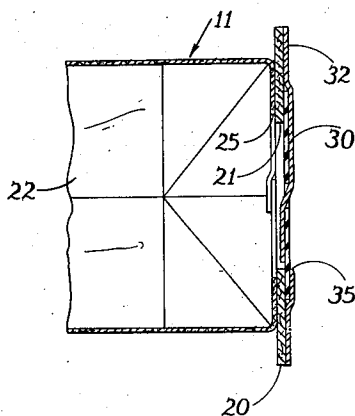


Fig. 9



INVENTOR.

GUSTAF EINAR LOFGREN

BY

Frank J. Novotny
ATTORNEY.

UNITED STATES PATENT OFFICE

2,596,808

SELF-SEALING RECEPTACLE FOR SEPARATING DUST FROM AN AIR STREAM

Gustaf Einar Lofgren, Riverside, Conn., assignor
to Electrolux Corporation, Old Greenwich,
Conn., a corporation of Delaware

Application April 6, 1949, Serial No. 85,797

10 Claims. (Cl. 183—51)

1

This invention relates to a self-sealing container, and more particularly to a dust collecting device adapted for use in a vacuum cleaner.

Heretofore a number of different devices have been proposed for separating entrained particles from the suction current of cleaning air used in the operation of the conventional type of vacuum cleaner. Although a cloth bag has been almost universally used in the past, more recently a modified disposable paper receptacle pervious to air but impervious to dust, lint, hair, threads and the like has met with considerable public acceptance. However, many difficulties have accompanied the adoption of the more obvious modifications of this common paper bag type of dust receptacle. Such problems as for example excessive cost, undue complexity of structure, difficulty of removal of contaminated bags or containers filled with dirt, etc., have arisen.

In view of this ineffective adaptation of dust containers as heretofore devised to solve this particular problem, it is an object of this invention to provide a low cost disposable paper container which makes possible the most efficient collection, and rapid and easy disposal of dust and dirt collected in the conventional types of so-called vacuum or suction cleaning machines.

In addition to such an economical and convenient solution for the conventional cleaning problem, a still further object hereof is to provide a highly flexible selectively pervious dust container which is readily foldable or collapsible to occupy the least possible space and thus facilitate storage in an easily accessible place, on the cleaner if necessary, and to provide such a container as is readily extensible into fully opened condition in and of itself and solely by initiating vacuum cleaner operation after being once mounted and sealed in position within the cleaner.

Another object is to provide such a self-opening and self-sealing dust container for use in the conventional type of vacuum cleaner.

Still other and further objects and advantages of this invention will become apparent, and similar and analogous objects will suggest themselves and be readily comprehended by those versed in the related art, upon further examining the examples given in the following specification, particularly when considered in conjunction with the appended drawings forming a part of this disclosure and in which:

Figure 1 is a side view, partly in section and with another part of the outer casing broken away, showing a dust collecting container in ac-

2

cordance with this invention in position in a tank type vacuum cleaner;

Figure 2 is a side view of the dust collecting container shown in Fig. 1, in a fully extended condition;

Figure 3 is a side view of the same dust collecting container shown in Fig. 2, but in a fully collapsed and folded condition suitable for storage;

Figure 4 is a perspective view of the exterior of a fully extended container with part of the pervious material forming the dust storage portion of the container torn away in order to show more clearly the external appearance of one modification embodying structure making possible the novel self-opening and self-sealing principles disclosed and described herein;

Figure 5 is a perspective view similar to that shown in Fig. 4, but showing the dust conveying nozzle extending through the pressure distended and expandedly opened resilient sealing element incorporated in this embodiment of the invention and further showing the broken resilient sealing strip in upwardly and backwardly diverted position so that dirt-laden air can be introduced directly into the interior of the container;

Figure 6 shows the sealing member in full view after withdrawal of the nozzle, the free end of the outer sealing flap being inserted in final position;

Figure 7 is a cross-sectional view taken on the line 7—7 of Fig. 4 prior to the insertion of the dust conveying nozzle through the sealing member;

Figure 8 is a cross-sectional view taken on the line 8—8 of Fig. 5 showing the relationship of the various elements of the nozzle and sealing member after insertion of the nozzle into the bag interior; and

Figure 9 is a cross-sectional view taken on the line 9—9 of Fig. 6.

Referring now more particularly to the figures and especially to Fig. 1, a conventional tank type of vacuum cleaner 10 is shown fitted with a dust collecting bag 11 embodying structure in accordance with this invention, the dust bag being placed in operative position within the cleaner casing 12. The bag or container 11 is held in place by the insertion of the bag and the placement of the end plate member or disc 20 of dust bag 11 onto a seat 13 formed in flange 14 which in turn is a part of cleaner casing 12. A removable cover 15 keeps the left-hand end of the casing 12 closed and seals the dust bag 11 within body chamber 17 in dust collecting position within seat 13. Dust inlet passage 16, to the

3

outer end of which a flexible dust collecting hose is connectable, has an inner end 18 forming a nozzle which extends some distance into the interior of dust bag 11 through an opening or centrally located aperture 21, Fig. 4, cut in end plate 20. A motor fan unit 19 in the opposite end of the body chamber completes the vacuum cleaner assembly.

Plate member 20 is preferably formed of relatively stiff material to which the flexible side walls 22 of dust bag 11 are secured. It is firmly clamped within seat 13 by cover or closure member 15 when the latter is locked in place. Dust-laden air is then conveyed directly into the interior of bag 11, the air passing through the porous walls 22 of the container or dust bag 11, while the entrained dirt is filtered out and remains entrapped within the bag 11.

The walls of the container are preferably flexible and foldable in the conventional manner for convenient packaging and storage, as shown in Figs. 2 and 3. The bottom (left end in Fig. 2) of the bag is adhesively or otherwise secured to the inner side of end plate 20 and has a hole, opening or aperture 23, Fig. 4, coextensive with or slightly larger than that cut in end plate 20, for the facile insertion therethrough of nozzle 18. The open end of bag 11, opposite the end secured to disc 20, is closed in any suitable manner. As shown in Figs. 2 and 3 this closure is effected by folding over, gluing or sewing the four side walls together across this open end when the container is in collapsed condition as shown at 25.

As is well known, a number of different devices have been heretofore suggested for sealing bags, both self-sealing devices and others, viz., folded paper flaps, distensible rubber sheets, interleaved iris type elements, etc., among various others. However, such devices have been both complex and expensive. Frequently they have proved ineffective in practice, many operated only under small pressure leaks, while still others failed to retain small dust particles.

The closure element shown in detail in Figs. 4 to 9 and more particularly the subject-matter of this invention is a highly effective and efficient self-opening and self-closing sealing device. It includes a distensible member 30, Fig. 4, of substantially square configuration in the center of which is a hole or aperture 31 punched therethrough. This square shaped distensible unit is adhesively or otherwise secured at its edges to the outer face of disc 20, in partial sealing orientation with respect to opening 21, see Figs. 4 and 7, aperture 31 being approximately centered with respect thereto. A paper strip 32, Fig. 5, having a weakened or partially sectioned area 35 and a width somewhat greater than the diameter of aperture 31, is adhesively secured to the outer disc surface in the region of the two end portions of strip 32 and extends directly over the aperture 31.

By the term distensible as used with reference to member 30 is meant any rubber-like material, one that is stretchable and returnable upon release substantially to its former size as contrasted to a foldable material which folds and/or unfolds.

In operation, responsive to the pressure exerted by the insertion of a filling tube 18, Figs. 5 and 8, strip 32 breaks at 35, then the aperture 31 of the elastic sealing member 30 expands and opens out to a wider and wider diameter until it finally allows the end of the tube 18 to protrude therethrough and to fit snugly thereon. The sealing flap 32 is simultaneously pushed upwards as in Fig. 5 and away from its sealing engagement with

4

the outer side of opening 31 until it protrudes into the expanded opening 31 and overlies tube 18.

When the tube 18 is withdrawn, the aperture 31 in the elastic sealing member 30 returns to its former small diameter, Fig. 6, and the flap 32 comes down and its free end is trapped or securely held within the contracted opening 31 to seal the latter (see Fig. 6), the entrapped dust behind the flap 32 pressing this flap into a more secure and firm sealing position.

Although a detailed description has been given with particular reference to a self-sealing bag device and more especially one where a distensible member is used together with an auxiliary closure flap, it is to be understood that the invention may be variously otherwise embodied and that its scope is to be determined solely by the following claims.

What I claim is:

1. A seal for a dust container comprising a bag having a stiff plate member, an opening in the plate member, a stretchable and elastic material extending across the opening, an aperture in the elastic material of normally less diameter than said opening, and a flexible strip member secured at at least one end to the outer side of said plate member and extending over the outer side of said aperture and insertable therethrough to provide a closure therefor.

2. A seal for a dust container comprising a bag having a stiff plate member, an opening in the plate member, a stretchable and elastic material extending across the opening, an aperture in the elastic material of normally less diameter than said opening, and a flexible strip member secured at both ends to said plate member and extending over said aperture, and having a weakened section adjacent one end.

3. A seal for a dust container comprising a bag having a stiff plate member, an opening in the plate member, a stretchable and elastic material extending across the opening, an aperture in the elastic material of normally less diameter than the opening, said aperture being distensible and returnable to its original size and a flexible strip member secured at both ends to said plate member and extending over said aperture, said strip being at least as wide as the normal diameter of the aperture, and having a weakened section adjacent one end thereof.

4. A seal for a dust container comprising a bag having walls with an opening in one of said walls, a stretchable and elastic material extending across the opening, the elastic material having an aperture of normally less diameter than said opening, with the material about said aperture being distensible and returnable to its original size and a flexible member secured at at least one end to the outer side of said one wall and extending over the outer side of said aperture and insertable therethrough to provide a closure therefor, said member being of less width than said opening and at least as wide as the normal diameter of said aperture, whereby said member substantially seals said aperture when inserted through the latter.

5. A seal for a dust container comprising a bag having a plate member, an opening in the plate member, a stretchable and elastic material extending across the opening, an aperture in the elastic material, and a flexible strip member extending over the aperture, attached at its ends to the plate member and having a weakened section adjacent one end thereof, the insertion of

5

a dust conveying member into the aperture being effective to stretch said material and enlarge said aperture and to break the strip at its weakened section to free one end of the strip and insert the free end into the aperture, the return of the enlarged aperture to its original size upon withdrawal of the dust conveying member being effective to hold the free end of the strip therein and seal the aperture.

6. A disposable dust bag for separating and collecting dust from the air stream of a vacuum cleaner having an inlet tube, said bag having a body of relatively porous pliable material and having a relatively stiff wall portion formed with an opening for the reception of said inlet tube, a thin sheet of stretchable and elastic material secured to said wall portion and extending over said opening, said sheet being formed with an aperture registering with said opening and normally of substantially less area than the cross-sectional area of said inlet tube, and a flexible strip member secured to said wall portion and extending across the outer side of said aperture, the insertion of said inlet tube into said opening serving to stretch said sheet to enlarge the area of said aperture sufficiently to receive the tube therethrough and serving to insert said strip member through said aperture, the elasticity of said sheet causing said aperture to return to its normal small area upon the withdrawal of said tube and to retain said strip member extending therethrough.

7. A disposable dust bag for separating and collecting dust from the air stream of a vacuum cleaner having an inlet tube, said bag having a body of relatively porous pliable material and having a relatively stiff wall portion formed with an opening for the reception of said inlet tube, a thin sheet of stretchable and elastic material secured to said wall portion and extending over said opening, said sheet being formed with an aperture registering with said opening and normally of substantially less area than the cross-sectional area of said inlet tube, and a flexible strip member extending across said aperture, secured at its ends to the outer side of said plate member and having a weakened section adjacent to one of said ends, the insertion of said inlet tube into said opening serving to stretch said sheet to enlarge the area of said aperture sufficiently to receive the tube therethrough and serving to sever the strip at its weakened section and to insert the severed strip through said aperture, the elasticity of said sheet causing said aperture to return to its normal small area upon the withdrawal of said tube and to retain said strip member extending therethrough.

8. A disposable dust bag for separating and collecting dust from the air stream flowing through the inlet tube of a vacuum cleaner, said bag comprising a body of relatively porous pliable material and an end portion, said end portion including a relatively stiff member having an opening of a size to receive the inlet tube and also including a thin sheet of stretchable and elastic material secured to said stiff member over said opening and having an aperture in registration with said opening and of a size substantially less than that of the cross-sectional area of said inlet tube, whereby a substantial amount of said material intervenes the peripheries of said aperture and said opening, said sheet of material being adapted to be stretched upon the insertion of the inlet tube through said opening and through said aperture and to return to the position ob-

6

structing said opening when said inlet tube is withdrawn from said aperture and opening, the stretching of said sheet resulting in the substantial enlargement of said aperture to snugly receive said tube, said sheet of stretchable and elastic material having the aperture, due to the elasticity of the sheet, contracting upon withdrawal of the tube so that the aperture returns to its normal small size, and a flexible strip secured to said end portion and extending across said aperture to provide a substantial closure therefor said strip being narrower than and substantially centered across said opening.

9. A disposable dust bag for separating and collecting dust from the air stream flowing through the inlet tube of a vacuum cleaner, said bag comprising a body of relatively porous pliable material and an end portion, said end portion including a relatively stiff member having an opening of a size to receive the inlet tube and also including a thin sheet of stretchable and elastic material secured to said stiff member over said opening and having an aperture in registration with said opening and of a size substantially less than that of the cross-sectional area of said inlet tube, whereby a substantial amount of said material intervenes the peripheries of said aperture and said opening, said sheet of material being adapted to be stretched upon the insertion of the inlet tube through said opening and through said aperture and to return to the position obstructing said opening when said inlet tube is withdrawn from said aperture and opening, the stretching of said sheet resulting in the substantial enlargement of said aperture to snugly receive said tube, said sheet of stretchable and elastic material having the aperture, due to the elasticity of the sheet, contracting upon withdrawal of the tube so that the aperture returns to its normal small size, and a flexible strip secured to said end portion outwardly of said sheet and extending over said aperture on the side of the sheet away from said bag body to provide a substantial closure therefor.

10. A disposable dust bag for separating and collecting dust from the air stream flowing through the inlet tube of a vacuum cleaner, said bag comprising a body of relatively porous pliable material and an end portion, said end portion including a relatively stiff member having an opening of a size to receive the inlet tube and also including a thin sheet of stretchable and elastic material secured to said stiff member over said opening and having an aperture in registration with said opening and of a size substantially less than that of the cross-sectional area of said inlet tube, whereby a substantial amount of said material intervenes the peripheries of said aperture and said opening, said sheet of material being adapted to be stretched upon the insertion of the inlet tube through said opening and through said aperture and to return to the position obstructing said opening when said inlet tube is withdrawn from said aperture and opening, the stretching of said sheet resulting in the substantial enlargement of said aperture to snugly receive said tube, said sheet of stretchable and elastic material having the aperture, due to the elasticity of the sheet, contracting upon withdrawal of the tube so that the aperture returns to its normal small size, and a flexible strip having its ends secured to said end portion at opposite sides of said opening and extending across said aperture to provide a substantial clo-

sure therefor, said strip being formed with a weakened portion adjacent to one of its ends.

GUSTAF EINAR LOFGREN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
931,887	Reaney et al. -----	Aug. 24, 1909
1,266,482	Kamrass -----	May 14, 1918

5

Number
1,644,096
1,819,421
2,034,217
2,102,035
2,297,994
2,528,332

10

Number
5,274

Name	Date
Voit -----	Oct. 4, 1927
Kendall -----	Aug. 18, 1931
Verwys -----	Mar. 17, 1936
Rose -----	Dec. 14, 1937
Vellinga -----	Oct. 6, 1942
Bergquist -----	Oct. 31, 1950

FOREIGN PATENTS

Country	Date
Australia -----	June 9, 1932