Dec. 17, 1940. R. ÖSTERDAHL 2,225,389

VACUUM CLEANER BAG

Filed March 4, 1939

Fig. 1

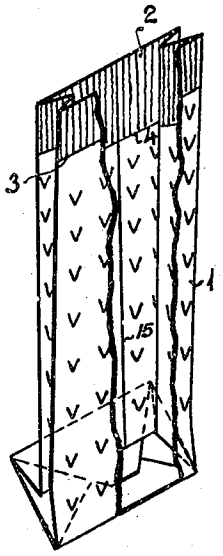


Fig. 2

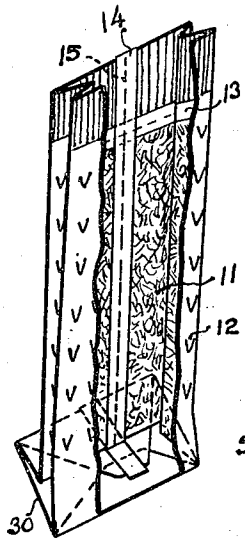


Fig. 3

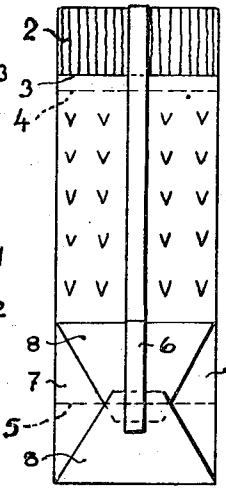


Fig. 4

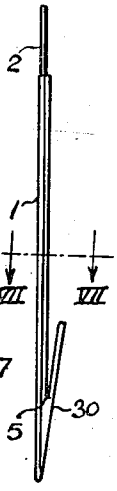
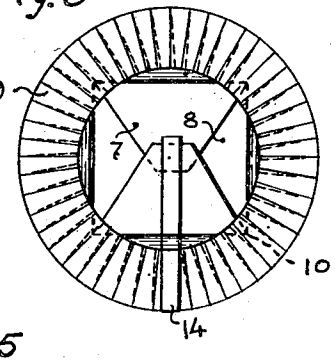


Fig. 6



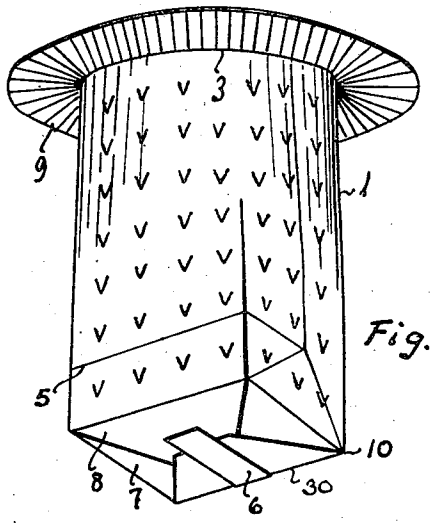


Fig. 5

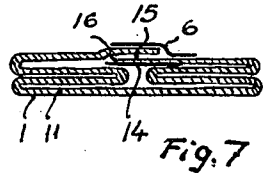


Fig. 7

Fig. 8

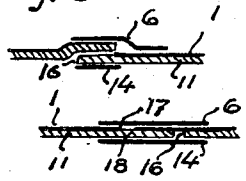


Fig. 10

Fig. 9

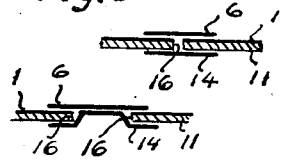


Fig. 11

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VACUUM CLEANER BAG

Ragnar Österdahl, Essingen, Sweden

Application March 4, 1939, Serial No. 259,923
In Sweden April 14, 1938

8 Claims. (Cl. 183—51)

This invention relates to replaceable and destructible dust collecting bags for vacuum-cleaners and has for an object to provide such bags which in use are capable of performing pulsatory movements for removing dust, etc., from their walls and without risk of breakage. Thus even though the bags have a relatively great dust collecting capacity and are made of a very inexpensive and relatively fragile material such as perforated or otherwise air pervious paper they can without risk of breakage perform sufficient dust removing movements caused by variations and repetitions of the suction effect to which they are subjected when in use. Another object of my invention is to utilize the above-mentioned quality of the bag in such a way as to allow the omission of the ordinary outer supporting means for the bag walls and the omission of the ordinary fabric bags hitherto used for subsequent straining of air passing through a replaceable dust bag of paper or the like. Still another object of my invention is to provide a replaceable and relatively fragile dust bag with a bottom having projections for supporting the dust bag particularly in case the latter occupies a more or less horizontal position.

With these and other objects in view which will be apparent from the following disclosure, the invention consists in certain novel features of construction and arrangements which will be apparent from the following description when taken in connection with the accompanying drawing, in which similar reference characters indicate the same or similar parts throughout the several views:

Fig. 1 is a perspective view, partly in section, of the dust collecting bag having a rectangular bottom;

Fig. 2 is a similar view of the dust collecting bag having an inner dust filter;

Fig. 3 is a view from behind of the dust bag shown in Figs. 1 and 2;

Fig. 4 is a side view of the bag shown in Figs. 1 to 3 when being collapsed for shipping and storage;

Fig. 5 is a perspective view showing substantially the same bag as shown in Figs. 1 to 4 but having a square bottom and being opened to be introduced into a vacuum-cleaner or having been introduced into same;

Fig. 6 is an end view from above of the bag shown in Fig. 5;

Fig. 7 shows a cross section on the line VII—VII of Fig. 4;

Figs. 8 to 11 are cross sectional views of several modifications of the longitudinal seam of the bag.

Referring to the drawing, the wall 1 of the dust collecting bag as shown in Fig. 1 consists of a flexible, perforated or otherwise air pervious material such as porous paper. A transversely corrugated or folded strip 2 of tough paper or another flexible and tough material is glued to the edge 3 of the sheet forming the wall of the bag at its open end so that its folds or corrugations stick to the marginal portion of sheet 1 between the edge 3 of the sheet and an edge 4 of the strip 2. The sheet thus obtained is folded to form a flat sleeve one end of which consists of the corrugated strip 2. The longitudinal seam 15 is sealed exteriorly by an adhesive tape 6 (Fig. 3). The other end of the flat sleeve is closed by first tucking in its V-shaped end portions 7 and folding them one upon the other so that two oppositely disposed triangular flaps 8 are obtained one of which is bent down about the folding line 5 into flat engagement with the bag wall. Thereafter said flaps are doubled and bent down upon each other so that a relatively rigid, rectangular closure as shown in Fig. 3 is obtained. It is assumed that the bottom of the bag is square. The width of the strip 2 beyond the edge 3 may not exceed a certain amount, as it is important that its edge shall not be split when it is bent outwardly to form an annular flange 9 for attachment to a vacuum-cleaner. Said width may not exceed

$$\frac{A-a}{\pi}$$

wherein A is the length of the strip material when not corrugated and a is the circumferential length of the edge 3.

The bag having been introduced into and attached to the vacuum-cleaner is subjected to external suction effect and obtains the shape shown in Fig. 5, i. e. it obtains a cylindrical shape in the proximity of the flange 9, and its square bottom is first turned about the folding line 5 to assume a transverse position and then to impart to the lower portion of the bag wall a substantially square cross sectional shape, merging upwardly into the cylindrical shape prevailing in the upper portion of the bag wall. Thus each of the four wall portions is flat at its bottom end and gradually changes in the direction towards the flange 9 into a curved cross-sectional shape. Thus when being subjected to external suction a great part of the bag wall is forced to assume a substantially cylindrical shape which action is counteracted by the relatively stiff square bottom. If the suc-

tion is decreased or released the square shape of the bag wall will be displaced upwards towards the bag mouth (towards the flange 9) and when suction effect is applied anew the cylindrical shape of the bag wall will perform repeated longitudinally reciprocating pulsatory movements or vibrations, so that dust adhering to the bag wall will be released and drop onto the bottom 30 of the bag if the latter occupies a vertical or leaning position. Due to this self-cleaning action the bag can remain in use within the vacuum-cleaner for a relatively long time until it has to be removed and thrown away. As distinguished from previously known replaceable dust bags the present bag due to the shape of its bottom has a great dust collecting capacity and is nevertheless capable of performing satisfactory dust releasing pulsatory movement without causing risk of breakage of the bag wall or its mouth. As the peripheries of the cylindrical portion and the square portion of the bag have the same length the corners 10 of the bag bottom 30 project beyond the cylindrical periphery as shown in Fig. 6. Therefore, said corners can be utilized for supporting the bottom end of the bag when the bag is inserted into the vacuum-cleaner, thereby decreasing stresses upon its connection parts (the mouth).

As the pulsatory movements of the bag wall are relatively small and as the bottom corners 10 of a square bag can support the bag effectively its wall may be made of a relatively fragile, perforated material, such as paper, even though the suction effect acting upon said wall is relatively great. Therefore, the bag can have an inner air straining filter 11 and in order to obtain a complete engagement of said filter with the pulsating wall 1 it should preferably consist of a wadding. Possibly, a lining having large openings is applied to said wadding. In order to prevent opposite parts of the wadding from sticking together when the bag is collapsed the wadding should preferably consist of fibrous lignocellulose the fibres of which are relatively coarse, resilient and resistant to moisture. In order to obviate undesired slitting of the bag wall at its perforations when the bag is pulled out of a pile or the like its perforations may be covered with flaps 12. When the bag is subjected to suction effect said flaps will open automatically and let through air. The flaps 12 are obtained by providing V-shaped cuts in the sheet forming the bag wall 1.

In the manufacture of a bag having an inner filter cover as now described the flaps 12 are cut in a continuously advancing sheet of paper and a wadding of ligno-cellulose saturated with a dust adhering, disinfecting, moisture absorbing and/or odorous matter is glued point by point or along lines to said sheet of paper, so that a relatively narrow space for attachment of the corrugated strip is left at one of its longitudinal edges while a wider space for folding the bottom 30 is left at its opposite edge. Simultaneously, a transversely folded or corrugated strip 2 of tough, strong paper is glued to the narrow free edge 3 of the sheet at the same side thereof as the wadding. Furthermore, a continuous strip 13 of paper is glued longitudinally of the sheet to one edge of the wadding and to the edge 4 of the corrugated strip 2. Rectangular bag blanks are continuously severed transversely from the sheet thus formed and said blanks are folded to form flattened sleeves, one end of which consists of the corrugated strip 2. At the longitudinal seam 15 the filter 11 is covered with a tape 14 glued thereto. Thereafter the other end of the flat sleeve is closed in the manner heretofore described, so that a square bottom closure is formed and the bag obtains the shape illustrated in Figs. 3 and 4.

As shown in Fig. 7 the longitudinal seam 15 is obtained by overlapping two edges of the sheet having a filter cover 11. Said edges are glued together and covered extensively with an adhesive tape 6 and interiorly at the filter edge 16 with another tape 14. The tape 14 is provided with an adhesive and glued to the wadding, or it may be attached thereto by adhesive pressed inwardly through the wadding. In the latter case the outer tape 6 is provided with adhesive in excess which is pressed through the wadding onto the tape 14. In any case, the tape 14 will prevent adhesive from being transferred from the longitudinal seam to the opposite part of the cover 11 of wadding when the bag is collapsed. In order to secure this the tape 14 may be unglued at its longitudinal edges. The tape 14 will secure the attachment of the edges of wadding to the outer wall which is important since the filter cannot be glued thereto over its entire surface as this would prevent air flow through the bag. Thus unless there is a tape covering the filter seam the filter wadding is likely to be loosened from the covering bag during its pulsatory movements. Furthermore, if adhesive were transferred from the longitudinal seam of the wadding to an oppositely disposed part of the wadding when manufacturing the flat bag the wadding would stick together and be torn off the mantle when the bag is opened for use.

The tape 14 need not necessarily cover the filter edge 16, but it is sufficient if one edge of the tape extends close to the filter edge 16 as shown in Fig. 8. The exterior tape 6 may be provided with paste in excess and when the tape is pressed against the seam such paste will penetrate the seam and adhere to the interior tape 14 except at the edge 16 of the filter. To facilitate this the bag wall 1 terminates somewhat behind the filter edge 16. As shown in Fig. 9 the filter edges 16 abut and the seam is covered with an outer tape 6 and an inner tape 14. As shown in Fig. 10 one edge 18 of the cover bag 1 projects beyond the filter edge 16 whereas the opposite edge 17 of said cover terminates behind the filter edge. The edge 18 is glued to the opposite filter edge. The edges 17 and 18 are covered with the tape 6 glued thereto. As shown in Fig. 11 the oppositely disposed longitudinal edges 16 of the mantle and filter are not arranged in abutting relationship, but a narrow space is left between them. The tapes 6 and 14 are glued to one another and the mantle and filter edges, respectively, of the bag. In any one of the embodiments now described or other embodiments the tapes 6 and 14 may consist of a single strip doubled on the edge of the corrugated strip 2 or on the bottom end of the sleeve-shaped bag blank. As the tape 14 covers a narrow part of the bag which is at any rate impervious to air flow it will not decrease the air perviousness of the bag.

I claim:

1. A vacuum-cleaner bag having a flexible air pervious wall and a relatively rigid bottom, said wall having an upper portion adapted to form a substantially cylindrical mouth for attachment to a vacuum-cleaner, said bottom being adapted to impart to the lower portion of said wall a sub-

stantially rectangular shape when subjected to external suction effect.

2. A vacuum-cleaner bag comprising a flexible air pervious wall, a relatively rigid bottom, and a mouth portion having corrugations extending longitudinally of the bag to allow bending of said mouth portion outwardly to form an annular flange for attachment of the bag to a vacuum-cleaner, said bottom being adapted to impart to the lower portion of said wall a substantially rectangular shape when subjected to external suction effect.

3. A vacuum-cleaner bag comprising a flexible air pervious wall, a relatively rigid bottom, and a mouth portion consisting of a transversely corrugated flexible strip which is attached to said wall with its corrugations extending longitudinally of said bag and is adapted to be bent outwardly to form an annular flange for attachment of the bag to the vacuum-cleaner, said bottom being adapted to impart to the lower end of said wall a substantially rectangular shape when being subjected to external suction effect.

4. A vacuum-cleaner bag having a flexible, air pervious wall, a relatively rigid bottom, and a lining of air straining wadding covering the inner surface of said wall, said wall and lining having an upper portion adapted to form a substantially cylindrical mouth for attachment to a vacuum-cleaner, said bottom being substantially rectangular and thereby being adapted to impart to the lower portion of said wall and lining a substantially rectangular shape when subjected to external suction effect.

5. A vacuum-cleaner bag having a flexible, air pervious wall, a relatively rigid bottom, and a lining of air straining wadding of ligno-cellulose covering the inner surface of said wall, said wall and lining having an upper portion adapted to form a substantially cylindrical mouth for attachment to a vacuum-cleaner, said bottom being substantially rectangular and thereby being adapted to impart to the lower portion of said wall and lining a substantially rectangular shape when subjected to external suction effect.

6. A vacuum-cleaner bag having a flexible, perforated wall, an air straining wadding of ligno-cellulose covering the inner surface of said wall, a relatively rigid bottom, a mouth portion having corrugations extending longitudinally of the bag beyond said wadding, and an interior strip of flexible sheet material extending transversely to the bag and being attached to the upper edge of said wadding and to said corrugations, said mouth portion being adapted to be bent outwardly to form an annular flange for attachment of the bag to a vacuum-cleaner, said bottom being adapted to impart to the lower portion of said wall a substantially rectangular shape when subjected to external suction effect.

7. A vacuum-cleaner bag having a flexible, air pervious wall, a dust filter having a longitudinal seam and covering the inner surface of said wall, an inner strip of sheet material covering said seam, and a relatively rigid bottom, said wall having an upper portion adapted to form a substantially cylindrical mouth for attachment to a vacuum-cleaner, said bottom being adapted to impart to the lower portion of said wall a substantially rectangular shape when subjected to external suction effect.

8. A vacuum-cleaner bag having a flexible, air pervious wall, a polygonal bottom, and an upper portion adapted to form a substantially cylindrical mouth for attachment to a vacuum-cleaner, said wall consisting of portions that are substantially flat at their bottom ends and in the direction towards said mouth gradually change shape upwardly and merge into the curved shape of the cylindrical mouth portion of the bag.

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