

(19)



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(11)

EP 0 813 839 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

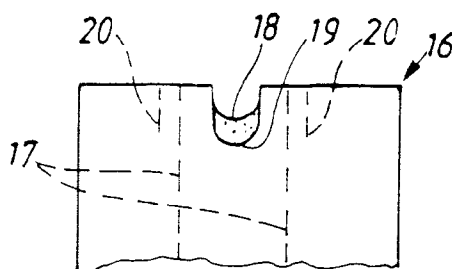
29.12.1997 Bulletin 1997/52(51) Int Cl.⁶: **A47L 9/14**(21) Application number: **97850091.6**(22) Date of filing: **10.06.1997**

(84) Designated Contracting States:

**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**(30) Priority: **19.06.1996 SE 9602422**(71) Applicant: **AKTIEBOLAGET ELECTROLUX
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c/o AB ELECTROLUX Corporate Patents &
Trademarks
105 45 Stockholm (SE)****(54) Method for producing an end closure for a vacuum cleaner dust bag**

(57) This invention relates to a method for producing an end closure for a vacuum cleaner dust bag by manufacturing in a first stage a tube shaped work piece comprising an outer layer and one or several lined layers. The work piece is in a second stage severed mainly perpendicular to the length direction of the tube shaped work piece and the outer layer is (16a) in connection with said severing operation is provided with one or several cuts or recesses extending from the cut edge in or-

der to form a flap (26). In a third stage parts of the end area of the work piece are successively folded inwardly and in connection therewith the lined layer or layers (16b) are folded inwardly or are removed within a portion of the area defined by the flap in order to uncover a part of the inwardly facing side (area 27) of the outer layer. The flap is then provided with glueing material on the uncovered surfaces and is arranged to overlap at least one of the the remaining inwardly folded end areas of the work piece.

**Fig. 2a****EP 0 813 839 A2**

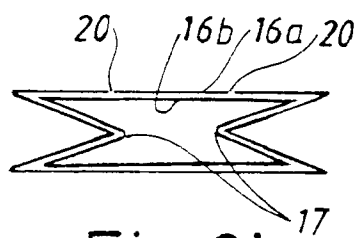


Fig. 2b

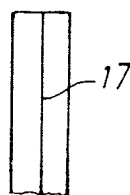


Fig. 2c

Description

This invention relates to a method for producing an end closure for a vacuum cleaner dust bag by manufacturing in a first stage a tube shaped work piece comprising an outer layer and one or several lined layers.

It is previously known to manufacture dust bags for vacuum cleaners by cutting, folding and glueing a tube shaped work piece comprising several layers. All the layers are made from air pervious material but the outer layer is more homogenous and less porous than the inner layer or layers. The end parts of the work piece are folded to form either a bottom or a top of the dust bag and in case the end part is designed to form a top an opening is formed in the layers. The top is usually glued to a cardboard plate having an air inlet opening which is partly covered by a membrane.

When manufacturing all these types of vacuum cleaner dust bags it is difficult to completely seal the inside from the outside of the bag at the folded areas since it is difficult to get the glue to penetrate the porous inner layers. Also when the different layers are folded and placed on each other the height of the different folds becomes rather large which means that it is difficult to glue two folded layers to each other on each side of a third folded layer or to glue the cardboard plate evenly to all folded layers beneath. Instead small air channels are formed through the porous inner layers and close to the folds through which air leaks out from the bag.

In order to partly overcome this problem a separate sealing piece comprising a layer of a rather non porous but air pervious material, such as the outer layer material of the bag, is glued on the outside of the bottom part or the top part of the bag. These sealing pieces are, when they are glued to the outer layer, so flexible that they easily follow the contour of the outside layers. As an alternative it is possible to laminate by glueing or by safeguarding that the glue penetrates the lined material but these alternative methods are complicated from a manufacturing point of view and also expensive.

The purpose of this invention is to facilitate the production process by eliminating these sealing operations. This is achieved by means of a method having the characteristics mentioned in the claims.

An embodiment of the invention will now be described with reference to the accompanying drawings on which Fig. 1 is a perspective view of a bag for which the method according to the invention is used, Figs. 2-6 are three separate projections of different stages of the manufacturing procedure (where a and c are side views and b are end views) whereas Fig. 7 is a perspective view of a part of the bag as shown in Fig. 5.

Fig. 1 shows the finished dust bag which is produced from a tube shaped work piece having several layers of air pervious material 10. The bag has an upper mainly flat top part 11 on which a plate 12 of comparatively stiff material such as cardboard or plastic is fastened. The plate 12 as well as the top part 11 has an

opening 13 through which a sleeve arranged on the vacuum cleaner is inserted in order to distribute the dirty air into the bag. The opening 13 might be provided with an elastic membrane 14 partly covering the opening 13 and forming a seal against the sleeve. The bag is also provided with a bottom part 15. At least one of the end parts 11, 15 described above is manufactured in accordance with the principle described below.

A tube shaped work piece 16 comprises an outer layer 16a and one or several inner lined layers 16b together forming the air pervious material 10. The outer layer serves as a fine filter having a larger flow resistance and being tighter than the inner layers who serve as a porous coarse filter. The work piece is cut into suitable lengths in order to form the finished bag by successive folding and glueing operations. In Fig. 2 one end of the cut work piece is shown in the flattened out position the work piece having two opposite, inwardly directed folds 17 extending in the length direction. Two recesses 18 and 19 respectively which together form the opening 13 in the finished bag might be provided. If the end is used to form the bottom no recesses are produced. The far away side of the work piece according to Fig. 2a is also provided with two cuts 20 extending in the length direction through the outer layer 16a.

The work piece is then, according to what is shown in Fig. 3, provided with folding lines 21, 22 and 23 resp. thereby forming a rectangular collar shaped part 24 having four wall parts 24a, 24b, 24c and 24d. Then the wall parts 24b and 24d are folded inwardly as appears from Fig. 4 after which one side of the wall part 24a is provided with glue on the areas which do not have any lined layers and is according to what is shown in Fig. 5 is folded inwardly so that it partly covers the two wall parts 24b and 24d and is secured to them. When folding the wall parts 24b and 24d from the position shown in Fig. 3 to the position shown in Fig. 4 the inner lined layer 16b will be folded twice within the triangular areas 25 (Fig. 5) of the flap 26 which is formed between the two cuts 20 of the wall part 24c whereas the areas 27 on the outer layer of the same flap is simultaneously uncovered. The areas 27 can, as well as the remaining parts of the flap 24c, which is not provided with the lined layers then be provided with glue after which the wall part 24c is folded inwardly to the position shown in Fig. 6 which means that the end part is closed and effectively sealed.

The plate 12 might then be applied on the end part whereas the other end of the work piece is closed by the same method or in some other way. Thus, the advantage with the arrangement according to the invention is that glueing takes place directly between the outer layers at the area 27 which gives a sealed connection without using special sealing pieces or by admitting the glue to penetrate the porous lined material.

Claims

1. Method for producing an end closure for a vacuum cleaner dust bag by manufacturing in a first stage a tube shaped work piece comprising an outer layer and one or several lined layers, **characterized** in that the work piece is in a second stage severed mainly perpendicular to the length direction of the tube shaped work piece to form a cut edge and that the outer layer (16a) in connection with said severing operation is provided with one or several cuts or recesses (20) extending from the cut edge in order to form a flap (26) and that in a third stage parts of the end area of the work piece are successively folded away and that in connection therewith the lined layer or layers (16b) are folded inwardly or are removed within a portion of the area defined by the flap in order to uncover a part of the inwardly facing side (area 27) of the outer layer and that the flap is then provided with glueing material on the uncovered surfaces and is arranged to overlap at least one of the the remaining inwardly folded end areas of the work piece.

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2. Method according to claim 1, **characterized** in that the tube shaped work piece before being severed is provided with two opposite inwardly facing folds (17) and that the parts of the end areas in the third stage are folded such that a bottom and/or a top part is formed in the bag said part having two opposite mainly rectangular portions (24b,24d) which are partly overlapped of a mainly trapezi formed third part (24a) which is at least partly overlapped by a fourth opposite portion (24c) comprising said flap (26).

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3. Method according to claim 1 or 2, **characterized** in that there are two cuts (20) which are mainly parallel with the length direction of the tube shaped work piece.

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4. Method according to any of the preceding claims, **characterized** in that the flap and the end area is provided with edge recesses (18,19) which after folding of the bag together forms an opening (13) in the bag.

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5. Method according to any of the preceding claims , **characterized** in that a plate (12) which is provided with an opening is fixed by glueing at the outside of the bag at the end areas which are folded inwardly.

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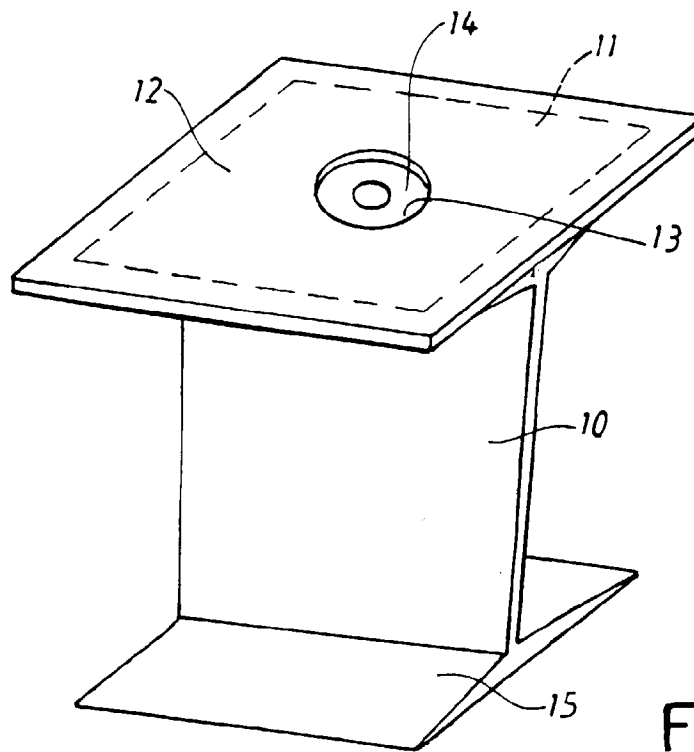


Fig.1

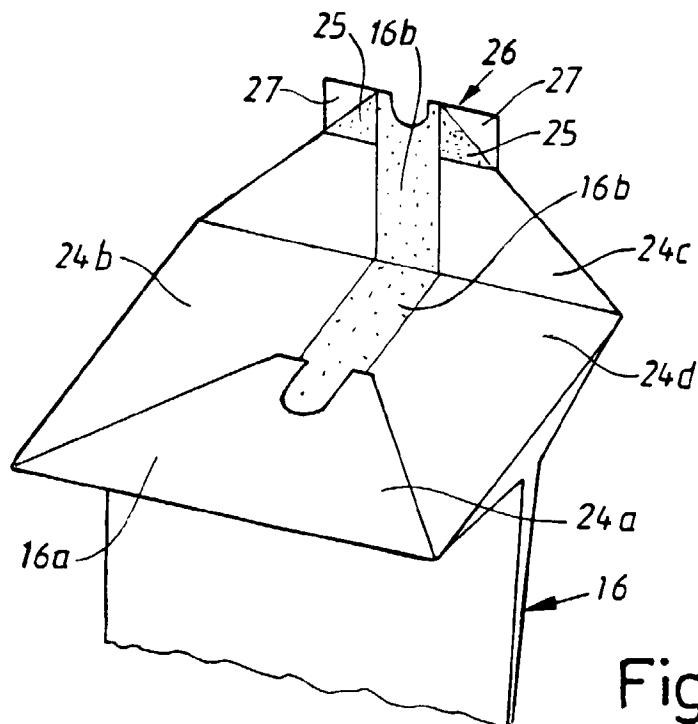


Fig.7

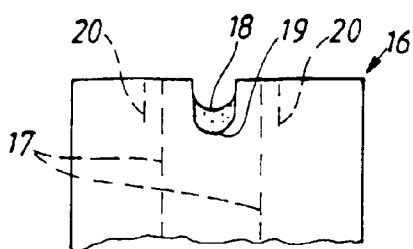


Fig. 2a

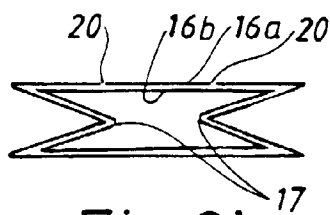


Fig. 2b

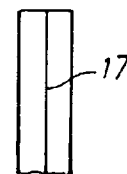


Fig. 2c

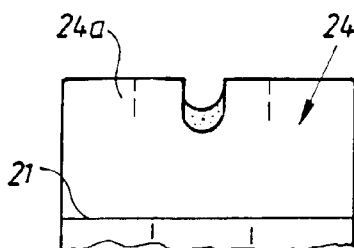


Fig. 3a

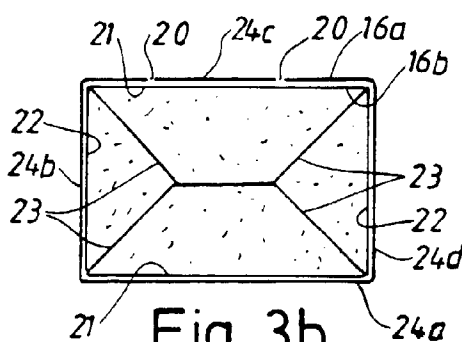


Fig. 3b

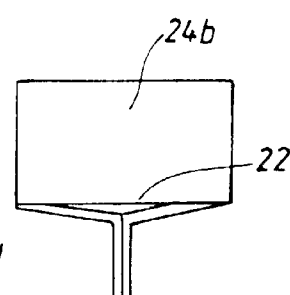


Fig. 3c

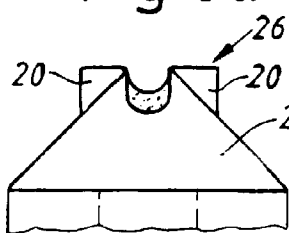


Fig. 4a

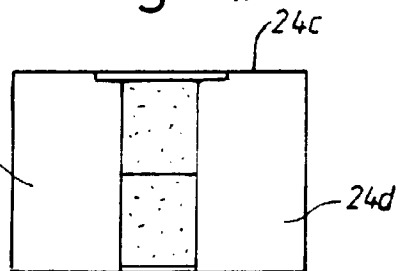


Fig. 4b

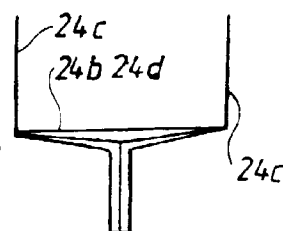


Fig. 4c

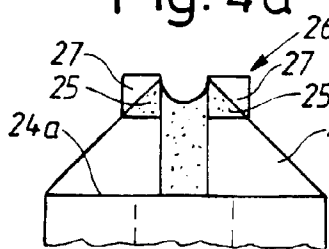


Fig. 5a

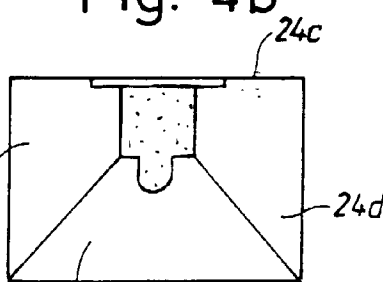


Fig. 5b

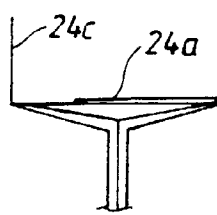


Fig. 5c

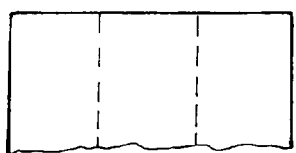


Fig. 6a

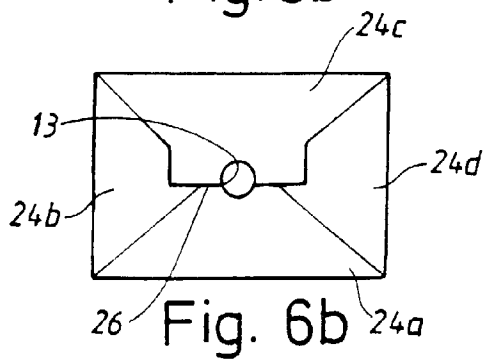


Fig. 6b

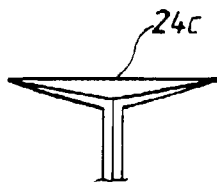


Fig. 6c