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 [45] Patented **Aug. 3, 1971**
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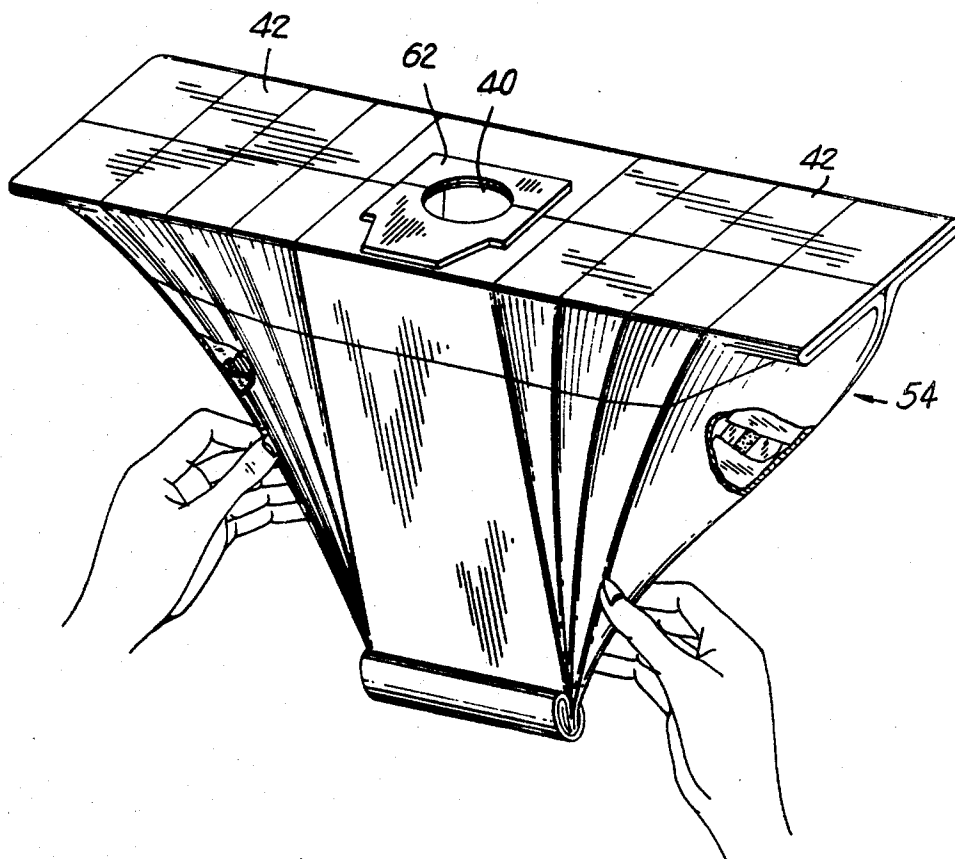
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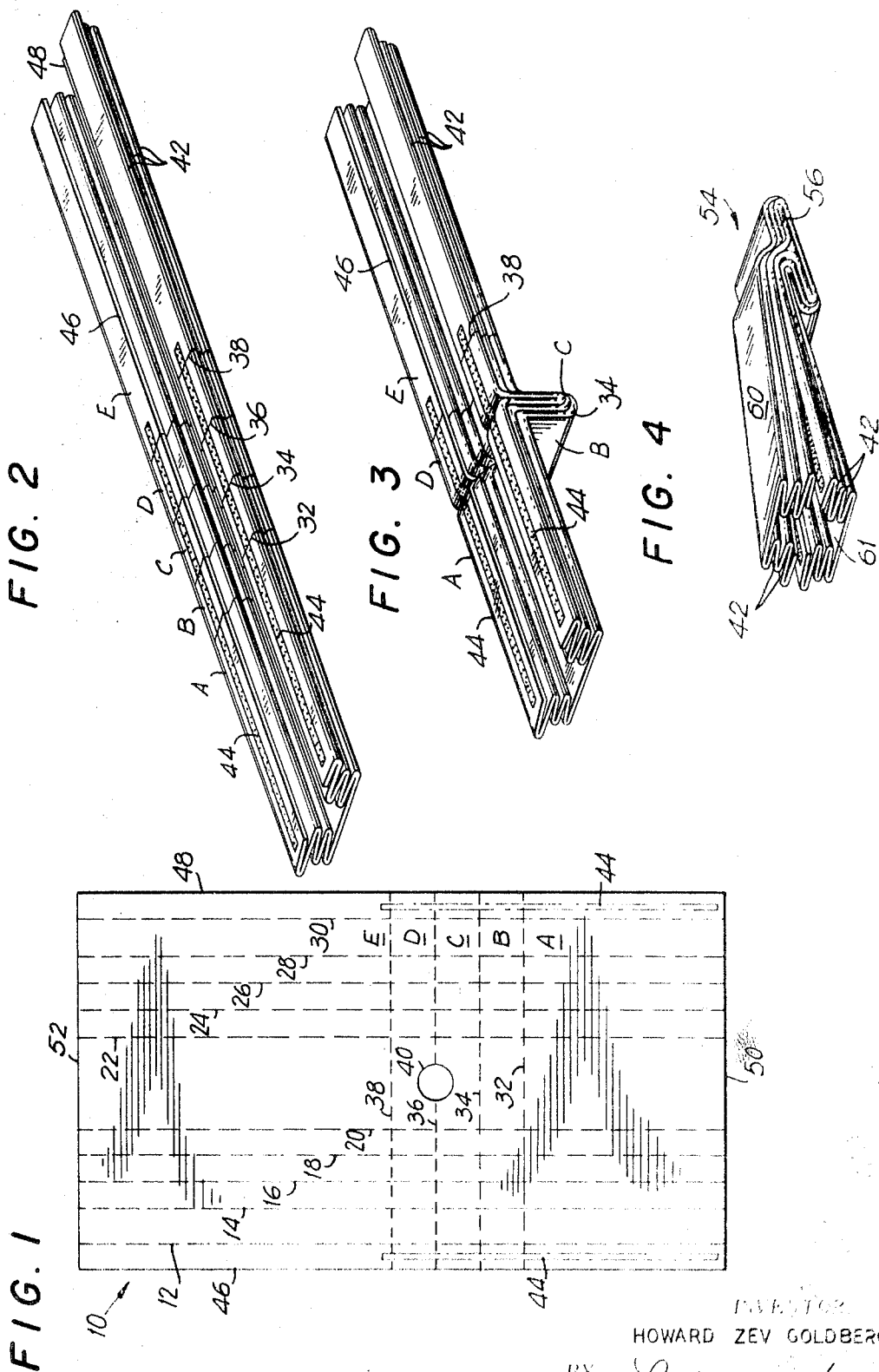
Primary Examiner—David M. Bockenek
Attorney—Lilling and Siegel

[54] **VACUUM CLEANER FILTER BAG**
8 Claims, 24 Drawing Figs.

[52] U.S. Cl..... **55/376,**
55/378, 55/381, 229/53, 229/55
 [51] Int. Cl..... **B01d 46/02**
 [50] Field of Search..... **229/54, 53,**
55, 62.5; 55/363, 367, 368, 376, 381, 382, 376,
378

ABSTRACT: The present invention pertains to a new and novel bag construction and the method of making same. The bag is formed of a flexible sheet material and has fold lines thereon, whereby the bag is formed by folding the same on the fold lines and results in the formation of a self-opening square construction. The bag may also have side pleats to result in a small compact bag which is readily expansible, which is readily adapted for manufacture on existing machinery and is particularly adapted for use in the manufacture of disposable vacuum cleaner filter bags.





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FIG. 5

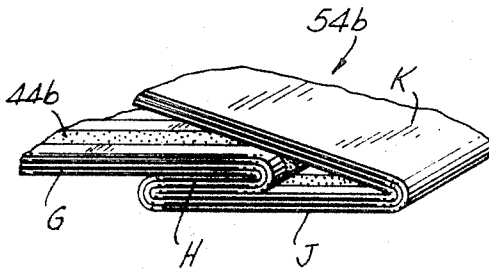


FIG. 6

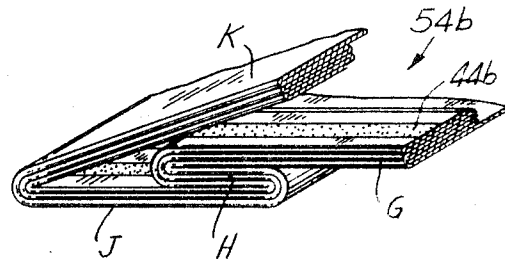


FIG. 7

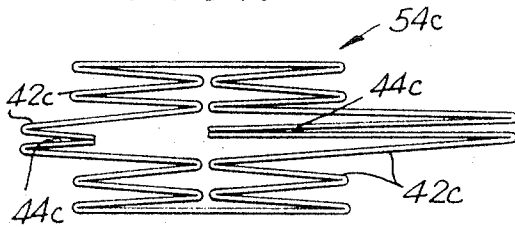


FIG. 8

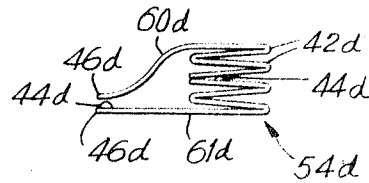


FIG. 9

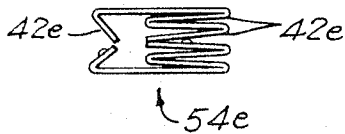


FIG. 10

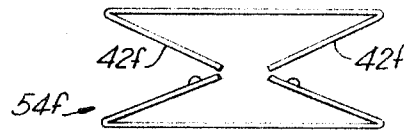
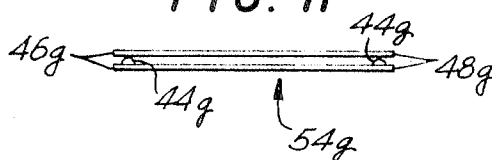


FIG. 11



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FIG. 12

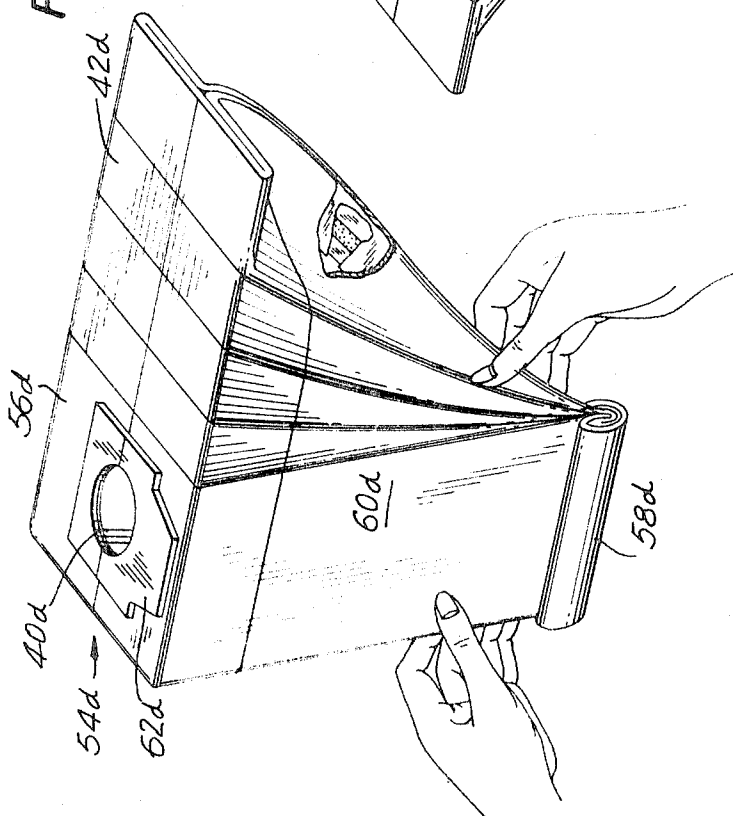
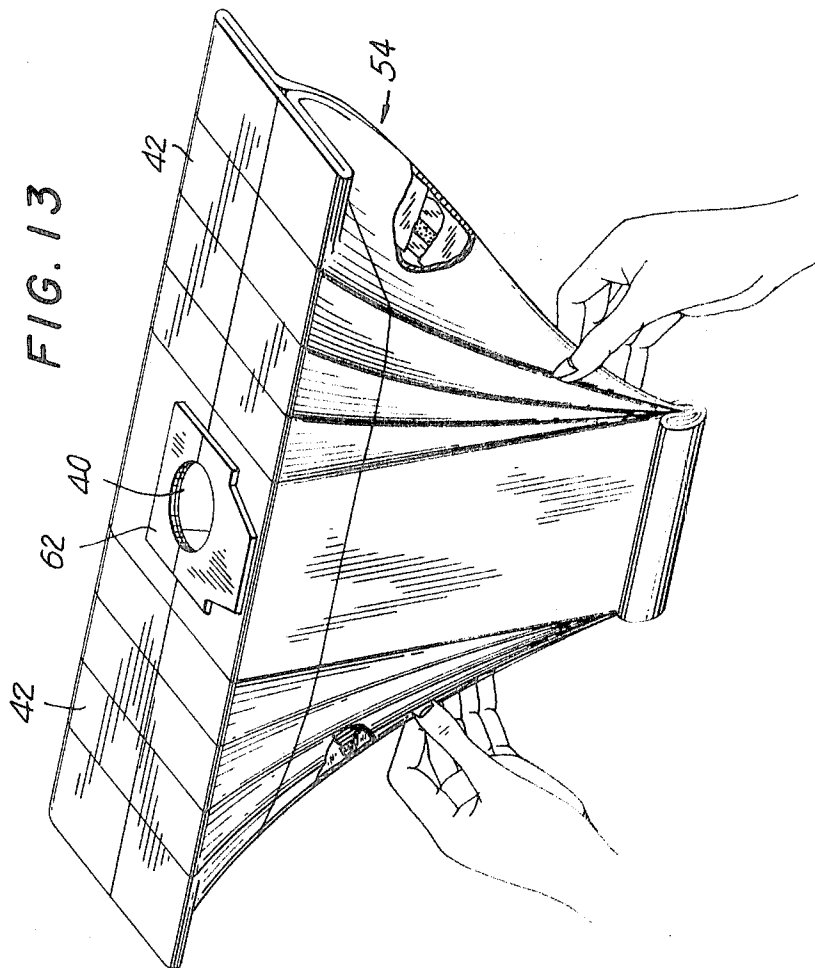


FIG. 13



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FIG. 14

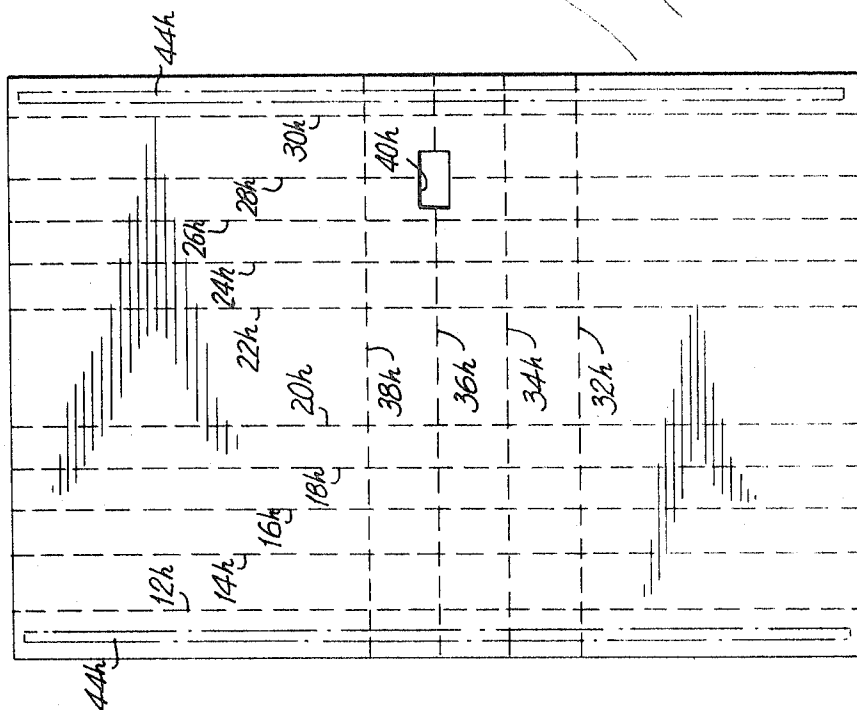
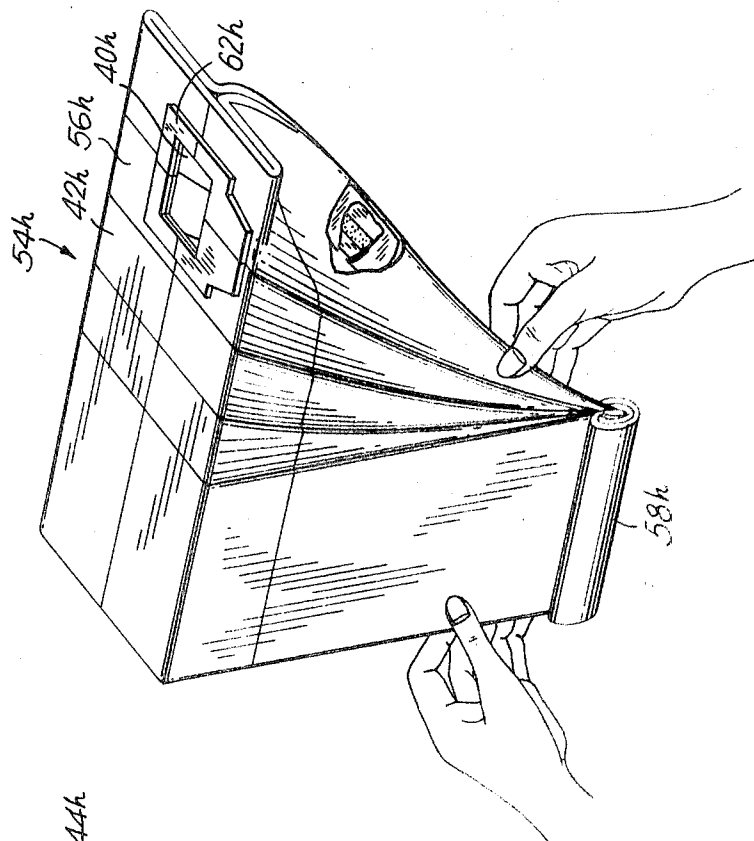


FIG. 15



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FIG. 18

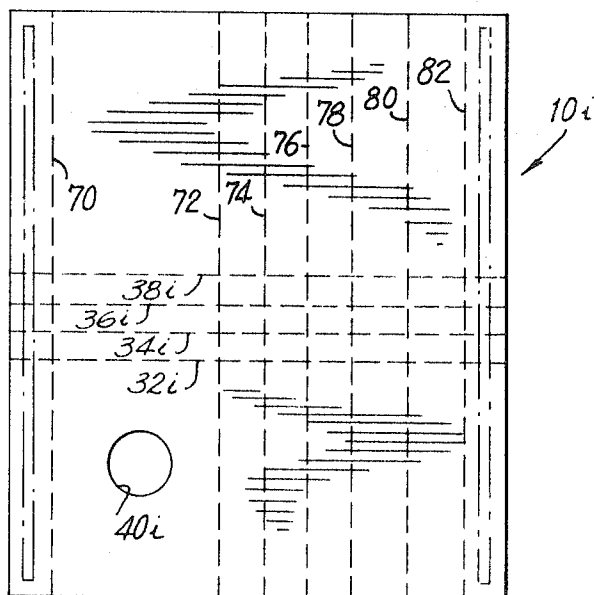


FIG. 17

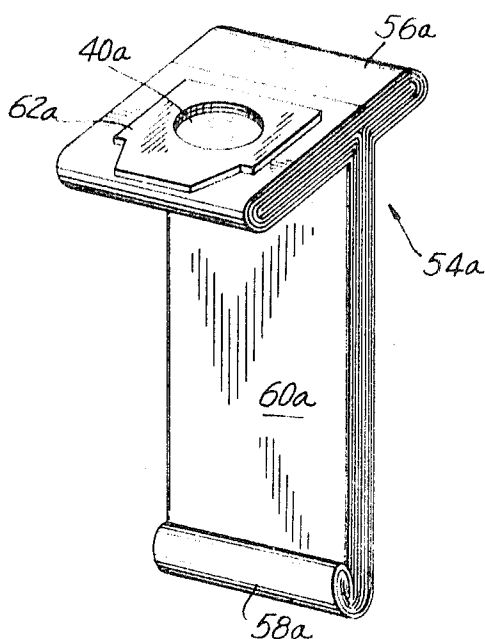
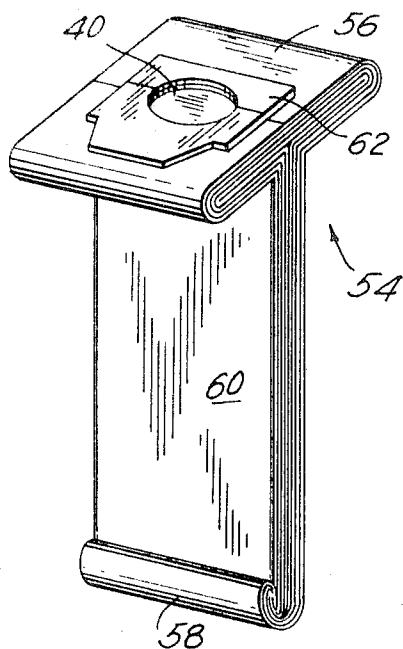


FIG. 16



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FIG. 19

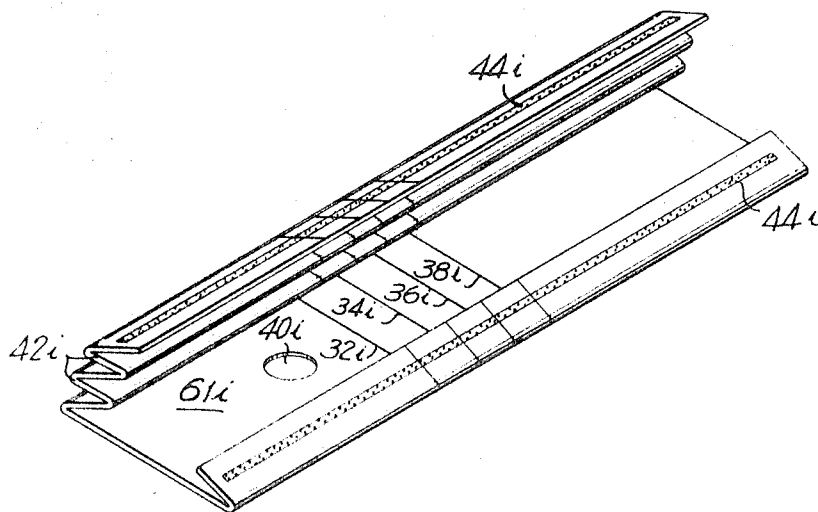
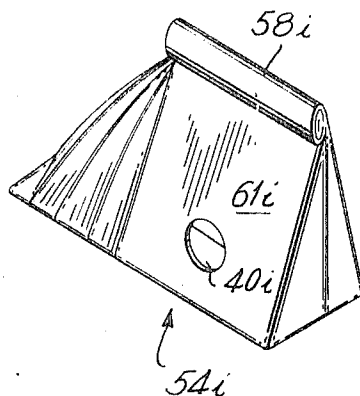


FIG. 20



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FIG. 21

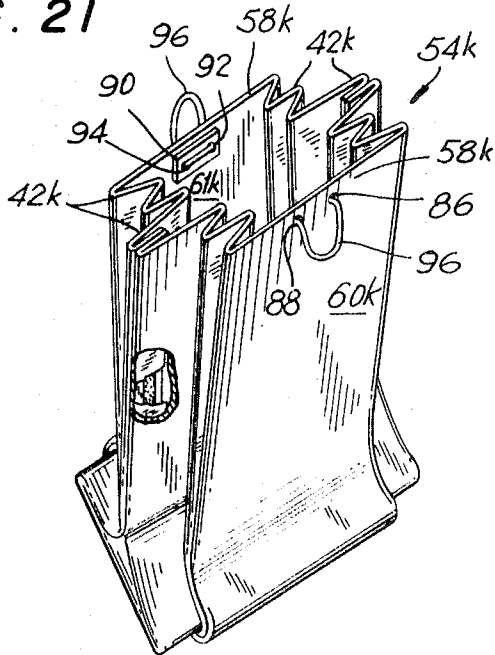
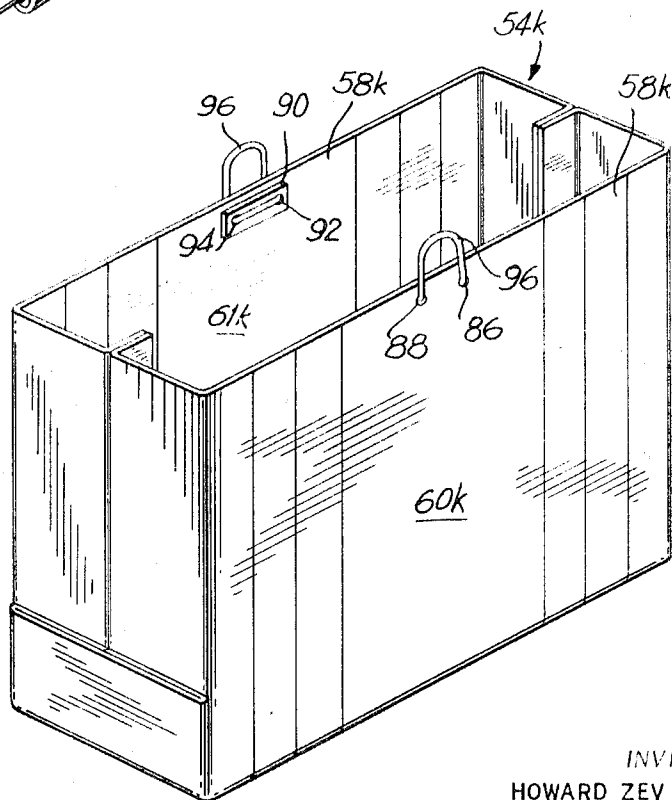


FIG. 22



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FIG. 23

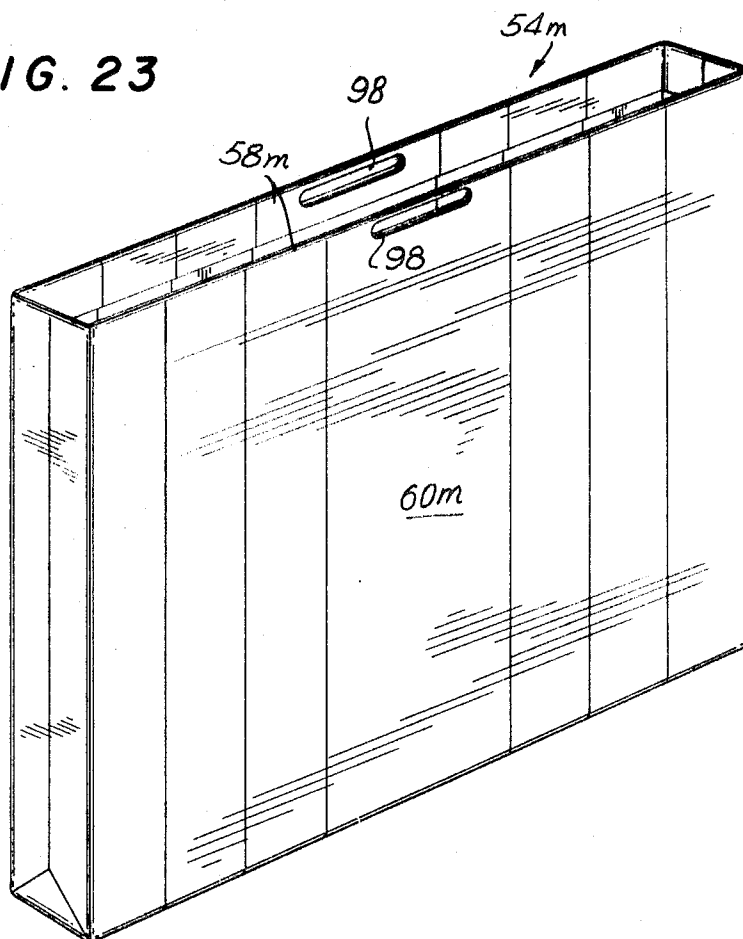
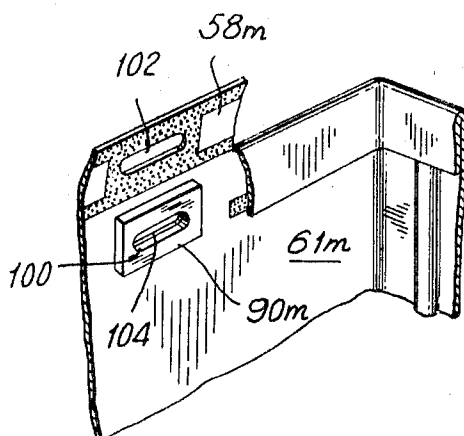


FIG. 24



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VACUUM CLEANER FILTER BAG

BACKGROUND OF THE INVENTION

The invention pertains generally to a new and novel bag construction and the method of making the same, and, in particular, to a bag having a self-opening square (SOS) construction. The bag construction of the present invention is intended for use in a multitude of general applications, but is primarily intended for use in the fabrication of disposable vacuum cleaner filter bags wherein the bags are constructed having an inlet opening.

Prior art filter bags have the disadvantage that they are fabricated on special-type machines whereby the bags are particularly adapted for use in conjunction with specific-type vacuum cleaners having a specific size and configuration.

SUMMARY

Accordingly, it is the primary object of the present invention to provide a new and novel bag construction and method of making the same.

It is another object of the present invention to provide a new and novel bag having a self-opening square construction.

It is a more particular object of the present invention to provide a new and novel vacuum cleaner filter bag whose volume is adjustable and whose geometric configuration can be easily and simply varied so as to be easily accommodated in various vacuum-cleaning apparatus and which can be easily, feasibly and relatively inexpensively manufactured by existing paper bag fabricating machinery.

It is yet another object of the present invention to provide a new and novel vacuum cleaner filter bag wherein the inlet opening to the bag is formed by the formation of an aperture in but a single layer of paper of the bag construction.

It is a further object of the present invention to provide a bag which can be manufactured on existing machinery wherein the width can be represented by the face and back thereof and the length by the gusset, as contrasted with present square opening bags whose end is either square or rectangular but which must have a section represented as the gusset as its width and a section represented by the face and back as the length.

The foregoing and other objects, features and advantages of the present invention will become more apparent from the detailed description to follow hereinafter when considered in conjunction with the accompanying drawings wherein:

BRIEF DESCRIPTION OF THE DRAWINGS:

FIG. 1 is a plan view of a blank utilized to form the bag of the present invention;

FIG. 2 is a perspective view of the blank after the longitudinal edges thereof have been folded over upon themselves to form pleats;

FIG. 3 is a perspective view of the blank after it has been transversely folded to form a portion of the bag bottom;

FIG. 4 is a perspective view of the bag blank after it has been folded transversely on itself so as to form the completed bag construction;

FIG. 5 is a partial perspective view illustrating the bag bottom being formed in accordance with another embodiment of the invention, and more particularly, of a bag bottom having a Z-type configuration;

FIG. 6 is a partial perspective view similar to that of FIG. 5 showing a bag bottom having an inverted Z-type configuration;

FIG. 7 is an end view of a bag fabricated in accordance with the principles of the present invention wherein there are an equal number of pleats on both sides of the bag, but wherein the pleats are varying in size;

FIG. 8 is an end view of another bag constructed in accordance with the principles of the present invention, wherein

there are no pleats formed on one side of the bag and there are a plurality of pleats formed on the other side of the bag;

FIG. 9 is an end view of the bag constructed in accordance with another embodiment of the present invention, wherein there is a single pleat formed on one side of the bag and a plurality of pleats formed on the other side of the bag;

FIG. 10 is an end view of the bag constructed in accordance with yet another embodiment of the present invention wherein the bag is formed with but a single pleat on each side thereof;

FIG. 11 is an end view of a bag formed in accordance with a further embodiment of the present invention wherein the bag is formed having a square-type bottom with no pleats on either side thereof;

FIG. 12 is a perspective view of a bag constructed in accordance with the embodiment of FIG. 8, in its expanded condition and with the top end of the bag folded over itself to seal the bag;

FIG. 13 is a perspective view of an expanded bag formed in accordance with the embodiment of the invention depicted in FIG. 4;

FIG. 14 is a plan view of another bag blank, formed in accordance with another embodiment of the present invention;

FIG. 15 is a perspective view of an expanded bag formed from the bag blank depicted in FIG. 14;

FIG. 16 is a perspective view of a bag construction formed from the blank depicted in FIG. 1, and wherein the inlet opening is centrally disposed in the bottom of the bag;

FIG. 17 is a perspective view, similar to that of FIG. 16, of a bag construction having a laterally offset inlet opening formed in the bag bottom;

FIG. 18 is a plan view of a blank utilized in the fabrication of a bag in accordance with another embodiment of the present invention;

FIG. 19 is a perspective view of the bag blank of FIG. 18 partially assembled;

FIG. 20 is a perspective view of the bag construction formed from the blank depicted in FIG. 18;

FIG. 21 is a perspective view of a bag assembly constructed in accordance with another embodiment of the present invention;

FIG. 22 is a perspective view of the bag assembly of FIG. 21 in its expanded configuration;

FIG. 23 is a perspective view of an expanded bag assembly constructed in accordance with yet another embodiment of the present invention; and

FIG. 24 is a partial perspective view of the handle construction of the bag assembly depicted in FIG. 23.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, and more particularly to FIGS. 1 through 4 thereof, there is shown a blank generally designated by the reference numeral 10, which is used to form the bag of the present invention, which is particularly intended for use as a vacuum cleaner filter bag. It is to be noted, however, that the bag has a multitude of general uses, several of which will be discussed in detail hereinafter.

The blank 10 is preferably formed of paper sheet material, such as single ply or multiple ply sheet material dispensed from a continuous roll of paper, and is generally of a rectangular configuration but may also be of square configuration. The blank 10 is provided with longitudinal fold lines 12, 14, 16, 18, 20, 22, 24, 26, 28, and 30 and transverse fold lines 32, 34, 36, and 38. The longitudinal fold lines may be equally or unequally spaced from one another; however, as shown in FIG. 1 herein, the outermost fold lines 12 and 30, those closest to the longitudinal edges of the blank 10, are spaced further from their adjacent fold lines 14 and 28, respectively, than are the other fold lines, the purpose of which will appear more fully hereinafter.

The transverse fold lines may be either equally or unequally spaced from one another, but as shown herein are equally spaced from one another.

The resultant bag structure is one which is small and compact and is relatively flat to permit the bags to be stored flush one upon the other. In use, the bags are easily expanded by pulling out the pleats formed by means of the longitudinal fold lines.

The blank 10 is also provided with an opening 40, which is herein depicted as circular, but which may have any other desired configuration and which serves as an inlet opening to the completed filter bag, as will be discussed hereinafter.

The bag is formed by first folding the blank 10 along the longitudinal fold lines 12, 14, 16, 18, 20, 22, 24, 26, 28 and 30, so as to form the partially completed assembly depicted in FIG. 2, wherein the folds produce a plurality of pleats or gussets 42.

As illustrated herein, the blank 10 may have glue or other type of adhesive layers 44 applied thereto between the longitudinal fold lines 12 and 30 and the longitudinal side edges of the blank 46 and 48, respectively. Alternately, the adhesive layers 44 may be applied to the uppermost surface layer of the gussets 42 formed after the blank 10 has been folded along the longitudinal fold lines, as shown in FIG. 2.

The transverse end edge 50 and transverse fold line 32 define a panel A, transverse fold lines 32 and 34 define a panel B, transverse fold lines 34 and 36 define a panel C, transverse fold lines 36 and 38 define a panel D, and transverse fold line 38 and transverse end edge 52 define a panel E.

In the next step of the assembly of the blank 10, the longitudinally folded blank, as shown in FIG. 2, is folded upon the transverse fold lines in the following manner. The blank is folded upon the fold lines 32, 34 and 36 such that the panels B and C are positioned perpendicularly downward with respect to the longitudinal dimension of the blank and are disposed in abutting engagement with one another. The panels B and C are securely fastened to one another by means of that portion of the adhesive layers 44 disposed therebetween. The resultant structure is that depicted by FIG. 3.

In the next step of the assembly, the blank 10, and more particularly, the panel E is folded upwardly upon the fold line 38, as viewed in FIG. 3, and placed upon the panels A and D in abutting engagement. The panel E is then securely fastened to the panels A and D by means of that portion of the adhesive layers 44 which are disposed therebetween.

The resultant structure is the bag generally designated by the reference numeral 54 and which is most clearly shown in FIG. 4. The resultant bag has a plurality of gussets 42 with the center one thereof being slightly larger than the rest and extending farthest laterally outward which facilitates the pulling out of all the pleats by virtue of the easy access to the center one thereof. The bag 54 has a rectangular or square self-opening bottom 56.

The final steps of the assembly are to close the upper end of the bag generally designated 58 by folding the same upon itself and securing the same to the front sidewall 60 by means of an adhesive, by stapling or by any other suitable means as best seen in FIG. 16. The bag also includes a rear side wall 61, best seen in FIG. 4. Also, a cardboard insert or collar 62 is secured about or within the opening 40 formed in the bag bottom 56 and secured thereto by one of a number of suitable ways, as is well known in the art; such as by adhesively securing the collar 62 to the bottom 56.

It is to be noted that in the completed bag construction, the center gusset is slightly larger than the remaining gussets 42, and projects laterally outward from the bag 54 further than the remaining gussets. This facilitates the pulling apart of the gussets 42 and the expansion of the bag since it is extremely simple to grasp the laterally extending central gussets on either side of the bag and to simultaneously pull them outwardly away from the bag. Of course, the sides of the bag can also be flush, or they can be projected. If desired, pulling means, such as pull tabs, etc., can be utilized to pull out the side gussets.

It is to be noted that the bag 54 need not be constructed so as to have a perfectly symmetrical configuration; i.e., with the

sidewalls being centrally disposed with respect to the bag bottom 56 or with the inlet opening 40 centered within the bag bottom 56.

A similar bag construction to that shown by FIG. 16 is depicted by FIG. 17 wherein similar parts are denoted by similar reference numerals and wherein the bag 54a may be termed to be of a nonsymmetrical construction. In this embodiment, the sidewalls are formed laterally offset from the centerline of the bag bottom 56a. Moreover, the inlet opening 40a is also laterally offset from the center of the bag bottom 56a.

It is to be noted that in both of the bag constructions depicted by FIGS. 16 and 17, the inlet openings are formed within the bag bottoms and that the inlet opening is formed by the perforation of but a single layer of sheet material.

Referring now to FIGS. 5 and 6, there is shown another form of the invention depicting an alternative method of forming the SOS bag. In FIG. 5, the bag 54b is formed from a blank similar to that depicted in FIG. 1. The blank, in this instance, has only three transverse fold lines (not shown), which divides it into four sections or panels, G, H, J and K. The blank is folded and assembled into the bag 54b by first placing the panel H in abutment with a portion of the panel J, the same being adhesively secured together by that portion of the adhesive layer 44b interposed therebetween; and then the panel K is secured to the remaining portion of the panel J and to the panel G by means of that portion of the adhesive layer 44b interposed between the aforesaid panels. This construction is generally denoted a "Z-type" construction. In the above example, the length of section K is equal to the effective length of the sections G, H and J.

With regard to FIG. 6, there is shown precisely the same structure as that depicted in FIG. 5, except that the bag is formed from an inverted "Z-type" construction, as depicted in FIG. 6 and wherein similar parts are denoted by similar reference numerals.

The bag constructions described previously hereinabove and more particularly those of the embodiments of FIGS. 4, 5 and 6 may be formed having various body configurations, several of which are depicted in FIGS. 7 through 11, as will hereinafter be discussed in detail.

With reference to FIG. 7, there is shown a bag 54c having a plurality of gussets or pleats 42c formed on both sides thereof. The center pleats, on both sides of the bag, are made somewhat larger or wider than the remainder of the pleats on the respective sides, with the center pleats on one side being larger than the center pleats on the other side. The individual layers forming the central pleats being secured by means of the adhesive layer 44c.

FIG. 8 depicts a bag 54d having a plurality of equal size pleats 42d on one side thereof with the center pleat being joined by an adhesive layer 44d, while the other side of the bag is formed without any pleats by merely securing the longitudinal edge 46d of the front and rear sidewalls 60d and 61d together by means of another adhesive layer 44d.

In FIG. 9, there is shown a body construction wherein a bag 54e has a plurality of equal size pleats 42e formed on the one side thereof, and a single pleat 42e formed on the other side thereof.

FIG. 10 depicts a bag 54f which is formed with but a single gusset 42f on each side thereof.

In FIG. 11, there is shown a bag 54g which although having the SOS-shaped bottom, is formed without any pleats on either side thereof. In this construction, the bag has the longitudinal side edges 46g and 48g secured to one another, respectively by means of the adhesive layers 44g interposed therebetween.

Referring now to FIG. 12, there is shown the bag construction 54d of FIG. 8 in its expanded configuration. The top end 58d of the bag is folded upon itself and secured to the front sidewall 60d in substantially the same manner as was the top end 58 with regard to FIG. 16.

It is herein to be noted that the top end may be secured in a variety of other ways other than that described hereinabove.

For example, the top end may be closed by taping, stapling, adhesive securing, or in any other conventional manner. Moreover, the end may have either a single or double roll formed thereat.

Circumposed about the inlet opening 40*d* is a collar 62*d* secured to the bag bottom 56*d*, which has been enlarged by the extension of the pleats 42*d*.

FIG. 13 depicts the bag construction 54 shown in FIG. 4, and more particularly, as shown in FIG. 16, in its expanded configuration. In this configuration the inlet opening 40 and the collar 62 circumposed thereabout, are centrally positioned with respect to the bag bottom which has now been greatly enlarged by the extension of the pleats 42 on both sides of the bag 54. It will be readily apparent that the bag 54 in its expanded configuration is substantially larger than the bag in its contracted position, as shown in FIG. 16, i.e. the bag has substantially V-shaped configuration.

Another embodiment of the present invention is depicted in FIG. 14, where there is shown a bag blank substantially similar to that depicted in FIG. 1 and where in similar parts are denoted by similar reference numerals. The only distinction between the blank shown in FIG. 14 and that shown in FIG. 1 is that in the blank of FIG. 14, the opening 40*h* is not centrally disposed with respect to the blank, but is positioned on the longitudinal fold line 28*h* and on the transverse fold line 36*h*.

The bag formed by the blank 10*h* is shown in FIG. 15 and is designated by the reference numeral 54*h*. The bag is formed by first folding the blank 10*h* along the longitudinal fold lines 12*h*, 14*h*, 16*h*, 18*h*, 20*h*, 22*h*, 24*h*, 26*h*, 28*h* and 30*h*. The bag is then folded along the transverse fold lines 32*h*, 34*h*, 36*h*, and 38*h*. The panels of the bag are then secured by means of the adhesive layers 44*h*, in the manner described hereinbefore in conjunction with the embodiment of FIG. 1.

When the bag 54*h* has been constructed and the end 58*h* has been formed, in the manner described hereinbefore, a collar 62*h* is secured to that portion of the bag bottom 56*h* formed by the extension of the pleats 42*h*, and the collar is circumposed about the inlet opening 40*h*. The resultant structure is a wedge-shaped bag having an inlet opening formed in the gusset structure, per se.

This type of wedge-shaped filter bag having the inlet opening in the bottom portion of the bag which is laterally offset from the main body structure, is required in certain type of vacuum cleaner appliances wherein the wedge-shaped filter bag construction of FIG. 12 is unsuitable. It is thus seen that the bag construction in the present invention permits the construction of this type of bag which has heretofore been exceedingly difficult and unsatisfactory.

Referring now to FIG. 18, there is shown another bag blank generally designated by the reference numeral 10*i*, which is constructed in the manner similar to that of the bag blank 10 shown in FIG. 1. However, in the blank 10*i*, the inlet opening 40*i* is formed in the blank such that the opening will be in the rear sidewall of the final bag construction denoted by the reference numeral 54*i*, and as shown in FIG. 20.

The blank 10*i* includes longitudinal fold lines 70, 72, 74, 76, 78, 80, and 82. The blank also includes transverse fold lines, 32*i*, 34*i*, 36*i*, and 38*i*. The bag 54*i* is formed by first folding the blank 10*i* along the longitudinal fold lines 70, 72, 74, 76, 78, 80 and 82, so as to result in the subassembly depicted by FIG. 19. The blank is then folded along the transverse fold lines 32*i*, 34*i*, 36*i*, and 38*i* in the manner described hereinbefore, whereby the panels are secured to another by means of the adhesive layers 44*i*. The top end 58*i* of the bag is then folded over a part of itself and secured with respect to the rear sidewall 61*i*.

It is herein to be noted that the bag 54*i* is formed having a plurality of pleats on one side and only a single pleat on the other side, wherefore, when the pleats are extended, the resultant configuration is substantially wedge-shaped. However, it will be appreciated that the wedge-shaped construction of the bag 54*i* is substantially different from that of the wedge-shaped constructions of the bag 54*d* and 54*h* shown in FIGS. 8 and 15, respectively.

It is thus seen that there is provided a bag construction which is capable of producing a multitude of various shaped configurations in size bags from a basic simple construction, wherein the bags are particularly adapted for use as vacuum filter bags in conjunction with vacuum cleaning devices having various geometrical-shaped inlet chambers for the reception of vacuum cleaner filter bags.

Referring now to FIG. 21, there is shown another embodiment of the present invention, and more particularly, a shopping or carrying bag which is depicted generally by the reference numeral 54*k*.

The bag 54*k* is formed from a blank which is substantially the same as that depicted in FIG. 1, except that the inlet hole 40 would not be present in the blank used to form the bag 54*k*.

The upper end, or ends, 58*k* of the bag, have a pair of apertures, 86 and 88, formed therein. Disposed on the inner surfaces of the front sidewall 60*k* and the rear sidewall 61*k*, at the upper end 58*k*, are reinforcing members 90 having apertures 92 and 94 formed therein. The reinforcing members are secured to the inner surfaces of the front and rear sidewalls by any suitable securement means, such as by adhesive. The apertures 92 and 94 are in alignment with the apertures 86 and 88, respectively, formed in the upper end of 58*k* of the bag. Flexible carrying handles 96 are passed through the aligned apertures 86, 92 and 88, 94. These carrying handles may be fabricated of string, fabric or any other suitable type of material.

It is thus seen that the bag 54*k* provides a shopping or carrying bag which can be folded into a very small compact package or, as shown in FIG. 6, may be expanded by the extension of the pleats 42*k* to form a relatively large capacity shopping bag.

Another shopping bag, generally designated by reference numeral 54*m*, is depicted in FIGS. 23 and 24. The construction of the bag 54*m* is substantially the same as of that of the bag 54*k* shown in FIGS. 21 and 22. In this embodiment, however, the upper ends 58*m* of the bag are formed with apertures or slots 98 therein which serve as the carrying means or handles for the bag 54*m*.

As best seen in FIG. 24, the inner surface of the front sidewall 60*m* and the rear sidewall 61*m* have reinforcing members 90*m* secured thereto, preferably by adhesive, at a position disposed adjacent the top ends 58*m*. The reinforcing members have a slot 100 formed therein, while the walls 60*m* and 61*m* have a slot 102 formed in the top end 58*m* and another slot 104 formed in vertical alignment with the slot 102 therebelow. The slot 100 is in alignment with the slot 104, and the top 58*m* is adapted to be folded over and secured upon itself, whereby the slots 102 will then be in alignment with the slots 100 and 104 to thereby form the slot 98, depicted in FIG. 23.

It is thus seen that I have provided new and novel bag construction and method of making the same, which results in all-purpose utility bags, specialized vacuum cleaner filter bags and in specialized shopping or carrying bags.

While I have shown and described the preferred embodiments of my invention, it will be apparent to those skilled in the art that there are many changes, modifications and improvements which may be made therein, without departing from the spirit and scope thereof, as defined in the appended claims.

I claim:

1. A vacuum cleaner filter bag having a closed flat bottom and inlet means formed from a blank comprising at least one ply of flexible sheet material, such as paper, said sheet including a plurality but not more than four fold lines extending transversely thereof and a plurality of longitudinal fold lines along at least one of the longitudinal side edges of said sheet, said transverse fold lines being disposed at the central portion of said sheet and longitudinally displaced from the center thereof, said sheet being folded upon said longitudinal fold lines to form a plurality of longitudinally extending side pleats and upon said transverse fold lines to form a plurality of sec-

tions disposed in selectively secured superposed relationship along at least a portion of said longitudinal side edges so as to form said bag with at least one pleated side, the length of one of said sections in the flat folded condition being equal to the effective length of the other sections, and said central portion of said sheet comprising the closed flat bag bottom.

2. The bag according to claim 1, wherein said inlet means comprises an aperture formed in one of said sections, the ends of said sheet being secured with respect to one another to seal the open top end of said bag, and said aperture being adapted to cooperate with a vacuum cleaner inlet element.

3. The bag according to claim 1, wherein said inlet means comprises an aperture formed in said pleated side edge, the ends of said sheet being secured with respect to one another to seal the open top end of said bag, and said aperture being adopted to cooperate with a vacuum cleaner inlet element.

4. A bag according to claim 1, wherein said sheet is formed having a plurality of longitudinal fold lines along each of the side edges thereof and thus a plurality of pleats on each side thereof.

5. A bag according to claim 4, wherein the number of longitudinal fold lines on each side of said sheet are equal to thereby form an equal number of pleats on each side of said sheet.

6. A bag according to claim 4, wherein the longitudinal fold lines formed along at least one of the side edges of said sheet are unequally spaced from each other to thereby form pleats of unequal width.

7. A bag according to claim 4, wherein the number of longitudinal fold lines formed along one of said edges of said sheet are different from the number of fold lines formed along the other of said side edges thereby forming a different number of pleats on one side of said sheet than on the other side of said sheet.

8. A vacuum cleaner filter bag according to claim 3, wherein said aperture traverses one of said longitudinal fold lines and is partially disposed in one of said pleats and partially in another pleat immediately adjacent said one pleat.

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