Jan. 10, 1967 J. J. FESCO 3,297,232

VACUUM CLEANER FILTER BAG

Filed Nov. 27, 1964 5 Sheets-Sheet 1

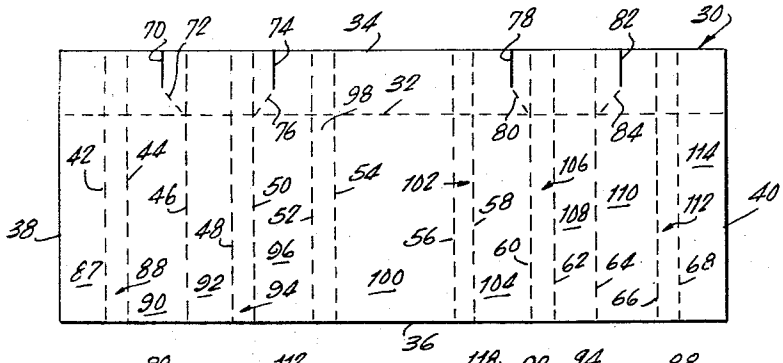


FIG. 1

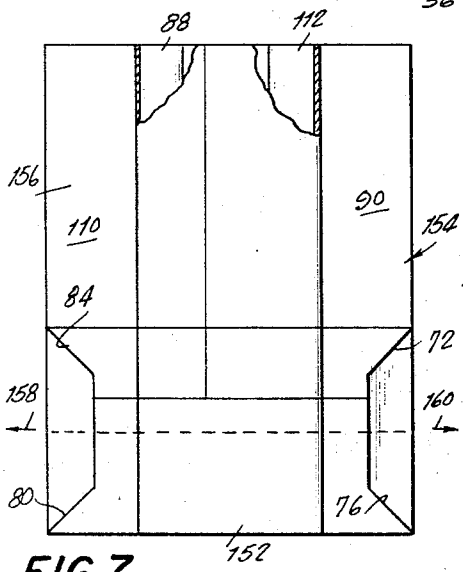


FIG. 7

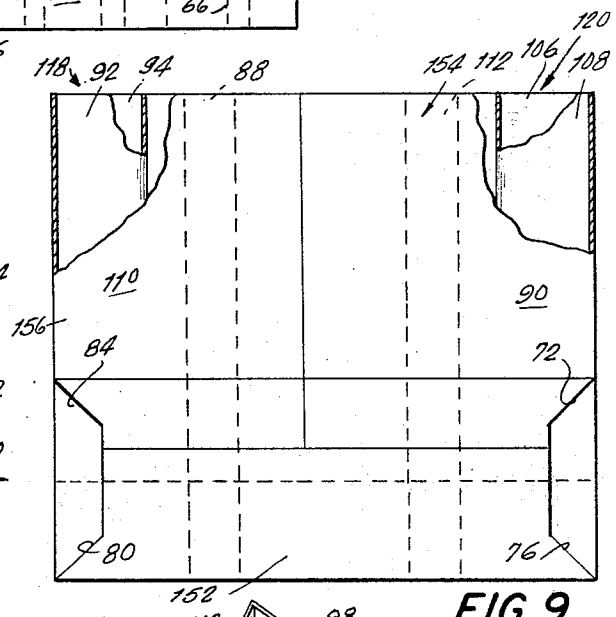


FIG. 9

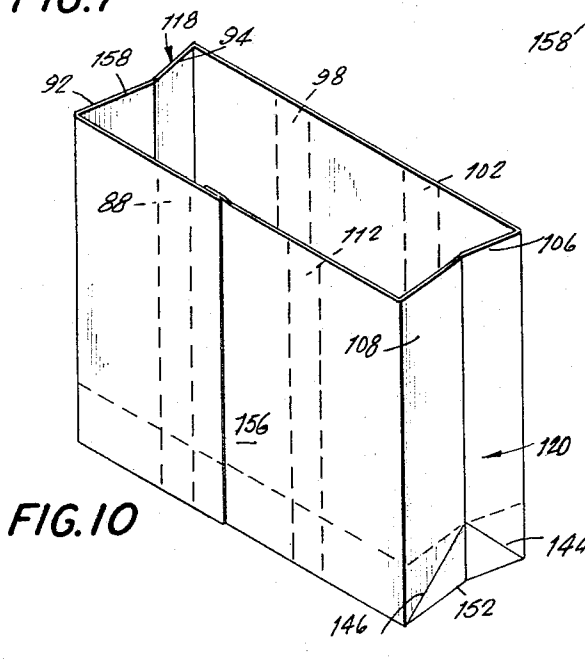


FIG. 10

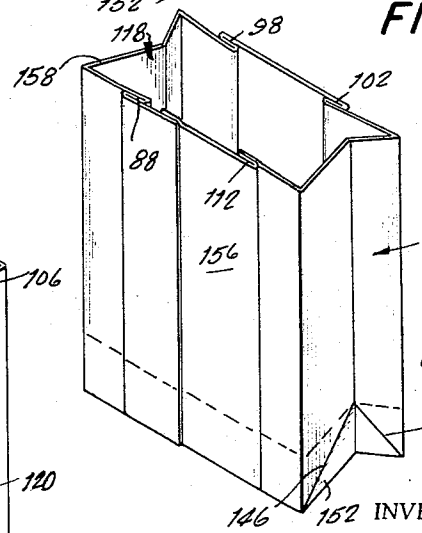


FIG. 8

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FIG. 2

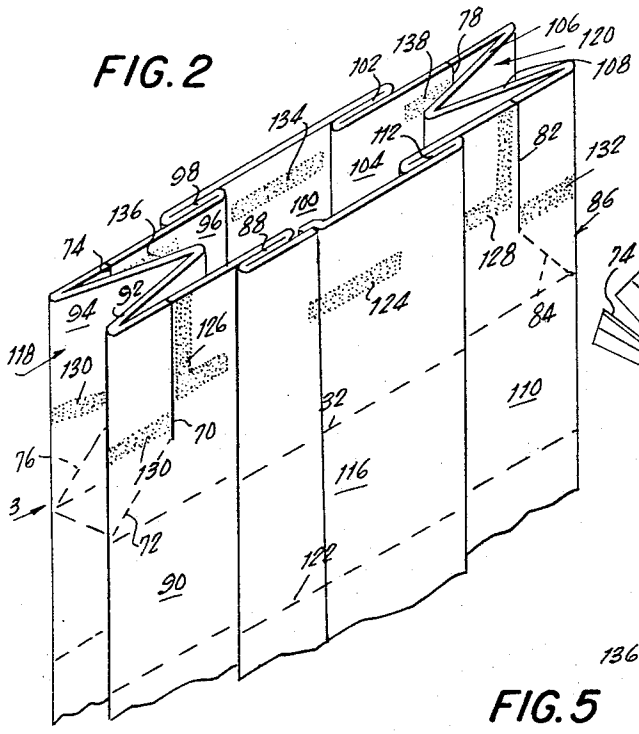


FIG. 3

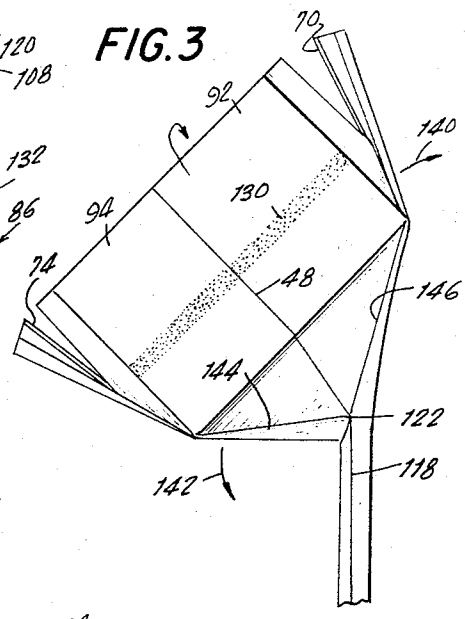


FIG. 5

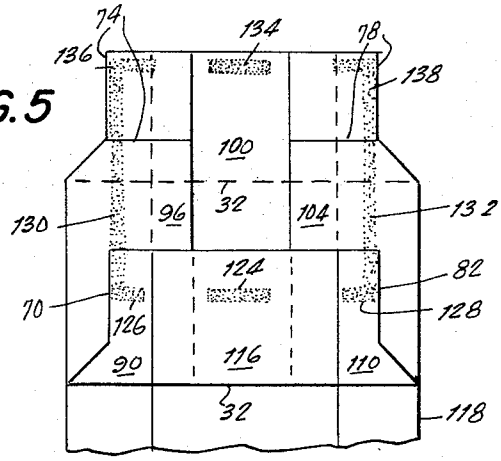


FIG. 4

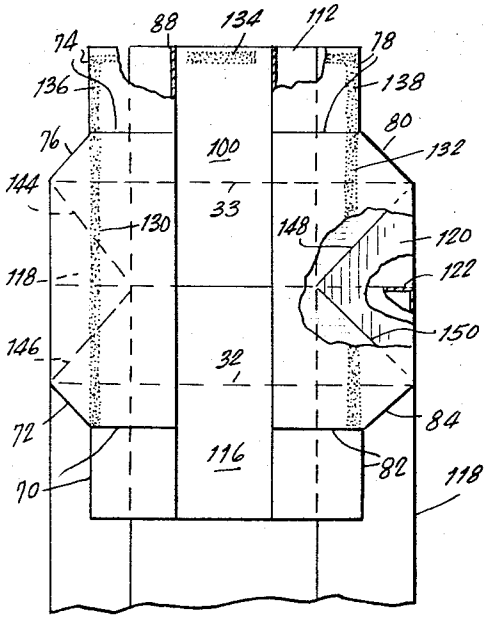
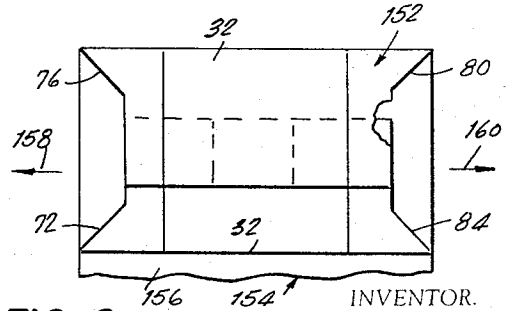


FIG. 6



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FIG. 11

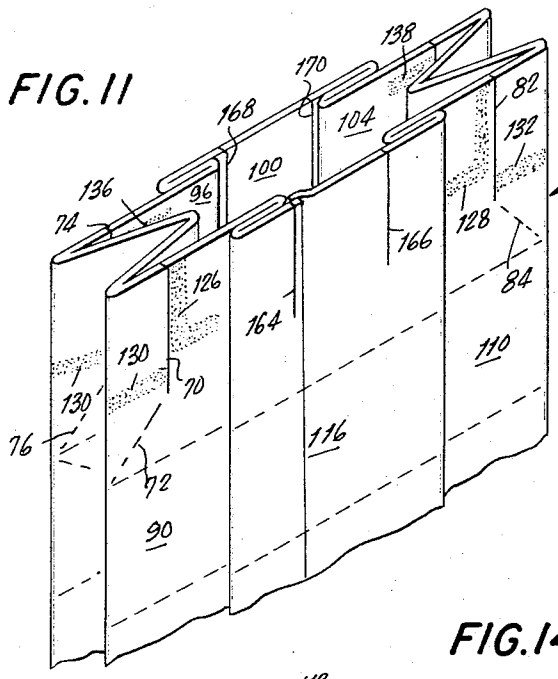


FIG. 12

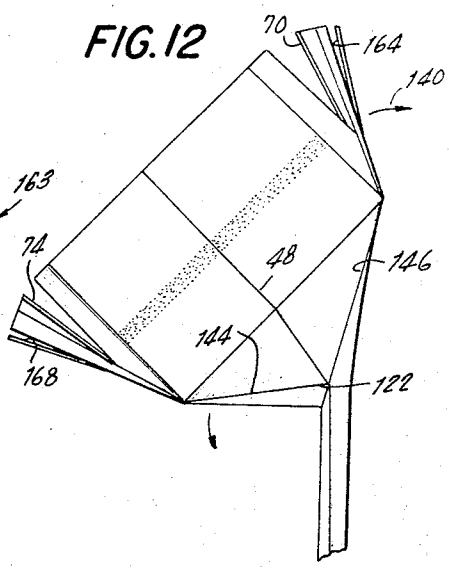
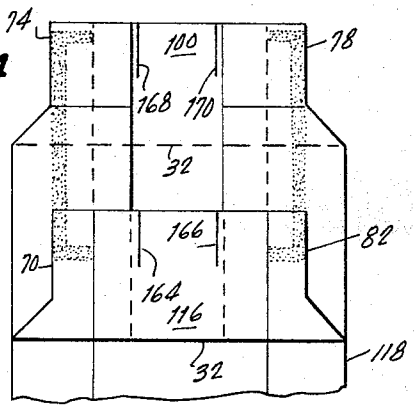


FIG. 14



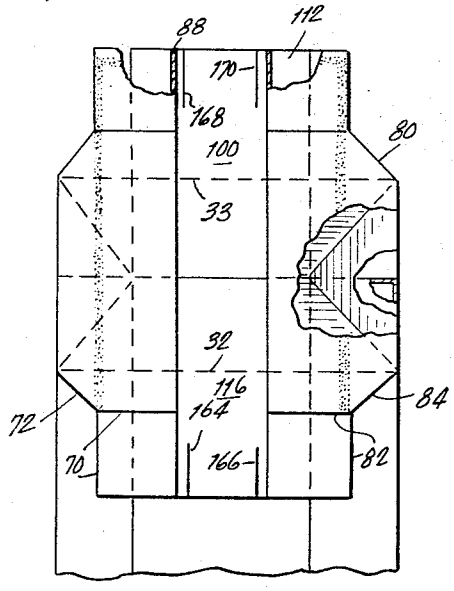


FIG. 13

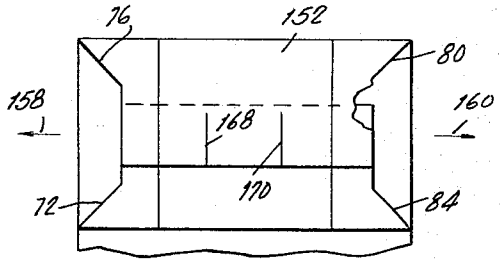


FIG. 15

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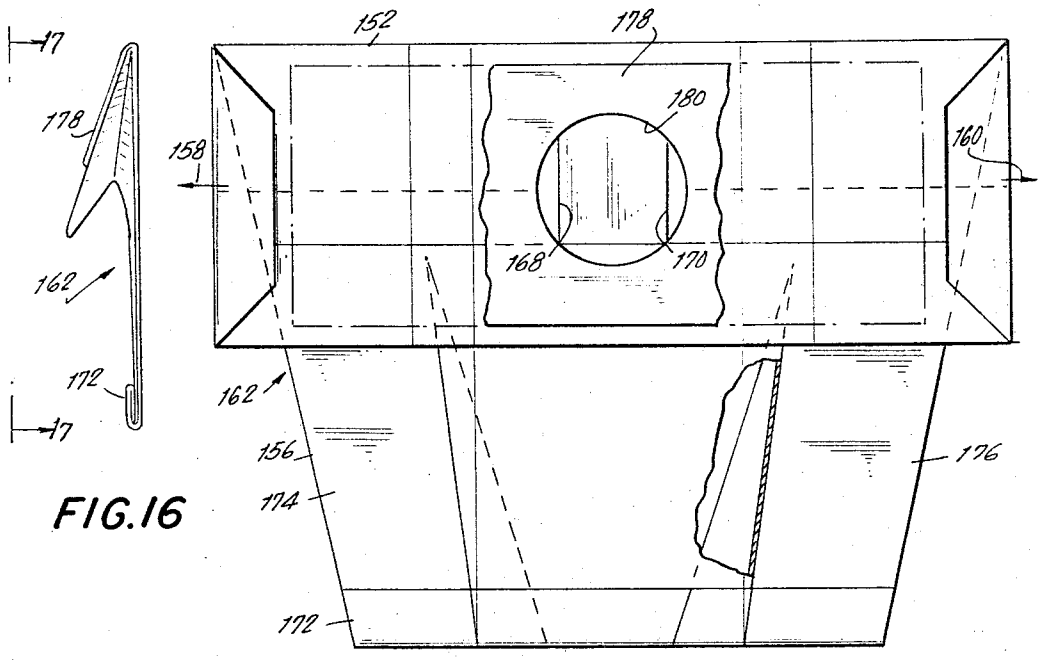


FIG. 16

FIG. 17

FIG. 18

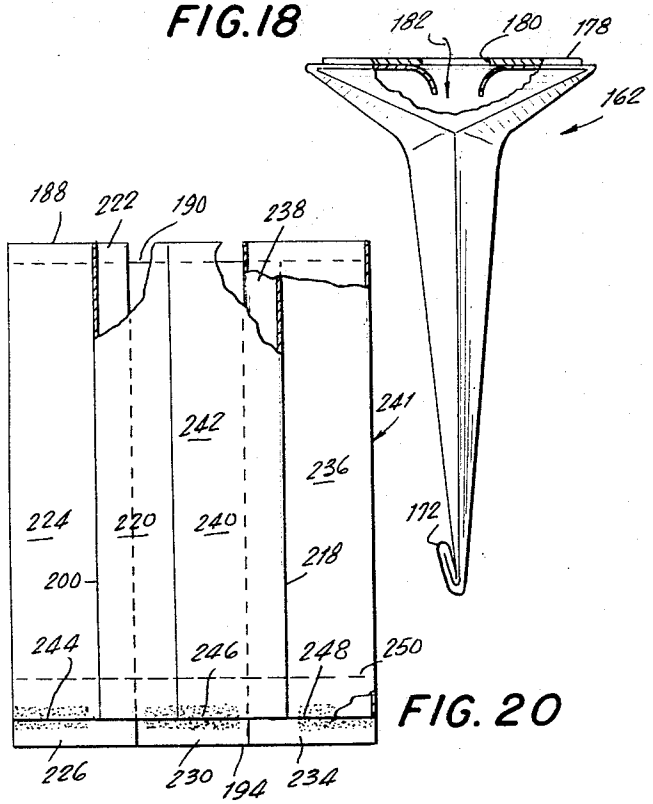


FIG. 20

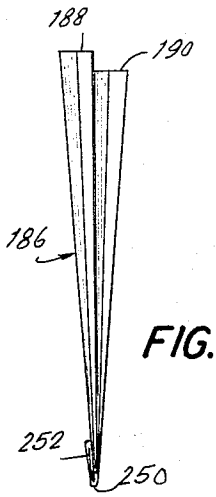


FIG. 21

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FIG. 19

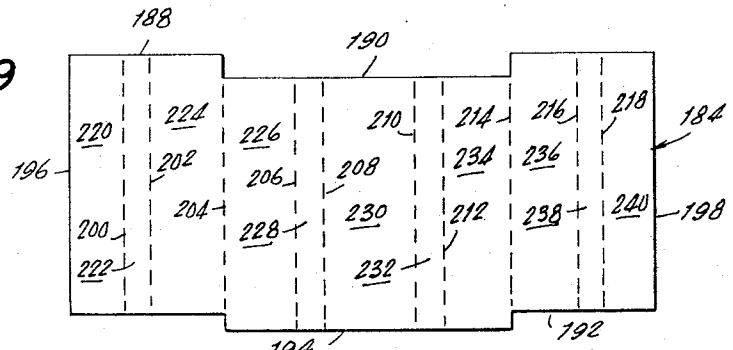
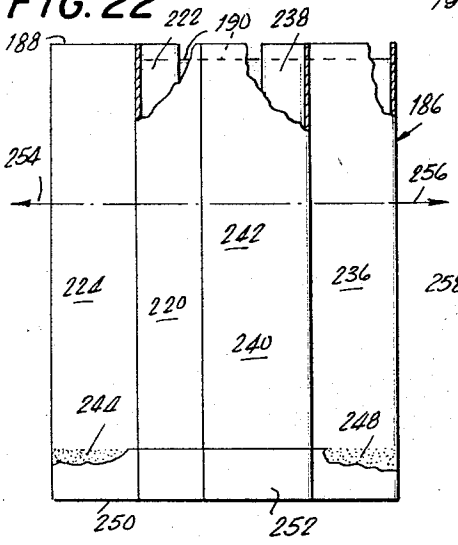


FIG. 22



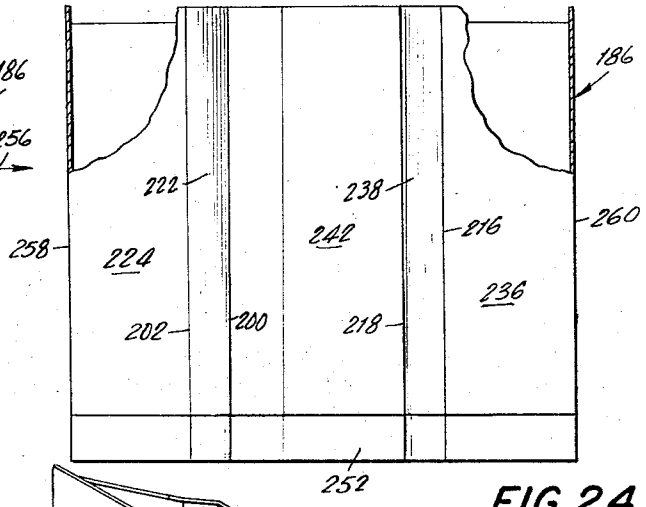


FIG. 24

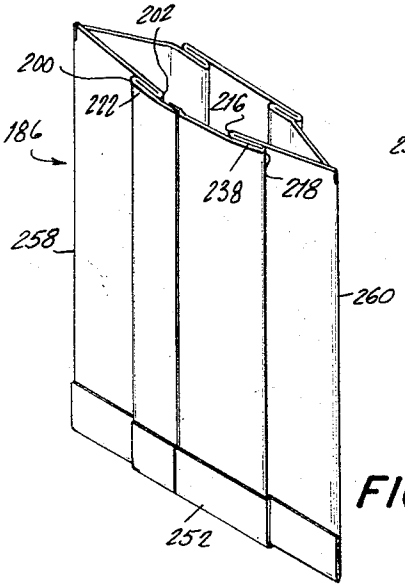


FIG. 23

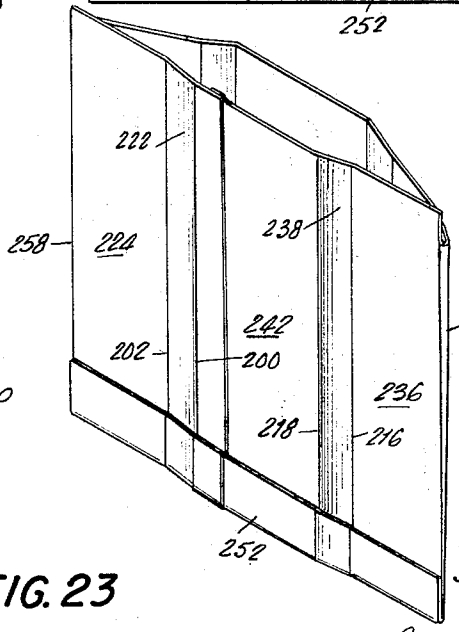


FIG. 25

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United States Patent Office

3,297,232

Patented Jan. 10, 1967

3,297,232

VACUUM CLEANER FILTER BAG

John J. Fesco, Baldwin, N.Y., assignor to Studley Paper Company, Inc., a corporation of New York

Filed Nov. 27, 1964, Ser. No. 414,285
10 Claims. (Cl. 229—53)

This invention relates in general to paper bags or the like and in particular to expansible paper bags which can be utilized both for general carrying purposes as well as for vacuum cleaner filter bags.

Paper bag making machinery is usually designed for the manufacture of a paper bag of particular dimensions and especially particular widthwise dimensions. Consequently, where it is desired to make paper bags of various widthwise dimensions different machines have to be set up to take care of the different bag sizes.

In view of the foregoing, it is an object of the present invention to provide a paper bag having an expansible widthwise dimension which can be manufactured on a paper bag making machine designed for making bags of a narrower widthwise dimension than the expanded widthwise dimension of the bag.

In accordance with the foregoing, it is another object of the present invention to provide a highly novel paper bag construction wherein a paper bag of predetermined widthwise dimension is provided which can be readily expanded to a greater widthwise dimension to accommodate a larger volume of contents of the bag.

It is another object of the present invention to provide a relatively large volume paper bag which can be manufactured on machinery designed for making smaller volume paper bags and which until utilized in the large volume dimension thereof will require the storage space of only a much smaller volume bag.

It is a further object of the present invention to provide a highly novel vacuum cleaner filter bag which can be manufactured on machinery designed for relatively small volume vacuum cleaner filter bags and yet which during use can be adjusted to accommodate a vacuum cleaner requiring a larger volume bag than can be manufactured on said machinery.

Other and further objects and advantages of the present invention will be readily apparent to one skilled in the art from a consideration of the following specification taken in connection with the appended drawings which illustrate the best mode presently contemplated for carrying out the invention.

In the drawings:

FIGURE 1 is a plan view of a blank utilized in the manufacture of an expansible bag pursuant to the present invention;

FIGURE 2 is a fragmentary perspective view of a bag tube formed from the blank of FIG. 1;

FIGURE 3 is a view taken in the direction of the arrow 3 in FIG. 2 which illustrates the initial steps in the formation of a bag bottom on the tube illustrated in FIG. 2;

FIGURES 4, 5, and 6 illustrate successive steps in forming the bag bottom on the tube illustrated in FIG. 2;

FIGURE 7 is an elevation view of a bag pursuant to the present invention, the bag being shown in its contracted and collapsed condition;

FIGURE 8 is a perspective view of the bag showing the latter in its contracted and open condition;

FIGURE 9 is a view similar to FIG. 7 and illustrates the bag in its expanded and collapsed condition;

FIGURE 10 is a view similar to FIG. 8 and shows the bag in its expanded and open condition;

FIGURES 11, 12, 13, 14, and 15 are similar to FIGS. 2, 3, and 6 respectively, and illustrate the steps in the formation of a vacuum cleaner filter bag pursuant to the present invention;

FIGURE 16 is a side elevation of the vacuum cleaner filter bag pursuant to the present invention;

FIGURE 17 is a view on an enlarged scale taken in the direction of the arrows 17—17 in FIG. 16, the bag in both FIGS. 16 and 17 being shown in its collapsed condition;

FIGURE 18 is a side elevation of the vacuum cleaner filter bag with the bag being shown in its erected and operative condition;

FIGURE 19 is a view similar to FIG. 1 and illustrates a modified form of blank for making a modified form of expansible bag pursuant to the present invention;

FIGURE 20 illustrates the blank of FIG. 19 formed into a tube from which a bag will be formed;

FIGURE 21 is a side view of a bag formed from the tube illustrated in FIG. 20;

FIGURE 22 is an elevation view of the bag illustrated in FIG. 21, the bag being shown in its contracted and collapsed condition;

FIGURE 23 is a perspective view which illustrates the bag shown in FIG. 22, the bag being in its contracted and open condition;

FIGURE 24 is a view similar to FIG. 22 and illustrates the bag in its expanded and collapsed condition; and

FIGURE 25 is a view similar to FIG. 23 and illustrates the bag in its expanded and open condition.

Referring now to FIGS. 1 through 10 in detail, FIG. 1 illustrates a blank 30 of paper sheet material, the blank as here shown being essentially rectangular in conformation. As here shown, the blank 30 is provided with a fold line 32 which extends longitudinally thereof adjacent to the longitudinal marginal edge 34 thereof. Between said longitudinal edge 34 and the opposing longitudinal edge 36 the blank is provided with fourteen transverse fold lines which are spaced laterally between the shorter end edges 38 and 40 of the rectangular blank, said fold lines being indicated by the reference numerals 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, and 68, respectively. In addition the bag is provided with a first slit 70 which extends inwardly from the longitudinal edge 34 between the fold lines 44 and 46 and which terminates inwardly of the longitudinal fold line 32. A fold line 72 extends from the inner end of the slit 70 to the intersection of fold lines 46 and 32. A second slit 74 is provided between the fold lines 50 and 52 and extends inwardly from the longitudinal edge 34 to the fold line 32 a fold line 76 extending diagonally from the rear end of the slit 74 to the intersection of the fold line 32 and 50. A third slit 78 extends inwardly from the longitudinal edge 34 between the fold lines 58 and 60 and a diagonal fold line 80 extends from the inner end of slit 78 to the intersection of fold lines 32 and 60. A fourth slit 82 extends inwardly from the longitudinal edge 34 between the fold lines 64 and 66 and a diagonal fold line 84 extends from the inner end of slit 82 to the intersection of fold lines 32 and 64.

FIGURE 2 illustrates a bag tube 86 which is formed by folding the blank 30 along the various transverse fold lines 42 through 68 thereof. It will be noted that the end edge 38 and the fold line 42 define a panel 87, a panel 88 being defined between the fold lines 42 and 44. A panel 90 is defined between the fold lines 44 and 46 and a panel 92 is defined between the fold lines 46 and 48. A panel 94 is defined between the fold lines 48 and 50, and a panel 96 is defined between the fold lines 50 and 52. A panel 98 is defined between the fold lines 52 and 54 and a panel 100 is defined between the fold lines 54 and 56. A panel 102 is defined between the fold lines 56 and 58 and a panel 104 is defined between the fold lines 58 and 60. A panel 106 is defined between the fold

lines 60 and 62 and a panel 108 is defined between the fold lines 62 and 64. A panel 110 is defined between the fold lines 64 and 66 and a panel 112 is defined between the fold lines 66 and 68. A panel 114 is defined between the fold line 68 and the adjacent end edge 40. It will be understood that the tube 86 is formed by adhesively securing the end edges 38 and 40 in overlapping relation so as to define a front panel 116 for the bag which is formed by the blank panels 87 and 114. The front side panels 90 and 110 straddle the main front side panel 116, the panel 88 being bent inwardly between the panels 90 and 116 and the panel 112 being bent inwardly between the panels 110 and 116. Similarly the bag is provided with a rear main side panel 100 and with the auxiliary rear side panels 96 and 104. The panel 98 is bent inwardly between the rear side panels 96 and 100 and the panel 102 is bent inwardly between the rear side panels 104 and 100. The panels 92 and 94 define a gusset 118 between the panels 90 and 96 and the panels 106 and 108 define a gusset 120 between the panels 110 and 104. In addition to the transverse fold line 32, the tube 86 is also provided with a second transverse fold line 122.

Stripes of adhesive material are selectively applied to the tube 86. More specifically and as best shown in FIGS. 2, 3, 4 and 5, a horizontal stripe of adhesive material 124 is applied to the outer surface of the panel 116. An L-shaped adhesive stripe 126 is applied to the outer surface of panel 90 inwardly of the slit 70 and a confronting L-shaped stripe 128 is applied to the panel 110 inwardly of the slit 82. A continuous stripe 130 extends along the outer surface of the tube from slit 70 to slit 74 so that it extends from the panel 90 across panel 92, 94 and into panel 96. A similar elongated adhesive stripe 132 extends between slits 82 and 78 extending from panel 110 across panels 108 and 106 and into panel 104. In addition to the foregoing adhesive stripes on its outer surfaces, the tube 86 is also provided with adhesive stripes on its inner surface. More particularly, provision is made for the horizontal stripe 134 on the inner surface of panel 100, and L-shaped stripe 136 on the inner surface of panel 96, and an L-shaped stripe 138 on the inner surface of panel 104.

The tube 86 is bottomed by folding panels 90, 116 and 110 downwardly, as indicated by the arrow 140 and by folding panels 96, 100, and 104 downwardly as indicated by the arrow 142, it being understood that the steps and operations for bottoming the tube 86 are conventional and well known in the art and that the adhesive material is actually applied when the tube is in the condition shown in FIGS. 4 and 5, the showing of adhesive in FIGS. 2 and 3 being for purposes of clarity of illustration. For this purpose, as is well known, the gusset 118 is provided with diagonal fold lines 144 and 146 which extend from the transverse fold line 32 through the transverse fold line 122, it being noted that the gusset 120 is also provided with similar fold lines 148 and 150 as best shown in FIG. 4. With the gussets bent inwardly above the fold line 122 as illustrated in FIG. 3, the tube 86 assumes the condition thereof illustrated in FIG. 4. It will be noted that in said condition of the tube, the L-shaped adhesive stripe 136 forms a continuation of the linear adhesive stripe 130 and similarly the L-shaped adhesive stripe 138 forms a continuation of the linear adhesive stripe 132. In the next step, which is illustrated in FIG. 5, the panels 90, 110, and 116 are bent inwardly or upwardly along the fold line 32. This causes panels 90 and 110 to be adhesively secured at the bottom end of the tube 86 to the underlying adhesive stripes 130 and 132. In the final step of the bottoming operation, panels 96, 100 and 104 are bent inwardly or downwardly along line 32 from the position thereof illustrated in FIG. 5 to the position thereof illustrated in FIG. 6. It will be noted that when the panels are so folded, the adhesive stripe 134 engages the adhesive stripe 124 to secure the panels 116 and 100 together, the L-shaped stripe 136 engages the L-shaped stripe 126, the L-shaped stripe 138 engages the L-shaped stripe 128, and elongated stripes 130 and 132 are folded upon themselves. As a result of the foregoing adhesive securement at the bottomed end 152 of the tube 86 there is now defined a bag 154 having a tubular body 156 and a bottom end 152, the tubular body being open at the other end thereof. It will also be apparent from the foregoing description that none of the adhesive stripes extend into or contact the panels 88 and 112 at the front side of the bag or the panels 102 and 98 at the rear side of the bag. These unsecured panels extend into the bag bottom 152 inwardly from the fold lines 32 which now define the longitudinal marginal edges of the bag bottom, as will be apparent from FIG. 6. These unsecured panels in essence define pleats which extend longitudinally of the front and rear surfaces of the bag and into the bottom 152. These pleats permit for the extension or expansion of the bag.

More specifically, FIG. 7 illustrates the bag 154 in the contracted and collapsed condition thereof with the bottom end 152 of the bag folded against the bag body 156. FIG. 8 illustrates the bag in the open but contracted condition thereof, the bag being shown as having a top opening 158 at one end of the bag body 156 and the closed end 152 being shown at the bottom of the bag, the gussets 120 and 118 being open or expanded. The condition of the bag in FIG. 7 permits the bag to be stored or transported in a relatively small space and the condition of the bag illustrated in FIG. 8 shows the bag in condition for receiving a smaller amount of contents. However, pursuant to the present invention, it is possible to expand the bag 154 so that it can contain a larger volume of contents even though it was manufactured with conventional bag machinery designed to accommodate a bag which is equal in size to that shown in the collapsed condition of the bag 154 as illustrated in FIG. 7. In order to expand the bag it is merely necessary to grasp the bottom 152 at the opposite ends thereof and move said opposite ends of the bottom in opposite directions as indicated by the arrows 158 and 160 in FIGS. 6 and 7. As previously indicated the pleats or panels 88 and 112 are on the front surface of the bag and the pleats or panels 98 and 102 are on the rear surface of the bag, all of which extend into the bottom 152 are unsecured along their respective surfaces to any other portion of the bag. Consequently, by merely pulling the bottom of the bag in the direction of the arrows 158 and 160, the bag may be expanded from the condition thereof shown in FIG. 7 to the condition thereof shown in FIG. 9, the latter figure illustrating the bag in the collapsed and expanded condition thereof. It will be noted that the condition of the bag 154 shown in FIG. 9 is substantially wider than the condition of the bag shown in FIG. 7. The expanded bag shown in FIG. 9 may be opened as shown in FIG. 10 so as to provide a storage space or volume which is substantially larger than the storage space or volume for contents to be put into the bag than that shown in FIG. 8. Consequently, it will be apparent that by using machinery capable only of forming a bag of the size illustrated in FIGS. 7 and 8, there may be produced a much larger size bag such as that illustrated in FIGS. 9 and 10.

Referring now to FIGS. 11 through 18 in detail, there is shown in FIGS. 16, 17 and 18 a highly novel vacuum cleaner filter bag 162. The vacuum cleaner filter bag 162 is formed of a blank of paper filter sheet material which may in all respects be similar to the blank 30 illustrated in FIG. 1 with the exception that in addition to the four slits 70, 74, 78 and 82 there is provided four additional slits 164, 166, 168 and 170 as shown in FIG. 11, it being understood that similar reference numerals indicate similar parts. It will be noted that the slits 164 and 166 are defined in the front side panel 116 and the slits 168 and 170 are defined in the rear side panel 100. The bag 162 is formed from a tube 163 which is similar in all

respects to the tube **86** except of course that the tube **163** is additionally provided with the four slits **164**, **166**, **168** and **170** and in addition the tube **163** is not provided with the adhesive stripe **124** on its front panel **116** or with the adhesive stripe **134** on its rear panel **100**. However, the other adhesive stripes utilized in the tube **86** are also utilized in the tube **163** and are located in the very same portion of the tube. The tube **163** is bottomed in exactly the same manner as the tube **86**, as will be apparent from FIGS. 12, 13, 14 and 15 which are similar to FIGS. 3, 4, 5, and 6 and illustrate the manner of forming the bottom end **152** on the tube **163** so as to define the bag **162** having the tubular body portion **156** and the bottom end **152**. It will be noted from FIG. 15 that when the tube **163** is bottomed, the slit **168** overlies the slit **164** and the slit **170** overlies the slit **166**, and it being noted that the portions of the bottom end **152** between the respective slits are free of securement by means of the adhesive stripes. In addition, instead of having an open end **159** as in the case of the bag **154**, the end of the tube opposite the bottom end **152** is merely folded upon itself and adhesively secured together so as to form a closed end **172** opposite the bottom end **152**, as best shown in FIG. 17.

In order to form the vacuum cleaner filter bag **162** the tube **163** is bottomed to provide the bottom end **152** as previously described and the other end thereof is closed as at **172**. In this condition of the tube, the bottom end **152** is in the condition thereof shown in broken line in FIG. 17. Consequently it will be understood that the tube **163** so bottomed as at **152** and closed at the other end as at **172** can be produced by conventional bag making machinery designed to accommodate or make a bag having the widthwise dimension of the tube **163**. Thereafter, in order to form a larger volume vacuum cleaner filter bag from this smaller volume tube, the tube **163** is expanded by pulling the opposite ends of the bottom end **152** as indicated by the allows **158** and **160** in the manner previously described. This will expand the width of the bag from its bottom end inwardly toward the closed top end **172** so as to define the opposite marginal sides **174** and **176** which diverge outwardly from the closed end **172** to the expanded bottom end **152**, this resulting from the fact that the unsecured panels are restrained against outward movement at the closed end **172** but are free to move at the bottom end **152** so as to substantially increase the volume of the bag.

The vacuum cleaner filter bag is then completed by securing a collar **178** to the expanded bottom end **152**. The collar **178** is of conventional construction, preferably being formed of paper board or card board and is provided with a central aperture **180**. It will be noted from FIG. 17 and FIG. 18 that the collar **178** is secured to the bottom end **152** so that the aperture **180** overlies the slits **168** and **170**.

The vacuum cleaner filter bag **162** is mounted in conventional fashion in a vacuum cleaner, the collar **178** serving to support the filter bag in conventional manner. The inlet end of a vacuum cleaner conduit is readily insertable into the bag by inserting the conduit through the aperture **180** in the collar **178** and by urging the conduit through the underlying slit portion of the bottom end **152**. When so urged, the slits will move apart as shown in FIG. 18, the conduit being moved through the slits as indicated by the arrow **182** in FIG. 18 so that the dirt laden air may be introduced directly into the filter bag in conventional manner.

Referring now to FIGS. 19 through 24 in detail, there is disclosed another modification. Pursuant to the present modification there is utilized a blank **184** of paper sheet material to form the bag **186**. The blank **184** is essentially rectangular in conformation, having a longitudinal marginal edge **188** provided with a recessed portion **190** and having an opposite longitudinal edge **192** having a lateral extension **194**. Betwen the end edges **196** and **198** thereof the blank **184** is provided with the transverse fold lines **200**, **202**, **204**, **206**, **208**, **210**, **212**, **214**, **216**, and **218**. As best shown in FIG. 19, these fold lines defiine the panels **220**, **222**, **224**, **226**, **228**, **230**, **232**, **234**, **236**, **238** and **240**.

The blank **184** is folded so as to define the tube **241** shown in FIG. 20. The opposite end edges **196** and **198** are secured together in overlying relation so that the panels **220** and **240** together define a front surface panel **242**. In addition to the panel **242** the front surface is defined by the two panels **224** and **236**. The panel **238** is reversed between the panels **236** and **240** and similarly the panel **222** is reversed between the panels **220** and **224**. It will be understood that the opposite side of the tube **241** is defined by the panels **226**, **230**, and **234**, the panel **228** being reversed between the panels **226** and **230** and the panel **232** being reversed between the panels **230** and **234**. It will be understood that as in the prior embodiments, said reverse panels constitute pleats or side panels which permit for the widthwise expansion of the tube or bag into which it is formed. With the blank **184** folded into the tube **241**, it will be noted that the lateral extension **194** appears on the rear side surface of the tube and consequently extends below the bottom edge of the front side surface therof as bst shown in FIG. 20 with the result that the panels **224**, **242**, and **236** terminate inwardly or upwardly from the bottom edge of the panels **226**, **230**, and **234**. Provision is made for the adhesive stripes **244**, **246** and **248** which as best noted in FIG. 20 extend from the panels **224**, **242** and **236** onto the panels **226**, **230**, and **234** respectively. It will be noted that the fold lines **200** and **218** are not covered by the adhesive stripes which terminate in each case short of the adjacent fold line.

To form the bag **186**, the tube is folded upwardly at the bottom and thereof viewing FIG. 20 along the fold line **250**. This defines a closed bottom tube **252** for the bag **186** as best shown for example in FIG. 21. It will be apparent that when the tube is folded along the fold line **250**, the adhesive stripes **244**, **246**, and **248** secure the bottom ends of the panels **224**, **242** and **236**, constituting the front side surface, as well as the panels **226**, **230** and **234** constituting the rear side surface together along the front side surface of the tube. However, since the adhesive stripes do not cover the fold lines and do not extend into the inwardly turned panels **222**, **228**, **232** or **238**, these panels are free of adhesive securement to the adjacent panels of the bag. Consequently they are free to be moved in response to the outward pulling of the bag along the longitudinal edges thereof. In order to expand the bag **186** the sides thereof are grasped along the opposite side edges and pulled in opposite directions as indicated by the arrows **254** and **256** in FIG. 22. This will expand the bag in a widthwise direction as best shown in FIG. 24. This of course substantially increases the capacity of the bag as will be readily apparent from FIG. 25 which indicates the expanded bag in the open condition thereof.

In view of the foregoing, it will be apparent that there has been illustrated and described a highly novel, expandable bag which has the outstanding advantage that it can be formed on conventional bag making machinery for making relatively narrow bags and thereafter expanded into a larger volume bag even though the machinery for forming smaller size bags was utilized in the manufacture thereof. It will be understood that various changes and modifications may be made therein without however departing from the basic inventive concept thereof as set forth in the appended claims.

I claim:

1. A bag formed of a blank of sheet material folded to define a front wall, a rear wall and opposing sides, said bag being closed at one end thereof, each of said walls having means for incerasing the widthwise dimension thereof, said means comprising pleats defined in each

of said walls and extending longitudinally thereof, said pleats being movable transversely of the respective walls to increase the surfaces thereof, said pleats extending without deformation into said closed end and being movable transversely of said closed end to increase the area thereof.

2. A rectangular bag formed of a blank of sheet material folded to define a front wall, a rear wall and opposing sides, said bag being closed at one end thereof, each of said walls having means for increasing the widthwise dimension thereof, said means comprising rectangular pleats defined in each of said walls and extending longitudinally thereof, said pleats being movable transversely of the respective walls to increase the surfaces thereof, said pleats extending without deformation into said closed end and being movable relative thereto.

3. A bag having a front wall, a rear wall and opposing ends, each wall comprising a main panel, a pair of auxiliary panels straddling said main panel, and a laterally extensible pleat interconnecting each auxiliary panel and said main panel, each pleat comprising a reflexed panel normally disposed between said main panel and the associated auxiliary panel and movable into planar relation therewith to extend the width of the associated wall, said bag being bottomed, and all of said panels extending without deformation into said bottom.

4. A bag as in claim 3, wherein said auxiliary panels are movable into planar relation with the associated panels at the bottom of said bag.

5. A bag as in claim 3, wherein said auxiliary panels are in movable relation with the associated panels at the bottom of said bag.

6. A bag formed of paper sheet material, said bag having a front wall, a rear wall, a pair of gussetted end walls, a closed bottom and an open top, each of said front and rear walls comprising a main central panel, a pair of auxiliary side panels and a reflexed panel between each side panel and said central panel, said central and side panels extending into the bag bottom, and said reflexed panels extending without deformation into said bottom and being movable into planar relation with the associated central and auxiliary panels, whereby said front and rear walls and said bottom are laterally extensible.

7. A bag as in claim 6, said central panels being secured together at said bottom, the corresponding auxiliary panels of said front and rear walls being secured together at said bottom, and said reflexed panels being free of mutual securement at said bottom.

8. A vacuum cleaner filter bag comprising a tube of filter sheet material, said tube having a front wall, a rear wall and a pair of gussetted end walls, each of said front and rear walls comprising a main control panel, a pair of auxiliary side panels and a reflexed panel between each side panel and said central panel, said tube being closed at both ends thereof, said reflexed panels being secured in said reflexed relation thereof at one end of said tube, said reflexed panels extending without deformation and being in planar relation with the associated main and auxiliary panels at the other end of the tube, a mounting collar provided at the other end of the tube, means defining an opening in said collar, and means at said other tube end for obtaining access to the interior of said tube, said access means being in registry with said opening means.

9. A vacuum cleaner filter bag as in claim 8, said access means comprising a pair of laterally spaced slits defined in each main panel at said other tube end, the slits of one of said main panels being in registry with the slits of the other of said main panels.

10. A vacuum cleaner filter bag as in claim 8, the corresponding auxiliary panels of said front and rear walls being secured together at said one tube end, said main panels and said reflexed panels being free of mutual securement at said one tube end.

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