

Oct. 8, 1968

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3,404,515

VACUUM CLEANER FILTER BAG

Filed May 19, 1967

2 Sheets-Sheet 1

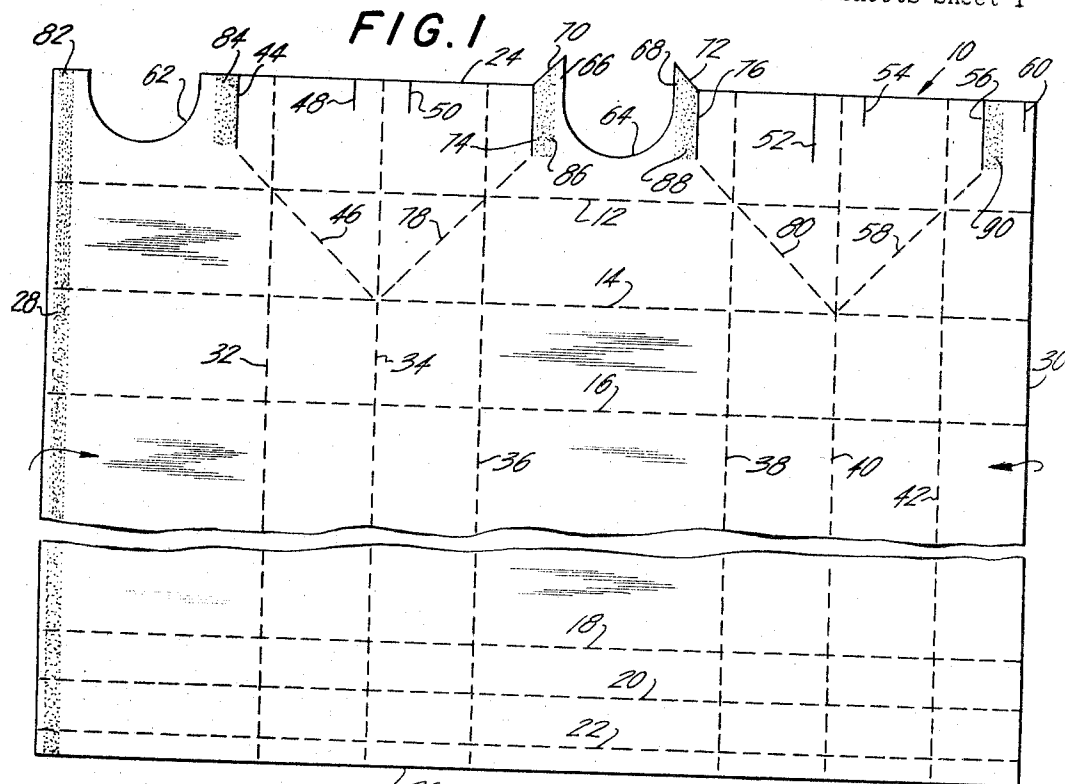
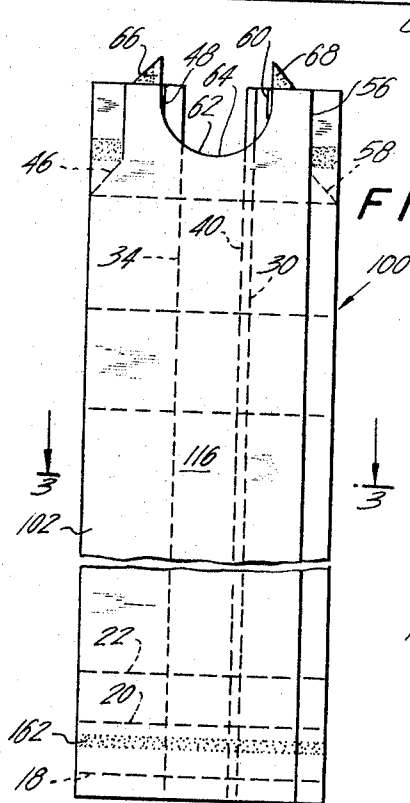
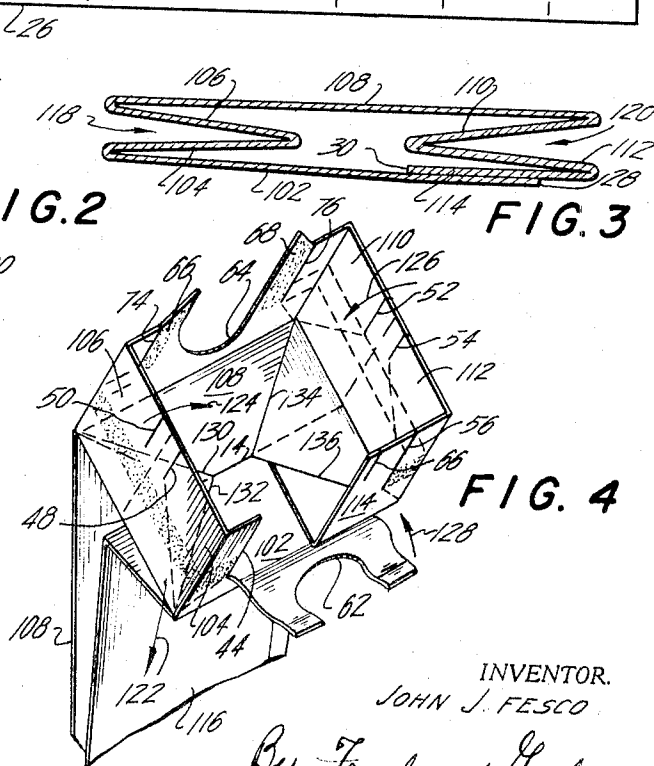


FIG. 4

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2 Sheets-Sheet 2

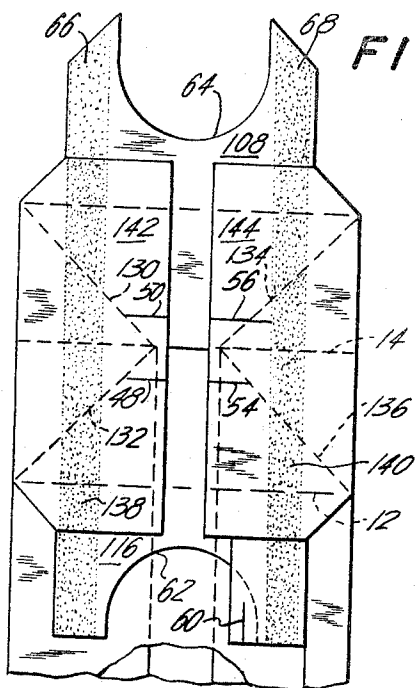


FIG. 5

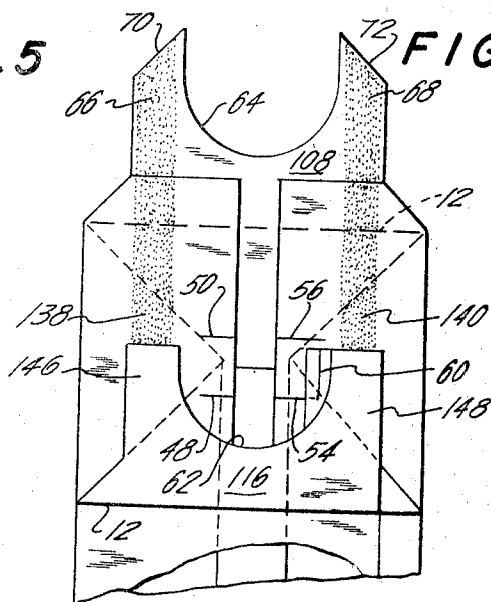


FIG. 6

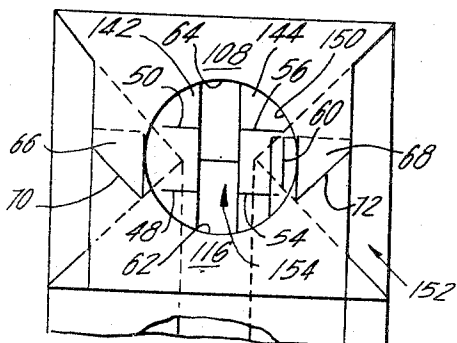


FIG. 7

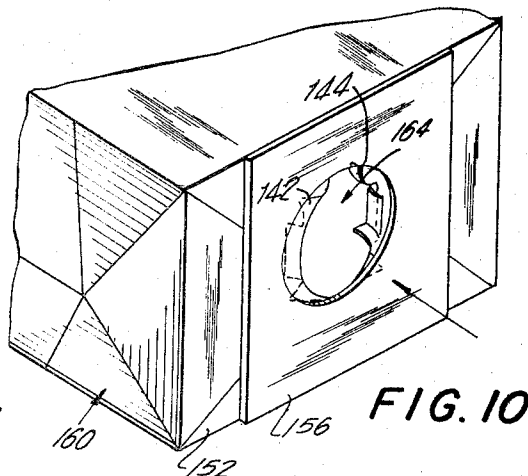


FIG. 8

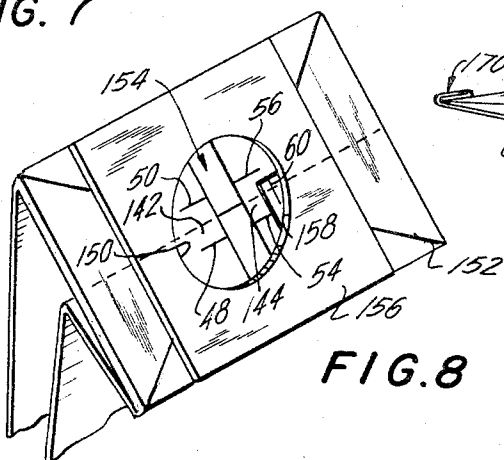


FIG. 9

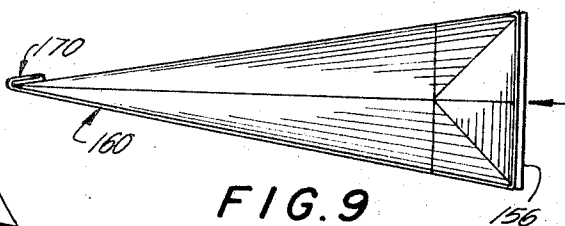


FIG. 10

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1

3,404,515

VACUUM CLEANER FILTER BAG

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2 Claims. (Cl. 55—377)

ABSTRACT OF THE DISCLOSURE

A novel vacuum cleaner filter bag comprising a tube of filter sheet material, said tube having a front wall, a rear wall and a pair of opposing sides, said tube being closed at one end thereof with the other end thereof comprising a bottom provided with access means for obtaining access to the interior of said tube, a mounting collar provided for said bottom, means defining an opening in said collar, said access means being in partial opening relation with said opening means, said access means being adapted to provide substantially free entry of air into said interior of said tube.

BACKGROUND OF THE INVENTION

(1) Field of the invention

This invention relates generally to paper bags or the like, and more particularly to paper bags adapted for use as vacuum cleaner filter bags.

(2) Description of the prior art

Paper bag making machinery is usually designed for the manufacture of a paper bag of particular dimensions and especially particular conformations. For example, a vacuum cleaner filter bag commonly in use has been one that is adapted to fit over an air-inlet coupling in inverted fashion. That is the mounting collar on the prior art bag is mounted in the vacuum cannister at the opening thereof and the cannister is thereafter secured to the vacuum head containing the air-inlet coupling. The air-inlet coupling is provided with a rubber tripper valve so that when the vacuum cleaner stands on its head, so to speak, which is the normal operational position, dust and dirt will not spill out of the bag before the motor is turned on to provide air-intake into the filter bag. Thereafter, when the vacuum motor is turned on, the tripper valve, by the action of the air rushing into the air-inlet coupling, is forced open permitting ingress of dirt-laden air into the vacuum filter bag through an opening in the bag provided for that purpose, the tripper valve being substantially in registry with said opening in the bag bottom. However, it has been a distinct disadvantage of the prior art bag in use for such vacuum cleaners that the opening in the bag bottom interferes with the operation of the tripper valve.

Likewise, in horizontal type vacuum cleaners, or in circular type vacuum cleaners, which, while not generally having these so-called tripper valves, also suffer from prior art bags which have relatively small access means. In other words, dirt-laden air is effectively prevented from having free access into the bag interior by virtue of small openings leading into the bag cavity. Specifically, the opening made by conventional paper bag making is merely a slit cut into the bag bottom, and to make matters worse the walls surrounding the slit are often inter-layered preventing the dirt-laden air from freely rushing into the bag body. Thus, the slit by virtue of its configuration and/or the construction of the bag bottom interferes with free entry of air into the bag.

This prior art slit has a dual disadvantageous effect, it materially reduces the access means into the bag body in all vacuum cleaners, and furthermore, the sides of the slit interfere with the tripping action of the tripper valve

2

in those inverted type cleaners, causing the valve to open only partially with the result that the efficient operation of the machine is greatly lessened. To avoid these disadvantages purchasers of the prior art bag described have been cautioned to push the slit open into the bag body, but this has been generally ineffective since many users forget to do so, or become annoyed at this extra operation needed for a purportedly finished filter bag.

SUMMARY OF THE INVENTION

It is therefore among one of the principal objectives of this invention to provide a vacuum cleaner filter bag, using conventional machinery, in which the access means into the interior of the bag are adapted to provide substantially free entry of air into the bag body.

In accordance with the present invention there has now been provided a novel vacuum cleaner filter bag comprising a tube of filter sheet material, said tube having a front wall, a rear wall, and opposing sides, said tube being closed at one end thereof with the other end thereof comprising a bottom provided with access means for obtaining access to the interior of said tube, a mounting collar provided for said bottom, means defining an opening in said collar, said access means being in partial opening relation with said opening means, said access means being adapted to provide substantially free entry of air into the interior of said tube.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be hereinafter more fully described with reference to the accompanying drawing, in which:

FIGURE 1 is a plan view of a blank utilized in the manufacture of the filter bag of this invention, with a portion of the blank cut away;

FIGURE 2 illustrates the blank of FIG. 1, formed into a tube from which a bag will be formed, with a portion of the blank cut away;

FIGURE 3 is a view taken along line 3—3 of FIG. 2, in the direction of the arrows appearing immediately over the numerals;

FIGURE 4 is a fragmentary perspective view showing the initial steps in the formation of a bag bottom on the tube illustrated in FIG. 2;

FIGURES 5, 6 and 7 illustrate successive steps in forming the bag bottom on the tube illustrated in FIG. 2;

FIGURE 8 is a fragmentary perspective view showing the bag bottom with a mounting collar provided therefor;

FIGURE 9 is a side view of the bag shown in FIG. 8; and

FIGURE 10 is a fragmentary perspective view showing the bag body in the inflated condition and the access means on the bag bottom in inwardly displaced relation.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the figures of the drawing in detail, FIG. 1 illustrates a blank 10 of paper sheet material, the blank as shown herein being essentially rectangular in conformation. The blank 10 is provided with fold lines 12, 14, 16, 18, 20 and 22 which extend longitudinally thereof. Fold line 12 is adjacent to longitudinal marginal edge 24; fold line 14 is adjacent to fold line 12 and inwardly disposed therefrom away from edge 24; fold line 16 is adjacent to fold line 14 and inwardly disposed therefrom away from fold line 12. Or, putting it another way, fold line 14 lies between fold lines 12 and 16. Fold line 22 is adjacent to opposing longitudinal edge 26; fold line 20 is adjacent to fold line 22 and inwardly disposed therefrom away from edge 26; fold line 18 is adjacent to fold line 20 and inwardly disposed therefrom away from fold line 22. Or, similarly, putting it another way, fold line 20 lies between fold lines 18 and 22. The result is that fold lines 16 and

18 are the furthest away from their respective edges 24 and 26. Between said longitudinal edge 24 and the opposing longitudinal edge 24 and the opposing longitudinal edge 26, the blank is provided with six transverse fold lines which are spaced laterally between the longer end edges 28 and 30 of the rectangular blank, said fold lines being identified by the reference numerals 32, 34, 36, 38, 40 and 42, respectively. Additionally, the blank is provided with a first slit 44 which extends inwardly from longitudinal edge 24 between fold line 32 and edge 28 and which terminates inwardly of fold line 12. A diagonal fold line 46 extends from the inner end of slit 44 to the intersection of fold lines 14 and 34. A second slit 48 is provided between fold lines 32 and 34 and extends inwardly from longitudinal edge 24 terminating inwardly of fold line 12 and inwardly of the inner end of slit 44. A third slit line 50 is provided between fold lines 34 and 36 and extends inwardly from longitudinal edge 24 terminating inwardly of fold line 12 and at about the same point as slit 48. A fourth slit 52 is provided between fold lines 38 and 40 and extends inwardly of edge 24 terminating inwardly of fold line 12 at about the same point as the inner end of slit 44. A fifth slit 54 is provided between fold lines 40 and 42 and extends inwardly from edge 24 terminating inwardly of fold line 12 at about the same point as slits 48 and 50. A sixth slit 56 is provided between fold line 42 and edge 30 and extends inwardly of longitudinal edge 24 terminating inwardly of fold line 12. A diagonal fold line 58 extends from the inner end of slit 56 to the intersection of fold lines 14 and 40. A seventh slit 60 is provided between slit 56 and edge 30 extending inwardly of edge 24 and terminating at about the same point as slit 54. There is further provided in the blank a U-shaped cut-out 62 between edge 28 and fold lines 32 and outwardly of slit 44 and extending inwardly of longitudinal edge 24 terminating inwardly of fold line 12. Another U-shaped cut-out 64 is provided between fold lines 36 and 38 terminating inwardly of fold line 12 and extending inwardly of edge 24. However, cut-out 64 is provided with outwardly extending flanges 66 and 68 from longitudinal edge 24, extending outwardly from the opposing edges of the U shape. If longitudinal edge 24 were extended through said flanges 66 and 68 they would form oppositely facing right triangles with their respective "hypotenuses" furthest removed from each other. These diagonal walls ("hypotenuses") 70 and 72 extend to longitudinal edge 24 and at their terminus point with edge 24 meet slits 74 and 76 respectively. Slit 74 extends inwardly from edge 24 and is between the cut-out 64 and fold line 36 terminating inwardly of fold line 12. A diagonal fold line 78 extends from the inner end of slit 74 to the intersection of fold lines 14 and 34, to which diagonal fold line 46 also extends, as previously described. Similarly, Slit 76 extends inwardly from edge 24 and is between the cut-out 64 and fold line 38 terminating inwardly of fold line 12. A diagonal fold line 80 extends from the inner end of slit 76 to the intersection of fold lines 14 and 40, to which diagonal fold line 58 also extends, as previously described. Stripes of adhesive material are selectively applied to the blank 10. Specifically, a continuous stripe of adhesive material 82 is applied to the inside surface of blank 10 inwardly of edge 28 and adjacent thereto.

Another stripe of adhesive 84 is applied directly adjoining slit 44 between said slit and cut-out 62. Adhesive stripes 86 and 88 are also provided extending from flanges 66 and 68, respectively, and directly adjoining slits 74 and 76, respectively, between said slits and the cut-out 64. Finally, another stripe of adhesive material 90 directly adjoins slit 56 between said slit 56 and slit 60. Other adhesive stripes located on the other surface of the blank 10, and not visible in FIG. 1, will be subsequently described hereinafter.

FIG. 2 illustrates a bag tube 100 which is formed by folding the blank 10 along the various transverse fold lines 32 through 42 thereof in the direction of the arrows

emanating from edges 28 and 30 (FIG. 1). It will be noted by observing FIGS. 2 and 3 that the longer end edge of 28 and the fold line 32 define a panel 102, a panel 104 being defined between fold lines 32 and 34. A panel 106 is defined between fold lines 34 and 36 and a panel 108 is defined between fold lines 36 and 38. A panel 110 is defined between fold lines 38 and 40, and a panel 112 is defined between fold lines 40 and 42. Finally, a panel 114 is defined between longer end edge 30 and fold line 42. It will be understood that the tube 100 is formed by adhesively securing the end edges 28 and 30 in overlapping relation to define a new front panel 116 for the bag which is formed by panels 102 and 114, panel 108 being the rear panel. The panels 104 and 106 define a gusset 118 between the panels 102 and 108, and the panels 110 and 112 define a gusset 120 between panels 108 and 114.

Looking at FIG. 4, it can be seen that the tube 100 is bottomed by folding panels 104, 106, 110 and 112 downwardly in the direction of the arrows 122, 124 and 126, respectively. U-shaped cut-out 62 is brought to bear against panel 114 in the direction of the arrow 128. It is to be understood that the steps and operations for bottoming the tube 100 are conventional and well known in the art and that the adhesive material is actually applied when the tube is in the condition illustrated in FIGS. 5 and 6, the showing of adhesives in FIGS. 1, 2 and 4 (except for stripe 82) being for purposes of clarity of illustration. For this purpose, as is well known, the gusset 118 is provided with diagonal fold lines 130 and 132 which extend from fold line 12 to fold line 34, and gusset 120 is provided with diagonal fold lines 134 and 136 which extend from fold line 12 to fold line 40. With the gussets bent inwardly above the fold line 14, as illustrated in FIG. 4, the tube 100 assumes the condition thereof illustrated in FIG. 5. It will be noted that in that condition the adhesive stripes 138 and 140 form a continuation of stripes 86 and 88, respectively (FIG. 1) and 84 and 90, respectively. It will also be noted that slits 48 and 50 are now in the left hand portion 142 of the partially bottomed bag tube, and parallel to each other, while slits 54 and 56, likewise parallel are now in the right hand portion 144, slits 50 and 56 being in a spaced end-to-end relation and slits 48 and 54 being in a similar spaced end-to-end relation. Slit 60 defined in panel 114 of front panel 116 is disposed below the plane of the aforementioned slits and is at right angles thereto, being located on the same side as slits 54 and 56 of partial bottom 144. In the next step which is illustrated in FIG. 6, the panel 116 carrying with it cut-out portion 62 and slit 60 of panel 114 is bent inwardly or upwardly along the fold line 12. This causes panel 116 to be adhesively secured at the bottom end of tube 100 to the underlying stripes 138 and 140. It will now be seen that slit 60 is still at right angles to slits 54 and 56 except that now it lies between slits 54 and 56 with its lower end terminating at slit 54 and the other end terminating below slit 56. Panel 116 is secured adhesively to stripes 138 and 140 at the leg portions 146 and 148, respectively, of U-shaped cut-out 62, leaving slits 48 and 50 free and unencumbered, as well as slits 54 and 56, except for that small portion of slit 54 which underlies slit 60, which, while partially covered is still rendered free and unencumbered due to its relationship with slit 60, described hereinabove. In the final step of the bottoming operation panel 108 carrying with it flanges 66 and 68 along with cut-out 64 is bent downwardly along fold line 12 from the position thereof illustrated in FIG. 6 to the position thereof illustrated in FIG. 7. It will be noted that when panel 108 is so folded that flange portions 66 and 68 of cut-out 64 are adhesively secured by their adhesive stripes 86 and 88 onto stripes 138 and 140, and that flange portions 66 and 68 terminating at their ends 70 and 72, respectively, are adhesively secured to leg portions 146 and 148, respectively, of panel 116.

Thus there is formed in FIG. 7 a bottomed bag tube with a substantially circular shaped aperture 150 sub-

stantially centrally located in the bag bottom 152. This said aperture 150 overlies and is in substantial registry with slits 48, 50, 54, 56 and 60, previously described. Aperture 150 also overlies an elongated slot 154 which is defined by portions 142 and 144 of the bag bottom and lies therebetween. As mentioned previously, portion 142 contains slits 48 and 50, while portion 144 contains slits 54 and 56, with slit 60 being in right angle relation thereto, also as previously described. Slot 154 is in approximately bisecting relationship to aperture 150 and forms the central opening means into the bag tube 100. A collar 156 is provided of conventional construction, preferably paper board or cardboard, to partially cover the bag bottom 152, with a central aperture 158 provided therein to be substantially in registry with aperture 150 of the bag bottom 152. The vacuum cleaner filter bag 160 is formed by folding the bag at the other end at fold lines 18, 20, and 22, with adhesive being applied as to horizontal stripe 162 (FIG. 2) and also at the outside of rear panel 108 (not shown) to form a "tri-lok" adhesive juncture 170 by the action of folding the end upon itself at the aforesaid fold lines.

Describing now the operation of the invention vacuum cleaner filter bag 160, when the bag 160 is suitably connected to an air-inlet coupling on a vacuum cleaner (not shown) by means of the collar 156, and the motor is turned on, the rush of dirt-laden air causes the bottom portions 142 and 144 to be inwardly displaced by means of air rushing through and pushing open slits 48, 50, 54, 56 and 60, as illustrated by FIG. 10. Thus, there is provided in the vacuum cleaner filter bag access means adapted to provide substantially free entry of air into the interior of the bag without the attendant prior art problems previously noted. Looking at FIG 10, it will be seen that a now generally circular access opening is provided when the vacuum cleaner is in operation, thereby eliminating the need to manually clear the access opening before installing the filter bag. The inventive bag works especially well in those upright vacuum cleaners employing tripper valves in their air-inlet couplings; however it is to be understood that the inventive bag works equally as well in any of the other types of vacuum cleaners, whether upright, horizontal, circular, or the like. Indeed, it can be seen by referring again to FIGS. 5-8, that only a single layer of filter paper appears at the exposed positions of portions 142 and 144 within aperture 150, specifically at slits 48, 50, 54 and 56, and while a very small portion of panel 114 overlies a like portion of bottom 144, there is compensated for by the fact that slit 60 is provided in panel 114 to work in cooperative opening relation with slits 54 and 56. This is in direct contrast to the prior art bags where multi-layered bottoms were provided in association with the aforesaid slit openings.

Having thus described the invention as applied to specific embodiments thereof, it is to be understood that various changes may be made by those skilled in the art without departing from the spirit and scope thereof.

I claim:

1. A vacuum cleaner filter bag comprising a tube of filter sheet material, said tube having a front wall, a rear

wall, and opposing sides, said tube being closed at one end thereof with the other end thereof comprising a bottom provided with access means for obtaining access to the interior of said tube, a mounting collar provided for said bottom, means defining an opening in said collar, said access means being in partial opening relation with said opening means, said access means being adapted to provide substantially free entry of air into the interior of said tube, said access means further comprising opening means in association with at least a pair of opposing slits defined in said bag bottom, said opening means in said collar being in substantial registry with said slits, and wherein said opening means of said access means further comprise an elongated slot in bisecting relationship with said opening means in said collar, said slot being in association with a plurality of slits defined in said bag bottom, said slits further comprising two pairs of laterally spaced slits, each of said pairs being on opposing sides of said slot, and each opposing slit being in spaced end-to-end relationship one with the other, there being another slit in partial overlying relationship with one of said pairs and at right angles thereto.

2. A blank for a vacuum cleaner filter bag comprising a sheet of paper material, said sheet being provided with a plurality of longitudinal fold lines, said sheet also being provided with a plurality of transverse fold lines, said transverse fold lines defining a front panel, a rear panel and opposing side panels, when said blank is folded thereon, said front panel defining a plurality of slits and a generally U-shaped cut-out portion at its upper longitudinal edge, said opposing side panels also defining a plurality of slits at their upper longitudinal edge, said rear panel defining a plurality of slits in association with a generally U-shaped cut-out portion, said U-shaped portion being integrally connected with upwardly projecting flanges from said longitudinal edge, said slits and U-shaped portion being provided at said upper longitudinal edge, diagonal fold lines extending from the ends of slits in said rear panel to intersect with diagonal fold lines extending from the ends of slits in said front panel.

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