

April 1, 1947.

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2,418,371

SUCTION CLEANER

Filed April 8, 1943

3 Sheets-Sheet 1

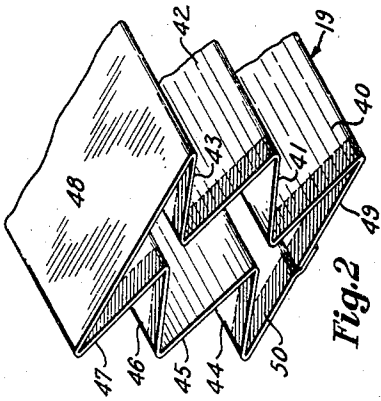


Fig. 2

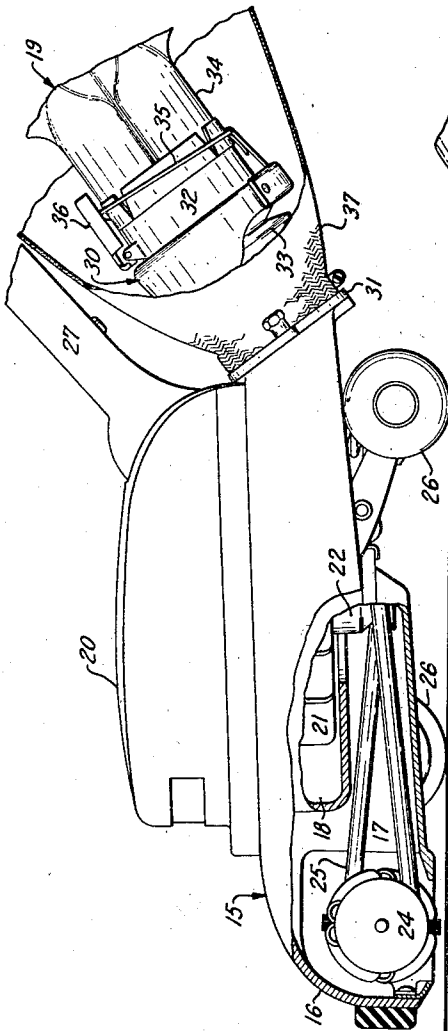


Fig. 1

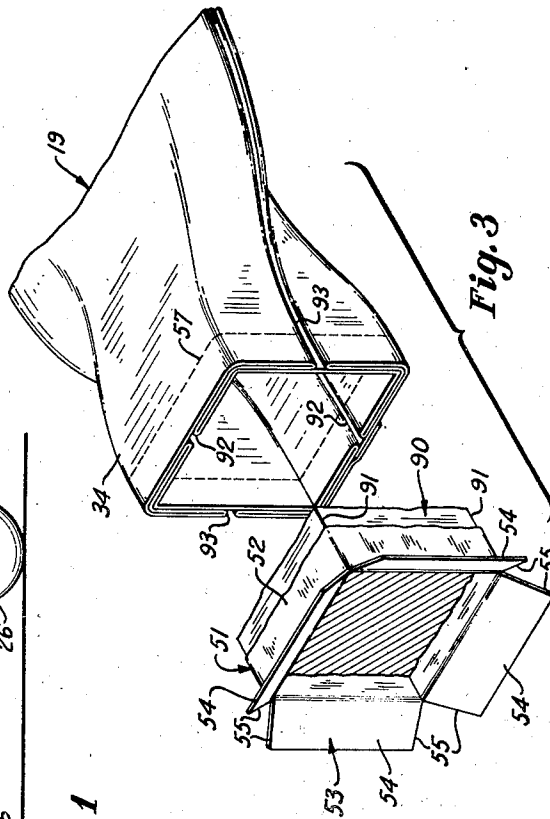


Fig. 3

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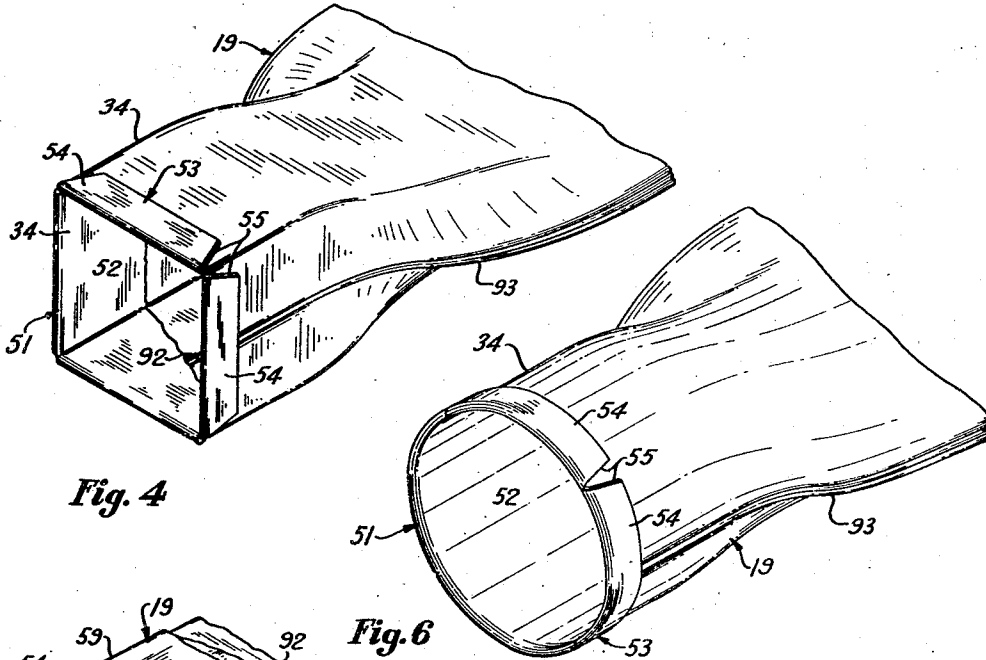


***Fig. 4***

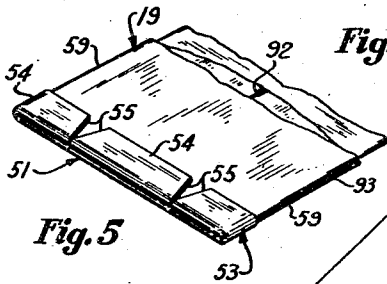


**Fig. 5**

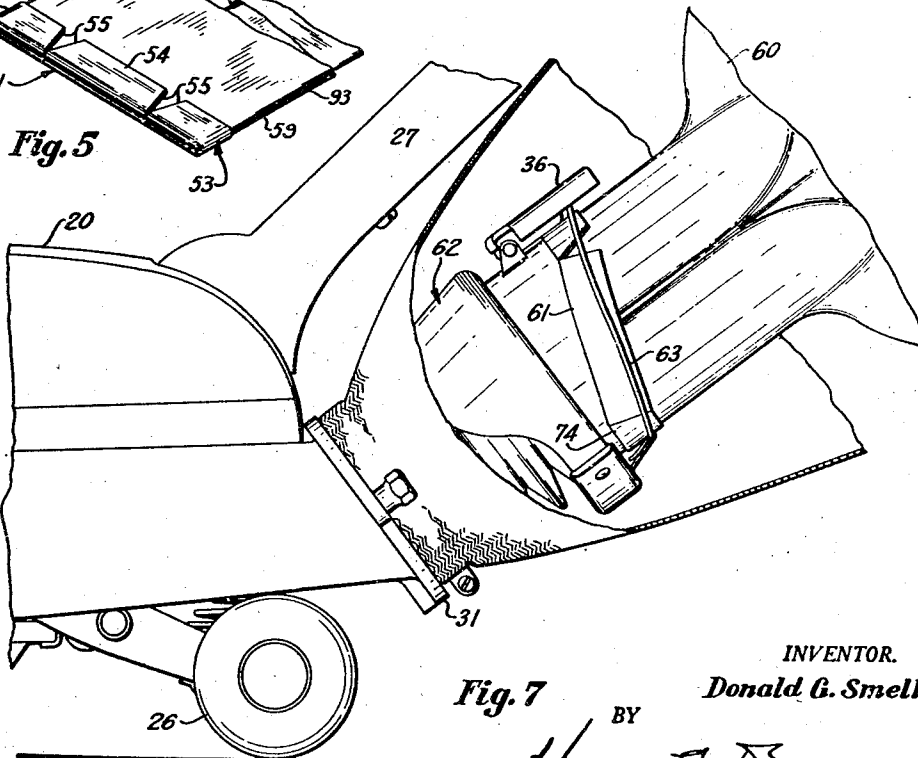


**Fig. 7**

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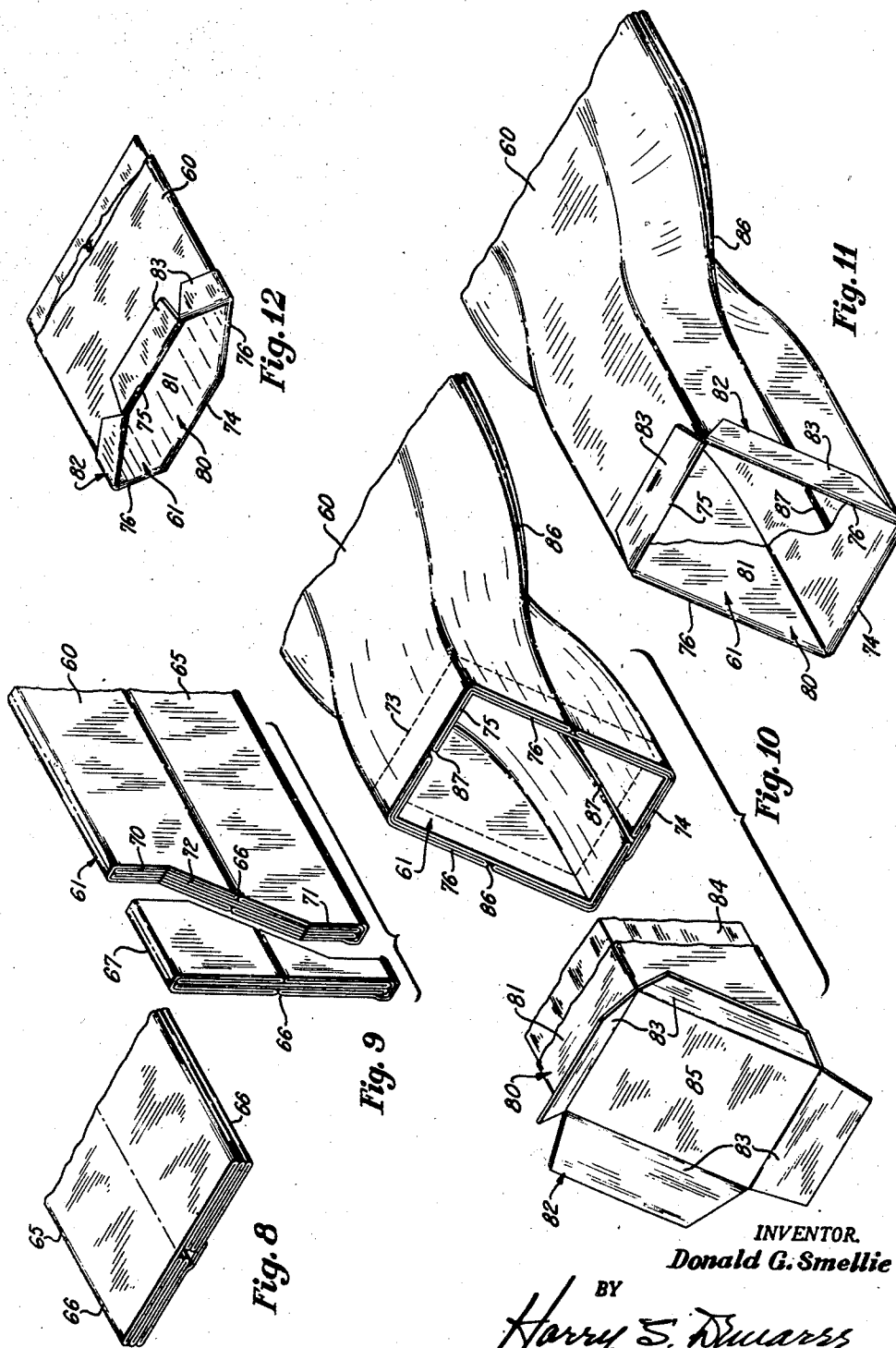
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SUCTION CLEANER

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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,418,371

## SUCTION CLEANER

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Application April 8, 1943, Serial No. 482,231

8 Claims. (Cl. 229—53)

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The present invention relates to suction cleaners in general and more particularly to dirt-filtering bags for suction cleaners.

An object of the invention is to provide a new and improved dirt-filtering bag for a suction cleaner. A further object is to provide a dirt-filtering bag having an inlet opening formed in pleats joined together and reinforced interiorly and exteriorly to span the creases of the adjacent pleats. Another object is to provide a dirt-filtering bag having a pleated inlet opening cut normal to and at an angle to the longitudinal axis of the bag for connection to the cleaner body. A further object is to provide a method of making the dirt-filtering bag. Other objects and advantages of the invention will be apparent in the following specification and drawings, wherein:

Figure 1 is a side elevation with parts broken away of one embodiment of the invention;

Figure 2 is a perspective view of the pleats forming the bag mouth prior to securing certain of the pleats together;

Figure 3 is an exploded perspective view of the method of attaching a reinforcing member to the pleated bag mouth;

Figure 4 is a perspective view of the completed bag mouth prior to being collapsed for storage;

Figure 5 is a perspective view of the bag collapsed for storage;

Figure 6 is a perspective view of the bag having its mouth formed into a circle for attachment to the cleaner body;

Figure 7 is a side elevation with parts broken away of another embodiment of the invention;

Figure 8 is a perspective view of the bag material having its pleats secured together and in a collapsed position;

Figure 9 is a perspective view of the pleats arranged at 90 degrees to that shown in Figure 8 and showing the method of making an angular cut to provide an angular marginal edge at the entrance to the bag mouth;

Figure 10 is an exploded perspective view of the method of attaching a reinforcing member to the angularly shaped pleated bag mouth;

Figure 11 is a perspective view of the completed bag prior to being collapsed for storage and shipping, and

Figure 12 is a perspective view of the bag collapsed for storage and shipping.

The embodiment of the invention disclosed in Figures 1 to 6 comprises a suction cleaner having a body 15 provided with a nozzle 16 connected

by a suction air passageway 17 with a fan chamber 18 communicating with an unshown exhaust passageway which conveys dirt-laden air to a bag 19. A housing 20 is mounted on the body 15 and encloses an unshown motor having a shaft which supports a fan 21 in the fan chamber 18 and provided on the fan is a belt pulley 22 in the suction air passageway 17. An agitator 24 is rotatably mounted in the nozzle 16 and is driven by a belt 25 extending to the pulley 22. The cleaner body 15 is supported on wheels 26 and is propelled over the surface to be cleaned by a handle 27 pivotally mounted on the cleaner body.

A bag adaptor 30 is pivotally mounted on a bag ring 31 removably attached to the rear end of the cleaner body 15 and has a tubular member 32 connected at one end to the cleaner body exhaust passageway by a flexible bellows 33, and the opposite end of the tubular member 32 receives the bag mouth 34 of the bag 19. The bag mouth 34 is secured to the tubular member 32 by a band 35 exterior of the bag mouth and is actuated by a lever 36 for removably clamping the bag mouth against the tubular member 32. The remainder of the bag 19 may be supported in an outer bag 37 of filtering material which is removably mounted at its lower end to the bag ring 31 and is supported at its upper end by the handle 27.

The bag 19 may be formed of dust-filtering material such as paper or other suitable material and is provided with pleats designated by the numerals 40 to 47, inclusive, and walls 48 and 49. The pleats extend from the bag mouth 34 longitudinally of the bag to an unshown opening at the top of the bag, and the top opening may be closed by a suitable unshown removable clamp for emptying the dirt from the bag.

The cross-sectional area of the bag mouth is determined by gluing pleats 40 and 44 to the bag wall 49, pleat 44 to pleat 45, pleat 40 to pleat 41, pleat 46 to pleat 47, pleat 42 to pleat 43, and pleats 47 and 43 to the bag wall 48, whereby the interior surfaces of the pleats 45, 46 and 41, 42 are the only portions of the pleats which are not joined together. The area of the pleats which are joined together longitudinally of the bag is indicated by the shaded portion 50 in Figure 2 to thereby constrict the lower end of the bag, whereby when the latter is inflated the pleats beyond the constricted mouth will unfold to provide the necessary bag wall area to filter out the dirt discharged by the fan into

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the bag 19, and the inflated bag will be supported by the outer bag 37.

The mouth of the bag is provided with a reinforcing member 51 which has a tubular valve 52 extending within the bag 19 and a collar 53 formed in four sections 54 which are positioned at the extreme edge of the bag mouth and folded to extend over the exterior surface of the bag.

In order to mount the reinforcing member 51 on the bag mouth, the valve 52 is placed on a square mandrel 90, as shown in Figure 3, so that the slots 55 between the collar sections 54 are along the longitudinal edges 91 of the mandrel 90, and the collar sections 54 and the valve 52 are provided with an adhesive such as glue. The pleated bag mouth 34 is arranged on the mandrel 90 so that the adjacent creases 92 of the pleats at the interior of the mouth and the creases 93 of the pleats at the exterior of the mouth are positioned along the flat sides of the mandrel 90. The bag mouth 34 is then moved forwardly on the mandrel until it touches the collar 53 and its sections 54 are then folded back over the exterior surface of the bag mouth. Due to the glue on the valve 52 and the collar sections 54, these parts are joined to the bag mouth for an area longitudinally of the bag 19 to the dotted line 57 in Figure 3.

Due to the arrangement of the bag mouth on the mandrel 90 with the collar sections 54 along the flat sides of the mandrel, the collar 53 and the valve 52 span the adjacent creases of the folds interiorly and exteriorly of the bag mouth to thereby protect and reinforce the same.

Thereafter the bag is removed from the mandrel 90 and folded as indicated in Figure 5 for storage and shipping, and when so folded the adjacent creases 92 of the pleats are disposed in the flat portion of the bag and the creases 93 at the longitudinal corners of the bag. When it is desired to use the bag, pressure is exerted on the longitudinal corners 59 to thereby form the bag mouth substantially circular as shown in Figure 6 for attachment to the tubular member 32 of the bag adaptor 30.

Another embodiment of the invention is disclosed in Figures 7 to 11 and comprises a dirt-filtering bag 60 of paper or other suitable filtering material and has an angularly shaped bag mouth 61 which is removably attached to a bag adaptor 62 similar to that previously described with the exception that the band 63 is contoured to clamp the angularly shaped bag mouth 61 to the adaptor 62.

The bag material 65 is formed in pleats longitudinally of the bag in the same manner described in the first embodiment, and the bag material is collapsed to the flat condition as shown in Figure 8. Pressure is then applied to the opposite corners 66 of the pleats to rearrange the pleats to the position shown in Figure 9. The angularly shaped bag mouth 61 is formed by cutting away a portion 67 of the bag material as shown in Figure 9 to provide offset cut edges 70 and 71 normal to the longitudinal axis of the bag and an inclined edge 72 between the two normal cuts 70 and 71. Thereafter, the pleats are glued together from the edge of the angular cut to the dotted line 73 shown in Figure 10. The cut edges 71 and 70 form the leading edge and offset edge 74 and 75, respectively, of the bag mouth, and the inclined edge 72 forms the inclined edges 76 of the bag mouth.

The mouth of the bag is provided with a reinforcing member 80 having a tubular valve 81

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extending inwardly of the bag 60 and a collar 82 formed in four sections 83 which are arranged at the extreme end of the bag mouth and are folded to extend over the exterior surfaces of the bag mouth. The lower end of the valve 81 adjacent the collar 82 is contoured complementary to the angular shaped bag mouth 61.

In order to attach the bag mouth 61 to the reinforcing member 80, the latter is placed on a square mandrel 84 so that the marginal edge of the valve 81 lies flush with the inclined face 85 of the mandrel 84, as shown in Figure 10. The bag mouth 61 is then placed on the mandrel 84 and moved forwardly to exteriorly telescope the valve 81 until the marginal edge of the bag mouth is flush with the inclined face 85 of the mandrel. Thereafter, the collar sections 83 are folded over the exterior of the bag and glued thereto, whereby the collar sections 83 span the adjacent creases 86 of the exterior folds and the valve 81 spans the adjacent creases 87 of the interior folds as shown in Figure 11. The bag may then be folded as shown in Figure 12 for storage and shipping.

In assembling the bag on the adaptor 62, the projecting straight edge 74 of the bag mouth 61 initially contacts the adaptor and guides the bag mouth thereon and aids in forming the bag mouth into an annulus to telescope the adaptor 62, and the bag is retained in proper position on the adaptor by the band 63.

I claim:

1. A paper dirt-filtering bag for suction cleaners, said bag having longitudinal pleats, certain of said pleats being joined together and others unattached to form a constricted bag mouth, said pleats having creases interiorly and exteriorly of said bag mouth, and a member at the marginal edge of said bag mouth, said member having a tubular portion interiorly of said bag mouth and a folded collar extending about said marginal edge and exterior of said pleated bag mouth, said tubular portion and said folded collar spanning the adjacent creases of said pleats interiorly and exteriorly of said bag mouth and secured to said pleats.

2. A bag having its material formed into a mouth for said bag, said bag mouth having its marginal edge formed by a projecting portion, another portion of said marginal edge offset rearwardly from said projecting portion, said portions extending normal to the longitudinal axis of said bag, and said bag mouth having a portion of said marginal edge inclined to the longitudinal axis of said bag and extending between said projecting and rearwardly offset portions.

3. A bag having its material pleated to form a bag mouth, said pleated bag mouth having a portion of its marginal edge normal to the longitudinal axis of said bag, and another portion of said marginal edge inclined to the longitudinal axis of said bag, and a member formed complementary to said portions of said marginal edge of said bag mouth for spanning the adjacent creases of said pleats to hold the latter in pleated position at said bag mouth.

4. A distensible tube having a plurality of folds in its material to form a mouth for said tube, some of the material forming said folds being attached together and other material forming other of said folds being unattached for separation when said tube is distended, said tube being so constructed and arranged that when distended

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said unattached material separates to form an open mouth.

5. A distensible tube having a plurality of folds in its material to form a mouth for said tube, some of the material forming said folds being attached together and other material forming other of said folds being unattached for separation to form an interior wall for said mouth when said tube is distended, said tube being so constructed and arranged that when distended said unattached material separates to form an open mouth.

6. A distensible tube having its material folded into a plurality of pleats to form a mouth for said tube, said pleats having their creases disposed interiorly and exteriorly of said mouth, some of the pleated material being attached together and other of said material being unattached for separation when said tube is distended to open said mouth, said tube being so constructed and arranged that when distended said unattached material separates to form an open mouth.

7. A dirt filtering bag for suction cleaners, said bag having a plurality of folds to form a bag mouth, some of the material forming said folds being attached together and other material forming said folds being unattached, said attached and unattached material of said folds defining the bag mouth.

8. A bag adapted for connection to a suction

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cleaner body, and comprising a bag having a plurality of folds, some of the material forming said folds being attached together and other material forming said folds being unattached to define the walls of a mouth for said bag, said folded bag mouth having a portion of its marginal edge normal to the longitudinal axis of said bag, and another portion of said marginal edge of said folded bag mouth inclined to the longitudinal axis of said bag, said normal edge being adapted for initial contact with the cleaner body to guide the inclined marginal edge of said folded bag mouth onto the suction cleaner body.

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#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

| Number    | Name          | Date          |
|-----------|---------------|---------------|
| 2,128,374 | Midulla       | Aug. 30, 1938 |
| 2,331,536 | Cerf et al.   | Oct. 12, 1943 |
| 2,221,617 | Steen         | Nov. 12, 1940 |
| 2,259,752 | Kimple        | Oct. 21, 1941 |
| 2,234,065 | Vogt          | Mar. 4, 1941  |
| 1,174,552 | Dubois et al. | Mar. 7, 1916  |
| 198,218   | Sawyer        | Dec. 18, 1877 |
| 1,171,431 | Gorton        | Feb. 15, 1916 |
| 1,732,680 | Hanlon        | Oct. 22, 1929 |