March 1, 1938. H. S. DEMAREE ET AL 2,110,013

SUCTION CLEANER BAG

Filed Sept. 12, 1936 3 Sheets-Sheet 1

Fig. 2

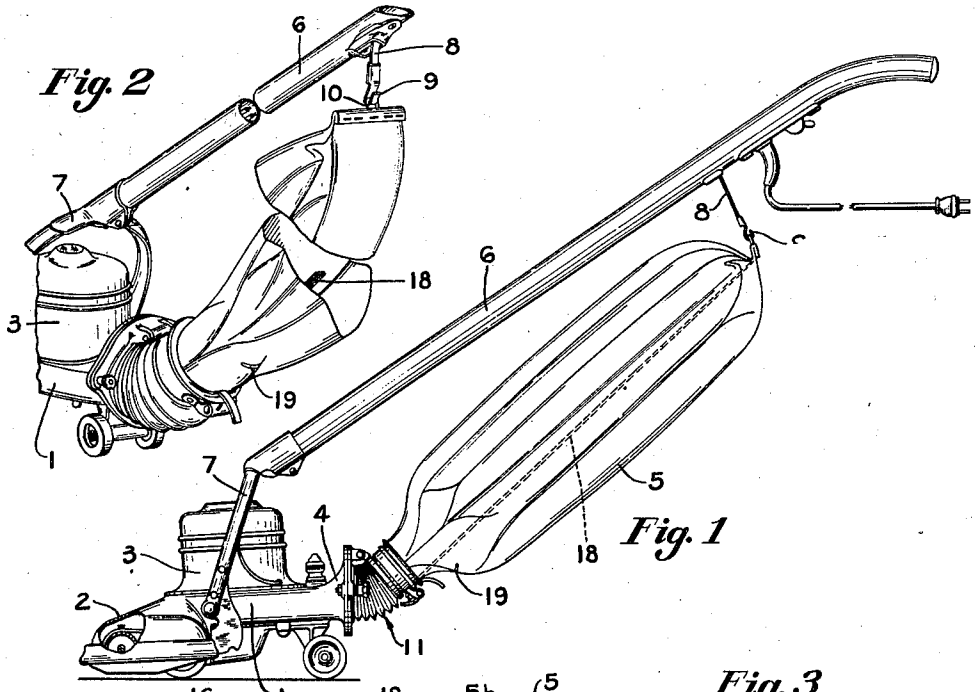


Fig. 1

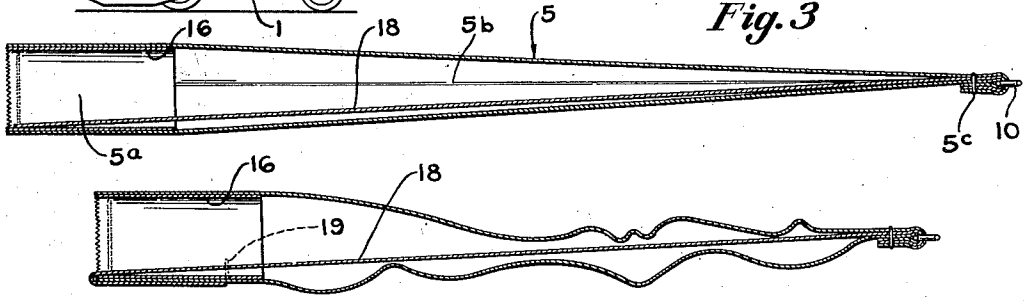


Fig. 3

Fig. 4

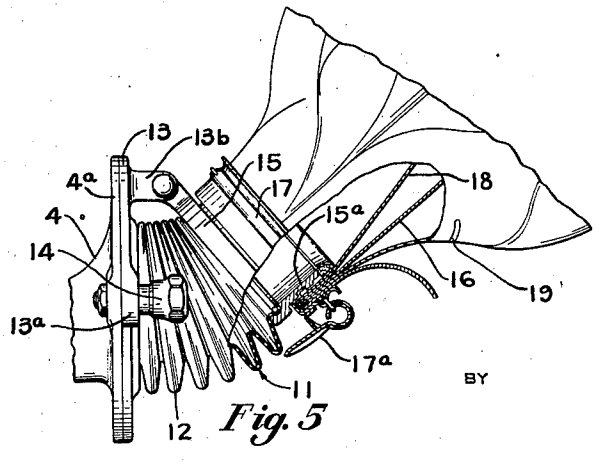


Fig. 5

BY

INVENTORS

Harry S. Demaree

Donald G. Smellie

Charles H. Fox

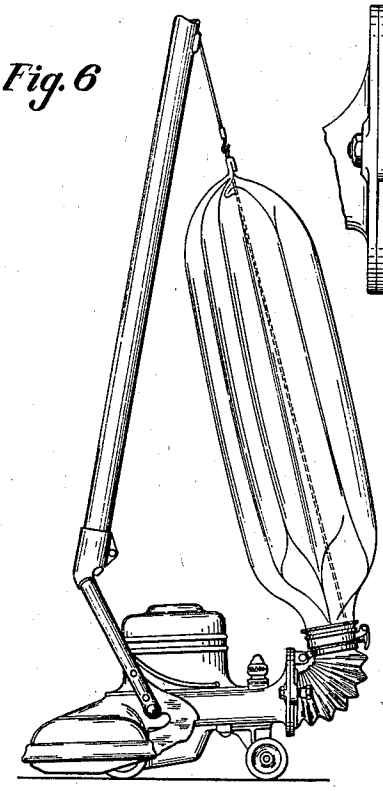
ATTORNEY

March 1, 1938. H. S. DEMAREE ET AL 2,110,013

SUCTION CLEANER BAG

Filed Sept. 12, 1936 3 Sheets-Sheet 2

Fig. 6



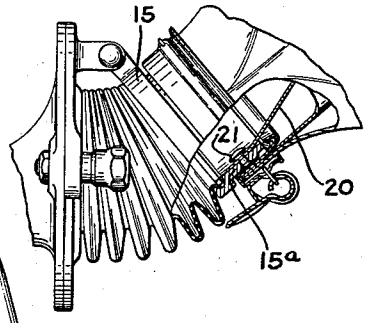


Fig. 7

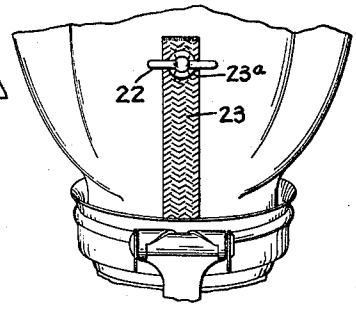


Fig. 8

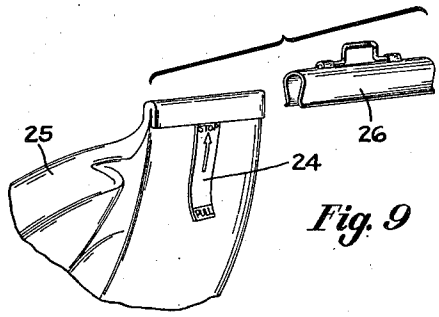


Fig. 9

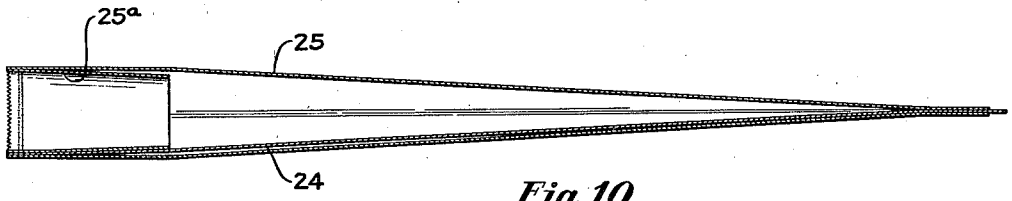


Fig. 10

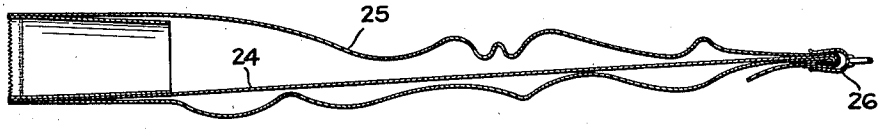


Fig. 11

INVENTORS

Harry S. Demaree

Donald G. Smellie

BY Charles H. Poole

ATTORNEY

March 1, 1938. H. S. DEMAREE ET AL 2,110,013

SUCTION CLEANER BAG

Filed Sept. 12, 1936 3 Sheets-Sheet 3

Fig. 13

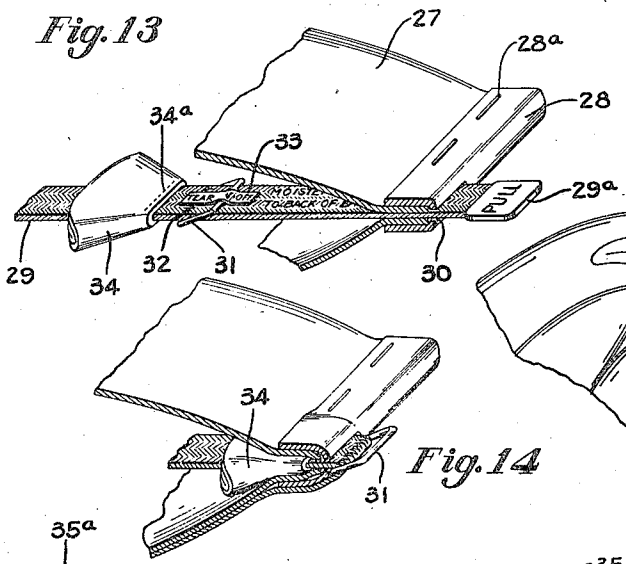


Fig. 14

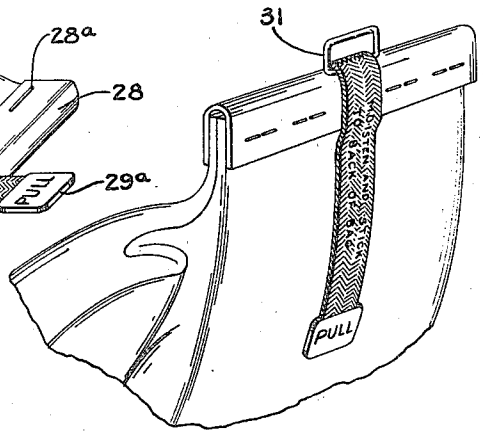


Fig. 12

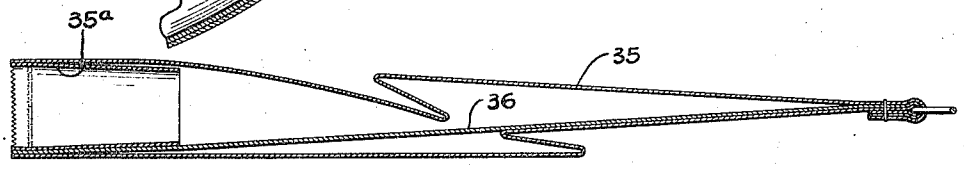


Fig. 15

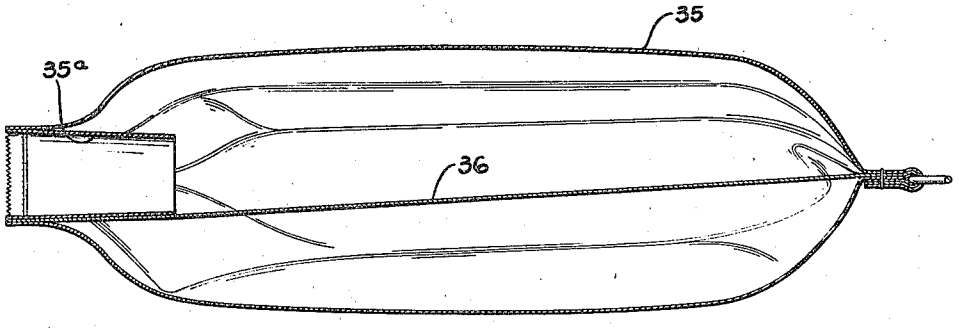


Fig. 16

INVENTORS

Harry S. Demaree

Donald G. Smellie

BY Charles H. Poole

ATTORNEY

Patented Mar. 1, 1938 2,110,013

UNITED STATES PATENT OFFICE

2,110,013

SUCTION CLEANER BAG

Harry S. Demaree, Chicago, Ill., and Donald G. Smellie, Canton, Ohio, assignors to The Hoover Company, North Canton, Ohio, a corporation of Ohio

Application September 12, 1936, Serial No. 100,442

8 Claims. (Cl. 183—51)

This invention relates to improvements in suction cleaners and more particularly to the use and application of a dirt collecting receptacle of relatively inexpensive material to replace the usual fabric dirt bag, and which can be removed and disposed of bodily after filling.

Apart from the substitution of a comparatively cheap bag for an expensive one, with the attendant advantage of disposing of the bag and its contents without emptying, there exists the problem of mounting such a bag on the cleaner so as not to subject it to undue wear and strain.

At present, the most satisfactory material for these short-lived disposable bags is an especially processed paper having sufficient toughness to withstand the wear and internal pressures and yet having the required degree of porosity to permit the passage of air therethrough. These paper bags are made somewhat after the manner of the standard cloth bag, that is to say, with wide pleats along the sides so that they can be folded flat and in a relatively compact form for shipment. However, when the bags are put into use they behave in much the same manner as any ordinary paper bag that is repeatedly inflated and deflated and hence, it is desirable if not essential to reinforce them lengthwise by means of an internally mounted tensioning member of a flexible but non-elastic character, such as a length of woven tape or a strip of other suitable material. The primary purpose of the tensioning member is to relieve the longitudinal or endwise strain upon the bag due in part to the air pressure and in part to the weight of the accumulated dirt and litter that makes up the contents of the bag.

But the addition of an internal tensioning member introduces another problem, namely, the folding and packaging of the bags for shipment and handling in quantity, for obviously a bag cannot be folded flatwise and at the same time have the tension member properly adjusted because the bag, being shorter when inflated, would pucker and buckle transversely when flattened, thus making it quite bulky for packaging aside from forming folds and creases which would tend to weaken the material.

Thus the object of the invention is to incorporate the tensioning members into the bags by fastening them at one end only, to be adjusted to the proper length at the time and during the process or operation of attaching the bag to the cleaner.

There are obviously several ways of accomplishing this result and consequently, the present disclosure includes several alternative or modified arrangements which differ chiefly from each other in the method of attaching the tensioning member after its length has been fixed.

Referring now to the accompanying drawings,

Figure 1 is a general view in side elevation of a suction cleaner equipped with a bag of the disposable type showing one arrangement of the internal tensioning member with the bag inflated.

Figure 2 is a perspective view showing the same cleaner with the same equipment but with the bag deflated.

Figure 3 is an enlarged view in longitudinal section through one of the dirt bags in its initial folded position.

Figure 4 is a view similar to that of Figure 3, showing the condition of the bag after the tensioning member has been adjusted to its proper length preparatory to its application to the cleaner.

Figure 5 is an enlarged detail view of the bag attached to the cleaner including an adapter between the lower end of the bag and the cleaner outlet connection.

Figure 6 is a view in side elevation similar to Figure 1 except that the handle is shifted to substantially vertical position and illustrating the utility of the internal tensioning member in relieving the bag of endwise strain.

Figure 7 is an enlarged detailed view in side elevation showing the neck portion of a bag attached to the so-called hinged adapter and showing a somewhat different method of fastening the free end of the tensioning member.

Figure 8 is a detailed view in elevation of the connection between the lower end of the bag and the hinged adapter, showing still another way of fastening the free end of the tensioning member.

Figure 9 is a perspective view of the upper end portion of a bag with its supporting clip and showing an alternative arrangement wherein the tensioning member is fixed at the lower end of the bag and is adjustable at its upper end.

Figure 10 is a detailed view in longitudinal section through a folded bag of the type shown in Figure 9.

Figure 11 is a view similar to Figure 10 showing the bag shortened by drawing the tape outwardly from its upper end and fastening it by the application of the supporting clip.

Figure 12 is a perspective view of a paper dirt bag showing another arrangement wherein the tensioning member is drawn outwardly through the upper end thereof.

Figure 13 is a detailed view of longitudinal section through the upper end of the bag shown in Figure 12 showing the tension member in initial position, prior to adjustment.

Figure 14 is a view similar to Figure 13 showing the tensioning member after it has been adjusted and fastened.

Figure 15 is a view in longitudinal section through a bag in which the internal tensioning member has been initially fastened at each end and illustrating the possibility of such an arrangement providing the bag can be suitably folded transversely, and

Figure 16 is a view similar to Figure 15 showing the same bag inflated.

The general construction and operation of a suction cleaner is so well known that a brief description will suffice: A casing 1 having a downwardly facing nozzle portion 2 extending transversely across its forward end, forms in part a fan chamber in which a fan is mounted to rotate at a high speed about the vertical axis and driven by a motor housed within a cylindric motor casing 3 surmounting the main casing 1. The fan chamber communicates with the nozzle 2 through a suitable passageway and also with an outlet connection 4 opening rearwardly from the main casing 1, the suction created by the fan being exerted at the nozzle to remove the dirt from the surface of the carpet or other floor covering being cleaned and, passing through the fan chamber, is discharged from the outlet connection 4 into a dirt receptable or bag, which in this instance is the folded or pleated paper bag 5.

The cleaner is maneuvered over the carpet surface by means of a handle 6 pivotally connected at its lower end to the cleaner casing 1, through the medium of a U-shaped bail member 7 which straddles the motor casing 3. Adjacent the upper end of the handle, which is preferably of a hollow construction, is an extensible bag supporting member 8, consisting of a tape-like strip projecting through a slot on the under side of the handle and connected with a spring located within the handle (but not shown) and provided at its outer end with a hook 9 whereby the same may be detachably connected with the upper end of the bag 5 through a suitable attaching loop 10.

Intermediate the lower or inlet end of the bag 5 and the outlet connection 4 of the cleaner casing, is an adapter 11 which is introduced between the relatively stationary casing 1 and the bag 5, to allow the latter to move or swing more nearly with the handle, and thus eliminate the repeated bending at the lower end of the bag. The adapter 11 comprises a bellows-like sleeve member 12 of a suitable material such as rubber. One end of the tubular bellows member 12 is attached to a circular base plate 13, adapted to have detachable connection with an annular flange 4a surrounding the outlet connection 4 of the cleaner casing, by means of clamping screws 14 carried by the flange 4a and adapted to engage a pair of hook-like ears 13a, 13a integral with the base plate 13. Also integral with the outer face of the base plate 13 and extending at right angles therefrom adjacent its top edge, is a bracket 13b which supports a hinged collar 15 surrounding the outer end of the tubular bellows member 12 to which the latter is attached internally.

As clearly shown in Figure 5, an extension 15a of the collar 15 of somewhat reduced diameter, projects beyond the outer end of the bellows member 12, this extension forming a support for the neck portion 5a of the bag 5, formed by a reinforcing sleeve 16 inserted within the inlet opening to the bag and about which the material of the bag is gathered. And finally, surrounding the neck of the bag after the same has been applied over the extension 15a, is a clamping collar 17 having the form of a split ring provided with a suitable clamping lever 17a at the junction of its split ends. Further description of the clamping collar is not essential as any suitable clamping ring would serve the purpose in this particular location.

Figure 3 shows the bag 5 in its folded condition as it would be received by the user, and except for the tubular reinforcing sleeve 16 at its inlet end, it is substantially flat, with the side portions folded inwardly in the form of relatively deep pleats 5b. The upper or closed end of the bag is suitably sealed as by turning over the outer edge upon itself and passing staples 5c therethrough as shown. Located centrally of the stapled outer end of the bag is the loop 10 whereby the bag is attached to the hooked end of the extensible cord 8.

Extending lengthwise within the bag is the tensioning member 18 to which the present invention pertains, said tensioning member having the form of a length of woven tape or other suitable flexible but non-elastic strip material. As shown, one end of the tape is anchored at the upper and closed end of the bag by including its end portion in the folded and stapled end of the bag material and from thence extends the length of the bag with its free end terminating at the opening in the opposite end thereof.

In the making of the bags the length of the tensioning member required to give proper support thereto when inflated, is first determined and a suitable mark or indication is made to aid the operator in applying the bag. Thus as shown in Figures 3 and 4, the first step is to grasp the end of the tape 18, and pulling the tape out from the open end of the bag, it is then folded back upon the exterior of the bag neck until its end coincides with a mark 19, preferably a transverse line printed thereon, as clearly shown in Figure 4. Obviously, an alternative arrangement would be to provide a similar mark on the tape at a predeterminned distance inwardly from its free end and drawing the tape outwardly until this mark coincides with the opening at the end of the bag. Now, by holding the tape or tensioning member 18 in its lengthwise adjusted position, as determined by the marking, the neck of the bag is then fitted over the extension 15a of the hinged adapter collar 15, the clamping ring 17 in the meantime having been loosened. And finally, while still holding the tape 18 in its lengthwise adjusted position, the clamping collar 17 is tightened by operating its clamping lever 17a. Thus the bag is secured at its lower end with the adjacent end of the tape firmly anchored. To complete the attachment of the bag the hook 9 at the end of the extensible bag support 8 is inserted through the loop 10 at the upper end of the bag.

Now, due to the shortening of tensioning member 18 the bag, prior to its attachment to the cleaner, will assume a somewhat crumpled appearance, as shown in Figure 4, with the lengthwise buckling of the material. Similarly, after the bag is attached to the cleaner but prior to its inflation, the bag will assume a somewhat partially inflated condition as shown in Figure 2. However, upon the starting of the cleaner the air entering

the bag under pressure immediately fills it out to its fully inflated condition whereupon it assumes its fully rounded contour without any creases or breaks at any point, which means, of course, that the internal tensioning member 18 is of just the proper length to take up the strain that would otherwise be exerted upon the bag material. In this manner then, the bag is supported independently of the material of which it is made and is relieved of all the strain incident to its support by the cleaner and its handle. In short, the tensioning member 18 provides a non-extensible connecting member between the movable collar 15 of the adapter 11 and the extensible connector 8 carried by the handle, and passing through the bag itself. Obviously, the advantage and purpose of the tensioning member, is to increase the useful life of the bag, by keeping the same constantly extended in a lengthwise direction so that it will not sag and thus come into contact with the floor during cleaning operation, nor will it buckle and sag with each deflation and particularly under the weight of the dirt therein.

The foreging discussion adequately reveals the invention and the purposes and advantages thereof. But as already stated there are other practical applications of the tensioning member. Hence, the remaining discussion will be directed to a number of alternative applications of the idea.

Referring to Figure 7 a slight departure from the arrangement of Figures 1 to 5 is shown, wherein the tape or flexible tensioning member 20, anchored in any suitable manner to the upper end of the bag, is provided at its free end with a slit, so that the end of the tape can be buttoned onto a buton-like head 21 projecting from the internal annular surface of the extension collar 15a of the hinged collar 15 of the adapter 11, which is otherwise the counterpart of that shown in Figure 5.

Now, in making use of the modification shown in Figure 7, it follows that the initial length of the tape would be somewhat less than in the previously disclosed arrangement wherein the end of the tape is folded back on the neck, since the end of the tape only has to be drawn out far enough to have its end buttoned onto the head 21 just before the neck is slipped over the extension collar 15a. For this reason the button method of attachment might not be quite as convenient, since it would mean that the operator would have to reach through the rather narrow neck of the bag in order to find the tape, unless a suitable leader were attached to the end of the tape, such as a length of string or cord, and which would be removed after the tape had been buttoned onto the collar.

Figure 8 shows another arrangement of that disclosed in Figures 1 to 5, wherein a double pronged fastener 22 is carried by the bag at a predetermined distance inwardly from the mouth thereof and the end of the tape or tension member 23 is provided with an eyelet 23a. Thus, prior to the attachment of the bag to the cleaner, the tape would be drawn out and its end made fast in the obvious manner.

Referring now to Figures 9, 10 and 11, one application of the already mentioned arrangement is shown wherein the tape is fixed at one end to the lower or inlet end of the bag and its free end extends through and slightly beyond the upper end of the bag. Thus as shown in Figure 10, the tape 24 is suitably fastened between the bag proper 25 and the tubular reinforcing member 25a and extending lengthwise passes outwardly through the upper end of the bag, which is not closed or sealed. The tape 24 projects outwardly from the upper end of the bag just enough to provide a tab on which the word "pull" is printed, as shown in Figure 9. However, at a predetermined distance inwardly from the tab end, the word "stop" with an indicating arrow is printed, so that the operator may obtain the proper adjustment of the tape by withdrawing the tape until the word "stop" coincides with the open edge of the bag. And finally, by folding the open upper end margins of the bag double and sliding them endwise into a metal clip 26, the bag is ready for attachment to the cleaner.

Figures 12, 13 and 14 disclose still another application of the idea of pulling the tape outwardly through the upper end of the bag, the tape having its other end fixed at the lower end of the bag. In this construction, the bag 27 is permanently closed at its upper end by means of a binding strip 28 folded crosswise over the end of the bag material and sealed as by staples 28a. The tape 29 passes between the bound edges of the bag material and through a slot 30 in the binding strip 28, the extended end of the tape being provided with a somewhat enlarged tab 29a having the word "pull" printed thereon, this tab being slightly wider than the slot so that it will prevent the end of the tape from being pulled backwardly into the bag. At a predetermined distance inwardly from the tab end of the tape is a rectangular shaped metal loop member 31 suitably fixed along one side to the tape as by means of stitching 32 and normally held down against the tape by means of an adhesive strip 33 which eventually is to be removed. And immedately beyond the metal loop 31 and surrounding the tape is a wedge shaped plug 34 made of felt or other fibrous material and suitably fastened to the tape as by stitching 34a with its smaller end toward the free end of the tape. And finally, on the underside of the tape, there is applied a coating of a suitable adhesive from the loop 31 to its outer end, including the tab 29a.

With this arrangement the bag, prior to its application to the cleaner, assumes a flat folded form with the tape 29 entirely enclosed within the bag except for the pull tab 29a at its outer end and to prepare the bag for attachment to the cleaner, the tape is pulled outwardly from the upper end until the loop member 31 has been drawn through the slot 30 in the bound end of the bag, and thus freed to be used for attaching the bag to the upper end of the handle. But obviously in drawing the loop member through the end of the bag the material will necessarily be stretched to such an extent as to cause an appreciable air leakage at that point. But with the plug member 34 carried into the stapled end of the bag, as clearly shown in Figure 14, any possibility of leakage is thus eliminated. To fasten the extended portion of the adhesive tape the side thereof bearing the adhesive is moistened and then sealed to the outer surface of the bag as clearly shown in Figure 12, and in accordance with the directions printed on the end portion of the tape.

The arrangement of Figures 12 to 14 inclusive, is perhaps somewhat less expensive than that shown in Figures 9 to 11, in that it does not involve the use of a separate metal clip for sealing and closing the upper end of the bag. However, it does require a somewhat more complicated form of tape in that it has to carry the

bag attaching loop and make provision for closing the slot through which the tape is drawn.

And finally, referring to Figures 15 and 16 a type of the bag construction is shown wherein the tape or tensioning member is fastened at each end of the bag in the process of manufacture and as a result no adjustment on the part of the operator is necessary. At first glance it may appear that the disclosure of such a construction is wholly inconsistent with the previous disclosures wherein it was sought to avoid the very objections which this latter type of construction introduces, namely, the undesirable buckling and creasing of the bag prior to its application to the cleaner and for packaging and shipping and handling purposes. However, it suggests a way of avoiding the objectionable features by resorting to a transverse folding of the bag which will probably take up the excess due to the shortening effect of the tensioning member.

Thus the bag **35** is of substantially the same construction as heretofore set forth and more particularly the identical construction shown in Figures 1 and 3, except that the tensioning member **36** is not only attached to the upper end of the bag, but also at the lower or inlet end as by suitable connection between the bag proper and the reinforcing neck portion **35***a*. As shown in Figure 15, the bag prior to inflation assumes a relatively flat form with its side pleats folded inwardly in the usual manner but in addition to the lengthwise folds or pleats the bag material is also folded transversely intermediate its end along two transverse fold lines spaced apart lengthwise from each other, one fold being in the underside of the bag and the other in the upper side of the bag. Moreover, one fold faces toward the upper end of the bag and the other fold towards the lower end of the bag with the result that in spite of the shortening effect of the member **36** with its permanent fastening at either end of the bag, the bag material still may be folded to a comparatively flat form and without any particular danger of injury to the bag. It is not contended that this arrangement is entirely satisfactory as it necessitates a rather complicated folding operation and one that has to be accomplished or undertaken by hand labor. Hence, while the initial permanent fastening of the tape within the bag relieves the operator of making the proper adjustment when attaching the bag to the cleaner, the attendant difficulties in the making and folding of these bags, would probably not recommend them over the adjustable tape arrangements of the preceding disclosures.

Having set forth the purposes and advantages of the invention in several of its more practical embodiments,

We claim:

1. A dirt receptacle for the purpose described comprising a bag-like container adapted to be supported at its ends in inflated condition, and a flexible tension member extending longitudinally and interiorly of said container with one end permanently attached thereto and its other end free for adjustable fastening adjacent the opposite end of said container.

2. A dirt receptacle comprising an elongated bag-like container adapted to be supported in inflated condition, a flexible tension member extending longitudinally and interiorly of said container and permanently attached at one end thereof, and means for adjustably fastening the free end of said tension member at the opposite end of said container.

3. A dirt receptacle for a suction cleaner, comprising an elongated bag-like structure of flexible material, and a strip of flexible material extending lengthwise within said receptacle and fixed at said one end thereof with its free end portion terminating adjacent the opposite end of said receptacle and marked to indicate the point of anchorage of said strip to obtain the desired tensioning effect on said receptacle in its inflated condition.

4. A dirt receptacle for a suction cleaner, comprising an elongated bag-like structure of flexible material, and a flexible strip extending lengthwise within said receptacle and permanently attached to said one end thereof, the free end of said strip being unattached but accessible from the opposite end of said receptacle, means for determining the amount said free end of said strip is to be withdrawn from said receptacle to obtain the desired tensioning effect thereon in its inflated condition, and means for anchoring the adjusted end of said strip.

5. A dirt receptacle for suction cleaners, comprising an elongated bag-like structure of a flexible material adapted to be folded flat prior to attachment to a cleaner, and a flexible tension member extending interiorly and lengthwise of said receptacle with one end permanently fastened at one end thereof and having a free end portion adapted to be withdrawn from the opposite end thereof and anchored to obtain the desired tensioning of said strip when said receptacle is inflated.

6. A dirt receptacle for suction cleaners, comprising an elongated bag-like structure of a flexible material initially folded flatwise and having a flexible tension member extending interiorly of its length with one end fastened at one end and a free end portion extensible from the opposite end thereof, said tension member having a mark thereon to indicate its effective tensioning length in the inflated condition of said receptacle, and means for anchoring the free end of said strip to said receptacle.

7. A dirt receptacle for suction cleaners, comprising an elongated bag-like structure of a fibrous material adapted to be folded flatwise with longitudinally extending pleats to facilitate handling prior to use, and a flexible non-elastic strip extending lengthwise within said receptacle and having one of its ends permanently fastened to said receptacle and its other end terminating in a free end portion extending through and extensible from the opposite end of said receptacle, said strip and receptacle having registering indications to determine the internal length of said strip for effective tensioning in the inflated condition of said receptacle, and means for anchoring said free end portion of the strip to said receptacle.

8. A dirt receptacle for suction cleaners comprising a container of flexible material adapted to be supported at its ends, and a tension member extending between the ends interiorly of said container and having a length such that it will be placed under tension when said container is in inflated condition.

HARRY S. DEMAREE.
DONALD G. SMELLIE.