

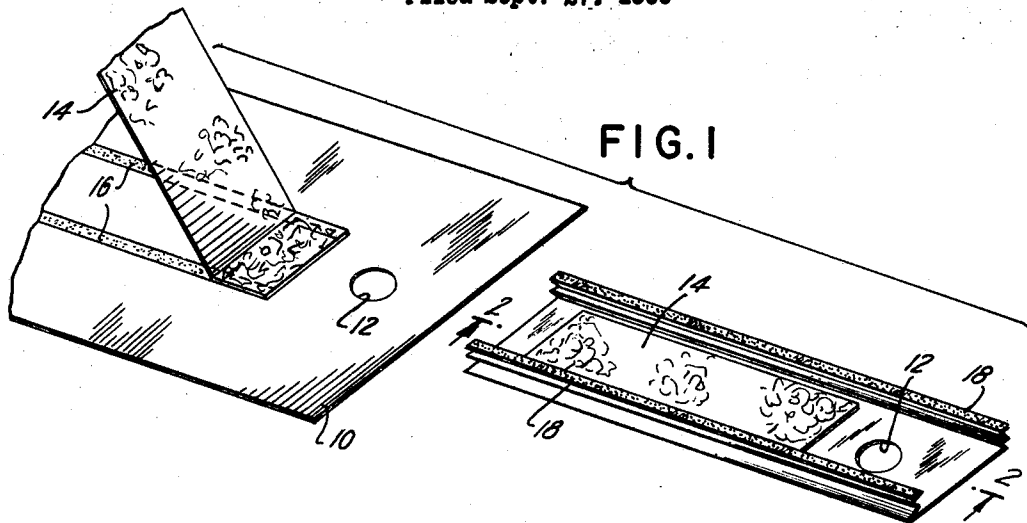
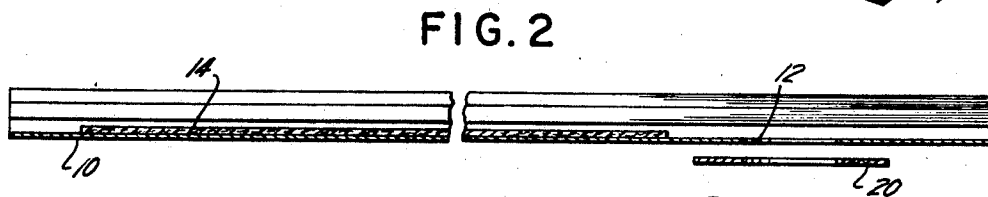
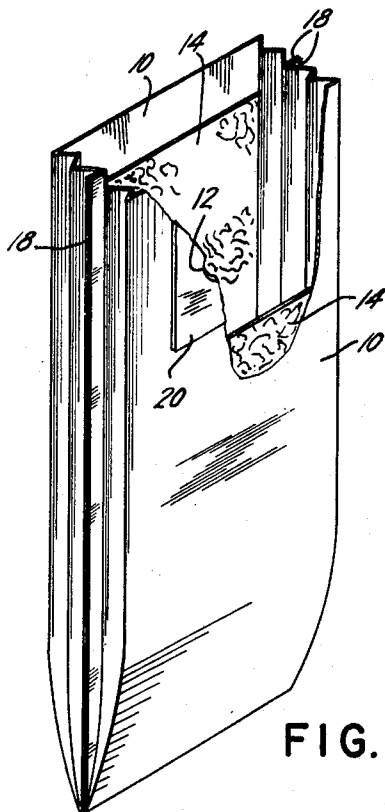
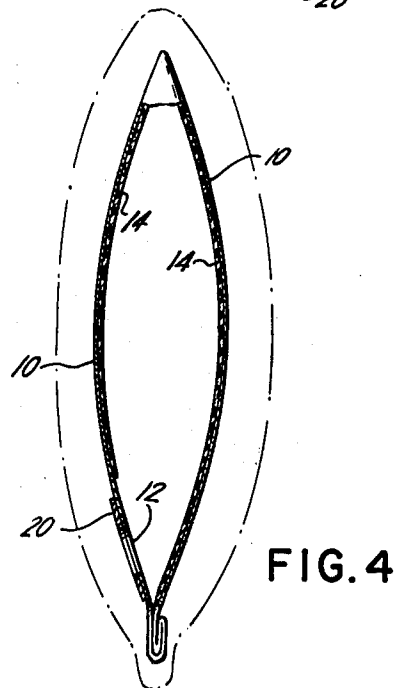
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FILTER BAG HAVING A FELT-LIKE INSERT

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FILTER BAG HAVING A FELT-LIKE INSERT

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4 Claims

ABSTRACT OF THE DISCLOSURE

A vacuum cleaner filter bag comprising in combination a container composed of air-permeable filter paper and an insert of felt-like material within said bag coextensive with a portion of the interior of the front and rear walls thereof.

This invention relates to vacuum cleaner filter bags. In particular, this invention relates to an improved type of vacuum cleaner filter bag containing a reinforcing and auxiliary filtering insert of felt-like material.

Vacuum cleaner filter bags are ordinarily made of paper filter sheet material through which air drawn by suction into the vacuum cleaner is free to pass, the particles of dust entrained in the air stream being filtered out and retained within the filter bag. However, it has been found that relatively fine particles of dust tend to pass through the wall of the filter bag at a point opposite the point of entry of the dust-laden air streams.

One approach to this problem has been to provide deflecting means to turn the air stream away from its normal impact point on the wall of the bag opposite the entry point of the air stream. Such arrangements have been successful in a number of instances, but have suffered in some cases from certain disadvantages. Among these may be mentioned the fact that such deflecting means, in some cases, tend to direct the air flow in such a manner that the filtering capacity of the bag is not fully utilized.

Another way of preventing the escape of fine dust particles is to make the bag of a less permeable material, having a finer pore structure than the usual bag materials. This approach is effective to a degree, but only in a limited manner, because the use of such bag materials also impedes the free flow of air through the bag wall creating a back pressure within the bag which, at best, reduces the effective suction of the apparatus, and at worst may result in rupture of the filter bag.

Another disadvantage of many common constructions used for the manufacture of vacuum cleaner bags is that the manner in which they are constructed requires that they be closed at both ends, for example by folding the material of the bag wall once or twice over upon itself, and stapling, gluing, or sewing the ends of the bag to hold them in the folded condition, thereby providing a dust-tight closure. This is a somewhat cumbersome operation, and is aggravated when the construction of the bag involves multiple plies of material, by virtue of the thick, bulky closure formed by folding such multiple plies of material over upon themselves.

An object of this invention, therefore, is to provide an improved vacuum cleaner filter bag.

Another object is to provide a vacuum cleaner filter bag which has improved ability to trap and retain fine particles of dust and dirt.

Still another object is to provide a filter bag with improved ability to retain fine particles, without sacrificing high air-permeability.

A further object is to provide a vacuum cleaner bag devoid of excessively bulky end closures.

A feature of the invention is the provision of a filter bag having an insert of felt-like material.

Another feature resides in the provision of an insert of felt-like material lining a part only of the bag, the remainder of the bag being devoid of such insert.

According to another feature the bag is formed from an elongated pre-cut blank of approximately twice the length of the bag desired, and the bag is formed with one end closed by folding said blank approximately in half along a line transverse to its major dimension.

In still another feature, the bag is made from an elongated blank and provided with a felt-like insert extending longitudinally of the blank, the insert being shorter than the blank and terminating short of the ends thereof, so that an end of the bag may be closed by folding to bring opposed ends of the blank together and doubling the juxtaposed blank ends upon themselves, without necessitating the inclusion of felt-like material of the insert in the doubled-over portion.

Other objects, features and advantages will become apparent from the following more complete description and claims, and by reference to the accompanying drawings.

In one particularly desirable embodiment, this invention contemplates a vacuum cleaner filter bag comprising in combination a container composed of air-permeable filter paper and an insert of felt-like material within said bag and coextensive with a portion of the interior thereof.

The bag body or container may be made of any type of air-permeable filter paper such as is commonly used for vacuum cleaner filter bags. The felt-like material may be an actual felt of animal hair or the like, or a felt-like mat of vegetable fibers such as kapok, cotton fibers, paper fibers or the like, all generally referred to herein as "felt-like material." For reasons of economy, a relatively inexpensive material such as paper fibers or cotton will ordinarily be preferred.

Referring now to the drawings:

FIGURE 1 is a perspective view of a filter paper blank and felt-like insert as fed into a conventional folding machine, and of the blank, and insert, as they emerge from the folder after pleating and folding to form a flat, elongated, half-tube, gusseted at the sides thereof.

FIGURE 2 is a cross-section taken along line 2—2 of FIGURE 1.

FIGURE 3 is a perspective view of a bag partially formed by folding the half-tube over upon itself and gluing along adjacent side flaps to form a bag closed on three sides.

FIGURE 4 is a cross-section of the bag of FIGURE 3 after the top has been closed by doubling over upon itself, and showing the bag as it would appear in use mounted in an upright vacuum cleaner.

As shown in the drawings, the bag according to the invention is made from a flat blank 10 of filter paper or the like, provided with an aperture 12 which eventually becomes the inlet aperture of the finished bag, and a flat strip 14 of felt-like material. Blank 10 is preferably provided with adhesive strips 16 to hold the felt strip in place. After the felt strip is positioned, the blank and the felt strip are fed together through conventional folding machinery to provide a folded configuration as shown in the right-hand portion of FIGURE 1, having adhesive-faced flaps 18 and one or more side pleats. The flat wall or unfolded portion of the folded blank, which eventually becomes the front and rear walls of the bag, is lined throughout most of its extent with the felt strip 14, leaving unlined the end portions of the wall and the side pleats. The adhesive may be applied to flaps 18 at any convenient stage of the process, either before, during, or after the folding operation.

After the folding operation, a conventional reinforcing

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collar 20 of cardboard, fiberboard or the like is applied to the outer wall of the bag surrounding aperture 12.

The folded blank is then folded again, this time along a line transverse to its longer dimension, and each of flaps 18 is cemented to itself, to form a bag closed on three sides, as shown in FIGURE 3.

It may be noted that when the bag is made in this way, the closure of the end opposite the inlet aperture is effected by the formation of a U-shaped bight in the wall of the bag, forming a secure closure without any need for doubling either the filter paper of the bag wall or the felt insert over upon itself.

The end nearer the inlet aperture is then doubled over, preferably twice, upon itself, and sealed in any conventional manner, as by stapling, cementing, or stitching. It will be noted that, because the felt insert does not extend to either end of the blank, the ends of the blank can be thus doubled over, without necessitating the formation of a bulky construction including the felt-like material.

In the bag according to the invention, there is provided a felt-like insert over most of the extent of the filter paper container, particularly at the flat walls where most of the filtering takes place. This insert greatly improves the capacity of the bag to filter out fine dust particles. On the other hand, the increase in resistance to air flow, which would normally accompany such an improvement, is avoided by providing substantial areas at the sides of the bag, in the pleated area, which are not lined, and afford relatively easy flow of air, thereby preventing any buildup of internal pressure. These areas, unlike the flat walls of the bag, are reached by the air stream only after a substantial change in direction, so that dust particles tend to be thrown against the flat, felted walls and trapped there, while the relatively clean air then makes its way to the unlined sides of the bag and passes there-through out of the bag.

I claim:

1. A dirt filtering bag for a vacuum cleaner, said bag comprising:

a sheet of flexible air-permeable material provided with a plurality of pleats including face pleats formed along the opposing side edges thereof with a non-pleated portion; said sheet and said insert being trans-an insert of felt-like material disposed on and joined to said sheet intermediate said pleats on said non-pleated portion; said insert having first and second ends terminating short of the ends of said sheet and having a lesser lateral dimension than said non-pleated portion; said sheet and said insert being transversely folded medially of their length along a single common fold line; the confronting panels of the face pleats being joined to each other; said pleats being laterally unfoldable along said transverse fold; said fold line forming an enclosed bottom for said bag

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coextensive with the width of said sheet; the confronting pleated ends of said sheet being secured together by being folded over upon themselves and secured in folded over position; said folded over pleated ends securing said pleats against lateral displacement along the top end of the bag; the pleated edges being held in pleated condition only by the bight along said transverse fold; an inlet aperture formed in said non-pleated portion and lying closer to said folded over pleated ends than to said fold line to cooperate with a vacuum cleaner inlet element; said inlet aperture being disposed between said first end of said insert and said folded over pleated ends; both ends of said insert terminating short of said folded over pleated ends and being closer to said folded over pleated ends than to said fold line with said second end of said insert being closer to said folded over pleated ends than said inlet aperture.

2. A dirt filtering bag according to claim 1 wherein an apertured collar is attached to said bag with its aperture being aligned with said inlet aperture.

3. A dirt filtering bag according to claim 2 wherein said collar is formed of a relatively stiff material.

4. A dirt filtering bag according to claim 3 wherein said collar is formed of cardboard.

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