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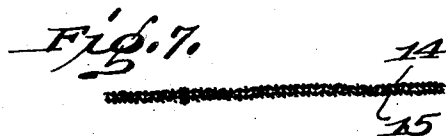
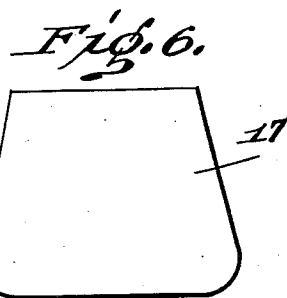
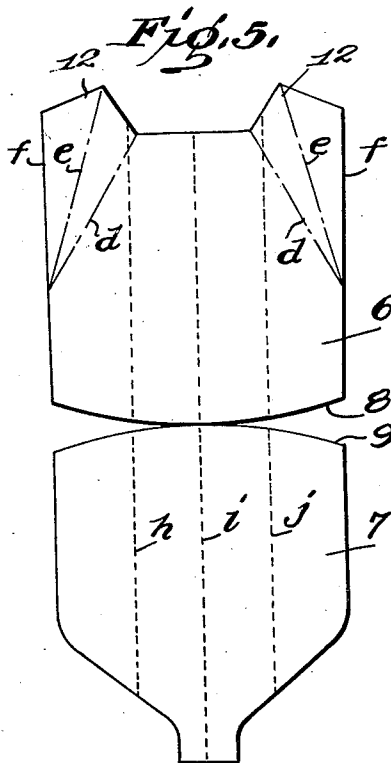
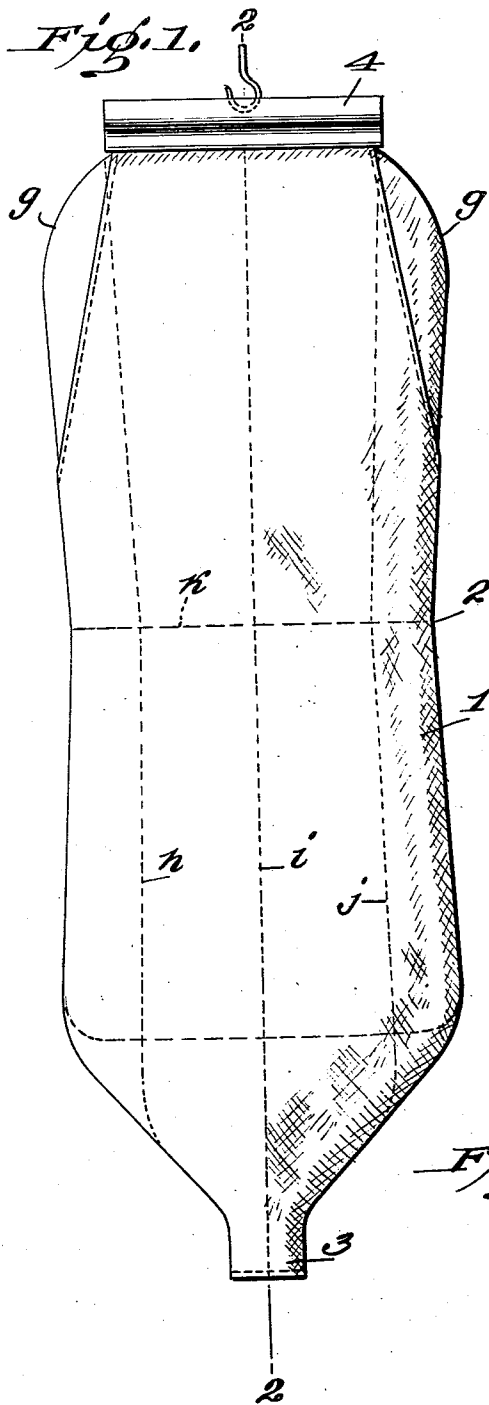
B. KERN

1,970,043

DUST BAG

Filed June 4, 1931

3 Sheets-Sheet 1



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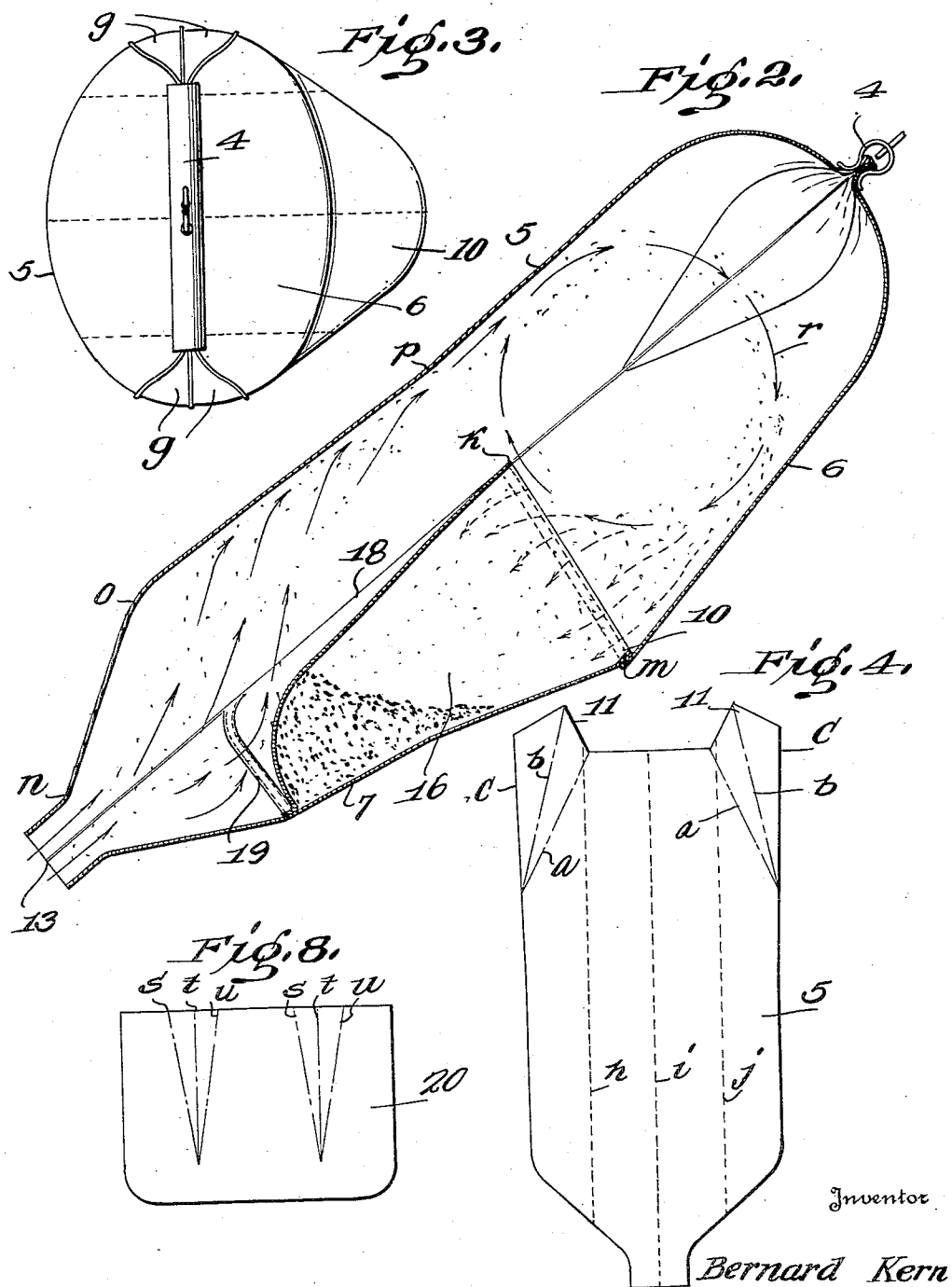
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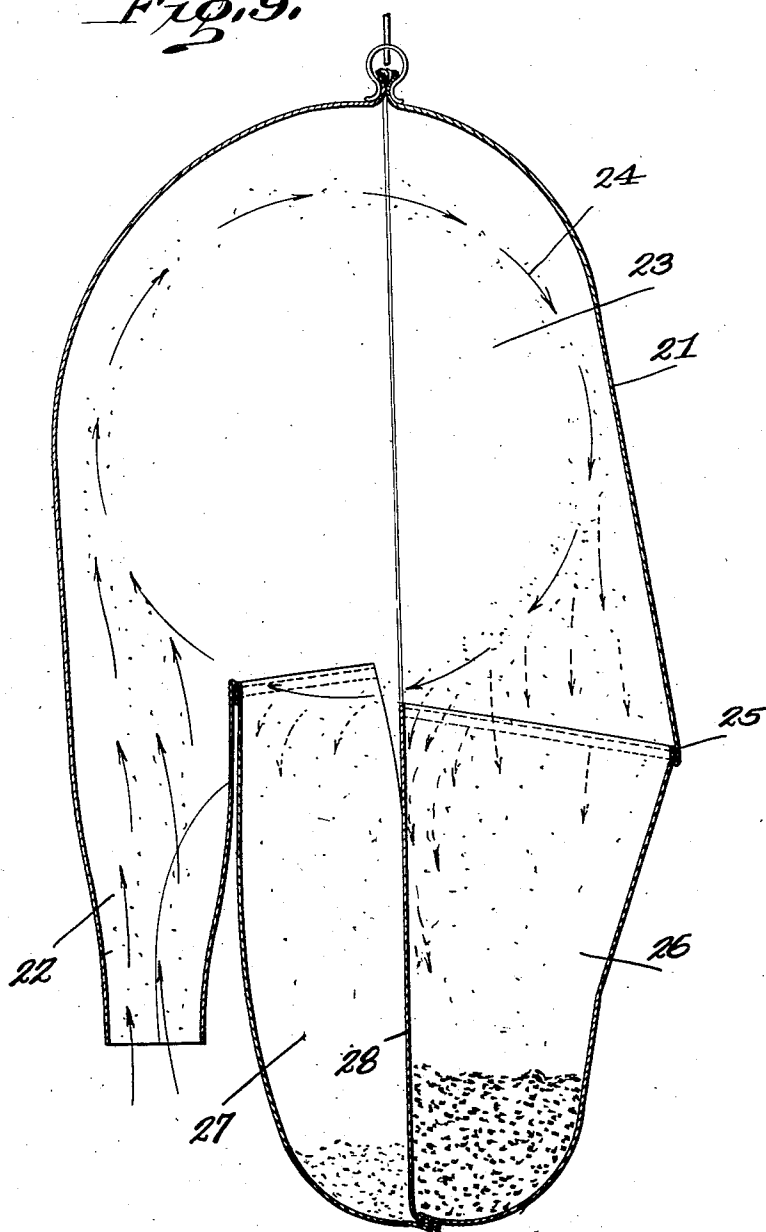
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Fig. 9.



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UNITED STATES PATENT OFFICE

1,970,043

DUST BAG

Bernard Kern, Syracuse, N. Y.

Application June 4, 1931, Serial No. 542,130

4 Claims. (Cl. 183—51)

My invention relates to new and useful improvements in a receptacle or dust bag adapted to be used in connection with vacuum or suction cleaners and it is the principal object of the invention to construct a bag of the character described in such a manner as to allow for a constant flow of air at a constant velocity and in such a manner that the back pressure remains constant after the walls of the bag are once saturated with dust.

It is a further object of my invention to provide a dust bag of the character described in which there is an interiorly formed pocket to receive the dust, said pocket being so positioned relative to the inlet opening as to direct incoming dust laden air towards one wall of the bag thus allowing a great percentage of the air to pass through the bag at this point while the remaining air is carried upwardly and allowed to expand into the upper portion of the bag and discharge the dust into the pocket.

Still another object of the invention consists in forming the rear wall of the body of the bag in such a manner as to provide an outwardly directed dip thereby increasing the area of the bag adjacent the upper edge of the pocket the dip forming a releasing point for the dust whereby it is directed into the pocket. In expanding at the upper portion of the bag, above the upper edge of the pocket, the air takes the natural course of a circle and the bag is of the largest cross section at the point where the dip is formed.

A still further object of the invention resides in forming the section forming the back portion of the bag in such a manner as to provide the dip, the member or partition forming the pocket being connected to the rear section of the bag in a novel manner to provide for the contraction of the body, crossways thereof, to aid in forming the dip.

In dust bags for the purpose described, now commonly in use, unless the bag is cleaned after each use of the cleaner the volume and velocity of the air changes because at each cleaning the volume of dust is increased and all of the dust in the bag is carried upwards and held to the walls of the bag by the escaping air thereby causing back pressure against the fan used in creating the vacuum or suction. In carrying forward my present invention the bag is constructed in such a manner as to allow for a constant flow of air at a constant velocity and in such a manner that the back pressure remains constant

after the walls of the bag are once saturated with dust.

So far as there is common subject matter the present application is a continuation in part of my application filed February 20, 1926, Serial No. 89,648, which application has been abandoned.

With the above and other objects in view, which will appear as the description proceeds, my invention consists in the novel details of construction and arrangement of parts, described in the following specification and illustrated in the accompanying drawings, and while I have illustrated and described the preferred embodiments of the invention, as they now appear to me, it will be understood that such changes may be made as will fall within the scope of the appended claims.

In the drawings:—

Fig. 1 is a front elevation.

Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1.

Fig. 3 is a top plan.

Fig. 4 is a plan showing the blank from which the front section of the bag is made.

Fig. 5 is a plan showing the blank, of two parts, from which the rear section of the bag is formed.

Fig. 6 is a plan of the blank which forms the partition for the pocket within the bag.

Fig. 7 is a fragmental detail of the fabric used in constructing the bag showing two layers of the fabric secured together to form the blanks disclosed in Figs. 4 and 5.

Fig. 8 shows a modified form of blank from which the partition to form the pocket is made; and

Fig. 9 is a longitudinal section through a modified form of bag in which two pockets are provided, the form of bag shown in this figure being particularly adapted for use in connection with a larger type of cleaner than that commonly used for domestic purposes and in which a larger fan is used having a capacity of discharging a much larger volume of air than the fan commonly used in domestic cleaners.

In the drawings 1 indicates the body portion of the bag restricted transversely, intermediate its ends, as shown at 2, and provided at the lower end with a restricted or reduced extension 3 adapted to be secured by a sleeve, not shown, or in any other manner to the vacuum or suction cleaner. The upper portion of the bag is formed in such a manner as to be normally closed by the clamp 4 and when the clamp is removed, for cleaning the bag, to provide a relatively large opening whereby the dust or litter may slide out

by shaking the bag from the inlet end, it not being necessary for the operator to use his or her hands in removing the dust or litter. The body of the bag is constructed from the blanks shown more particularly in Figs. 4 and 5 of the drawings, the blank 5 shown in Fig. 4 being used for forming the front portion of the bag and the blank shown in Fig. 5 being used for forming the rear section. The blank shown in Fig. 5 is formed of two portions 6 and 7 the inner edges of which are curved as shown at 8 and 9 respectively and are adapted to be secured together by stitching. By stitching on the curved lines 8 and 9 an outwardly extending dip is formed in the rear portion of the bag as shown generally at 10, this dip being of particular advantage in depositing the dust or litter, from the currents of air, into the pocket to be later described. At the upper end the blank 5 is formed at the sides with the upwardly directed pointed extensions 11 and the portion 6 of the blank shown in Fig. 5 is formed at the upper edge with the upwardly directed pointed extensions 12. The blanks shown in Figs. 4 and 5 will be secured together along their longitudinal edges by stitching as shown at 13 and when the upper end of the bag is to be closed the extensions 11 will be folded on the lines *a*, *b* and *c* to form inwardly directed pleats and the pointed extensions 12 of the blank shown in Fig. 5 will be similarly folded on the lines *d*, *e* and *f* to form inwardly directed pleats. When so folded the upper end of the bag will be somewhat restricted to receive the clamp 4 but it will be understood that when the cleaner is being operated that air discharged into the bag will force or blow portions of the pleats outwardly as shown more particularly at *g* in Fig. 1 of the drawings. Each of the blanks shown in Figs. 4 and 5 is formed of two layers of the material as shown at 14 and 15 more particularly in Fig. 7 of the drawings, these layers being secured together by the longitudinally extending rows of stitching *h*, *i* and *j*. By using the two layers of material the air in escaping through the fabric will take an indirect course. The surface of the fabric is woolly and formed with a nap and when the two layers of cloth are sewed together there will be a double thickness of the nap which will cause the air to take an indirect passage through the two layers of fabric. The nap will retain the dust.

For receiving the dust or litter discharged from the circulating air, within the bag, I provide the pocket indicated at 16, this pocket being formed by securing the partition formed by the blank 17 interiorly of the bag as shown more particularly in Fig. 2 of the drawings, this partition being secured within the bag by stitching along the edges 18 and at the bottom as shown at 19. This partition is of such a width as to slightly draw in the side edges of the bag to form the restricted portion 2 and to aid in causing the bag to assume the shape to provide the dip 10. When the bag is supported in an inclined position, in use, as shown more particularly in Fig. 2 of the drawings, the partition forming the pocket will naturally fall inwardly a short distance as shown in Fig. 2 or in other words the center portion will assume a position slightly inward of the stitching 18. The edges of the bottom partition are secured to the rear section of the bag.

It will be noted that the top edge of the partition shown at *k* is on a somewhat higher plane than the point *m* where the portions 6 and 7 of the rear section of the bag are stitched together

on the curved lines 8 and 9. The purpose of this will be later apparent.

The bottom portion of the pocket formed by the partition 17 partly obstruct passage through the inlet opening formed by the extension 3 and as the air is discharged, with the dust or litter from the cleaner into the bag through the restricted inlet opening it strikes the bottom of the pocket, as shown by the arrows in Fig. 2 and is directed at high velocity towards the front surface of the bag. I find in practice that because of the high velocity of air there is no discharge of air between the points *n* and *o* but there is a discharge of air between the points *o* and *p*, a small amount of dust accumulating on the wall between the points *o* and *p*. After reaching a point above the top edge of the pocket the air expands forming its own circle as shown by the arrows *r* and discharges the dust and litter into the pocket. The rear wall of the pocket is the first to become saturated with the dust so as to entirely seal the same and prevent any air from getting through. The circulating air above the pocket acts as a weight on the dust that is within the pocket. It will be understood that the heavier particles or dust and litter are constantly being thrown out to the extreme periphery of the circle formed by the air currents and these heavier particles are discharged at what may be termed the releasing point which is at the dip 10. This dip acts as a scoop to receive and direct the heavier particles of dust and litter into the pocket and the lighter particles of dust and litter will fall from the air currents into the pocket.

From the above it is thought that the construction and advantages of my improved form of bag will be clearly understood. In a bag of the construction shown and described there is a constant discharge of a given volume of air and the circulating volume of air is intended to constantly gather and discharge the dust from the dust laden circulating volume of air into the pocket which is beyond the influence of the cyclonic disturbance in the bag. Also there is no heavy accumulation of dust on the front portion of the bag between the points *o* and *p*. By providing the top edge of the partition, forming the pocket, on a somewhat higher plane, as shown at *k* then the point *m* will aid in directing the air and dust and litter carried thereby into the pocket. It will be further seen that with a bag of the construction shown and described that it is not necessary to use a check valve at the inlet end of the bag. Instead the dust and litter is supported within the pocket and so held when the cleaner is not in use and when the bag is removed for discharging the accumulated dust and litter.

In Fig. 8 of the drawings I have shown a slightly modified form of partition 20 for forming the pocket. In this form of partition the upper edge is somewhat wider than the upper edge of the partition shown at 17 in Fig. 6 and to reduce this width the material may be folded on the lines *s*, *t* and *u* to provide pleats, these pleats taking up slack in the partition when secured within the bag.

In Fig. 9 of the drawings I have shown a slightly modified form of bag adapted for use in connection with a larger type of cleaner than that commonly used for domestic purposes or in other words for use with a machine of the vacuum or suction type which is used for picking up heavy particles consisting of dust, sand, gravel, small iron pieces or the like. Such a machine is ordinarily used in factories or warehouses. In

this modified form of bag the body portion is shown at 21 and is provided with a restricted inlet opening 22 which discharges the debris laden air into the large upper portion of the bag shown at 23 where it expands and forms a circle denoted by the arrows 24. The bag is formed with the "dip" shown at 25 in the same manner as described for that form of bag shown in other figures of the drawings and is further provided with the pockets 26 and 27 as distinguished from the single pocket provided in the preferred form of the invention. These pockets are formed by the partition 28 and the upper edge of the pocket 27 is on a somewhat higher plane than the upper edge of the pocket 26 so as to properly direct the air currents and debris carried thereby into the respective pockets. The release point for the debris is at the dip 25 which acts as a scoop to discharge the heavier particles into the pocket 26 while the lighter particles will be discharged into the pocket 27.

In each form of the invention described the largest area of the bag is at the dip. The most natural turn that the air will take will be the longest radius. At the dip the bag has a scoop shape and the area in the bag is the largest in cross section at this point.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A dust bag of the character described including a front wall, a rear wall, an inlet opening for the debris laden air, and a plurality of pockets for receiving the debris released from the air, the rear wall having an outwardly dipped portion at the point at which the debris is released from the air for directing the same into the pockets.

2. A dust bag of the character described in-

cluding a front wall, a rear wall, an inlet opening for the debris laden air, and a plurality of parallel pockets for receiving the debris released from the air, the rear wall having an outwardly dipped portion at the point at which the debris is released from the air for directing the same into the pockets.

3. A dust bag including front and rear walls connected along their longitudinal edges, the rear wall including sections formed of blanks having arcuate-shaped edge portions adapted to be connected to provide a dip in the rear wall, and a partition connected to the longitudinally connected edges of the walls to form a pocket, said partition drawing the sides of the walls inwardly to cooperate in forming the dip.

4. A dust bag of the character described having an inlet opening at one end and normally closed at the opposite end, and a pocket positioned within the bag with a portion overlying the inlet opening a substantial distance thereabove to initially direct dust laden air entering the inlet opening towards one wall of the bag and said pocket also having a wall portion to provide with the wall towards which the air is directed a restricted air passage through which the air is carried for a substantial distance and to provide an enlarged space adjacent the closed end into which the air is discharged from the restricted passage, the air entering the enlarged space forming a circular current from which the dust is released for deposit into the pocket, the wall of the bag opposite to that towards which the air is initially directed being formed of sections having arcuate-shaped edges connected to provide a continuous unbroken surface with an outwardly flared dip, the unbroken surface and dip directing the dust into the pocket.

BERNARD KERN.