H. E. HOOVER.

BAG FOR SUCTION SWEEPERS.

APPLICATION FILED APR. 27, 1918.

1,380,907.

Patented June 7, 1921.

2 SHEETS—SHEET 1.

Fig. 4

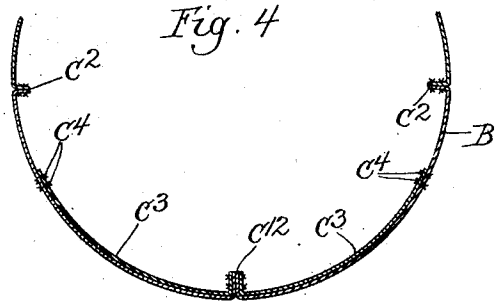


Fig. 3.

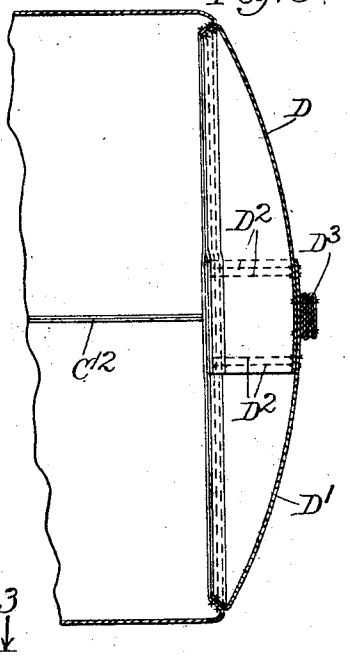


Fig. 2.

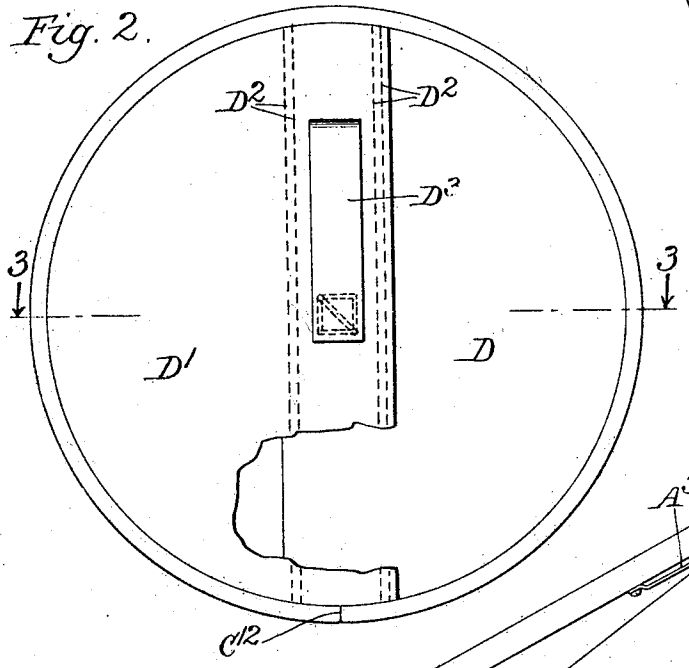
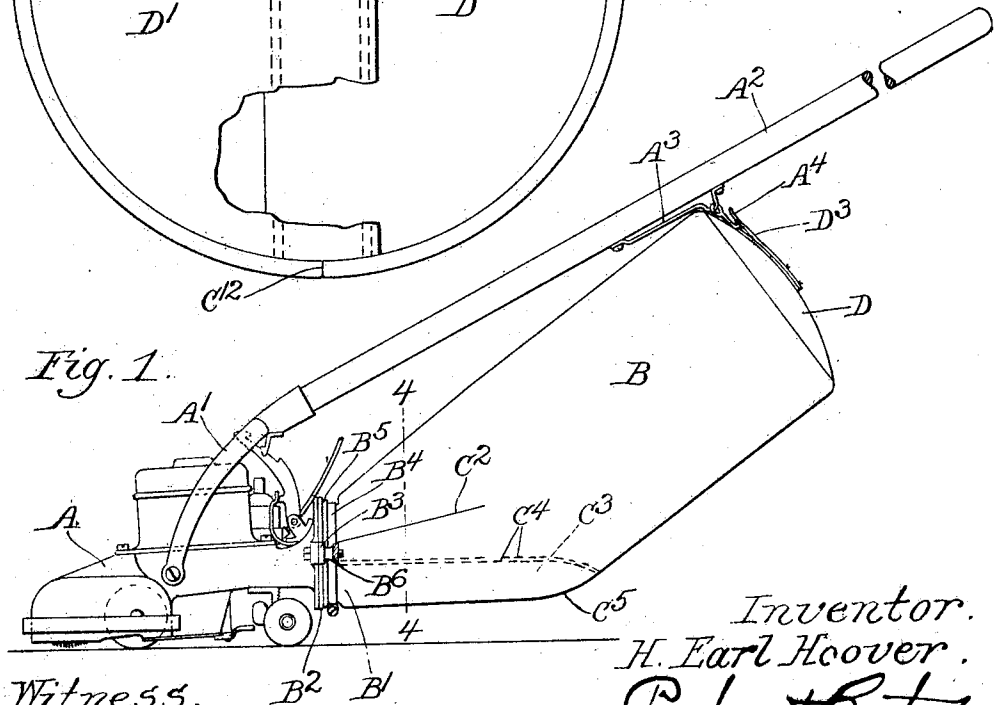


Fig. 1.



Witnesses.

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2 SHEETS—SHEET 2.

Fig. 5.

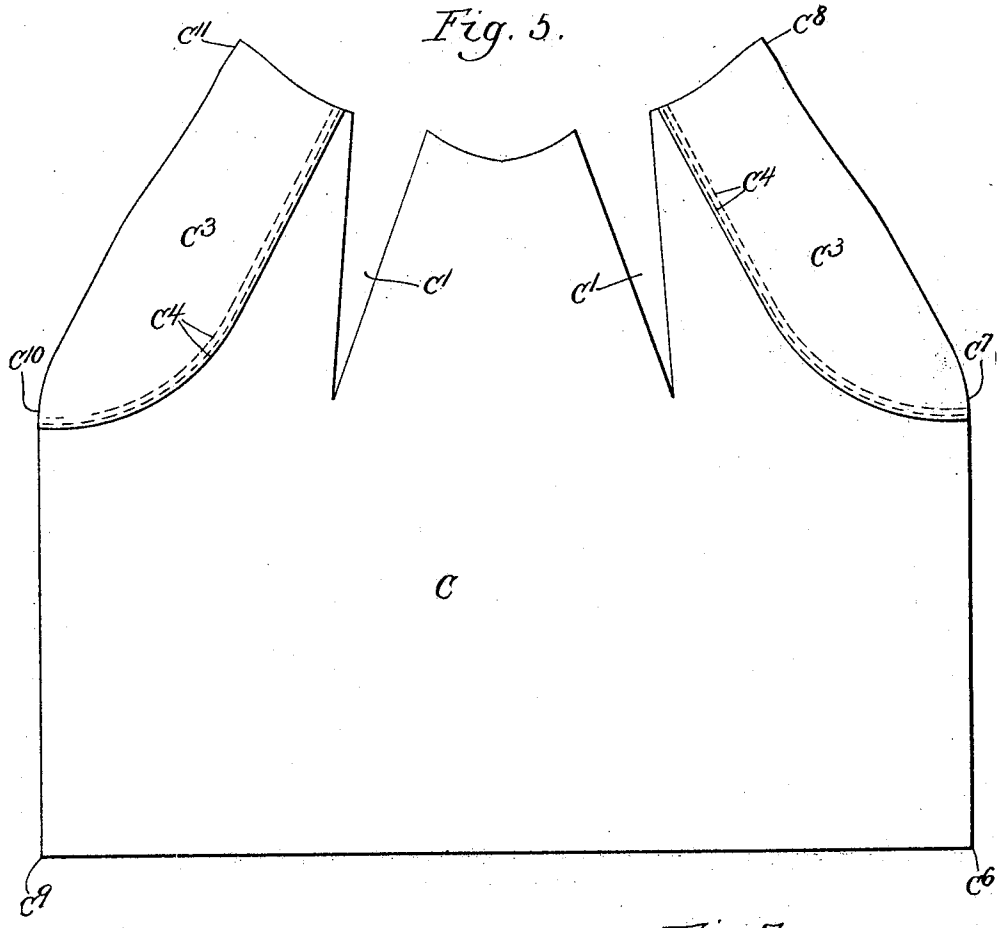


Fig. 6.

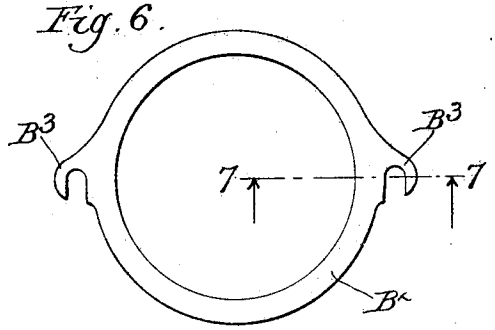
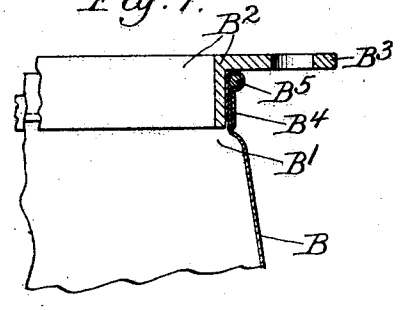


Fig. 7.



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UNITED STATES PATENT OFFICE.

HOWARD EARL HOOVER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE HOOVER SUCTION SWEEPER COMPANY, OF NEW BERLIN, OHIO, A CORPORATION OF OHIO.

BAG FOR SUCTION-SWEEPERS.

1,380,907. Specification of Letters Patent. Patented June 7, 1921.

Application filed April 27, 1918. Serial No. 231,245.

To all whom it may concern:

Be it known that I, HOWARD EARL HOOVER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Bags for Suction-Sweepers, of which the following is a specification.

My invention relates to dust bags for suction cleaners which are adapted to catch the dust or dirt brought into the cleaner by the dust laden air and hold it while permitting the escape of the air itself. It must be understood that these dirt bags are very important parts of the machine. If the bag is too thin the air gets out but the dust comes with it and this is objectionable. If the bag is too thick or impervious the dust does not escape but neither does the air and the air is backed up and back pressure is created. This decreases the renovating value of the apparatus because it reduces the volume of air drawn through the carpet and also decreases the dirt lifting capacity. It is very important to have a dust bag of the right size, shape and material so that it will catch all the dirt and will let out the air but the bag must also be durable else it will soon develop holes and let streams of dust laden air escape. In the past bags of this kind in which a blast of dirt-laden air is projected by a fan were made with an open mouth smaller than the cross sectional area of the bag. This mouth is connected on to the bag by first making a cylindrical bag, that end of which is near the open mouth is of double thickness, then folding this double thickness on to each other, and sewing them together. This gives a stiff, rigid and heavy neck surrounding the intake. Air cannot pass freely through even a double thickness of cloth. The bag is hard to sew because so many layers of cloth impede the operation of the needle. It is hard to fasten in position about the sleeve which forms the open mouth because of its stiffness and bulkiness, and it is not a symmetrical smooth well rounded job.

I propose to take a single sheet of cloth which may or may not be treated and be dust impervious, and to cut it in such a manner that when the cut edges are sewn together, I will have a bag cylindrical for a large part of its length but tapered down on one side to and provided with a wide open mouth. The lower tapered portion of the bag will have a reinforcement preferably inside and of the same cloth as the bag, and this reinforcement will go back far enough so that all hard abrasive dirt particles thrown back into the bag by the fan will be caught on it and not by the body of the bag itself. The result is most of the bag is of one thickness and so has a large air dispersing capacity. Only a small part of the bag is of two thicknesses and only that part is of two thicknesses which needs reinforcing.

It must be borne in mind that the fan drives in a large volume of dust laden air and that the whole interior of the bag is coated with dust deposited by this dust laden air as it passes through the fine meshes of the bag. Of course, there will not be enough dust to clog up the bag and the dust will under the pressure of the air not be able to go through the bag but occasionally large or heavy particles such as a match, large grains of sand, pieces of wood and the like which are thrown into the bag violently by the dust laden air will if they impinge upon the normal bag wall exert a hammer blow effect sufficient to drive the dust previously deposited through the bag and thence into the room. For this reason it is important that the reinforcing be so arranged that it takes the direct blow of any dirt particles as they are thrown in by the fan.

The reinforcing part which is thus struck, I have shown preferably inside of the bag and it will be made preferably of rejected bag material, that is material which had holes in it or something of that kind. However, under some circumstances it might be desirable to have the reinforcing outside of the bag and the reinforcement might be of some other kind of material. For instance, it might be made of material which did not show the dirt as clearly as the normal bag material, that is to say, if you use a light gray bag you might want to have the lower portion of it, that part which comes nearest the floor made of khaki color or black as it would not show soil or stain if it dragged on the floor but no matter what material this reinforcing strip or floor or bottom is made of, no matter what color it is, no matter where it is, it must be understood that it operates to protect the bag from wearing out as above indicated so that there will not be leakage and rapid deterioration of the bag.

The bag itself is so shaped that it inflates properly and makes a handsome sightly dust receptacle. Among the objects of my invention, therefore, are to provide a bag which will perform all the requirements above set out which will be of the type above indicated and to provide an economical process of manufacturing such a bag. Another object is to provide means for salvaging scrap material which cannot be used in the bag in its original form, but by cutting may be used. Other objects will appear from time to time in the specification.

My invention is illustrated more or less diagrammatically in the accompanying drawings wherein—

Figure 1 is a side elevation of a suction sweeper with my bag in place;

Fig. 2 is an end view of the bag;

Fig. 3 is a section on line 3—3 of Fig. 2;

Fig. 4 is a section on line 4—4 of Fig. 1;

Fig. 5 is a pattern of the main bag section on a reduced scale before it is sewn;

Fig. 6 is a front elevation of the bag ring about which the open mouth of the bag is secured;

Fig. 7 is a section along the line 7—7 of Fig. 6.

Like parts are indicated by like characters in all the figures.

A is a suction cleaner containing a motor, fan and brush. A power conducting cable not here illustrated conducts the electric current through the switch to the motor and it may be controlled by the operator. A^1 is a handle bail pivoted on the suction cleaner. A^2 is a handle rod connected to the handle bail. A^3 is a guide bracket associated with the handle rod and adapted to have slidably mounted thereon a hook A^4 which engages the loop D^3 in the end of the dust bag B. The dust bag B is closed everywhere except at its lower intake end. There it has a wide open mouth B^1 in which is inserted a bag ring B^2. The flange of this bag ring is provided with hooks B^3 adapted to be engaged by thumb screws B^6 to hold the open mouth of the bag in register with the discharge from the fan. The open mouth of the bag is held on the sleeve of the bag ring B^2 by means of a clamping ring B^4 on the outside of the fabric of the bag. The sleeve of the bag ring is on the inside. The clamping ring is tightened to hold the parts together. To make assurance doubly sure the open mouth of the bag is preferably surrounded by a thin, flexible inextensible ring B^5 which is enfolded in the fabric of the bag. This ring I make preferably of rolled soft paper. It might be made of string or of thread or merely an additional fold of the fabric of the bag, or even of wire or any other material and it fits over the bag ring sleeve and is clamped in position and cannot be drawn off the sleeve because it would have to be drawn between the sleeve and the clamping ring, and this is manifestly impossible.

C is a flat piece of cloth. It is the blank which has been cut and the sewing up of which will form and shape the bag. At one end are two angular indentations C^1 C^1. These when sewed together form the seams C^2 C^2 one on either side of the bag. C^3 C^3 are reinforcing members sewed to the blank along the seams C^4 C^4. These are the same seams shown in dotted lines at C^4 on Fig. 1, and it will be observed that when the bag is sewn together these reinforcing strips or members make a kind of a reinforcing floor for the bottom of the bag immediately in line with the material as it is projected from the fan into the bag, and this reinforcing floor is carried up slightly around a bulge or bend of the bag as at C^5. Depending on the velocity of the air current, this reinforcement may be carried up farther and farther so as to make sure that few if any dirt particles fly freely through the air and strike the wall of the bag outside of the reinforcing zone. When the seams C^2 C^2 have been sewn up, the reinforcing members having previously been sewed along the lines C^4 C^4, the blank is rolled together so that the line C^6, C^7, C^8 and the line C^9, C^{10}, C^{11} come together. They are then sewn to form the seam C^{12}. This sewing of course is done with the bag turned inside out. This forms a cylindrical bag except at one end where it is tapered off on a kind of a bias, and the bag is open at both ends. The large end is closed by a round end which I will now describe.

The head or end of the bag may be made of one piece cut round if desired and sewn into the end of the bag as indicated, but experience shows that there is a certain amount of waste cloth because a thread may have been dropped in its manufacture leaving a small air hole through which dust and dirt can get out, and no matter how great care is taken there is always a possibility that pieces with such defects may get in. When this happens, these pieces are cut up into two sections D D^1, each of them a little more than a semi-circle. These pieces are so small that it is easy to cut them from the defective cloth without including any of the defective parts. These pieces are then laid one on the other as shown in Fig. 2 and sewn together along the lines D^2 D^2. This gives us a flat round head or end with a double reinforcing strip across the middle. This reinforcing strip distributes the load on the bag. When tension is exerted on the loop at the end thereof a single thickness may pull out and certainly would be likely to provide air leaks. A double thickness is not so likely to be pulled out. If the bag end is made of one piece, then it is necessary to sew a special re-

inforcing strip diametrically across the bag end so as to get the same double thickness reinforcement effect. The holding or handle loop D^3 is then sewn in place at the center and the head is sewed into the bag. The reinforcing head is then folded into the material at the open mouth end. This is sewed up, and the bag is then turned right side out and mounted on the bag ring. The result is the bag shown in Fig. 1.

It will be evident that while I have shown in my drawings an operative device, still many changes might be made both in size, shape and arrangement of parts without departing materially from the spirit of my invention and I wish therefore that my drawings be regarded as in a sense diagrammatic.

In making the bag the following series of operations are carried out. Starting with the flat piece of cloth cut as shown in Fig. 5 with the reinforcing strips as shown therein these strips C^3 are stitched on the flat pattern along the seams C^4. The darts C^1 are then sewn together along the seams C^2. The edges of the pattern C are sewn together along the lines C^6, C^7, C^8, and C^9, C^{10}, C^{11} to form the seam C^{12}. The head D made either of one or two pieces as the case may be is then sewn along the line C^6, C^9. This work is all done with the bag inside out and all preferably with a double needle machine. This double needle machine or at least a double seam is of importance. Experience shows that if you have a single seam when you have tension on the bag the thread or threads joining the seam will cause holes and pulling out or expanding of some of the meshes of the cloth and dust laden air will escape. When you have a double seam one seam appears to take the tension, the other seam appears to hold the flaps or edges together so as to prevent leakage between the sewn parts, also this second interior seam which does not carry any tension stops fraying or unraveling of the edges of the cloth and insures a permanent continuous cloth edge in which the holding seam is located. This edge extends between the two seams and is sufficient to make it impossible for the tension supporting seam to be separated from the cloth.

The bag having been completed, a single needle machine may be used to sew in the reinforcing ring B^5 though a double needle machine may be used for that purpose also if desired, though owing to its complication and the fact that it is not needed ordinarily, a single seam machine is used for that purpose.

I claim:—

1. As a new article of manufacture, a dust bag for suction sweepers having a substantially straight or untapered upper margin and a tapered lower margin, the cross section of the bag near the mouth being much smaller than the cross section of the bag near the other end whereby the necessary expansion of air near the mouth is provided for and the solid materials carried by the air are deposited on the inner lower surface of the bag adjacent the mouth, and a patch lining for reinforcing the bag on such lower surface.

2. As a new article of manufacture a dust bag for suction sweepers comprising a substantially cylindrical body with means for supporting it at its outer end, a mouth with means for attachment to the sweeper and, intermediate the body and mouth, a neck of a gradually diminishing cross section from the body toward the mouth formed by a substantially straight upper surface and a correspondingly extended tapered lower surface whereby the necessary expansion of air is provided for and the solid heavy materials carried by the air are deposited on the latter surface, and a patch lining for reinforcing the bag on such lower surface.

In testimony whereof, I affix my signature in the presence of two witnesses this 22nd day of April 1918.

HOWARD EARL HOOVER.

Witnesses:
MARIAN L. INGRAHAM,
MINNIE M. LINDENAU.