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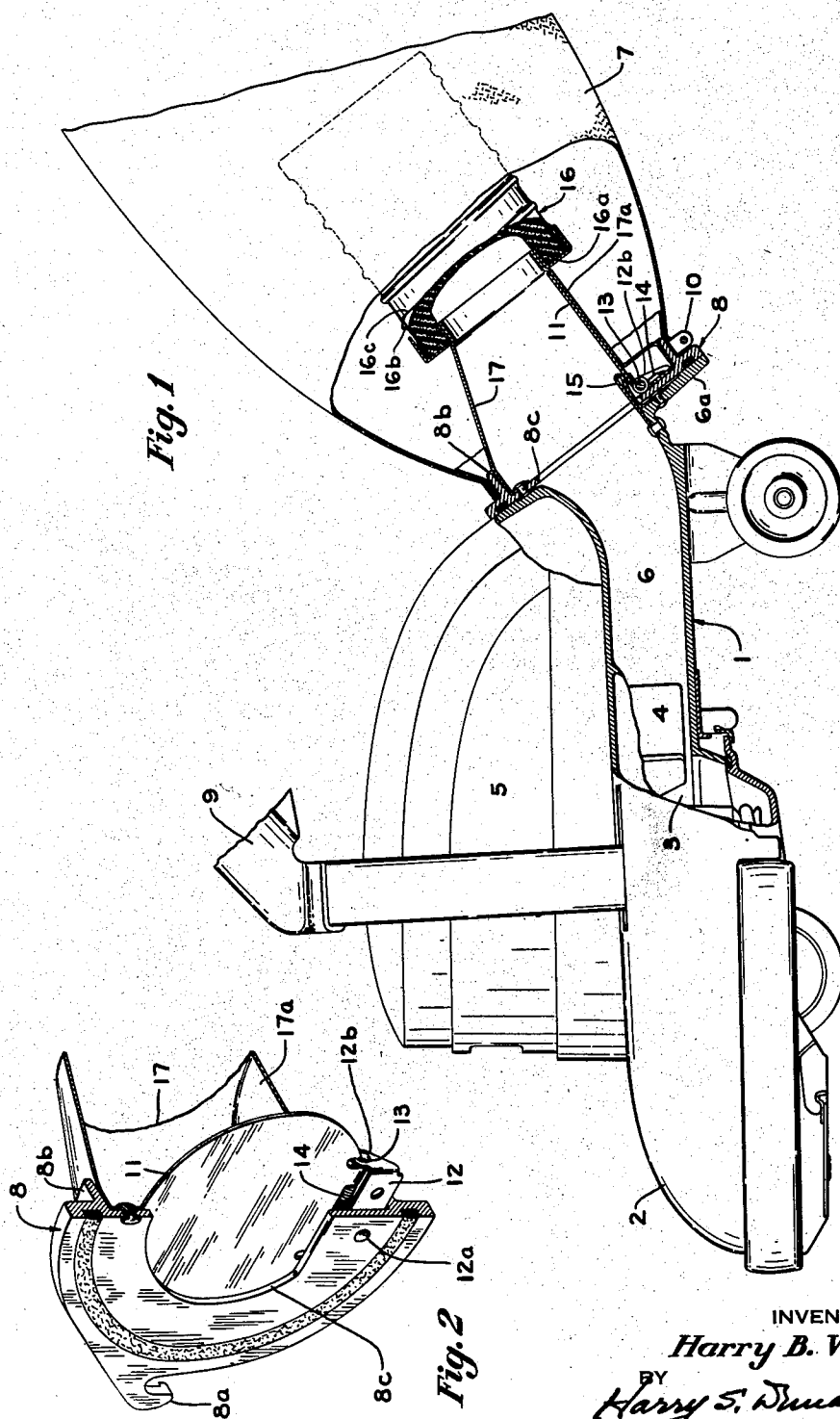
H. B. WHITE

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SUCTION CLEANER DIRT BAG

Filed May 16, 1940

2 Sheets-Sheet 1



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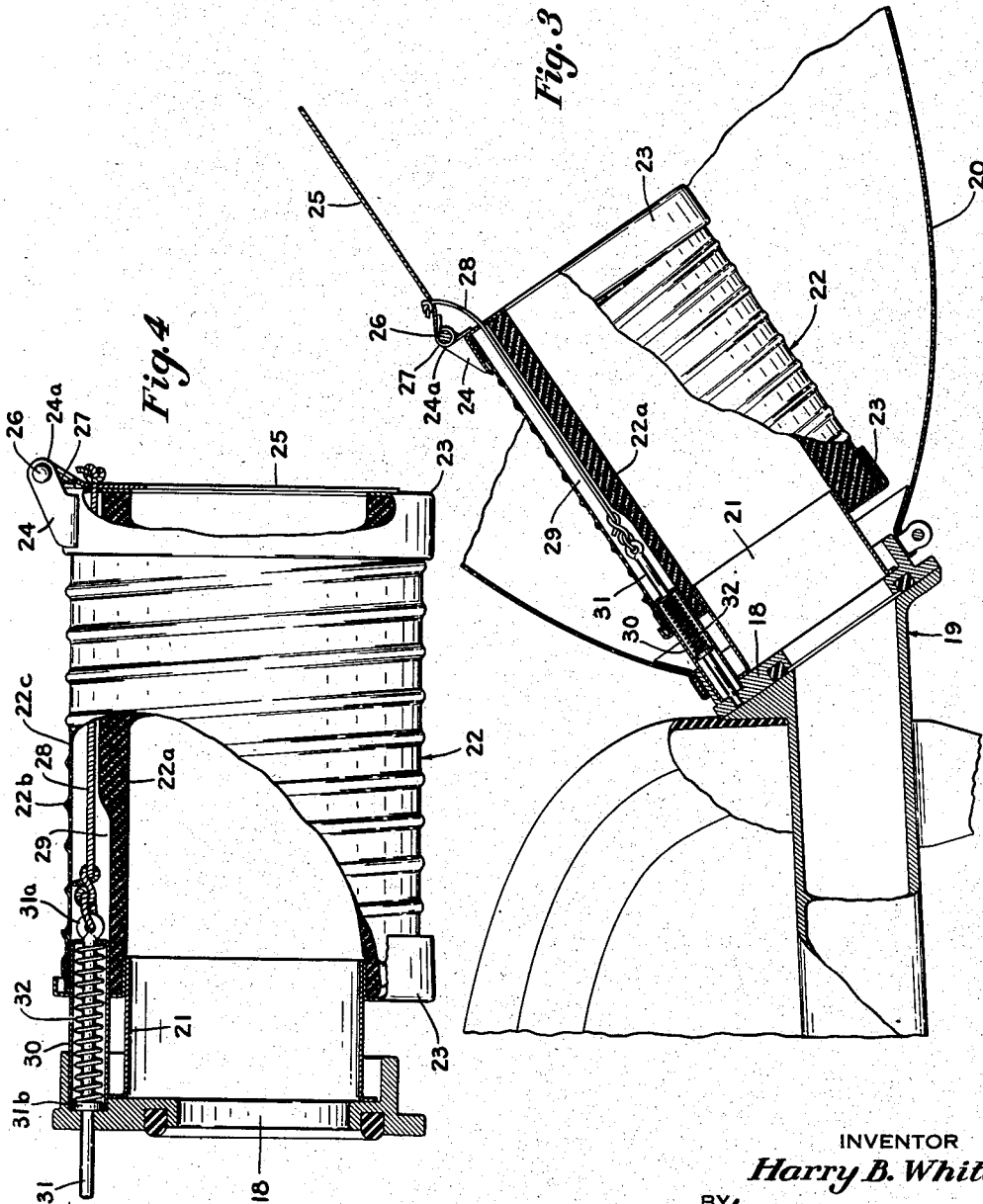
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## UNITED STATES PATENT OFFICE

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## SUCTION CLEANER DIRT BAG

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7 Claims. (Cl. 183—40)

This invention relates to improvements in suction cleaner dirt bags and more particularly to a dirt bag having a spring-actuated valve member mounted at its inlet end and so arranged that upon the attachment of the bag to the cleaner, the valve swings automatically from a normal closed position into open position, there to be held positively until the bag is removed and the valve member again closed under spring pressure.

The object of the invention is to provide a positive closure for the inlet end of a dirt bag and particularly a bag designed to be emptied through its opposite or outer end. In the operation of emptying a bag with openings at both ends, it is usually held in vertical position with the inlet end uppermost and is shaken to dislodge the dirt, so that unless the inlet end is sealed in some manner, a cloud of dust is likely to rise and create a very unpleasant situation for the person emptying the bag.

In the more common dirt bag assembly, it is possible to fold the upper end of the bag in such a way as to prevent the issuance of dust therefrom during the emptying operation, but when the cleaner is equipped with a muffler and particularly one that is assembled within the inlet end of a dirt bag, it is quite difficult to close off the inlet end while emptying the bag without using some extraneous means, such as a piece of cardboard held firmly over the opening. Therefore, a further object of the invention is to provide a positive closure for the inlet end of a dirt bag which includes a muffler as a part of its assembly, and so arranged as to close the instant the bag is removed from the cleaner and remain closed until the bag is replaced.

Two applications of a valve applied at the inlet end of a dirt bag for a suction cleaner are disclosed in the accompanying drawings in which:

Figure 1 is a view in side elevation of a typical suction cleaner of the handle-maneuvered type with the exhaust outlet from the cleaner and inlet end of the bag shown in section.

Figure 2 is a fragmentary perspective view of the ring at the inlet of the dirt bag and showing the details of the valve mounting;

Figure 3 is a modified showing of a valve mounted at the outer end of a muffler; and

Figure 4 is an enlarged detail view of the bag ring and muffler unit showing the mounting of the valve and the relationship of the several parts when the bag is removed from the cleaner body.

The suction cleaner illustrated in Figure 1 is typical of the standard design and consists gen-

erally of a wheeled casing 1 having a nozzle 2 at its forward end with its downwardly opening suction mouth, a fan chamber 3 communicating with the nozzle, and a suction fan 4 mounted in the fan chamber and driven by a motor enclosed with a housing 5 supported upon the casing 1.

Extending rearwardly from the fan chamber 3 is an exhaust passage 6 terminating in a flanged outlet connection 6a to which is removably attached a dirt bag 7 and preferably through the medium of an annular fitting or ring 8 bearing flatwise against the flanged outlet connection 6a.

The filter bag 7 is preferably of a porous textile fabric or an especially prepared paper, its outer end being open but normally held in closed position by means of a suitable clamping member (not shown) suspended from the outer end of the handle 9.

As thus far described, the cleaner follows more or less the standard arrangement of parts, this being particularly true of the bag ring 8 which, as the name indicates, is merely a flat ring with radially projecting ears 8a on opposite sides which engage clamping bolts anchored in the flanged outlet connection 6a but not shown, and a laterally projecting annular flange 8b on its outer face about which the somewhat restricted mouth portion of the bag is attached by means of a clamping ring 10 concealed within a marginal hem.

As is more clearly shown in Figure 2, the inner periphery of the bag ring 8 forms an opening 8c of a somewhat elliptical contour with its vertical dimension somewhat shortened, this opening conforming generally to the shape of the outlet end of the exhaust passage 6 from the fan chamber.

Mounted upon the outer face of the bag ring 8 and just below the lower edge of the opening 8c is the valve member 11 consisting of a thin metal plate having substantially the same contour as the opening 8c in the bag ring but slightly larger in its dimension so as to form a closure therefor. A supporting bracket 12 is fastened to the face of the bag ring as by means of rivets 12a and is provided at its ends with outwardly projecting ears 12b between which extends a horizontal hinge pin 13, which in turn forms the pivotal mounting for the valve member 11. Also carried by the hinge pin 13 is a torsion spring 14 with one end bearing against the bracket 12 and the other against the outer face of the valve member 11 in such a way that the spring pressure is always exerted in a counter-clockwise direction to hold the valve in closed position and, to resist any

movement tending to swing it into open position.

Now, it is obvious that the valve will be held in closed position unless forced open and held against the counter spring tension. Thus, in Figure 1 there is mounted along the lower edge of the outlet from the exhaust passage a horizontally and outwardly projecting finger 15 so located as to be positioned directly above the bottom edge of the opening 8c in the bag ring with its tip end projecting a short distance above and beyond the hinge pin 13. This finger is preferably made of a strip of metal bent double throughout its projecting portion with its end portions spread apart at right angles, and thence riveted to the bottom and outer faces of the exhaust passage 6 and flanged outlet connection 6a, respectively.

The function of this projecting finger 15 is quite obvious, namely, to contact the hinged valve member 11 just outwardly from its pivotal axis as the bag ring is fitted to its seat against the flanged outlet connection 6a, thereby swinging it downwardly into horizontal and open position where it remains until the dirt bag is again removed, whereupon it immediately swings into closed position by the action of the torsion spring 14.

As previously mentioned, the use of a positively actuated valve member at the inlet end of a dirt bag is especially desirable when a muffler is mounted within the lower end of a dirt bag as a part of the same assembly. Thus, in Figure 1 a muffler 16, preferably consisting of a flexible tube 16a of sponge rubber, encased in a wire-bound fabric covering 16b and supported in an annular channel-shaped seat 16c at the outer end of a tapered sleeve 17 forming a rearward extension of the bag ring 8. The sleeve 17 is provided with a flattened portion 17a, along its bottom wall. This forms a seat for the valve and eliminates a pocket which would normally be formed under the valve when it is in open position. Thus, the muffler 16 extends from 6 to 8 inches beyond the bag ring and, while it has a limited degree of flexibility whereby to yield with the bag as it moves with the handle, it is quite impossible to seal off the bag mouth while the dirt is being emptied from the opposite open end without some form of self contained closure device such as the spring-actuated valve arrangement herein disclosed, although it is to be noted that its use need not be confined to the presence of a muffler.

In the disclosure of Figures 3 and 4, however, the valve member is preferably mounted at the outer end of the muffler. As shown the muffler is similar in all respects to the one shown in Figure 1, having a limited degree of flexibility throughout its length so that it can yield somewhat with the movement of the bag as it swings with the handle. Thus a bag ring 18, similar to that previously described is used, and the flanged connection 19 at the exhaust outlet from the cleaner body is again arranged at an angle of about 45 degrees to the vertical as is also the center line of the bag 20 attached thereto.

Forming a rearward extension of the bag ring 18 is an annular collar 21 carrying the muffler 22. At each end of the muffler proper the body portion 22a is enclosed within channel-shaped rings 23, 23, the outer end ring 23 carrying a supporting bracket 24 for a valve member 25, consisting of a thin metal plate of circular shape mounted upon a hinge pin 26 extending between the ears 24a, 24a of the supporting bracket 24. A coiled torsion spring 27 is mounted on the hinge

pin 26 but in this case it acts to hold the valve member 25 in its open position rather than in its closed position over the end of the muffler, as shown in Figure 4.

Now, to control the opening and closing of the valve 25, a somewhat different arrangement is required, first because the valve member is now located at the outer end of the muffler and at a distance from the bag ring, and second, because the muffler itself is of a flexible construction throughout its length. Moreover, with the torsion spring arranged to open the valve member, the operating means in this instance functions to allow it to swing into open position immediately upon the attachment of the bag to the cleaner.

Attached to the valve member immediately adjacent its pivotal axis is a flexible cord 28 which passes along the top side of the muffler and within a lengthwise extending passage 29 formed in its body portion 22a. Mounted at the lower end of the channel 29 is a cylinder 30 extending endwise from the lower end of the muffler and seating within a socket in the outer face of the bag ring 18 adjacent the periphery thereof. Within this cylinder 30 is mounted an endwise shiftable push rod 31 with its lower end projecting through and beyond the outer face of the bag ring 18 and its upper end extending from the cylinder 30 in the form of a loop 31a to which is attached the free end of the cord or flexible connecting member 28. And finally, a coil spring 32 surrounds the push rod within the cylinder 30 with one end bearing against a collar 31b on the rod 31, this spring 32 constantly acting to force the push rod outwardly from the face of the bag ring 18 or, as in Figure 4, from right to left. Moreover, the tension exerted by the coil spring 32 on the push rod 31 is greater than that exerted by the torsion spring 27 upon the valve member 25. Otherwise, the valve would not close when the dirt bag assembly is removed from the cleaner.

Now, in the act of attaching the dirt bag and the muffler assembly, the projecting end of the push rod 31 contacts the flanged face of the outlet connection 19, and as a result the push rod is shifted endwise from left to right thereby compressing the spring 32 and imparting sufficient slack in the cord 28 to allow the valve member 25 to swing into open position under the action of its torsion spring 27. In this way, the valve is closed by the stronger spring 32 acting upon the push rod 31 when the dirt bag assembly is removed and is opened by the weaker torsion spring 27 acting on the valve member 25 when the push rod is shifted in a direction to overcome the tension of the plunger spring 32. But in either case the movement of the valve is positive and not dependent upon gravity or air pressure. And, with the valve actuating mechanism consisting in part of a flexible connection throughout the length of the muffler, it is possible to locate the shut-off valve at the outer end thereof and yet the muffler is free to flex throughout its length as may be necessary.

Having set forth the invention in two of its more practical applications, but without desiring to limit the invention to these specific disclosures, I claim:

1. A dirt bag for suction cleaners comprising a fitting adapted for detachable mounting at the exhaust outlet of said cleaner, a spring-actuated hinged valve member mounted on said fitting and normally adapted to be held in position to close off the passage of air into said bag, and a valve

operating member responsive to contact with the exhaust outlet of said cleaner to open said valve member and to hold the same in open position while said bag is attached to the cleaner.

2. A dirt bag for suction cleaners comprising an annular fitting adapted for detachable mounting at the exhaust outlet of the cleaner and supporting a tubular muffler projecting into said bag, a hinged valve member mounted at the outer end of said muffler and including a spring acting normally to hold said valve in open position, a spring-pressed plunger mounted on said fitting with one end projecting therefrom for contact with the body of the cleaner adjacent its exhaust outlet, and means connecting said plunger with said valve, whereby the endwise movement of said plunger in contact with the cleaner body in the act of attaching the bag thereto causes said plunger to be retracted against its spring pressure and permits said valve member to open and to be held in open position by its spring while the bag is attached to the cleaner.

3. A dirt bag for suction cleaners comprising an attaching ring adapted for detachable mounting at the exhaust outlet of the cleaner and supporting within the bag a tubular muffler of relatively flexible construction throughout its length, a hinged valve member mounted at the outer end of said muffler and including a spring acting normally to hold said valve in open position, a spring-pressed plunger mounted on said attaching ring with one of its ends projecting therefrom for contact with the body of the cleaner adjacent its exhaust outlet, and a relatively flexible connecting member between said plunger and said valve, whereby the endwise movement of said plunger in contact with the cleaner body in the act of attaching the bag thereto causes the plunger spring to be compressed and permits said valve member to open and to be held in open position under the tension of its spring while the bag is attached to the cleaner.

4. A dirt bag for suction cleaners comprising a fitting adapted for detachable mounting at the exhaust outlet of the cleaner and including a muffler extending into the bag, a valve member having hinged mounting at one end of said muffler and provided with a spring acting normally to

swing the valve into open position over the end of the muffler, and a spring-actuated member operatively connected with said valve to hold the same in closed position when said bag is detached from the cleaner, said member having a portion responsive to contact with the exhaust outlet in the act of attaching said bag to the cleaner thereby to permit said valve member to shift into open position.

5. A dirt bag for suction cleaners comprising a fitting adapted for detachable mounting at the exhaust outlet of the cleaner and including a muffler extending into the bag, a valve member having hinged mounting at the outer end of said muffler and including a spring acting normally to swing the valve into open position, and a spring-pressed plunger mounted on said fitting and connected with said valve member to hold the same in closed position when said bag is detached from the cleaner, one end of said plunger being exposed to contact with the exhaust outlet whereby in the act of attaching the bag thereto, the endwise displacement of said plunger permits said valve member to swing into open position.

6. In a suction cleaner, a dirt bag having a dirt inlet adapted to be connected to the suction system of the cleaner, a valve movable to a position to close said inlet to said bag when the latter is disconnected from said cleaner, a plunger connected to said valve and actuated upon the physical connection of said bag to said cleaner for moving said valve to open position to permit dirt to pass from said suction system through said inlet into said bag.

7. A dirt bag for suction cleaners comprising a dirt inlet to said bag adapted to be connected to the suction system of a suction cleaner, a muffler connected to said inlet, a valve movably supported on said muffler and movable to a position with respect to said muffler to close said bag inlet when said bag is disconnected from said cleaner, and means actuated upon connection of said bag to said cleaner to move said valve to open position for the passage of dirt from said suction system through said muffler and inlet into said bag.

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