

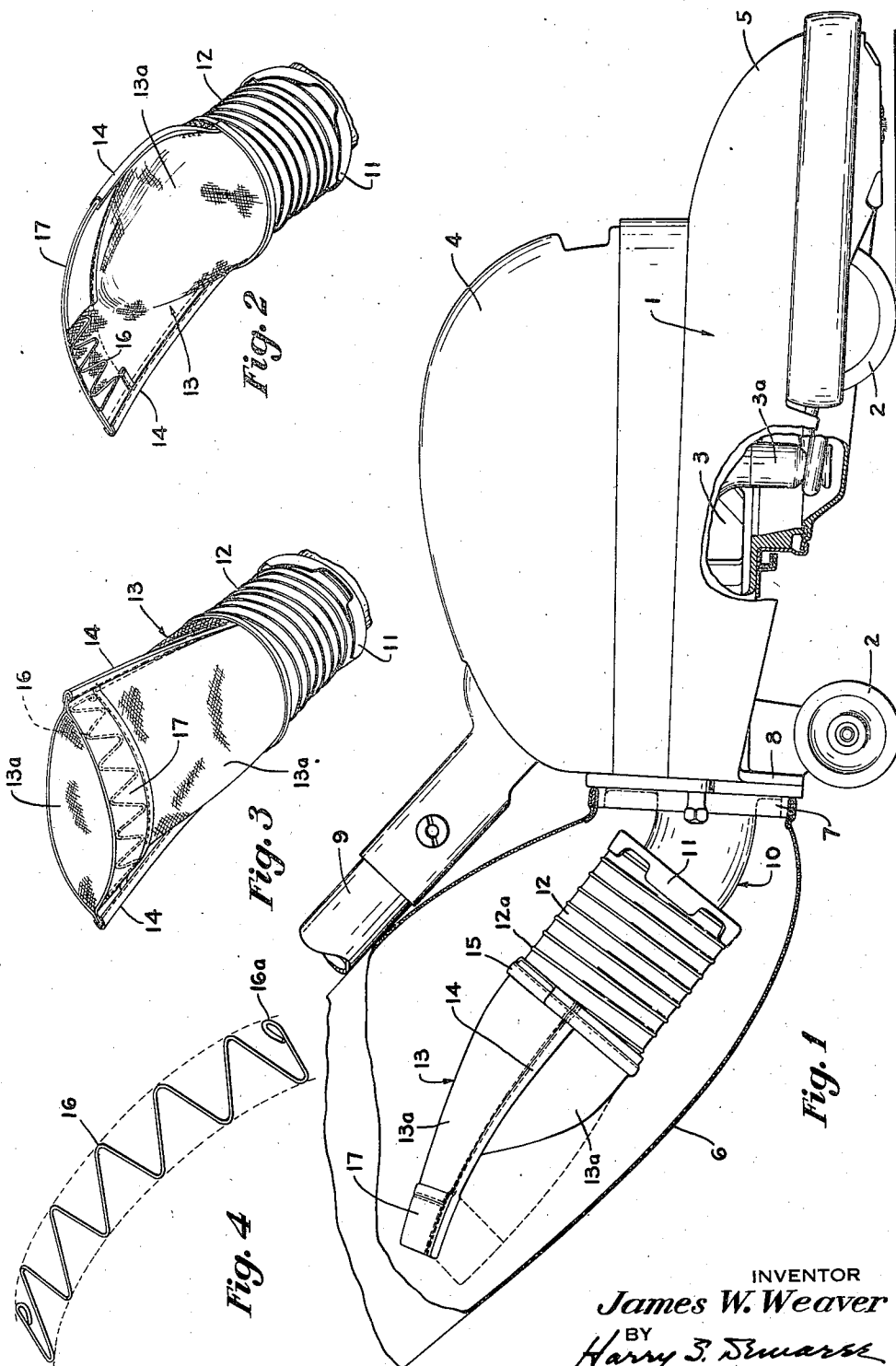
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INLET VALVE FOR SUCTION CLEANER DIRT BAGS

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INLET VALVE FOR SUCTION CLEANER DIRT BAGS

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1 Claim. (Cl. 251-122)

This invention relates to improvements in inlet valves for suction cleaner dirt bags and more particularly to a valve member incorporated in the inlet end of a dirt bag and adapted to provide a closure therefor while the bag is removed from the cleaner and is being emptied of its contents.

In the standard type of handle-manuevered suction cleaner, the dirt or filter bag is suspended beneath the handle with one end detachably connected with the exhaust outlet from the cleaner body and the other end normally closed but capable of being opened so that, upon removing the bag from the cleaner and opening its outer end, the contents can be readily shaken therefrom when held in an upright position with its inlet end uppermost. It is desirable, however, to provide some means for closing off the otherwise open upper end of the bag in order to prevent the dust from escaping and creating an unpleasant condition.

Where the bag is of a simple construction with merely an attaching ring at its inlet end, it is possible to gather or fold the bag material in such a way as to effectively seal the inlet end during the emptying operation. But with the increasing utilization of muffler elements at the exhaust outlet from the cleaner, it is quite impossible to seal the inlet end of the dirt bag in the customary manner particularly if the muffler is built into or forms a part of the bag attaching ring or fitting, because the muffler is usually a tubular member projecting some distance into the bag and while somewhat flexible is too stiff to permit the end of the bag to be sealed, except perhaps with the use of some extraneous means, such as an object with a flat surface held over the mouth of the bag or some soft material stuffed into the entrance.

Therefore, the object of the present invention is to provide a practical type of valve which remains closed while the cleaner is not in operation, but capable of opening under pressure of the incoming dirt-laden air. Such a dirt valve would preferably be constructed of a light durable material and designed to form an effective seal without creating any appreciable back pressure to reduce the efficiency of the suction system. Moreover, such a valve would ordinarily be associated with a muffler incorporated in the dirt bag assembly, although the valve would function with equal effect in the absence of a muffler.

A preferred embodiment of the invention is

disclosed in the accompanying drawing, in which:

Figure 1 is a general view in side elevation of a suction cleaner of standard design with a portion of the dirt bag removed to show the application of a valve to a muffler;

Figure 2 is a perspective view of the dirt valve carried at the end of a tubular muffler and showing its conformation in closed position;

Figure 3 is a perspective view of the valve and muffler similar to Figure 2 but showing the valve in open position under the pressure of the incoming air; and

Figure 4 is a perspective view of the closure spring extending throughout one-half of the open end of the valve as it appeared when removed from the valve and assuming its normal bowed conformation.

The ordinary motor-driven suction cleaner is such a familiar household appliance that its construction and mode of operation need only the briefest discussion. The body of the cleaner consists of a main casing 1 supported upon pairs of front and rear wheels 2, 2 and houses at its central portion a suction fan 3 driven by an electric motor housed beneath the dome-like cover 4, the fan rotating within a chamber communicating with the nozzle 5 extending across the front of the casing 1 and provided with the usual downwardly opening suction mouth in close proximity to the carpet surface. The dirt-laden air carried into the fan chamber from the nozzle is discharged rearwardly through a passage which opens into the inlet end of the dirt bag 6 constructed of a suitable porous fabric or other fibrous material.

The more common method of mounting the dirt bag 6 is to provide an attaching ring 7 at its lower end, the same being suitably clamped flush against a flanged seat 8 forming the outlet connection from the fan chamber, and suspended at its outer end from the handle 9. In the present arrangement the attaching ring 7 includes as an integral part thereof a tubular extension 10 of the exhaust passage from the fan chamber, the same extending centrally into the bag for a short distance with a slight upward bend or tilt and terminating in an enlarged circular socket-like seat 11 for the lower end of a muffler 12. The muffler may be of any suitable type or construction but for the purpose of the present disclosure it may be considered to be a length of sponge rubber tubing of from 6 to 8 inches in length and having an internal diameter slightly larger than the exhaust passage of which

it forms an extension. Being of sponge rubber, the muffler 12 is flexible throughout its length, but in order to limit its flexibility to some extent, its outer surface is bound by a coil of wire 12a.

From the foregoing description of the bag and muffler, it is clear that it forms a single unit in the sense that upon the removal of the bag, the ring 7 with its muffler supporting extension 10 is also removed. Likewise, it will be noted that it is quite impossible to effectively seal off the inlet end of the bag during emptying operation since the muffler prevents the sealing of the inlet end of the bag by any manual manipulation. It is therefore the function of the dirt valve 13 to close off the inlet opening or passage to the dirt bag by mounting the same at the outer end of the muffler 12.

The valve consists essentially of a tube or sleeve of some suitable sheet material or fabric, sufficiently stiff in character to maintain an extended position or provided with suitable reinforcing members to accomplish this end. Moreover, the material of which the sleeve is made is quite impervious to dirt, although it need not necessarily be entirely impervious to the passage of air therethrough providing sufficient air pressure is exerted to open the valve mouth while the cleaner is in operation.

Structurally, the valve may vary in its details, although preferably it is constructed of two sections or halves 13a, 13a of the particular material selected, these sections being stitched together along their side edges 14, 14 and the seams preferably bound by tape. At the base of the sleeve 13 is a band or ring 15 designed to be slipped over the end of the muffler 12 and suitably fastened.

From its base, the sleeve is preferably cut with a slight outward flare so that its diameter at the outer end is somewhat greater than at its base.

The sleeve 13 is open entirely across its outer end, as shown in Figure 3, but normally the outer edges of the two sections of the sleeve are pressed and held firmly together by means of a spring element 16 enclosed within a wide hem 17 formed along the outer edge of one of the sleeve sections 13a. In short, only one-half the circumference of the valve mouth is reinforced by the spring element 16, the corresponding marginal portion of the other section being without reinforcement except perhaps for a hem or other marginal binding.

As clearly shown in Figure 4, the spring element 16 consists of a length of spring wire bent into a serpentine form for the purpose of giving it considerable greater width and more flexibility than would be the case if a straight piece of spring wire or a flat strip were used. Loops 16a are formed at the opposite ends of the spring 16 and after the spring has been inserted end-

wise into the wide hem 17 along the outer edge of one of the half sleeve sections 13a, these loops 16a are preferably anchored in the longitudinal seams 14, 14. Moreover, in the act of inserting the spring 16 it is compressed slightly in a lengthwise direction so that it is in a continual state of tension and as a consequence assumes a natural bowed position in overlying and sealing engagement with the opposite non-reinforced marginal portion of the valve mouth, as clearly shown in Figure 2, when the cleaner is not in operation or when the bag with its muffler assembly is removed from the cleaner. However, while the cleaner is in operation, the dirt-laden air forced through the muffler readily overcomes the tension of the mouth sealing spring 16, thus causing the tensioned and untensioned halves of the valve mouth to spread apart as shown in Figure 3 and to assume an elliptical shape with the spring now bowed outwardly in the opposite direction.

Needless to say, the tension of the spring is gauged to maintain the valve in closed position during the process of emptying the dirt bag of its contents and thus prevent dust from being expelled through the inlet opening and toward the person performing the emptying operation. Beyond this, it is obvious that any considerable amount of pressure required to open the valve would merely place an additional load on the fan without serving any good purpose. Hence, the advantage of the valve construction herein disclosed is its lightness and simplicity of construction plus the maintenance of an effective seal during bag emptying operation with a minimum of resistance to its opening during cleaner operation.

Having thus set forth a preferred construction for a dirt valve embodying the invention, but without limiting its structure or mode of application to the precise disclosure herein,

I claim:

A valve for a suction cleaner dirt bag comprising a sleeve of flexible material adapted to be positioned in the mouth of a bag and having an open end adapted to communicate with the exhaust of a cleaner, the opposite end of said flexible sleeve having an outlet for discharging dirt-laden air, a spring in one-half only of the periphery of said outlet, said spring exerting a force at all times tending to move the one-half periphery to which it is attached into a convex contour facing the apposing one-half periphery of said outlet to effect the closing of said outlet by drawing said one-half periphery portions together, characterized in that said spring force is of a magnitude such that the force of a stream of air passing therethrough can overcome the tendency to assume said convex contour to effect the opening of said outlet.

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