

Aug. 6, 1946.

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2,405,170

SUCTION CLEANER

Filed Aug. 20, 1942

2 Sheets-Sheet 1

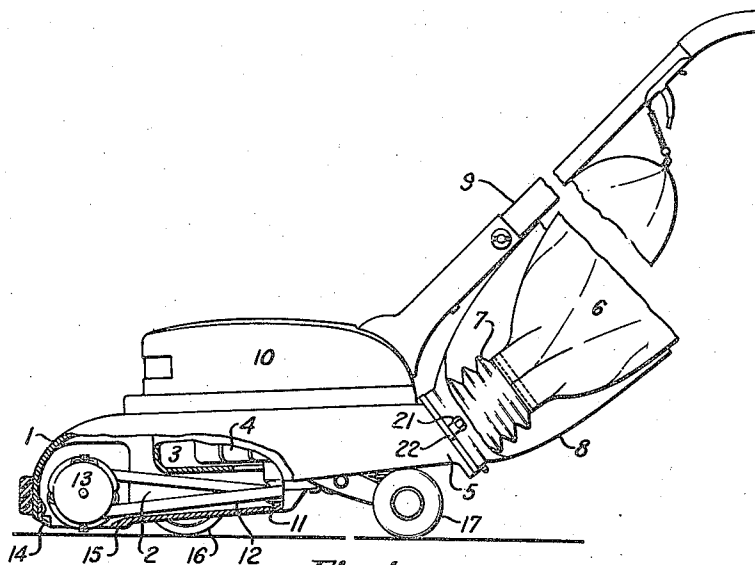


Fig. 1

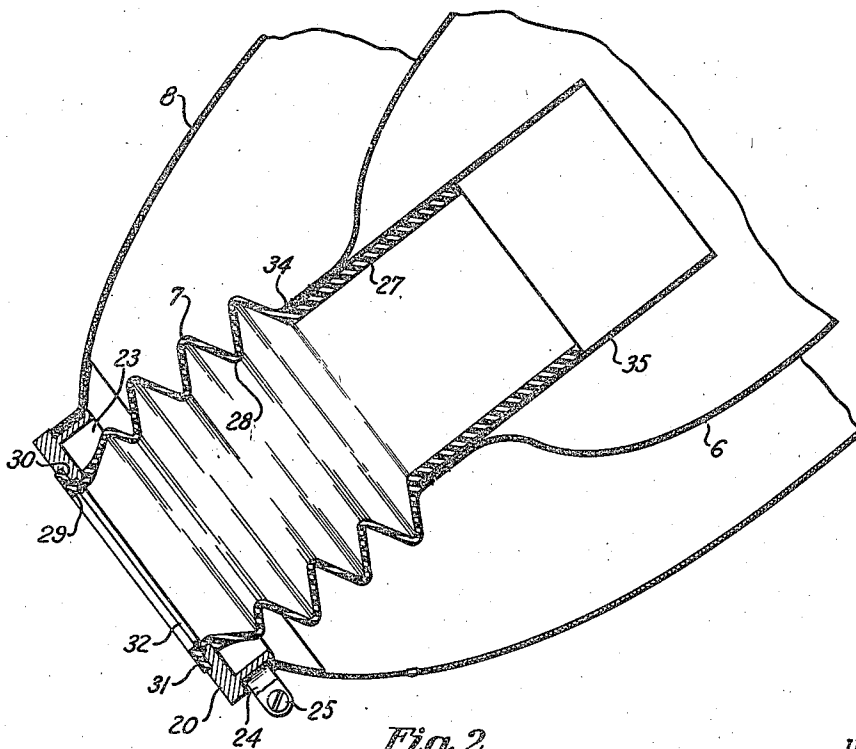


Fig. 2

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2 Sheets-Sheet 2

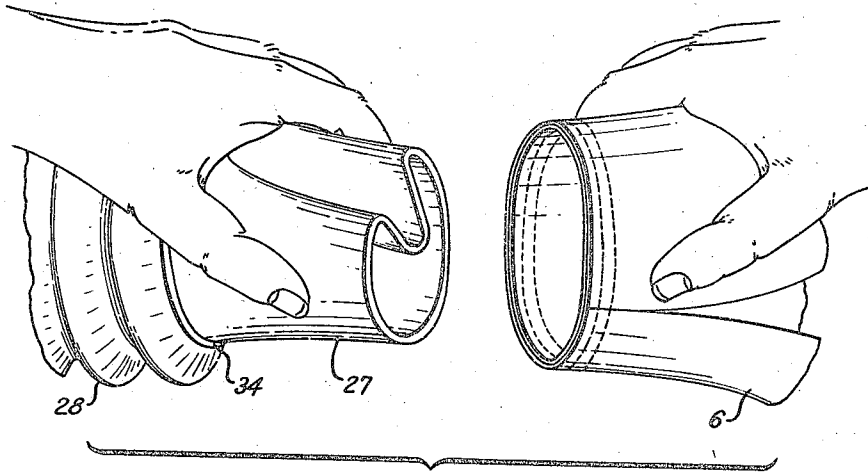


Fig. 3

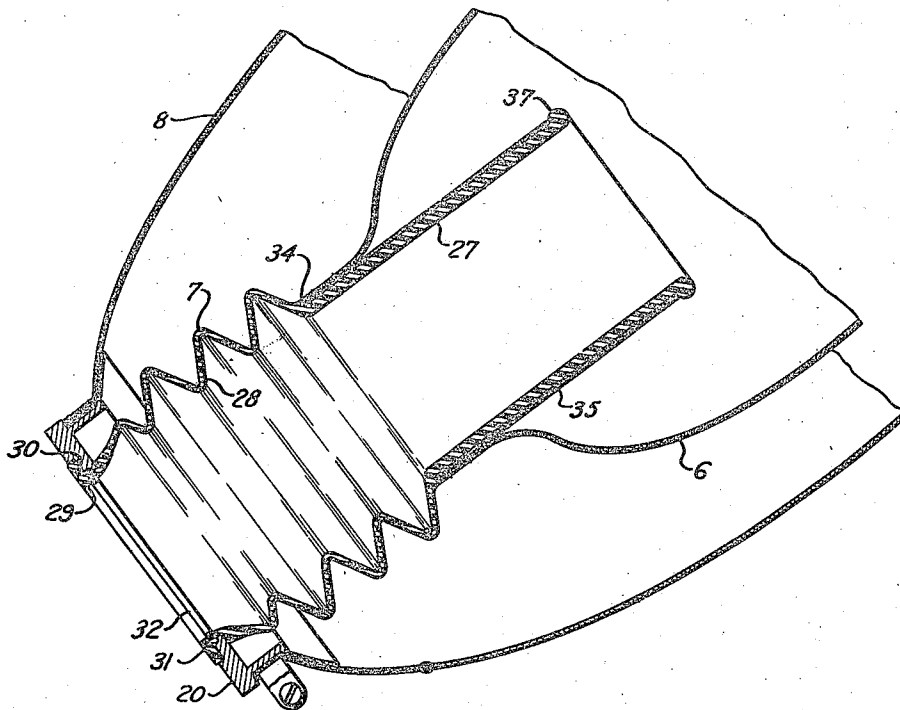


Fig. 4

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SUCTION CLEANER

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5 Claims. (Cl. 285—90)

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The present invention relates to suction cleaners in general and particularly to a new and novel means for the attachment of a dirt-filtering bag to the exhaust outlet of a suction cleaner. More specifically the invention comprises a simple, economically manufactured bag mounting means which includes a resilient and deformable member detachably connected to the inlet end of a suction cleaner dirt-filtering bag.

It is an object of the present invention to provide a new and improved bag-attaching means for a suction cleaner. It is another object of the invention to provide a simple, unitary, flexible bag-connecting element which detachably seats the inlet end of a dirt-filtering bag. A further object of the invention is to provide a connector for a dirt bag in a suction cleaner which connector is formed of resilient material, such as rubber, and which embodies a portion designed to flex and another portion which is deformable to permit of insertion into a dirt bag. A still further object of the invention is to provide a resilient mounting for a dust bag in a suction cleaner which is characterized by including in a unitary integral resilient structure means which resiliently and flexibly mount the bag and which removably secure it in place. Still another object of the invention is to provide a bag connector formed of rubber or similar material which is formed for a part of its length as an element adapted to flex transversely and for the remainder of its length as an element adapted to be deformed in the direction of its own length. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawings to which they relate.

Referring now to the drawings in which the same reference character refers to the same part throughout,

Figure 1 is a side elevation of a suction cleaner which embodies a bag mounting construction constructed in accordance with the present invention;

Figure 2 is an enlarged vertical section through the bag mounting construction shown in Figure 1;

Figure 3 is an illustration of the manner in which the dirt-filtering bag is seated upon the resilient connector;

Figure 4 is a view similar to Figure 2 illustrating a preferred modification of the invention.

In the usual and well known type of suction cleaner, the dirt-laden air is exhausted from the cleaner body into a dirt-filtering bag. The lower or inlet end of this bag is usually attached to the

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cleaner exhaust outlet while its upper end is suitably supported from the cleaner handle. The bag may be of cloth or of paper and in the latter event it is usually enclosed within an outer appearance bag which may perform a supporting function in addition to its appearance function and which may enclose not only the bag but also the connecting means by which the dirt-filtering bag is connected to the exhaust outlet.

The connector between the inlet of the dirt bag and the end of the exhaust outlet has heretofore taken many forms and shapes and has been of varying complexity. In the connector formed and constructed in accordance with the present invention the element has been reduced to an exceedingly simple form which functionally performs everything which has heretofore been performed by more complex constructions. The connector constructed in accordance with the present invention has the desirable features of simplicity, ruggedness, and economy. It detachably connects the bag to the cleaner exhaust outlet and at the same time permits the flexing of that bag relative to the outlet in the pivotal movement of the cleaner handle, thereby eliminating bending strains and stresses in the bag which tend to tear the bag material.

Referring again to the drawings and to Figure 1 in particular, a modern suction cleaner is illustrated and is seen to comprise a nozzle 1, which is interiorly connected thru an airpassageway 2 to a fan chamber 3. A rotary suction-creating fan 4 is positioned within fan chamber 3 and draws air from the nozzle and air passageway, through the fan chamber, and exhausts it through the exhaust outlet 5 into a suitable dirt-filtering bag 6. The latter is removably connected to the exhaust outlet by a connector indicated generally by the reference character 7. The dirt bag 6 and a portion of the connector 7 are enclosed within a suitable appearance bag 8 which is of the zippered side opening type and which is suitably supported at its zipper end from the cleaner handle 9. Handle 9 is seen to be pivotably connected at its lower end to the cleaner body. Returning to the cleaner body a motor casing 10 houses a suitable unshown driving motor for the suction-creating fan 4, the shaft 11 of the motor extending downwardly into the air passageway 2 where it connects to the power-transmitting belt 12.

A rotary agitator 13 is rotatably mounted within the nozzle 1 and is adapted to contact a suction-lifted surface covering undergoing cleaning between the front and rear nozzle lips 14 and 15.

Agitator 13 is of the common and well known type which includes rigid beater elements and flexible brush elements.

The entire cleaner is movably supported upon suitable front and rear wheels 16 and 17, respectively, in such a manner that it may be propelled and reciprocated over a surface covering undergoing cleaning by the exertion of a suitable force through the cleaner handle 9.

Referring now to Figure 2, in particular, an enlarged cross-sectional showing of the mounting of the dirt-filtering bag 6 and of the outer appearance bag 8 is clearly shown. That mounting is seen to comprise a bag ring 20 which is adapted to seat upon the exhaust outlet 5 of the cleaner and to be suitably retained in place by means of one or more manually operable clamping nuts 21 carried by the outlet which cooperate with one or more ears 22 formed upon the sides of the ring. The appearance bag 8 seats upon a flange 23 forming an integral part of the bag ring 20 and is clamped in place thereon by a suitable encircling clamping band 24 which may be sewed into the mouth of the bag. Clamping band 24 has its outwardly bent ends drawn together by a suitable screw 25.

The dirt-filtering bag 6 is flexibly supported at its lower end upon the bag ring 20 by means of an integral conduit element or connector which may be said to be divided into three parts, to wit, an outer tubular end portion 27, a central, accordion-like bellows portion 28, and an inner end portion 29 which seats within the bag ring 20 being held in place by an expanding spring element 32. The extreme end of end portion 29 fits within an annular recessed seat 30 in the face of bag ring 20 to form, because of its resilient character, a surface which functions efficiently as an air seal with the ring attached to the abutting end of the exhaust outlet. The presence of annular corrugations 31 on the end face of portion 29 improves the effectiveness of the seal.

The central bellows or accordion-like portion 28 of the connector 7 comprises a plurality of flexible pleats which are adapted to fold and bend much in the manner of an accordion to permit of the angular tilting of the bag seating portion 27. Such movement occurs with a bag seated thereon as the handle supporting the bag moves from vertical to the horizontal position. This operation of the bellows portion clearly removes strain from the bag itself. The portion 28 is sufficiently strong that, depending on whether the dirt-filtering bag 6 is to be positioned within an outer appearance bag 8, or whether it is to be supported directly by the cleaner handle, it is able to provide the necessary supporting strength for the inner end of the bag without collapsing and yet permit of flexure without undue resistance to handle pivotal movement.

The outer end 27 of the connector has the characteristic of normally extending as a cylindrical tube which, however, is adapted to be deformed by the operator in the manner illustrated in Figure 3 in order to enable it to be inserted within the mouth of the dirt-filtering bag 6. Portion 27 is formed at its inner end with a shoulder 34 against which the inner end of the bag mouth is adapted to abut in the full seating relationship. Once inserted within the bag inlet the withdrawal by the operator of the compression force permits the bag-seating portion 27 to expand under its own internal resilient forces to assume its normal cylindrical contour, and,

being of the proper size relative to the bag inlet, resiliently clamps the inner surfaces of that inlet in place to prevent the outward withdrawal of the bag under normal operating forces.

In the embodiment illustrated in Figure 2 the bag 6 is formed with a bag mouth or inlet member, or valve member 35 which is itself cylindrical and of a size sufficient that the portion 27 in its normally cylindrical condition is slightly restrained when positioned therein. The valve 35 is seen to be longer than the bag seating portion 27.

To remove the dirt-filtering bag 6 from its connector substantially the reverse operation of that above indicated is necessitated. The operator exerts a sufficient compression force upon the bellows portion 28 adjacent the connector 27 to permit of a partial deformation of the element 27 and thereafter a more complete deformation is possible as by the insertion of a finger or similar element or tool whereupon the separation takes place easily in the manner obvious from Figure 3.

Referring to Figure 4 a second preferred embodiment is illustrated which is similar in all respects to that illustrated in Figure 2 with the exception that the bag valve 35 is shorter than the bag-seating portion 27 of the connector and the latter is formed at its outer end with a rim or bead 37 which prevents the outward withdrawal of the bag 6 with the bag-seating portion 27 in its expanded cylindrical condition. Insertion of the bag-seating portion 27 into the bag 6 and its removal therefrom is in the manner described for the first embodiment.

While the invention has been disclosed embodying an outer appearance bag it is within the scope of the invention that this appearance bag be eliminated and the dirt-filtering bag supported directly from the handle.

I claim:

1. In a bag mounting for a suction cleaner dirt bag, a resilient flexible air passageway formed for a part of its length as a bendable bellows with accordion-like pleats and for an adjacent part of its length as a normally cylindrical conduit deformable under a manually applied transverse collapsing force to enable it to be inserted within a dust bag inlet and having sufficient expansive force to clamp in place against normal operating forces a dust bag so positioned, said parts of said mounting having sufficient rigidity and strength as to support the attached end of a dust bag unaided and to prevent collapse under the weight of said supported bag and yet sufficiently flexible within said bellows to permit bending.

2. In a bag mounting for a suction cleaner dirt bag, a rigid ring for attachment to an exhaust outlet of a suction cleaner, a resilient flexible conduit seated at one end on said ring and extended outwardly therefrom, a portion of said conduit adjacent said ring being formed as a bendable bellows with accordion-like pleats and the outer end portion being formed as a cylindrical bag seat collapsible under a manually applied transverse force to permit insertion within a bag inlet of substantially the same size and having sufficient expansive force to clamp the said inlet in place against normal displacing forces encountered in cleaner operation, said bellows portion of said conduit and said end portion having sufficient rigidity and strength as to support unaided and without collapse the attached end of a dust bag.

3. The construction recited in the preceding

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claim characterized in that a peripheral shoulder is formed on said bag seat at a distance from the outer end thereof to provide an abutment for the end of a sleeve-like dust bag inlet to assist in the proper positioning thereof.

4. The construction recited in the second preceding claim characterized in that said bag seat is formed with an enlarged beaded end and with a peripheral shoulder spaced inwardly therefrom which end and which shoulder form abutments to prevent the sliding of a sleeve-like bag inlet on said seat.

5. A suction cleaner dust bag having an inlet, means adapted movably to mount said bag on a suction cleaner comprising a resilient flexible air

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passageway adapted to connect to the body of said cleaner at the exhaust outlet thereof and formed adjacent thereto as a bendable bellows with accordion-like pleats and at its outer end as a sleeve deformable under a manually applied transverse collapsing force, said sleeve being of a size as to slide through said bag inlet when deformed by a transverse collapsing force and to fit tightly within said inlet in clamping relationship after being inserted therein and released, said bellows and sleeve having sufficient strength and rigidity as to support said bag and without collapsing unaided at its end adjacent said cleaner body.

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