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FILTER ATTACHMENT FOR SUCTION CLEANERS

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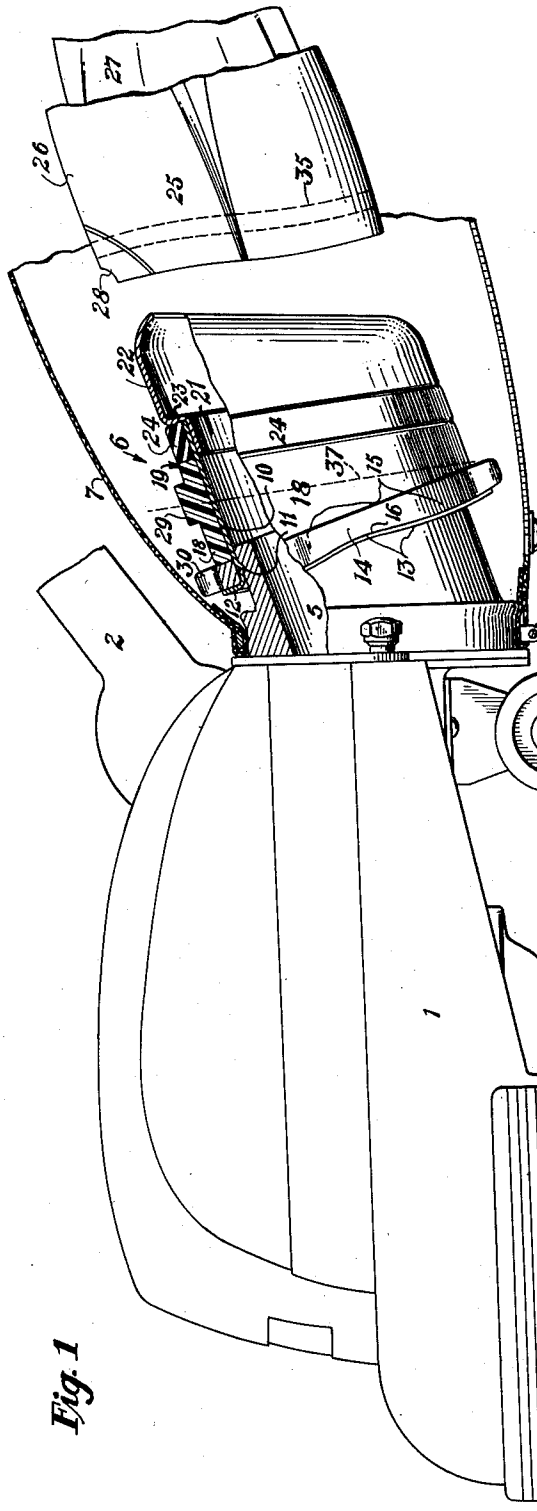


Fig. 1

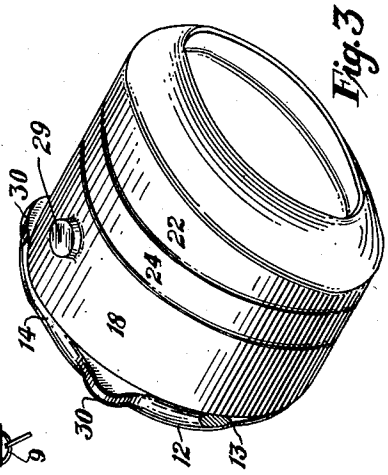


Fig. 3

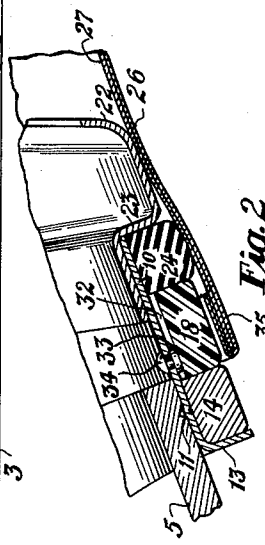


Fig. 2

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FILTER ATTACHMENT FOR SUCTION CLEANERS

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1 Claim. (Cl. 183—51)

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The present invention relates to the art of suction cleaners and more particularly to a simple, economical, reliable and easily operated mechanism for securing a paper filter bag to the exhaust air outlet of the suction cleaner proper.

It is a particular object of the invention to provide a mounting structure for a suction cleaner filter so constructed that the filter is readily slid upon the cleaner exhaust outlet and secured by an internally expanding ring along a plane parallel to the plane of the mouth of the bag by a simple rotary movement of a hand grip device.

It is a further object of the invention to provide a filter bag securing structure which presents no sharp angles or other surfaces likely to abrade and cut the fabric of the exterior appearance bags customarily provided to encase paper filters in ambulant type suction cleaners.

It is a further object of the invention to provide a suction cleaner filter securing means particularly adapted for use with paper filter bags in which the filter bag is secured to the cleaner exhaust air outlet by an internal expanding construction which grips the bag along a plane parallel to the plane of its mouth and slightly behind the mouth reinforcements of the bag so that the force tending to separate the filter from the cleaner structure due to air pressure in the bag tends to draw the reinforced section of the bag into side engagement with the expansible securing means.

Due to the type of flexure which a suction cleaner filter bag undergoes during the operation of the cleaner it has been found that a bag with its mouth cut upon the bias with respect to its axis engaging a similarly cut suction cleaner exhaust outlet with the long portion of the material of the filter mouth on the bottom of the exhaust outlet lengthens the useful life of the filter and prevents premature failure thereof, particularly at the point at which the filter joins the exhaust outlet. The bias cut of the open end of the filter mouth also facilitates the operation of sliding the filter mouth into the filter support tube.

It is a further object of the invention to provide a mouthing device for a suction cleaner filter bag in which an expanded body of soft compressible material frictionally engages the inner surface of the bag mouth just back of the mouth reinforcing means to hold the bag resiliently and to air seal the same.

It is an additional object to provide a bag securing construction which can be operated by a simple rotary motion of a large gripping device presenting no angular surfaces which will tend to injure the operator, which does not require material force for its operation, and which does not present surfaces to the outer appearance bag which will tend to abrade and cut through the same.

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These and other objects of the invention will become apparent as the description proceeds when taken in connection with the accompanying drawings in which:

Figure 1 is a side elevational view partly in section illustrating a suction cleaner embodying the present invention;

Figure 2 is a sectional detail of part of the apparatus of Figure 1 drawn upon an enlarged scale; and

Figure 3 is a perspective view of a suction cleaner exhaust outlet construction embodying the present invention.

Referring now to the drawing in detail and first to Figure 1 thereof there is illustrated an ambulant motor operated suction cleaning apparatus 1 having an operating and manipulating handle structure 2. The cleaner structure 1 is carried upon the surface being cleaned by suitable supporting wheels 3 and has a suction inlet mouth 4 through which dirt laden air is drawn from the surface to be cleaned into the body of the cleaning apparatus 1. The air pump customarily provided in such apparatuses discharged at the rear thereof into an exhaust outlet element 5 which carries upon its outer end a filter securing and mounting construction generally indicated at 6. A filtering device, to be described more fully hereinafter, is secured upon the mounting construction 6 and is encased by a cloth appearance bag indicated at 7 which is secured by a spring clamp indicated at 8 to the outer surface of the exhaust outlet 5 adjacent the point at which it connects to the cleaner body 1. The cloth bag 7 is openable by any suitable means such as a slide fastener 9 at its bottom side to permit access to the constructions inside the same and so that it may be folded back to expose substantially the entire construction 6 and the filter attached thereto.

The mounting structure for the filter comprises a cylindrical tube 10 embracing the exterior of the end of the exhaust casing 5 and rigidly secured thereto by a series of indentations 11. The inner end, nearest the cleaner body 1, of the cylindrical tube 10 is provided with a radially projecting flange 12 in the form of a very shallow pitch axial displacement type of cam as indicated at 13. An operating ring or cam 14 surrounds the tube 10 and has one

face thereof bearing against the flange 13 and is similarly shaped. As shown in Figure 1, similar portions of the ring 14 and flange 13 are in engagement with each other so that the ring 14 is then in the position in which it is closest to the body of the cleaner structure. 1. Slight rotation of the ring 14 will cause the thickest, convex portion 15 thereof to engage and ride upon peak, convex portion 16 of the flange 13 which will tend to advance the ring 14 to the right as viewed in Figure 1 away from the body of the cleaner 1. A compression ring 18 surrounds the cylindrical tube 10 and is slidably mounted thereon. The left hand face of the ring 18, as viewed in Figure 1, lies in a plane which is normal to its axis and engages the flat right hand face of the ring 14. The right hand face of the ring 18 as viewed in Figure 1 is cut upon a bias with respect to its axis as indicated at 19. The plane of the right hand face of ring 18 is parallel to the plane of the outer end of tube 10 which is also cut upon a bias with respect to its longitudinal axis. The outer end of tube 10 is secured to the inner reduced cylindrical end portion 21 of a pilot tube 22. The junction between the conduit 10 and the tube 22 forms a shoulder 23. A soft rubber ring 24 is positioned between the shoulder 23 and the right hand end face 19 of the plastic ring 18.

The external diameter of the tube 22, rubber ring 24 and ring 18 are all equal in the uncompressed condition of the rubber ring 24 illustrated in Figure 1. These elements are adapted to receive the bias cut end 25 of the reduced mouth portion of a paper filter structure 26 which includes an inner dirt valve indicated at 27. The particular construction of the filter is disclosed in detail in U. S. Letters Patent 2,295,981 issued to H. B. White on September 15, 1942. Briefly, the paper filter bag has its inlet mouth reduced by a series of pleats in the bag material which are fixedly secured adjacent the inlet mouth by stitching 35 lying in planes parallel to the open end of the bag mouth. Other securing and reinforcing means may be provided at this point if desired.

The bias cut end of the filter 26 is provided with a half circular notch 28 adapted to engage with a positioning button 29 formed upon the slidable ring 18. When the filter structure 26 is assembled with the exhaust outlet assembly 6 of the cleaner the two are brought into axial alignment with each other and the reduced pleated end portion 25 of the filter is slipped over the tube 22, ring 24 and end of ring 18 until the button 29 engages the semi-circular notch 28. When this condition is reached the bias cut end of the filter mouth will lie substantially along the dashed line 37. With the paper filter assembled with the assembly 6 the ring 14 is grasped by means of the rounded finger projections 30 and is given a partial turn causing the convex portion 15 of the ring 14 to move into engagement with the convex portion 16 of the cam flange 13. This action shifts the ring 18 to the right as viewed in Figure 1 axially of the tube 10 and compresses the rubber ring 24 expanding the same and causing it to grip the paper filter internally with a friction, air tight seal.

Rotation of the ring 18 is barred by a pin and slot construction shown more fully in Figure 2. The ring 18 is provided with an inner slot 32 adapted to receive the enlarged head 33 of a rivet 34 mounted in the tube 10. By this means the ring 18 is free to shift axially of the tube 10 but can not rotate with respect thereto.

Also as shown more clearly in Figure 2 rotation of the ring 14 expands the ring 24 into the filter just rearwardly of the reinforced bias cut end portion thereof so that the force tending to strip the filter from the structure 6 due to air pressure in the bag when the cleaner is in operation tends to pull the reinforced end 35 of the filter into side abutting engagement with the expanding ring 24 thus improving the air sealing qualities of the joint and taking up part of the strain in the reinforced end 35 of the paper filter.

While only a single constructional form of the invention has been illustrated herein the invention is not limited to the precise constructional details shown in the drawing. Other forms of camming devices for example could be utilized to apply an axial pressure to the expanding sealing ring. Other variations in the constructional details of the invention will readily occur to those skilled in the art.

While I have illustrated and described the invention in considerable detail, it is to be understood that various changes may be made in the arrangement, proportion and construction of parts without departing from the spirit of the invention or the scope of the appended claim.

I claim:

A filter bag mounting device for suction cleaning apparatus comprising a conduit structure having an end portion and a shank portion of reduced external diameter joined by a shoulder extending radially of said structure and lying in a plane transverse and inclined to the axis of said conduit structure, a ring of compressible elastic material around said shank portion abutting said shoulder, a compression ring encompassing said shank portion and slidable axially thereof, said compression ring having one end face lying in a plane parallel to said transverse and inclined plane and its other end face lying in a plane normal to the axis of said conduit structure, a cam ring encompassing said conduit structure and rotatable with respect thereto and having one end face abutting said other end face of said compression ring and its other end face formed as a cam surface, means on said conduit structure forming a stationary cam surface abutting said first mentioned cam surface whereby rotation of said cam ring shifts said compression ring axially of said structure to compress said elastic material.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,295,981	White	Sept. 15, 1942

FOREIGN PATENTS

Number	Country	Date
387,245	Great Britain	Feb. 2, 1933