

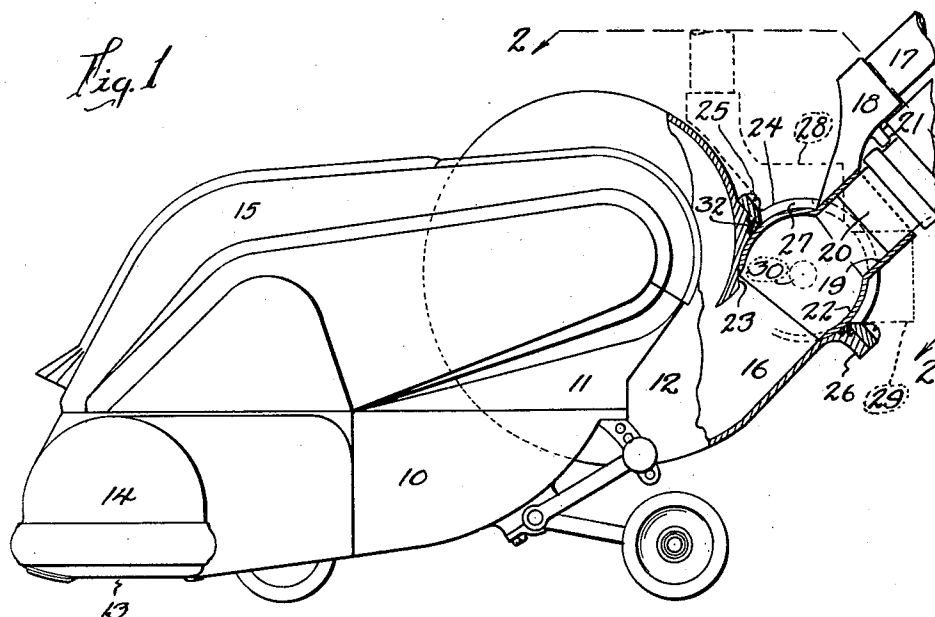
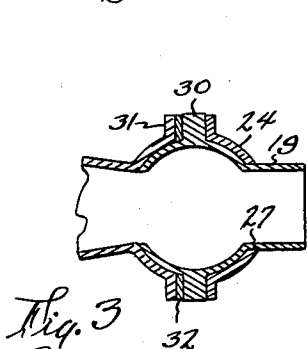
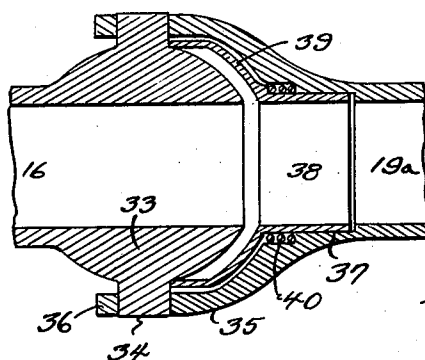
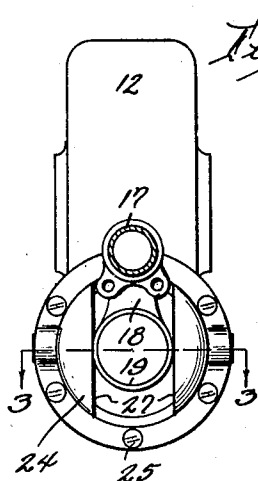
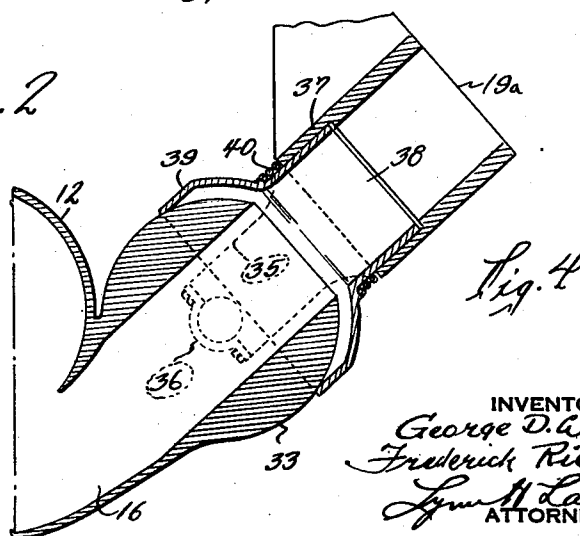
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VACUUM CLEANER

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VACUUM CLEANER

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5 Claims. (Cl. 183—36)

Our invention relates to vacuum cleaners and has for its object to provide a cleaner wherein the fan case discharge nozzle is rigidly associated with the handle, fixedly connected to the inlet of a dust collecting bag, and movably connected to the body of the cleaner so that the handle and bag may swing in a vertical plane relative to the cleaner body without the occurrence of any bending in the neck of the bag.

We are aware that it is not new to provide a rotatable joint in the air passage between a fan case and its exhaust nozzle. The present invention, however, aims to achieve a maximum efficiency in the handling of the discharging air stream; i. e., to cut down the resistance caused by abrupt bends in the outlet. To this end, the invention proposes to provide an arrangement wherein the fan case is positioned in a vertical plane on a transverse horizontal axis, its outlet directed rearwardly, wherein the discharge nozzle is coupled to the outlet by a rotatable joint forming a normally substantially straight passage from the outlet to the discharge nozzle, and wherein the handle is mounted upon the nozzle so as to utilize said joint as its hinging connection to the fan case.

The invention also deals with the problem of sealing the rotatable joint against the escape of dust. To this end, it provides a spherical surface for the slidably coupled members of the joint, and means for sealing such surface.

Further objects will appear in the perusal of the following detailed description of the invention in connection with the accompanying drawing, in which:

Fig. 1 is a side elevation of a cleaner embodying my invention, parts being broken away to better illustrate the construction.

Fig. 2 is a rear elevation of the fan case taken as indicated by the line 2—2 of Fig. 1.

Fig. 3 is a longitudinal sectional view through the rotatable joint taken on the line 3—3 of Fig. 2.

Fig. 4 is a vertical longitudinal sectional view through a joint comprising a modified form of the invention, and

Fig. 5 is a view of the modified form similar to Fig. 3.

The invention provides a suction chamber comprising a body 10 and a pair of elbows 11 forming a suction passage from the body 10 to the inlet of the fan case 12 which is secured to the elbows 11. While the preferred form of the invention embodies a double inlet, double impeller fan, it will be understood that it is equally ap-

plicable to a single type fan wherein the axis of rotation is transverse and horizontal.

The carpet contacting mouth of the suction chamber is indicated at 13, and a rotatable agitator (not shown) may be carried in the agitator housing 14 and driven by suitable driving mechanism encased in the motor housing 15, such driving mechanism also serving to drive the fan. Details of the construction of these features are as shown in the application of Dewey M. Dow, Serial Number 74,012 filed April 13, 1936.

The outlet 16 of the fan case projects rearwardly and is preferably inclined upwardly so as to be in alignment with the normal rearwardly and upwardly inclined position of the handle 17. The handle 17 is mounted in a bracket 18 which is formed integrally with and rigidly secured to the discharge nozzle 19.

To the discharge nozzle 19 is attached the bag coupler 20 to which in turn is attached the inlet of the bag 21 which receives and filters the dust laden air delivered from the fan.

The nozzle 19 has an integrally formed spherical hollow knuckle 22 of larger diameter than the nozzle 19. The knuckle 22 is journaled between spherical cavities 23 forming a continuation of the outlet 16 and a spherical cap 24 which is secured at 25 to the flange 26 forming the terminus of the outlet 16. The cap 24 has a circumferential slot 27 just wide enough to freely receive the nozzle 19, and extending to a sufficient arc to allow the nozzle 19 to oscillate between limited positions that are disposed 90° apart. These positions are indicated in dotted lines at 28 and 29 respectively.

The hollow knuckle 22 is open at its end opposite the nozzle 19 so that when in normal position it registers with the outlet 16. In either of the terminal positions, it will still be in partial communication with the outlet 16 so that cleaning may be effected in either of these terminal positions.

The movement of the joint is limited to swinging in a vertical plane by a pair of trunnions 30 formed integrally with the knuckle 22 and journaled in suitable bearings 31 formed between the cap 24 and seat 23.

By making the joint spherical it is possible to employ a packing ring 32 extending around the knuckle 22 in a plane perpendicular to the axis of the discharge nozzle 19 when in normal position. By locating the packing ring near the bisecting plane of the knuckle 22 (the plane passing through the trunnions 30) it is possible to move the joint to either of the extreme positions with-

out having any portion of the mouth edge of the knuckle 22 move entirely through the packing ring. Thus the packing ring serves to carry out its sealing function at all times irrespective of the position of the handle. Also, the packing ring may be made perfectly circular and thereby attain a maximum efficiency in sealing the joint against the escape of dust.

In the modified form of the invention shown in Figs. 4 and 5, the outlet 16 has a ball shaped end portion 33 provided with two diametrically opposed trunnions 34 disposed in the horizontal transverse diameter of the ball.

The outlet nozzle 19a is provided with a fork 35 the ends of which are journaled upon the trunnions 34 and detachably secured thereto by means of bearing caps 36 shown in dotted lines in Fig. 4. The nozzle 19a has a socket 37 in which is mounted the sleeve portion 38 of a sealing cup 39. The circular rim of the cup 39 is seated against the spherical surface of the ball end 33 of the outlet 16 and is resiliently held in such seated engagement by a coil spring 40 encircling the sleeve 38 and engaged between the cup 39 and end of the socket 37.

It will be noted that the invention provides an arrangement of fan case and nozzle wherein there is a straight passage from the fan case outlet through the nozzle and into the bag when the nozzle is in its normal position.

This is effected by the use of the sliding knuckle joint which may generically be either spherical or cylindrical and the positioning of the mouth in the knuckle diametrically opposite the discharge nozzle. The invention is thus distinguished from arrangements in which the fan case is positioned horizontally or in some other position than on a horizontal transverse axis and in which the mouth of the rotatable joint is co-axial with the axis of rotation. The invention also deals with the solving of the problem of sealing the joint which problem is more acute in the type of arrangement under consideration than it is where the air passage in the knuckle is co-axial with the axis of rotation.

We claim as our invention:

1. In a vacuum cleaner, a suction chamber, a fan case rigidly attached thereto with the axis of rotation of its fan transversely and horizontally disposed therein and its outlet directed rearwardly, a discharge nozzle having a knuckle portion socketed in said outlet for oscillation around a horizontal transverse axis, said knuckle portion having an inlet mouth opposed to said nozzle and communicating with said outlet, a handle rigidly attached to said nozzle, and a dust collector fixedly associated with said handle and nozzle, coupled to said nozzle in communicating relation thereto and supported by the said handle for movement therewith.

2. In a vacuum cleaner, a suction chamber, a fan case rigidly attached thereto with the axis of rotation of its fan transversely and horizontally disposed therein and its outlet directed rearwardly, a discharge nozzle having a knuckle portion socketed in said outlet for oscillation around a horizontal transverse axis, said knuckle portion having an inlet mouth opposed to said nozzle and communicating with said outlet, a handle rigidly

attached to said nozzle, and a dust collector fixedly associated with said handle and nozzle, coupled to said nozzle in communicating relation thereto for supporting the said handle for movement therewith, said knuckle being spherical in outer contour and a packing ring mounted in said outlet in a plane lying substantially in the axis of swinging movement of the nozzle and substantially perpendicular to the longitudinal axis of the nozzle in its normal position, said packing ring engaging the spherical surface of the knuckle to seal the joint between said outlet and said knuckle.

3. In a vacuum cleaner, a suction chamber, a fan case rigidly attached thereto the axis of rotation of its fan transversely and horizontally disposed therein and its outlet directed rearwardly, a discharge nozzle pivoted to said outlet for oscillating movement around a transverse horizontal axis, means coupling said discharge outlet and forming a substantially straight air passage from the fan case through said outlet and said discharge nozzle, said means including a knuckle portion on one of the parts and a seating portion on the other of the parts, seated and resiliently urged against the surface of said knuckle portion in sealing engagement therewith and a handle rigidly attached to said nozzle.

4. In a vacuum cleaner, a suction chamber, a fan casing rigidly attached thereto, the axis of rotation of its fan transversely and horizontally disposed therein, and its outlet directed rearwardly and upwardly, a discharge nozzle pivoted to said outlet on a transverse horizontal axis for swinging in a vertical plane, said nozzle and outlet forming two relatively rotatable parts of a substantially straight air passage from the interior of the fan case to the delivery mouth of said nozzle, and means coupling said nozzle to said outlet so as to maintain said air passage closed at all times, said means including a knuckle portion on one of the parts through which the air passage extends in a straight line substantially diametrically of the axis of swinging movement of the nozzle and a seating member slidably mounted on the other part and resiliently urged against the surface of said knuckle portion, said surface being developed concentric to said axis of swinging movement, and a handle rigidly attached to said nozzle.

5. In a vacuum cleaner, a suction chamber, a fan case rigidly attached thereto with the axis of rotation of its fan transversely and horizontally disposed therein and its outlet directed rearwardly, a discharge nozzle having a knuckle portion socketed in said outlet for oscillation around a horizontal transverse axis, said knuckle portion having an inlet mouth opposed to said nozzle and communicating with said outlet, a handle, its axis lying on a line spaced above the outlet end of the nozzle, said handle being rigidly attached to said nozzle, intermediate its outlet end and the knuckle, and a dust collector fixedly associated with said handle and nozzle, coupled to said nozzle in communicating relation thereto and supported by said handle for movement therewith.

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