June 17, 1941. W. T. HEDLUND 2,246,438

VACUUM CLEANER

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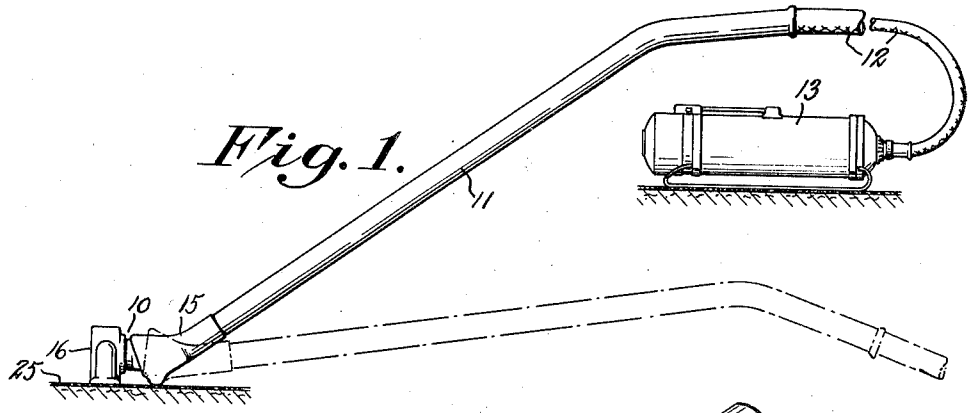


Fig. 1.

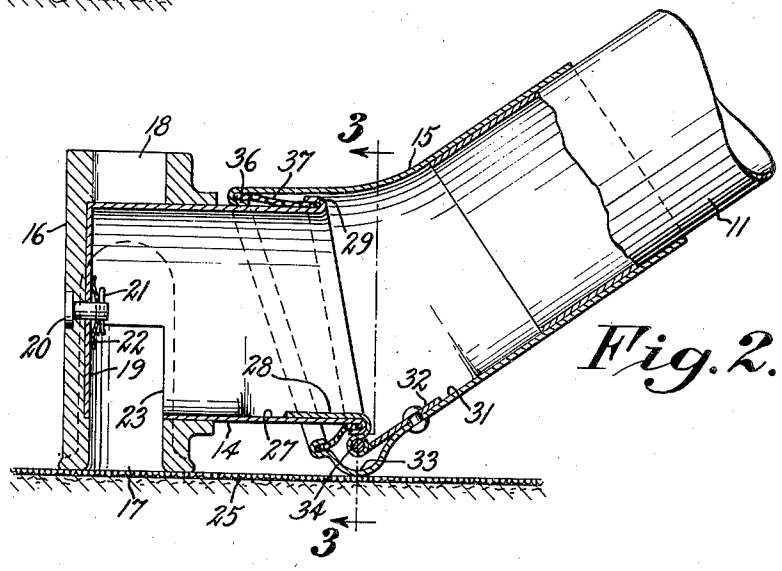


Fig. 2.

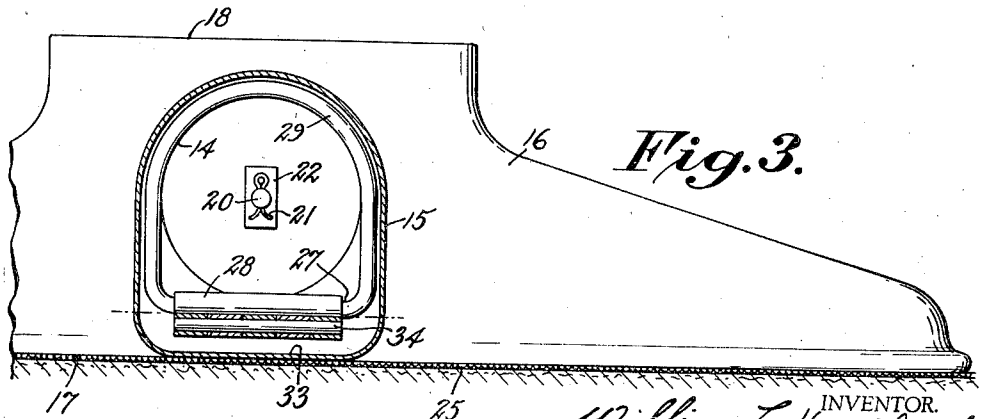


Fig. 3.

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VACUUM CLEANER

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4 Claims. (Cl. 15—156)

My invention relates primarily to vacuum cleaners. One of the objects of my invention is to permit swinging movement of an inclined suction conduit relative to a nozzle or nozzle part without loss of suction through air leakage, with a minimum of friction, and by simple means permitting free air-flow.

However, as will be apparent, my novel bendable conduit construction is not limited to the specific application described.

The invention will be understood from the following description, read in conjunction with the accompanying drawing, which form part of this specification, and of which—

Figure 1 is a side view of a vacuum cleaner unit, hose, wand and nozzle;

Fig. 2 is a vertical sectional view of the nozzle and wand; and

Fig. 3 is a cross-sectional view taken on the line 3—3 of Fig. 2.

The vacuum cleaner shown is of a known kind. The nozzle 10 is connected to the end of rigid tubing 11, sometimes called a wand. The upper end of the wand is held by the operator and the wand serves both as a suction conduit from the nozzle to the source of suction and as a directing medium for guiding the nozzle on a rug or other surface to be cleaned. The upper end of the wand is connected by a flexible hose 12 to a power unit 13 suitably mounted on runners or wheels and adapted to be pulled over the floor or rug. The hose 12 serves both as a suction conduit and as a medium for pulling the unit 13. The unit 13 includes a motor, a fan and dust separating means.

To accommodate different operators and to facilitate use of the nozzle under low furniture, it is desirable that the wand be capable of having different inclinations with respect to the floor, while the nozzle should have the same relation to the floor regardless of inclination of the wand. Angular movement of the wand should not tilt the nozzle so that excess air leaks under an edge. Consequently, the conduit connection between the wand and the nozzle should be bendable. At the same time so little friction should result from this bending that the nozzle will not tilt with the wand. This is particularly a problem with a light nozzle. Furthermore, the bendable connection should be air-tight.

In accordance with the present invention, the nozzle is provided with a horizontal tubular part 14 and an overlapping inclined tubular part 15. Parts 14 and 15 may be of thin metal stock and may be made of sheet stock by press operations.

Part 14 is of circular cross-section at its outer end and a mouth-piece or nozzle body 16, which may consist of a hollow casting having suction openings or mouths 17 and 18 of different size, is mounted thereon. Mouth-piece 16 is rotatably mounted on the outer circular portion of part 14 and may be weighted on one side for automatic turning on lifting the wand and nozzle from the floor. The mouth-piece is secured to the closed end 19 of part 14 by suitable means such as a pin 20, cotter pin 21 and an interposed spring washer 22. Part 14 has an opening 23 in its lower half to provide communication between its interior and that suction opening (17 as shown) which is in contact with the rug or floor 25, while the upper part of part 14 is closed to block off the upper opening (18 as shown).

The rear part of part 14 (right hand part in Fig. 2) is formed outwardly at the lower half to provide a flat horizontal bottom 27. To this bottom part 27 is secured, as by rivets or welding, one wing 28 of a piano-type hinge. The rear end of part 14 is oblique to the vertical and has an outwardly extending reverse flange 29.

Part 15 has an upper end of circular cross-section for receiving the wand 11 with frictional engagement. Its lower end is extended laterally at its lower half to provide a flat bottom 31 to which is secured the other wing 32 of the hinge. This end of part 15 is further extruded to provide a pocket 33 and to provide a horizontal contact surface (the outer surface of the bottom of pocket 33) for contact with the rug or floor 25 which contact surface is in the same plane as the plane of suction opening 17. The horizontal pintle 34 of the hinge is disposed in pocket 33 so as to be inside the bendable tube joint but to one side of the air-flow channel. In order that the pintle 34 may be in the pocket, wing 28 is bent around flange 29. Part 15 has an inwardly extending reverse flange 36.

Parts 14 and 15 are connected by a band of yieldable air-impervious sheet material 37 which is secured under the flanges 29 and 36 of the respective parts so as to be air-tight. Band 37 may be of rubber, rubberized cloth, aeroplane cloth or other like material which is yieldable and capable of movement without cracking. Flanges 29 and 36 may be serrated or punched with teeth to seize the cloth-like material. Glue may be applied before the flanges are crimped over the cloth-like material.

It will be seen that the part 15 can swing relative to part 14 about pintle 34. Parts 14 and 15 may be said to overlap or telescope in gapped re-

lationship, part 15 being flared for this purpose, so that there is an appreciable range of relative movement without contact between parts 14 and 15. The limit of relative movement in either direction is determined by contact of flange 36 against part 14. The parts may be so formed that wand 11 has slight movement or such movement that the wand 11 can be brought adjacent the floor to move the nozzle under furniture. The latter great movement is not necessary, however, since the lowering of the wand can be accomplished partly by swinging the wand on the horizontal axis 34 and partly by rotation in such manner that part 14 rotates within part 16.

It will be understood that the vacuum cleaner is set in operation by closing a switch associated with unit 13, thereby causing the fan to draw air and dust through the nozzle, parts 14 and 15, wand 11 and to the cleaner unit 13 containing the dust separator.

As the wand 11 is moved to and fro the nozzle retains its proper position with respect to the rug independently of the height at which the upper end of wand 11 is held above the floor. The wand and part 15 take up pressure so that the mouth-piece is relieved. This avoids chattering. The bearing surface on the outside of pocket 33 is as wide as the diameter of the suction conduit.

As the parts swing relative to each other about pintle 34, the band 37 accommodates itself to the position of the rigid metal parts. Pintle 34 is advantageously arranged so that there is a minimum twisting of the soft material 37. To this end, the flanges 29 and 36 are more or less radial with respect to member 34 and member 34 is in alignment with band 37.

In assembling the parts, the hinge may be made up separately, first attached to one of the parts, the band 37 secured to both parts and the other wing of the hinge finally secured.

In accordance with the requirements of the patent statutes I have described the preferred form of the invention and it will be understood that the scope of the invention is not limited in any way by the limitation of disclosure.

What I claim is:

1. A nozzle for vacuum cleaners including a mouth-piece, a hollow part mounted on said mouth-piece, a second hollow part for connection to a source of suction, a hinge connecting said hollow parts, and flexible material disposed wholly within and surrounded by at least one of said parts for connecting said parts to form an air-tight conduit, said hinge being disposed within said air-tight conduit.

2. A nozzle for vacuum cleaners including a mouth-piece, a substantially horizontal conduit part connected to said mouth-piece, a hinge connected to said horizontal part and having its axis horizontal, a conduit part connected to said hinge and overlapping said horizontal part, and air-impervious material connecting said conduit parts at the place of overlapping.

3. A nozzle as defined in claim 2 in which one of the conduit parts is formed with a pocket in which the hinge is disposed.

4. A jointed conduit including tubular parts, one of said parts having a lateral pocket, a hinge in said pocket connected to said parts, air-impervious material connecting said parts, and a mouth-piece connected to one of said parts, said pocket forming a floor contacting surface in line with the opening of the mouth-piece.

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