Oct. 20, 1953 R. B. McCARTHY 2,655,682

SUCTION CLEANER NOZZLE AND BRUSH

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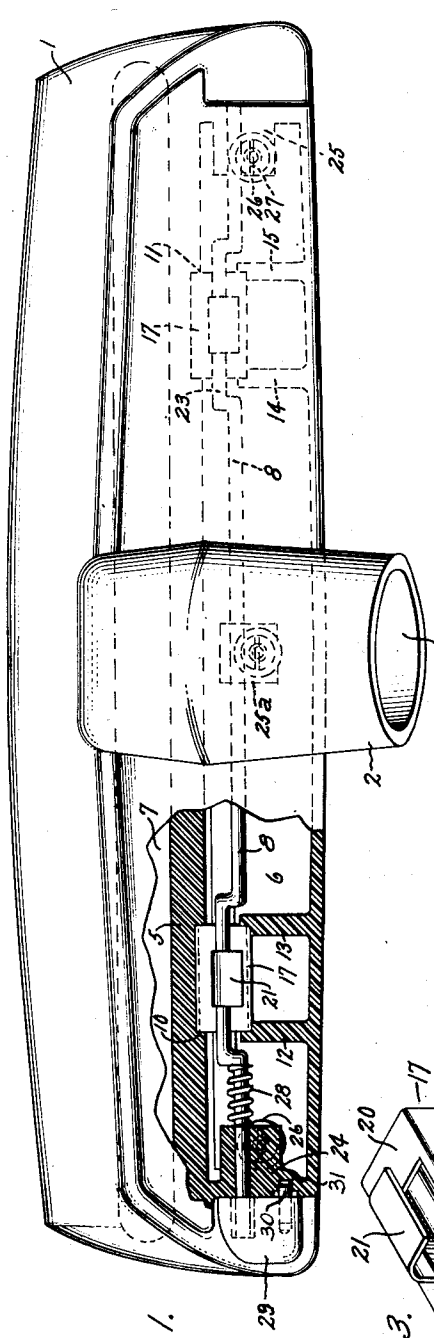


Fig. 1.

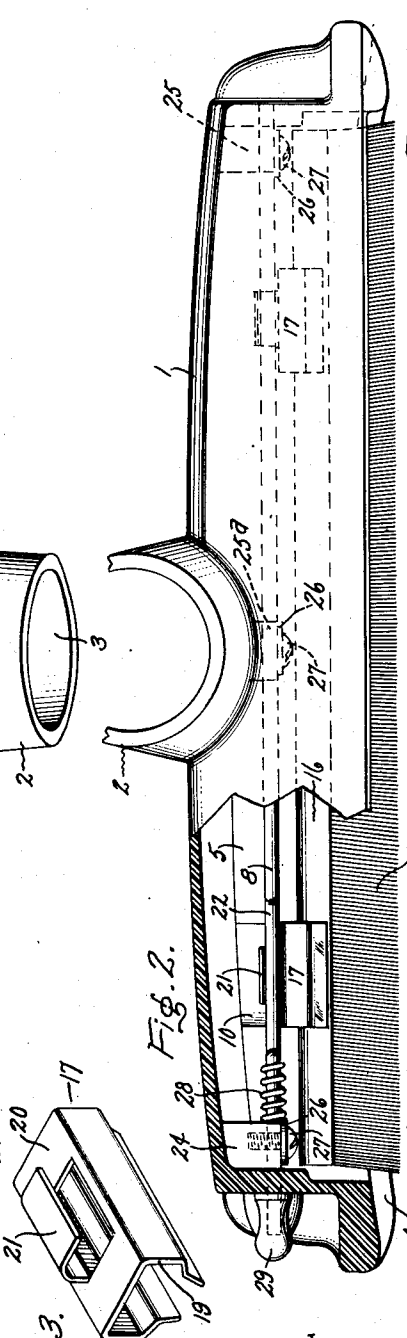


Fig. 2.

Fig. 3.

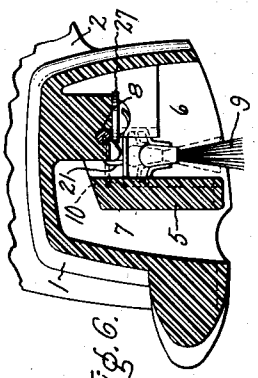


Fig. 6.

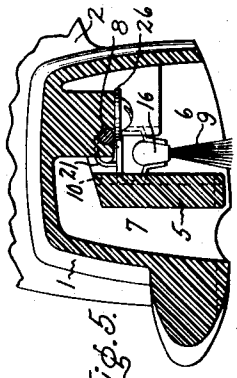


Fig. 5.

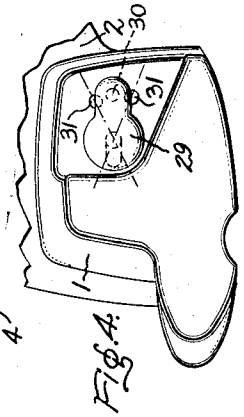


Fig. 4.

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SUCTION CLEANER NOZZLE AND BRUSH

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1 Claim. (Cl. 15—373)

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This invention relates to suction cleaners, and more particularly to a nozzle for a suction cleaner and an adjustable brush mounted within the nozzle.

For realization of the full advantages of suction type cleaners, the principal cleaning should occur as the result of rapid movement of air over the area being cleaned and into the cleaning nozzle. In practice, however, it is found that movement of air alone is insufficient for thorough cleaning in certain instances. Additional means are required to stir up and loosen particles of dust and dirt for removal by the rapidly moving air. Brushes of the rotary or fixed type are commonly used to aid the suction cleaner in thoroughly removing dirt from the surface being cleaned. However, many of the brush and mounting designs adapted to cooperate with the suction nozzle have the disadvantage of smearing dirt on the surface before the air action takes place, reducing the air flow into the nozzle, or driving the dirt particles deep into a surface preventing removal in the normal cleaning operation.

A primary object of my invention is to provide a nozzle and brush arrangement in which the air movement is first given the opportunity of dirt removal before the brush action takes place. The brush may still serve its essential function of loosening additional dust and dirt for removal by the air flow. A further important object of my invention is to provide a brush adjustably positioned within the nozzle so that the cleaner is readily adaptable for cleaning of any surface, and to compensate for wear of the brush bristles.

It is also an object of my invention to provide controlling means for positioning the brush which is readily operated from a convenient point on the outside of the nozzle.

A still further object of my invention is to provide an adjustable brush mounting of improved and simplified design, and economical to manufacture.

In accomplishment of the foregoing objective, a feature of my invention consists in mounting the brush within the cleaning nozzle so that air flow into the nozzle suction chamber may occur without relying on the air flow through the bristles of the brush itself. A further feature of my invention is in the employment of a crankshaft cooperating with the brush in a manner providing brush adjustment with respect to the nozzle by rotation of the crankshaft from a point outside the nozzle.

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The features of my invention which I believe to be novel are set forth with particularity in the appended claim. My invention itself, however, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing, in which Fig. 1 is a plan view, partially in section, of the nozzle and brush assembly; Fig. 2 is a front elevational view, partially in section; Fig. 3 is a perspective view of a brush clip employed in this assembly; Fig. 4 is an end elevation of the nozzle body; and Figs. 5 and 6 are cross-sectional elevations illustrating different brush positions within the nozzle.

The embodiment of my invention illustrated is in the form of an attachment for a suction cleaner having a nozzle body 1 connected to a suction hose (not shown) through a neck 2 which forms part of body 1. Neck 2 defines the suction exhaust aperture 3 through which the air travels to a suitable air cleaning device. It is to be understood, however, that my invention is not limited solely to an attachment for a suction type cleaner; and the invention herein disclosed is equally applicable, for example, to a fixed nozzle of a conventional upright suction cleaner.

Body member 1 and neck 2 of the nozzle are formed integrally from any suitable material, such as, for example, a hard thermoplastic. Body 1 has an elongated shape with side walls defining a suction chamber with a mouth 4 which is placed against the surface to be cleaned. The suction chamber within body 1 communicates with the exhaust aperture 3. Within the body 1 a vertical barrier 5 extends from the mouth of the body upwardly into the suction chamber. Barrier 5 divides the nozzle interior into two compartments 6 and 7 as best shown by Figs. 5 and 6. While compartment 6 may be only a brush compartment, by providing communication with compartment 7, two suction chambers are provided with the brush centrally located between the compartments. The shape of body 1 may be designed so that an equal air flow occurs through compartments 6 and 7 of the nozzle.

For the purpose of slidably carrying the brush 9 for vertical adjustment, grooves 10 and 11 are formed in barrier plate 5 at spaced points. Opposite groove 10, legs 12 and 13 extend inwardly from the rear side wall of body 1. The corners of legs 12 and 13 are notched, so that the groove 10 and the notches in the corners of legs 12 and 13 create a channel through which

a clamp supporting brush 9 may slide. Similarly, opposite groove 11, legs 14 and 15 are provided for slidably receiving the second brush clamp.

The brush 9 is elongated in shape and includes a plurality of bristles secured in position by a brush head 16. For supporting brush 9 within body 1, a pair of clamps 17 are employed. The form of each of these clamps is best shown by Fig. 3. Clamp 17 has spaced parallel side walls 18 and 19 bent over from a connecting portion 20. The open end of clamp 17 has inwardly extending flanges adapted to engage head 16 of brush 9. The proportioning and spacing of side walls 18 and 19 permit this clamp to be slidably received within the passage formed by groove 10 and legs 12 and 13 on one side of the nozzle and by groove 11 and legs 14 and 15 on the other side of the nozzle. Brush 9 may be permanently secured to clamp 17 by any suitable method such as spot welding or soldering. A half hook 21 is struck up from connecting portion 20 of clamp 17 as a means for connecting these brush clamps to the crankshaft 8.

Crankshaft 8 is rotatably supported by body 1 and is provided with spaced eccentric portions 22 and 23. Adjacent each end of body 1 and within the suction chamber, protuberances 24, 25 and 25*a* are provided to form bearing members for the rotatable crankshaft 8. The lower end of each protuberance is grooved to receive the shaft 8, and when the shaft 8 has been positioned within these grooves, a washer 26 and self-tapping screw 27 are employed to prevent removal of the shaft from the body.

When the crankshaft 8 has been installed in position, brush 9 as carried by clamps 17 is engaged with the eccentric portions 22 and 23 of the crankshaft by means of the half hooks 21. Thus as crankshaft 8 is rotated, the brush assembly is raised or lowered in accordance with the position of eccentrics 22 and 23. A spring 28 having one end engaging eccentric 22 and its opposite end engaging protuberance 24 of the body, provides the necessary spring force to hold knob 29 and pin 30 in cooperative relation with any recess 31 to which it has been adjusted.

Crankshaft 8 extends through the body 1 on an end thereof, and as here shown the left end, so that the knob or operating handle 29 may be connected to the crankshaft for rotation thereof. Operating handle 29, as best shown by Fig. 4 may be rotated through a limited arc in order to raise or lower brush 9 with respect to the mouth of body member 1. It is thus seen that the position of brush 9 within the nozzle is readily controllable by a simple adjustment of operating knob 29 to adapt this suction cleaner to any type of surface.

This nozzle and adjustable brush, in accordance with my invention, are readily assembled by first mounting the crankshaft 8 within body member 1; and then with the eccentrics 22 and 23 in their lowermost position, the half hooks 21 of clamp 17 which supports the brush are connected to the eccentrics. The eccentrics are next rotated to their uppermost position and any necessary adjustment of the position of the brush is made. In this position of the crankshaft, of course, the brush should be in its uppermost or retracted position. Operating handle 29 is then connected to the crankshaft in a proper position for movement through the desired range of adjustment. It is apparent from the above description that this assembly is readily manufactured and easily assembled to form an improved nozzle and adjustable brush therefor.

The operation of this adjustable brush is most clearly shown by a reference to Figs. 4, 5, and 6. With operating handle 29 in an intermediate position, eccentrics 22 and 23 are in a horizontal position permitting brush 9 to project slightly beyond the mouth of body member 1. Upon rotation of knob 29 in a counterclockwise direction, eccentrics 22 and 23 lower brush 9 so that it projects a greater distance outside the mouth of body member 1. This is shown as the full line position in Fig. 6. Rotation of knob 29 in a clockwise direction raises the brush 9 and by full rotation in a clockwise direction the brush is retracted within the nozzle so that no brushing action occurs.

In order to increase the frictional holding of the crankshaft by the spring and to provide definite positions for the handle adjustment, such as those indicated by the broken lines in Fig. 4, the knob 29 carries on its underside next to the nozzle body a projecting pin 30. This pin on the knob is pushed, together with the knob, by the spring 28, toward removable engagement with any one of a number of dwells or recesses 31 on the end wall of the nozzle in a manner well-known in the art. Slight endwise movement of the crankshaft 8 and consequent compression of the spring 28 will permit the pin to ride from one recess to another during rotary manual adjustment of the knob, but the pressure of the spring will normally hold the pin and the knob, and therefore the crankshaft, in one of the adjusted positions.

When this nozzle assembly is used, it will be seen that the inrushing air into the mouth of the nozzle first operates to remove dust and dirt, and the brush is inoperative while the nozzle is moved backwardly and forwardly. Thus there will be no smearing of dirt on the surface being cleaned until the air movement has had an opportunity to remove the dirt. Brush 9 is normally stationary, and hence there is no beating action which might tend to drive dirt deeper into a rug or carpet, or other surface being cleaned. Equal air flow may be provided within both compartments 6 and 7 of the suction chamber so that the same action takes place whether the nozzle assembly is moved forwardly or backwardly in the cleaning operation. Since such a suction cleaner will be used on many different surfaces, the ease of adjustment of the brush position is an important aspect of this device. While using this nozzle, the operator may very simply move the control knob 29 to position the brush in such a location as will most efficiently perform that particular cleaning operation.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited solely thereto, since modifications may be made and I, therefore, contemplate by the appended claim to cover any such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

In a suction cleaner nozzle of the type having an elongated body defining a suction chamber with an elongated mouth adapted to contact a surface to be cleaned and a longitudinally extending brush slidably mounted in said mouth for movement toward and away from said surface, that improvement in means for adjusting the position of said brush comprising a crankshaft

extending longitudinally of and rotatably supported by said body within said mouth, spaced eccentric portions on said crankshaft, hook members on said brush engaged with said eccentric portions, one end of said crankshaft extending outside of said body, a control knob attached to said end outside said body, a projection on said knob, said nozzle body having a plurality of recesses therein for selective cooperation with said knob projection, and a spring extending between the inside of said mouth at one end and one of said eccentric portions for providing means to maintain said knob projection in a selected one

of said recesses, whereby said crankshaft and said brush are held in adjusted position.

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