VACUUM CLEANER FLOOR TOOL WITH ROTATING BRUSH
AND CLEANING MEANS FOR BRUSH

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United States Patent Office

2,904,818

Patented Sept. 22, 1959

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Application September 17, 1953, Serial No. 380,719

4 Claims. (Cl. 15—388)

The present invention relates to vacuum cleaner floor tools having rotating brushes for use with vacuum cleaners of the type which comprise a normally stationary suction creating means to the suction inlet of which a length of flexible hose is connected, the floor tool being connected to the hose, usually through the intermediary of a tubular metal wand section. Examples of such vacuum cleaners are the so-called tank type and canister type cleaners.

The general object of the invention is to provide an improved vacuum cleaner floor tool having a rotating brush which embodies means for automatically cleaning the brush while the floor tool is being used so as to avoid the accumulation of lint, hairs, etc., on the brush; and for a consideration of what I believe to be novel and my invention attention is directed to the following specification and to the claims appended thereto.

According to the invention, a floor tool having a brush housing in which is located a rotating brush, the brush being rotated by an electric motor, traction wheels on the floor tool or other suitable means, is provided with an elongated discharge slot through which air flows from the brush housing at relatively high velocity, the arrangement being such that the row or rows of bristles on the brush rotate past the discharge slot in close proximity thereto; and at one or both longitudinal edges of the slot is means which defines serrations or teeth past which the ends of the bristles rotate, the ends passing close to but without contacting the teeth. The air flow causes lint and similar material picked up by the brush bristles to stream outward in the direction of air flow as the brush rotates past the slot so that lint and similar material will be caught by the serrations or teeth, stripped from the brush bristles, and carried along by the air to the discharge opening of the toy.

In the drawing, Fig. 1 is a top plan view partly broken away of a floor tool embodying the invention. Fig. 2 is a sectional view taken on line 2—2, Fig. 1. Fig. 3 is a bottom plan view partly broken away and on a larger scale than that of Fig. 1, of an end of the tool. Fig. 4 is a detail view looking toward the outlet slot of the tool, it being seen taken on line 4—4, Fig. 7. Figs. 5, 6, 7, and 8 are detail sectional views illustrating the operation of the brush cleaning means, the wheel being omitted in Figs. 6, 7, and 8.

Referring to the drawing, 10 indicates an elongated brush housing having a suction slot 11 in its bottom wall 12 which extends throughout substantially the length of the housing. When in position on a surface to be cleaned, suction slot 11 faces downwardly. In the housing is a brush 13 comprising a core 14 on which is mounted a plurality of rows of bristles 15 which may be arranged on the core in any suitable manner, straight rows being shown in the present instance. Core 14 has stub shafts 16 at its ends by means of which it is rotatably mounted in bearing bushings 17 in the end walls of housing 10.

Insofar as my invention is concerned, brush 13 may be rotated by any suitable means. In the present instance it is arranged to be rotated by being connected to traction wheels 18 which are connected to stub shafts 16 and serve to support the brush housing on a floor and to rotate the brush. Preferably suitable gearing is provided in wheels 18 through which the wheels are connected to the brush so as to multiply the speed at which the brush is turned by the wheels. Traction wheel driven brushes for vacuum cleaners wherein the wheels drive the brush through speed multiplying gearing are known and hence do not require specific illustration. Any suitable gearing arrangement may be used, the essential thing being that as the tool is moved back and forth across the floor the brush is rotated either clockwise or counter-clockwise by the traction wheels.

Connected to the rear wall of the brush housing are walls which define a discharge chamber 20 which communicates with the brush housing through an elongated discharge slot 21. Discharge slot 21 is disposed in a generally vertical plane. The bottom wall 22 of chamber 20 is formed integral with housing 10 as shown clearly in Fig. 2. The top wall 23 of chamber 20 is formed by a liner located in a hood 24 which forms the top outer wall of the tool as a whole and is suitably attached to the bottom part of the brush housing. Walls 22 and 23 are triangular in shape, diverge relatively to each other and terminate to form a discharge opening 25 which communicates with a discharge neck 26 to which a suction hose being indicated in dotted lines at 27 in Fig. 1. As shown in Fig. 2, discharge neck 26 is connected to wall 22 by a screw 26a which threads through an integral rearwardly extending part 26b on wall 22.

The brush structure is such that when rotating the ends of the rows of bristles pass in close proximity to outlet slot 21.

The brush housing wall portions 28 and 29 adjacent to and leading up to slot 21 are shaped to form in substance a converging passage for directing flow of air to the slot. As a result when the tool is in use air drawn in through inlet slot 11 is discharged through outlet slot 21 at high velocity.

For cleaning lint, hair, etc., from the rows of brush bristles there is provided along one or both edges of outlet slot 21 means which forms a series of serrations or teeth which project into and in substance form the top and bottom edges of outlet slot 21, the serrations or teeth being so positioned that the outer ends of the rows of bristles move past them in close proximity to but without contacting them. If the brush rotates always in the same direction then serrations or teeth may be provided on the far side only of the slot as regards the direction of rotation of the brush. However, in the case of traction wheel driven brushes, if the brush rotates in opposite directions as the tool is moved back and forth across the floor then serrations or teeth may be located along both edges of the outlet slot. In the present instance the serrations or teeth 30 are shown as being formed in the edges of the strip 31 attached to walls 28 and 29 adjacent to outlet slot 21.

The manner of operation of the invention is depicted in Figs. 5 to 8 inclusive. Referring to Fig. 5, it being assumed the brush is rotating in the direction indicated by the arrow, the brush picks up lint and other similar material from the surface being cleaned as indicated at A in Fig. 5 and carries it along past outlet slot 21. Air discharging at high velocity through outlet slot 21 tends to cause the lint and other similar material picked up by the brush to stream out into the outlet slot as indicated at B in Fig. 6. As the material is carried along it will be caught by the serrations or teeth on the far side of slot 21 as regards the direction of rotation of the brush.
as indicated in Fig. 7 at C, the material being stripped from the brush and being carried along by the air to the discharge opening 25 as indicated in Fig. 8 at D. Thus, stringy material such as lint is effectively cleaned from the rotating brush.

It is to be noted that the brush bristles in rotating past teeth 30 do not engage the teeth although they move past the teeth in close proximity to them. This arrangement of the parts whereby the bristles do not actually engage the teeth or serrations 30 is an important feature of my invention for by such arrangement efficient cleaning of the brush is obtained without placing any additional load on the brush resisting its turning and without subjecting the brush to additional wear such as would occur if the bristles contacted and rubbed across the teeth.

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

1. A cleaning tool for a vacuum cleaner comprising walls which define an elongated brush housing having an elongated downwardly facing suction inlet slot, a brush in said housing, means for rotating the brush, walls connected with the brush housing which define a discharge chamber which communicates with said brush housing through an elongated discharge slot of a width relatively narrow as compared to the width of said inlet slot, said discharge slot being generally vertically disposed, walls of the housing being shaped to provide a converging passage for directing air to said discharge slot and walls of said chamber being shaped to define a diverging passage which terminates in a discharge opening, said brush being positioned to rotate past said discharge slot in close proximity thereto, and means defining teeth along at least one of the longitudinal edges of the discharge slot past which the brush rotates, said teeth extending in substantially the same plane as said discharge slot and said brush passing in close proximity to but not in contact with said teeth when said brush is rotated.

2. A cleaning tool for a vacuum cleaner comprising walls which define a brush housing having an elongated air inlet slot and an elongated air discharge slot, said discharge slot being generally vertically disposed, the walls of the brush housing which direct air to said discharge slot converging toward the slot whereby air is discharged through the slot at high velocity, traction wheels for the housing, a brush in the housing connected to said traction wheels for rotation by them in either a clockwise or counterclockwise direction, said brush having one or more rows of bristles, and means forming serrations at both edges of said air discharge slot past which the rows of bristles move.

3. A vacuum cleaner tool comprising a housing having an air discharge slot, traction wheels for the housing, a rotating brush in the housing driven by said traction wheels in either a clockwise or counterclockwise direction, and means defining serrations along both edges of said slot, said brush having a row of bristles which as the brush rotates moves past the slot in close proximity to but without engaging with said serrations.

4. A device as defined in claim 2 wherein said bristles are of such a length relative to their axis of rotation and the disposition of the serration forming means as to pass in close proximity to but without engaging said serrations when said brush is rotated.

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