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RETRACTABLE BRUSH FOR SUCTION CLEANERS

Filed June 26, 1944

2 Sheets-Sheet 1

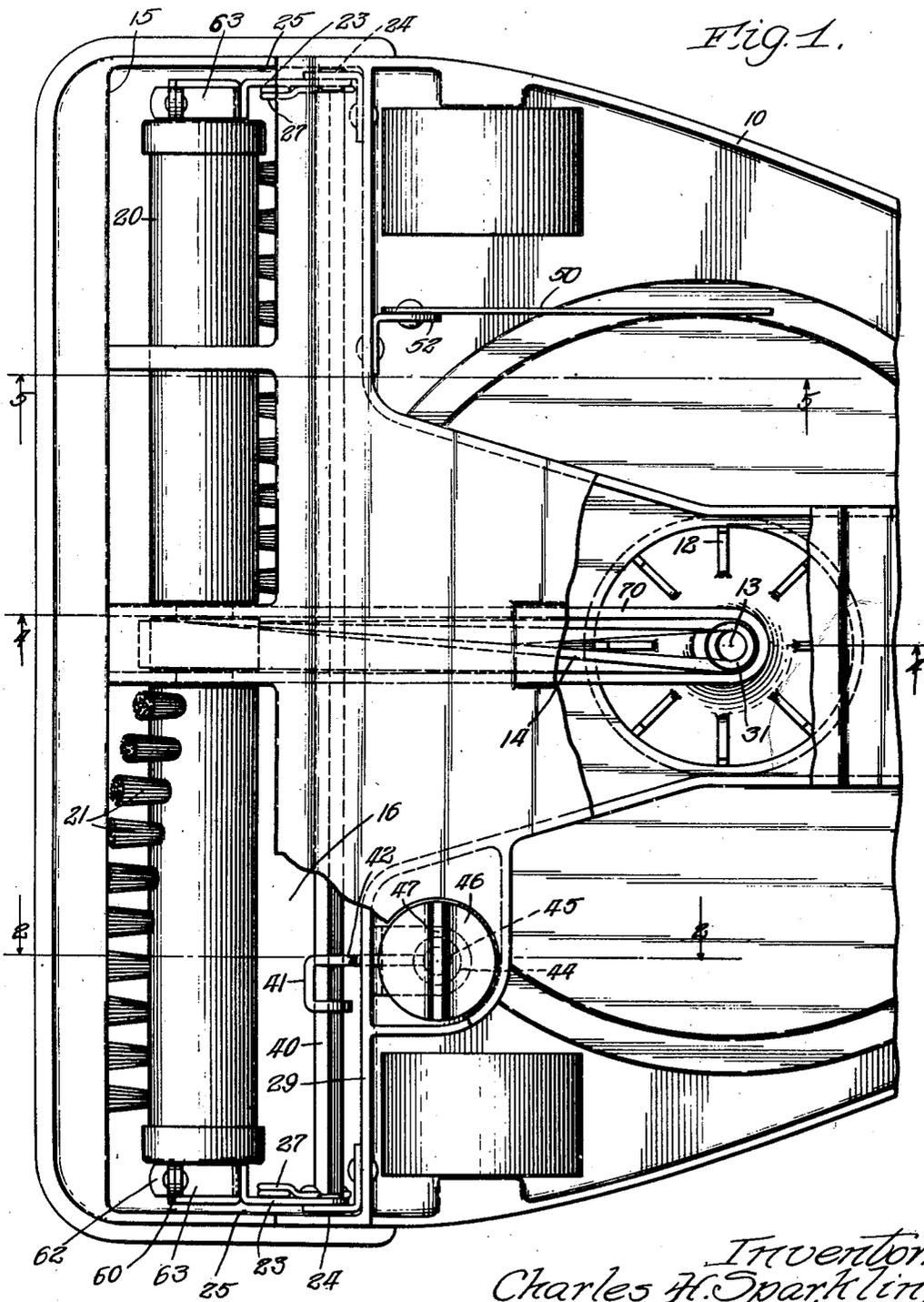


Fig. 1.

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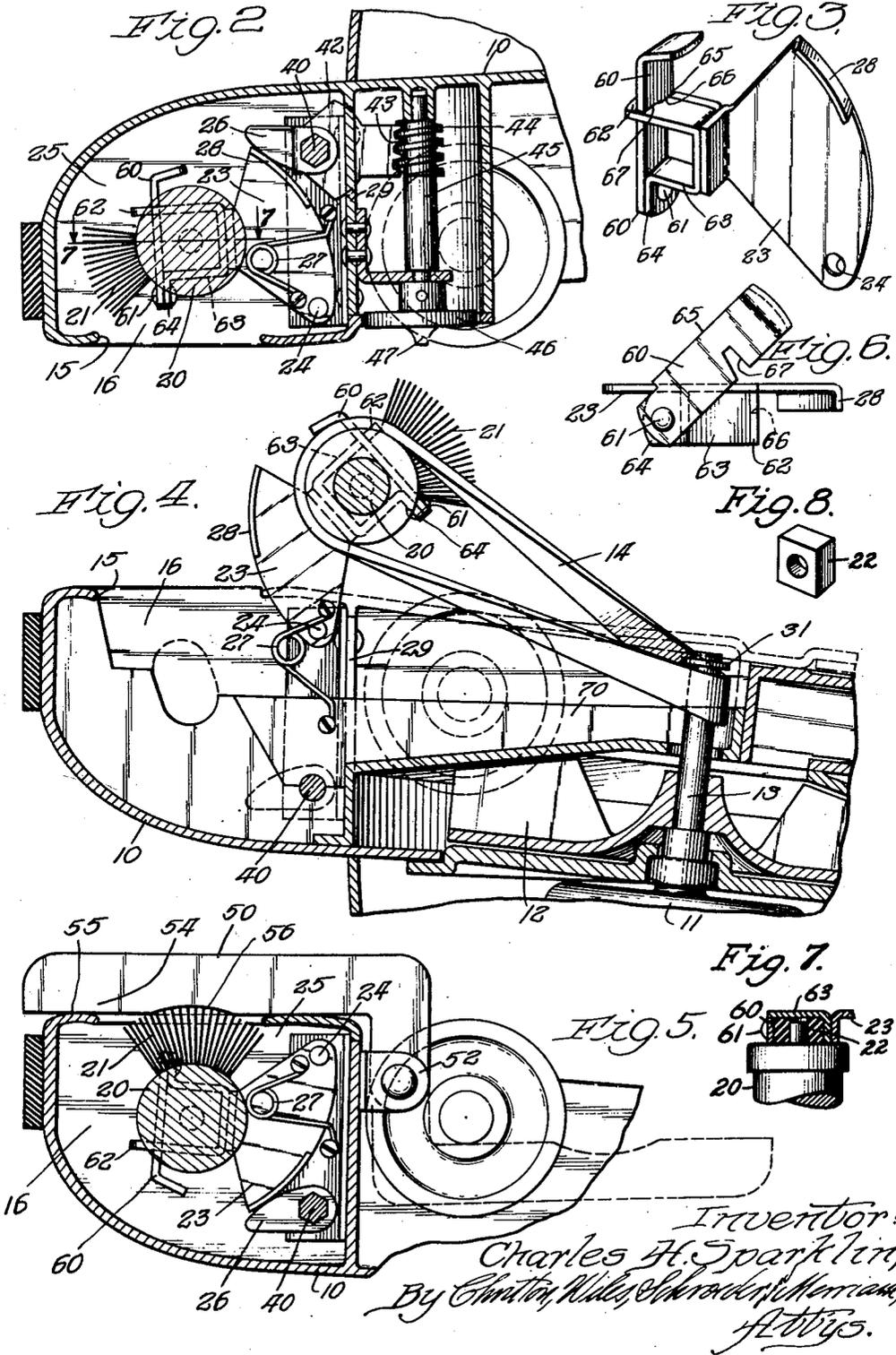
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2 Sheets—Sheet 2



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# UNITED STATES PATENT OFFICE

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## RETRACTABLE BRUSH FOR SUCTION CLEANERS

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Application June 26, 1944, Serial No. 542,109

1 Claim. (Cl. 15—368)

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This invention relates to a retractable brush for a suction cleaner.

The usual motor brush suction cleaner is equipped with a rotary motor driven brush and a nozzle chamber. This brush is driven by a flexible belt which extends rearwardly to a spindle mounted on the motor, and depending through the fan chamber into the air passageway of the cleaner.

The belt is, of course, under tension, and is normally twisted 90°. The mounting of the belt on the spindle is a task requiring considerable strength, and for this reason it is desirable to provide mechanical means for stretching the belt into place. In the present invention this is made possible by mounting the brush within the nozzle chamber in such manner as to permit its ready retraction by swinging it out of the chamber and towards the rear.

The invention is particularly directed to the mounting of the brush during retraction so that it will not be disengaged from the mounting brackets and the belt will not be disengaged from the motor spindle.

The invention is illustrated in the drawings in which Fig. 1 is a plan view of the front portion of the cleaner looking upward; Fig. 2 is a sectional elevation thereof taken along the line 2—2 in Fig. 1; Fig. 3 is a detailed perspective view of one of the brush mounting brackets; Fig. 4 is a view taken along line 4—4 of Fig. 1 but with the brush in position for attachment of the belt and with the cleaner turned upside down; Fig. 5 is a detailed view taken along the line 5—5 in Fig. 2, with the position of the cleaner inverted, illustrating the operation of the gauge; Fig. 6 is a detail of one of the brush mounting brackets with the latch partly open; Fig. 7 is a section taken along line 7—7 of Fig. 2; and Fig. 8 is a perspective view of a brush bearing.

The invention relates to any conventional type of motor brush cleaner having a casing 10, a motor 11, a fan 12, a belt-driving spindle 13, a power belt 14, and a suction opening 15 leading to a nozzle chamber 16. A brush 20 is mounted in the motor chamber and may be of any conventional type, but the present invention is primarily applicable to one having a series of bristles 21. The bearings 22 for the brush roller are each mounted in a bracket 23.

This bracket includes a bearing-receiving cup 63 which encloses three sides of the square brush bearing. This leaves one side open through which the brush may be removed, in the customary manner. It has been discovered, however, that

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during retraction of the brush there is a considerable tendency for the bearings to slip out of the cup at one end or the other. I have discovered that this difficulty may be overcome without interfering with the removal of the brush when desired by the provision of a pivoted closure for the fourth side of the cup, which is locked in position while the brush is in operating position within the nozzle chamber, but may be readily swung away when the brush has been retracted from the chamber.

This closure is best shown in Figs. 1 and 4. It comprises a plate 60 pivotally mounted at 61 on a flange 64 of the bearing-receiving cup 63. The outer edge 65 of the plate is normally substantially flush with the end wall 25 of the nozzle chamber so that when the brush is in operating position the plate cannot swing open. A limiting stop 62 may also be provided having a slot 66 engaging a corresponding slot 67 in the plate 60.

The bracket 23 is pivotally mounted at 24 in the end wall 25 of the nozzle chamber. It is normally urged into engagement with the cam 26 by any suitable means such as a spring 27. When it is in operating position, the cam is engaged by the cam follower surface 28 on the lower side of the bracket. The pivot for the bracket is near the bottom of the nozzle chamber and somewhat in advance of the rear wall 29 thereof. As a result, the brush may be lifted into the position shown in Fig. 4 in which the upper edge 30 of the bracket engages the wall 29. At this point the bracket has passed the dead center of the spring so that the brush is held in the upper position shown in Fig. 4. In this position the belt may readily be mounted on the spindle 13 and is held thereon by the collar 31. It will be observed that in this position the brush is considerably closer to the spindle than in its operating position, so that the belt may readily be placed in position. The brush is then retracted to operating position without much effort on the part of the operator.

The brackets 23 are disclosed and claimed in my copending application Serial No. 541,140, filed June 20, 1944. The springs 27 and their associated structure are disclosed and claimed in Earl D. Boisselier United States Patent No. 2,432,086.

The collar 31 is highly desirable in combination with a retractable brush inasmuch as there is otherwise a tendency for the belt to slip off while the brush is being returned to the nozzle chamber. It has been found that the collar is satisfactory in operation in combination with a cylindrical driving shaft immediately adjacent thereto. The spindle is sufficiently extended and

the collar mounted at a point sufficiently close to the end that the belt normally does not engage the collar during operation of the motor.

The position of the brush may be adjusted by the cams 26. These cams are mounted at the ends of the hexagonal rock bar 40. This bar is encircled by a yoke 41, one arm of which bears a lever arm 42 provided at its end with the gear teeth 43 which engage the worm 44 carried by the adjusting post 45. This post is secured to the casing and is provided at its top with the cap 46 having a rib 47 adapted for easy grasping. Turning of the post 45 raises or lowers, depending upon the direction of turning, the arm 42, and, therefore, rotates the bar 40. Rotation of the bar, which is of course rigid, raises or lowers the cams 26, thereby synchronously adjusting both ends of the brush by movement of the brackets 23.

The appropriate position of the brush may be indicated by the gauge 50 which is pivotally mounted in a bracket 52 secured to the rear wall 29 of the nozzle chamber. In its retracted position, as shown in Fig. 1, the gauge is immediately outside of the air conduit and does not interfere with operation of the device. When swung into forward position, as shown in Fig. 5, the front end 54 of the bracket abuts on the front lip 55 of the nozzle, thereby accurately positioning the registration portion 56 of the gauge. This portion is preferably cut away in a circular segment so positioned that the bottom of the segment indicates precisely the point where the end of the bristles 21 should be, namely,  $\frac{1}{8}$  inch below the nozzle lips. The adjusting knob is then turned until the brush is at this point, after which the gauge is returned to its inoperative position.

It is preferred to employ the invention in combination with a belt guard 70 of any suitable type, for example, as described in the co-pending application of Charles H. Sparklin, Serial No. 539,331, filed June 8, 1944, which has now become abandoned.

The foregoing detailed description has been given for clearness of understanding only, and

no unnecessary limitations should be understood therefrom.

What I claim as new, and desire to secure by Letters Patent, is:

In a suction cleaner, a body including an elongated nozzle chamber having end walls thereon, a brush within the nozzle chamber rotatable about a longitudinal axis and positioned within said chamber with one end of the brush being adjacent one of said end walls and the other end of the brush being adjacent the other end wall, a pivotally mounted bracket adjacent each end of the brush and adjacent the inner surface of an end wall of the nozzle chamber, each bracket having the pivot point thereof below the longitudinal axis of the brush and to the rear thereof, a bearing in each end of the brush with each bearing having substantially the shape of an equiangular quadrangle in vertical cross-section, and each bracket having a bearing-receiving cup of similar shape with three sides of the cup being formed of a single flat strip of sheet metal bent to the required shape and the fourth side being formed of a second strip of sheet metal pivotally attached at one end thereof to one end of the first strip of sheet metal and normally engaging the other end of said first strip to form the fourth side of said cup, said second strip being movable outwardly away from the brush in a plane substantially parallel to the longitudinal axis of the brush so that substantial movement thereof is prevented by the adjacent end wall of the nozzle chamber when the bracket is within the nozzle chamber.

CHARLES H. SPARKLIN.

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

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