

Oct. 4, 1932.

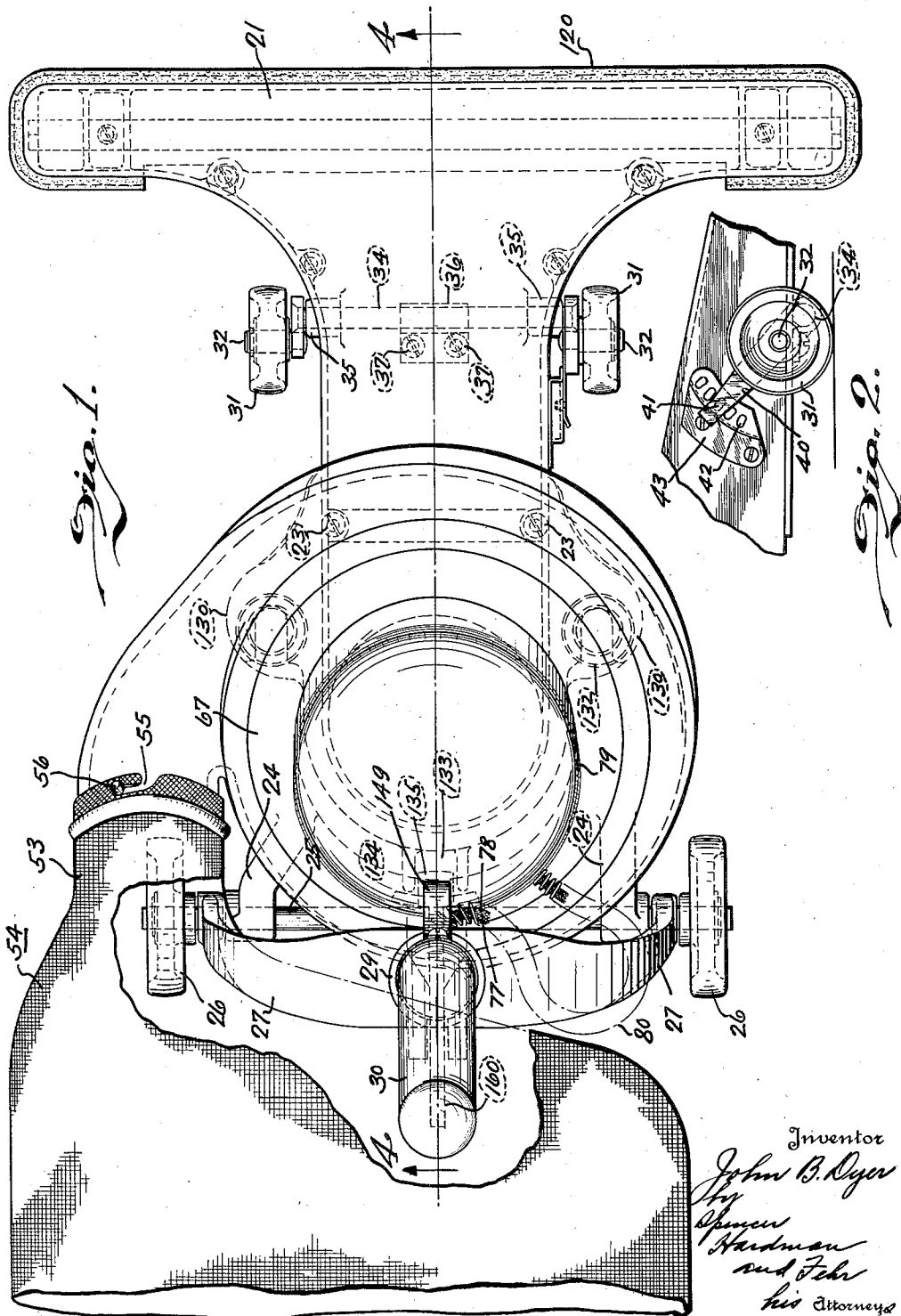
J. B. DYER

1,880,915

SUCTION CLEANER

Filed April 17, 1930

3 Sheets-Sheet 1



Inventor
John B. Dyer
By
Spencer
Hardman
and Fehr
his Attorneys

Oct. 4, 1932.

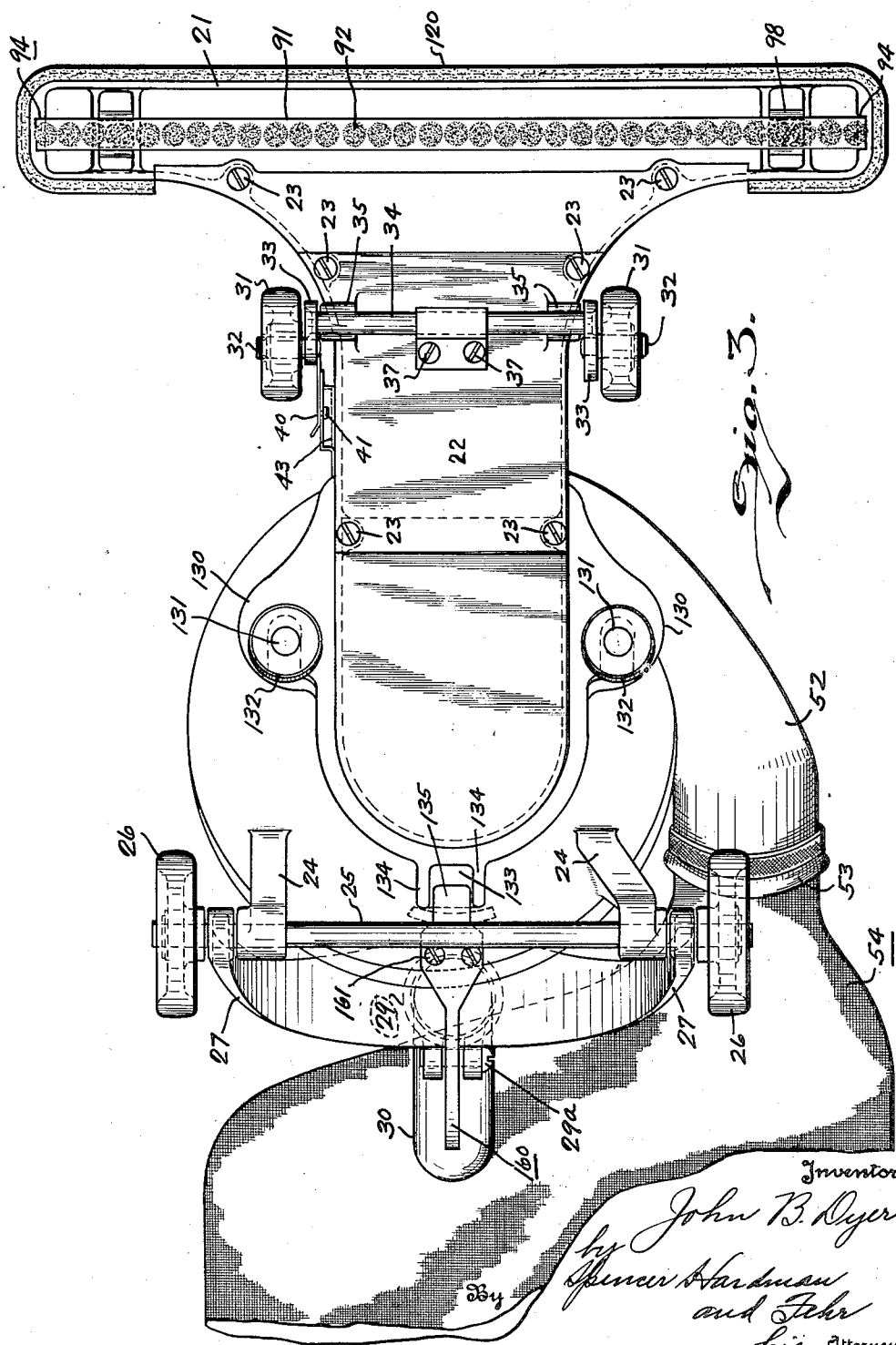
J. B. DYER

1,880,915

SUCTION CLEANER

Filed April 17, 1930

3 Sheets-Sheet 2



Oct. 4, 1932.

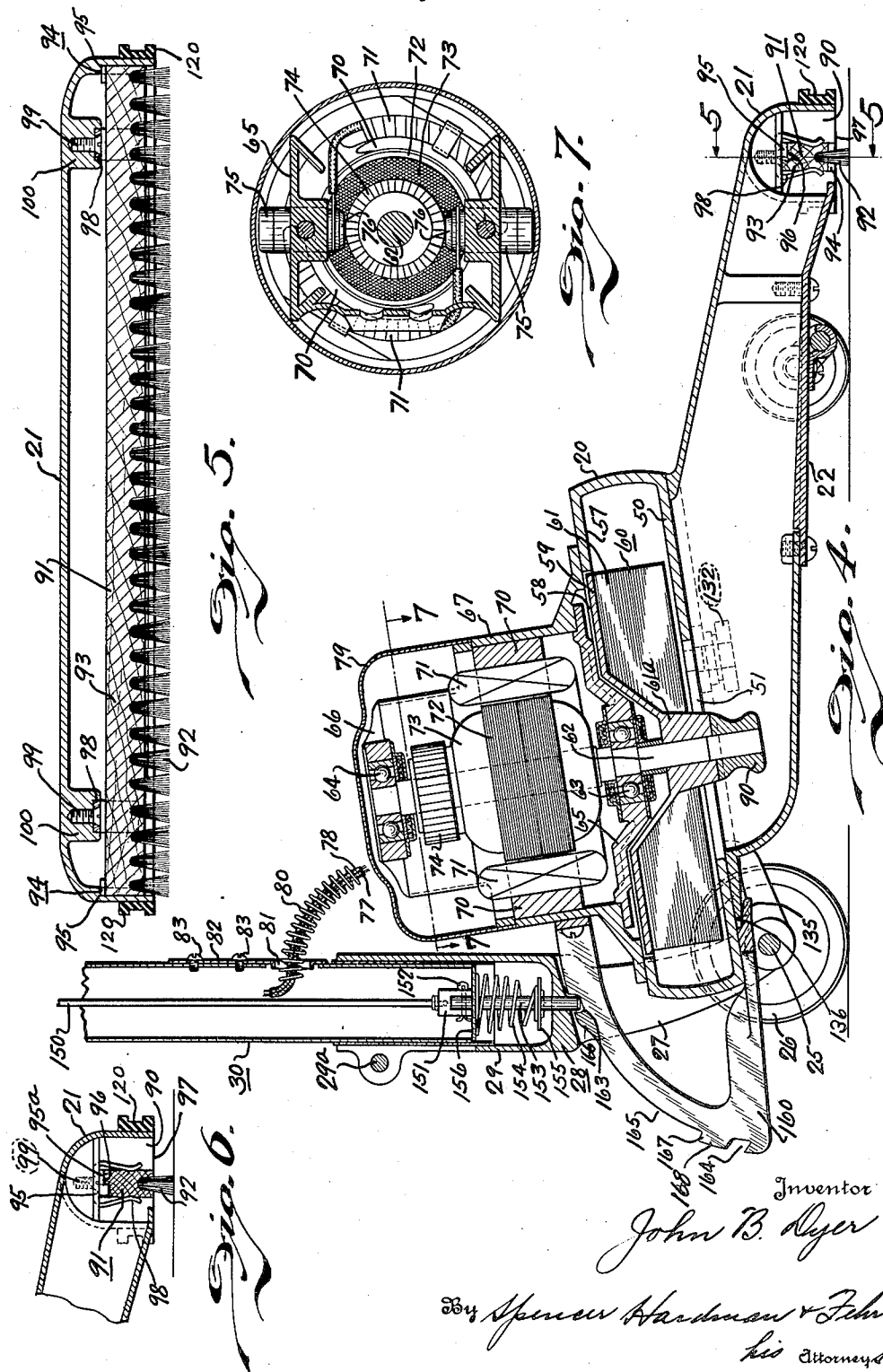
J. B. DYER

1,880,915

SUCTION CLEANER

Filed April 17, 1930

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

JOHN B. DYER, OF PENDLETON, INDIANA, ASSIGNOR TO DELCO-REMY CORPORATION, OF ANDERSON, INDIANA, A CORPORATION OF DELAWARE

SUCTION CLEANER

Application filed April 17, 1930. Serial No. 445,112.

This invention relates to suction cleaning apparatus generally known as a vacuum cleaner and particularly the type of vacuum cleaner for domestic use, which comprises a suction nozzle associated with an electric motor operated rotary suction producing fan which exhausts into a dust collecting bag. The cleaner is provided with wheels or rollers by which it is supported upon the surface to be cleaned and is moved about by a handle.

The present invention has for its object the simplification and the reduction of the cost of manufacture of vacuum cleaners of this type. More particularly, it is one of the objects of the invention to provide a novel means for adjusting the elevation of a stationary brush in the suction cleaning nozzle.

Further objects and advantages of the present invention will be apparent from the following description reference being had to the accompanying drawings wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a fragmentary plan view of a vacuum cleaner embodying the present invention, the handle being shown upright.

Fig. 2 is a fragmentary side view of Fig. 1.

Fig. 3 is a bottom plan view.

Fig. 4 is a fragmentary sectional view on the line 4—4 of Fig. 1.

Fig. 5 is a sectional view on line 5—5 of Fig. 4.

Fig. 6 is a fragmentary sectional view showing a portion of the nozzle which was shown in Fig. 5 and showing the nozzle brush in a different position of adjustment.

Fig. 7 is a sectional view on the line 7—7 of Fig. 4.

The supporting frame work of the vacuum cleaner comprises a suction fan housing 20 and a detachable nozzle 21 having attached thereto a bottom plate 22 attached thereto by screws 23. The fan housing 20 provides bearing brackets 24 for a rod 25 upon the ends of which supporting rollers 26 are journaled. Between each roller and the bracket 24 the rod receives an arm 27 of a bale 28 providing a socket 29 for a handle 30. The rollers 26 support the rear portion of the cleaner

above the floor. The forward or nozzle portion of the cleaner is supported by rollers 31 each mounted on a pin 32 fixed to an arm 33 which is attached to a rod 34 at a point offset from the point of attachment of the pin 32. The rod 34 is received by notched bosses 35 provided by the bottom plate 22 and is retained in position by a clip 36 attached to the plate 22 by screws 37. By turning the rod 34 the pins 32 are caused to rotate relative to the rod and hence vary the elevation of the pin 32 with respect to the nozzle and hence vary the height of the nozzle above the floor upon which the rollers 31 rest. The rotation of the shaft 34 is effected by providing a sheet metal resilient arm 40 which is attached at one end to the crank arm 33 and is provided at its other end with a detent 41 adapted to be received by any one of a circular row of recesses 42 in a plate 43 which is attached to the side of the nozzle 21.

The bottom wall 50 of the fan housing 20 is provided with a central opening 51 providing communication between the nozzle and the inlet to the fan housing. The outlet 52 of the fan housing, as shown in Figs. 1 and 3, is connected with the inlet 53 of a dust collector bag 54 by a conventional bayonet slot and pin connection 55, 56. The upper wall 57 of the fan housing is provided with a central aperture 58 which receives the annular plane portion 59 of a suction fan 60 having blades 61 merging with the annular portion 59 and with a hub 61a attached to the armature shaft 62 of an electric motor. The shaft 62 is journaled in bearings 63 and 64 supported respectively by a plate 65 and a brush holder frame 66, both of which are attached to the main motor frame 67 which in turn is attached to the fan housing 20. The frame 67 supports pole pieces 70 carrying field windings 71. The armature shaft 62 supports a core 72 carrying armature windings 73, the leads of which are connected respectively with the bars of a commutator 74. The frame 66 supports brush holders 75, each guiding a brush 76 into engagement with the commutator 74. One end of each field winding 71 is connected with a brush and the other end of the field windings

are connected with wires 77 and 78 leading from the field windings to an opening in a motor frame cover 79, thence through a flexible coiled wire sheath 80 and then through an opening 81 in a plate 82 attached by screws 83 to the handle 30.

The nozzle 21 which has a relatively narrow mouth 90 houses a stationary nozzle brush 91 comprising a row of bristle tufts 92 attached to a wooden back 93 which is received at its ends by notches 94 provided in the nozzle 21. The notch 94 includes a recess 95 less in width than the main portion of the notch and adapted to receive a tongue 96 extending from the top of the brush back 93 when the brush is located as shown in Fig. 4. This arrangement permits the brush back to be moved as far as possible above the lower edge of the nozzle indicated at 97. In this position the brush back 93 is retained by resilient sheet metal clips 98 attached by screws 99 to threaded bosses 100 integral with the nozzle 21. If the brush be removed from the nozzle and turned end for end and then reinserted between the clips 98, it cannot be pushed as far upwardly into the nozzle as previously for the reason that the tongues 96 at the ends of the brush back 93 are not in alignment with the groove recesses 95 but abut shoulder portions 95a located at a lower elevation than the top wall of the recesses 95. Thus the present invention provides a simple means for locating the nozzle brush in two positions of adjustment with respect to the lower edge 97 of the nozzle mouth.

While the cleaner is being moved over the floor by the handle 30 the motor operates to create a suction at the mouth of the nozzle where air laden with dust dislodged by the nozzle brush is caused to circulate through the nozzle and housing and thence through the dust collecting bag 54 in which the dust is collected while the relatively clean air passes out through the pores of the bag.

The nozzle 21 may be readily detached from the fan housing 20 to permit the substitution of a different type of nozzle, for example, one supporting a rotating brush driven by the pulley 90 at the lower end of the armature shaft 62. One example of such nozzle and brush is disclosed in my companion copending application, Serial No. 445,111, filed April 17, 1930. Referring to Fig. 3, it will be seen that the nozzle 21 is provided with notched ears 130 each adapted to receive the threaded shank of a stud 131 fastened to the bottom wall 50 of the fan housing 20. Each stud 131 receives a thumb nut 132 which, on being tightened, secures an ear 130 to the bottom of the fan housing 20. These nuts 132 secure the nozzle to the fan housing at two places. The nozzle is secured at a third place by providing it with a tapered wedging portion 133 located between two ribs 134 thus providing a notch which

receives a tongue 135 integral with a handle locating sector bracket 160 secured by screws 161 to the fan housing 20 and by screws 162 to the motor frame 67. The tongue 135 is also tapered and provides a tapering notch 136 which receives the tapering part 133 of the nozzle 21. It is not necessary to remove the nuts 132 entirely when removing the nozzle. The nuts are loosened so that the nozzle may be shifted laterally sufficiently to permit the nozzle to clear the sector bracket tongue 135 and the nuts 132.

Near its upper end the handle 30 pivotally supports a lever 149 (see Fig. 1) which is attached to a wire 150, shown in Fig. 4, which passes down through the handle and is attached at its lower end to a notched block 151 attached by a pin 152 to a plunger 153 urged downwardly by a spring 154 located between a washer 155 attached to the plunger and a washer 156 bearing against the lower end of the handle 30. The plunger 153 is adapted to cooperate with the handle locating sector 160 which is provided with narrow notches 163 and 164 which respectively cooperate with the lower end of the plunger 153 to hold the handle in uppermost or lowermost positions. The sector 160 also provides a wide notch 165 which permits movement of the handle through a range of intermediate positions. The notch 165 is defined by a relatively smooth shoulder 166 which cooperates with the end of the plunger 153 to cam it upwardly as the handle is moved clockwise as viewed in Fig. 4 about the pivot rod 25. When the end of the plunger 153 is in alignment with the notch 163 the plunger will be urged into the notch 163 by the spring 154 so as to permit the return of the handle to the uppermost position without requiring the operator to move the lever 149. The notch 163 cooperates with the plunger 153 to hold the handle 30 in vertical position in which it would ordinarily be located when the cleaner is not in use. Before using the cleaner the operator pushes the lever 149 downwardly to cause the plunger 153 to be withdrawn from the notch 163 so that the handle may be moved into position such that the plunger 153, when released, will move into the wide notch 165. During usual manipulation of the cleaner the handle is generally held at such an inclination that the plunger 153 remains within the notch 165. Hence, no further manipulation of the lever 149 is usually required. When using the cleaner under low articles of furniture it may be desirable to fix the handle 30 in its lowermost position of inclination with respect to the cleaner. This is accomplished by again moving the lever 149 so that the plunger 153 will clear the abrupt shoulder 167 defining the lower end of the wide notch 165 so that the plunger may be moved clear of the projection 168 which separates the wide notch 165 from the narrow notch 164.

The release of the lever 149 after the plunger 153 has been located in alignment with the notch 164 will permit the plunger 153 to move into locking engagement with the sector 160.

6 Thus the handle 30 is locked in the lowermost inclined position with respect to the cleaner. When the handle is thus locked to the cleaner non-rotatably in the lowermost position of inclination, it has been found to facilitate the movement of the cleaner when moving the nozzle under low articles of furniture.

15 While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Suction cleaning apparatus comprising, in combination, a suction chamber and suction producing means therein, a nozzle communicating with the chamber and having a relatively long, narrow mouth, a stationary brush located in the nozzle mouth and comprising a row of bristle tufts supported by a back member, means for retaining the brush back member in the nozzle, and means for limiting the extent to which the brush back can be moved upwardly in the nozzle and comprising a stop provided by the nozzle and an adjacent recess extending vertically above the stop, and a projection extending upwardly from the brush back and cooperating with said stop and recess so as to be received by the recess only when the brush is located in a certain position when inserted in the nozzle, and received by the stop when the brush is located in the nozzle in the reversed position, whereby the brush may be supported in the nozzle in two different positions of vertical adjustment.

2. In a suction cleaner, a suction chamber and suction producing means therein, a nozzle communicating with the chamber and having a relatively long, narrow mouth, a stationary brush located in the nozzle, means for removably retaining the brush in the nozzle, and means providing different selective positions of vertical adjustment of the brush in the nozzle comprising stepped abutments on the brush and nozzle which interfit in one position of the brush when inserted in the nozzle, but which do not interfit when the brush is turned end for end and inserted in the nozzle.

3. In a suction cleaner, a suction chamber and suction producing means therein, a nozzle communicating with the chamber, a stationary brush located in the nozzle, and stepped formations in the nozzle and on the brush which cooperate to provide for different selective positions of the brush in the nozzle by limiting insertion thereof to different extents dependent upon the position of the brush when inserted in the nozzle.

65 4. In a suction cleaner, a suction chamber

and suction producing means therein, a nozzle communicating with the chamber and having a relatively long, narrow mouth, a stationary brush located in the nozzle mouth and comprising a row of bristle tufts supported by a back member having an abutment at each end, an abutment at each end of the nozzle cooperating with the brush back abutments to limit the insertion thereof into the nozzle in one position, and an abutment at each end of the nozzle at a different elevation from the first mentioned abutments cooperating with the brush back abutments to limit the insertion thereof into the nozzle to a different extent in a reversed position.

5. In a suction cleaner, a suction chamber and suction producing means therein, a nozzle communicating with the chamber and having a relatively long, narrow mouth, a stationary brush located in the nozzle, means for removably retaining the brush in the nozzle, and means providing different selective positions of vertical adjustment of the brush in the nozzle comprising cooperating portions on the brush and nozzle to limit insertion of the brush into the nozzle to different extents dependent upon the end for end position of the brush when inserted.

In testimony whereof I hereto affix my signature.

JOHN B. DYER.