July 24, 1923.

1,462,574

H. E. HOOVER

SUCTION SWEEPER

Filed Oct. 20, 1917

Fig. 1.

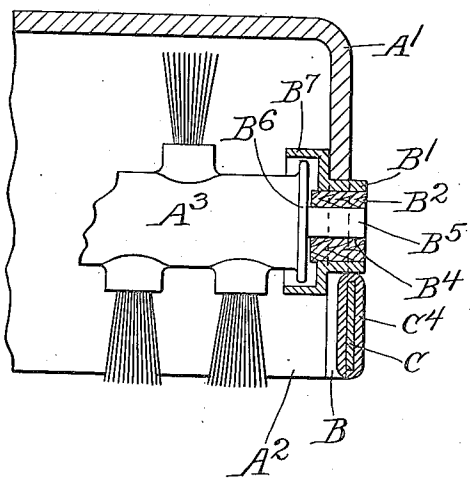


Fig. 2.

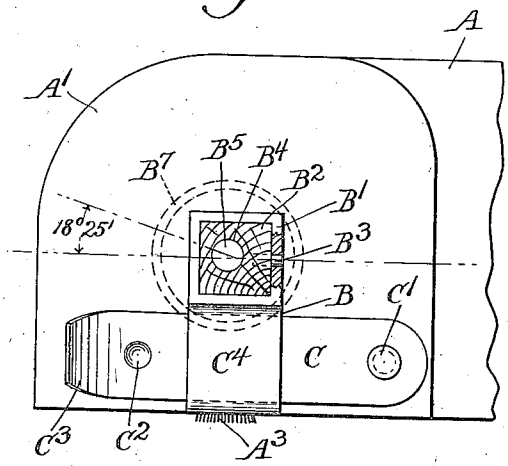


Fig. 3.

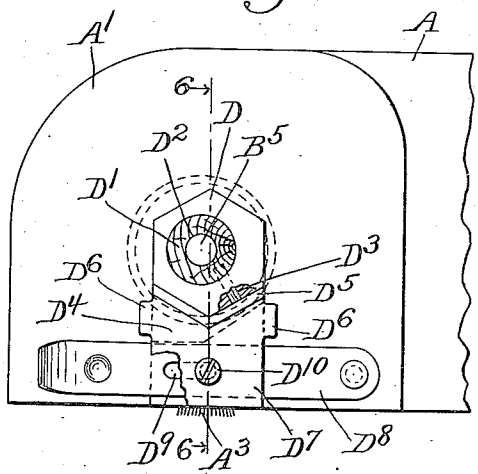


Fig. 4.

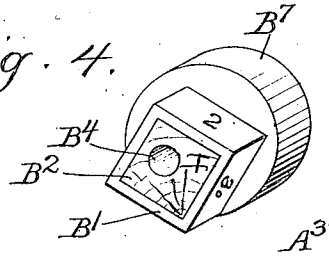


Fig. 6.

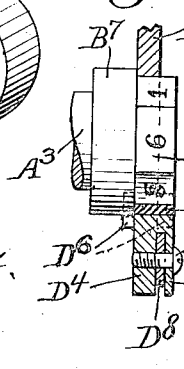
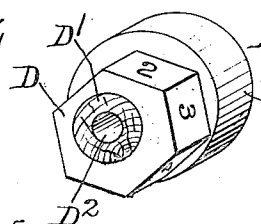


Fig. 5.



Witness.
Edward T. Wray.

Inventor.
H. Earl Hoover.
by Parker & Carter
Attorneys.

Patented July 24, 1923. 1,462,574

UNITED STATES PATENT OFFICE.

HOWARD EARL HOOVER, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE HOOVER COMPANY, OF NORTH CANTON, OHIO, A CORPORATION OF OHIO.

SUCTION SWEEPER.

Application filed October 20, 1917. Serial No. 197,706.

To all whom it may concern:

Be it known that I, HOWARD EARL HOOVER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Suction Sweepers, of which the following is a specification.

My invention relates to improvements in suctions sweepers and has for one object to provide a new and improved form of suction sweeper wherein a power driven brush is used and wherein means are provided for adjusting the height of the brush above the floor. Another object is to provide a brush adjustment which will be simple, durable and easily made, which can be made by the person who uses the device without the use of any tools of any kind whatsoever and which can be made with a minimum of difficulty and delay. Other objects of my invention will appear from time to time in the specification.

My invention is illustrated more or less diagrammatically in the accompanying drawings wherein—

Figure 1 is a longitudinal section through a part of a suction nozzle showing parts in elevation and parts in section with some parts omitted for the sake of clearness;

Figure 2 is an end elevation of the nozzle part of the sweeper;

Figure 3 is an end elevation of a modified form;

Figure 4 is a perspective of the square adjusting block;

Figure 5 is a perspective of the adjusting block of Figure 3;

Figure 6 a section along the line 6—6 of Fig. 3.

Like parts are indicated by like characters in the drawings.

A is a part of a suction sweeper housing terminating in a suction nozzle A^1 having a downwardly open suction mouth A^2. A^3 is a brush rotatably mounted within the housing having bristles which extend out a short distance through the suction mouth. Means not here shown are provided for positively rotating this brush at high speed.

The opposed end walls of the housing A^1 are slotted as at B. These slots extends up from the bottom of the wall to a point above the normal axis of rotation of the brush. B^1 is an adjusting block adapted to lie one in each of the slots B. The adjusting block contains a square bearing block B^2 held in position by the pin B^3. This bearing block extends clear through the adjusting block B^1 and is eccentrically perforated as at B^4 to furnish a bearing for the spindle B^5 projecting outwardly from the brush body A^3. The brush body A^3 is flanged as at B^6 overlying the bearing block B^2 and this flange is enclosed by a cup B^7 integral with the adjusting block B^1. This cup forms a flange or enlarged portion for the adjusting block and engages the inner side of the end housing wall.

C is a spring locking arm. It is pivoted on the outside of the end wall of the housing as at C^1. It is provided at its other end with a boss C^2 adapted to penetrate a perforation in the end wall of the housing and interlock therewith so that when held by its own elasticity against the end wall of the housing it is rigidly held by such interlock against rotary movement in a downward direction. C^3 is a thumb piece whereby the spring lever may be bent out to permit rotation about the axis C^1. C^4 is a rubber packing tube enclosing the spring lever. It is of slightly greater length than the width of the slot B. It is adapted when in the position shown in Figures 1 and 2 to close the slot below the adjusting block B^1 and to compress against the under side of that block and force it and hold it up in the upper extremity of the slot. The adjusting block makes a tight fit with the slot and there is no opportunity for air to enter in around the adjusting block between it and the walls of the slot and no opportunity for air to enter that part of the slot which is closed by the rubber packing.

The sides of the adjusting block are numbered as indicated in Figure 4. The eccentricity of the bearing aperture in the adjusting block is such that when the block is rotated the distance between the open suction mouth of the nozzle and the axis of the rotation of the brush is varied. I perfer to so position the eccentric bearing aperture that the variation is about an equal increment for each 90° rotation of the ad-

justing block. I have shown the block in Figures 1 and 2 in one of the intermediate positions.

It will be understood that the apparatus is shipped from the factory with the brush in the highest position. In this position the user looking at the bottom of the machine will see the No. 1 stamped on the visible side of the adjusting block. When the bristles have worn to a point where the brush does not operate satisfactorily, the operator takes out the bearing block rotates it through an angle of 90° in a counter clockwise direction as shown in Figure 2 until the Figure 2 is on the lower side of the adjusting block and visible at the bottom of the slot. The next adjustment in the same direction through an angle of 90° will make the Figure 3 visible and the last will make the Figure 4 visible. There are, therefore, four positions and three adjustments, that is three changes of position after the device has been shipped from the factory.

The position of the bearing aperture in the bearing block is such that for each 90° movement the axis of rotation of the brush comes down one fourth of its full adjusted excursion. Practically it works out that when the block is in that position which holds the brush at the highest point above the floor or the operating plane of the suction mouth the center of rotation of the brush is on a line inclined an angle of approximately 18° 25′ to the vertical, in this case as in Figure 2 on the left-hand side of the vertical. In Figure 2 as above stated the mid position is shown wherein the axis of rotation of the brush is on a line inclined 18° 25′ to the horizontal.

This arrangement enables us to get four positions with three adjustments with a square adjusting block. If the eccentric bearing hole were arranged on a radial line not inclined to the horizontal or vertical in either position but coincident with the horizontal or vertical line as the case may be then only two adjustments would be possible with the square block.

In the modified form shown in Figures 3 and 4, the slot instead of having a square bottom has the bottom made up of two inclined sides to conform in shape to a hexagon adjusting block D. This hexagon block has the cup B^7 and in this case a round bearing block D^1 apertured as at D^2 and held against rotation by the pin D^3. D^4 is a filler block cut away at its top to conform in shape to the hexagon and provided with a rubber packing D^5. Ears D^6 and a flange D^7 co-operate to make a groove in which the spring adjusting arm D^8 slides. This arm is slotted as at D^9 and a pin D^{10} in the block D^4 is slidably and rotatably mounted therein so that by releasing the spring arm the filling block may be disengaged from the slot and the adjusting block drawn out. The rotation of the adjusting block will result in an up or down movement of the axis of the brush as in the form shown in Figures 1, 2 and 4.

It will be evident that while I have shown in my drawings an operative device, still many changes might be made both in size, shape and arrangement of parts without departing materially from the spirit of my invention, and I wish, therefore, that my drawings be regarded as in a sense diagrammatic.

The use and operation of my invention are as follows:—

The suction sweeper is used by the operator in the usual manner by moving it back and forth across the floor. The motor operates a fan to cause air to be drawn in through the nozzle in the usual manner common to such devices. The motor also drives the power driven beating and sweeping brush at a relatively high rate of speed the ends of the brush bristles being adapted to come into engagement with the carpet or other floor covering as the nozzle moves across it. The result of the rapid rotation of the brush is that the bristle ends are gradually worn away. The time will enventually come when the brush will not beat or sweep the carpet with sufficient force owing to the shortness of the bristles.

The operator makes the necessary adjustment by pulling out the two spring bars at either end of the nozzle. This disengages the holding block carried by the bars so that the square adjusting blocks are free to move in the slots in the ends of the nozzle. The operator will also disengage the belt and move the brush with the adjusting blocks down out of the slots. He then rotates the block through an angle of ninety degrees or sixty degrees or any other number of degrees depending upon the shape of the adjusting block. I have shown a square and a hexagonal adjusting block and I might use an octagonal block or any other desired shape. A relatively small rotation of the adjusting block will carry the eccentric bearing down to move the brush toward the floor covering a short predetermined distance. The operator then replaces the parts in the operating position and the machine is again ready for operation. When the brush bristles have worn down some more, the same maneuver will be carried out except that a further rotation of the adjusting block will result in moving the brush down still further.

For the convenience and instruction of the operator, I propose to mark the different sides of the block so that as shipped from the factory No. 1 will be on the side toward the floor covering and will indicate the first position. The block would be moved

so that No. 2 would be on the side toward the floor covering for the second position. No. 3 for the third and so on for any desired number of adjustments.

The angle through which each adjusting block is turned for each adjustment is preferably the same because thus it is easiest to get an equal adjustment for each position but conceivably the angles might be different either to give different adjustments or to give the same adjustment depending upon the proportion of the parts.

It is, of course, essential that the adjustments at each end of the brush be the same and the numbers on the adjusting blocks will make it possible for the operator to know absolutely that the adjustment was the same at each end.

The slot in each end of the nozzle is filled partially by the adjusting block. That part of the slot which comes into engagement with the block is shaped to conform to it so that no air can enter the housing between the walls of the slot and the adjusting block. The keeper or holder or holding lever which holds the adjusting block in position in the bottom of the slot is adapted to close the remainder of the slot. It either closes it directly in the case of the square adjusting block where it engages the bottom side of the block or indirectly by means of a supporting block which engages or penetrates the slot and is shaped to engage the adjusting block. In either event there is no opportunity for any air to enter the housing except through the suction mouth or through some predetermined or prearranged passage provided for that purpose.

The holding or supporting finger or arm is pivoted on the housing but held against rotation thereon by means of some suitable interlocking member as indicated so that when it is in the working position it is held rigidly against movement towards the floor but when drawn out slightly so as to release the interlocking device it is free to rotate to dis-engage the parts.

I have shown this spring finger held by an integral lug penetrating a recess in the wall of the housing. Many other means might be provided for holding it against rotation. It would be only necessary that the means be so arranged that rotation cannot take place until the spring finger has first been bent back.

I have shown the hood of this device as adapted to rest on the floor or floor covering though, of course, the hood might be supported in any desired manner. In any event, the vertical adjustment of the brush is an adjustment with reference to the support or the point of support of such hood and the adjustment of the brush vertically does not affect the relation of the hood to the floor or floor covering. I have shown the connection between the brush and the hood as consisting of two parts of different general characteristics though for some purposes they might be of the same cross section one end of the part mounted on the hood, the other supporting the brush.

One of the two interlocking parts which constitutes the brush support at each end, is associated with the end of the casing. It may be formed in the casing or it may be mounted on the casing and in the claims I have alluded to it as on the casing, intending to cover thereby any such construction. I have spoken of the two parts as interlocking. They are made of such form as to permit them to slide together in the process of interlocking but not to rotate so that they can be put together in each of the series of predetermined positions and since the brush bearing is eccentric to one of them, it is obvious that the putting of them together with any one such position would effect an adjustment of the brush as compared with any other position.

By the term "brush end" I mean, of course, any portion of the brush whatever form it may take which serves the purpose in question of cooperating with the bearing as the cases may be. In the actual operation of the structure as shown, the brush supports, and by this term I mean the part on which the brush bearing is mounted, are released by moving the bar or lever C and with the brush removed from the machine. They may be entirely separable. In any event, they are assembled with the two bearing supports on the ends of the brush, and then these three parts are turned into the predetermined or desired position and slid through the slots into proper position. Here they are secured by the bar or lever or otherwise. Thus without anything other than what falls from the shapes of these parts, they can be manipulated so as to effect the desired adjustment by simply removing them from the machine and reinserting them in the new position.

I claim:—

1. In a suction cleaner the combination of a casing having an inlet slot and slotted ends with a rotatable brush means for adjusting and supporting said brush in the casing comprising blocks having a plurality of edge faces, said brush mounted within said blocks, at an unequal distance from each edge face thereof, said blocks adapted to slide in said end slots and means for holding them therein and preventing them from rotation while so held.

2. In a suction cleaner the combination of a casing having an inlet slot and slotted ends with a rotatable brush, means for adjusting and supporting said brush in the casing comprising blocks having a plurality of parallel faces, each face being adapted to

contact with said end slots, said brush eccentrically mounted within said blocks, said blocks adapted to slide in said end slots and prevented from rotation while therein.

3. In a suction cleaner, the combination of a casing having an inlet mouth and a rotatable brush, the ends of the casing being slotted, of a member provided with a bearing to receive the journal of the brush and having a plurality of flat faces at different distances from the axis of said bearing adapted to be slidingly and non-rotatably received in said slot, and means for securing said members in slot comprising a lever supporting said member and pivoted to said casing.

4. An adjustable brush support for a suction cleaner comprising a housing provided with slots in the end walls thereof, a bearing member adapted to receive the end of the brush and provided with a plurality of parallel surfaces, each adapted to contact with the sides of the slots, some of said surfaces being farther from the axis of the brush than others.

5. An adjustable brush support for a suction cleaner comprising a housing provided with slots in the end walls thereof, a bearing member adapted to receive the end of the brush and provided with a plurality of parallel surfaces, adapted to contact with the sides of the slots, some of said surfaces being farther from the axis of the brush than others, and a locking device adapted to hold said bearing member in the end of said slot.

6. In a suction cleaner the combination of a casing having an inlet slot with a rotatable brush, and means for adjustably supporting the brush in the casing, comprising an eccentric brush bearing, a part of said casing slotted to receive such bearing and a bar to hold the bearing pivotally mounted at one side of the slot and provided with means for securing it in the holding position.

7. In a suction cleaner the combination of a casing having an inlet slot with a rotatable brush, and means for adjustably supporting the brush in the casing, comprising an eccentric brush bearing, a part of said casing slotted to receive such bearing and a bar to hold the bearing pivotally mounted at one side of the slot and provided with means for securing it in the holding position, and a slide intermediate the ends of the supporting bar and adapted to slide on both the slot and the bar.

In testimony whereof, I affix my signature in the presence of two witnesses this 18th day of October 1917.

H. EARL HOOVER.

Witnesses:
MINNIE M. LINDENAU,
CHRISTINA DEANS.