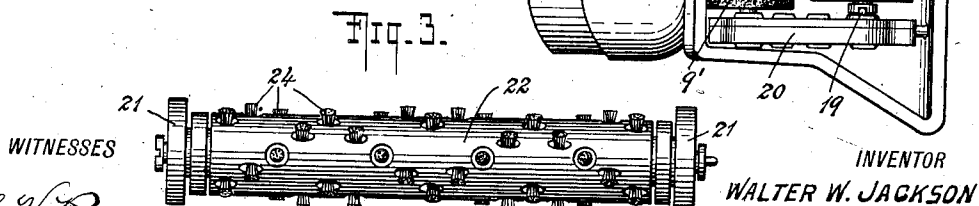
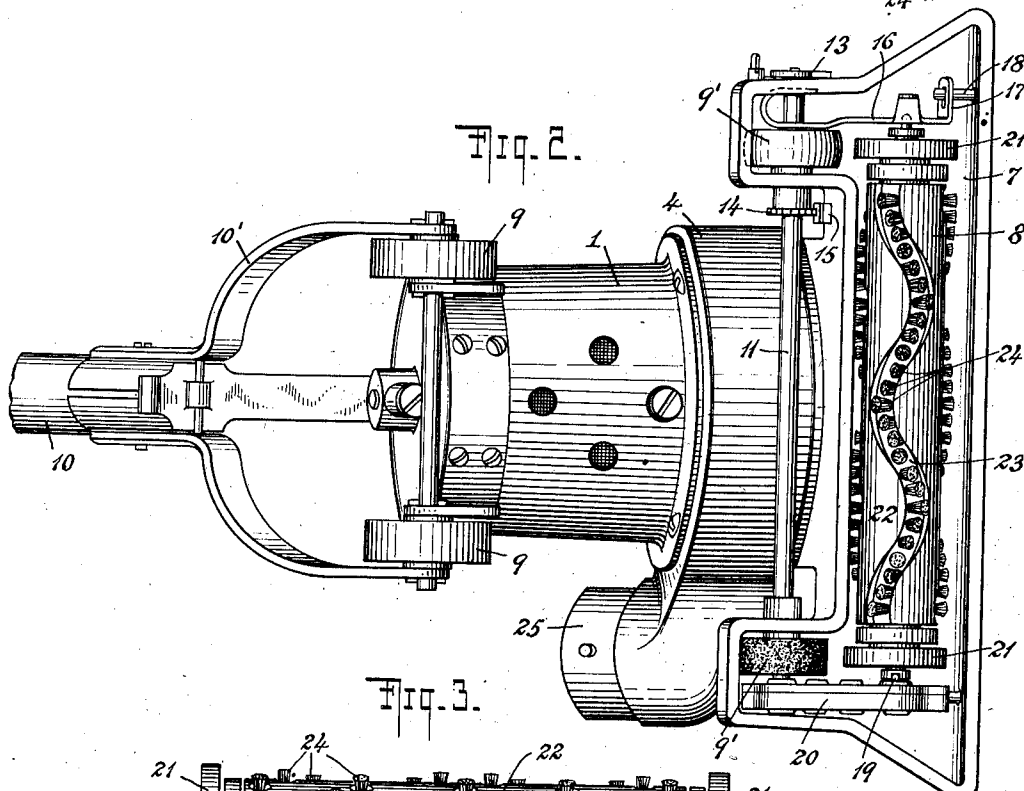
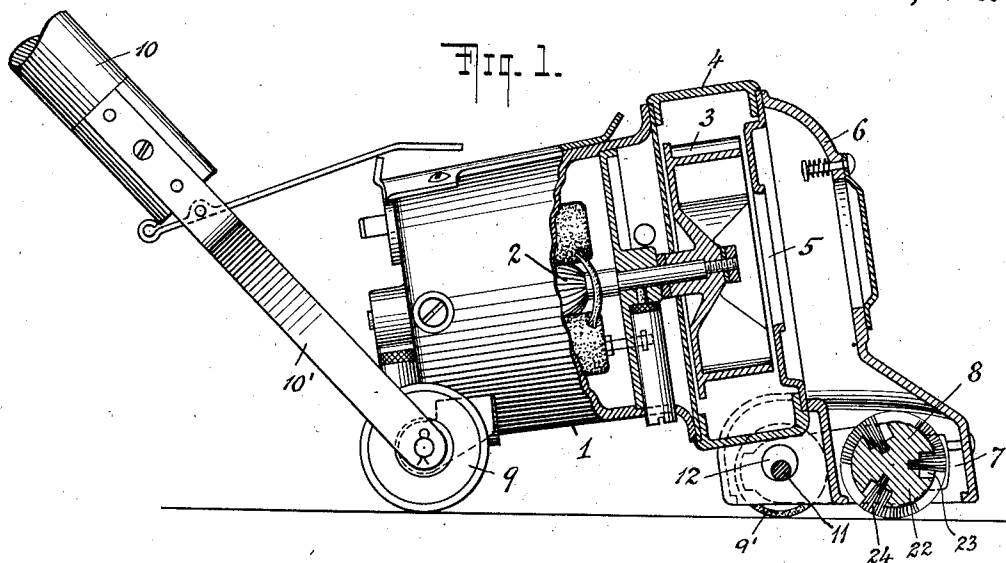


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BRUSH FOR VACUUM CLEANERS.

APPLICATION FILED AUG. 30, 1918. RENEWED AUG. 12, 1920.

1,355,978.

Patented Oct. 19, 1920.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## BRUSH FOR VACUUM-CLEANERS.

1,355,978.

Specification of Letters Patent.

Patented Oct. 19, 1920.

Original application filed December 6, 1915, Serial No. 65,213. Divided and this application filed August 30, 1918, Serial No. 252,008. Renewed August 12, 1920. Serial No. 403,147.

*To all whom it may concern:*

Be it known that I, WALTER W. JACKSON, a citizen of the United States, residing at Sewaren, county of Middlesex, State of New Jersey, have invented a new and useful Improvement in Brushes for Vacuum-Cleaners, of which the following is a specification.

My invention relates to vacuum or suction cleaners, and more particularly to portable power driven cleaners, for floors and the like, of the type comprising a casing in which is contained a fan or equivalent suction device, driven by an electric motor, and provided with an elongated nozzle and slot adapted to be brought closely adjacent to the floor as the casing is pushed thereover; the throat of said nozzle having therein a brush arranged to contact or to be revolved in contact with the surface to be cleaned so as to loosen the nap of the fabric and any attached dirt or fibers, or to loosen the dirt upon the floor when the same is not covered by fabric, thereby facilitating the sucking up of said dirt and fibers into the dust receptacle with which the cleaner is also provided. But the invention is also applicable to vacuum cleaners which are not motor driven.

This application is a division of my earlier application, Serial No. 65,213, filed December 6, 1915, entitled "Vacuum cleaners".

It is the object of my invention to provide a suction cleaner of the character specified with a brush so constructed and so placed with reference to the slot in which it operates that dirt and particularly fibers do not end to be driven into or to remain attached to the brush, but are subjected to the action of a forcible current of air which detaches them therefrom and sweeps them into the dust receptacle.

Other objects of my invention will appear as the specification proceeds.

The invention resides in the special features of construction to be hereinafter described and which are set forth in the claims.

My invention will be better understood by referring to the accompanying drawings which show my improved brush embodied in a typical cleaner, only so much of the mechanism and details of the cleaner being shown as is necessary to a clear understanding of the invention.

In the drawings, Figure 1 represents an end elevation (partly a central vertical section) through a cleaner provided with a preferred form of my improved brush; Fig. 2 represents a plan view of Fig. 1, taken from below; and Fig. 3 represents a modified form of brush within the scope of the invention.

Referring to the drawings, a cylindrical casing, preferably of aluminum, 1 contains an axially mounted electric motor 2 having a fan 3 rigidly fixed upon the extended motor shaft in front of the motor. That section 4 of the cylindrical casing which incloses the fan, is provided in front with a central opening 5 over which is formed a cover 6 the lower part of which is shaped as an elongated transverse nozzle having a bottom slot or throat opening 7. The opening 7 is of substantial width and in it is mounted the revoluble brush 8 which forms the subject matter of this invention.

On each side of the casing 1, at the rear thereof, and also in rearward extensions of the nozzle at each end thereof, are mounted pairs of wheels 9, 9', upon which the casing is adapted to be moved back and forth over the surface to be cleaned by means of a handle 10 having a fork 10' whose ends are pivoted upon the axles of the rear wheels 9.

The forward wheels 9', one or both of which (one in the drawings) are preferably covered with rubber to increase the tractive effect, are loosely mounted upon a transverse shaft 11 the ends of which are fixed eccentrically in cylindrical hubs 12 which are rotatably fitted in the rearward extensions of the nozzle ends. One end of the shaft is provided with a crank member 13, on the outside of the nozzle, by means of which the hubs may be revolved so as to raise or lower the shaft 11, and, therefore, the wheels 9', thus bringing the opening 7 of the nozzle nearer to or farther from the floor surface. A ratchet wheel 14, having teeth adapted to engage a spring locking member 15 attached to the rear of the nozzle, is fixed upon one of the eccentric hubs so that, as the crank member 13 is used to rotate the shaft 11, said shaft may be locked in any position.

The brush 8 is provided with a shaft, one end of which is carried at one end of an in-

wardly sprung resilient arm 16, while the other end of the arm is pivoted upon shaft 11. A bent portion of the arm adjacent to the brush is provided with a slot 17 parallel to the nozzle and opening, at its outer end, into another slot at a right angle there-  
 5 to. Ordinarily a pin 18, fixed to the casing, and engaging slot 17, and the last named slot are in line so that the brush is freely  
 10 movable up and down in accordance with any inequalities of floor surface over which the cleaner nozzle is moved. The other end of the brush shaft terminates in a disk having a diametral slot 19 into which keys a  
 15 suitable stub shaft mounted in a gear case 20 and driven through a chain of gears from a gear fixed upon one end of shaft 11, all these gears (not shown) being inclosed within the gear case. The gear case 20 is itself  
 20 pivotally mounted upon shaft 11. By bringing slot 17 and pin 18 into line and springing arm 16 outwardly, the adjacent end of the brush is released so that its other end can be withdrawn from the stub shaft and  
 25 the entire brush removed for cleaning or replacement.

Idler wheels 21 are loosely mounted upon each end of the brush shaft and support said shaft in fixed relation to the floor during  
 30 the operation of the machine.

The construction of the brush is as follows:

A hub 22, preferably of wood, extends for substantially the full length between the  
 35 wheels 21 and has a diameter such that a comparatively narrow space exists between the front and back of the hub and the front and back inner wall surfaces respectively of the nozzle throat 7.

Undulatory or wave-like grooves 23 are cut in this hub lengthwise thereof; these grooves are uniformly spaced about the hub. In the bottom of these grooves are set  
 40 bristles 24 of the brush, the ends of these bristles extending radially outward beyond the surface of the hub. As shown in Fig. 3, each longitudinal set of bristles is arranged as a plurality of tufts but the bristles of each set may also be arranged uniformly  
 45 from end to end of the hub, if desired, or in any other usual way.

Instead of undulatory grooves I may use straight grooves if I so desire.

A dust box or receptacle (not shown) attaches in the usual way to the pipe connections 25 opening from casing section 4 containing the fan.

The operation of my invention is as follows:—

The motor circuit being closed, motor and fan are rapidly revolved and air is drawn through the opening 7 and past the brush 8 into the fan chamber and out through pipe connection 25. The machine being wheeled  
 65 back and forth over the floor or the sur-

face to be cleaned by the aid of handle 10, the brush 8, the wheels 21 of which rest upon the floor, is positively driven by the chain of gears through the movement of wheels 9' which also rest upon the floor. It  
 70 will be noticed that the motion of the brush as it sweeps the floor (*i. e.* the motion of the bristles which actually contact with and engage the floor surface) is always in the same direction as that in which the machine  
 75 is being pushed. Owing to the narrow gaps which exist between the front and back of the hub and the wall surfaces of the throat 7, the air passes through these gaps and over the ends of the brushes at very high velocity. 80  
 Furthermore, since but the outer end of the brushes extend beyond the hub, the air is prevented from flowing through the body of the bristles either transversely or radially inward and is compelled, instead, to  
 85 pass over the bristle ends substantially at right angles to the length of the bristles. As a consequence, any fragments of dust or refuse which have been picked up and retained by the bristles are blown therefrom  
 90 instead of being forced farther into the body of the bristles, and they are then swept through the casing and into the dust receptacle. The brush is, therefore, kept  
 95 clean at all times instead of being gradually made inoperative by reason of accumulation of foreign matter therein.

A further important function of the enlarged hub is, in the case of fibers sufficiently long to reach from one longitudinal  
 100 set of bristles to another, that said fibers are kept pushed from the hub of the brush by the strips in such a way that the flow of air through the brush is enabled to get  
 105 on the under side of the fibers and push them away from the brush. With a hub of usual diameter and bristles set directly therein and extending therefrom, such fibers are apt to be drawn or forced up against the hub where the air can only reach their  
 110 outside surfaces and as a result the flow of air through the bristles has the effect of massing successive fibers against the hub rather than of removing them therefrom.

The brush may be removed for thorough  
 115 cleaning by inserting the finger in the nozzle opening and pressing the arm 16 outwardly, as is made possible by slot 17 and pin 18; this will release the ends of the  
 120 brush shaft.

Fig. 4 shows a modified form of my improved brush in which the grooves containing the bristle tufts are discontinuous, being equivalented, in fact, by a series of individual sockets in the bottom of each of  
 125 which is set an individual bristle tuft, the walls of the sockets being spaced from the tufts. The operation of this form of brush is exactly the same as that of the brush first described.  
 130

While I have described a preferred and one relative form of my improved brush, other forms may be made within the spirit of the invention and the scope of the following claims.

I claim:

1. In a vacuum cleaner provided with a nozzle having an elongated throat and a bottom opening adapted to be moved adjacent to the floor, a rotatable brush within the throat, said brush comprising a hub narrowly spaced from the wall surfaces of the throat, and having radial recesses formed therein, bristles spaced from the walls of the recesses and extending outwardly beyond the peripheral surface of the hub, being seated in the bottom of said recesses.

2. In a vacuum cleaner provided with a nozzle having an elongated throat which has a bottom opening adapted to be moved adjacent to the floor, a rotatable brush within the throat, said brush comprising a hub

narrowly spaced from the wall surfaces of the throat and having longitudinal grooves formed therein, bristles spaced from the walls of the recesses and extending outwardly beyond the peripheral surface of the hub, being seated in the bottom of said recesses.

3. In a vacuum cleaner provided with a nozzle having an elongated throat which has a bottom opening adapted to be moved adjacent to the floor, a rotatable brush within the throat, said brush comprising a hub having recesses symmetrically spaced about the periphery thereof and bristles in said recesses spaced from the walls thereof, the inner ends of said bristles being set in the bottoms of the recesses and the outer ends extending beyond the peripheral surface of the hub.

In testimony whereof I have hereunto set my hand.

WALTER W. JACKSON.