

O. DRAKE.
 SUCTION CLEANER.
 APPLICATION FILED NOV. 13, 1915.

1,291,802.

Patented Jan. 21, 1919.
 2 SHEETS—SHEET 1.

Fig. 1.

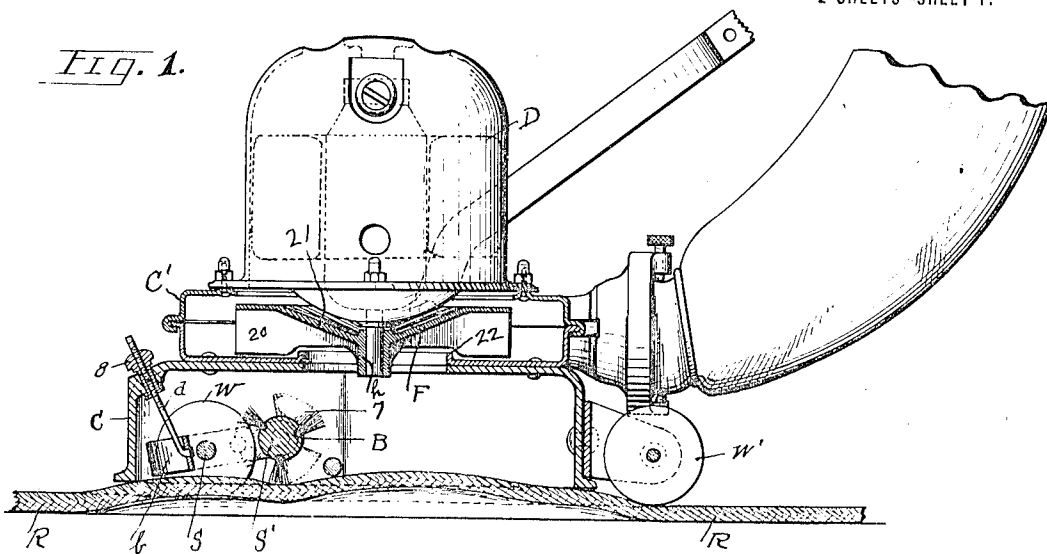
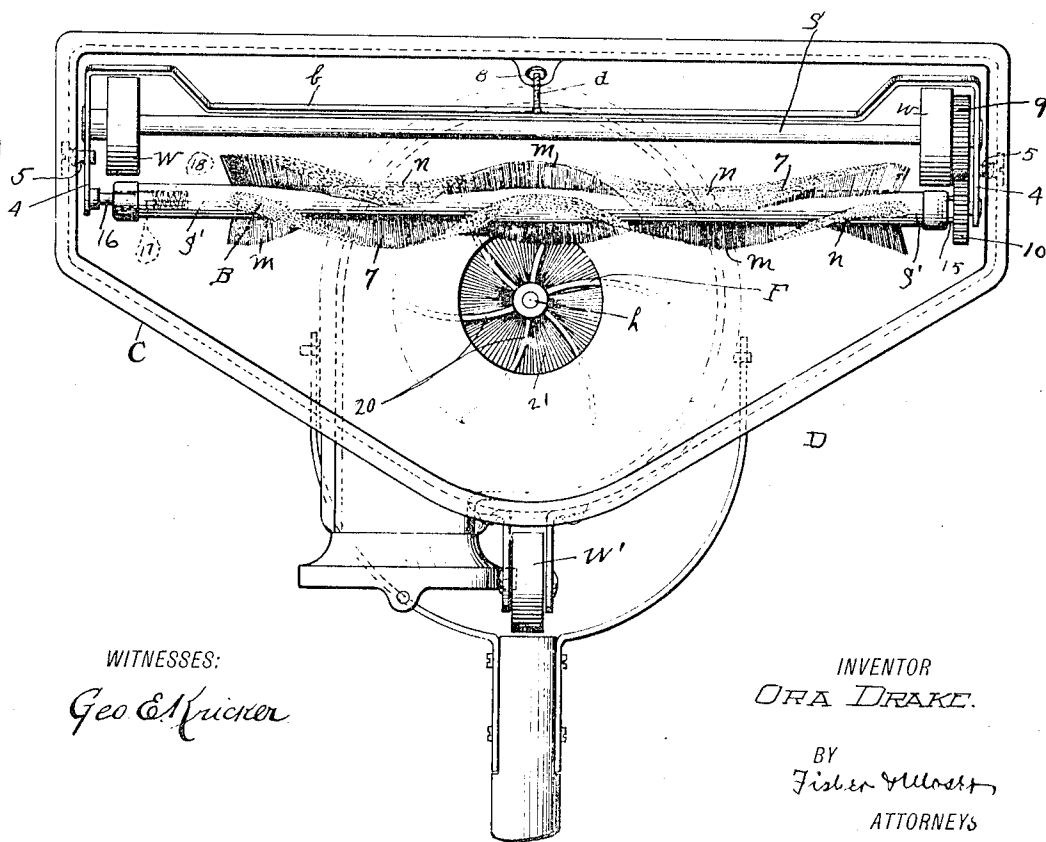


Fig. 2.



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FIG. 3.

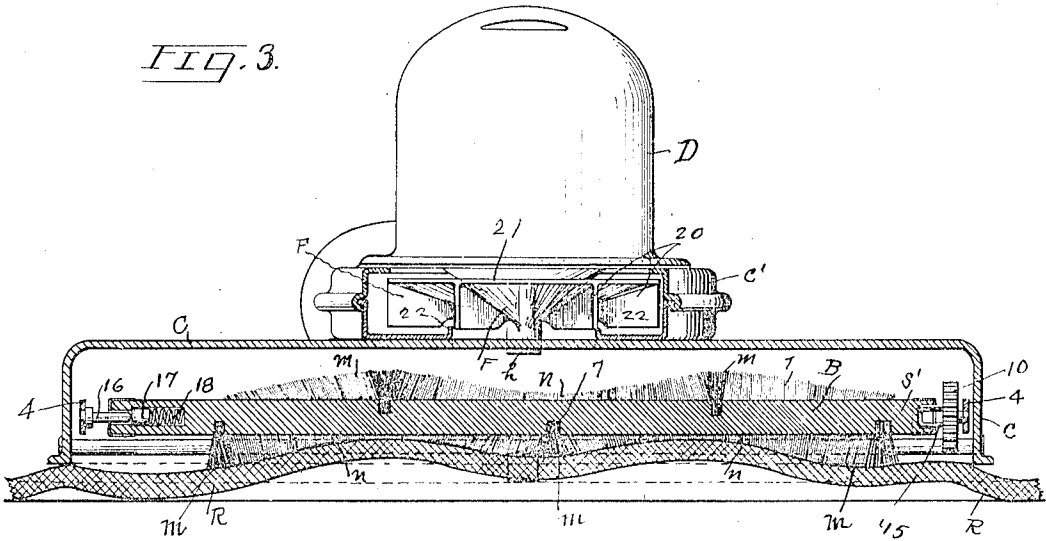


FIG. 4.

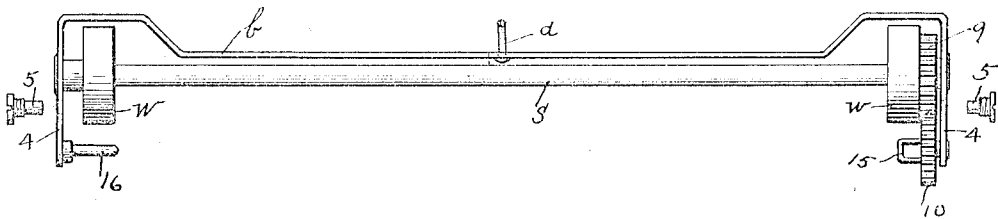


FIG. 5.

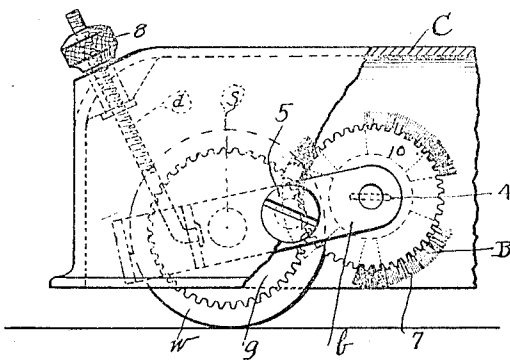
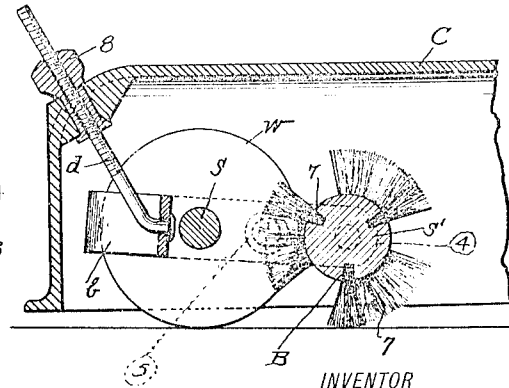


FIG. 6.



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SUCTION-CLEANER.

1,291,802.

Specification of Letters Patent.

Patented Jan. 21, 1919.

Application filed November 13, 1915. Serial No. 61,275.

To all whom it may concern:

Be it known that I, ORA DRAKE, citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Suction-Cleaners, of which the following is a specification.

This invention relates to suction cleaners of the electrically actuated type, and the invention consists in the construction and combination of parts substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a cross section of the machine except the motor chamber which is in full lines, and Fig. 2 is a bottom view thereof.

Fig. 3, Sheet 2, is a sectional elevation at right angles to Fig. 1, and lengthwise of the shoe and brush. Fig. 4 is a detail of the brush carrying frame and the rollers or wheels which carry the machine mounted thereon. Fig. 5 is an end elevation, partially sectioned and enlarged, of the front portion of the shoe or casing and the parts mounted therein. Fig. 6 is a cross section showing the brush and the carrying wheels at different elevations from Fig. 5 in respect to the floor.

The invention herein lies in certain novel features and details of construction as set forth in the description and claims.

Thus, the said shoe or casing C is peculiar in this particularly, that it is wide open over its entire bottom and of a size which affords a suction surface of about seventy square inches. This extends or spreads the cleansing area accordingly and enables the fan to displace a very large volume of air. The outline of the said casing is seen in plan in Fig. 2, and the bottom opening is co-extensive with the side walls thereof.

It will also be observed that I operate the machine at decided elevations above the surface over which it travels, as seen in Figs. 1, 3, 4, and 5 and convenient means are provided to adjust the carrying means to the level wanted to do efficient work in any given case. Thus, in Figs. 1 and 3, the machine is supposed to be engaged in cleaning

a carpet or rug, or the like, and the same or corresponding elevation of the parts is shown in Fig. 5. The length of nap of carpets and rugs varies, and the machine must be adjusted accordingly, and the means provided for this purpose are effective and simple, as will presently be seen.

In these views it is to be further observed that the carpet or rug R is raised by suction from the floor upon which it lies and on which the carrying wheels W travel, so that the carpet itself helps to close off the air about the edge of the shoe and suction is forced to occur mainly through the carpet over practically the entire area covered at the time by the shoe. Of course the area traversed is constantly changing but the suction through the fan F remains the same continuously.

Now, as to the traveling or working elevation of the machine and the means employed for this purpose, it will be seen that I show a skeleton frame consisting in this instance of a metallic bar *b* of a suitable size and bent at right angles at its ends to provide end supports for the said wheels W and the brush B and pivots or fulcrums 5 thereon for the shoe. Pivot screws 5 serve as such fulcrums or pivots, and the said frame is tiltably or pivotally supported thereon and adjustable as to elevation by means of a screw rod *d* fixed to the middle thereof and provided with a sleeve nut 8 engaged in or through the front top angle or edge of the shoe as seen in Figs. 1 and 6. Rotation of said nut by hand controls the elevation of the shoe in respect to the carpet or other article to be cleansed. The said wheels are supported on shaft S rotatably mounted at its ends in said frame in front of the said pivots 5 and the brush B has a shaft S' of suitable construction to receive the bristles 7 therein and is rotatably and separably mounted in said arms 4 at the rear of the said pivots. This brings the said wheels and the brush about equal distances from the pivots 5 and one is raised as the other is lowered by the tilting of the frame *b*. The adjustments thus provided afford convenient means for fixing the eleva-

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tion of the shoe and the brush in respect to the work.

In this connection it will also be seen that the wheels or rollers *W* are directly with-
 5 in the ends of the shoe at its front and fixed on shaft *S*, while the brush is at the rear thereof and approximately near the middle of the shoe, and gears 9 and 10 operatively connect the said shafts *S* and *S'*. These
 10 relative positions have been found to be very important on account of the character of the work the brush is intended to perform. It will be seen the brush has the dual function of beating and sweeping the carpet,
 15 the rotation being reversely to the direction of the travel of the wheels of the machine and at a high rate of speed. To these ends the brushes or bristles indicated by 7 are set lengthwise in shaft *S'* in sinuous or wave
 20 like rows, three in this instance and uniformly spaced apart their entire length. Hence as the brush is rotated it is adapted to develop high and low points successively in opposite rows, as seen, for example, at *m*
 25 and *n*, in Fig. 3. That is, the high point *m* in a given row or line of the bristles 7 comes directly opposite a depression *n* in the next preceding line in the order of rotation, and as the carpet is sucked up into
 30 the depression it is struck a beating blow by the succeeding high point. It must not be inferred however, that the bristles or brushes are of different lengths, because they are of the same length and the dif-
 35 ference in elevation on a given line lengthwise is caused by the sinuosity of the line or row. Sweeping by the brush is a continuous operation in high and low points alike since the brush revolves at a
 40 rapid speed under the normal travel of the tool and the traction of the wheels *W* can be depended upon to impart such action to the brush through the two gears connecting said parts. It will also be seen that to make
 45 the brush effective in this work it must be set back in the machine away from the edge of the shoe and where the carpet is lifted from the floor. Hence I have located the brush in the clear at or near the middle
 50 of the shoe and where its work will be equally effective its full length. A great difference has also been found in the operation of the machine over a front location because it works easily at the center, whereas
 55 it could hardly be worked at all at the front, where the brush seemed to get locked and could not work.

In the use of a machine of this kind it is
 60 necessary to have convenient means for removing and replacing the brush to cleanse the same, and to this end I employ the simple means seen in Figs. 3 and 4, comprising a flat loop shaped driving shank
 15 rigid with the gear 10 adapted to enter

freely in a slot in the end of the brush shaft 65 or body, while the opposite end of said shaft is supported by a spindle or spur 16 rigid with arm 4 of frame *b* and adapted to enter a bore in the said body against a spring pressed stop 17 therein. Lengthwise 70 movement of the brush on said spindle against the pressure of spring 18 enables the opposite end of the brush to be disengaged from the shank 15 and this releases the brush for removal. Replacement is equally 75 simple.

The suction fan *F* is located in a suitable casing *C'* fixed upon casing *C* and has a hub *h* set centrally over the suction hole in the top of said casing *C* and is driven by an 80 electric motor in the dome *D*, as usual. The said fan is made especially effective by the novel construction and arrangement of the blades 20. It will be seen that the said blades 20 are radially disposed and curved 85 lengthwise and flaring from the said hub outward past the flange 22 about said opening at which point the blades are shouldered downward behind the said flange and of uniform width from said shoulder outward. 90 In my experience with this class of machines I have found a tendency to develop what may be termed a dead air space just beneath or about the hub of the fan, owing probably, to the slow speed of rotation there 95 as compared with its periphery, and this has interfered with the effectiveness of the suction of the fan. But by the present construction of the said blades and conical back 21 the suction is made uniform over the 100 entire opening and there is no dead space and an increase of air displacement is made possible.

A wheel *W'* carries the rear of the shoe.

What I claim is:

1. A suction cleaner as described comprising a shoe, a tilting frame having rearwardly projecting arms at its ends in said shoe, carrying wheels supported on said frame in advance of said pivots and a rotatable brush mounted therein at the rear of said pivots and means to adjust said frame. 110

2. A suction cleaning machine as described comprising a shoe and a frame 115 pivoted in the ends thereof and means to adjust said frame about its pivots, in combination with carrying wheels supported by said frame in advance of said pivots and a rotatable brush at the rear thereof and transmitting means operatively connecting said wheels with said brush. 120

3. A suction cleaning machine as described comprising a shoe open across its bottom from edge to edge and having an exhaust opening in its top, in combination with a rotatable brush relatively at the immediate front of said opening, a tilting 125

frame carrying said brush having end pivots in said frame and carrying wheels on said frame in advance of said brush.

5 4. A suction cleaning machine as described comprising a shoe and a frame having pivots in the ends thereof, a set of carrying wheels supported in the front portion of said frame and a brush in the rear portion thereof on opposite sides of said pivots,

and means to fix the respective elevations 10 of brush and wheels located at the front of said frame and shoe.

In testimony whereof I affix my signature in presence of two witnesses.

ORA DRAKE.

Witnesses:

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GEO. E. KRICKER.