

J. M. SPANGLER.
 SUCTION CARPET SWEEPER.
 APPLICATION FILED JULY 24, 1911.

1,073,301.

Patented Sept. 16, 1913.

Fig. 1.

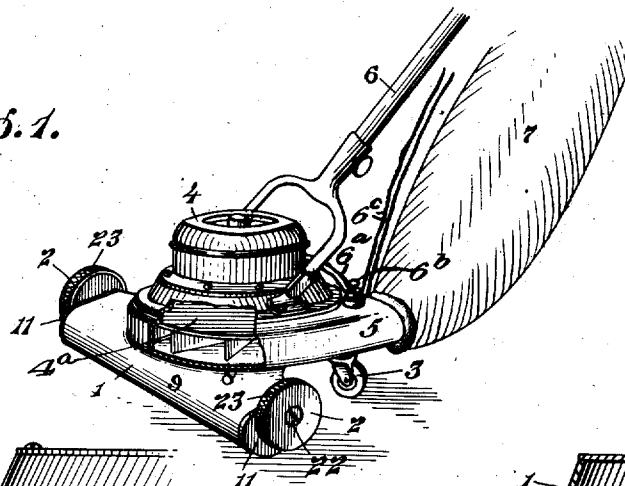


Fig. 2.

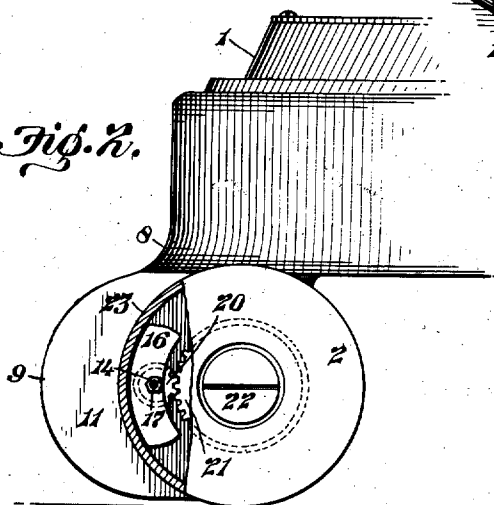


Fig. 3.

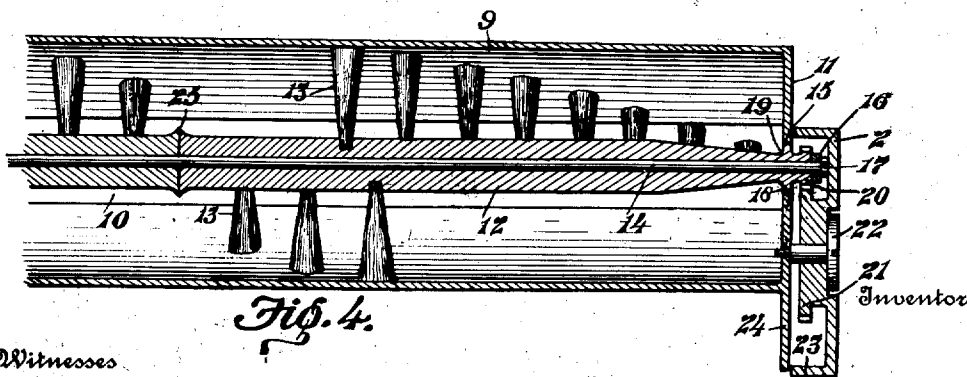
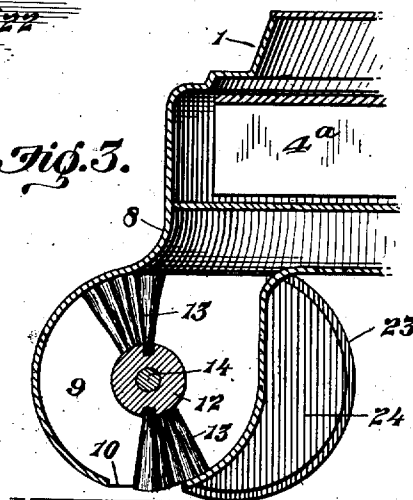


Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

JAMES M. SPANGLER, OF CANTON, OHIO, ASSIGNOR TO THE HOOVER SUCTION SWEEPER COMPANY, OF NEW BERLIN, OHIO, A CORPORATION OF OHIO.

SUCTION CARPET-SWEEPER.

1,073,301.

Specification of Letters Patent.

Patented Sept. 16, 1913.

Application filed July 24, 1911. Serial No. 640,260.

To all whom it may concern:

Be it known that I, JAMES M. SPANGLER, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Suction Carpet-Sweeper, of which the following is a specification.

This invention relates to improvements in devices for brushing and pneumatically cleaning floors and floor coverings and similar surfaces and objects, the device being provided with means for producing a suction whereby a strong inrush of air into the device takes place at and adjacent to the brush.

The objects of the invention are, to generally improve devices of the character mentioned and in a portable, self-contained device, to combine a motor driven suction creating device with a brushing device mechanically operated by contact with the surface to be cleaned while the device is moved over such surface, the suction creating device and brushing device being preferably independent in operation; and to so construct the brush and brush operating mechanism that the same will operate with the least resistance and will not hinder the free and easy movement of the device over the surface to be cleaned. These objects, together with other objects apparent to those skilled in the art may be attained by the construction illustrated in the accompanying drawings, although the invention may be embodied in other forms, the construction illustrated being chosen by way of example.

In the drawings, Figure 1 is a perspective view of a suction carpet sweeper embodying the invention. Fig. 2 is a fragmentary elevation of one of the ends of the brush cylinder, a portion being broken away to disclose the internal construction. Fig. 3 is a vertical sectional view through the brush cylinder and a fragmentary portion of the fan casing. Fig. 4 is a horizontal fragmentary view through the brush cylinder and brush, a portion of the view being broken away.

Throughout the several views similar reference numerals indicate similar parts.

The numeral 1 indicates a hollow casing movably supported above the floor upon the driving wheels 2 and caster wheel 3. Upon the casing 1 is mounted the electric motor

4 of well known design. Within the casing 1 is a fan 4^a operatively connected to the motor 4, said motor and fan being adapted to exhaust the air from said casing 1 through the exhaust collar 5 preferably formed integrally with the casing 1.

To the casing 1 is pivotally connected the handle 6, a portion of which is broken away in the drawing, said handle being of the usual form and adapted to be grasped by the operator for the purpose of moving the sweeper over the floor or other surface.

The electric conductors 6^a lead from the motor 4 to a switch 6^b preferably located on the fan casing and from said switch suitable flexible electric conductors 6^c of convenient length connect with a source of electric current, such as an electric light fixture, for supplying the necessary current to operate the motor 4.

To the exhaust collar 5 is connected a dust receptacle 7 shown in the drawings as consisting of a cloth bag supported from the handle and adapted to receive through the collar 5 dust and sweepings as they are exhausted from the casing 1.

At the forward portion of the casing 1 a downward extension 8 of said casing connects said casing with the hollow brush cylinder 9, which brush cylinder extends transversely and is provided at its lower side with the longitudinal slot 10, which slot extends from the end plate 11 at one end of the cylinder to the corresponding end plate at the other end. Said plates 11 close the ends of the cylinder in such way as to prevent the entrance of air into the casing 1 except through the slot 10. It will be understood that when the motor 4 is operated to drive the fan within the casing 1 and the air is exhausted from the casing 1 into the receptacle 7, a forceful inrush of air through the slot 10 is produced carrying with said air any dust, dirt or small objects on the floor or other surface immediately below the slot 10 and depositing such dust and sweepings in the receptacle 7. In combination with such inrush of air, however it is very important and desirable to combine a light brushing of the surface being cleaned in order to loosen any particles or objects which the air alone might be unable to dislodge. To accomplish such brushing action a brush comprising a brush spindle 12 and

bristles 13 is arranged within the brush cylinder, the spindle 12 being rotatably mounted upon a fixed shaft 14 extending from one end plate 11 to the other. It will be understood that the bristles 13 are connected to the spindle 12 and as the spindle 12 is caused to rotate said bristles will be carried around upon the inner side of the brush cylinder. As the slot 10 is of substantial width and the bristles 13 extend substantially to the wall of the brush cylinder, the bristles will project slightly through the slot 10 as they pass it in rotating.

Each end plate 11 is provided with an axially disposed spindle aperture at 15 and at the outer side of said plate, an off-set bearing portion 16 is preferably formed integrally with the plate 11 and is provided with an aperture through which the fixed shaft 14 extends, a nut 17 at each end being arranged upon the fixed shaft to hold the same in place. The brush spindle 12 is provided with the thread guard 18 arranged to rotate in the aperture at 15, the spindle 12 being reduced adjacent said thread guard thus causing said guard to form an annular flange connected to the spindle in such way as to produce a concave annular surface at 19 adapted to guide any threads that may be wound upon the spindle 12 away from the aperture at 15. Extending beyond the plane of the plate 11 and on the inner side of the portion 16 the spindle 12 is provided with the small pinion 20, which pinion meshes with the relatively large pinion 21 fixedly connected to the driving wheel 2 and rotatable therewith upon the bearing screw 22 connected to the plate 11. The bearing screw 22 is connected to the plate 11 to the rear of the axis of the spindle 12 as clearly illustrated in Fig. 4 and the wheel 2 is provided with an integral, externally knurled, inwardly extending tread flange 23 adapted to bear upon the floor or other surface to be cleaned. The end plate 11 is provided with a rearwardly projecting portion 24, which with the said flange 23 serves to inclose the pinions 20 and 21. It should be noted that while the axis of the driving wheels is preferably in the same horizontal plane as the axis of the spindle 12, the diameter of the driving wheels is greater than the diameter of the brush cylinder, consequently lifting the brush cylinder slightly from the surface upon which the driving wheels bear; and holding the slot 10 slightly spaced from said surface as clearly illustrated in Figs. 2 and 3. It will be understood that the construction at both ends of the brush cylinder is the same, the description just given being applicable to both ends.

For the purpose of permitting the sweeper to be moved over the floor, to turn corners and to be moved around in different directions in a free and easy manner and with the

least resistance, to prevent uneven distribution of work between the two driving wheels, and to cause the portions of the brush adjacent the respective driving wheels to rotate in a direction opposite the direction of rotation of said driving wheels under all conditions, the brush spindle 12 is made in two independently rotatable parts preferably of equal length, the two parts abutting and the external surface of the two portions preferably rising to form an annular portion of greater diameter where the two portions of the spindle abut as shown at 25 to act as a thread guard and prevent threads from being wound into the space between the two portions of the spindle.

The operation of the device is as follows: The motor being started and the air exhausted from the casing 1 through the collar 5 and receptacle 7, a strong inrush of air through the slot 10 will be produced. The operator, grasping the handle 6, should move the device backward and forward over the surface to be cleaned, thereby causing the driving wheels 2 to rotate, such rotation being transmitted through the pinions 21 and 20 to the spindle 12. In turning a sharp curve with the device it will frequently be found that one driving wheel will be caused to rotate in one direction while the other driving wheel is rotated in the opposite direction. By reason of the spindle 12 being made in two independently rotatable parts, such opposite rotation of the driving wheels will take place without any unusual resistance whatever, the brush in the end of the brush cylinder moving forward rotating in one direction while the brush in that portion of the cylinder moving backward will be rotated in the other direction. If it is desired to utilize the pneumatic action of the device rather than the brushing the operator merely moves the device slowly over the surface, and it will be readily understood that as occasion may require the brushing effect may be increased by more rapid movement of the device as when it is desired to loosen and lift from the surface threads and the like embedded or clinging to the floor covering, or when it is desired to dislodge other matter from the surface to be cleaned so as to enable the inrush of air to lift all of the sweepings and deposit them in the receptacle. In addition to this use of the brush it should be stated that it is advantageous to employ the brush for the reason that its light brushing action is beneficial in straightening, smoothing, and brightening the nap of the floor covering. The tendency of the inrushing air is to lift the floor covering against the edges of the slot 10 so as to hold said covering in advantageous position for the proper operation of the brush thereon.

It will thus be seen that by combining the

motor driven suction creating device with the brushing device mechanically driven by contact with the surface being cleaned when the device is in motion thereover a most convenient, readily operated, controllable and efficient device is produced. By requiring the motor to drive the air exhausting fan only, the device, including the motor, can be made in a relatively small size, of light weight and at less cost, while producing most satisfactory results.

I claim:—

1. In a suction carpet sweeper of the character described, a hollow brush cylinder, end plates closing the ends of said cylinder and provided with spindle apertures, bearing portions connected to and outwardly spaced from said end plates, a fixed shaft extending through said cylinder and apertures and connected at its ends to said bearing portions, a brush within said casing and provided with a spindle portion rotatably mounted upon said fixed shaft, driving wheels rotatably mounted on the outer side of said end plates and means between said bearing portions and said end plates oper-

atively connecting said driving wheels and spindle.

2. In a suction carpet sweeper of the character described, a brush cylinder, an end plate therefor provided with an aperture axially disposed with reference to said cylinder, a brush spindle rotatably mounted in said cylinder and having its outer end extending through said aperture, said spindle provided with an annular flange in a plane with said end plate, and closely but freely rotatably fitting within said aperture, said spindle also provided with an annular concave surface immediately on the inner side of said annular flange, and driving means on the outer side of said end plate, operatively connected to the portion of said spindle projecting outwardly from said plate and adapted to rotate said spindle.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

JAMES M. SPANGLER.

Witnesses:

WILLIAM H. MILLER,
IRENE LUTZ.

Correction in Letters Patent No. 1,073,301.

It is hereby certified that in Letters Patent No. 1,073,301, granted September 16, 1913, upon the application of James M. Spangler, of Canton, Ohio, for an improvement in "Suction Carpet-Sweepers," an error appears in the printed specification requiring correction as follows: Page 3, line 14, for the word "hollow" read *hollow*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of October, A. D., 1913.

[SEAL.]

R. T. FRAZIER,
Acting Commissioner of Patents.

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