C. L. GOUGHNOUR.

CLEANING MACHINE.

APPLICATION FILED OCT. 28, 1908.

968,934.

Patented Aug. 30, 1910.

2 SHEETS—SHEET 1.

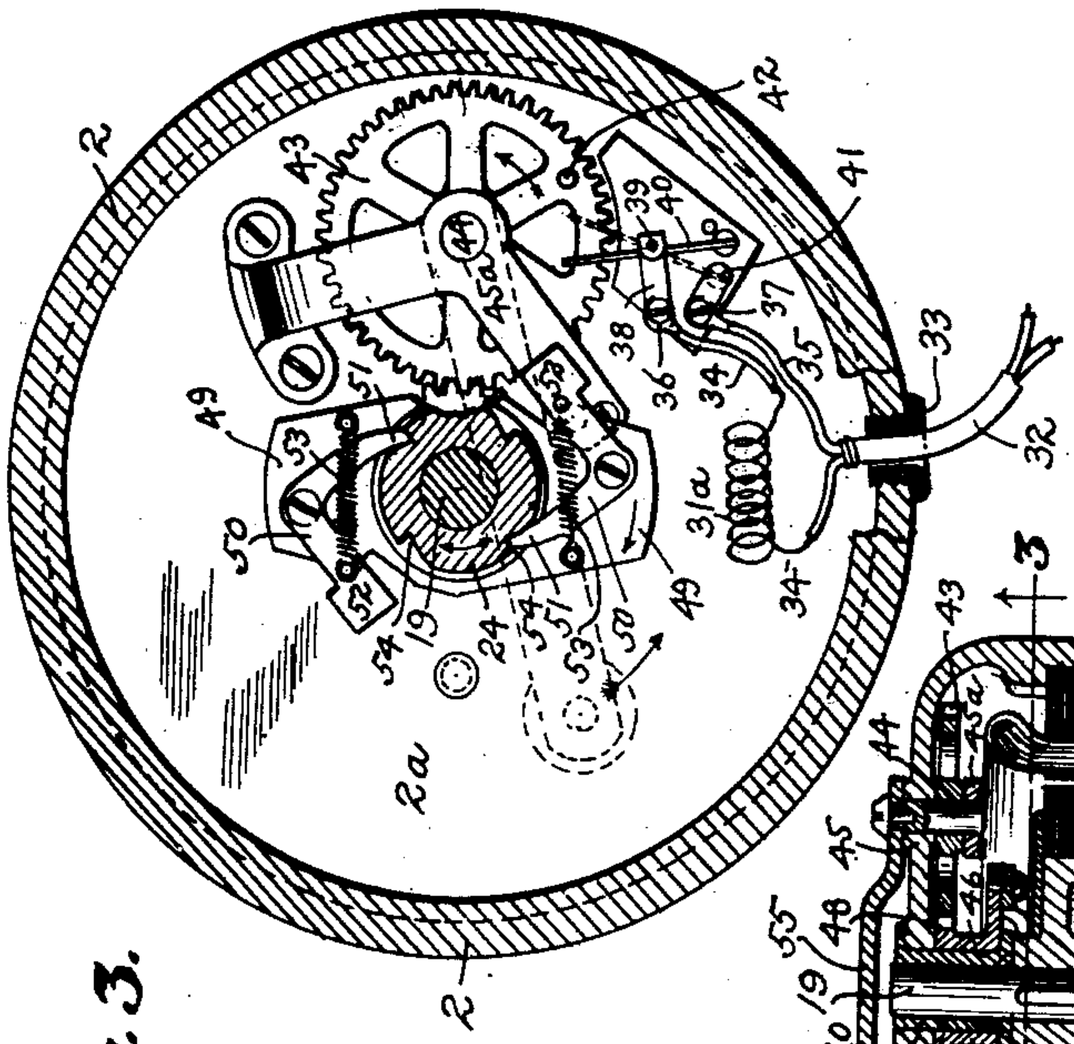

Fig. 3.

Fig. 1.

Fig. 4.

WITNESSES

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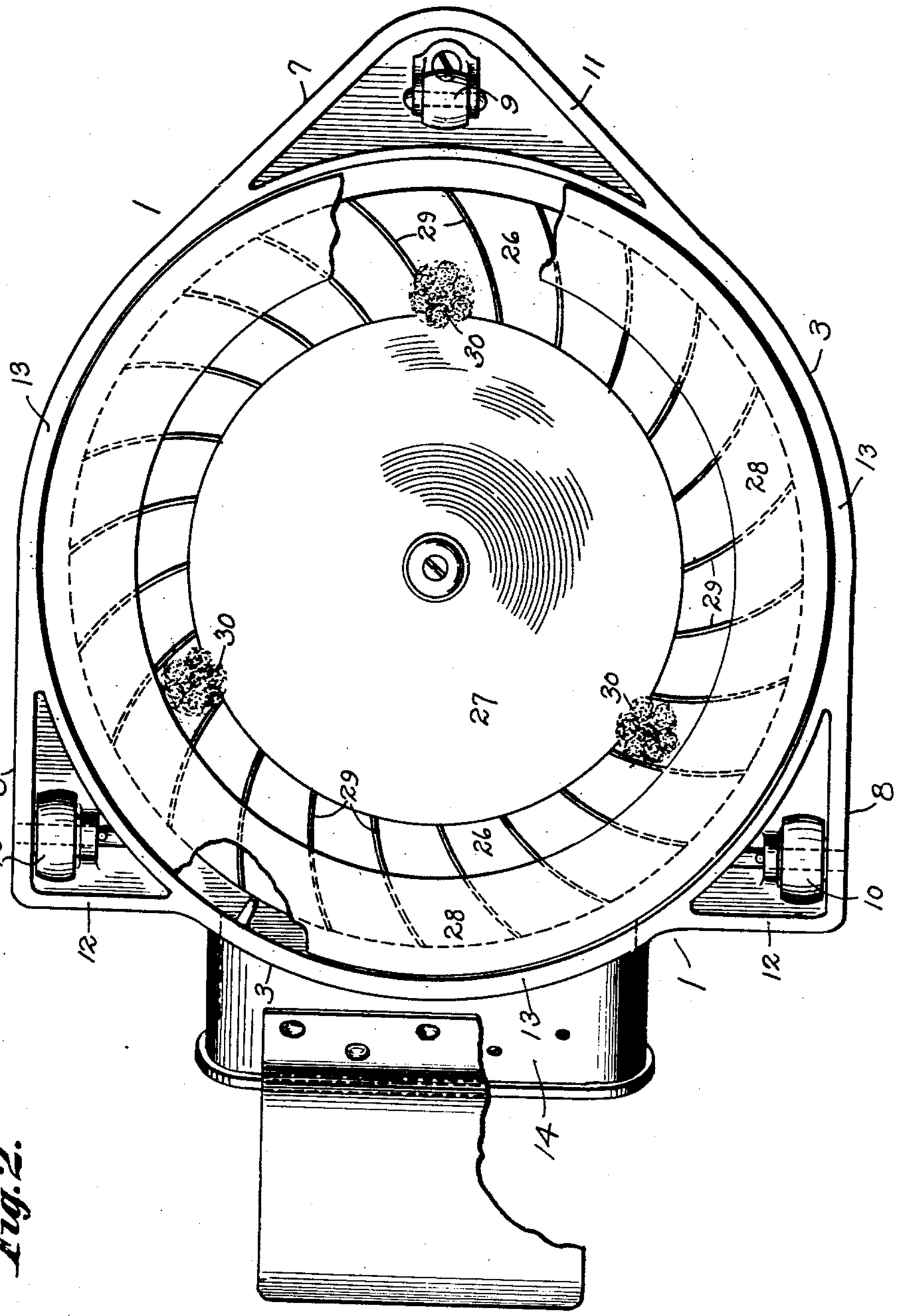

Fig. 2.

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CHARLES L. GOUGHNOUR, OF CANTON, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE UNITED ELECTRIC COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

CLEANING-MACHINE.

968,934. Specification of Letters Patent. Patented Aug. 30, 1910.

Application filed October 28, 1908. Serial No. 459,878.

To all whom it may concern:

Be it known that I, CHARLES L. GOUGHNOUR, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Improvement in Cleaning-Machines, of which the following is a specification.

The invention relates to a machine for cleaning a carpet, a floor or other similar flat substance or surface, and the general object of the improvement is to combine a suction fan and agitating brushes on a single spindle with a suitable motor, whereby a simple and compact machine is produced without any gearing or complicated connections.

Another feature of the invention is to make the peripheral sides of the suction fan of two flat and comparatively narrow rings, between which rings the fan vanes are formed or connected; to completely close the upper side of the fan with an inverted cone-shaped wall, the apex of which depends to or near the plane of the lower side, whereby the air currents are deflected and thrown directly outward between the parallel rings; and to leave substantially the whole of the lower side, and the blower cavity around the cone, open for the free suction of air.

A further object of the invention is to completely close the lower side of the motor-section of the case, preferably by an inverted cone-shaped partition, and to leave the whole of the lower side of the blower section of the case open for presentation to the surface to be cleaned, thus bringing the open side of the fan contiguous to or in direct contact with the work.

An additional feature of the invention is to adapt the machine for use with an electric motor, and to provide a switch mechanism for the motor which will start the rotor at the same time the electric current is closed, whereby an alternating current single phase motor can be used, such a current being more generally available in the residential regions of cities.

These objects and features of the invention, thus set forth in general terms, and other ancillary advantages, are illustrated in the accompanying drawings, forming part hereof, in which—

Figure 1 is a longitudinal-vertical section of the cleaning machine; Fig. 2, an under-side plan view of the same; Fig. 3, a cross section, looking upward on line 3—3, Fig. 1; and Fig. 4, a detached perspective view of the centrifugal-dogs with a detached fragmentary sectional view of the adjacent end of the rotor hub.

Similar numerals refer to similar parts throughout the drawings.

The case 1 is cylindric in general form and the upper or motor section 2 is preferably of less diameter than the lower or blower section 3. The top of the motor section is closed by the cover 2^a formed or attached on the cylindric side wall thereof, and the top of the annularly extending portion of the blower section is closed by the cover 3^a, which connects the cylindric wall of the motor section with the cylindric wall of the blower section. The inverted cone-shaped partition 4 is formed or attached in the case, with its peripheral edges joined thereto at or near the angle of the motor section with the cover of the blower section, and with its apex extending downward into the cavity of the blower section; thus completely closing the chamber 5 of the motor section, and completely separating it from the cavity 6 of the blower section, the entire lower side of which blower section is left open for presentation to the substance or surface to be cleaned.

The triangular extensions 7 and 8 are provided on the periphery of the blower section of the case, one extension 7 being preferably located in the middle of the forward portion and two extensions 8 being preferably located on opposite sides of the rear portion of the machine; in which forward extension the caster 9 is swiveled and in which rear extensions the rollers 10 are pivotally mounted. The machine is adapted to be supported and to travel on the caster and the rollers, and the swiveled caster permits a free turning and movement of the machine in all directions. The lower edges 11 and 12 of these extensions are preferably formed in

the same plane with the lower edge 13 of the cylindric wall of the blower section of the case; and these edges are located slightly above the lower bearing sides of the caster and rollers, and are thus normally near but not in contact with the substance or surface to be cleaned. The outlet neck 14 on which the mouth 15 of the dust-receiving sack 16 is adapted to be telescoped and secured, is formed or attached preferably on the rear side of the blower section of the case, and the rear end of the dust-sack is preferably suspended from the hook 17 on the handle 18 of the machine.

The axially-located spindle 19 of the machine is journaled in the tubular bearing 20 which is formed or attached and depends from the cover of the motor section, and in the bearing 21 which is formed or attached in and extends above the apex of the inverted-cone shaped partition 4 which constitutes the bottom of the motor chamber. The rotor 22 and the blower fan 23 are securely attached on the spindle, the one above the partition bearing and the other below the partition bearing in the end opening of the case and substantially flush with the edge 13 thereof; and the hubs 24 and 25 of the rotor and the fan, by abutting the upper and lower ends of the partition bearing, serve to hold the spindle in proper position.

The upper side of the fan is preferably completely closed by a wall which is composed of the flat ring portion 26 and the centrally depressed inverted-cone shaped portion 27, the latter of which is formed or attached on the hub of the fan; but on the lower side of the fan is provided only the comparatively narrow, flat peripheral ring 28 located adjacent to the edge 13 of the case and substantially flush therewith. The upper and lower rings are connected or joined together by the intervening vanes 29 of the fan, which are uprightly arranged between the rings and are preferably curved backward, as the fan is rotated, from true radial lines, in the usual manner, to increase the outward throw of air when the fan is rotated. The agitating brushes 30, of which three are illustrated, are preferably secured to the upper wall of the fan at or near the angle of the cone-shaped depression therein, and the free ends of the brushes extend downward inside the lower ring to or slightly below the plane of the bearing sides of the caster and rollers, so that the brushes will positively bear on and rub against the substance or surface to be cleaned.

It is evident that a rotation of the fan will cause the brushes to rub against the carpet or floor and will loosen the dust or dirt thereon, and that the suction caused by the current of air which is forced outward by the fan vanes will draw the air inward under the edges of the case and under the lower narrow, flat ring of the blower, and also upward through the body of the surface to be cleaned if the same is porous; thence upward through the open lower side of the blower and outward between the vanes of the fan, being positively deflected thus outward by the inverted-cone shaped portion of the upper wall if not so carried by the air current; and thence with the air current around the periphery of the case and outward through its neck into the receiving bag. It will be understood that the air escapes through the porous walls of the receiving bag and that the dust and refuse from the cleaned carpet or surface is caught in the bag, from which it is removed when desired by detaching the mouth of the bag from the machine.

It is evident that the surface of the carpet or the floor is exposed to the action of the agitating brushes, as the machine is moved from place to place; that the whole of the surface which is opposed to the open side of the fan inside the lower peripheral ring thereof is subject to the suction of the blower; that the dust and dirt is received directly into the blower and is deflected and discharged therefrom by the shortest possible route, without encountering any unnecessary or dead air spaces on the way which would tend to retard or precipitate the dust within the blower cavity; and finally, that the partition between the blower cavity and the motor chamber completely isolates and protects the latter chamber and its contents from the dust and dirt arising from the cleaning. And it has been found in practice that the suction of the blower will lift a carpet upward against the lower edges of the case, thus drawing all the air into the blower through the carpet and positively cleaning the body thereof.

The stator 31 is secured in the motor section of the case, in proper position around the rotor 22, and the terminal-wire cable 32 which leads from any suitable and accessible source of power, is entered through the thimble 33 in the wall of the case, as shown in Fig. 3. One wire 34 is connected through the stator, diagrammatically shown at 31^a in Fig. 3, with the binding post 36, and the other wire 35 is connected with the binding post 37; which binding posts are secured with suitable insulation on the under side of the cover 2^a of the motor section of the case. The binding post 36 is connected by the bus bar 38 with the pivot 39 of the switch 40 and the binding post 37 is connected with the contact piece 41. The switch 40 is pivoted at 39 intermediate its ends, and one end thereof is adapted to be

rotated into and out of contact with the piece 41. The other end of the switch is located in the path of the pin 42 on the gear wheel 43 secured on the short axle 44, which axle is journaled in the bearings 45 and 45ª formed in or attached to the cover of the case.

The collar 46 is rotatably mounted on the tubular bearing 20 around the spindle—between the hub of the rotor and the cover of the case, and is supported by the flange 47. On the upper end of the collar is formed or attached the pinion 48 which is arranged to mesh with and to be operated by the gear wheel 43; and on the lower end of the collar is formed or attached the radial plates 49 on which are pivoted the centrifugal-dogs 50, the same being provided with the detents 51 and the weights 52, and being connected with the plates by the springs 53. In the upper end of the hub 24 of the rotor are provided the notches 54 in which the detents of the dogs are adapted to engage when the weights of the dogs are thrown outward and the detents inward by the rotation of the rotor, which engagement is normally prevented by the action of the springs.

The crank 55 on the top of the case is connected with the axle 44 of the gear wheel, and it is evident that by turning this crank to rotate the gear wheel in the direction shown by the arrow in Fig. 3, the collar 46 will be rotated by the gear, which will throw the weights of the dogs outward and the detents inward to engage with the notches in the hub of the rotor, which engagement starts the rotor; and that when the wheel has been turned so that its pin 42 will strike the near end of the switch, the other end will be thrown into contact with the piece 40, thus closing the electric circuit, whereby the rotation of the rotor, which has been started by the dogs, is continued by the electric current. By reversing the rotation of the cog wheel by its crank, the pin on the wheel will strike the reverse side of the near end of the switch and throw the other end out of contact with the piece 40, thus opening the circuit. The impinged end of the switch is preferably made sufficiently flexible and elastic so that it will spring out of the path of the pin after the switch has been opened or closed, and then resume its normal position.

It is evident that by forming the partition between the motor and blower sections of the case in the shape of an inverted cone, with its center depressed into the cavity of the blower section, and by forming the lower journal bearing for the spindle in the depressed center of this partition, the necessary height of the machine is materially reduced, which permits the machine to be readily entered under articles of furniture even though the bottoms thereof are quite close to the floor. It will be understood, however, that the use of such a partition or of any partition at all, is not essential to the other features of the machine, for the upper closed wall of the fan serves, in a general way, to shield the motor chamber of the case; and it is furthermore evident that when the inverted-cone shaped partition is employed, it is not essential to employ the inverted-cone shaped wall on the upper side of the fan for the purpose of deflecting the dirt outward, for the face of the partition can well serve this purpose; but it is preferred to employ the partition to more completely close the motor chamber, and to employ the coned fan wall for more positively controlling the air current and deflecting the dirt.

While the open bottom of the blower section, which constitutes the bottom of the machine, has been referred to in the description as the lower "side" thereof, it is quite evident that considering the cylindric shape of the case, the top and bottom of the same can be very properly and more generally referred to as the "ends" of the case; and for convenience and conciseness in diction, the upper and lower portions of the case are referred to in the claims as the ends thereof.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A machine for cleaning carpets, floors and the like, including a cylindric case provided with an outlet and having one end open and presented to the carpet, an axial spindle in the case, a fan with brushes on the spindle in the end opening of the case and a rotary motor on the spindle inside the fan, whereby dirt is loosened from the carpet by the brushes, then sucked into the open end of the case and discharged through the outlet.

2. A machine for cleaning carpets, floors and the like, including a cylindric case provided with an outlet and having one end open and presented to the carpet, an axial spindle in the case, a fan on the spindle in the end opening of the case substantially flush with the edge thereof and a rotary motor on the spindle inside the fan, whereby dirt is sucked from the carpet into the open end of the case and discharged through the outlet.

3. A machine for cleaning carpets, floors and the like, including a cylindric case having one end open and presented to the carpet, a cross partition intermediate the ends of the case and coned centrally toward the end opening thereof, an axial spindle journaled in the coned partition, a fan on the spindle in the end opening of the case sub-

stantially flush with the edge thereof and a rotary motor on the spindle inside the partition.

4. A machine for cleaning carpets, floors and the like, including a cylindric case having one end open and presented to the carpet, and a co-axial rotary fan with brushes in the end opening of the case and having an inner wall coned centrally toward the open end of the case.

5. A machine for cleaning carpets, floors and the like, including a cylindric case having one end open and presented to the carpet, and a co-axial rotary fan in the end opening of the case, substantially flush with the edge thereof.

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