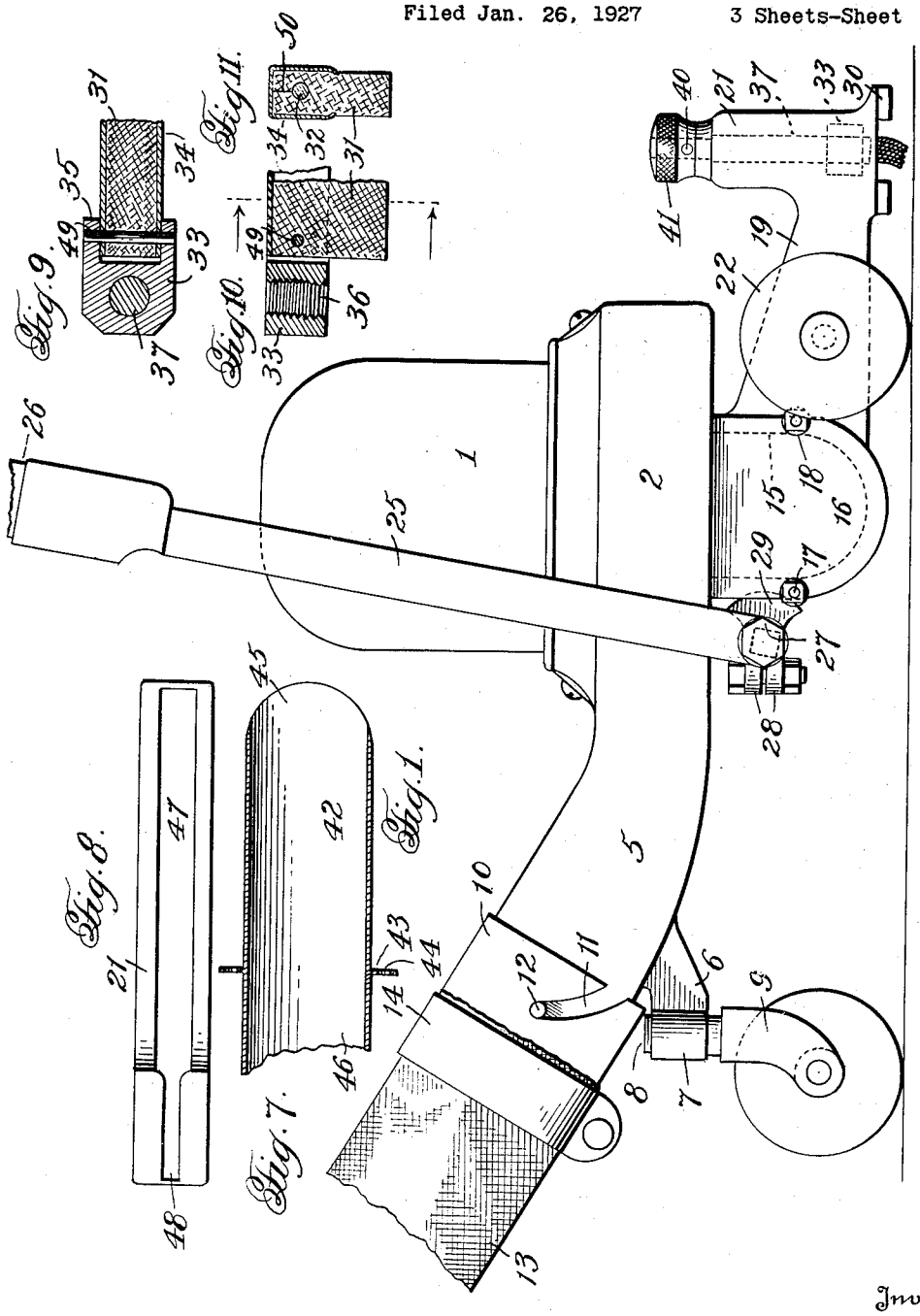
July 28, 1931. B. KERN 1,816,538

CARPET AND FLOOR CLEANER

Filed Jan. 26, 1927 3 Sheets-Sheet 1



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CARPET AND FLOOR CLEANER

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Fig. 2.

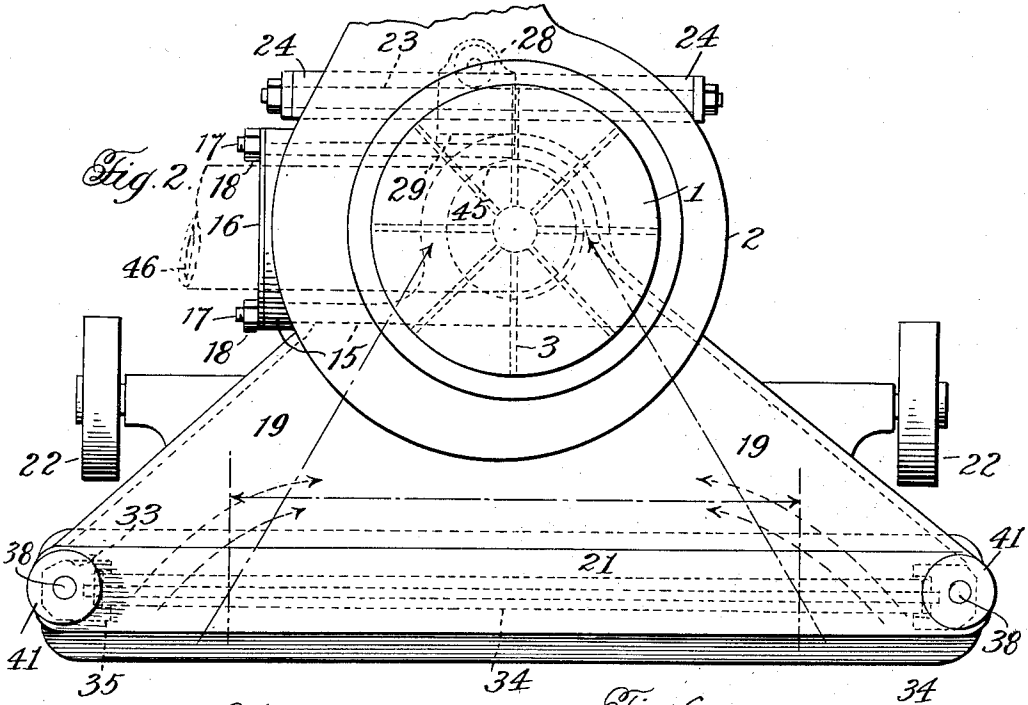


Fig. 5.

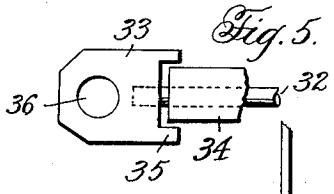


Fig. 6.

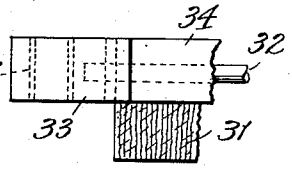


Fig. 3.

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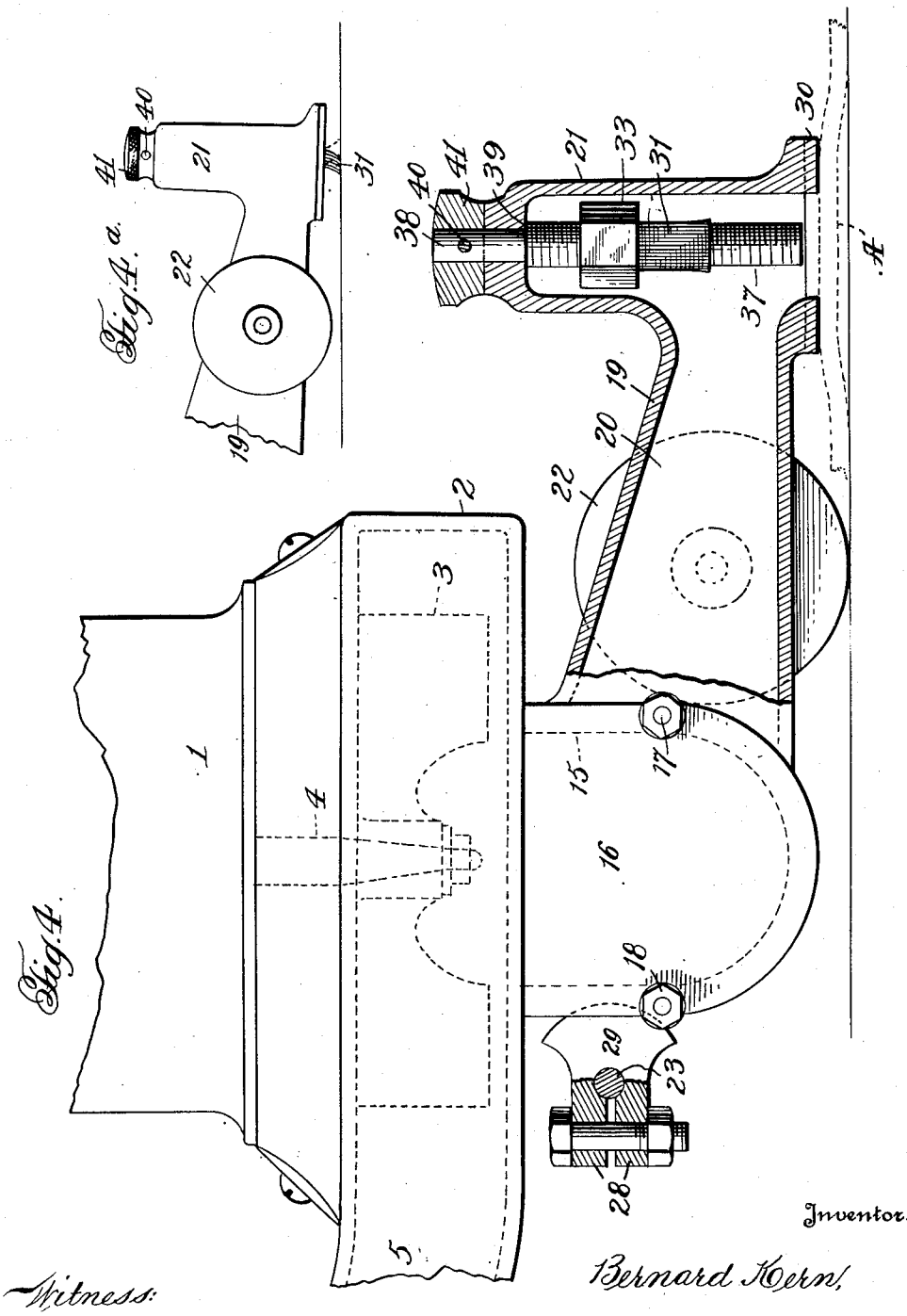
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CARPET AND FLOOR CLEANER

Filed Jan. 26, 1927 3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

BERNARD KERN, OF SYRACUSE, NEW YORK

CARPET AND FLOOR CLEANER

Application filed January 26, 1927. Serial No. 163,730.

My invention relates to new and useful improvements in carpet and floor cleaners of the suction or vacuum type and has for its principal object the provision of a machine of this character which is relatively simple and inexpensive in construction, relatively light in weight whereby it may be easily manipulated and carried from place to place, which is efficient and effective in operation, and in which the nozzle does not have to be adjusted.

Another object of the invention resides in the provision of a machine of the character described which has a nozzle portion formed in a novel manner whereby dirt, litter, etc. may be picked upon throughout the entire length of the nozzle and carried through the passages of the machine for deposit into the dust bag.

A further object of the invention consists in the provision of an adjustable pad, within the nozzle, which may be raised out of contact with the floor or other surface and which may be lowered to engage the floor or other surface and to support the forward part of the machine.

Still another object consists in the provision of means, operable by the movement of the handle, for supporting the body of the machine when being carried from place to place and to prevent the forward portion of the machine from swinging downwardly.

A still further object resides in the provision of novel means for securing tools or attachments, of the well-known type, in position.

With the above and other objects in view, which will appear as the description proceeds, my invention consists in the novel details of construction and arrangement of parts, described in the following specification and illustrated in the accompanying drawings, and while I have illustrated and described the preferred embodiments of the invention, as they now appear to me, it will be understood that such changes may be made as will fall within the scope of the appended claims.

In the drawings:

Fig. 1 is a side elevation.

Fig. 2 is a top plan.

Fig. 3 is a longitudinal vertical section through the nozzle with parts shown in elevation.

Fig. 4 is a side elevation with parts shown in vertical section.

Fig. 4ª is a fragmental elevation of the nozzle showing the adjustable pad in lowered position.

Fig. 5 is a fragmental top plan showing the manner of connecting the end of the pad to its supporting chairs.

Fig. 6 is a fragmental side elevation of the construction shown in Fig. 5.

Fig. 7 is a detail of the tube for connecting the tools.

Fig. 8 shows a bottom plan of a modified form of nozzle.

Figs. 9 and 10 are sectional details showing a modified construction for connecting the pad to its supporting chair, and

Fig. 11 is a transverse vertical section showing a modified form of pad.

In the drawings 1 indicates the motor housing and 2 the fan housing, the fan being shown at 3 and secured to a depending shaft 4 from the motor. The motor, received in the housing 1, is not shown but is of ordinary construction and the fan 3 is adapted to operate on a horizontal plane. Projecting rearwardly from the fan housing 2 is the hollow tubular extension 5 from adjacent the rear end of which depends the arm 6 formed with the sleeve 7 having a vertically extending bore to receive the reduced shank portion 8 of a supporting castor 9. A sleeve 10 is adapted to telescope the outer end of the extension 5 and is provided with the bayonette slot 11 to receive the pin 12 carried by the extension 5. The end of a dust bag 13

is secured to the sleeve 10 by means of a clamping band 14.

The fan housing 2 is formed with a bottom opening and secured to or formed on the housing, beneath the opening, is a substantially trough-shaped receptacle 15, one end of which is open and adapted to be closed, normally, by means of the plate 16 provided with openings through which the bolts 17 are adapted to pass. Nuts 18 are received on the bolts and engage the outer face of the plate. Extending forwardly from the receptacle 15 is an arm 19 having an air passage 20 is communication with the receptacle 15. A nozzle 21 is formed longitudinally of the arm 19 and is of a construction to be later described. A supporting wheel 22 is mounted on each side of the arm 19 and normally supports the arm and bottom surface of the nozzle 21 slightly above the surface to be cleaned.

A horizontal shaft 23 is supported in the rear of the receptacle 15 in the bearings 24 and the ends of the shaft are preferably square to be received in square openings adjacent the lower end of the arms 25 of the yoke portion of the handle 26. Nuts 27 are received on the threaded ends of the shaft and engage the outer faces of the arms 25 to hold them in position. When the handle is moved it will rotate the shaft 23. Secured to the shaft 23, intermediate the ends thereof and by the clamp portion 28 is a stop or projection 29 which, when the handle is in the position shown in Fig. 1 will engage the wall of the receptacle 15 and prevent the forward or heavy end of the machine from tilting downwardly when the machine is being carried from place to place.

At each side of the air opening or passage in the nozzle 21 I provide a longitudinally extending depending lip 30 the ends of which terminate inwardly of the ends of the opening or passage in the nozzle for a purpose to be later described. When the machine is in operation the carpet or rug which I have designated generally at A will be drawn or sucked into the position shown in Figs. 3 and 4 of the drawings. As shown the rug or carpet will be drawn into engagement with the depending lips 30 but will be positioned slightly below the bottom surface of the nozzle at the points beyond the ends of the lips. I have found this to be of particular advantage. In the use of a cleaner of the character described, of the vacuum or suction type, it is necessary to operate the fan at a high rate of speed, without a brush as well as with a brush, but more so without a brush because the air must do the cleaning as well as the conveying. At the required speed of the fan air will radiate from the inside wall of the inlet of the nozzle on a center line of from thirty to thirty-two degrees which I have indicated in Fig. 2 of the drawings. The effective suction occurs between the thirty-two degree lines radiating from the side of the center of the inlet and is approximately eight inches. The air on each side of the thirty-two degree lines are the eddy currents which do not travel at so great a speed as the air of the effective suction. By having the lips 30 terminating inwardly of the ends of the passage in the nozzle I provide free spaces for the air and litter to enter the nozzle without the nozzle touching the litter. This is of particular advantage for the following reasons. In actual practice and tests I found that the litter beyond the effective suction lines would not be taken up because the litter came in contact with the nozzle which kept rubbing or tangling the fine woolly threads more and more with the nap of the rug. This made it impossible to pick them up. I then found that when I spaced the ends of the nozzle slightly above the rug or other object being cleaned that the nozzle would not touch the litter and I succeeded in picking it up. For the reasons pointed out above I have formed the nozzle with the depending lips on each side of the air passage but terminate the ends of the lips inwardly of the end of the passage so as to leave a space at each end of the nozzle which will be spaced above the carpet or object being cleaned which will not engage the litter but instead will allow the litter to pass freely into the passage of the nozzle.

Supported within and adjustable relative to the nozzle 21 is a pad 31 preferably formed of a strip of felt having a rod 32 extending therethrough and with its ends projecting therefrom and received in openings formed in the chairs of castings 33. A metal casing 34 is secured to the top of the felt pad 31 and the side faces of the casing are preferably pressed into tight engagement with the side faces of the felt for connecting the two together. The chairs or castings 33 have the inwardly extending side flanges 35 between which the ends of the pad extend and these side flanges limit the swinging movement of the pad, it being understood that the projecting ends of the rod 32 are loosely received in the recesses or openings of the chairs or castings 33 to allow the pad to swing in a manner to be later described. Each of the castings or chairs 33 is provided with a vertically extending threaded bore 36 in which operates a threaded rod 37, the upper end of which is reduced as shown at 38 and passes through an opening formed adjacent the ends of the nozzle. The reduced portion 38 forms a shoulder 39 to engage the inner face of the top of the nozzle and secured to the reduced portion 38 by a transversely extending pin 40 is a knurled nut or finger hold 41, it being understood that this knurled nut or finger hold is positioned above the top surface of the nozzle. The rods 37 are normally rotated to position the pad

in the upper end of the nozzle 21 and out of contact with the floor or other surface to be cleaned. The raised position is shown in Fig. 3. When it is desired to lower the pad into engagement with the floor or other object to be cleaned the rods 37 are rotated to lower the pad and when lowered the pad projects beyond the bottom surface of the nozzle 21, engages the floor or other object, and holds or supports the supporting wheels 22 slightly above the floor or other object, the pad then acting as a support for the forward end of the machine. As the machine is moved forward the pad will assume the position shown in full lines in Fig. 4ª and the dirt and litter gathers on the front of the pad. A large amount of the loose dust or litter on the floor is picked up by the air currents but the smudge which adheres to the floor, and can only be removed by wiping, adheres to the pad. On the rearward movement of the machine the position of the pad is changed so as to assume the position shown in dotted lines in Fig. 4ª and the surface with the smudge thereon is more directly exposed to the air currents and will be removed thereby.

When it is desired to secure attachments or tools to the machine the plate 16 is removed and the tube or sleeve 42 secured in position. This tube or sleeve 42 is provided with a flange 43 having openings 44 through which the bolts 17 are adapted to pass. When the tube or sleeve is in position the end 45 thereof, on one side of the flange 43, will project into the receptacle 15 and the end 46 thereof, on the other side of the flange, will be positioned for connection of the tools or attachments.

In Fig. 8 of the drawings I have shown a slightly modified form of nozzle in which the width at one end of the air passage 47 is reduced as shown at 48 and this permits a greater speed of the air at this point to more effectively loosen the litter from anchorage on the rug. While I have only illustrated the narrowed portion at one end of the nozzle it will be understood that I could equally as well form narrow portions at each end.

In Figs. 9 and 10 of the drawings I have illustrated a slightly modified means of connecting the pad 31 to the supporting chairs 33. In this form of the invention I do away with the rod 32 and form the space between the arms 35 of such a width as to engage the outer faces of the casing 34. A pin 49 is passed transversely through the arms 35 and the pad adjacent the end thereof as more particularly shown in Fig. 9 of the drawings. In this form of the invention the pad will have no swinging movement.

In Fig. 11 of the drawings I have shown the pad 31 as being slit longitudinally along the top edge as indicated at 50 and this facilitates the insertion of the rod 32.

I wish to lay particular stress on the fact that with my construction it is not necessary to adjust the nozzle in any manner. Under the present principles now commonly used it is necessary to have some adjustment for the nozzle because of the great fluctuation of the back pressure in the dust bag. As the back pressure increases the suction at the nozzle decreases. The dust bag of a cleaner is the neck of a bottle; the same can only exhaust the amount of air that can be discharged through the neck of the bottle, therefore the suction at the nozzle and the lifting and cleaning power is directly proportionate to this volume of air and its velocity pressure. Under these conditions it is necessary to have some adjustment and also because of the great variety of the weight of the rug or carpet per square foot and the great variation of the length thereof. The extended lips on my form of nozzle equalizes the weight of the rug or carpet to a minimum and the dust bag has overcome the fluctuation of back pressure so that I am able to work out a cleaner that requires no adjustment.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. A machine of the character described including a nozzle having an elongated air passage therein, and a depending longitudinally extending lip on each side of the passage, the ends of said lips terminating inwardly of the ends of the passage on both sides thereof.

2. A machine of the character described including a nozzle formed to provide end portions on a higher plane than the intermediate portion, said end portions on a higher plane extending throughout the width of the nozzle.

3. A machine of the character described including a nozzle, members positioned within the nozzle adjacent each end thereof, inwardly directed spaced flanges formed on each of the members, a pad positioned between the members with the ends thereof positioned between the inwardly directed flanges, means for connecting the pad to the members for swinging movement, and means for adjusting the members vertically, the inwardly directed flanges of the members limiting the swinging movement of the pad.

4. A machine of the character described including a nozzle, members positioned within the nozzle adjacent each end thereof, a pad positioned between and connected to the members, said members being positioned beyond the ends of the pad to provide spaces between the ends of the pad and nozzle for the passage of matter gathered by the nozzle, and means engageable with the members for raising and lowering the pad relative to the nozzle.

5. A machine of the character described including a nozzle, members positioned with-

in the nozzle adjacent each end thereof, a pad positioned between and connected to the members, said members being positioned beyond the ends of the pad to provide spaces between the ends of the pad and nozzle for the passage of matter gathered by the nozzle, and means engageable with the members for raising and lowering the pad relative to the nozzle, said means being positioned beyond the ends of the pad.

In testimony whereof I hereunto affix my signature.

BERNARD KERN.