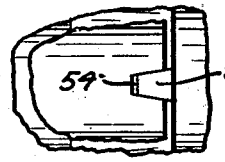
July 1, 1930. R. L. LEE 1,768,616

DOMESTIC APPLIANCE

Filed Aug. 3, 1923

Fig. 4.



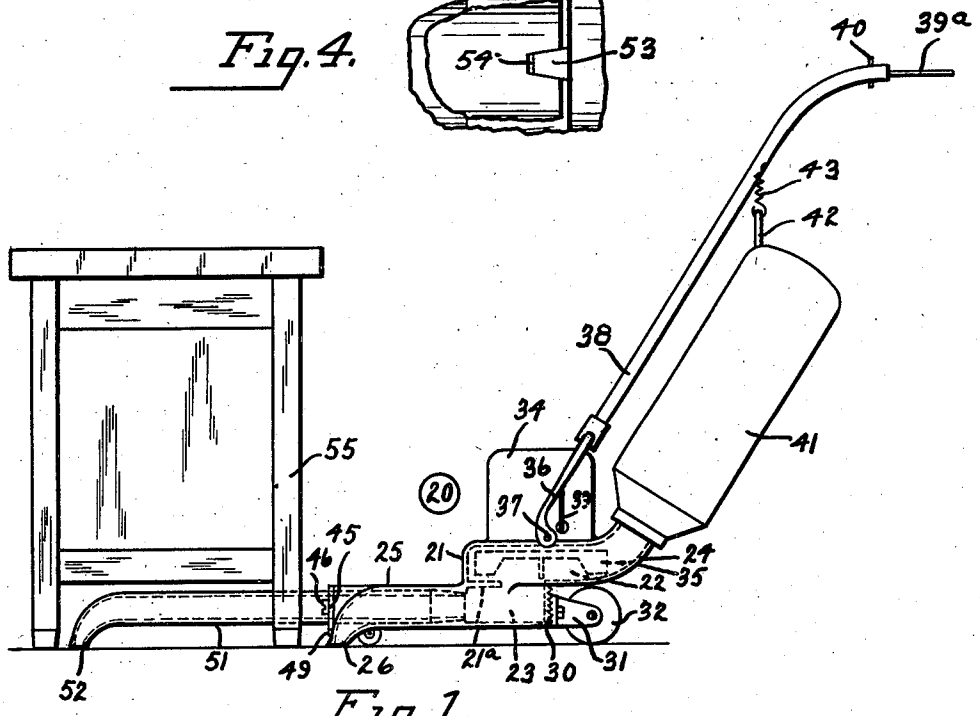


Fig. 1.

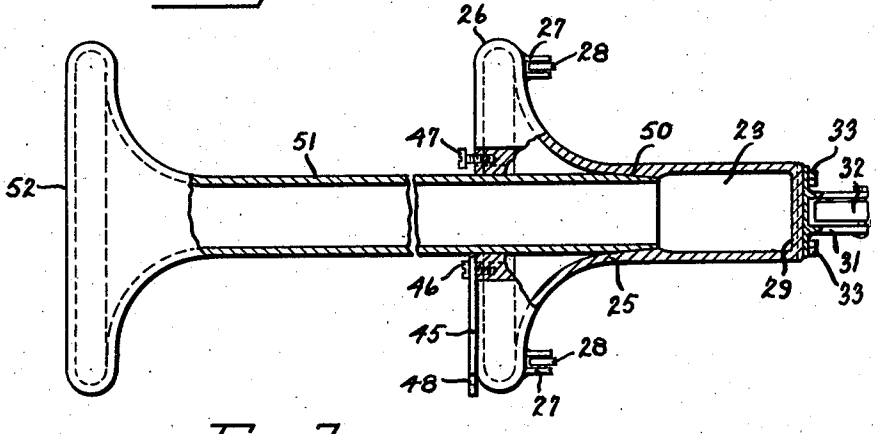


Fig. 2.

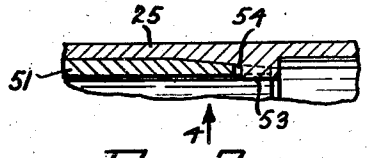


Fig. 3.

Inventor
RALPH L. LEE.
By J. Ralph Tabb
His Attorney

Patented July 1, 1930 1,768,616

UNITED STATES PATENT OFFICE

RALPH L. LEE, OF DAYTON, OHIO, ASSIGNOR TO DELCO-LIGHT COMPANY, OF DAYTON, OHIO, A CORPORATION OF DELAWARE

DOMESTIC APPLIANCE

Application filed August 3, 1923. Serial No. 655,469.

This invention relates to vacuum cleaners, and particularly to the type of apparatus for cleaning floor surfaces.

Among the objects of the present invention are to provide an attachment for a vacuum cleaner adapting it to clean restricted spaces under furniture and the like, the cleaner with the attachment being manipulated in the manner of using the cleaner alone.

Other and further objects of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of one embodiment of the invention is clearly shown.

In the drawings:

Fig. 1 is a side view of a cleaning machine and an attachment embodying the present invention, and shows the attachment extending under an article of furniture such as a table or desk;

Fig. 2 is a top plan view partly in section and on an enlarged scale, of the cleaner and attachment shown in Fig. 1;

Fig. 3 is a fragmentary sectional view showing the locating stud for positioning the attachment with respect to the cleaner nozzle; and

Fig. 4 is a fragmentary underside view thereof looking in the direction of the arrow 4 in Fig. 3.

Referring to the drawings, a cleaning machine 20, preferably of the suction type, comprises a casing or frame portion 21 provided with pump and suction chambers 22 and 23 respectively separated by a dividing wall 21[a] provided with an opening. Casing 21 is provided with an upwardly curved neck portion 24 leading from the pump chamber 22, and also a neck portion 25 leading from the suction chamber 23 and merging into a nozzle 26. Brackets 27 are provided adjacent the sides of the nozzle 26 for supporting rollers 28. The rear wall 29 of the casing 21 is provided with notches 30 which cooperate with companion notches in a removable bracket 31 to which is attached a roller 32. Screws 33, passing through elongated openings in bracket 31 and engaging tapped holes in the wall 29, provide for adjustment of the roller 32 to raise or lower the rear end of the casing 21 and thereby adjust the nozzle 26 with respect to the floor or surface to be cleaned. A motor 34 is supported by the casing 21, and the armature shaft thereof passes through an opening in the top wall of the casing 21 and extends into the pump chamber 22. A suction fan 35 is located within the chamber 22 and is directly attached to the armature shaft of the motor 34. A yoke member 36, which is pivoted at 37 to opposite sides of the casing 21 is secured to a tubular handle 38 through which conductor 39 passes and connects with a terminal of the motor 34. A switch 40 provided adjacent the upper end of the handle 38, is connected with conductor 39 and with a suitable source of current by conductor 39[a]. A dust bag 41 is removably attached to the neck portion 24 in any suitable manner, and is provided with a loop 42 through which the hooked end of a spring 43 passes, the other end of said spring being secured to the handle 38, for supporting the dust bag.

The neck portion 25 is provided with a circular opening in alignment with the suction chamber 23, over which is fitted a removable cover 45. This cover is held in place by a screw 46 which passes through a hole in the cover and engages a tapped hole in the portion 25, and also by a screw 47 engaging a tapped hole in the portion 25 and cooperating with a notch 48 in the cover 45. This cover 45 may be shifted to the position shown in Fig. 2 by loosening the screws 46 and 47 and swinging the cover around, the screw 46 acting as a pivot. A lug 49 is provided on the outer surface of the nozzle 26 to prevent the cover 45 dropping to the floor, and being dragged along when the cleaner is moved about.

The inner surface of the neck portion 25 is provided with a conical seat, as shown at 50, adjacent the suction chamber 23. A rigid extension tube 51 is adapted to be received by the circular opening in the portion 25 and is provided with a tapered end for cooperating with the tapered surface

or conical seat 50. This tube 51 merges into a nozzle 52. A locating lug 53 is provided on the inner surface of the portion 25 and cooperates with the notch 54 at the inner end of the tube 51. Thus, when the tube 51 is inserted within the portion 25, the nozzle 52 is automatically located in the same plane as that of the nozzle 26. To attach the tube 51 to the cleaner, it is but necessary to move the cover 45 to the position shown in Fig. 2, insert the tube into the portion 25 through the circular opening in the front wall thereof, align the notch 54 with the lug 53, and force the tube endwise so that the tapered end thereof will engage with the conical seat 50. The friction therebetween will be sufficient to securely hold the tube 51 in position. Unless the notch and lug are in alignment, the tube 51 cannot be seated within the tapered portion 50. Therefore, if the attachment is rendered operative at all, the nozzle end thereof will be automatically located parallel to the nozzle 26 of the vacuum cleaner.

It will be apparent that when the nozzle 26 is adjusted with respect to the floor or surface to be cleaned, through means of the adjustable bracket 31, the nozzle 52 will likewise respond to this adjustment, and be raised or lowered with respect to the floor.

When the tube 51 is inserted within the portion 25, communication between the suction chamber 23 and the nozzle 26 is cut off, so that the suction of the fan 35 will draw air and the dirt particles through the nozzle 52, through tube 51 and into the suction chamber 23, thence into chamber 22, the action of fan 35 forcing the dirt particles up through portion 24 into the dust bag 41. Of course when the rigid attachment is not in use, the circular opening in the portion 25 is closed by the cover 45, and the air and dirt particles will be drawn up through nozzle 26, through chamber 23 into chamber 22, the dust particles being deposited in the bag 41.

Fig. 1 shows the cleaning attachment applied to a cleaning machine and extending under the table or desk 55, the bottom of which is relatively close to the floor, and indicates the manner in which the attachment described herein may be utilized in cleaning restricted surfaces under furniture and the like. Since the attachment nozzle 52 is rigidly supported by the vacuum cleaner this nozzle can be manipulated by means of the handle 38 of the cleaner. The nozzle 52 is maintained in correct relation with the floor by means of the tripod support provided by the wheels 28 and 32 which also locate the nozzle 26. By virtue of the construction described, cleaning under furniture can be accomplished as easily as cleaning open spaces with conventional types of suction cleaners.

The axially aligned wheels 28 and the third wheel 32 provide a support which automatically adapts the nozzle 26 to irregularities in the floor surface. The means for attaching the extension nozzle to the cleaner provides for maintaining the extension nozzle opening substantially parallel to the axis of the wheels 28, hence the nozzle 52 is also automatically adjusted to irregularities in the floor surface. By adjusting the height of wheel 32 the tube 51 can be tilted about the axis of wheels 28 to vary the distance between the nozzle 52 and the floor.

While the nozzle 52 is herein shown as supported from the floor and guided by the rigid extension tube 51, it should be expressly understood that the invention is not limited to this specific construction but that the nozzle 52 may be connected with the suction chamber by any other suitable means which will hold the nozzle 52 in position against lateral movement, whereby it may be guided by the operating handle 38 as above described. It will also be apparent to those skilled in the art that the nozzle 52 need not be supported by the rollers 28 and 32 but may be maintained in proper operative relation with respect to the floor by means of any other or additional supports. While the form of mechanism herein shown and described constitutes a preferred embodiment of one form of invention, it is to be understood that other forms might be adopted and various changes and alterations made in the shape, size, and proportion of the elements therein without departing from the spirit and scope of the invention.

What is claim is as follows:

1. Cleaning apparatus comprising, in combination, a vacuum cleaner including a casing having an opening, a suction chamber, and a nozzle connected with the chamber; and a rigid attachment having a portion insertable through said opening and into said chamber for rigidly connecting the attachment with the chamber, another portion of said attachment being provided with a nozzle which, when the attachment is so connected, will be held in proper relation with the surface to be cleaned, and which is movable with said cleaner over the said surface.

2. Cleaning apparatus comprising, in combination, a vacuum cleaner including a suction chamber and a nozzle connected therewith; and means attachable to the cleaner for closing off the suction nozzle from the chamber, said means providing a nozzle connected with the chamber and being rigidly supported with respect to the cleaner and in proper relation with the surface to be cleaned for movement therewith over the said surface.

3. Cleaning apparatus comprising, in

combination, a vacuum cleaner including a suction chamber, a nozzle connected therewith and a duct located close to a floor level for connecting the nozzle and chamber; and an attachment including a nozzle and pipe rigidly supported by the cleaner and adapted when attached to close the duct from the first named nozzle, the attachment pipe being located close to the floor level with the nozzles arranged in parallel relation with the floor.

4. Cleaning apparatus comprising, in combination, a vacuum cleaner provided with a suction chamber and supports resting on a floor surface, a suction nozzle, a duct connecting the nozzle and chamber and extending substantially parallel to and in close proximity to the floor, and provided with an inner conical seat and an opening; an elongated rigid tube terminating at one end in a suction nozzle and being tapered at the other end thereof and adapted to be received by the said opening, the tapered end of said tube being received by the conical seat; and means for automatically positioning said last named suction nozzle in parallel relation with respect to the first named suction nozzle, said last named suction nozzle responding to a movement of said supports over the floor surface.

In testimony whereof I hereto affix my signature.

RALPH L. LEE.