Oct. 13, 1925. 1,557,212

R. L. LEE

DOMESTIC APPLIANCE

Filed Jan. 14, 1924

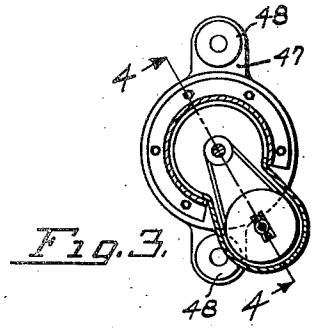


Fig. 3.

Fig. 2.

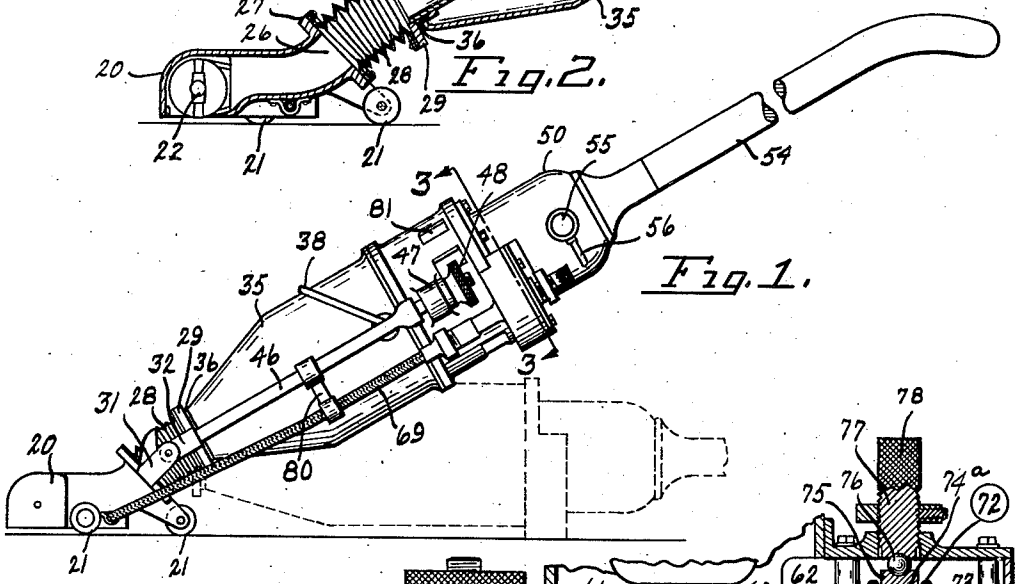


Fig. 1.

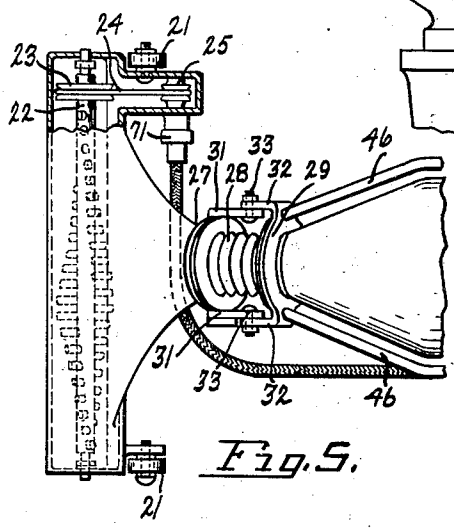


Fig. 5.

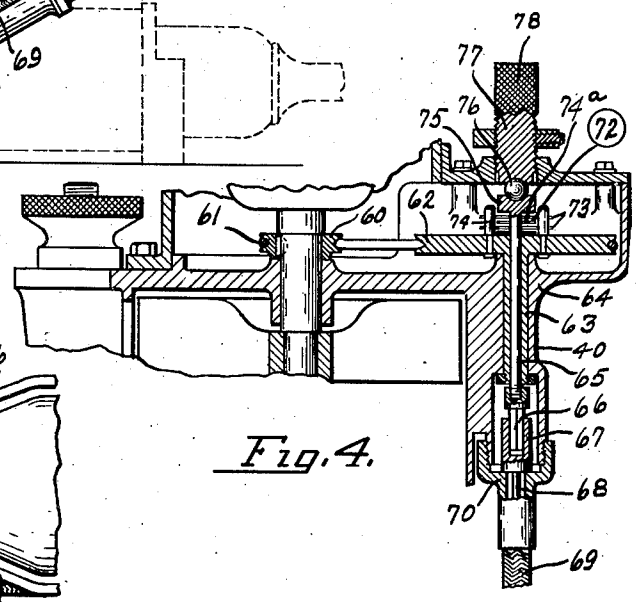


Fig. 4.

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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 January 14, 1924. Serial No. 686,124.

To all whom it may concern:

Be it known that I, RALPH L. LEE, a citizen of the United States of America, residing at Dayton, county of Montgomery, State of Ohio, have invented certain new and useful Improvements in Domestic Appliances, of which the following is a full, clear, and exact description.

This invention relates to suction cleaning apparatus especially adapted for household use and more particularly to the type of apparatus shown in the copending application of Ralph L. Lee, Serial No. 635,460, filed April 30, 1923. The said application discloses suction cleaning apparatus comprising a suction nozzle or cleaner head adapted to be moved over a surface to be cleaned, the nozzle being mounted on rollers and operated by a handle. The handle carries a prime mover such as an electric motor which drives a suction pump and a centrifugal dust separator, both of which are included in the handle. The suction nozzle is provided with an oscillating heater which is driven by means of flexible cable connected with said electric motor.

It is one of the objects of the present invention to provide for driving by the motor on the handle a revolving brush mounted within the suction nozzle. A further object is to provide such improvements in apparatus in the type referred to as will permit cleaning under low articles of furniture.

In order to accomplish these and other objects of the invention, one form of the invention includes a portable nozzle or cleaner head mounted on rollers and enclosing a revolving brush. To the nozzle there is pivotally attached an elongated tubular member which terminates in a handle by means of which the nozzle and tubular member are manipulated. This tubular member comprises a plurality of separable portions which provide housings for the electric motor, the suction pump, and the dust separating air propeller which are driven by the motor. The tubular member includes also an elongated dust container for receiving the dust which is separated from the air entering the container from the suction nozzle. The tubular member is connected by a flexible pipe with the cleaner head and is relatively small in external diameter and is adapted to rest directly upon the floor, the vertical distance to the highest part of the apparatus being that of the external diameter of the tubular member. By making the tubular member relatively small in external diameter and by eliminating parts extending upward therefrom the apparatus can be used to clean under relatively low articles of furniture.

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

In the drawings:

Fig. 1 is an elevation of a form of the present invention.

Fig. 2 is a longitudinal sectional view thereof.

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view on a large scale on the line 4—4 of Fig. 3.

Fig. 5 is a plan view partly in section of the lower end of the dust container showing its connection to the suction nozzle and a plan view of the suction nozzle.

Referring to the drawings, 20 designates a cleaner head or a suction nozzle mounted on trunnions 21 and provided with a mechanical cleaner in the form of a revolvable brush 22 attached to a pulley 23 which is driven by a belt 24 from a pulley 25. Apparatus for driving the pulley 25 will be described later.

A nozzle outlet pipe 26 is provided with a flange 27 which is connected by a flexible pipe 28 with a flange 29. Flanges 27 and 29 are provided with lugs 31 and 32, respectively, which are pivotally connected by bolts or pins 33. The flange 29 is apertured to receive the outer end of a pipe 34 projecting exteriorly and interiorly with respect to a dust container 35 which is permanently attached to pipe 34. A gasket 36 is located between the lower end of container 35 and flange 29. The pipe 34 supports a deflector or baffle 37. Container 35 is provided with a bail or handle 38.

The upper end of container 35 receives, as a cover, a tubular frame 40 having an end wall 41 providing a bearing for a shaft 42 carrying a suction fan 43 and an air agitating propeller 44. Between members 43 and 44 there is located a partition 45 provided with a central aperture 46. Frame 40 is connected with the flange 29 by means of rods 46 which extend upwardly from

the flange 29 substantially parallel to the side walls of the container 35. The upper ends of these rods 46 pass through apertured lugs 47 extending from the frame 40. The upper ends of the rod 46 are threaded to receive nuts 48. By tightening nuts 48 the container 35 is clamped between the frame 40 and the flange 29.

The frame end wall 41 supports a motor field frame 50 carrying windings 51 and providing a bearing at 52 for the shaft 42 which carries the rotor 53 of the electric motor which drives the fan 43 and agitator 44. The motor field frame supports a handle 54 which in conjunction with the field frame 40, the frame 41, the container 35 and parts attached thereto, serves as means for manipulating the suction nozzle. The motor field frames 50 support an electric switch connected with a service cable 56 for supplying current to the electric motor when the switch is closed.

In order to provide for driving the pulley 25 by the electric motor the shaft 42 carries a pulley 50 which drives by means of a belt 61 a pulley 62 mounted on a shaft 63 which is journaled in a bearing 64 provided by the frame 40. The shaft 63 is tubular and receives a rod 65 attached to a coupling member 66 which is rectangular in section. The coupling member 66 is received by a companion coupling member 67 connected with a flexible cable 68 which is connected with the pulley 25. The cable 68 is enclosed by a flexible casing 69 attached by coupling members 70 and 71, respectively, to the frame 40 and to the nozzle 20. In order mechanically to connect the rod 65 with a pulley 62 a disc clutch 72 is provided. The clutch 72 includes discs 73 slidably mounted on pin 74 attached to the pulley 62. Upon the rod 65 there are mounted a plurality of floating discs 74ª. The rod 65 is provided with a head 75 having a spherical depression for receiving a ball 76 also received by a spherical depression in the inner end of a screw 77 provided with a knurled end 78. By turning the screw 77 the clutch plates will be clamped together and power will be transmitted from the pulley 62 to the rod 65.

A bracket 80 attached to one of the rods 46 assists in supporting the flexible cable casing 69.

The mode of operation of the invention is as follows: By manipulating the switch 55 the motor will operate to drive the suction producing pan 53, the air agitator 44 and the revolving brush 22. The brush assists in removing articles of dirt and other foreign matter from the surface to be cleaned. Such matter is drawn with air through the suction nozzle 20 and is discharged into the dust container 35. This dust laden air is agitated and given a swirling motion by means of the air propeller 44. By centrifugal action the dust is separated from the air and is collected in the container 35. The baffle 37 tends to direct the air issuing from pipe 34 towards the side walls of the container so that dust laden air will be prevented from going directly into the suction pump before being set into swirling motion by the propeller 44.

Air practically free from dust will pass through the aperture 46 and will be expelled through openings 81 in the side wall of the frame 40.

In order to empty the dust container 35 the nuts 48 are unloosened to permit the separation of the frame 40 from the flange 29 the necessary distance for the removal of the container 35 from between these members.

The parts 35, 40 and 50 may be considered as an elongated tubular member practically the same external diameter throughout its length since the external diameter of parts 35 and 40 is practically the same as the external diameter of the motor frame 50. These dimensions can be made relatively small so that when this tubular member is resting on the floor as indicated by the dotted lines in Fig. 1, its overall vertical dimension is relatively small therefore it is apparent that the cleaning apparatus can be moved under relatively low articles of furniture. The transmission mechanism connecting the electric motor with the revolving brush 22 is located at the side of the tubular member rather than under or above it so that substantially no additional vertical clearance is necessary on account of this mechanism.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claim which follows.

What is claimed is as follows:

In a vacuum cleaner, a suction nozzle having a mechanical cleaner therein, a handle hinged to said nozzle for manipulating the same, said handle including a tubular portion enclosing a suction pump, and motor for driving the pump, and means for driving the mechanical cleaner by the motor, said means including a flexible shaft extending along the tubular portion but removed from the under side and upper side thereof, whereby the tubular portion may rest directly upon the floor when cleaning under low articles of furniture, and movement of the cleaner under said furniture will not be hindered by said flexible shaft.

In testimony whereof I hereto affix my signature.

RALPH L. LEE.