CONVERTIBLE SUCTION CLEANER

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7 Claims. (Cl. 15—9)

This invention relates to suction cleaners and has as its primary object to provide a suction cleaning apparatus which is convertible from a conventional type domestic suction cleaner to a portable cleaner.

In using the words "domestic type cleaner" I have reference to the ordinary suction cleaner adapted to travel upon a floor provided with travelling wheels for this purpose and provided also with a handle by means of which the machine may be operated by a person in an upright position. Portable cleaners are well known, and the term "portable" is commonly used to refer to any cleaner which is suspended from the operator during the cleaning operation. Such a cleaner ordinarily does not have travel wheels, and comprises only a filtering bag, a motor and fan assembly, a cleaning tool and its connection to the suction producing device, and some sort of supporting means by means of which the cleaner may be suspended from some portion of the body of an operator. This type of vacuum cleaner is used commonly for cleaning the upholstery of automobiles and the like, and it has become quite common for a housewife to purchase not only a conventional domestic cleaner but also a portable cleaner, the one to be used for cleaning the house and the other for cleaning the family vehicle.

The present invention proposes to very considerably reduce the expense to the average family of providing cleaning equipment both for the house and for the automobile, by providing a set of apparatus which the housewife can convert into either a floor or a hand type cleaner.

The invention further has as its object to improve some of the faults of the ordinary portable cleaner. For instance, I propose to provide a portable cleaner which has the same capacity, the same ruggedness and durability, and the same strength of suction as a full sized domestic cleaner. This has not been true in the past of portable cleaners. Most of them incorporate only small sized replicas of the suction producing apparatus found in a domestic cleaner, and are otherwise correspondingly cheaper and lighter in construction.

Another objection to the ordinary portable cleaner is its lack of balance. The weight of the filtering bag tips the ordinary cleaner to one side so that it is rather unwieldy to handle. My invention aims to remedy this condition by providing a portable cleaner in which the filtering bag is positioned on one side of the suction producing device and the floor tool which forms part of the domestic cleaner, is positioned on the opposite side of the suction producing device, an auxiliary handle being provided, positioned intermediate the bag and the floor tool, whereby the bag and floor tool tend to balance each other in substantially horizontally opposed positions when the cleaner is suspended from said auxiliary handle. This arrangement is particularly advantageous in that the bag is thus supported in an elevated position and does not tend to hang low and drag against surfaces or parts being cleaned.

This application is a continuation in part of my application Serial No. 549,627, filed July 9, 1931.

The present invention makes it possible to detach the domestic handle and switch assembly from the body of the cleaner, and to thereby constitute the body of the cleaner a unit which is common both to the domestic cleaner and the portable cleaner. The term "body" is used here to indicate the motor and suction device assembly, the floor tool, and the travel wheels.

A further object of this invention is to provide an auxiliary handle the primary purpose of which is to provide support for the portable cleaner, and to arrange this handle so that it may be used also, if desired, in connection with the domestic cleaner. To this end, the handle is arranged in a rather inconspicuous position where it projects a very small amount and will not seriously interfere with the adaptability of the domestic cleaner to cleaning in confined spaces. This is accomplished in the particular type of cleaner to which this invention is primarily applied, namely, one in which the fan casing is provided with opposed projecting suction inlet sockets, by attaching opposite ends of the handle to said casing so that the space between said sockets is utilized as part of the space within the handle, preferably attaching said opposite ends to said sockets.

Another object is to provide for detachability of the handle, so that the latter may be detached when the cleaner is used as a domestic cleaner, if this is desired by the housewife.

With these and other objects in view my invention consists in the combination and construction and arrangement of the various parts thereof, whereby the objects contemplated are attained, as more fully set forth in the accompanying specifications, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of the portable cleaner, an operator thereof being indicated in broken lines.

Fig. 2 is an enlarged detail view of the fan case, and the associated auxiliary handle, parts being
shown in section to better illustrate the construction.

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

Fig. 4 is an inverted plan view of the handle.

Fig. 5 is a side elevation of the apparatus when converted into a domestic cleaner.

Fig. 6 is a side elevation of the cleaner body with a somewhat modified form of auxiliary handle attached thereto.

Fig. 7 is a perspective view of the said modified form of auxiliary handle.

Referring first to Fig. 1, provide a cleaner body, including a motor 10, a fan casing 11, including a suction chamber 12, suction inlet sockets 13 and 14 respectively, and the outlet socket 15; and the floor tool 16 mounted on a tubular neck 17 secured in the socket 13. Numeral 12—A indicates a known form of valve rotatably mounted within the chamber 12 and serves to connect alternatively either the socket 14 or the socket 13 to the fan which operates within the fan case 11.

Turning now to Fig. 5, the socket 14 receives a hollow tubular handle 18, which is clamped in place by means of the clamping device 20. Aligning the ears 20 defining a slot 31 in the socket 14 to draw the split halves of the socket into clamping engagement with the lower end of the tube.

Supported on handle 18 is the switch assembly 21 which incorporates a combined switch element and plug socket (not shown) to which may be attached the plug 22 of the motor cord 23. The latter extends into the motor housing as at 24, being thus permanently attached to the motor.

The extension cord 25 of the domestic cleaner is permanently attached to the switch, being supported by a coil spring 26 forming part of the switch assembly.

The extension cord 25 forms an inseparable part of the handle assembly, and it will now be seen that in removing the handle 18 from the cleaner body, that the extension cord would be removed along with it while the motor cord 23 remains attached to the motor, the point of separation being between the plug 22 and the socket incorporated in the switch assembly 21.

The filter bag 27 for the domestic cleaner is of a known construction and is attached and supported by brackets 28, specifically forming no part of the present invention although it would be understood that the present invention contemplates some means for attaching and supporting the bag. A conventional detachable connection 29 connects the bag to the discharge or outlet socket 15.

It will now be seen that in converting the cleaner just described into a portable type, the handle and bag can quickly be removed by removing the screw 13, pulling the handle from the socket 14, and detaching the bag connections.

At this point it may be explained that one object of the present invention is to provide an arrangement whereby the housewife may quickly and easily transform one type of cleaner into the other type, with a minimum of difficulty, removal of the handle and bag of the domestic cleaner is seen to be a simple operation, and the attachment of the parts which provide the portable cleaner is equally simple.

These parts are comprised in a flexible tube 30, attached by means of a jacket 31 to the handle 18, a cleaning tool of the same type as the tool 31—A illustrated in Fig. 1, attachable to the other end of tube 30, and a short length bag 32 which is self-supporting when attached by means of its neck 33 to the connection 29 of the socket 15, the stiffness of the fabric, together with that of the paper dust receptacle or liner (P), contained therein, contributing to such support.

The bag 32 has a mouth defined by its longitudinal edges which merge with the neck 33, said edges being provided with a well known type of slide fastener 32a, by means of which the mouth may be opened or closed. The fastener serves as a stiffening rib for the upper edge of the bag, helping to support the bag in the extended position shown in Fig. 1. The fastener also serves to secure the neck 33 around the connection 29.

The auxiliary handle shown in Fig. 4 comprises a crescent shaped handle member 34 provided at one end with a teat 35 and at its other end with a fork or yoke 36 adapted to embrace the socket 13. In one arm of the yoke 36 is secured a pin 37 while the other end of the arm is formed with an internally threaded boss 38 through which is threaded a set screw 39.

Turning now to Figs. 2 and 3, the socket 14 is provided with a window 40 in which is received the teat 35 while the socket 13 is provided with a pair of opposed openings 41 in one of which is received the pin 37 and in the other of which is received the end of the set screw 39.

In attaching the handle, the teat 35 is first placed in the opening 40, the set screw 39 is backed off to allow the socket 13 to be seated between it and the pin 37, the two are brought into registry with the openings 41, and the set screw is then threaded inwardly to secure the socket 13 between the arms of the yoke 36.

An alternative form of the auxiliary handle is that shown in Fig. 7, wherein the handle portion 34—A is made of leather and provided at its ends with a pair of flat ears 42, each having a pair of slots 43 through which a strap 44, (or 45, as the case may be) is fastened. The buckles are shown at 46. The strap 44 encircles the sockets 14 and 15 and the strap 45, which is smaller in diameter, encircles the socket 13, all as shown in Fig. 6.

In using the portable device the plug 22 may be inserted into an ordinary plug socket 47 on any suitable current carrying cable such as ordinary garage extension cord 48.

Returning again to the domestic cleaner set-up it will be noted that the detachable connection of the motor cord 23 is made at a point where there is no danger of the cord plug being pulled out of its socket accidentally. The cord is normally positioned below the handle 18 closely adjacent to the bag 27, and is protected against becoming caught on obstacles. At the same time, a connection is provided by means of which the motor pulling the handle from the handle assembly and a connection left for attachment to the garage extension cord.

Attention is now called to the fact that only the bag and handle are detached from the body portion of the cleaner in making the conversion. This simplifies removal without going to the extent as to make it practical for the ordinary housewife to make the conversion herself.

The floor tool 16 is allowed to remain attached, and serves a useful function in connection with the portable cleaner, namely, acting as a carry bag for the motor 32 and allowing the cleaner to balance in a natural position wherein the bag extends substantially in a horizontal direction while the motor 10 hangs sub-
stantially in a vertical position. The motor 10 also acts as a counterweight to offset any irregularities between the weight of the bag 32 and that of the floor tool, bringing the center of gravity below the plane of the floor tool and the upper edge of the bag.

Some of the advantages just stated arise from the peculiar arrangement of floor tool, motor and bag connection, whereby the floor tool, motor and bag are positioned in the relation described.

Some changes may be made in the construction and arrangement of the parts in my invention without departing from the true spirit thereof and it is my purpose to cover by my claims any modified forms of construction or the use of mechanical equivalents which may reasonably be included within their scope.

I claim as my invention:

1. In combination, a suction cleaner including a fan casing having opposed air passage members, a handle including at one end a seat, one of said air passage members having a hole to receive said seat, said handle including at its other end a fork to embrace the other air passage member, the respective prongs of said fork having elements projecting toward each other, one of said elements being retractable, and the air passage member embraced by the fork having a pair of opposed holes to receive said elements.

2. In an attachment to a suction cleaner including a fan casing having opposed air passage members, a handle including at one end a member to engage with one of said air passage members and at its other end, with a fork to embrace the other of said air passage members, the respective prongs without elements projecting toward each other, said elements being adapted to engage in suitable holes in the air passage member embraced by the fork.

3. In a suction cleaner, a fan casing and motor unit having on one side of its axis a projecting tool, a handle attached to the fan casing opposite the motor, whereby the unit may be suspended with its axis substantially vertical and said members projecting laterally, a dust collector attached to said outlet and projecting in a horizontal direction, the weight of said collector being substantially balanced by said projecting member, and said motor serving to maintain said dust collector and projecting member in equilibrium, said dust collector including stiffening means whereby it may support itself in said horizontal position, deriving its support solely from its connection to said outlet.

4. For attachment to a suction cleaner including a fan casing having opposed air passage members, a handle including at one end a member to engage with one of said air passage members and at its other end, with a fork to embrace the other of said air passage members, the respective prongs of said fork having elements projecting toward each other, one of said elements being in the form of a retractible set screw threaded through its respective prong, and each of said elements being adapted to engage in suitable holes in the air passage member embraced by the fork.

5. For attachment to a suction cleaner including a fan casing having opposed air passage members, a handle including at one end a member to engage with one of said air passage members and at its other end, with a fork to embrace the other of said air passage members, the respective prongs of said fork being formed at their ends with aligned collars, one of which is internally threaded, a set screw threaded therethrough, and a pin secured in the opposite collar, the air passage member embraced by the fork being provided with holes in which said pin and set screw respectively are adapted to engage.

6. In a suction cleaner, a fan casing and motor unit having on one side of its axis a projecting tool, a handle attached to the fan casing opposite the motor, whereby the unit may be suspended with its axis substantially vertical and said members projecting laterally, a dust collector attached to said outlet and projecting in a horizontal direction, the weight of said collector being substantially balanced by said projecting member, and said motor serving to maintain said dust collector and projecting member in equilibrium, said dust collector including stiffening means whereby it may support itself in said horizontal position, deriving its support solely from its connection to said outlet, and a flexible tube connected to said outlet, and adapted to connect to a suitable cleaning tool at its end.

7. In a suction cleaner, a fan casing and motor unit having on one side of its axis a projecting tool, a handle attached to the fan casing opposite the motor, whereby the unit may be suspended with its axis substantially vertical and said members projecting laterally, a dust collector attached to said outlet and projecting in a horizontal direction, the weight of said collector being substantially balanced by said projecting member, and said motor serving to maintain said dust collector and projecting member in equilibrium, said dust collector including stiffening means whereby it may support itself in said horizontal position, deriving its support solely from its connection to said outlet, and a flexible tube connected to said outlet, and adapted to connect to a suitable cleaning tool at its end, said flexible tube being detachably connected to said inlet so that it may be substituted for by a rigid handle for converting the cleaner into a roller supported type.

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