

Dec. 29, 1959

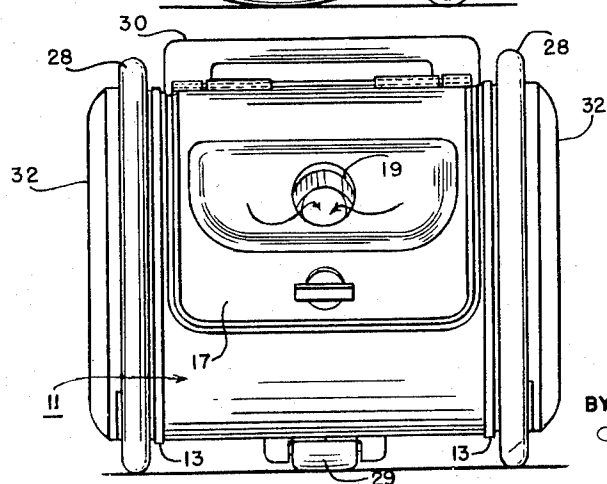
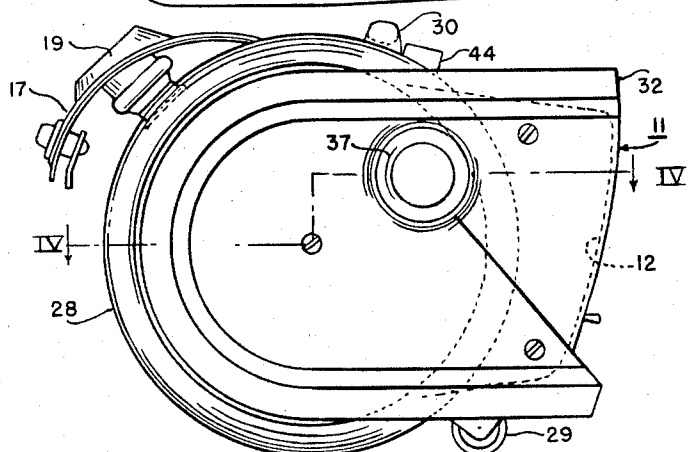
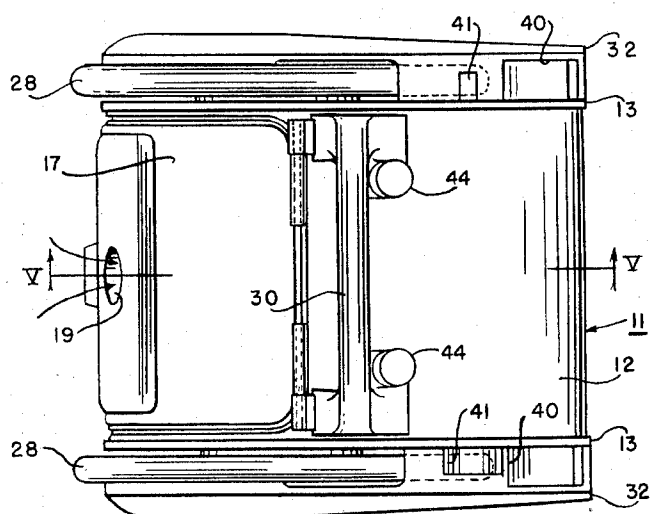
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2,918,693

SUCTION CLEANING APPARATUS

Filed Oct. 30, 1957

3 Sheets-Sheet 1



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SUCTION CLEANING APPARATUS

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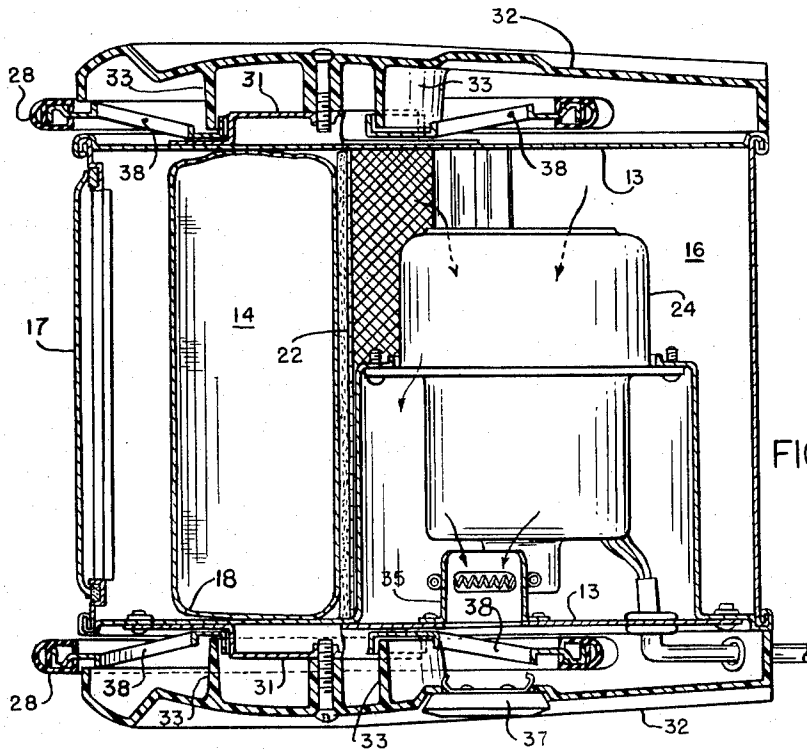


FIG. 4.

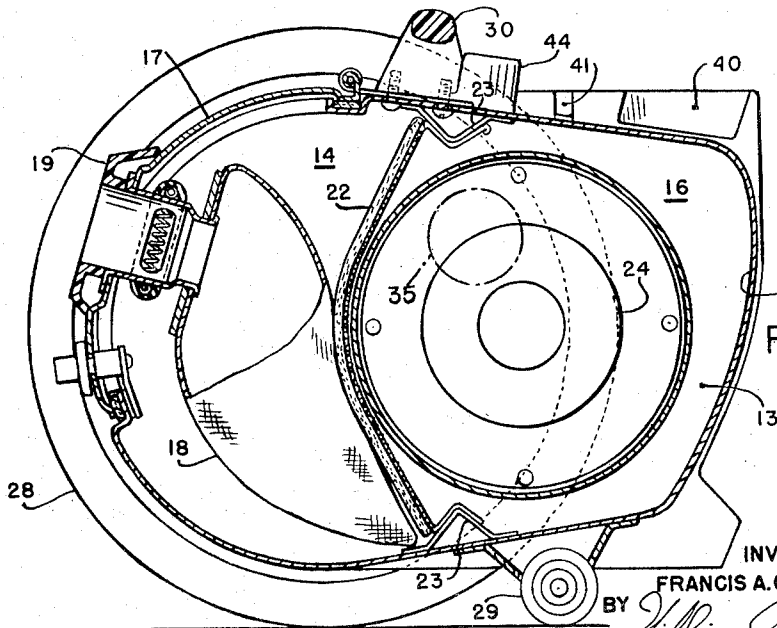


FIG. 5.

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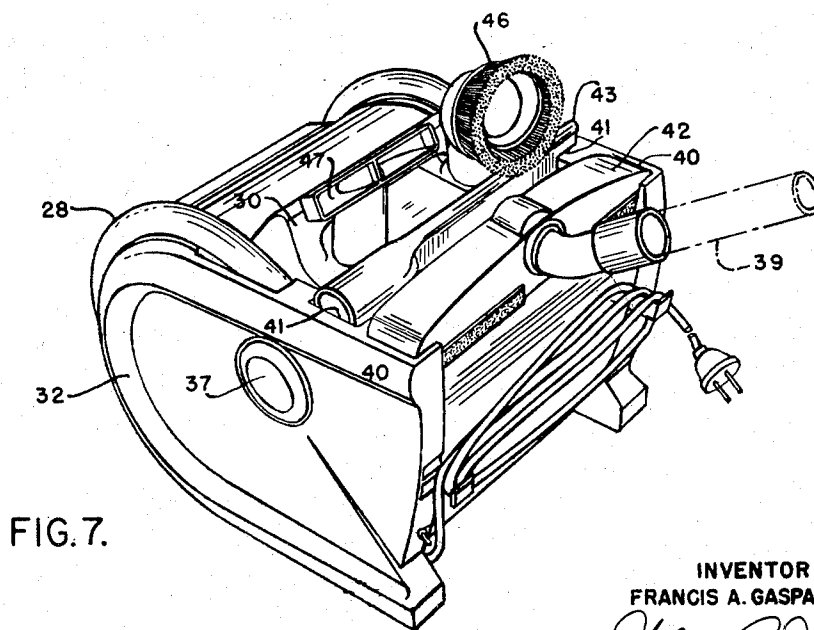
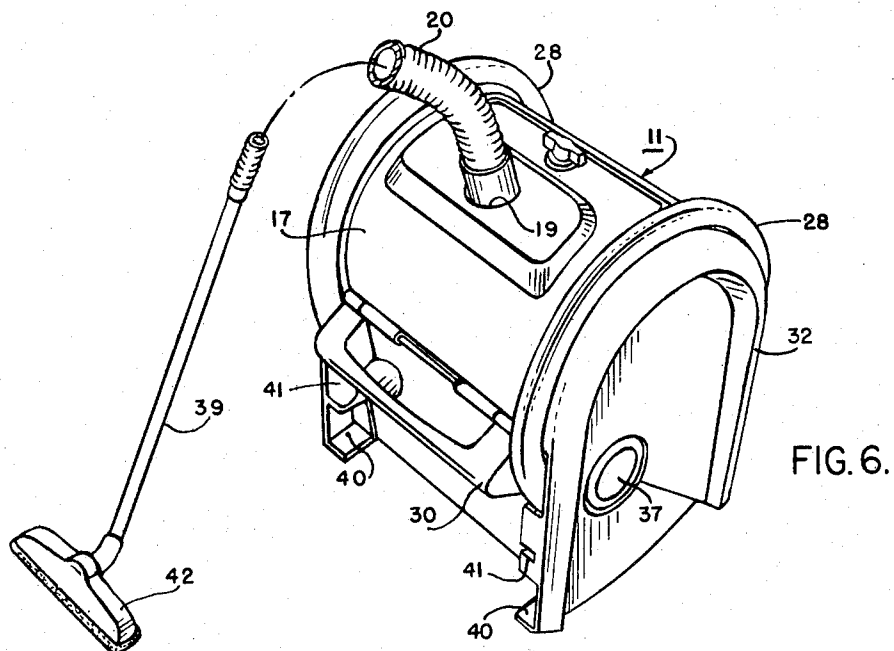
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SUCTION CLEANING APPARATUS

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3 Sheets-Sheet 3



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2,918,693

SUCTION CLEANING APPARATUS

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Application October 30, 1957, Serial No. 693,293

4 Claims. (Cl. 15—323)

This invention relates to suction cleaning apparatus, more particularly to mobile suction cleaners, and has for an object to provide improved apparatus of this kind.

In domestic suction cleaners of the type set forth, characteristics such as maneuverability, compactness, and convenient, infrequent disposal of accumulated dirt have become increasingly important to the user. Consequently, it is currently desirable to equip domestic suction cleaners with large diameter wheels so that the cleaner can be easily maneuvered over floor obstructions and about the house, and, further, to provide a compact casing arrangement having means for effectively filtering and collecting dirt in a large, conveniently disposable filter bag. A large filter bag requires less frequent replacement than a small filter bag and thus permits the cleaner to operate at maximum efficiency for long periods of time.

This invention provides a uniquely arranged suction cleaner of the mobile type which includes a casing having a generally ovoid side outline and a pair of large diameter front wheels. A semi-cylindrical frontal portion of the casing, formed generally about the front wheel axis, defines a suction chamber containing a large filter bag; and, within a rearwardly converging portion of the casing, an apparatus chamber houses a motor-blower unit. Thus, a basic arrangement is provided in which maximum utilization of volume is derived from a distinctive casing, designed to lend itself well to economical manufacture and efficient performance.

It is a desirable feature to equip the casing with means for carrying attachments so that they are readily available when the cleaner is in use. In accordance with this invention, the top wall is utilized for supporting attachments, which are held in place by suitable recesses and protuberances, formed in side portions of the cleaner adjacent the top wall.

Convenient access to the filter bag, which permits quick inspection and almost effortless replacement thereof, is an additional feature of this invention. The foregoing is accomplished by uniquely attaching the filter bag to the inner side of a hinged door which closes a front access opening to the suction chamber.

A still further feature of this invention is the ease with which this cleaner may be used for cleaning stairs. By means of its rear end design, the cleaner may be placed on end, so that it cannot roll, on a step or any flat surface and used as a swivel-top cleaner.

It is to be observed, therefore, that improvements to suction cleaners have been directed, of late, to increasing their versatility and convenience. The use of large wheels can greatly improve the mobility of the appliance but, without further provisions, the improved mobility may sacrifice or omit other equally important features. For example, some prior art cleaners have a generally cylindrical casing shape which is unsuitable for carrying so-called "wand" attachments, such as may be necessary for above-the-floor cleaning; and, in such cleaners, the user may even be required to upend the casing and remove one wheel in order to inspect or remove the filter bag.

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In some other large wheel cleaners, the casing projects forward and above the rubber-tired wheels, thereby increasing the likelihood that furniture and other household objects of value will suffer injury in the event of collision. In the illustrated embodiment of this invention, the large wheels not only provide improved maneuverability but also serve as front bumpers for the casing. Further, the casing construction, as previously described, supports wand attachments and permits convenient inspection and renewal of the filter bag.

The foregoing and other objects are effected by the invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a top view of the suction cleaner constructed and arranged according to the invention;

Fig. 2 is a side elevational view of the apparatus shown in Fig. 1, but with the door open to illustrate the manner in which the filter bag is removed from the cleaner;

Fig. 3 is a front elevational view of the suction cleaner shown in Fig. 1;

Fig. 4 is an enlarged horizontal sectional view as viewed from the plane IV—IV of Fig. 2 and showing the interior arrangement of the apparatus;

Fig. 5 is an enlarged vertical sectional view taken along line V—V of Fig. 1;

Fig. 6 is a perspective view of the apparatus upended for use as a swivel-top cleaner, shown together with a wand and cleaning tool; and

Fig. 7 is a perspective view of the cleaner showing the top wall as used for holding cleaning nozzles, and details of the rear portion.

Referring in detail to the drawings, the invention is therein shown applied to a domestic suction cleaner adapted for use with a flexible hose and cleaning tool, and supported on a pair of large diameter wheels. The casing has the general appearance of a somewhat flattened, hollow shell, and provides an unusual number of convenience features for a cleaner so well suited for economical manufacture. Further, the relationship of the wheels to the casing results in an arrangement which provides stability, ease of handling and maintenance, and maximum utilization of volume.

The casing 11 of the suction cleaner is constructed of a tubular wrapper member 12 having a generally semi-cylindrical front wall of arcuate cross section formed about a horizontal axis. Generally ovoid side panels 13 are employed to complete the casing construction by sealing the ends of the wrapper member 12, thereby enclosing a suction chamber 14 and an apparatus chamber 16 in the front and rear portions of the casing, respectively. (See Figs. 4 and 5 wherein the suction and apparatus chambers are generally indicated.)

An access opening, closable by a door 17 hinged at the top, is formed in the front wall of the casing 11 to provide access to the suction chamber 14 wherein a porous filter bag 18 is contained for the collection and filtering of dust. A suitable latch and handle are provided for the door 17. Formed in a central region of the door 17 is a suction inlet 19 having means for positively coupling the suction inlet with the discharge end of a flexible cleaning hose 20 (see Fig. 6). The positive coupling means are neither shown nor described herein, but may be of the type disclosed in Patent No. 2,757,942, issued on August 7, 1956, to A. H. Eberhart and assigned to the assignee of the present invention. The positive coupling between the hose 20 and the cleaner casing 11 permits the operator to move the cleaner by pulling on the hose.

The filter bag 18 is of the conventional type, but preferably having a resiliently dilatible inlet opening for

encompassing and gripping an inner extension of the suction inlet 19 in sealing relationship. Thus, the bag 18 is most conveniently installed by attaching it to the inner extension of the suction inlet 19 with the door 17 in open position; then closing the door and lowering the bag 18 into the suction chamber 14. To insure efficient operation of the cleaner, the user occasionally checks the dirt level in the filter bag 18 by unlatching and raising the door 17, whereby the bag is raised from the suction chamber 14 and exposed for inspection. However, if a very large amount of dirt has been accumulated, the bag 18, now too heavy to be supported by the inlet opening of the bag, will detach itself from the suction inlet 19, thus remaining in the suction chamber 14 and presenting itself for disposal and replacement.

A removable flocked screen 22, forming a porous partition between the apparatus chamber 16 and the suction chamber 14, is positioned, by virtue of its own resilience, in edgewise compression between suitable upper and lower brackets 23 (see Fig. 5). The flocked screen 22 provides an additional filtering stage in the air flow system, is washable, and permits communication of air between the chambers 14 and 16.

Housed within the apparatus chamber 16 is a motor-blower unit 24, supported on one of the side panels 13. The motor-blower unit 24 creates a vacuum within the casing 11 for translating dust-laden air through the suction inlet 19 into the suction chamber 14, wherein separation of the dust from the air is accomplished by the filter bag 18 in the usual manner.

A pair of large diameter front wheels 28, equipped with rubber or rubber-like tires, as shown in Fig. 4, are pivotally mounted on opposite sides of the casing 11 for cooperation with a small rear wheel 29 in providing support for the casing 11. The manner of attachment of the front wheels 28 is further discussed hereinafter, but the pivotal axis of the wheels 28 is substantially coaxial with the horizontal axis about which the arcuate front wall of the casing 11 is formed. The front wheels 28 superextend, or project beyond, the front wall of the casing 11 along lines radial and perpendicular to the wheel axis so that tread portions, or loci thereof, of the resilient tires lie in an imaginary cylindrical surface forward of the front wall and serve as a front bumper for the cleaner. Moreover, the wheels 28, by virtue of their size, permit a high degree of maneuverability during movement of the cleaner throughout the house and over floor obstructions. A handle 30 is secured to the top of the casing 11 for the convenience of the user in lifting the cleaner and for coping with unusually obstinate floor obstructions.

In the preferred embodiment, the front wheels 28 are made from sheet metal, well-suited for stamping. A large and flanged circular opening is punched in a central region of each wheel 28 and serves as a rotating bearing adapted for pivotal cooperation with a stationary journal 31 carried by each side panel 13.

In order to hold each front wheel 28 in place on its journal 31, a fender 32 having an inwardly extending circular flange 33 is secured, as by screws, to each side of the casing 11. Each circular flange 33 and the adjacent journal 31 are positioned in concentric, radially spaced relationship, with a front wheel bearing retained therebetween, in such a manner that the wheels 28 are free to rotate but are restrained from axial or radial movement. Application of a suitable lubricant to parts in sliding contact is advisable.

The wheel mounting arrangement is described in greater detail and claimed in the copending application of William A. Ardito, Serial No. 747,913, filed July 11, 1958, and assigned to the assignee of the present invention.

The fenders 32, which form decorative end portions of the cleaner casing 11, cover a major portion of the wheels 28 while exposing all but the rearmost portions of the tires. The front portion of each fender has an

arcuate shape similar to the shape of the front wall of the casing proper 11, and projects frontward a shorter distance from the wheel axis than the tires. The arrangement is such that the tire portions of the wheels project above and forward of the cleaner casing to act as bumpers for the casing, and reduces the likelihood of injury to furniture and walls during movement of the cleaner about the house. Lying in the same plane, rearmost of the fenders 32, are the upper and lower rear corner portions of each fender 32 which support the cleaner when it is placed on its rear end as a swivel-top cleaner (see Fig. 6). In this position the wheels 28 and 29 are off the floor and the cleaner can be placed at rest on a flight of stairs, thus making the job of stair cleaning less awkward and burdensome.

Referring especially to Fig. 4, the filtered air is preferably discharged from the blower chamber 16 at low velocity in a manner unlikely to stir up dust, dirt, and the like from ash trays and surfaces yet to be cleaned. Accordingly, an outlet nozzle 35 is formed in the side panel 13 adjacent the outlet side of the motor-blower unit 24 so that air discharged from the apparatus chamber 16 is directed against inner surfaces of the nearby wheel 28 and fender 32, is thus diffused, and returned almost imperceptibly to the ambient atmosphere. The outlet nozzle 35 is provided with positive coupling means similar to the inlet nozzle 19; and, in order that a connection may be made—for the purpose of conducting forced air from the apparatus chamber 16—a suitable aperture, closable by a readily removable cap 37, is provided in the fender 32 neighboring the outlet nozzle 35, and in registry therewith. Several flanged openings 38 are also formed in the wheels 28 in order to strengthen and lighten them, and also to permit the passage of a male connector (attached to the end of the flexible hose 20) through the fender aperture and one of the wheel openings 38 for connection with the outlet nozzle 35.

The cleaner is also capable of carrying an assortment of accessories or attachments such as cleaning nozzles on its top wall, as shown in Fig. 7. The cleaning nozzles are attachable, one or the other at a time, to a rigid, tubular wand portion which forms an extension of the flexible hose 20 (see Fig. 6). Suitable recesses 40 and 41 are formed in the fenders 32, which form part of the casing 11, to position and retain a carpet cleaning nozzle 42 and a crevice cleaning nozzle 43, respectively. A pair of upwardly extending, spaced protuberances or knobs 44 are formed as an integral part of the handle 30 (see Fig. 1), and employed to receive and hold a dusting brush 46 and a drapery nozzle 47. Each knob 44, respectively, enters the interior of the neck of the supported tools 46 and 47 in order to secure them in an accessible position. Thus, the top wall of the cleaner is utilized for carrying attachments so that they are readily available to the operator when the cleaner is in use. It is to be observed, as in Fig. 1, that when no attachments are carried on the cleaner casing, the cleaner retains the appearance of a complete unit, because the tool retaining means of this invention are inconspicuous by comparison with the unoccupied hooks and holders proposed in prior art cleaners.

The carpet cleaning nozzle 42 is supported and positioned rearmost of the attachments so that when the inflexible wand 39 (a portion of which is shown in phantom in Fig. 7) is attached thereto, the cleaner can be pushed and maneuvered from the rear with a minimum of effort. The method of moving the cleaner just described is in addition to the conventional movement of the cleaner caused by the operator pulling upon the end of the hose during the cleaning operation.

From the foregoing it may be seen that improved maneuverability, infrequent and easy replacement of filter bags, and many new convenience features are accomplished in this uniquely arranged casing, in which maximum utilization of volume is derived.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. A suction cleaner adapted for use with a cleaning hose and comprising a casing, means for movably supporting said casing, said supporting means including a pair of spaced wheels mounted for rotation about a horizontal axis, said wheels having tread portions lying in an imaginary cylindrical surface, said casing having a front wall of arcuate cross-section disposed forwardly of said axis and enclosed within said imaginary cylindrical surface, said casing having a rear wall disposed rearwardly of said imaginary surface and top and bottom walls which extend rearwardly from said front wall in converging relationship, said casing having a suction chamber and an apparatus chamber disposed respectively in front and rear portions thereof in communication with each other, a motor-blower unit housed in the apparatus chamber and disposed at least partly between said imaginary cylindrical surface and said rear wall, said front wall of the casing having an opening formed therein for access to said suction chamber, means for closing said opening movable to an open position, means for securing said closing means in a closed position, a suction inlet formed in said closing means and adapted to receive one end of a cleaning hose, and a filter bag having porous walls, said bag being disposed in said suction chamber entirely within said imaginary surface and attached to said suction inlet for receiving dust-laden air from the suction inlet and discharging filtered air through the walls of said bag into said apparatus chamber.

2. A suction cleaner adapted for use with a cleaning hose and comprising a casing having a front wall of arcuate cross-section, said front wall being formed about a horizontal axis extending transversely of said casing, means for movably supporting said casing including a pair of spaced wheels mounted for rotation about said axis, said wheels having tread portions lying in an imaginary cylindrical surface, said front wall being disposed forwardly of said axis and enclosed within said imaginary cylindrical surface, said casing having a rear wall disposed rearwardly of said imaginary surface, top and bottom walls of said casing which extend rearwardly from said front wall in converging relationship, said casing having a suction chamber and an apparatus chamber disposed respectively in front and rear portions thereof in communication with each other, a motor-blower unit housed in the apparatus chamber and disposed at least partly between said imaginary cylindrical surface and said rear wall, said front wall of the casing having an opening formed therein for access to said suction chamber, means for closing said opening movable to an open position, means for securing said closing means in a closed position, a suction inlet formed in said closing means and adapted to receive one end of a cleaning hose, and a filter bag having porous walls, said bag being disposed in said suction chamber entirely within said imaginary surface and attached to said suction inlet for receiving dust-laden air from the suction inlet and discharging filtered air through the walls of said bag into said apparatus chamber.

3. In a suction cleaner, the combination of a casing,

means for movably supporting said casing including a pair of spaced wheels mounted for rotation about a horizontal axis, said casing having a front wall of arcuate cross-section extending generally transverse to said casing, said wheels having tread portions, the loci of said tread portions forward of said axis being more distant than said front wall from said axis along lines radial and perpendicular to said axis, a suction inlet formed in said casing, said casing having a rear wall disposed rearwardly of said axis an appreciably greater distance from said axis along radial and perpendicular lines than the loci of said tread portions, said casing having top and bottom walls thereof extending rearwardly from said front wall to said rear wall, said top wall of the casing presenting a substantially broad flat surface for storing a plurality of cleaning nozzles, and means for retaining said nozzles in readily accessible position on said top wall.

4. In a suction cleaner, the combination of a casing, means for movably supporting said casing including a pair of spaced wheels mounted for rotation about a horizontal axis, said casing having a front wall of arcuate cross-section extending generally transverse to said casing, said wheels having tread portions, the loci of said tread portions forward of said axis being more distant than said front wall from said axis along lines radial and perpendicular to said axis, said front wall having an opening formed therein providing access to the interior of said casing, means for closing said opening, said closing means being movable to an open position, a suction inlet to said casing formed in said closing means, air translating apparatus within said casing for creating a suction at said suction inlet, a filter bag within said casing and connected to said suction inlet, said casing having a rear wall disposed rearwardly of said axis an appreciably greater distance from said axis along radial and perpendicular lines than the loci of said tread portions, said air translating apparatus being disposed at least partly between the loci of said tread portions and said rear wall, said casing having a top wall thereof extending rearwardly to said rear wall from the upper terminal of said front wall, said top wall of the casing presenting a substantially broad flat surface for storing a plurality of cleaning nozzles, and means for retaining said nozzles in readily accessible position on said top wall.

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