The invention relates to mobile electric vacuum cleaners, and particularly to an improvement in the electrical wiring, connections and switch therefor.

Mobility in a vacuum cleaner is very desirable, however, there exist in existing mobile vacuum cleaners that are mounted on wheels. Foremost among these deficiencies are: awkward and complicated wiring, frequent entanglement of the electrical cord in the wheels during operation, and likelihood of the electrical switch to be inadvertently actuated during operation.

The object of my invention is to provide an improved wheeled mobile electric vacuum cleaner, wherein the wiring is simple, neat and inexpensive, and the electrical switch and cord connection are located on the cleaner so as to minimize the possibility of the switch being inadvertently actuated or the cord becoming entangled in the wheels during operation.

The object of my invention is achieved by mounting the electrical cord and switch on a side portion of the cleaner that also constitutes a support for one of the wheels, and connecting them to the suction unit in the cleaner by short electrical wires. With this arrangement, the portion, in addition to supporting a wheel, constitutes a support for the switch and cord connection, and locates the latter members so as to be accessible from the side of the casing and, therefore, out of the direct path of movement of the cleaner.

Other objects and further details of that which I believe to be novel and my invention will be clear from the following description and claims taken with the accompanying drawings wherein:

Figure 1 is a front elevation view of the improved mobile electric vacuum cleaner, with portions broken away and shown in section.

Figure 2 is a side elevation view of the cleaner looking in the direction of the arrow in Figure 1.

Figure 3 is a fragmentary view of a portion of the cleaner showing a detachable electrical cord connected to the cleaner.

Referring to the drawings, and particularly to Figure 1, it will be seen that the mobile electric vacuum cleaner generally comprises a casing 10, in the form of a drum or cylinder, which rotatably supports large wheels 12 and 14 at its respective ends. The cleaner may be propelled across a surface on which it rests by pushing or pulling the casing. The manner of mounting wheel 12 on the casing forms no specific part of my invention and, therefore, will not be described in detail; the manner of mounting wheel 14 will be described subsequently.

The cleaner includes air flow producing and filtering means within the casing, and appropriate cleaning tools that are placed in communication with the interior of the casing by being connected to an inlet tube formed on the casing, all in a conventional manner. Inlet tube 16 is secured in the walls of and extends into the casing 10. The inlet tube has a mounting bracket 18 formed on its end that is positioned within the casing for the purpose of detachably receiving the mounting plate 20 of a dust-collecting bag 22. The construction of the inlet tube, the dust-collecting bag and their coupling are not shown nor described in detail, for they form no specific part of my invention. Reference may be had to application Serial No. 399,270 entitled Suction Hose Connections For Vacuum Cleaners filed by J. P. Hunter on December 21, 1953, now patent No. 2,769,998, and assigned as that of the instant application, for an example of the type of inlet tube structure that may be employed, and to application Serial No. 411,056 entitled Suction Cleaner and Disposable Bags Thereof filed by W. N. Kemnitz and G. H. Bramhall on February 18, 1954, now Patent No. 2,771,152, and assigned to the same assignee as that of the instant application, for an excellent example of a dust-collecting bag and a coupling that may be employed.

A motor and fan unit 24 of a known type is shown schematically in Figure 1, and is supported by mounting frame 26 and is disposed within casing 10 coaxially with the major axis thereof. Frame 26 is generally annular and attached to the casing 10 at its periphery and to unit 24 at its inner edge. Frame 26 and motor and fan unit 24 divide the interior of casing 10 generally into the suction chamber 28 (that portion with mounting 10 to the right in Figure 1 of unit 24 and its mounting bracket 26) and the discharge chamber 30 (that portion to the left of unit 24 and its mounting bracket 26).

The suction chamber 28 houses a guard 32, which is somewhat dome-shaped and comprises disk portion 34 and perforated cylindrical portion 36. Guard 32 surrounds part of the motor and fan unit 24, is secured to the mounting bracket 26 and/or the unit 24 by conventional securing means 38, and cooperates with the casing 10 to form an annular filtering chamber 100. Dust-collecting bag 22 is positioned in chamber 100. A combination screen and cloth filter assembly 40 surrounds the perforated cylindrical portion 36 of the guard for the purpose of preventing any dust particles from passing through the guard and into the motor and fan unit.

The assembly 40 may be constructed in a manner similar to the combination screen and cloth filter assembly disclosed and claimed in the co-pending patent application of Warren N. Kemnitz, Serial No. 520,721, filed July 8, 1955, and assigned to the assignee of the instant application.

Discharge chamber 30 communicates with the atmosphere through any conventional discharge means, such as a plurality of discharge openings (not shown) in the end wall (not shown) of casing 10 adjacent to wheel 12.

Cup-shaped cover 46 comprises a body which has a generally circular flat wall 58, cylindrical wall 98 and flange 48. Cover 56 is secured to disk portion 34 of guard 32 by threaded members 50 that pass through appropriate unnumbered openings in flange 48 and gasket 52, and are received in threaded openings 54 formed in the disk portion. As will be clearly seen in Figure 1, the interior of cover portion 36 of the disk portion 34 oppose each other and cooperate to define a chamber 56.

Circular wall 58 of cover 46 has openings 60 and 62 formed therein. Mounted within chamber 56 and secured to wall 58 is a conventional electrical receptacle 64 of the detachable socketed variety, having its socket aligned with opening 60, as can best be seen in Figure 2. This mounting is obtained by securing diamond-shaped bracket 66, which is a part of receptacle 64, to the inner face of wall 58 by conventional securing means 68, such as bolts, rivets, or the like.

The specific form of receptacle 64 is well known and, therefore, will not be described in detail. It includes electrical contact prongs 70, which are mounted within its socket, and on its exterior it carries two similar electrical connectors. Electrical connector 72, one of the
connectors, may be seen in Figure 1. The other electrical connector is located behind connector 72, as viewed in Figure 1 and, therefore, cannot be seen. Connector 72 is connected to wire 74, that passes through a grommet 44 that is located in opening 42 formed in disk portion 34 and is connected to the motor and fan unit in a conventional manner. The undesigned connector is connected to wire 76, which in turn is connected to the electrical switch 78 in a conventional manner. To complete the wiring, the electrical connector is connected to the motor and fan unit in a conventional manner, passes through grommet 44 and is connected to switch 78 in a conventional manner.

Switch 78 is a conventional electrical component and, therefore, the details of its construction will not be illustrated or described, for it forms no specific part of my invention. The switch is illustrated as being of the known push-button variety, however, it may be any type. Switch 78 is secured in the opening 62 in the wall 58 in any conventional manner, as by means shown in Figure 1. The switch has a threaded sleeve portion 84 that extends through opening 62. Portion 84 supports a spacer 82 on one side of the wall 58, and receives a lock-nut 86 on the other side of the wall. Switch 78 includes an actuating rod 88, which extends through the portion 84 of the switch and has a free end that is accessible from the exterior of the cleaner. Knob 130 on the free end of rod 88, and constitutes a conventional push-button. Switch 78 is actuated by pressing the push-button 90 toward the switch; this causes the opening or closing of the switch, depending upon the condition of the switch prior to pushing the push-button 90.

The other electrical connector 72 of the structure other than the wheel and lid assembly 92 shown on the right hand side of Figure 1, which is removably mounted on cylindrical wall 98 of cover 46 in a manner to be explained subsequently. The assembly comprises the aforementioned wheel 14, the casing closure lid 94 and the mounting structure 96. When assembly 92 is removed and the cleaner viewed in the direction of the arrow in Figure 1, the interior of the cleaner is exposed. This makes anamal filtering chamber 100 accessible for the purpose of changing dust-collecting bags. In the example illustrated, a bag is removed by uncoupling its mounting portion 20 from the mounting bracket 18, and moving it axially out of the filtering chamber 100; an appropriate replacement bag may then be mounted in chamber 100 by following the reverse procedure.

The closure lid 94 is generally frusto-conical and has an annular sealing gasket 102 formed at its periphery. Gasket 102 is adapted to cooperate with the lateral edge of the casing 10 to seal the filtering chamber 100 when the assembly 92 is mounted in assembled position. The central portion of lid 94 is apertured and carries an annular sealing gasket 106 on its side facing the interior of the filtering chamber 100. Gasket 106 cooperates with portions of the guard 32 and the filtering assembly 40 to effectuate a seal. The central portion of lid 94 is provided with a plurality of small openings around its aperture, that receive securing means 108, which are shown as being bolts. Bolts 108 pass through appropriate openings in the ring-like bracket 110 and are secured in the locking collar 112.

The central portion of lid 94 cooperates with an offset portion of bracket 110 to define an annular bearing cavity which is adapted to receive the annular bearing 114 that is secured to the central hub portion 116 of the wheel 14. Wheel 14 includes a laterally facing cavity that is formed by laterally displaced annular portion 120 and is adapted to be freely rotatable in the bearing cavity formed by the lid 94 and the bracket 110.

Assembly 92 is removably mounted as a unit on cylindrical wall 98 of cover 46. When the assembly is mounted in assembled position, the lid 94 seals the open end of casing 10, and wheel 14 is rotatable relative to the lid, bracket 110 and collar 112, the latter parts being rigidly secured to the casing 10 and being stationary therewith relative to the wheel. When assembly 92 is disengaged from the lid bracket, collar and wheel 14 all move as a unit.

The specific mode of removable mounting assembly 92 on cylindrical wall 98 does not form a specific part of my invention and, therefore, will not be described in detail. One arrangement would be to provide parallel lands 122 on the cylindrical wall of cover 46 and dispose projections 124 thereon. In the example illustrated in Figure 2, projections 124 are shown as being the ends of rod 126, which may be a roll pin. Assembly 92 has an internal cylindrical wall, indicated generally in Figure 1 as 128, which is formed by the aligned undesignated central apertures in lid 94, bracket 110 and collar 112. Wall 128 has a plurality of conventional bayonet type slots (not shown) that open on the inner side of assembly 92 and are adapted to cooperate with projections 124 to lock the assembly on the cover 46. Assembly 92 is mounted on cover 46 by sliding wall 128 on wall 98 axially toward casing 10 until the projections 124 enter the bayonet slots. When the projections are fully within the bayonet slots, the assembly is locked on the cleaner by twisting collar 112 relative to cover 46. To remove assembly 92, the reverse is employed.

In use, the plug 64 is inserted into the opening 132 of an electrical cord which is plugged into receptacle 64, and a plug (not shown) on the cord's other end is plugged into a conventional source of electrical power, such as a domestic electrical outlet. A flexible hose having a conventional cleaning tool attached may be secured to the portion of inlet pipe 16 which is accessible from the exterior of the cleaner. Then the electrical current is turned on by depressing push-button 90. This actuates the motor and fan unit, causing a flow of dust-laden air through the cleaning tool, flexible hose, inlet 16, dust-collecting bag 22, motor and fan unit 24, discharge chamber 30 and out through the discharge openings. While in use, the cleaner is maneuvered about the room either by pulling the flexible hose, or by providing a pushing and pulling arrangement. An example of such an arrangement is disclosed in the referred to application of J. P. Hunter, and in application Serial No. 399,271, entitled Suction Hose Connections for Vacuum Cleaners, filed by J. C. Shelvay and P. O. Rawson on December 21, 1953, now Patent No. 2,769,996, and assigned to the same assignee as that of the instant application. Regardless of the manner in which the cleaner is moved about the room, the central cylindrical portion of the cleaner remains relatively stationary while the wheels 12 and 14 rotate.

Prior to my invention, all of the mobile electric vacuum cleaners of which I am aware had the cord attached to the cylindrical part of the cleaner, and any attempt to move the cleaner about the room was likely to result in entanglement of the cord in the wheels or other portions of the cleaner. Additionally, in most prior mobile electric vacuum cleaners, the switch was mounted on the cylindrical portion of the cleaner, and inadvertent actuation of the switch, due to the contact of the switch with any object in the room or by inadvertent rotation of the cylindrical portion causing the switch to contact the floor, was possible. By mounting the cord receptacle and the switch in the supporting structure for the wheel and lid assembly so as to be accessible from the side of the cleaner, most of the possibility of entanglement of the cord in the cleaner or inadvertent actuation of the switch is eliminated, for the switch and cord are not in the path of movement of the cleaner. It should be observed that the switch is further protected from inadvertent contact, by the displaced annular portion 120 of the wheel, which extends laterally to an extent that it forms a protective wall for the switch. The switch is protected still further from inadvertent contact, by the sausage-shaped protuberance 118 which is formed on the collar 112.
It should be noted that my invention utilizes a portion of the cleaner which must necessarily be provided in one form or another to support the lid and wheel assembly, as the supporting structure for the switch and receptacle. Also, a simple effective wiring arrangement for connecting the receptacle and switch to the motor and fan unit has been provided. In this arrangement, the switch and receptacle, which are mounted on the lateral face of the cleaner, are connected directly to the motor and fan unit by wires that pass axially to the motor and fan unit, and which are completely protected by the guard 32 and cover 46.

As will be evident from the foregoing description, certain aspects of my invention are not limited to the particular details of construction of the example illustrated, and I contemplate that various and other modifications and applications will occur to those skilled in the art. It is, therefore, my intention that the appended claims shall cover such modifications and applications as do not depart from the true spirit of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A vacuum cleaner comprising a casing having an interior, wheels on said casing for supporting it and on which it normally may be moved in a fore and aft path of movement, a portion of said casing extending laterally relative to said path of movement for removable supporting one of said wheels at one lateral side of the casing, an electrical switch mounted on said portion and accessible from the exterior of the cleaner on the lateral side of said one wheel, and an electrical cord detachably secured to said portion at a point which is accessible from the exterior of said cleaner on the lateral side of said one wheel, whereby access to the interior of said casing may be had by detaching said electrical cord and removing said one wheel.

2. A device as defined in claim 1 wherein said one wheel has a deformed portion that defines a laterally facing cavity within which said electrical switch is located.

3. A vacuum cleaner comprising a casing having two lateral sides, said casing being closed at one side and having a wheel rotatably mounted at said side, a motor and fan unit in said casing, a guard mounted within said casing and spaced therefrom, said guard surrounding part of said unit and extending toward the open side of said casing, said guard supporting a cover at its end closest to the open side of the casing, said cover projecting beyond the open side of said casing, a lid adapted to close said casing, a rotatable wheel adapted to be mounted about said cover, whereby said cleaner is adapted normally to be moved on said wheels in a fore and aft path of movement with said wheels located at the lateral sides thereof, and an electrical switch mounted on said cover and accessible from the exterior of said cleaner on the lateral side of said last-mentioned wheel.

4. A device as defined in claim 3 wherein said lid and wheel part of a unitary assembly that is removably mounted on said cover.

5. A device as defined in claim 1 wherein an electrical cord is detachably secured to said cover.

6. A device as defined in claim 3 wherein said wheel has a deformed portion that defines a laterally facing cavity within which said switch is located.

7. A device as defined in claim 3 wherein an electrical cord is secured to said cover.

8. A device as defined in claim 7 wherein said cord is electrically connected to said unit and said switch, said switch is electrically connected to said unit, and wherein all of the connecting means are located within said cover and said guard.

9. A vacuum cleaner as defined in claim 3 wherein said lid and wheel are part of a unitary assembly that is removably mounted on said cover, and wherein said assembly has a protuberance in the vicinity of said switch that prevents inadvertent actuation of said switch.

10. A vacuum cleaner comprising a casing having two lateral sides, said casing being closed at one side and having a wheel rotatably mounted at said side, a motor and fan unit in said casing, a guard mounted within said casing and spaced therefrom, said guard surrounding part of said unit and extending toward the open side of said casing, said guard supporting a cover at its end closest to the open side of the casing, said cover projecting beyond the open side of said casing, a lid adapted to close said casing, a rotatable wheel adapted to be mounted about said cover, whereby said cleaner is adapted normally to be moved on said wheels in a fore and aft path of movement with said wheels located at the lateral sides thereof, and an electrical cord secured to said cover at a point which is accessible from the exterior of said cleaner on the lateral side of said last-mentioned wheel.

11. A device as defined in claim 10 wherein said last mentioned wheel is removable and said cord is detachable.

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