March 23, 1954 B. J. TAMARIN ET AL 2,672,642

VACUUM CLEANER WITH CONCEALED CORD-REEL

Filed Sept. 2, 1947

5 Sheets-Sheet 1

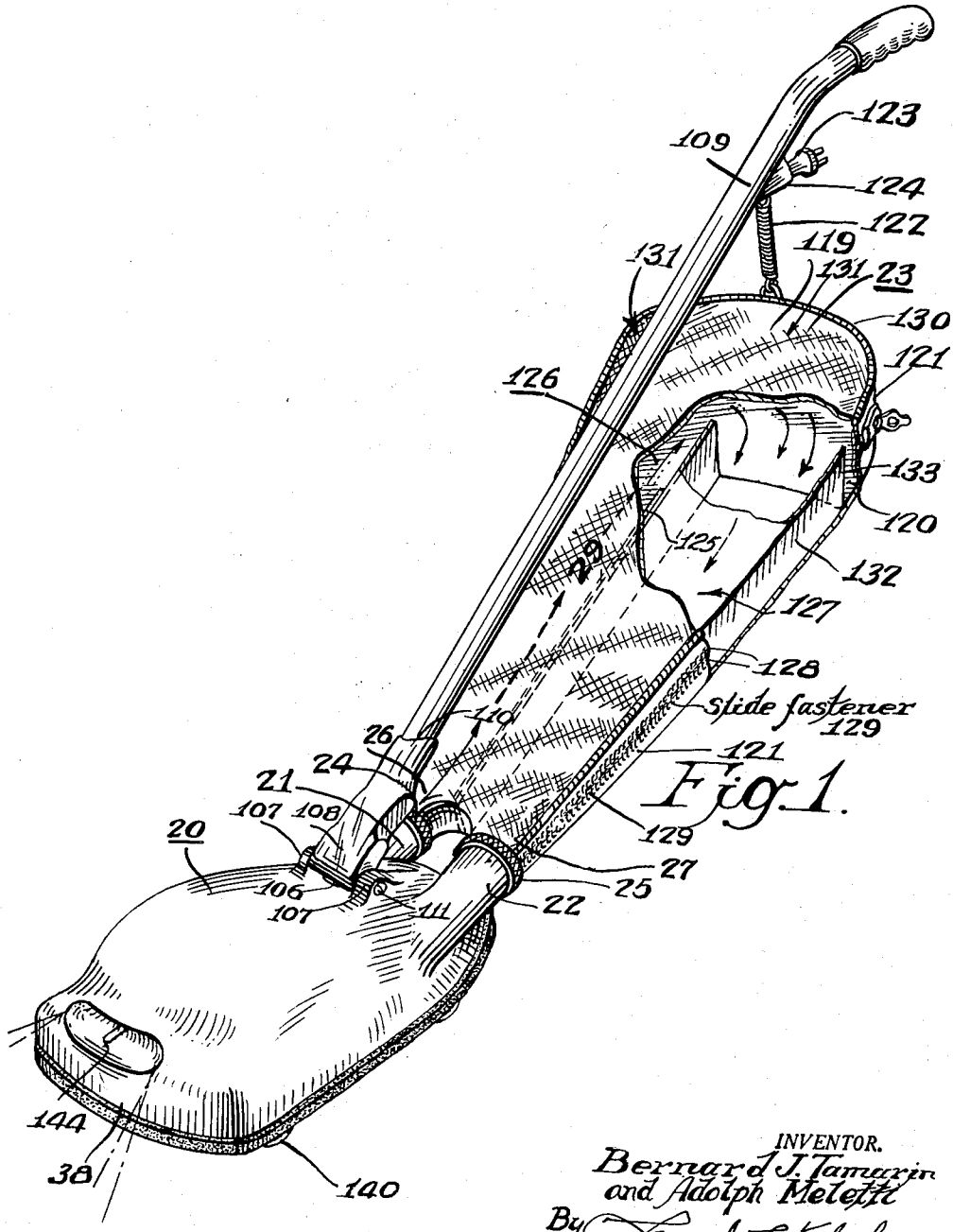


Fig. 1.

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5 Sheets-Sheet 2

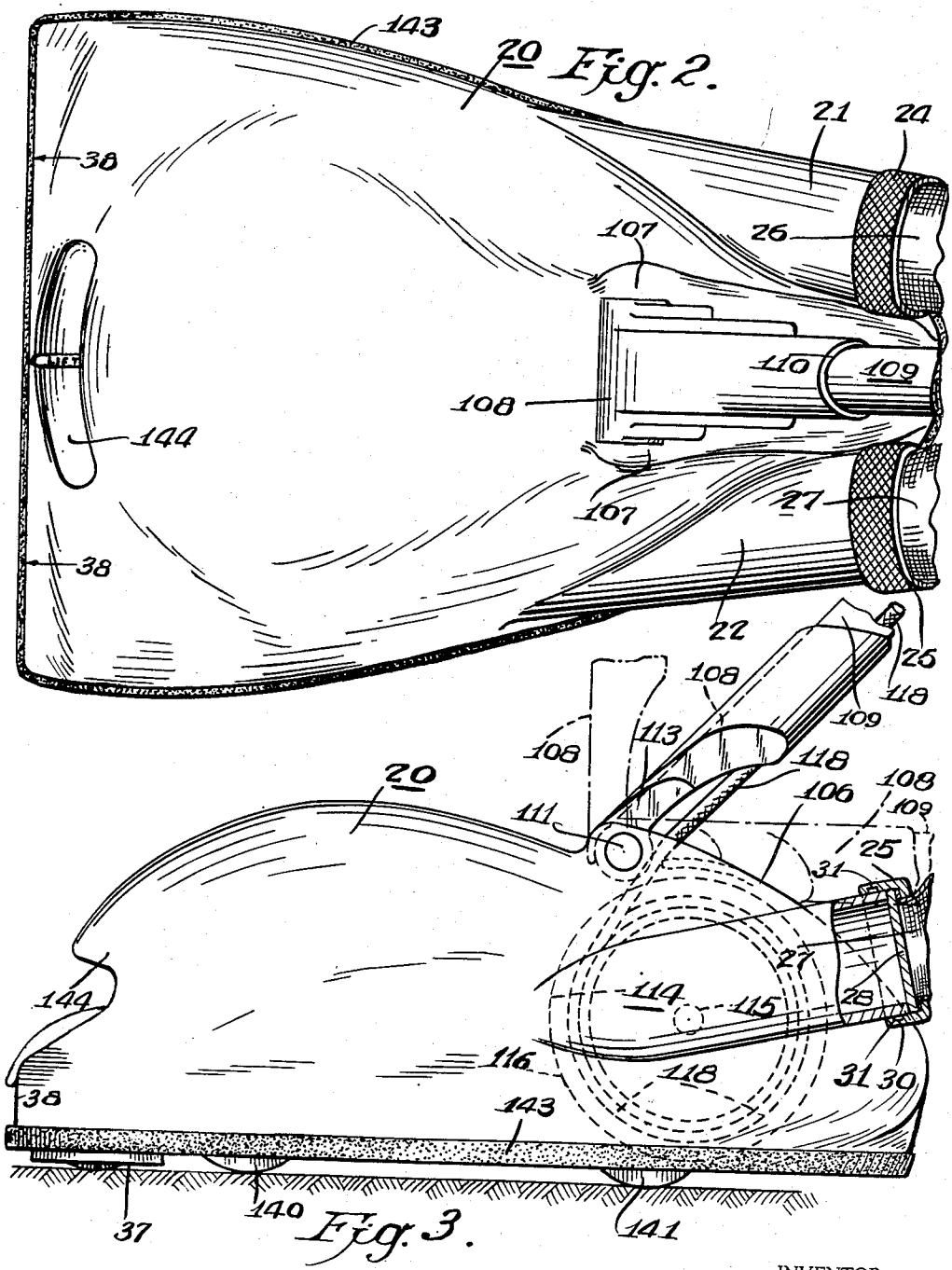


Fig. 2.

Fig. 3.

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5 Sheets-Sheet 3

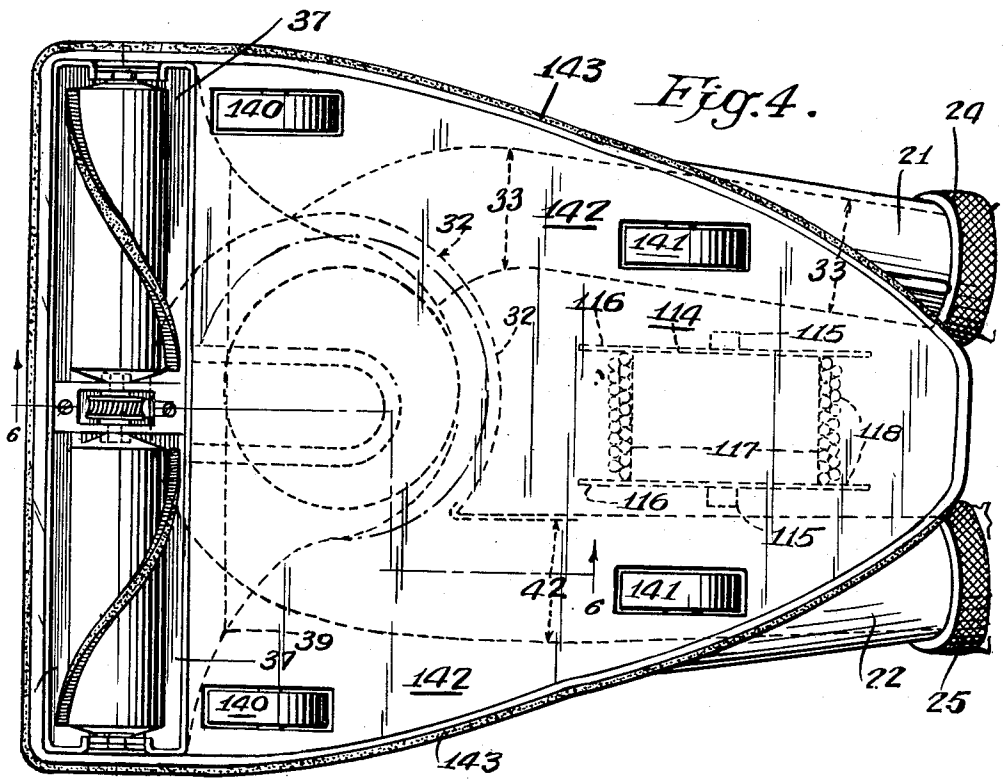


Fig. 4.

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VACUUM CLEANER WITH CONCEALED CORD-REEL

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Fig. 5.

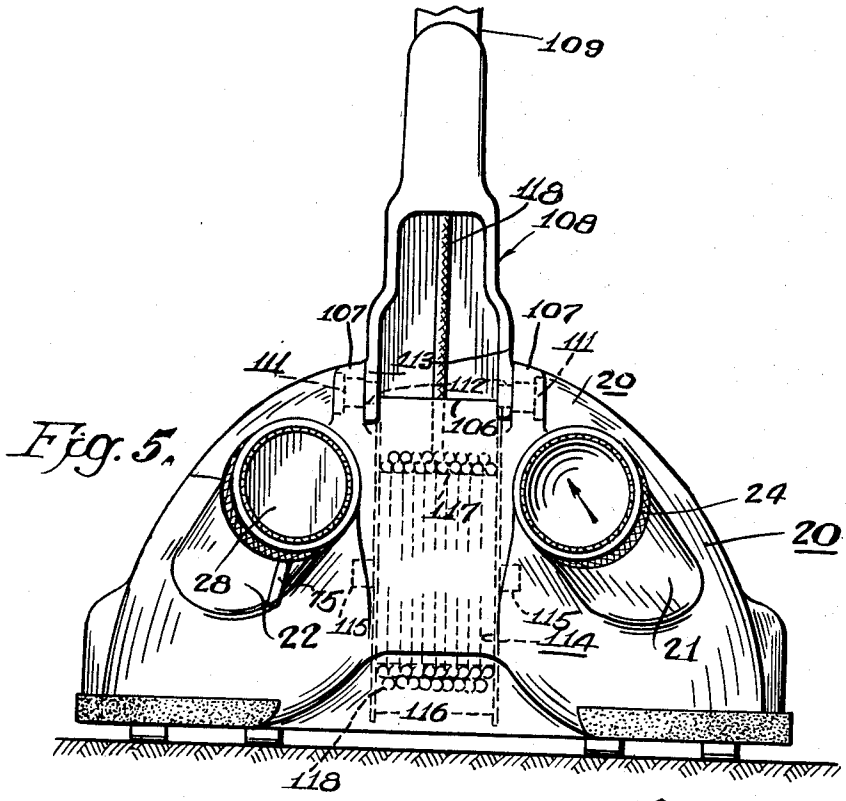
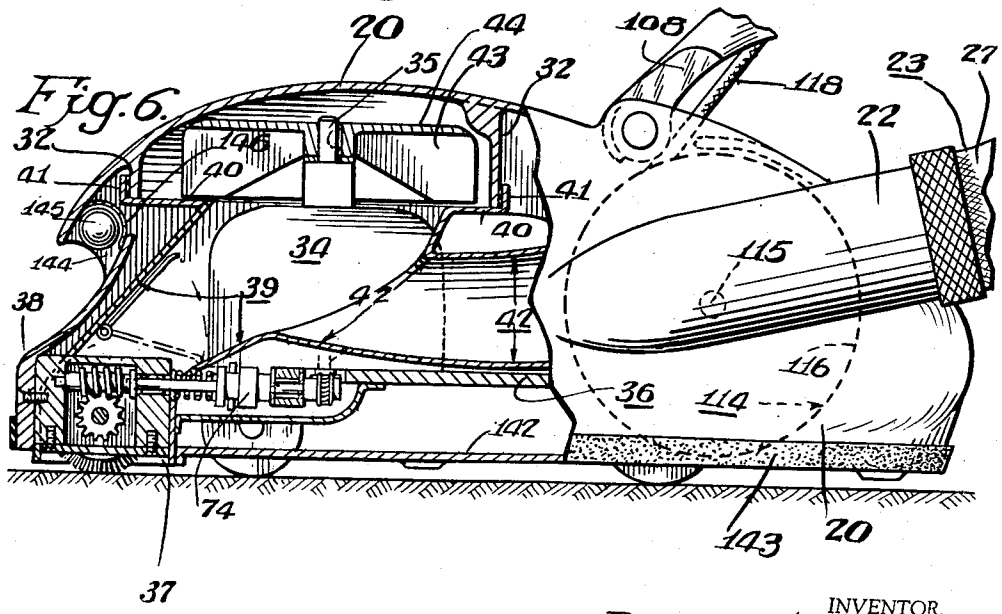


Fig. 6.



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VACUUM CLEANER WITH CONCEALED CORD-REEL

Filed Sept. 2, 1947

5 Sheets-Sheet 5

Fig. 7

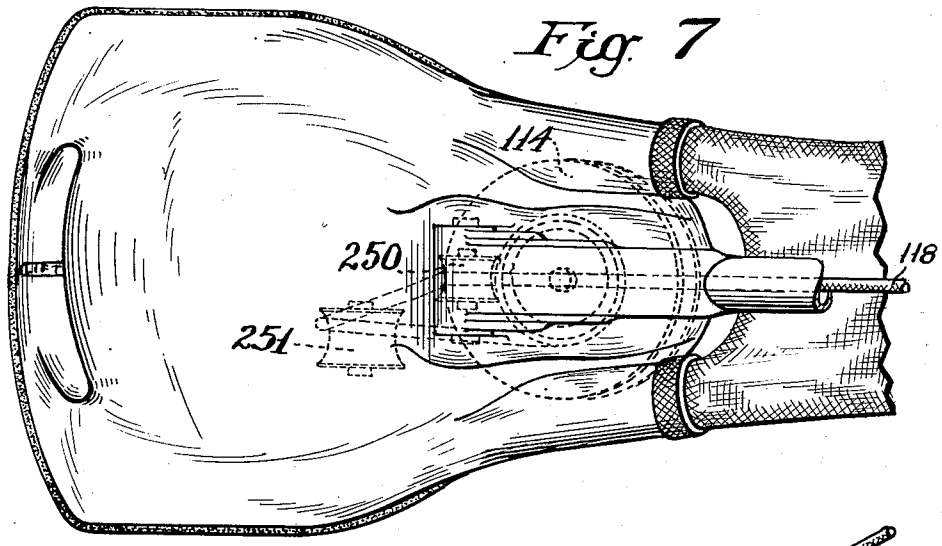


Fig. 8.

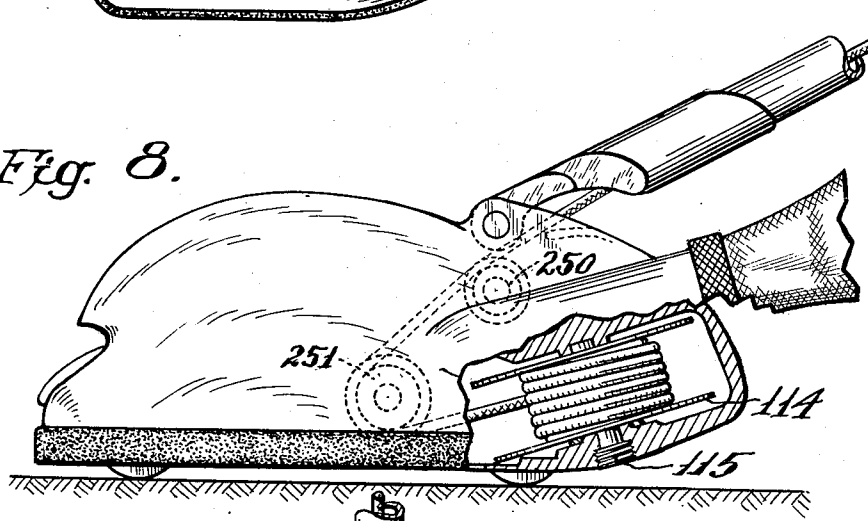
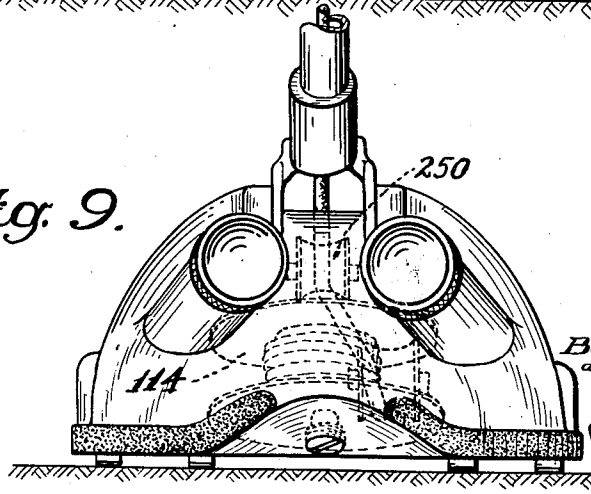


Fig. 9.



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Patented Mar. 23, 1954

2,672,642

UNITED STATES PATENT OFFICE

2,672,642

VACUUM CLEANER WITH CONCEALED CORD-REEL

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Application September 2, 1947, Serial No. 771,792

7 Claims. (Cl. 15—323)

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The present invention relates to a new and useful vacuum cleaner, and it relates more particularly to a vacuum cleaner of the type in which the entire machine, including the suction-producing parts, traverses the floor-area to be cleaned, and which carries its own dust-collector bag.

An object of the present invention is a vacuum cleaner construction with self-contained cord-reel in which the cord is extensible and retractable, at will, into the main body of the vacuum cleaner housing, with passageways for the cord through the handle and through the juncture between the handle and chassis.

A further object of the present invention is to provide a vacuum cleaner which will be more versatile and effective in actual use and more convenient under the many operating conditions of its use.

In the accompanying drawings, in which like reference numerals indicate like parts,

Figure 1 represents a perspective view of a vacuum cleaner exemplifying one embodiment of the present invention.

Figure 2 represents a top plan view of the vacuum cleaner shown in Figure 1.

Figure 3 represents a side-elevational view of the vacuum cleaner shown in Figures 1 and 2.

Figure 4 represents a plan view of the vacuum cleaner (representing one embodiment of the present invention) viewed from below, but with parts omitted and other parts shown in dotted lines, in phantom, and with other parts shown in solid lines, so as to show the relationship of the various parts, at various levels.

Figure 5 represents a rear elevational view of the vacuum cleaner embodying the present invention, but with the dust-collector bag removed, and with the cord-reel shown in dotted lines.

Figure 6 represents a side-elevational view of the vacuum cleaner of the present invention, partly in vertical cross-section on line 6—6 of Figure 4.

Figures 7, 8 and 9 represent top view, side elevational view (partly broken away) and rear-elevational view, respectively, of another embodiment of the present invention, modified in respect to the disposition of the cord-reel, but otherwise the same as the embodiment heretofore shown.

For the purpose of illustrating the present invention, there are shown, in the accompanying drawings, exemplifying forms thereof, although it is to be understood that the various instrumentalities of which the present invention consists can be variously arranged and organized

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and that the present invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

In the embodiment of the vacuum cleaner of the present invention shown in the drawings, an outer housing or frame-like member 20 may be formed, either of one or more cast (or die-cast) parts or of one or more press-shaped sheet-metal parts suitably united, (or of one or more press-shaped sheet-metal and one or more cast parts) and generally open underneath and generally closed at the top, and preferably having a pair of more or less symmetrically disposed generally tubular air-ports 21 and 22 extending therefrom in a generally rearward and/or upward direction, as shown more particularly in Figures 1, 2, 3, 5 and 6. One of the air-ports (as, for instance, 21) is the air-outlet through which the air is expelled into the dust-collector bag 23, while the other air-port (as, for instance, 22) is a suction inlet to which the manually-operated vacuum-tools or "attachments" may be connected. The suction inlet 22 also serves as a mechanical support or anchorage for one side of the generally flat dust-collector bag 23 when the vacuum cleaner is used for vacuum-cleaning floors, rugs or carpets on the floor.

Each of the air-ports 21 and 22 may terminate in any suitable coupling collar (as, for instance, collars 24 and 25, respectively) or any other suitable quick-attachable and quick-detachable coupling or connector, either of the bayonet type or screw type or spring-jawed snap-on type—whereby the tubular bag-inlet 26 as well as the tubular bag-anchorage portion 27 (at the lower end of the bag 23) may be quickly (and at will) attached to or detached from either or both of the generally tubular air-ports 21 and 22, respectively.

If desired, the two lower end-extensions 26 and 27 of the dust-collector bag 23 may be equipped with the coupling collars or coupling means 24 and 25, while the tubular air-ports 21 and 22 may be threaded or otherwise suitably formed to receive the coupling collar or coupling means of the bag 23. The details of the quick-attachable and quick-detachable coupling or connector means (24 and 25) are not shown, in the accompanying drawings, because any conventional (or new) connector means may be used.

In Figure 3 of the drawings, a cross-sectional view of the "blind" anchorage end 27 of the dust-collector bag 23 (and of the corresponding air-port or nipple 22) is shown. When the "blind" end 27 of the bag 23 is attached to the suction-inlet or nipple 22, such suction-inlet is thereby

closed off, either by the blind end 27 of the bag or by any other suitable closure, such as, for instance, a plate or disc 28 which may be carried within the knurled and rotatable coupling ring 25 (which, in Figure 3, is shown as having bayonet grooves 30 in its interior, engaging two or more circumferentially distributed bayonet pins or lugs 31 carried by the tubular suction-inlet nipple 22).

A downwardly extending fan-housing 32 is disposed within the upper housing or frame-like member 20. The fan-housing 32 may be formed integrally with the main housing 20, or it may be formed separately, and secured thereto (Figure 6 showing this fan-housing 32 as being formed integrally with the main housing 20). An air-discharge duct or conduit 33 extends from the periphery of (and communicates with) the fan-housing or fan-chamber 32—withthe duct disposed in a more or less tangential relationship to the generally circular (or round) fan-housing 32 at its juncture therewith, as indicated more particularly in Figure 4. The duct 33 extends to and communicates with the outlet air-port or nipple 21 at the rear or posterior end of the housing 20—the duct 33 passing through the main wall of the housing 20. The duct 33 may be formed integrally with the housing 20 and with the fan-housing 32, or it may be formed as a separate unit and thereafter assembled with the housing 20 and fan-housing 32.

In the lower part of the housing 20, the lower rotary brush and its operating mechanism, as well as the chassis, may be mounted from beneath, as shown particularly in Figure 6. Thus, the electric motor 34, with its axis and shaft 35 disposed vertically (or in a generally upright position), may be mounted upon any suitable chassis 36, which may also carry (or have formed integrally with it) the floor-suction inlet 37 extending across more or less the full width of the front 38 of the vacuum cleaner, and the floor-suction duct 39 extending upwardly from the floor-suction inlet 37 to the bottom of the fan-housing 32. The cross-section of the duct 39 gradually changes from an elongated shape to a round shape as it extends upwardly into more or less coaxial relationship with (and into communication with) the bottom of the fan-housing or fan-chamber 32—to which it may be joined by the annulus 40 and the flange 41, which latter may be telescoped over the lower end of the fan-housing 32 with a more or less close fit or with suitable packing or sealing means therebetween.

A suction-inlet duct 42 branches out from the floor-duct 39, in a generally rearward direction (as generally indicated in Figure 4) from a part of the floor section duct 39 beneath the fan-housing 32. The branch duct 42 extends rearwardly and merges into or communicates with the rear suction-inlet or nipple 22.

Any suitable multi-bladed air-impeller 43 is secured to the upper end 35 of the shaft of the motor 34, and is disposed within the fan-housing 32 in operative relation thereto. The impeller 43 is open underneath and preferably has an upper plate or disc 44 connecting its several blades, so that when the impeller is revolved at suitable speed, it will impel air centrifugally, toward the outer periphery or perimeter of the fan-housing 32 and hence expel the air through the duct 33 and nipple 21 into the dust-collector bag 23, and thereby correspondingly suck air upwardly through the floor-suction duct 39 or through the rear-suction duct 42 (according to whether the vacuum cleaner is used for floor vacuuming or with some "attachment" connected to the nipple 22.

The coupling-means of the "attachment" or tool (by which it is connected to the suction-inlet 22) either engages inside the suction-inlet 22 or is otherwise arranged. A clutch 74 is provided to cause the brush to be rotated when the motor 34 is operated. When the clutch is de-activated the brush remains stationary. Thereby the clutch 74 remains de-clutched or open and the brush remains stationary, while a cleaning tool or "attachment" is connected to the suction-inlet 22.

A cord-opening 106, flanked by upwardly raised journal portions or flanges 107 of the upper-housing 20, is provided for the reception of the handle-receiving hinge-member 108 in which the lower end is secured. The hinge-member 103 may be formed of sheet metal or otherwise made hollow, as indicated more particularly in Figure 5, with the upper tubular portion 110 thereof serving as a socket for telescopically receiving the lower end of the tubular handle 109. A pivot pin or trunnions 111 are extended inwardly from the journal portions 107, as indicated particularly in Figure 5. Instead of having a pair of pivots or trunnions extending only into the corresponding openings 112 of the side-flanges 113 of the pivot member 108, a single pivot may be extended straight through.

Beneath and within the upper housing 20, and rearwardly of the motor 34, and preferably between the two air-ducts 33 and 42 (which ducts, together with the fan-housing 32 and the duct 39, are disposed in a generally U-shape, in respect to each other—in plane view), a spring-powered (or otherwise powered) cord-reel 114 is disposed. The cord-reel 114 may be of any suitable construction, including, but not limited to, the cord-reel constructions of patent No. 2,391,840 and of co-pending application Serial No. 561,866, filed November 4, 1944, now Patent No. 2,591,214. The axle or shaft 115 of the cord-reel 114 is preferably horizontal and disposed transversely of the fore-and-aft median plane of the vacuum cleaner housing 20, and includes the side flanges 116 and the drum portion 117, within which is housed the powering spring as well as the control mechanism for starting and stopping the reel action by pulling on the electrical cord 118 (or otherwise). The hinge-member 108 and the cord-reel 114 are so disposed, in relation to each other, that the electrical cord 118, passing through the hollow interior of the handle 109 and through the hinge-member 108 (and 110), will be disposed generally tangentially with respect to the drum 117 of the cord-reel 114 in all angular positions of the handle, including the vertical position shown in the dotted lines in Figure 3, as well as in the horizontal position also shown in dotted lines in Figure 3—the cord-opening 106 in the upper housing 20 being just sufficient to accommodate the cord 118 in all positions of the handle 109, across the full axial width of the drum 117. The cord-opening 106 is generally concealed, however, by the broad basal portion of the hinge-member 108.

The cord 118 terminates in an electrical-connector plug 123. The cord 118 passes out of the handle, near the top thereof, through a slightly angular or inclined cord-guide portion 124 carried by or formed in the handle 109.

The bag 23 is preferably more or less flat, having an upper panel 119 and the lower panel

120, and an intervening side wall 121 extending around and connecting the upper and lower panels, and having lower tubular ends 26 and 27 for detachable connection with the nipples 21 and 22 of the vacuum-cleaner housing.

The upper end of the bag 23 is preferably flexibly and resiliently hung from the handle 109, by a spring or other flexible and/or resilient spring 122 (or the like) from which it may be unhooked, at will.

The bag 23 may be formed of any suitable filtering fabric, which will permit air to pass therethrough, but will retain dust and other particles.

A partition-wall 125 is provided between the upper and lower panels 119 and 120, formed of similar filtering fabric or the like, and extends from the bottom of the bag upwardly, but terminates considerably short of the upper end of the bag, as shown particularly in Figure 1. By this means, the bag is divided longitudinally into more or less similar longitudinal compartments 126 and 127 communicating with each other at the top of the bag 23, but not communicating with each other at the bottom of the bag 23. The side 121 of the bag 23, flanking the collector-compartment 127, is parted along a longitudinal line 128, and to the parted edges of said sidewall 121 (of the bag 23), for the length of the separate collector-compartment 127, a "zipper" type slide-fastener 129 is secured. The slide-fastener 129 may also be extended around the upper end 130 of the bag 23 to approximately the point 131, so that the bag may also be opened up at its upper end. A fabric (or other flexible) flap is provided inside the zipper, to seal the bag 23 along the line 128 against the free or unfiltered passage of air.

Into the collector-compartment 127, a porous or filter-paper bag 132, more or less conforming to the shape of the collector-compartment 127, may be inserted: the paper bag 132 being open at its upper end 133, but being otherwise continuous on all sides and at the bottom—the texture of the paper bag 132 being such that air can flow through it while entrapping or retaining dust and other particles.

The dust-laden air driven out through the duct 33, by the impeller 43, passes out through the nipple 21, up through the lower tubular end 26 of the bag 23 and upwardly through the inlet compartment 126 thereof, in the direction shown by the arrows 29. Some of the air, of course, is expelled through the side-walls of the bag in the zone of the compartment 126 thereof. However, a large part of the air continues upwardly and then downwardly into the paper bag 132 into the collector-compartment 127 thereof, where, because of the lesser air-movement, the bulk of the dust tends to settle. By this means the accumulation of dust near the inlet 26 of the bag 23 is prevented, and the larger body of accumulated dust and dirt is prevented from falling into the inlet 26 of the bag 23 and into duct 33 (particularly when the vacuum-cleaner is not in use and when it is merely being handled in the course of moving it about the house). Thus, by partitioning the bag 23 for a suitable distance upwardly from the bottom, the bulk of the accumulated dust is caused to settle on the side of the partition 125 opposite to the side on which the inlet 26 is disposed, thereby preventing the large mass of accumulated dust from falling back into the duct 33 and clogging it and building up back-pressure against the impeller 43.

On the other hand, the paper bag 132 in the accumulating-compartment 127 also serves to facilitate the final cleaning-out of the bag 23 by permitting the bulk of its contents to be removed by merely lifting out the paper bag 132 and discarding the paper bag 132 with its contents. Thus, the paper bag 132 is first removed and it is then rolled up a bit and then dumped into a trash basket or trash container. Thereafter, if desired, the thinner layer of dust accumulated on the interior of the sides of the bag may also be removed by shaking out the bag 23 itself. However, this latter operation need be less frequent than the removal and disposal of the paper bag 132, because the bulk of the dust and dirt will be accumulated in the paper bag 132.

Wheels 140 and 141 may be provided, for rollingly supporting the vacuum cleaner on any floor surface or carpet surface.

The bottom of the vacuum cleaner may further be enclosed by a bottom plate 142, and the outer perimeter of the vacuum cleaner may be surrounded by suitable resilient buffer strip 143, of rubber or the like.

The upper-housing 20 is preferably provided with a front light-recess 144 (see Figures 1, 2, 3 and 6, in which a suitable electric-light socket 145 is mounted with its axis generally horizontal for the reception of a tubular electric incandescent light or the like. A reflector shield 146 may be placed behind the socket 145 (and behind the lamp carried thereby) for reflecting the light outwardly and downwardly from the recess or light chamber 144.

A small opening may also be provided in the closure-disc 28 (covered by filtering fabric) so as to create a slight vacuum in the "blind" end 27 of the bag 23, to aid in maintaining the flow of dust-laden air through the bag 23 generally in the direction of the arrows 29 shown in Figure 1, and to cause a greater accumulation of the dirt in the separate disposable paper bag 132, without appreciably reducing the floor-suction of the vacuum cleaner.

In Figures 7, 8 and 9, we have shown a modified embodiment of the present invention, in which the cord-reel is differently disposed, although the other phases of this embodiment of the invention may be substantially the same as shown in Figures 1–6 inclusive.

Thus, in this embodiment of the present invention, the cord-reel 114 is mounted upon an axle or shaft 115 disposed in a generally upright position, although it may be tilted forwardly slightly as shown particularly in Figure 8.

In this embodiment of the invention, the cord-reel 114 passes over one or more idle rolls or idle-pulleys 250 and 251, shown in dotted lines in Figures 7, 8 and 9, which serve to guide the cord 113 onto the reel 114.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiments be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having thus described the invention, the following is hereby claimed, and desired to be secured by Letters Patent:

1. A vacuum-cleaner including a housing, having a floor-suction inlet therebeneath and an

electric motor with its axis of rotation disposed generally upright and an air-mover driven thereby, a cord-reel within said housing and substantially fully concealed thereby, with its axis disposed generally horizontally and transversely of said housing, a cord-opening in said housing above said reel to permit the passage of the cord therethrough generally tangentially of the reel, a handle pivotally connected with said housing generally above said reel and having a cord-concealing passageway terminating above and in operative alignment with said cord-opening in said housing for permitting the substantially concealed passage of the cord between the handle and said reel.

2. A vacuum-cleaner including a housing, having a floor-suction inlet at its front, a pair of filter bag receiving sockets, on the rear portion of the housing with at least one of said sockets being an air port and an electric motor and an air-mover driven thereby disposed within said housing between said floor suction inlet and said filter bag sockets, a cord-reel substantially encased and concealed within said housing and disposed generally intermediate said filter bag sockets, a cord-opening in said housing in operative alignment with said reel, for permitting the passage of a cord through the housing, a handle-hinging member pivotally connected to said housing in operative alignment with said cord-opening and having a shield-portion substantially concealing said cord-opening from view, from above, a handle connected with said hinge-member and carrying a cord-passageway terminating in proximity of said shield portion of said hinge-member, whereby the cord may pass through the passageway of the handle and onto the reel, substantially concealed from view.

3. A vacuum-cleaner including a housing, having a floor-suction inlet therebeneath and an electric motor with its axis of rotation disposed generally upright and an air-mover driven thereby, a cord-reel within the rear portion of said housing and substantially fully concealed thereby, with its axis disposed generally horizontally and transversely of said housing, a cord-opening in said housing above said reel to permit the passage of the cord therethrough generally tangentially of the reel for substantially the width of the reel, a generally tubular handle pivotally connected with said housing generally above said reel, and having a cord-concealing passageway terminating above and in operative alignment with said cord-opening in said housing above the reel, for permitting the substantially concealed passage of the cord between the handle and said reel.

4. A vacuum-cleaner including a housing, having a floor-suction inlet at its front, a pair of filter bag receiving sockets on the rear portion of the housing with at least one of said sockets being an air port and an electric motor and an air-mover driven thereby disposed within said housing between said floor suction inlet and said filter bag sockets, a cord-reel substantially encased and concealed within the rear portion of said housing with its axis in a plane different from the plane in which the motor-axis lies and disposed generally laterally intermediate said filter bag sockets, a cord-opening in said housing above said reel to permit the passage of a cord through the housing substantially throughout the width of said reel, a handle-hinging

member pivotally connected to said housing generally above said cord-opening and having a shield-portion substantially concealing said cord-opening from view, from above, a handle connected with said hinge member and carrying a cord-passageway terminating in proximity of said shield portion of said hinge-member, whereby the cord may pass through the passageway of the handle and onto the reel, substantially concealed from view.

5. A vacuum-cleaner including a housing having a floor-suction inlet at its front and a pair of filter bag receiving sockets on the rear portion of the housing with at least one of said sockets being an air port, an air-mover operatively disposed within said housing between said floor-suction inlet and said pair of filter bag sockets, and a cord-reel substantially fully encased and concealed within said housing and disposed generally laterally intermediate said pair of filter bag sockets and rearwardly of said air-mover.

6. A vacuum-cleaner as claimed in claim 1 in which the handle includes a portion positioned forwardly of the opening and immediately adjacent the upper portion of the casing, thereby substantially concealing from the front the passage of the cord between the handle and the reel.

7. A vacuum-cleaner including a housing having a floor-suction inlet at its front and a pair of filter bag receiving sockets on the rear portion of the housing with at least one of said sockets being an air port, an air-mover operatively disposed within said housing between said floor-suction inlet and said pair of filter bag sockets, and a cord-reel substantially fully encased and concealed within said housing and disposed generally laterally intermediate said pair of filter bag sockets and rearwardly of said air-mover and with its axis disposed in a generally upright position and a handle pivotally connected to said housing and having a cord-guiding passageway permitting the passage of the cord between the handle and the reel substantially concealed from the front.

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