Dec. 28, 1943. W. D. SELLERS 2,337,936

SUCTION CLEANER

Filed June 11, 1941 5 Sheets-Sheet 1

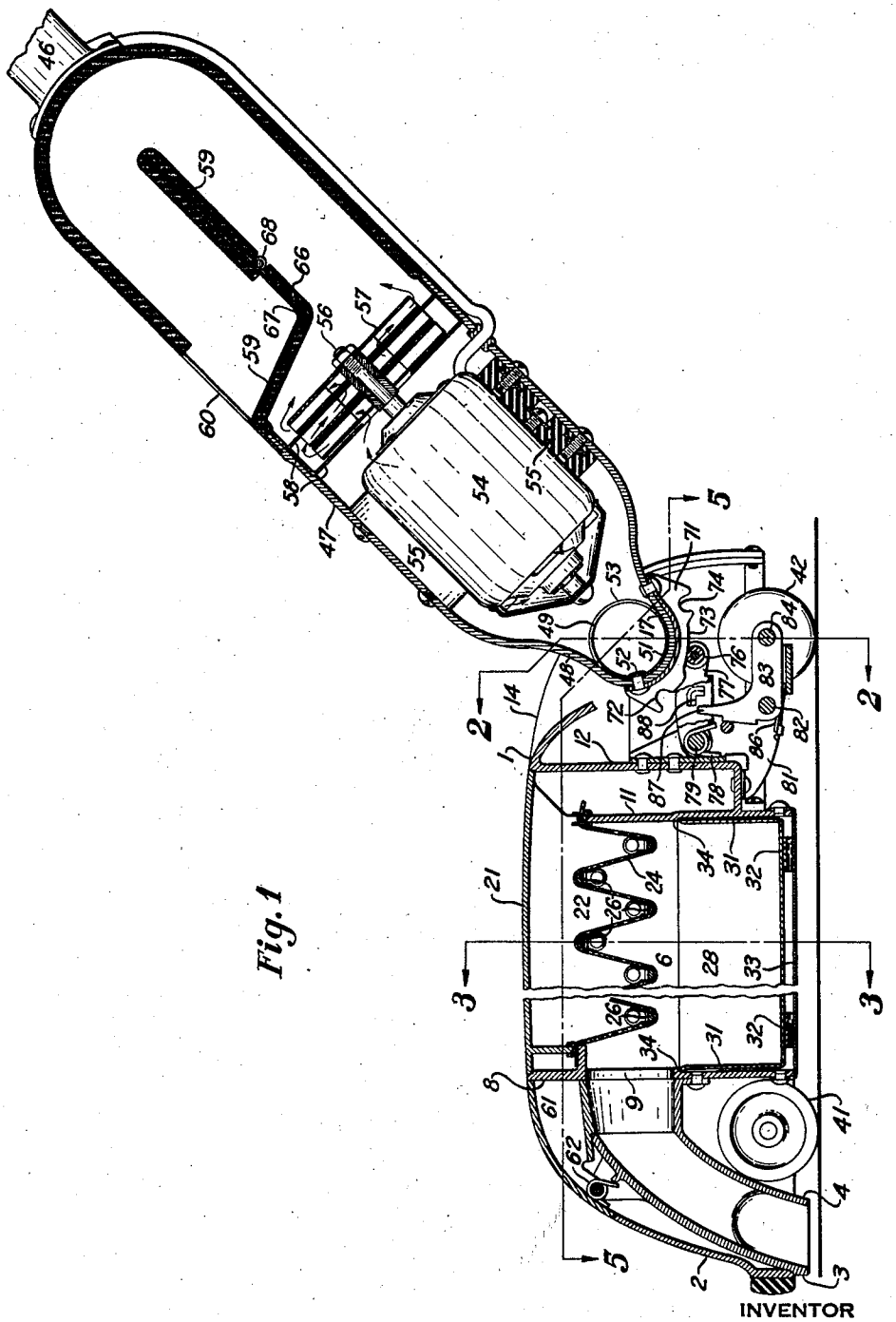


Fig. 1

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Dec. 28, 1943. W. D. SELLERS 2,337,936

SUCTION CLEANER

Filed June 11, 1941 5 Sheets-Sheet 2

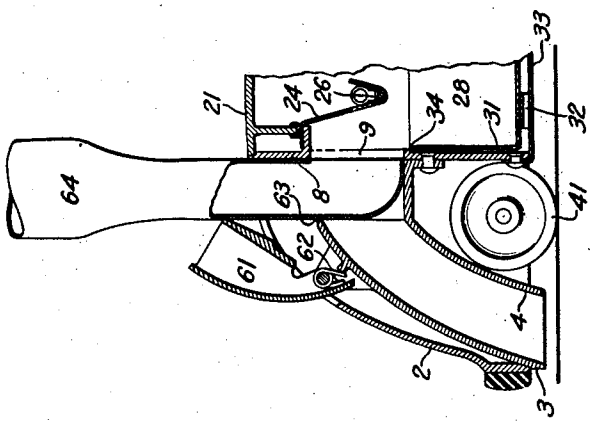


Fig. 4

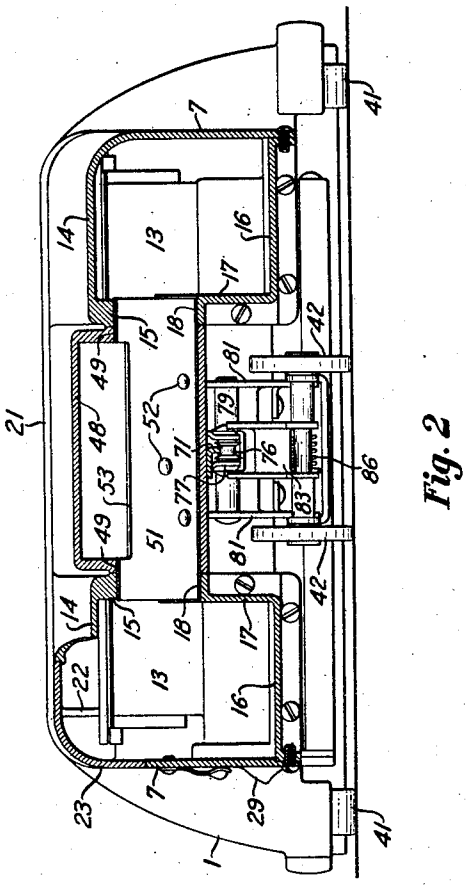


Fig. 2

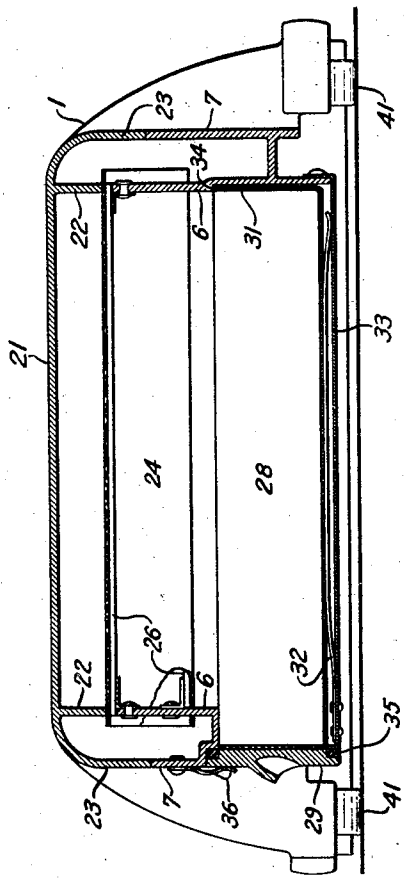


Fig. 3

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Dec. 28, 1943. W. D. SELLERS 2,337,936

SUCTION CLEANER

Filed June 11, 1941 5 Sheets-Sheet 3

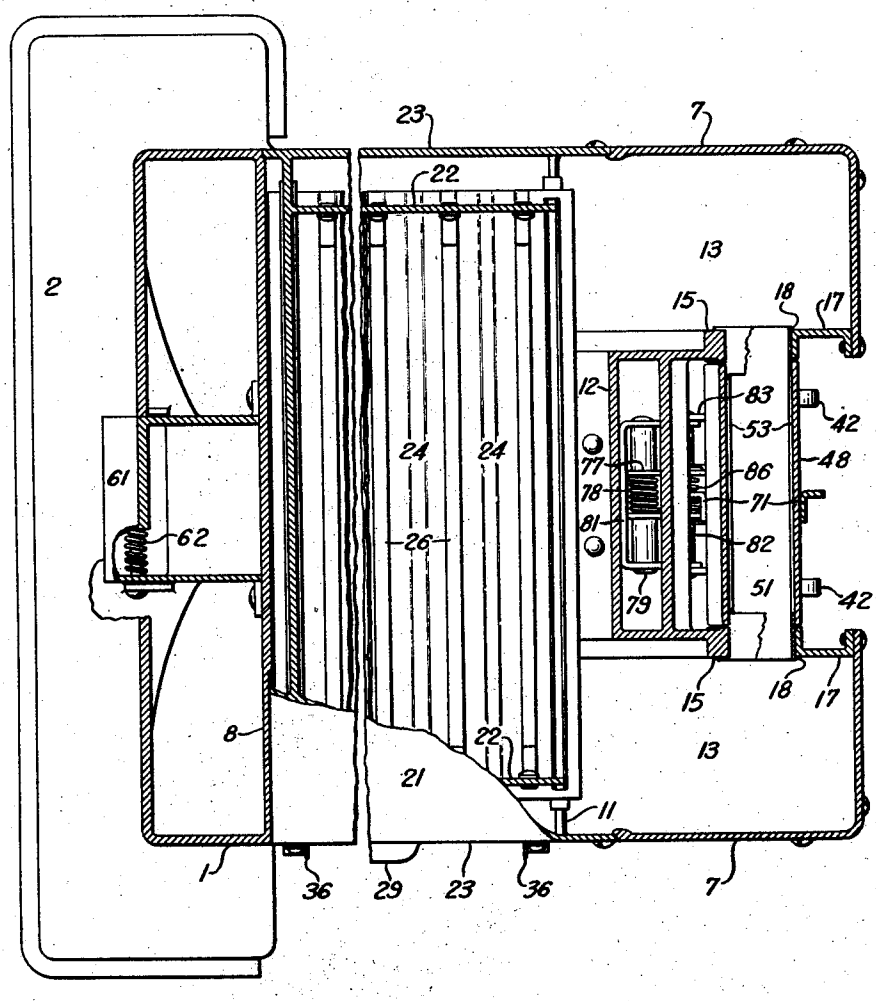


Fig. 5

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Dec. 28, 1943. W. D. SELLERS 2,337,936

SUCTION CLEANER

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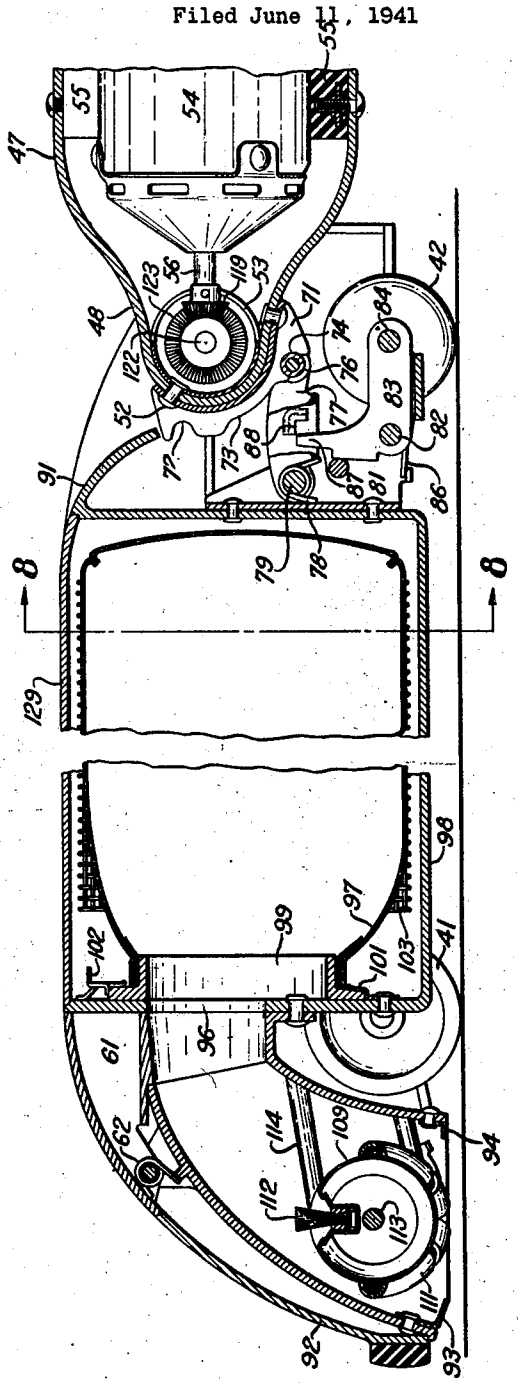


Fig. 6

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Dec. 28, 1943. W. D. SELLERS 2,337,936

SUCTION CLEANER

Filed June 11, 1941 5 Sheets-Sheet 5

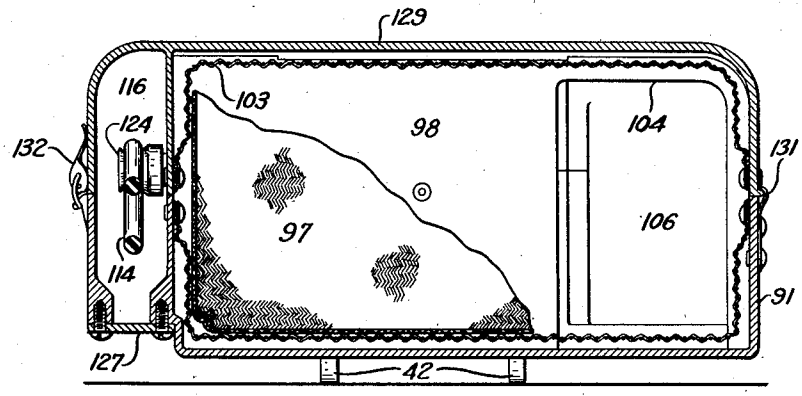


Fig. 8

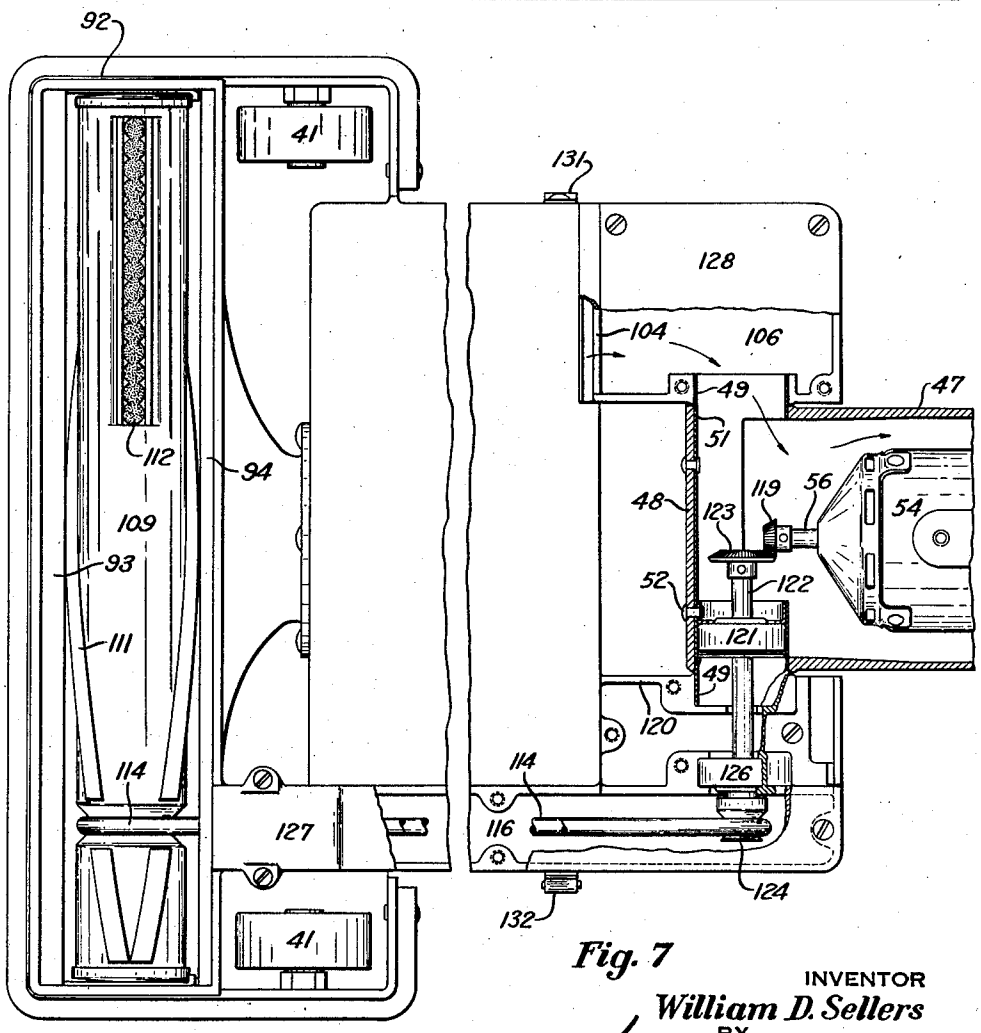


Fig. 7

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Patented Dec. 28, 1943

2,337,936

UNITED STATES PATENT OFFICE

2,337,936

SUCTION CLEANER

William D. Sellers, Glen Ellyn, Ill., assignor to The Hoover Company, North Canton, Ohio, a corporation of Ohio

Application June 11, 1941, Serial No. 397,591

8 Claims. (Cl. 15—6)

The present invention relates to suction cleaners and particularly to a new and novel arrangement of parts in a suction cleaner. More specifically the invention comprises an improved suction cleaner construction in which the parts are so arranged as to provide a main body or floor unit which incorporates the cleaner nozzle and the dirt-separating means, the suction-creating means forming a part of the handle unit which is pivotally mounted on the main body.

In the use of a suction cleaner its height is a factor of importance. It is often desirable to pass the cleaner under articles having a relatively low clearance above the floor, and if the cleaner is too high it will not pass thereunder. In a cleaner constructed in accordance with the present invention the cleaner height can be greatly reduced below that of the normal cleaner with a resultant increase in the range of cleaner usefulness. It is also desirable that the suction cleaner nozzle maintain an optimum adjustment relative to the surface covering undergoing cleaning in order that the cleaner may function at all times at maximum effectiveness. With the parts of the suction cleaner arranged as in the present invention it is possible for the surface-contacting nozzle, and also the agitator therein, if one be included, to be at all times in a position of maximum cleaning effectiveness with respect to the surface covering undergoing cleaning. The greatest part of the weight of the machine is carried by the rear wheels with the front wheels carrying but a very small part. Accordingly, the tendency of the nozzle, under the influence of cleaner weight, to sink into the surface covering undergoing cleaning is minimized.

The task of removing the collected dirt from the modern suction cleaner is one of its objectionable features. In the suction cleaner constructed in accordance with the present invention this problem has been solved in a very satisfactory manner by the provision of easily cleaned dirt-containers which are readily removed from the body of the machine and which are also readily replaceable. The arrangement of parts is such that it is feasible to use a high speed driving motor with tandem suction-creating fans of a type which ordinarily is not used in the floor type of suction cleaner in which the entire machine is manually propelled over the surface covering being cleaned. This is made possible because the air is pre-filtered before passing through the suction-creating unit and because when an agitator be incorporated, the length of the driving belt is such that a relatively great reduction in driving speed can be accomplished without undue belt wear.

It is an object of the present invention to provide a new and improved suction cleaner. It is another object of the invention to provide a new and improved arrangement of functionally necessary parts in a suction cleaner. A further object of the invention is to provide a manually-propelled suction cleaner in which the ambulatory main body comprises only the cleaner nozzle and the dirt-separating means. A still further object of the invention is to provide a manually propelled suction cleaner in which an ambulatory main body or floor unit comprises the cleaner nozzle and dirt-filtering means, the cleaner handle which incorporates the suction-creating means being pivotally supported thereon. A still further object of the invention is to provide a manually propelled suction cleaner in which the dirt-laden cleaning air is filtered within the floor supported main body and then passes into the handle unit, including the suction-creating means, in the clean condition. Still another object of the invention is to provide a manually propelled suction cleaner in which the dirt-carrying air passes directly into a dirt separator from the cleaner nozzle, the separator including a removable rigid impermeable receptacle or tray. A further object of the invention is to provide a suction cleaner of the manually propelled type in which the cleaner handle includes suction-creating means and is pivoted to the main cleaner body immediately above the rear supporting wheels, means being provided to prevent the cleaner from nosing downwardly when the machine is lifted by the handle. A further object of the invention is to provide a suction cleaner of the type in which the cleaner main body includes the nozzle and dirt-separating means, the air passing in a filtered condition from the latter means to the handle-carried suction-creating means in a cleaned condition, there being power-transmitting means from the driving unit of the suction-creating means to the surface covering agitator positioned within the cleaner nozzle. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawings to which they relate.

Referring now to the drawings in which preferred embodiments of the present invention are disclosed, and in which the same reference character refers to the same part throughout:

Figure 1 is a longitudinal vertical section through a suction cleaner constructed in ac-

cordance with the first embodiment of the invention and illustrates the arrangement of parts in the ambulatory main body or floor unit and in the pivoted handle unit carried thereby;

Figure 2 is a vertical transverse section upon the line 2—2 of Figure 1 and illustrates the pivotal mounting of the cleaner handle unit upon the cleaner main body unit;

Figure 3 is a vertical transverse section upon the line 3—3 of Figure 1 and illustrates the position of the filtering element in the dirt-separating chamber in the central body portion of the machine and also the manually removable dirt-receiving drawer positioned therebelow;

Figure 4 is a partial vertical section of the forward portion of the cleaner, as illustrated in Figure 1, but with the dusting tool converter inserted into the nozzle for off-the-floor cleaning;

Figure 5 is a horizontal section through the main body looking down from the line 5—5 of Figure 1;

Figure 6 is a longitudinal vertical section through the second preferred embodiment of the invention and illustrates a different type of removable dirt-filtering receptacle and also discloses the power transmission means between the driving motor and the rotary agitator positioned within the cleaner nozzle;

Figure 7 is a bottom view of the cleaner illustrated in Figure 6, portions of the bottom plates being broken away to show the power-transmitting jack shaft which extends transversely or laterally from the motor shaft to the power-transmitting belt;

Figure 8 is a vertical section upon the line 8—8 of Figure 6 and shows the position within the cleaner body of the power-transmitting belt, the dirt-separating means, and also the exhaust air passageway.

Referring again to the drawings and to Figures 1 to 5, inclusive, in particular, the first preferred embodiment of the invention is illustrated and is seen to comprise an ambulatory main body 1 which at its forward end is formed as a transversely extending nozzle 2 having surface-contacting front and rear lips 3 and 4, respectively. Rearwardly of the nozzle 2 the body 1 in its central portion is formed as a chamber or housing having side walls 6, outer appearance side walls 7 spaced from the walls 6, a front wall 8 formed with an opening 9 which leads to the nozzle, and a pair of spaced rear walls 11 and 12. The rear wall 11 is of lesser height than the wall 12 and the space therebetween opens into rearwardly extending passageways 13 which can be considered to form the rear portion of the body. Each passageway 13 is formed in its outer side by the body side walls 7, at its top and rear by the rearwardly and downwardly curved integral top wall 14, and at the upper section of its inner wall by the walls 15 which are also integral. The bottom walls 16 of the passageways 13, together with the lower sections 17 of the spaced inner side walls, are separate members which are secured fixedly in place. Circular ports or seats 18 are formed in the inner apposed walls of the passageways 13 in the cooperating walls 15 and 17 and these ports provide the egress for the cleaning air from the cleaner main body and also function to support rotatably the cleaner handle as will be described. It is seen that the cleaner main body is so arranged that an air passageway is formed which extends from the lips 3 and 4 of the nozzle through the body of the machine rearwardly to the ports 18 in the passageways 13.

The central body portion of the casing 1 includes a removable cover element 21 which is formed along each of its sides with parallel spaced downwardly extending side walls 22 and 23 which contact and form extensions of the side walls 6 and 7 of the main portion of the casing between the front wall 8 and the rear wall 12 of the central portion of the body. Outer walls 23 make substantial straight line contact with the walls 7 but, as is clearly illustrated in Figure 1, the line of contact of the adjacent walls 6 and 22 comprises a multiplicity of interfitting angular projections which intermesh in the manner of gear teeth.

The interfitting walls 6 and 22 are adapted to clamp between them a filter element 24 of cloth, paper or fabric, or similar material which is permeable to air but not to foreign material suspended therein. The purpose of the irregular contour of the line of contact of the walls 6 and 22 is to provide as great a surface filtering area as possible. It is evident that filter 24 separates the space above and below itself and between the walls 8 and 11. The contours of the interfitting abutting walls upon the opposite sides of the filter 24 are identical and between the projections of maximum extent upon the opposite walls there extend rigid spacers 26 which serve to support the filter 24 and to hold it in the contours of the cofitting wall. In the assembled relationship, as clearly illustrated in Figures 1 and 3, the filter element 24 is clamped between the abutting walls 6 and 22 and is exposed on its underside to air entering from the nozzle 2 through the aperture 9. Air passing through the cleaner must pass through the filter member before it can enter the space thereabove and so gain entrance to the air passageways 13.

Immediately below the filter 24 in the central body portion of the cleaner, there is provided a removable dirt receptacle or drawer 28 which is slidingly mounted within the central body portion for displacement from one side thereof. The outer face 29 of the receptacle 28 forms a continuation of one side wall 7 while the side walls 31 abut the inner walls 6, 8 and 11 upon the inside of the machine. Leaf springs 32 on the bottom wall 33 of the central portion of the cleaner at all times urge the receptacle upwardly so that along the upper edges of its side walls 31 it underlies and makes contact with downwardly-facing overhanging shoulders 34 which are formed upon the walls 6, 8 and 11. To eliminate air leakage around the dirt drawer the inside face of the front wall 29 of the receptacle 28 is provided with a seal 35 of suitable material such as felt or rubber which makes abutting contact with the cleaner casing. A manually releasable spring latch 36 bears against the plate 29, as illustrated in Figure 3 and slightly compresses the seal 35 and also holds the drawer in place. The cleaner main body or unit which has now been described is supported for movement upon a surface by means of spaced front wheels 41, 41 and rear wheels 42, 42. The front wheels 41 are relatively broad when compared with the rear wheels 42, the relationship being such that the forward or nozzle end of the cleaner does not sink appreciably into a supporting covering. By this means of support an optimum nozzle height adjustment is at all times maintained in accordance with the invention set forth

in the co-pending application of Charles H. Taylor, Serial No. 220,917, filed July 23, 1938, now Patent 2,267,764.

In the suction cleaner constructed in accordance with the present invention, the cleaner main body or floor unit which is supported directly upon the surface covering includes the cleaner nozzle and the dirt-separating means, as described. The suction-creating means which draws the air through the nozzle, and also the filtering means, are mounted upon and form a part of the cleaner handle unit which is pivotally connected to the body unit as will now be described.

Referring to Figure 1 in particular, the cleaner handle is indicated generally by the reference character 46 and while the upper end thereof is not illustrated it is of the usual well known type which includes a handle grip and the usual electric switch by which the cleaner motor is controlled. The lower portion of the casing is seen to comprise a hollow, cylindrical conduit 47 which is reduced at its lower end to form a mounting portion 48 formed with side apertures 49 through which extends a hollow cylindrical conduit and bearing member 51 which is riveted as at 52 to the neck portion 48 of the handle. The bearing element 51 extends into and seats rotatably within the circular seats 18 in the inner side walls of the air passageways 13 and serves to support rotatably the entire handle unit. The hollow bearing element 51 is formed, it is to be noted, with an elongated slot 53 which interiorly connects it to the interior of the handle unit so that air may enter the handle from the passageways 13. Attention is also directed to the fact that the handle 46 is pivotally mounted upon the floor unit substantially immediately above the rear supporting wheels 42.

Positioned within the hollow conduit portion 47 of the handle is an electric driving motor 54 suitably supported in spaced relationship to the surrounding casing as by resilient supports 55. At the upper end of the motor 54 is positioned a multiple unit fan indicated generally by the reference character 57 which is mounted directly upon the motor shaft 56. The fans are of the usual tandem type and cooperate with stationary baffles 58 carried fixedly by the cylindrical casing 47. The air is exhausted therefrom into the upper end of the cylindrical handle body portion 47 which is there divided, as is clearly illustrated in Figure 1, by a central wall portion 59 into a labyrinth or muffler, the walls of which are lined by sound-absorbing material which functions to remove sound vibration from the air exhausted thereinto. An exhaust port 60 permits the air to leave the cylindrical casing 47 after it has traversed the labyrinth arrangement.

The general arrangement of parts in this first embodiment of the invention has now been described but certain additional refinements will be referred to before the operation of the cleaner is set forth. The cleaner is so constructed and arranged as to be adapted for conversion for off-the-floor cleaning, either sucking or blowing. To permit of the attachment of dusting tools for off-the-floor use, the nozzle 2 is provided in its double top wall with a pivoted valve 61 which is normally held in closed position by a coil spring 62 at its pivot point. When in closed position the nozzle forms an air tight passageway leading from the nozzle lips 3 and 4 directly to the opening 9 into the filter chamber, but in the open position, as illustrated in Figure 4, the valve 61 provides an aperture 63 through which a dusting tool converter element 64 may be inserted so as to connect to the aperture 9 and to seal the nozzle proper therefrom. The usual type of dusting tools may be connected to the converter element 64 and when so connected, and in the operation of the machine, it is clear that cleaning air will be drawn therethrough and through the converter element 64 into the machine in which it will be handled as though it had arrived from the cleaner nozzle itself.

To permit of the use of dusting tools with positive pressure air in blowing use there is provided a pivoted valve element 66 in the baffle 59 in the cleaner exhaust. Valve 66 normally closes an opening 67 which is in exact alignment with the exhaust outlet 60 of the machine and is normally held in this closing relationship by means of a coil spring 68 at its pivotal axis. The relationship is such that the converter element 64 can be inserted through the port 60 to force the valve element 66 downwardly to open position and can then fill the entire passageway leading directly to the pressure side of the suction-creating fans. When so connected the dusting tools will receive air under pressure through the converter element 64 or its equivalent. The arrangement has the advantage that the pressure drop resulting from the passage of air through the labyrinth is eliminated.

As in the usual cleaner, it is desired that the handle be free to pivot within its operating range, and also that it can be moved to vertical and horizontal positions. In the cleaner constructed in accordance with the present invention, this is made possible and the handle is not only movable as stated, but means are provided which prevent the cleaner casing from dropping or nosing downwardly when it is lifted by the handle. To provide this control an arcuate sector 71 is carried on the underside of the neck portion 48 of the handle. Sector 71 is formed with the usual seats 72, 73 and 74 which correspond to the vertical or storage position, the working operating range, and the horizontal position of the handle. Cooperating with the sector 71 is a roller detent 76 carried by a two-sided lever arm 77, which is itself spring-urged by a coil spring 78 at its pivot point 79, into contact with the sector 71. The force of spring 78 acting upon roller detent 76 is sufficiently great, and the sides of the seats 72, 73 and 74 are so contoured, that the handle cannot be displaced unintentionally from any seat. The pivotal axis 79 is carried by a rigid bracket 81 positioned between the spaced air passageways 13 at the rear of the machine, and to the side arms of this bracket is pivoted at 82 an L-shaped frame 83 which carries the shaft 84 upon which the rear wheels 42 are mounted. A coil spring 86 at all times exerts a force which tends to pivot the frame 83 in a direction to lower the rear wheels, but the spring force is insufficient to accomplish this result when the machine is resting upon a supporting surface so that with the cleaner in use the rear face of frame 83 contacts the stationary bracket and is held in the position illustrated in Figure 1 by the weight of the machine.

The upper end of wheel-carrying frame 83 is formed as an abutment 87 which is adapted to underlie a shoulder 88 on the pawl-carrying arms 77. With the machine resting upon the floor, as illustrated in Figure 1, the frame 83 is in its upper position and the abutment 87 is displaced from under the shoulder 88 upon the detent-car-

rying arm 77 and the latter is free to pivot downwardly as when the detent is moved from one seat to another on the sector 71. As the machine is initially lifted from a supporting surface covering, however, the coil spring 86 forces frame 83, and of course the rear wheels 42, downwardly and the abutment 87 moves under the shoulder 88. Thereafter the arm 77 cannot move downwardly and it becomes impossible for the detent 76 to ride over the shoulders at the extremities of each of the seats on the sector. When this occurs, it is possible for the operator to lift the machine solely by the handle and the front end of the machine cannot nose downwardly for it is impossible for the handle to pivot relative to the machine outside of its range which corresponds to the particular sector seat in which the pressed detent 76 is positioned at that particular time. Upon the machine again being placed upon a surface covering the rear wheel 42 is forced upwardly by the weight of the machine, the frame 83 moves to the position illustrated in Figure 1, and thereafter free pivotal movement of the handle is possible.

The means of conversion of the machine from an on-the-floor cleaner to an off-the-floor cleaner, and also the mechanism by which the machine is prevented from nosing downwardly when lifted by the handle having been described, it is now in order to describe the operation of the machine in its normal on-the-floor use. In operation the cleaner is placed in use by the operator energizing the cleaner motor by means of the common and well known switch which is positioned at the upper end of the cleaner handle 46. The motor 54 rotates driving the suction-creating fan unit 57. The motor and fan are of the high speed, relatively small diameter type and create a suction of many inches of water. The interior of the hollow handle body section 47 being directly connected to the interior of the casing 1 of the machine, the suction of the fan unit is effective therein and air is drawn into the nozzle 2 through and between the surface-contacting lips 3 and 4. The surface covering undergoing cleaning is lifted into contact with these lips and the foreign material therein and thereon is dislodged and carried upwardly into the nozzle and through the opening 9 into the dirt filtering chamber. As the suction from the suction-creating unit is present within the casing and more particularly is present in the air passageways 13, and as those passageways are connected directly to the handle and also to the space immediately above the filter 24, it is clear that the air from the nozzle will be drawn upwardly through that air-permeable member. The foreign material carried by the air, however, cannot pass through the filter member 24 which, incidentally, has a total area which substantially equals that of the normal filter bag of the usual suction cleaner. This foreign material is retained upon the underside of the filter and falls therefrom into the receptacle or drawer 28 which is positioned immediately therebelow. The filtered air passes above the filter 24 and into the air passageways 13 at the rear of the machine. From the air passageways 13 the air is drawn through the tubular mounting element 51 into the hollow conduit portion 47 of the handle past the motor 54, where it performs a cooling function, through the suction-creating fans 57, finally to be exhausted into the sound-deadening labyrinth or muffler from which it escapes through the exhaust outlet 60 to atmosphere. Within the muffler the sound vibrations which have been impressed upon the air by its passage through the cleaner are removed, and as finally exhausted from the machine the air is in a quieted condition.

After an extended period of cleaner use it will become desirable to empty the collected dirt from the machine. This requires only that the operator pivot the latch 36 on the side of the cleaner body from the position illustrated in Figure 3 to a substantially horizontal position. This will permit the drawer 28 to be withdrawn to the left by means of a force exerted upon its front face 29. Upon being removed from the machine the receptacle 28 can be inverted whereupon the collected material will fall therefrom and thereafter it can be re-inserted into the machine and again locked in place by the latch 36. In operation there is substantially no leakage from the receptacle, the seal 35 surrounding the only opening through which air could escape from the machine around the receptacle.

If after prolonged use, it should become necessary to replace the dirt filter 24 the operation is relatively simple. The operator first removes the top cover plate 21. The irregular side walls 22, which clamp the filter member in place upon the side walls 6, are removed with the top and the operator can then lift the filter from its position within the body and discard it. Thereafter a replacement filter, which may be merely a sheet of paper, is positioned in the manner of the original filter, it being desirable for the operator to effect the conformation of the new filter at least roughly to its supporting surfaces. Thereafter the cover 21 is repositioned and the spacers 26 on the top carry the sheet downwardly into position. With the top in position the new filter is automatically clamped in place by the line contact between the cooperating walls of the cover and the lower body portion to prevent any leakage. The only passage of air then possible is through the filter element itself.

Referring now to Figures 6 to 8, inclusive, the second preferred embodiment of the invention is illustrated and is seen to differ primarily from the first described embodiment through the incorporation into the machine of a rotary agitator within the cleaner nozzle, driven from the main driving motor 54 of the machine, and also through the elimination of the corrugated filter member and its mounting and securing means of the first embodiment and the substitution therefor of the more common type of filter bag.

In the second embodiment of the machine the main casing is indicated by the reference character 91 and is seen to comprise a nozzle 92 having a double front wall and surface-contacting lips 93 and 94. The nozzle 92 interiorly connects through a port 96 into the central compartment or housing 98 of the machine which is adapted to contain and house the filtering means. In this embodiment the filtering means comprises the bag 97 at the mouth of which is the bag ring 99 encircling the port 96. Bag-ring-retaining means are indicated by the reference character 101 and are seen to include a manually displaceable latch element 102. A wire screen bag support 103 surrounds the filter bag 97 for the major portion of its length and serves to space it interiorly from the side walls of the enclosing housing 98. In its rear wall the receptacle 98 is provided at one side with an exhaust port or outlet port 104 which opens directly into air passageway 106 similar in substantially all respects to the passageways 13 in the first embodiment

there being, however, but a single air passageway 106.

The main body of the cleaner constructed in accordance with the present embodiment is movably supported by pairs of front and rear wheels 41 and 42, as in the first construction, and the latter being pivotally supported upon the frame 83 as in the first construction and for the same purpose.

Rotatably mounted within the nozzle 92 is a rotary agitator 109 which includes rigid beater elements 111 and flexible brush elements 112. The agitator is rotatably supported upon a central stationary through-supporting shaft 113 and is rotated by means of a power-transmitting belt 114 which extends rearwardly at the side of the housing 98 in a belt channel 116, the belt pulley surface upon the agitator being positioned near one end thereof. Power to drive the power-transmitting belt is derived from the driving motor 54 carried in the cleaner handle which also drives the suction-creating means as in the first embodiment as will be immediately described.

The handle unit, which includes the suction-creating means and the driving motor therefor, in this embodiment is substantially exactly like that of the first embodiment, and is therefore only partially illustrated. There is one difference, namely, that the motor shaft 56 extends downwardly toward the main casing of the cleaner and carries a beveled driving pinion 119. As in the first embodiment the lower end 48 of the hollow cylindrical section 47 of the handle is pivotally mounted upon its tubular mounting element 51. That element, in the present embodiment, rotatably seats at one side within the inner side wall of the air passageway 106 and while its opposite side is supported in a similar seat formed in a specially provided vertical wall 120. The handle is pivotally mounted as in the first embodiment but air enters only from the air passageway 106 upon one side thereof.

Positioned in the pivotal center line of the cleaner handle, and carried by a bearing 121 within the pivotal mounting element 51, is a rotary jack shaft 122 which at its inner end carries a beveled gear 123 which meshes with the gear 119 on the motor shaft 56. At its outer end shaft 122 carries a driving pulley 124 and is additionally supported adjacent thereto by means of a second bearing 126 positioned within the inner wall of the belt channel 116. It is seen that power is transmitted directly from the driving motor shaft 56 through the gears 119 and 123 to the jack shaft 122 from which point power is relayed through the belt 114 to the rotary agitator 109 within the nozzle. It is also clear that because the shaft 122 is in the pivotal center line of the handle the driving connection between the gears 119 and 123 will be maintained in all angular positions of the handle, the point of contact of the gears 119 and 123 merely moving around that pivotal axis.

A removable elongated screw-held bottom plate 127 is provided for the belt channel 116 and a properly shaped screw-held bottom plate 128 is provided for the air passageway 106, the bottom wall of the main hollow bag-containing passageway 98 being formed integrally with the lower portion of the cleaner casing. One other detail of body construction which should be mentioned is the removable cover plate 129 which forms the top of the bag containing housing. As is best illustrated in Figure 8 this cover plate forms the top portion of the belt channel 116 and also the top and side portions of the filter-bag-containing housing and is normally secured in place by means of an overhanging latch or hook 131 at one side and by a manually operable latch element 132 at the opposite side.

The operation of the present embodiment of the invention is very similar to that first described. In the on-the-floor cleaning operation the machine is propelled back and forth upon the surface covering by means of a force exerted by the operator through the handle. The suction effective within the hollow handle created by the suction-creating means is also effective within the cleaner main casing, the latter being interiorly connected thereto, and so cleaning air is drawn into the cleaner nozzle between the lips 93 and 94. The surface covering undergoing cleaning is lifted upwardly into contact with those lips and is contacted by the agitator 109 and is beaten and brushed to dislodge the foreign material therefrom. This foreign material, together with the air entering the nozzle, passes upwardly and through the port 96 into the dirt bag 97. The latter is spaced from the surrounding walls of the housing 98 by the wire spacing screen 103 and, as the pressure surrounding the bag is reduced, the air is drawn through the air permeable fabric thereof. The foreign material is retained within the bag while the air passes therethrough and from the receptacle 98 into the air passageway 106. It is drawn thence through the hollow handle past the driving motor, where it performs its cooling function, and is exhausted from the upper end of the cleaner handle in the exact manner of the first embodiment.

During this operation the agitator is rotated by means of the rotating force received from the power-transmitting belt 114 which is itself driven from the cleaner motor through the mechanism described comprising the gears, the power-transmitting belt and the driving pulley. The driving relationship is maintained in all angular positions of the handle for, as is clearly illustrated in Figure 6, pivotal movement of the handle will serve merely to change the angular position of the shaft 54 relative to the driven shaft without in any way varying its distance therefrom.

If off-the-floor use is desired, the pivoted valve element 61 can be opened to permit of a converter to be connected to the port 96 as in the manner illustrated in the first embodiment. While the exhaust port in the handle is not illustrated it is identical with that of the first embodiment and of course the conversion for blowing would therefore be identical. The nosing downwardly of the cleaner upon being lifted by force exerted through the handle is prevented in the present embodiment by the same means as in the first embodiment including the cooperative relationship existing between the downwardly spring pressed rear supporting wheels 42 and the handle-controlling means.

After considerable use it may become desirable to clean the filter bag and in such event the operator releases the cover-securing latch 132 and removes the cover 129. Thereafter a pivotal movement of the latch 102 permits of the lifting upwardly of the bag ring 99 which, of course, carries with it the bag 97. The latter upon being removed from the machine can be cleaned in the usual manner and is thereafter replaced and again secured in place by the latch 102. Upon replacing the cover 129 and again latching it in place the machine is ready for further operation.

I claim:

1. In a suction cleaner of the type having an ambulatory body unit including a nozzle and dirt-separating means and a handle unit including suction-creating means and a driving motor therefor pivotally mounted on said body and having its motor shaft completely within said handle; a surface agitator in said nozzle, and power-transmitting means connecting said agitator to said motor shaft including a jack shaft in the pivotal axis of the handle unit.

2. In a suction cleaner of the type having an ambulatory body unit including a nozzle and dirt-separating means and a pivoted handle unit including suction-creating means and a driving motor therefor; a surface agitator in said nozzle, and power-transmitting means connecting said agitator to said motor including a jack shaft in the pivotal axis of said handle, gear means connecting one end of said shaft to the shaft of the driving motor, a pulley upon the opposite end of said jack shaft, and a power-transmitting belt connecting said pulley to said agitator so as not to alter the length of said belt upon pivotal movement of said handle unit.

3. In a suction cleaner of the type having an ambulatory body unit including a nozzle and dirt-separating means and a pivoted handle unit including suction-creating means and a driving motor therefor; a surface agitator in said nozzle, and power-transmitting means connecting said agitator in said nozzle to said motor including a first power-transmitting element in the exact pivotal axis of said handle extended from one side thereof into engagement with the extended lower end of the shaft of said motor at the pivotal axis of said handle unit, and a second power-transmitting element between said first element and said agitator.

4. In a suction cleaner of the type having an ambulatory body unit including a nozzle and dirt-separating means positioned rearwardly thereof and a pivoted handle unit including suction-creating means and a motor having its shaft extended in the direction of the length of and completely within said handle substantially into the pivotal axis thereof; a rotary surface agitator in said nozzle, a rotary shaft extended parallel to said agitator in the pivotal axis of said handle connected in power-transmitting relationship to said motor shaft at the pivotal axis of said handle unit, and means connecting said rotary shaft to said agitator and extended at the side of said dirt-separating means.

5. In a suction cleaner of the type having an ambulatory body including a nozzle and dirt-separating means and a pivoted handle unit including suction-creating means and a driving motor therefor; a surface agitator in said nozzle, a belt channel in said body along the side of said dirt-separating means, a belt in said channel connected to said agitator, and a jackshaft in the pivotal axis of said handle connected to said belt in said channel and to the shaft of said driving motor so as not to alter the length of said belt upon pivotal movement of said handle unit.

6. The structure recited in the preceding claim characterized in that said motor is positioned adjacent the pivotal axis of said handle with one end of its shaft connected to said jackshaft and the opposite end of its shaft connected to said suction-creating means.

7. In a suction cleaner of the type having an ambulatory body including a nozzle and dirt-separating means and a pivoted handle unit including suction-creating means and a driving motor therefor; a surface agitator in said nozzle, a suction air passageway in said body from said nozzle to the rear of said body, a tubular member pivotally connecting said handle unit to said body and connecting said air passageway in said body with said suction-creating means in said handle unit, and power transmitting means in the air stream in said tubular member connecting said motor in said handle unit to said agitator and including a jack shaft in said tubular member at the pivotal axis of the handle unit.

8. In a suction cleaner of the type having an ambulatory body including a nozzle and dirt-separating means and a pivoted handle unit including suction-creating means and a driving motor therefor having its shaft within said handle unit; a surface agitator in said nozzle, a tubular member pivotally connecting said handle unit to said body, bearing means in said tubular member supporting a jack shaft in said tubular member at the pivotal axis of said handle unit, said jack shaft connected to said motor shaft in said tubular member, and means connecting said jack shaft to said agitator.

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