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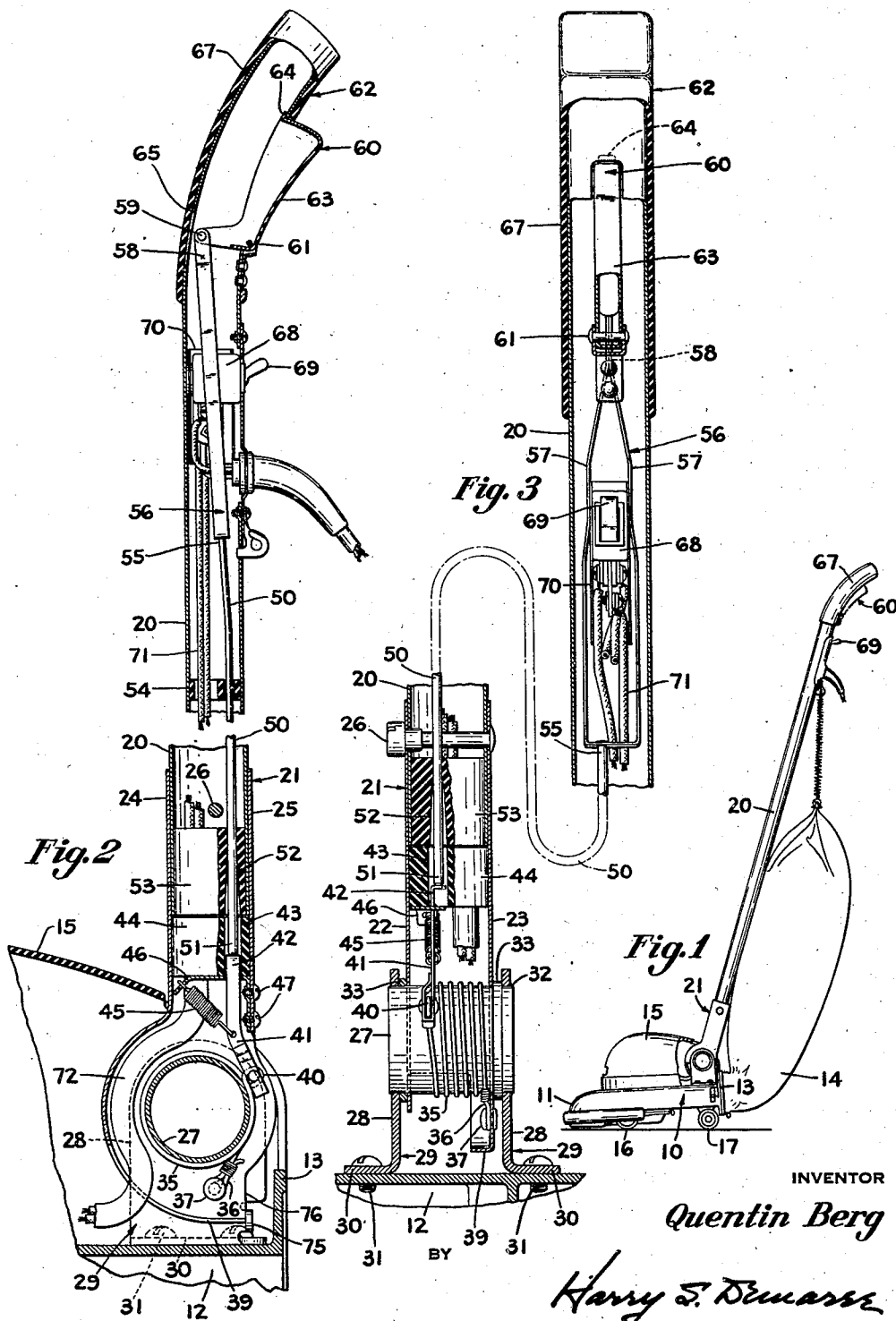
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2,243,067

SUCTION CLEANER

Filed Feb. 15, 1939

2 Sheets-Sheet 1



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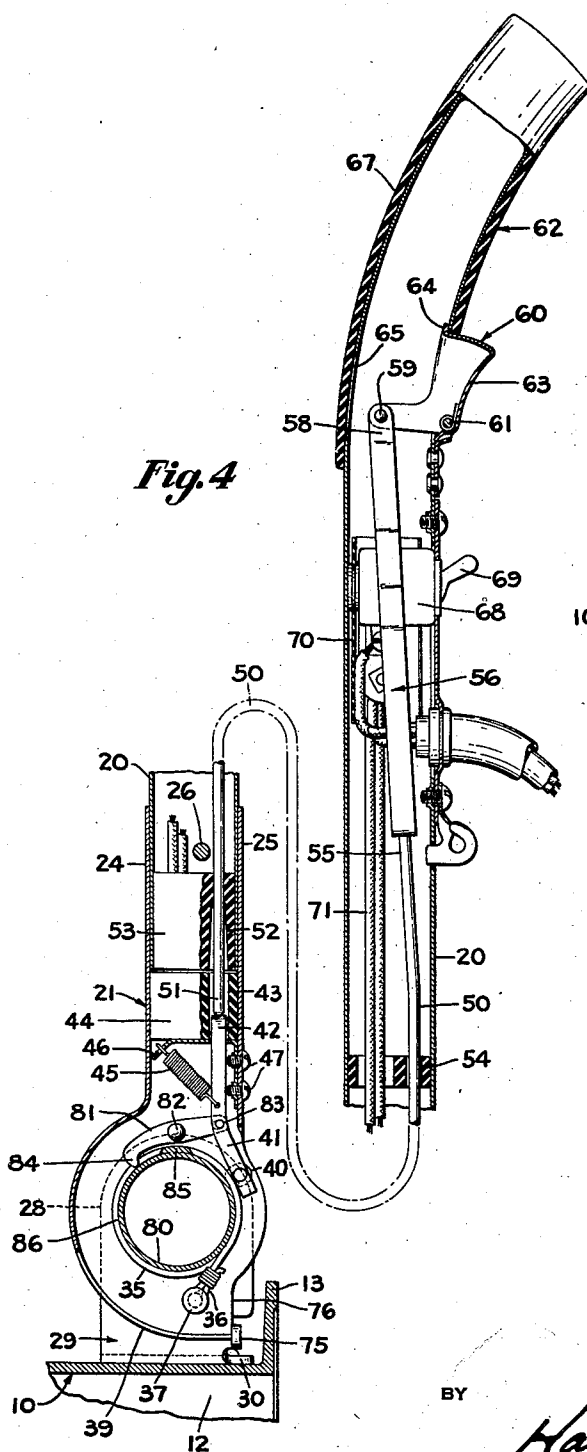


Fig. 4

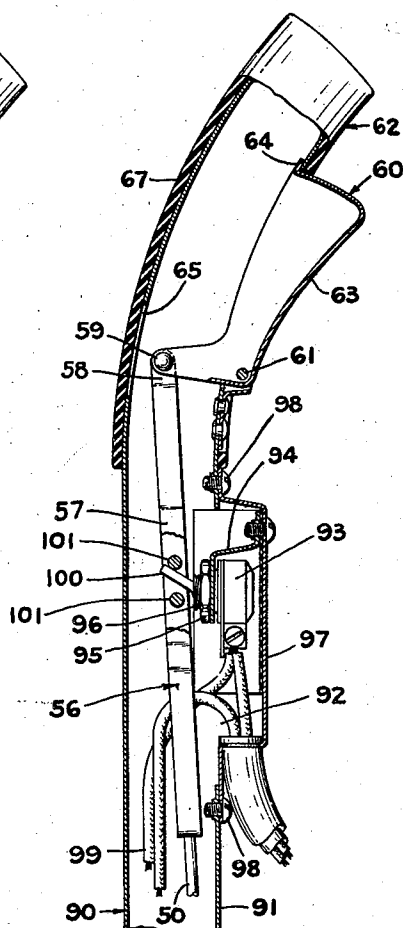


Fig. 5

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SUCTION CLEANER

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9 Claims. (Cl. 306-11)

The present invention relates to suction cleaners and particularly to new and improved handle control mechanism in suction cleaners.

It is an object of the invention to provide a new and improved suction cleaner. Another object to provide new and improved handle controlling means in a suction cleaner. It is another object to provide means which permit free movement of the handle in one direction and lock the handle in any position upon movement in the reverse direction. A further object is to provide resilient friction means to lock the handle in any desired position. Further objects and advantages of the invention will be apparent upon referring to the following specification and claims and the attached drawings, wherein:

Figure 1 is a side elevation of a suction cleaner in which my invention is embodied;

Figure 2 is a broken longitudinal sectional view of one embodiment of the invention;

Figure 3 is an enlarged broken sectional view of the embodiment shown in Figure 2 taken at right angles thereto;

Figure 4 is a broken sectional view of another embodiment of the invention, and

Figure 5 is a sectional view of another embodiment of the invention.

The invention disclosed herein is employed in a suction cleaner comprising a main casing 10 having a nozzle 11 communicating with an unshown fan chamber connected to an exhaust passageway 12 provided with a vertical flange 13 to which a dust bag 14 is removably secured. The casing 10 supports a motor housing 15 enclosing an unshown motor for driving an unshown fan which creates suction to draw dirt-laden air from the surface being cleaned through the nozzle 11 into the fan chamber and discharges the dirt-laden air through the exhaust passageway 12 into the dirt bag 14. The cleaner is supported on front and rear wheels 16 and 17 respectively.

One embodiment of the handle control mechanism is disclosed in Figures 2 and 3, and comprises an elongated hollow handle 20 removably disposed in a split hollow handle socket 21 having side walls 22 and 23, a front wall 24 and a split rear wall 25. A bolt and nut connection 26 clamps the handle 20 in the split handle socket 21. The handle socket 21 is pivotally mounted on the casing 10 by being journaled on a hollow pivot or friction drum 27 extending through the socket side walls 22 and 23, and through the vertical walls 28 of a pair of spaced brackets 29 having flanges 30 removably secured by bolts 31 to the rear end of the casing 10 above the exhaust passageway 12. In order to prevent rotation of the handle pivot 27, one end 32 of the latter is rigidly secured to one of the handle brackets 29. A pair of spacers 33 are interposed

between the socket side walls and handle brackets to properly position the handle on the pivot 27.

In order to lock the handle in any angular position between the storage position shown in Figure 2 to a substantially horizontal position, a resilient spring 35 is wound helically about the friction drum 27 which is of relatively large diameter. The normal contracted inside diameter of the helical spring 35 is slightly less than the outside diameter of the drum 27. Although I have shown the friction spring 35 as being circular in section, it may be of different cross section and the friction surface of the drum 27 may be hardened to resist wear. One end 36 of the spring 35 is rigidly secured by a rivet 37 to an extended portion 39 of the socket side wall 23 and the spring 35 is wrapped counter-clockwise about drum 27, as viewed in Figure 2. The opposite end 40 of the spring 35 is secured to a rod 41 having a longitudinally off-set portion 42 which extends upwardly in the socket and terminates in an opening 43 in the insulating portion of a male electrical plug 44 mounted in the handle socket 21.

A tension spring 45 has one end secured to the rod 41 and another end secured to a member 46 which is removably mounted in the handle socket by screws 47 and serves as a support for the male electrical plug 44. The tension spring 45 at all times urges the movable end 40 of the spring 35 in a direction to wrap the latter about the drum 27 and to urge the rod 41 upwardly in the handle socket 21.

In order to actuate the rod 41 and control the wrapping and unwrapping of the friction spring 35 about the drum 27, I provide a hand operated mechanism including a push rod 50 having one end 51 normally abutting the upper extreme end of the rod 41. The actuating rod 50 extends through a bore 52 in a female electrical connector 53 and upwardly in the handle through a guide member 54 and has its upper end 55 rigidly connected to a yoke 56 having a pair of spaced arms 57 which are joined together at their upper ends as indicated at 58, for pivotal connection to a pin 59 mounted in a hand operated lever 60. The lever 60 is pivotally mounted at 61 on the handle 20 adjacent the upper end of the hand grip 62 where the operator grasps the handle to manipulate the cleaner, and the hand engaging portion 63 of the lever 60 at all times projects beyond the exterior of the hand grip 62. A lip 64 is formed on the hand lever 60 for engagement with the handle 20 to limit outward pivotal movement of the lever. A portion 65 of the handle 20 is cut out to facilitate assembling the yoke 56 to the hand lever 60, and a rubber or other insulating material 67 covers the upper end of a handle 20 to form an insulated hand grip.

A switch case 68 is mounted in the handle 20 and has an operating lever 69 disposed beneath and adjacent to the hand operated handle control lever 60 for convenient manipulation of the latter. The switch case 68 is arranged between the spaced arms 57 of the yoke 56, and insulation 70 is interposed between the yoke 56 and the switch 68 to insulate the hand operated handle control lever 60. Electrical conductors 71 extend downwardly through the hollow handle 20 to the connector 53, and conductors 72 extend from the male plug 44 and then between the front socket wall 24 and the handle pivot 27 to the unshown motor.

One of the walls 28 of the handle bracket is provided with an offset lug 75 for engagement with an extending lip 76 on the side wall 23 of the handle socket to limit movement of the handle in its storage position as shown in Figure 2. When the handle 20 is in substantially horizontal or its lowest operating position, it abuts the exhaust flange 13 to limit further downward movement of the handle.

In operation, assume the handle is in storage position as shown in Figure 2, the helical spring 35 will lock the handle in such position and prevent relative rotation between the handle and the casing 10 since the helical spring 35 has a natural tendency to wrap tightly in a counter-clockwise direction, as viewed in Figure 2, and since the normal inside diameter of the helical spring 35 is slightly less than the outside diameter of the friction drum 27. If the cleaner is lifted off the floor the natural tendency of the casing 10 is to pivot counter-clockwise, as viewed in Figure 2, which causes the movable end 40 of the spring 35 to wrap more tightly about friction drum 27, and thus lock the handle with respect to the casing.

When it is desired to lower the handle the operator depresses the hand lever 60 which moves the actuating rods 50 and 41 downwardly in the handle 20 against the force of the spring 45 causing the free end 40 of the locking spring 35 to move clockwise as viewed in Figure 2, or in an unwrapping direction, which unwraps the locking spring 35 increasing the inside diameter of the latter to move it out of locking frictional engagement with the friction drum 27, whereby the spring 35 bodily moves with the handle and the latter can be freely lowered to any desired position. Thereafter, the operator releases the hand lever 60 and the tension spring 45 forces the actuating rods 41 and 50 upwardly in the handle to return the parts to normal position. At the same time the free end 40 of the locking spring 35 inherently contracts and moves in a counter-clockwise direction as viewed in Figure 2, to frictionally engage throughout its helical length the drum 27 and to thereby lock the handle in the selected position. Additionally, the weight of the handle 20 causes the latter to tend to pivot clockwise as viewed in Figure 2, whereby the end 36 of the helical spring 35 tends to wrap more tightly about the drum 27 to lock the handle in position.

If it is desired to raise the handle from a low position the operator merely pivots the handle upwardly without manipulating the actuating lever 60. The locking spring 35 permits free upward movement of the handle since the latter when pivoted upwardly, moves in the same direction in which the locking spring 35 is wound about the pivot 27, that is, in a counter-clockwise direction as viewed in Figure 2.

Another embodiment of the invention is shown in Figure 4 and is alike in all respects to the previous embodiment with the exception of the friction drum about which the handle locking spring is wound. In this embodiment a pivot or drum 80 is rigidly supported in a pair of handle brackets 29 mounted on the cleaner casing 10. The locking spring 35 has one end 36 rigidly secured at 37 to the pivotally mounted handle socket 21, and its movable end 40 is secured to the actuating rod 41 which abuts the rod 50 connected to the yoke 56 pivoted to the actuating lever 60.

A lever 81 is pivoted at 82 to a side wall of the handle socket 21 and has one end 83 pivotally connected to the actuating rod 41 and its opposite end is provided with a laterally projecting lug 84 which rides on a cam 85 provided on the drum 80 and also rides on the arcuate surface 86 of the latter.

In operation, when the handle is in storage position the lever 81 rests upon the drum surface 86 as shown in Figure 4. When it is desired to lower the handle, the lever 60 is depressed causing the actuating rod 41 to move downwardly in the handle against the force of the spring 45. Downward movement of the rod 41 pivots the lever 81 out of engagement with the drum surface 86 and also unwraps the spring 35 from locking frictional engagement with the drum 80, whereby the handle 20 may be freely lowered to any position.

If the handle has been moved to the normal working range, that is, plus or minus with respect to the 45 degree angle, and the actuating lever 60 is released, the lever 81 will engage the cam 85 and prevent the locking spring 35 from wrapping tightly about the drum 80, whereby the handle may be freely raised and lowered throughout the effective unlocking range of the cam 85. When the handle is raised or lowered so that the lever 81 clears the cam 85, the spring 45 urges the actuating lever 60 to normal locking position and the spring 35 wraps, or contracts, tightly about the drum 80 to frictionally engage the latter and lock the handle in position.

A further embodiment of the invention is disclosed in Figure 5 and comprises a handle 90 which is pivotally mounted to the cleaner casing 10 hereinbefore described. The rear wall 91 of the handle is provided with an elongated opening 92 for the reception of a switch mechanism. The switch mechanism comprises a switch case 93 mounted on an angular bracket 94 by means of a nut 95 threaded on a hollow bolt 96 forming part of the switch, and the bracket 94 is secured to a cover plate 97 which is removably mounted on the rear handle wall 91 by screws 98. Electrical conductors 99 extend from the switch 93 downwardly in the handle to an unshown motor. The switch lever 100 extends through the hollow bolt 96 and is disposed between a pair of spaced bars 101 secured in the side arms 57 of the yoke 56 forming part of the hand operated mechanism for controlling the expansion and contraction of the spring 35 to lock the handle in different positions.

In operation, when the hand lever 60 is depressed to unwrap the locking spring 35 and thus unlock the handle 90, the yoke 56 moves downwardly in the handle and also moves the switch lever 100 to energize the motor as long as the operator depresses the lever 60. When the operator releases the lever 60 the spring 45 moves the yoke 56 upwardly in the handle to cause the

lever 80 to move to normal position and the switch lever 100 to be shifted to inoperative position to de-energize the motor, and at the same time the handle 90 is locked in the selected position.

It is to be understood that the protection herein applied for is not confined to the particular combinations of features or elements set out in the following claims. Protection is herein applied for, for any one or more of the features or elements referred to in the following claims, or described in the foregoing specifications or shown in the accompanying drawings, either independently or in combination.

I claim:

1. In an ambulatory machine, comprising a body, a handle pivotally mounted on said body, a friction member mounted on said body, locking means wrapped around and frictionally engaging said friction member, said means having one end movably mounted and its other end rigidly secured to said handle, said locking means being wrapped around said friction member and connected to said handle whereby the weight of said handle tends to wrap said locking means tightly about said friction member to prevent said handle from pivoting downwardly, and means for shifting said movable end of said locking means to release the latter from said friction member to permit free downward movement of said handle.

2. In an ambulatory machine, comprising a body, an electric motor, a handle pivotally mounted on said body, a switch mounted on said handle to control the current to said motor, a friction member, locking means wrapped around and frictionally engaging said friction member to lock said handle in position, hand operated means on said handle for releasing said handle locking means from said friction member to permit free movement of said handle with respect to said body, and means connected to said hand operated means for operating said switch to energize said motor when said hand operated means are actuated to unlock said handle, and operable to de-energize said motor when said hand operated means are moved to handle locking position.

3. In an ambulatory machine, comprising a body, a handle pivotally mounted on said body, a friction member, locking means wrapped around and frictionally engaging said friction member to lock said handle in position, means for releasing said handle locking means from said friction member to permit free movement of said handle with respect to said body, and means for rendering said locking means ineffective for permitting free oscillating movement of said handle without manipulation of said locking releasing means.

4. In an ambulatory machine, comprising a body, a handle pivotally mounted on said body, a friction member, locking means wrapped around and frictionally engaging said friction member to lock said handle in position, manually operated means for releasing said handle locking means from said friction member to permit free movement of said handle with respect to said body, cam means, and lever means connected with said cam means and manually operated means and operable upon engagement with said cam means to render said locking means ineffective for permitting free oscillating movement of said handle without manipulation of said manually operated means.

5. In an ambulatory machine, comprising a

body, a handle pivotally mounted on said body toward the rear thereof, a friction member carried by said body, locking means adjacent said friction member and connected to said handle for free movement of the latter with respect to said body, said locking means being actuated when said cleaner is lifted off its supporting surface whereby said body and friction member rotate with respect to said locking means to force the latter into frictional engagement with said friction member and hold the handle in position with respect to said machine body.

6. In a suction cleaner, a casing containing cleaner mechanism, a handle pivoted on said casing rearwardly of the center of gravity thereof, said casing of its weight rotating downwardly and forwardly with respect to said handle when the cleaner is lifted by said handle, a friction member mounted on said casing, locking means around said friction member and connected to said handle, said locking means being wrapped into frictional engagement with said friction member by said downward tilting of said casing with respect to said handle upon said lifting of the cleaner to thereby lock said handle with respect to said casing.

7. In a suction cleaner, a casing containing cleaner mechanism, a handle pivoted on said casing rearwardly of the center of gravity thereof, said casing of its weight rotating downwardly and forwardly with respect to said handle when the cleaner is lifted by said handle, a friction member mounted on said casing, locking means cooperating with said friction member to hold said handle in adjusted positions relative to said casing, manually operated means for releasing said locking means to permit free movement of said handle, and means for rendering said locking means ineffective for permitting free oscillation of said handle without manipulation of said locking releasing means, said locking means being wrapped into frictional engagement with said friction member by said downward tilting of said cleaner upon said lifting of the latter to thereby rigidly lock said handle with respect to said casing.

8. In a manipulatable tool having a handle pivotally mounted thereon, means for positioning said handle in a storage position or in a position for use, said means including a one-way frictional clutch device providing for free movement of said handle toward said storage position but acting to arrest its movement in the reverse direction at any point in its path of movement except when constrained from such action, and means for constraining said one-way clutch from arresting movement of the handle in either direction.

9. In an ambulatory machine, comprising a body, an electric motor, a handle pivotally mounted on said body, a switch mounted on the upper end of said handle to control the current to said motor, handle locking means on said body and handle for locking the latter with respect to said body, hand operated means on said handle for releasing said handle locking means to permit movement of said handle with respect to said body, and means connected to said hand operated means for operating said switch to energize said motor when said hand operated means are actuated to unlock said handle, and operable to de-energize said motor when said hand operated means are moved to handle locking position.

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