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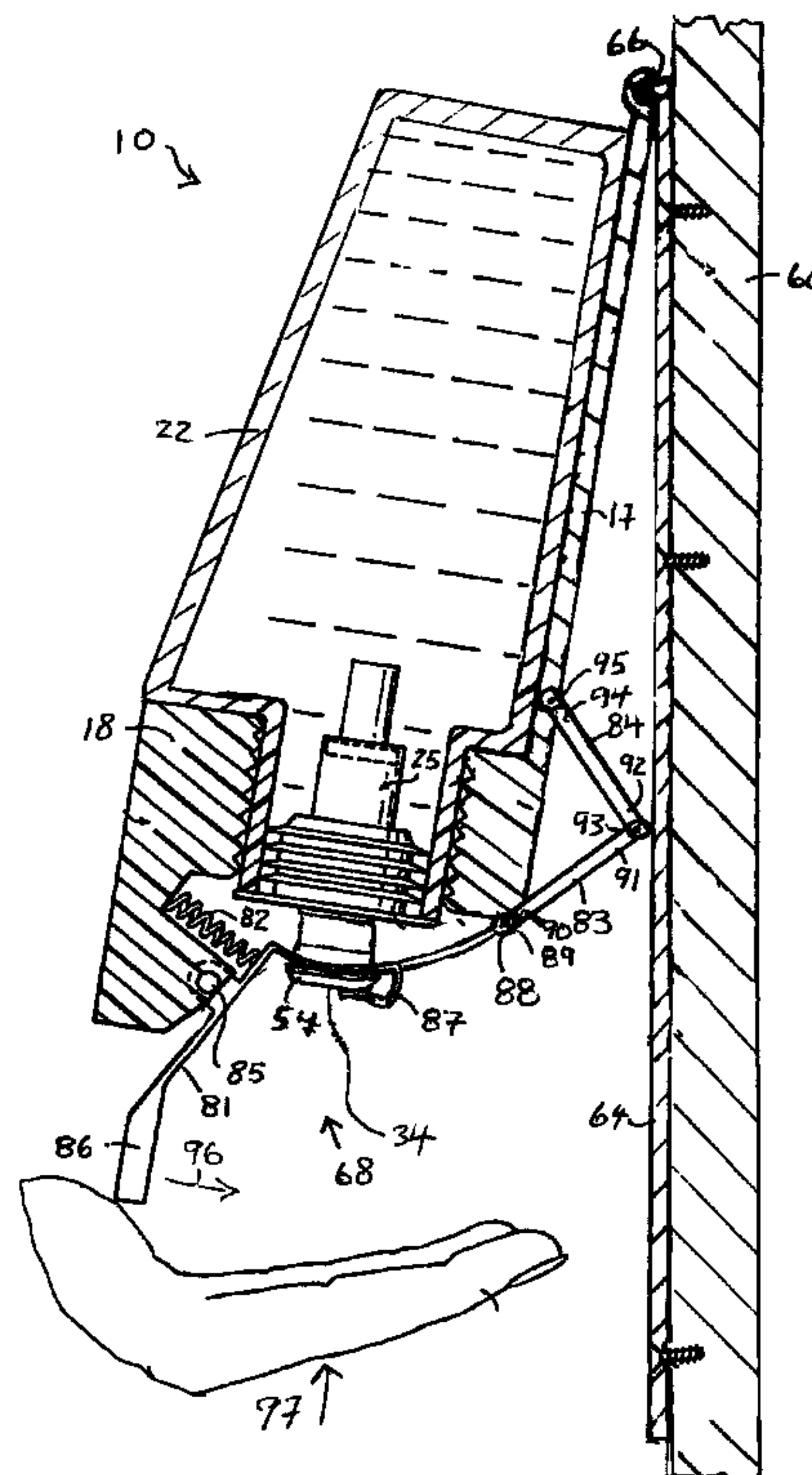
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(54) Title: LOW PROFILE DISPENSER



(57) Abrégé/Abstract:

A fluid dispenser which has a low profile when not activated but when activated for dispensing moves forwardly to a forward position in which the dispensing outlet is forward of the position it assumes in the unactivated condition.

ABSTRACT

A fluid dispenser which has a low profile when not activated but when activated for dispensing moves forwardly to a forward position in which the dispensing outlet is forward of the position it assumes in the unactivated condition.

Title

LOW PROFILE DISPENSER

Scope of the Invention

[0001] This invention relates to dispensers and, more particularly, to a dispenser preferably for hand cleaning fluid to be located in the hallway of a building, having a low profile to minimize interference with persons passing through the hallway and which, when activated to dispense fluid, moves outwardly from the wall to facilitate usage.

Background of the Invention

[0002] Dispensers, as for dispensing fluid materials such as fluids, paste, powders, particulate material, foams and liquids as for cleaning or disinfecting as, for example, a user's hands, are well known. Typical such dispensers are mounted on vertical wall surfaces and provide a discharge outlet for dispensing of fluid onto a person's hand typically disposed beneath the dispenser. It is common practice to mount such fluid dispensers as in hallways of hospitals and food service and food preparation areas to facilitate persons in adopting good hand cleaning practices. It is desired that such dispensers have a low profile, that is, extend from the wall surface a minimal amount so as to limit the extent to which the dispenser impedes passage of persons and objects past the dispenser. In particular, many countries such as the United States of America, have a requirement that to assist disabled persons, devices such as fluid dispensers mounted to hallway walls must not extend inwardly from the wall beyond a set distance, typically four inches (10.16 cm).

[0003] Known wall mounted soap dispensers include dispensers such as manually operated dispensers as shown in U.S. Design Patent 568,659 to Ophardt et al, issued May 13, 2008 and U.S. Patent 5,489,044 to Ophardt, issued February 6, 1996 and automated dispensers such as, for example, as shown in U.S. Patent 5,836,482 to Ophardt et al, issued November 17, 1998. In the use of such dispensers when mounted to a vertical wall, a user's hand is placed underneath the dispenser and fluid is dispensed downwardly from the dispenser onto a user's hand.

[0004] The present inventor has appreciated disadvantages which arise when a dispenser is provided with a low profile, for example, to extend merely four inches from the wall. One

disadvantage is that there is less than desired space underneath the dispenser in front of the wall for a person to conveniently and comfortably place their hand to receive the dispensed fluid. The further disadvantage of awkwardness in use arises in that the fluid being dispensed is often dispensed closer to the wall than desired and, therefore, onto the fingers of a user's hand rather than, preferably, into the palm of a user's hand. Disadvantageously, the leading edge of the user's hand, typically the user's fingers, come to engage the surface of the wall below the dispenser resulting in the disadvantage of user discomfort due to engagement of the wall. Disadvantageous sanitary issues in respect of possible cross contamination arise due to multiple hands contacting the wall. Another disadvantage is that in the discharge of the fluid, the fluid has an increased propensity to engage the surface of the wall.

Summary of the Invention

[0005] To at least partially overcome these disadvantages of the previously known devices, the present invention provides a fluid dispenser which has a low profile when not activated but when activated for dispensing moves forwardly to a forward position in which the dispensing outlet is forward of the position it assumes in the unactivated condition.

[0006] An object of the present invention is to provide a low profile fluid dispenser as for mounting on a vertical surface which, when activated, provides increased separation of the dispensing outlet from the wall surface on which the dispenser is mounted.

[0007] Another object is to provide a method of operation of a fluid dispenser under which, when activated, the dispenser is moved forwardly from a support wall and while the dispenser is forward of the rear position, fluid is dispensed.

[0008] Accordingly, in one aspect, the present invention provides a fluid dispenser adapted to be mounted at its rear to a vertical support surface of a support member with the dispenser extending forwardly from the vertical support surface, the dispenser including:

- a discharge outlet for discharge of fluid material downwardly from the dispenser to discharge fluid material,
- a fluid material reservoir containing fluid material to be dispensed,
- a discharge mechanism to discharge fluid material from the reservoir out the discharge outlet when activated,

an activation mechanism to activate the discharge mechanism,
the discharge outlet being movable between a forward position and a rear position, and

a movement mechanism to move the discharge outlet between the forward position and a rear position,

in a cycle of operation to dispense fluid material, the movement mechanism moves the discharge outlet from the rear position to the forward position and then back to the rear position, during which cycle the activation mechanism activates the discharge mechanism to discharge fluid material out the discharge outlet while the discharge outlet is forward of the rear position, preferably in one or more conditions selected from the following conditions: (a) the discharge outlet is in the forward position, (b) the discharge outlet is moving toward the forward position, and (c) the discharge outlet is moving away from the forward position.

[0009] The dispenser may be either a manual or an automated dispenser. When the dispenser is a manual dispenser, then the manually operated activation mechanism, such as a lever, may provide a dual function of moving the dispenser from a low profile rear position to a forwardly disposed position as well as activating a dispensing mechanism to dispense fluid. Where the dispenser is an automated fluid dispenser, the dispenser preferably includes an electrically powered movement mechanism to move the discharge outlet between the forward position and the rear position and the electrically powered activated mechanism to activate a discharge mechanism such as a piston pump. The dispenser may be a combination of manual and automated operation as, for example, with an electrically powered movement mechanism to move the discharge outlet to a forward position in a manually activated activation mechanism such as a lever to activate a discharge mechanism such as a piston pump to discharge fluid. Similarly, the dispenser could include a manual movement mechanism to move the discharge outlet to the forward position and an automated discharge mechanism which may be electrically powered to discharge fluid from the reservoir.

[0010] In a preferred embodiment, the present invention provides a wall mounting plate which is secured to a wall surface. The wall mounting plate is pivotally coupled to a rear of a housing for the fluid dispenser pivot axis such that substantially the housing of the fluid

dispenser may pivot about the pivot axis between a rear inactivated position and a forward position in which fluid is to be dispensed. Preferably, the pivot axis is horizontal, however, this is not necessary.

Brief Description of the Drawings

[0011] Further aspects and advantages of the present invention will become apparent from the following description taken together with the accompanying drawings in which:

[0010] Figure 1 is a partially cut-away side view of a first preferred embodiment of a fluid dispenser in accordance with the first aspect of the present invention as mounted to a wall in a rear position;

[0011] Figure 2 is a side view the same as Figure 1 but showing the dispenser in a forward position;

[0012] Figure 3 is a cross-sectional side view of the pump assembly shown in Figure 1 in the rear position;

[0013] Figure 4 is a pictorial view of a dispenser assembly in accordance with a second preferred embodiment of the present invention;

[0014] Figure 5 is a pictorial exploded view of the dispenser assembly shown in Figure 4;

[0015] Figure 6 is a schematic cross-sectional side view of the dispenser assembly shown in Figure 4;

[0016] Figure 7 is a schematic partially cut-away pictorial side view of the dispenser assembly in Figure 6 in a rear position and showing a mechanism to move the housing relative the wall plate;

[0017] Figure 8 is a schematic partially cut-away pictorial side view similar to Figure 7 but showing the entire height of the dispenser in the forward position; and

[0018] Figure 9 is a schematic front view of the drive wheel and a rear view of the camming wheel similar to that of Figure 6;

[0019] Figure 10 is a schematic cross-sectional side view of a fluid dispenser in accordance with a third preferred embodiment of the present invention;

[0020] Figure 11 is a schematic perspective view of a fluid dispenser in accordance with a fourth preferred embodiment of the present invention;

[0021] Figure 12 is a schematic side view of a fluid dispenser in accordance with a fifth embodiment of the present invention in a rear position; and

[0022] Figure 13 is a side view of the dispenser of Figure 12 in a forward position.

Detailed Description of the Drawings

[0023] Reference is made to Figures 1 and 2 which show a fluid dispenser 10 mounted to a wall 60. The dispenser 10 includes a housing 62 which carries and supports a reservoir bottle 22, a pump assembly 25 and a lever assembly 68. The housing assembly includes a wall plate 64 which is fixedly secured to the wall 60. The housing 62 includes a backplate 17 which is pivotally coupled to the wall plate 64 via a hinge member 65 for relative pivoting about a horizontal pivot axis 66. The housing 62 is shown to have a bottom support plate 18 extending forwarding from the backplate 17 to receive and support the bottle 22 and the pump assembly 25. The support plate 18 has a circular opening 70 therethrough. The bottle 22 sits supported on the support plate 18 with a neck 27 of the bottle extending through the opening 70 and secured in the opening 70 as by friction fit. The pump assembly 25 has a construction as illustrated in Figure 3 as taught, for example, in U.S. Patent 5,489,044 to Ophardt, issued February 6, 1996, the disclosure of which is incorporated herein by reference. The pump assembly includes a piston chamber-forming member 30 secured in the neck 27 of the bottle 22. The piston chamber-forming member 30 carries a one-way valve member 72 and an axially reciprocal piston member 32 such that in a known manner reciprocal axial movement of the piston member 32 within the piston chamber-forming member 30 will dispense fluid 74 within the bottle 22 out a discharge outlet 34 of the piston member 32.

[0024] The housing 62 carries a lever assembly 68 which includes an activating lever 81, a spring 82, a first link 83 and a second link 84. The actuating lever 81 is mounted to the bottom support plate 18 for pivoting about a horizontal lever pivot axis 85 with the spring 82 disposed between the bottom support plate 18 and the actuating lever 81 to urge the actuating lever 81 to pivot clockwise as shown. The actuating lever 81 includes forward and rearward from the pivot axis 85, a manual engagement handle 86 for engagement by a user to move the actuating lever 81 counterclockwise against the bias of the spring 82. The actuating lever

81 carries rearwardly from the lever pivot axis 85 a hook member 87 which engages an engagement flange 54 on the piston member 32 such that with pivoting of the actuating lever 81 to different positions about the lever pivot axis 85, the piston member 32 slides axially within the piston chamber-forming member 30. The actuating lever 81 extends rearwardly past the hook member 87 to a rear end 88. The rear end 88 is pivotally coupled to the first link 83 for relative pivoting about a first horizontal link pivot axis 89 at a first end 90 of the first link 83. A second end 91 of the first link 83 is pivotally connected to a first end 92 of the second link 84 for relative pivoting about a second horizontal link pivot axis 93. A second end 94 of the second link 84 is pivotally mounted to the backplate 17 for relative pivoting about a third horizontal link pivot axis 95.

[0025] Reference is made to Figure 1 which shows the housing 62 in a rear position relative to the wall 60. As shown, the backplate 17 is substantially flush and parallel to the wall plate 64. The pump assembly 25 has its piston member 32 in an extended position as biased to this position by reason of the actuating lever 81 being biased clockwise by the spring 82.

[0026] With the dispenser 10 in the rear position as shown in Figure 1, a user may activate the dispenser preferably by manually urging with the rear of an upwardly facing palm of a user's hand 97 the engagement handle 86 rearwardly towards the wall 60 in the direction indicated by the arrow 96 with the palm and fingers under the discharge outlet 34. In such movement, the actuating lever 81 is pivoted counterclockwise relative to the bottom support plate 18 against the bias of the spring 82 with the hook member 87 moving the piston member 32 axially inwardly into the piston chamber-forming member 30 and with the rear end 88 of the actuating lever 81 being moved upwardly towards the pivot axis 95 on the backplate 17. In such movement, the distance between the rear end 88 on the actuating lever 81 and the pivot axis 95 on the backplate 17 is reduced, which distance is spanned by the two rigid links, namely, the first link 83 and the second link 84. To accommodate the reduction in distance, the first link 83 and the second link 84 pivot about their respective ends so as, as best seen in Figure 2, to move the junction of the second end 91 of the first link 83 and the first end 92 of the second link 84 rearwardly relative to the backplate 17. With the junction between the first link 83 and the second link 84 engaging the wall plate 64, the housing 62 is,

proximate its lower end, moved forwardly relative to the wall plate 64, thus causing the housing 62 to pivot about the horizontal pivot axis 66 between the wall plate 64 and the backplate 17. In a forward position as shown in Figure 2, the forwardmost surfaces of the dispenser 10 are disposed a greater distance from the wall 60 than in the rear position of Figure 1. Similarly, the discharge outlet 34 in the forward position of Figure 2 is disposed forwardly of the position in which the discharge outlet 34 is positioned in the rear position shown in Figure 1. In Figure 2, with the discharge outlet 34 farther forward from the wall 60 than in the position of Figure 1, there is a greater distance forward of the wall 60 for accommodating the user's hand 97 engaged on the manual engagement handle 86 of the actuating lever 81, and extending forwardly under the housing 62.

[0027] With movement of the housing 62 from the rear position toward the forward position, the piston 32 is retracted into the piston chamber-forming element 30 and fluid is dispensed as the piston 32 is retracted to a fully retracted position corresponding to the forward position. With movement of the housing from the front position to the rear position, the piston 32 is withdrawn to draw fluid into the pump assembly. Rather than utilize a piston pump assembly as shown in Figures 1 to 3 which discharges in a retraction stroke, a piston pump assembly could be used which discharges in a withdrawal stroke, that is, when the housing is moving from the forward position to the rear position.

[0028] In the embodiment of Figures 1 and 2, the wall plate 64 extends downwardly to a lower end 96 below the discharge outlet 34 and below the manual engagement handle 86 so as to provide a protective, sanitary and preferably cleanable portion of the wall plate 64 which may be engaged by the fingers of a user's hand and/or fluid which may be dispensed from the discharge outlet. This is not necessary and the wall plate 64 may be reduced as to merely secure the hinge member 65 to the wall 60.

[0029] Reference is made to Figure 4 which illustrates a dispenser assembly 10 in accordance with a second preferred embodiment of the present invention. This dispenser assembly 10, as best seen in Figure 6, includes a housing assembly 62 and a wall plate 64. The wall plate 64 is secured to a wall 60. The housing assembly 62 is mounted at its upper rear to the wall plate 64 for pivoting about a horizontal pivot axis 66. The housing assembly includes a removable reservoir assembly 12 adapted to be secured to a housing formed by a

combination of a backplate assembly 14, a presser member 15 and a shroud 16. The backplate assembly 14 has a generally forwardly directed faceplate 17 from which a horizontally disposed support plate 18 extends forwardly supported by two side plates 19. The presser member 15 is pivotally mounted to the backplate assembly 14 between the two side plates 19 with stub axles 20 received in journaling bores 21 in each of the side plates 19. The housing assembly is completed by the shroud 16 being coupled to the backplate assembly 14 to substantially enclose the support plate 18 and the presser member 15. The reservoir assembly 12 is adapted to removably couple to the assembled housing.

[0030] As best seen in Figure 5, the reservoir assembly 12 comprises a reservoir bottle 22, a pump assembly 25 and a collar 26. The bottle 22 has a threaded neck 27 about an outlet. The pump assembly 25 includes a piston chamber-forming member 30 engaged onto the threaded neck 27. The pump assembly 25 further includes a piston 32. The piston 32 is reciprocally movable coaxially within a cylindrical chamber formed within the piston chamber-forming member 30 so as to dispense fluid from inside the bottle 22 out of the outlet 28 internally through the piston 32 and out a discharge outlet 34 of the outer end of the piston 32.

[0031] With the backplate assembly 14, presser member 15 and shroud 16 assembled, the assembled reservoir assembly 12 may be coupled thereto by the reservoir assembly 12 moving vertically downwardly relative the backplate assembly 14 with the pump assembly 25 to pass vertically downwardly through an opening 30 in the plate 18, and the entire reservoir assembly 12 then being urged rearwardly to engage a rear support portion of the plate 18 above the collar 26 and below a lower shoulder on the bottle placing the piston 32 into a position for coupling with or in which it is coupled with the presser member 15. Removal of the reservoir assembly 12 is accomplished by reversed movement forwardly then upwardly.

[0032] The backplate assembly 14 includes and carries an activation unit 48 best seen in Figure 5. The activation unit 48 includes as only schematically shown in Figure 5, an electric motor 49 which rotates via a series of gears 50, a drive wheel 51 carrying an eccentrically mounted axially extending cam post 52 shown in Figure 5. The cam post 52 couples to an inner end of the presser member 15 such that in rotation of the drive wheel 51 in one full

revolution, the presser member 15 is pivoted about its stub axles 20 downwardly and then upwardly, returning to the same position. The presser member 15 is coupled to the piston 32 by engagement between catch members (not shown) carried by the presser member 15 with an engagement flange 54 on the piston 32. Such catch members and engagement may be similar to that described in U.S. Patent 5,373,970 to Ophardt dated December 20, 1994, which engagement necessarily results on coupling of the reservoir assembly 12 with the backplate assembly 14.

[0033] In one cycle of operation, the motor 49 is operated so as to rotate the drive wheel 51 360 degrees and thus move the piston 32 in a single stroke inwardly and outwardly to dispense an allotment of fluid from the bottle 22. The motor 49 is an electric motor and its operation may be controlled by a control mechanism receiving various inputs. The activation unit 48 shown is adapted to be used as a touchless dispenser in which the presence of a user's hand below the presser member 15 underneath the discharge outlet 34 is sensed by a hand sensing system including an electromagnetic radiation emitter 53 located at the bottom front of the activator unit 48 to direct radiation downwardly and forwardly towards the position the user's hand is to be placed and an electromagnetic radiation sensor 54 also located near the bottom front of the activation unit 48 adapted to sense radiation reflected off the user's hand. The hand sensing system, on suitable receipt of reflected radiation from the hand, provides a suitable signal to the control mechanism indicating the presence of the hand, for example, satisfying at least one condition for operation of the motor.

[0034] While the use of a hand sensing mechanism involving electromagnetic emitter 53 and sensor 54 is illustrated, many other systems may be provided to provide a primary indication that fluid should be dispensed. For example, these could include providing a simple on/off switch to be manually activated, or a requirement for identification as by use of a fingerprint as disclosed, for example, in U.S. Patent 6,206,238 to Ophardt, issued March 27, 2001.

[0035] The series of gears 60 includes a gear member 100 shown in Figures 6, 7 and 8. The gear member 100 is coupled at its front to the drive wheel 51 and at its rear, with a camming wheel 102 such that the gear member 100, drive wheel 51 and camming wheel 102 rotate about a common axis 104 normal to the pivot axis 66 in 1 to 1 unison.

[0036] The camming wheel 102 has an axially forwardly directed front surface 106 normal the common axis 104. The camming wheel 102 carries an axially, rearwardly directed camming surface 107 circumferentially extending about the camming wheel at a radius from the common axis 104. The axial distance of the camming surface 107 of the front surface 106 varies with angular position about the common axis 104 from a minimum at a low point indicated as 108 to a maximum at a high point 110 180 degrees from the low point 108.

[0037] A cam roller 112 is carried on the wall plate 64 mounted for rotation about a vertical axis. The cam roller 112 is disposed offset relative the common axis 104 to engage the camming surface 107 of the camming wheel 102. Engagement between the cam roller 112 and the camming surface 107 of the camming wheel 102 determines the extent to which the housing assembly 62 is pivoted about the pivot axis 66 relative the wall plate 64.

[0038] In the rear position as seen in Figures 6 and 7, the cam roller 112 engages the camming wheel 102 at the low point 108 which is the farthest forward point on the camming surface 107. From the rear position, by rotation of the camming wheel 102 180 degrees in one direction, the cam roller 112 is moved to engage the high point 110 on the camming surface 107 pivoting the housing assembly to assume the forward position as shown in Figure 8, and corresponding to a position in which the piston member 32 is retracted. From the forward position of Figure 8 with rotation of the camming wheel 102 a further 180 degrees, the cam roller 112 is moved from the high point 110 to the low point 108, and the dispenser assembly assumes the rear position of Figures 6 and 7.

[0039] In the embodiment of Figure 4, the engagement between the cam post 52 and the presser member 15 will determine the movement of the piston 32 with rotation of the drive wheel 51. The presser member 15 and cam post 52 may engage at all times with the stroke of the presser member 15 being equal to the diameter of the circle that the cam post 51 rotated from the uppermost rotary position of the cam post 52 to its lowermost position. In this case, however, the piston 32 will be reciprocally moved at times when the housing assembly 62 is (a) moving from the rear position to the forward position, (b) in the forward position, and (c) moving from the forward position to the rear position. Various arrangements can be made towards dispensing fluid, for example, substantially only when the housing assembly is closer to the forward position than the rear position or when the housing assembly 62 is only in the

forward position. For example, the pump assembly 25 could be configured to dispense only in a portion of its reciprocal movement when the housing assembly is close to the forward position. As another example, referring to Figure 9, Figure 9 shows a front view of an alternate version of the drive wheel 51 adjacent a rear view of an alternate version of the camming wheel 102 with corresponding angles of rotation of 0°, 120° and 240° shown. The camming wheel 102 is provided with a flat portion 200 of the camming surface 107 about 0° which the cam roller 102 will engage to locate the housing assembly in the rear position and a flat portion 201 between 120° and 240° which the roller cam 102 will engage to place the housing assembly in the forward position. The cam post 52 is illustrated in solid lines in Figure 9 in the zero position and in dashed lines at each of the 120°, 180° and 240° positions. The presser member 15 is schematically illustrated in dashed lines in Figure 8 as being biased upwardly into the cam post 52 in a highest upward position that the presser member 15 may assume and in dotted lines in a lower position, with the vertical distance 206 between the dashed lines and dotted lines representing the stroke of the presser member 15 in which it moves the piston 32 between extended and retracted positions to pump fluid. With this arrangement, the movement of the presser member 15 is limited to between the 120° and the 240° position, when the housing assembly 62 is in the forward position.

[0040] Reference is made to Figure 10 which illustrates an automated fluid dispenser of the type illustrated in U.S. Patent 5,836,482 to Ophardt et al, issued November 17, 1998. As with the other embodiments, similar reference numerals are used to refer to similar elements. In Figure 10, the pump assembly 25 is driven by an electric motor 49 which rotates a gear pump generally indicated 120 to dispense fluid from the bottle 22 out of the discharge outlet 34. A separate electric motor 149 is provided mounted to the housing backplate 17 and coupled to a camming wheel 102 substantially the same as the camming wheel illustrated the second embodiment. As in the second embodiment, the backplate 17 is pivotally coupled to the wall plate 64 via hinge member for relative pivoting about a horizontal pivot axis 66. While not shown, the wall plate 64 is adapted to be secured to a wall. A hand sensing system includes an emitter 53 and a sensor 54 to sense radiation reflected off a user's hand or other object provided below the dispenser.

[0041] In the operation of the embodiment of Figure 10, by reason of providing two separate motors 49 and 149, the dispenser can be operated in a manner that movement of the housing assembly between the forward position and the rear position can be performed totally independently of the activation of the discharge mechanism to discharge fluid from the reservoir. In a preferred mode of operation, with the dispenser in the rear position as shown in Figure 10, on initial sensing of a person's hand or other object below the dispenser, then the first motor 149 may be activated to move the dispenser housing to the forward position. Once the housing assembly reaches the forward position, in the forward position, the pump 49 may then be activated to discharge fluid.

[0042] In a first preferred sequence of operation, with the dispenser in the rear position, on initially sensing an object below the discharge outlet, the motor 149 is activated to move the dispenser housing to the forward position and leave the dispenser in the forward position. With the dispenser in the forward position, if an object is again sensed under the discharge outlet 34, then the motor 49 is operated to discharge an allotment of fluid. After the discharge of a first allotment of fluid and possibly after the passage of a minimal time interval, if an object continues to be sensed below the discharge outlet 34, then a second allotment of fluid may be dispensed and, subsequently, if desired, additional allotments. After a predetermined number of allotments have been dispensed or a length of time has been passed as is predetermined, possibly only if there is no object which is sensed underneath the discharge outlet, then the motor 149 may be operated to move the housing assembly from the forward position to the rear position.

[0043] It is believed that users will find pleasing the movement of the dispenser from the rear position to the forward position as becoming recognized as an initiation of the dispensing with the user to then appreciate that with the dispenser in the forward position, the dispenser is then ready to dispense fluid.

[0044] In another second preferred sequence of operation, each time an allotment of fluid is to be dispensed, the dispenser housing will move from the rear position the forward position, dispense in the forward position and then return to the rear position. Hand cleaning situations arise in which, for example, surgeons are to clean their hands for a period of time, for example, three minutes with an allotment of fluid, for example, 5 ml to be dispensed every

sixty seconds and to be rubbed into the hands for sixty seconds. The dispenser may be controlled such that movement of the dispenser to the forward position demonstratively signals to the surgeon the fact that an allotment is ready on the desired schedule to be delivered on the surgeon placing the hands under the discharge outlet. While other audio or visual signals may be provided after initial dispensing, the timed movement to the rear position then movement to the forward position will assist a surgeon in appreciating that it is time for a second or successive allotment to be dispensed. Under such operation after initial activation, the dispenser would move to the forward position, and dispense if a hand is sensed under the outlet then move to the rear position, and repeat this three times.

[0045] In the preferred embodiments, the housing assembly is hinged at its upper rear to the wall plate for pivoting between the rear position and the forward position and to return from the forward position to the rear position due to the weight of the housing assembly acting under gravity. It is to be appreciated that the mechanism for pivoting the housing assembly may provide for positive movement forward and movement rearward without relying on gravity to move the housing. Alternatively, a biasing mechanism such as a spring may be disposed between, for example, the backplate and the wall plate to bias the housing to assume the rear position.

[0046] As pump assemblies, the embodiments illustrate the use of a piston type pump and a rotary gear pump. The invention is not so limited that any manner of discharge mechanism may be suitable including, for example, peristaltic pumps and valves releasing fluid from a pressurized bottle, without limitation.

[0047] The manually operated pump assembly illustrated in Figure 1 is adapted for applying manual pressure to the manual engagement handle 86 to move it rearwardly relative to the housing. It is to be appreciated that a different arrangement of an activating lever could be arranged in which a manual engagement handle is to be moved forwardly away from the wall and such forward movement may in itself serve to provide the motive power to draw the housing assembly from the rear position to a forward position. An activating lever which is moved forwardly could be used in conjunction with a piston pump which discharges in a withdrawal stroke rather than in a retraction stroke.

[0048] In accordance with one preferred aspect of the present invention, it is preferred that fluid is not dispensed from the discharge outlet unless the dispenser assembly is in or substantially in the forward position. In respect of the manually operated arrangement in the embodiment of Figure 1, this could be accomplished by providing a delay mechanism or a lost motion link or links in the actuating lever 81 such that, for example, the dispenser housing is substantially moved to the forward position before the piston member 82 is substantially axially moved relative to the piston chamber-forming member 30. Further, provision of a pair of lost link elements can permit, once the housing is in the forward position for further movement of the actuating lever 81 to merely axially move the piston element 32 without additional pivoting of the housing relative to the wall plate. This, for example, could permit repeated cycling of the piston element 32 by reciprocal movement of the actuating lever 81 over a forwardmost portion of the range of movement of the activating lever during which the housing is maintained in the forward position.

[0049] A low profile dispenser may have side mounted activation levers such as taught in U.S. Patent 7,367,477 to Ophardt issued May 6, 2008. Pivoting of a side mounted activation lever may result in movement of the housing from a rear position to a forward position and for dispensing of fluid from the discharge outlet. For example, the side mounted activation lever could carry a low friction wedge to slide upwardly and increasingly displace the rear of the housing forwardly from a wall plate with movement of the side activation lever.

[0050] The dispenser is preferably adapted for dispensing fluid onto a user's hand disposed below the dispenser, however, the dispenser can also be adapted to dispense onto a user's hands in front of or to the side of the dispenser. For example, reference is made to Figure 11 which illustrates a dispenser of the type illustrated in U.S. Patent Application Publication US 2007/0210110 published September 13, 2007. As shown, the dispenser 10 has an activation lever 86 to be engaged as by a user's elbow of one arm 210 so as to dispense fluid from a discharge outlet 34 at the upper front of the dispenser 10. The dispenser 10 is shown to have a housing assembly 62 mounted to a wall by a wall plate 64 for pivoting about a horizontal pivot axis 66 disposed at the lower rear of the housing assembly 62. A spring member 230 only

schematically shown may bias the housing assembly 62 to a rear position. Manual downward force on the forward end of the activation lever 86 will tend to pivot the housing assembly 62 forwardly about the pivot axis 66.

[0051] Reference is made to Figures 12 and 13 which illustrate another embodiment of a manually operated dispenser 10 in accordance with the present invention. A housing 62 is pivotally mounted to a wall plate 64 for pivoting about a pivot axis 66. The housing 62 carries an engagement handle 226 fixed thereto, such that a person may use the tips of the fingers of their hand 97 to draw the housing 62 from a rear position shown in Figure 12 to a forward position in Figure 13. The wall plate 64 has a side plate 218 which extends forwardly beside the housing 62. The side plate 218 has a cam slot 220 therein within which there is received a post 222 comprising a horizontal extension of an engagement flange on the piston 32. In movement of between the forward position in Figure 12 and the rear position in Figure 13, the post 222 and therefore the piston 32 is moved upwardly relative the housing 62 to discharge fluid. The cam slot 220 has delay portion 224 which is at a constant radius from the pivot axis 66. While the post 222 is in the delay portion 224, the piston 32 is not moved axially. In this manner, the piston 32 is not moved axially other than when the housing 62 is proximate the forward position. A spring 230 may bias the housing 62 to return to the rear position.

[0052] The dispenser need not be limited to dispensing of fluids onto a person's hands and may be adapted for dispensing another application such as to dispense a food product such as ketchup or mustard as used in fast food industries, to dispense cream or milk, to dispense fluid medications as into a cup or receptacle or the like, without limitation.

[0053] In the preferred embodiments, the housing is coupled to the wall plate for pivoting about a horizontal axis. This is not necessary. The housing could be pivoted to the wall plate as for pivoting about a vertical axis. While the preferred embodiments show the housing as pivotally mounted to a wall plate, it is within the scope of the present invention that the housing be coupled to the wall and the wall plate by mechanisms other than by pivoting. For example, the housing could be coupled to the wall by a pantograph arrangement in which on activation the housing would move in a parallel direction forwardly away from the wall maintaining the relative vertical arrangement compared to the wall. The housing, of course,

could be mounted for mere forward sliding relative to slide members secured to the wall. The manner of forward movement of the dispenser relative the wall is not limited and such movement need not be merely horizontal but may have a horizontal component as well as a vertical and/or sideways component. Additionally, the housing may be mounted to a wall plate as for rotation about a vertical axis in a manner which moves the discharge outlet from a position closer to the wall to a position forward from the wall.

[0054] In the preferred embodiment, the housing assembly comprises effectively a complete dispenser modified over known dispensers substantially merely to permit relative movement of the housing assembly between the rear and forward positions. This has the requirement that the entire weight of the housing assembly must be moved forwardly. As an alternative embodiment as, for example, in the embodiment of Figure 10, merely the discharge outlet 34 maybe moved forwardly and this could, for example, be accommodated in the embodiment of Figure 9 if the tube 150 connecting the reservoir 22 to the pump assembly 25 is flexible and on activation of the motor 149, merely a lower section of the backplate 17 below a dashed line indicated as 160 moves forward whereas an upper portion of the backplate 17 remains immobile relative to the wall. This could, for example, be provided by providing the backplate 17 to be provided as two elements rather than the single element shown in Figure 10.

[0055] The dispensers in accordance with the present invention are for dispensing fluids which are, as used herein, any flowable material whether liquids, pastes, flowable particulate matter and the like without limitation. Movement of the dispenser housing between forward and rearward positions, as with tilting, pivoting or rotating can be of assistance in dispensing allotments of particulate matter.

[0056] While the invention has been described with reference to preferred embodiments, many modifications and variations will now occur to persons skilled in the art. For a definition of the invention, reference is made to the following claims.

WE CLAIM:

1. A fluid dispenser adapted to be mounted at its rear to a vertical support surface of a support member with the dispenser extending forwardly from the vertical support surface, the dispenser including:
 - a discharge outlet for discharge of fluid material downwardly from the dispenser to discharge fluid material,
 - a fluid material reservoir containing fluid material to be dispensed,
 - a discharge mechanism to discharge fluid material from the reservoir out the discharge outlet when activated,
 - an activation mechanism to activate the discharge mechanism,
 - the discharge outlet being movable between a forward position and a rear position,and
 - a movement mechanism to move the discharge outlet between the forward position and a rear position,
 - in a cycle of operation to dispense fluid material, the movement mechanism moves the discharge outlet from the rear position to the forward position and then back to the rear position, during which cycle the activation mechanism activates the discharge mechanism to discharge fluid material out the discharge outlet while the discharge outlet is forward of the rear position.
2. A fluid dispenser as claimed in claim 1 wherein the activation mechanism activates the discharge mechanism to discharge fluid material out the discharge outlet only while the discharge outlet is closer to the forward position than the rear position.
3. A fluid dispenser as claimed in claim 1 wherein the activation mechanism activates the discharge mechanism to discharge fluid material out the discharge outlet only while the discharge outlet is substantially in the forward position.

4. A fluid dispenser as claimed in claim 1 wherein the activation mechanism is an electrically powered mechanism, and the movement mechanism is an electrically powered mechanism,

the dispenser includes a control mechanism which on being activated operates the movement mechanism to move the discharge outlet from the rear position to the forward position, and with the discharge outlet in the forward position activates the activation mechanism to activate the discharge mechanism so as to discharge fluid out the discharge outlet, and

after discharging fluid material out the discharge outlet, the control mechanism operates the movement mechanism to move the discharge outlet from the forward position to the rear position.

5. A fluid dispenser as claimed in claim 4 wherein the control mechanism includes sensors to sense the presence of a user's hand under the discharge outlet and the control mechanism is activated when the sensors sense the presence of a user's hand under the discharge outlet.

6. A fluid dispenser as claimed in claim 5 wherein, the activation mechanism activates the discharge mechanism to discharge fluid material only when the sensors sense the presence of a user's hand under the discharge outlet.

7. A fluid dispenser as claimed in claim 4 wherein the discharge outlet is biased to assume the rear position such that on movement of the discharge member from the rear position of the discharge outlet, the bias attempts to return the discharge outlet to the rear position.

8. A fluid dispenser as claimed in claim 4 wherein:

the dispenser includes a housing carrying the discharge outlet, the fluid material reservoir and the discharge mechanism,

the dispenser further includes a wall plate which is provided rearward of the housing, the housing pivotably mounted at its rear to the wall plate for pivoting about a horizontal pivot axis such that pivoting about the horizontal pivot axis moves the housing including the discharge outlet, the fluid reservoir and the discharge mechanism between a rear orientation relative to the wall plate in which the discharge outlet is in the rear position and a forward orientation relative to the wall plate in which the discharge outlet is in the forward position.

9. A fluid dispenser as claimed in claim 8 wherein the housing is pivotally mounted at either its upper rear or its lower rear to the wall plate for pivoting about the pivot axis,

the housing having a forwardmost surface comprising a forwardmost surface of the dispenser when the housing is mounted to the wall plate,

wherein when the housing is in the forward orientation, the forwardmost surface of the housing is in an extended position forward of a retracted position the forwardmost surface of the housing assumes when the housing is in the forward orientation.

10. A fluid dispenser as claimed in claim 9 wherein:

the movement mechanism is carried by the housing and includes a movable camming member which engages a cam member on the wall plate, and

wherein movement of the camming member relative the cam member moves the housing between the rear orientation and the forward orientation.

11. A fluid dispenser as claimed in claim 10 wherein the camming member is movable by being rotatable about a rotation axis.

12. A fluid dispenser as claimed in claim 10 wherein:

rotation of the camming member about the rotation axis a first 180 degrees in one direction provides for movement of the housing from the rear orientation to the forward orientation, and rotation of the camming member about the rotation axis a second 180

degrees in the same one direction provides for movement of the housing from the forward orientation to the rear orientation.

13. A fluid dispenser as claimed in claim 12 wherein:
the rotation axis is normal to the pivot axis,
the rotation axis being generally horizontal when the housing is in the rear orientation.
14. A fluid dispenser as claimed in claim 13 wherein the cam member is provided at constant radius from the rotation axis as a continuous circumferential surface on the camming member.
15. A fluid dispenser as claimed in claim 9 wherein:
the dispenser is a fluid dispenser which dispenses fluid material onto a hand of a user,
the dispenser is mounted to a wall of a building in a hallway,
the housing having a downwardly directed lower surface,
the discharge outlet directed downwardly to discharge fluid material onto a hand of a user disposed below the discharge outlet,
wherein when the housing is in the forward orientation, the forwardmost surface of the housing is in the extended position forward of a retracted position the forwardmost surface of the housing assumes when the housing is in the forward orientation.
16. A fluid dispenser as claimed in claim 1 wherein:
the movement mechanism includes a manually engageable member for engagement by a user for movement between a first position and a second position such that movement of the engageable member between the first position and the second position moves the discharge outlet between the forward position and the rear position,
the activation mechanism coupled to the movement mechanism whereby a cycle of movement of the movement mechanism to move the discharge outlet from the rear position

to the forward position and then from the forward position the rear position activates the discharge mechanism to discharge fluid.

17. A fluid dispenser as claimed in claim 16 wherein:

the dispenser includes a housing carrying the discharge outlet, the fluid reservoir and the discharge mechanism,

the dispenser further includes a wall plate provided rearward of the housing,

the housing pivotably mounted at its rear to the wall plate for pivoting about a horizontal pivot axis such that pivoting about the horizontal pivot axis moves the housing including the discharge outlet, the fluid reservoir and the discharge mechanism between a rear orientation relative to the wall plate in which the discharge outlet is in the rear position and a forward orientation relative to the wall plate in which the discharge outlet is in the forward position,

the engageable member is mounted to one of the housing and the wall plate.

18. A fluid dispenser as claimed in claim 17 wherein the engageable member comprises a lever member pivotably mounted for movement between the first position and a second position.

19. A fluid dispenser having a front, a rear and a bottom,

the dispenser mounted at its rear to a vertical support surface of a support member with the bottom of the dispenser generally directed downwardly, and the dispenser extending forwardly from the vertical surface to the front,

the dispenser including:

a discharge outlet for discharge of fluid downwardly from the bottom of the dispenser to discharge fluid,

a fluid reservoir containing fluid to be dispensed,

a discharge mechanism to discharge fluid from the reservoir out the discharge outlet when activated,

an activation mechanism to activate the discharge mechanism,
 a lowermost portion of the dispenser being movable forwardly and rearwardly
 relative to the support surface between a forward position and a rear position, and
 a movement mechanism to move the lowermost portion between the forward position
 and a rear position,
 the discharge outlet being carried on the lower most portion and movable therewith,
 wherein in a sequence of operation to dispense fluid the movement mechanism
 moves the lowermost portion and the discharge outlet to the forward position and while the
 lowermost portion and the discharge outlet are in the forward position the activation
 mechanism activates the discharge mechanism to discharge fluid out the discharge outlet.

20. A fluid dispenser as claimed in claim 1 or 19 wherein during the cycle of operation,
 the activation mechanism activates the discharge mechanism to discharge fluid material out
 of the discharge outlet while the discharge outlet is in one or more conditions selected from
 the following conditions: (a) the discharge outlet is in the forward position, (b) the discharge
 outlet is moving toward the forward position, and (c) the discharge outlet is moving away
 from the forward position.

21. A hand cleaner dispenser comprising:
 a housing;
 a wall mount secured to a vertical support member;
 the housing coupled to the wall mount for movement between:
 (a) a recessed condition in which the housing protrudes from the support member by
 a maximum of a first distance, and
 (b) an extended condition in which the housing protrudes from the support member
 by a maximum of a second distance greater than the first distance;
 a housing driver mechanism operative to move the housing between the recessed
 condition and the extended condition,
 the housing comprising:

a reservoir for fluid to be dispensed,
a pump activatable to dispense fluid from the reservoir out a discharge outlet directed downwardly from the housing bottom, and
a pump driver mechanism operative to activate the pump;
an activation mechanism which coordinates the operation of the housing driver mechanism and the pump driver mechanism such that the pump discharges fluid from the discharge outlet when the housing is proximate the extended condition.

22. A hand cleaner dispenser as claimed in claim 21 wherein:

the housing is coupled to the wall mount for pivoting about a horizontal axis between the recessed condition and the extended condition.

23. A hand cleaner dispenser as claimed in claim 21 wherein the activation mechanism operates the housing driver mechanism in a cycle of operation in which the driver mechanism moves the housing from the recessed condition to the extended condition and returns the housing from the extended condition to the recessed condition.

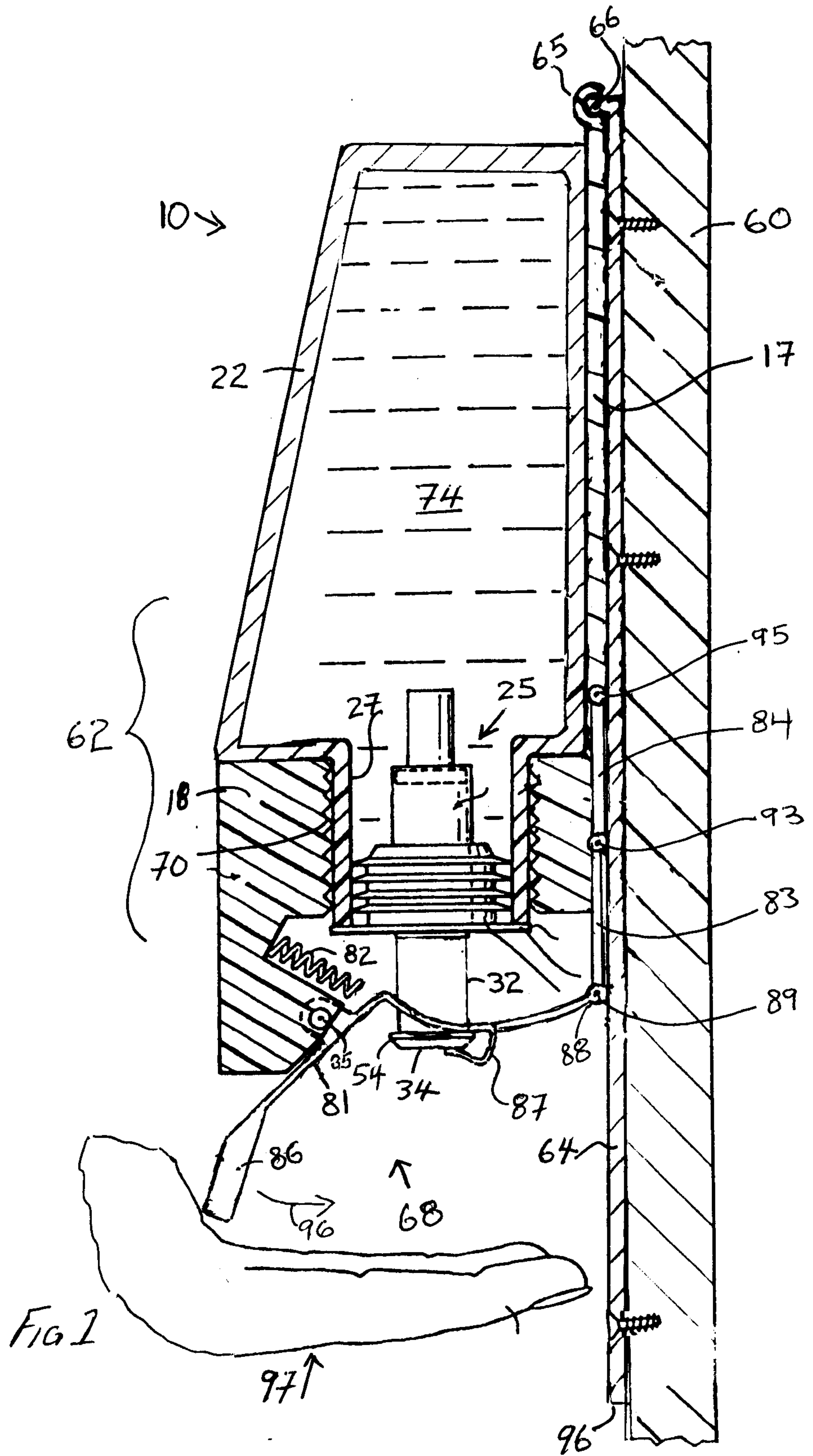
24. A hand cleaner dispenser as claimed in claim 23 wherein during the cycle of operation, on activation of the activation mechanism with the housing in the recessed condition, the pump driver mechanism is operated such that fluid is dispensed from the fluid outlet after the housing driver mechanism has moved the dispenser from the recessed condition toward the extended condition.

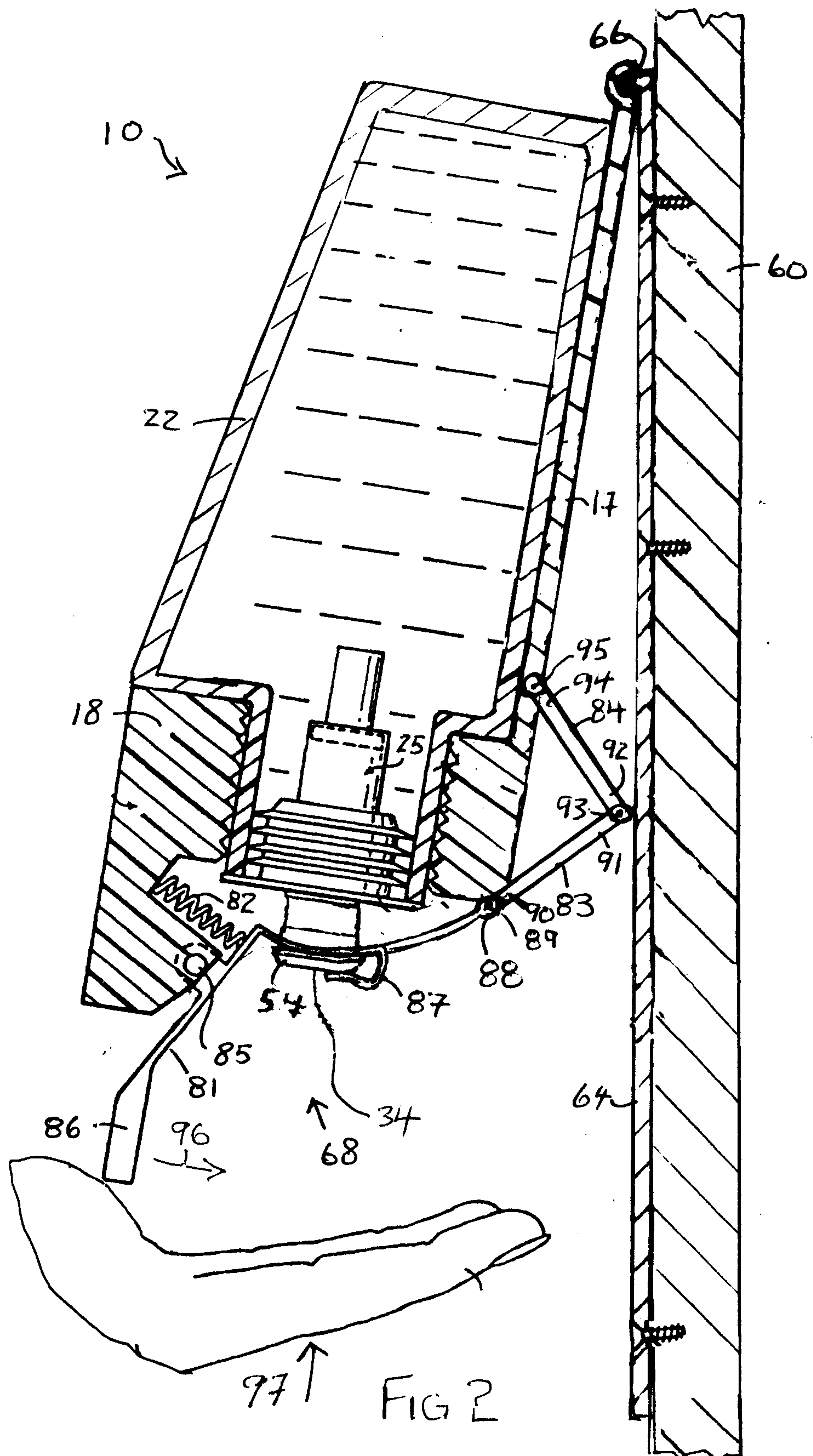
25. A hand cleaner dispenser as claimed in claim 24 wherein:

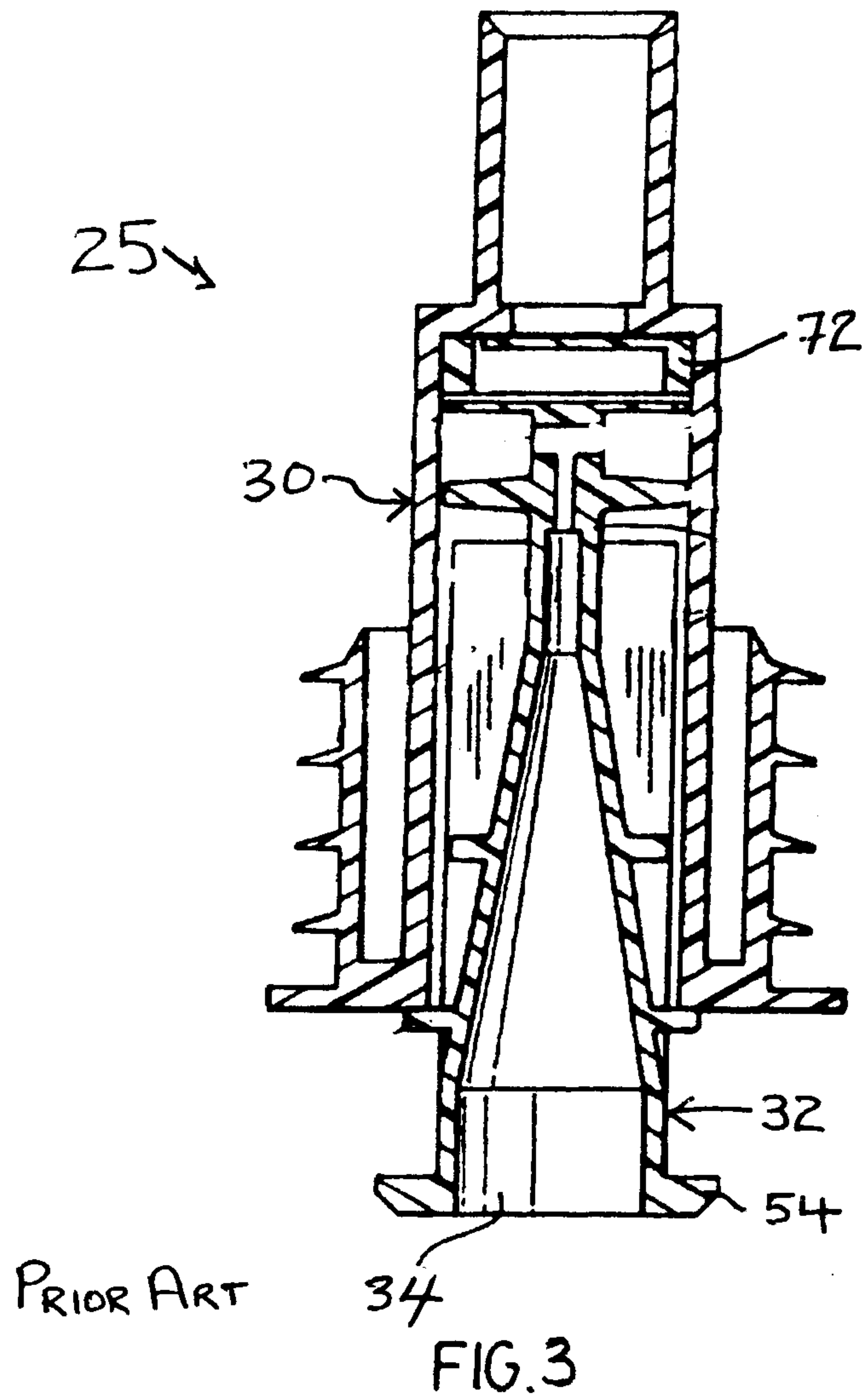
the housing is coupled to the wall mount for pivoting about a horizontal axis between the recessed condition and the extended condition.

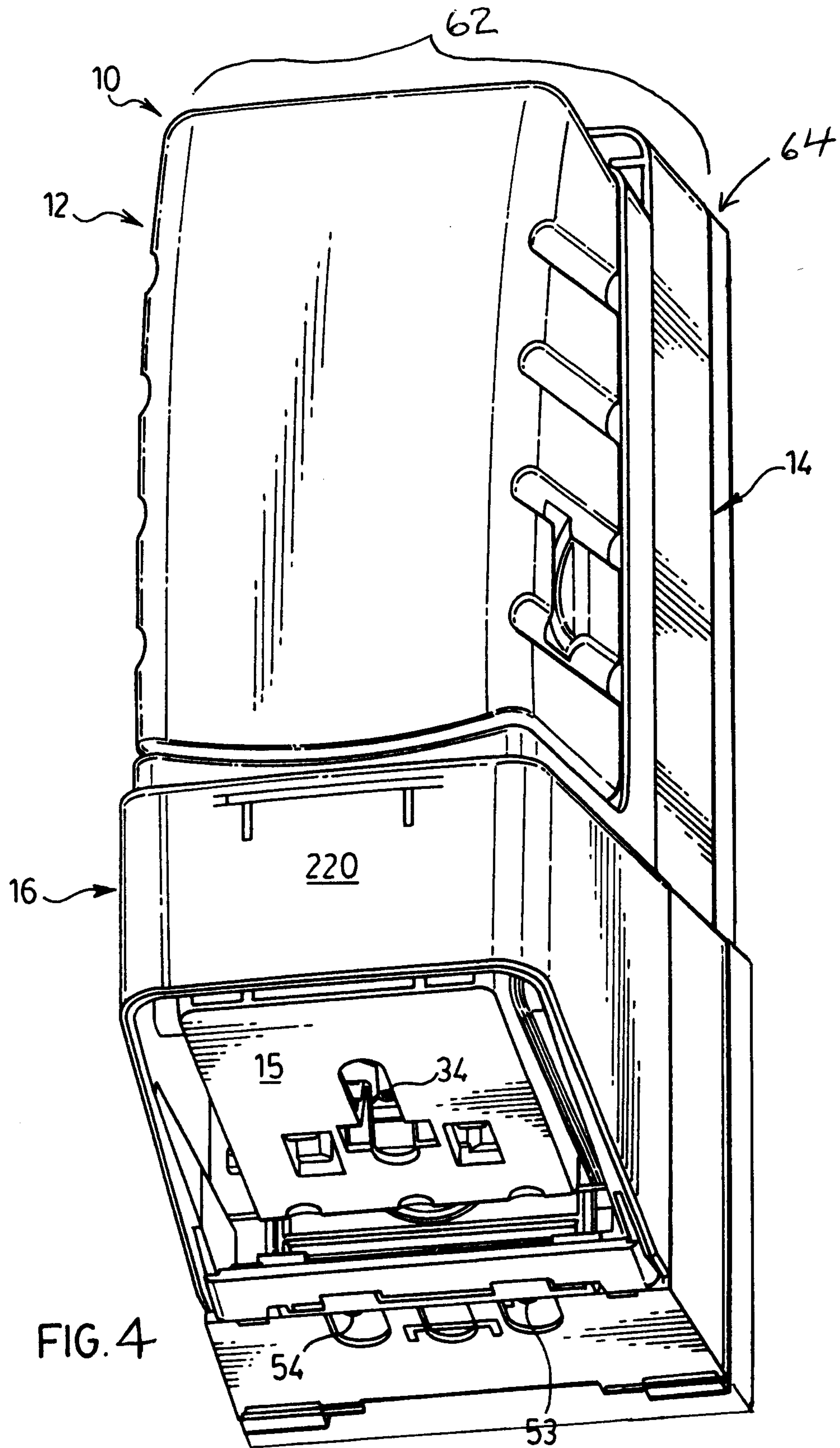
26. A hand cleaner dispenser as claimed in claim 21 wherein in the recessed condition a back of the housing is proximate the support member.

27. A hand cleaner dispenser as claimed in claim 21 wherein:
the housing has a front, a back, a top, a bottom, and two sides;
the vertical support member is a wall in a building; and
in the recessed condition, the housing back is proximate the wall.
28. A hand cleaner dispenser as claimed in claim 27 wherein:
the housing is coupled to the wall mount for pivoting between the recessed condition and the extended condition about a horizontal axis extending between the housing sides proximate the juncture of the housing top and back.
29. A hand cleaner dispenser as claimed in claim 28 wherein the activation mechanism operates the housing driver mechanism in a cycle of operation in which the driver mechanism moves the housing from the recessed condition to the extended condition and returns the housing from the extended condition to the recessed condition.
30. A hand cleaner dispenser as claimed in claim 29 wherein during the cycle of operation, on activation of the activation mechanism with the housing in the recessed condition, the pump driver mechanism is operated such that fluid is dispensed from the fluid outlet after the housing driver mechanism has moved the dispenser from the recessed condition toward the extended condition.









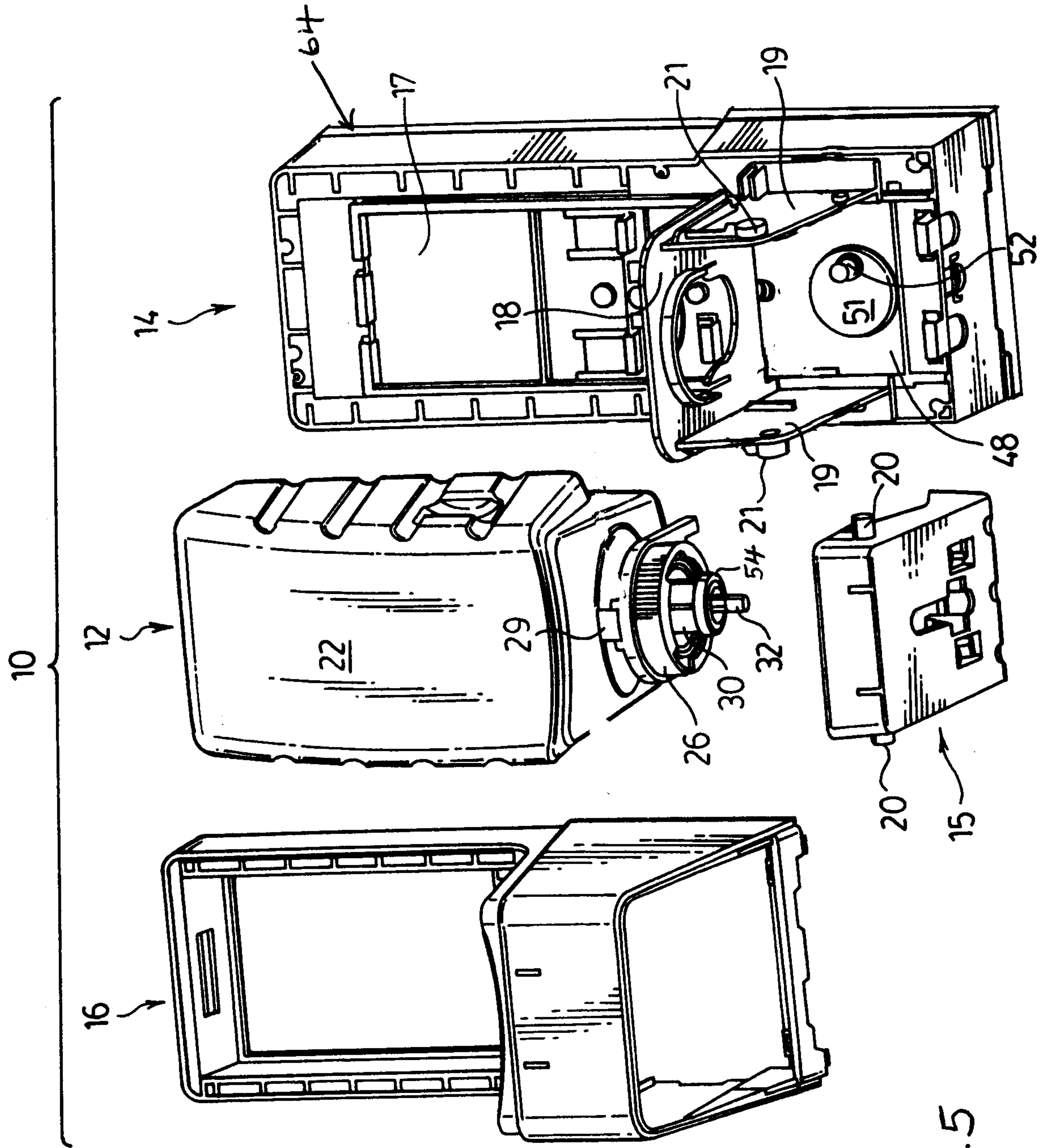


FIG. 5

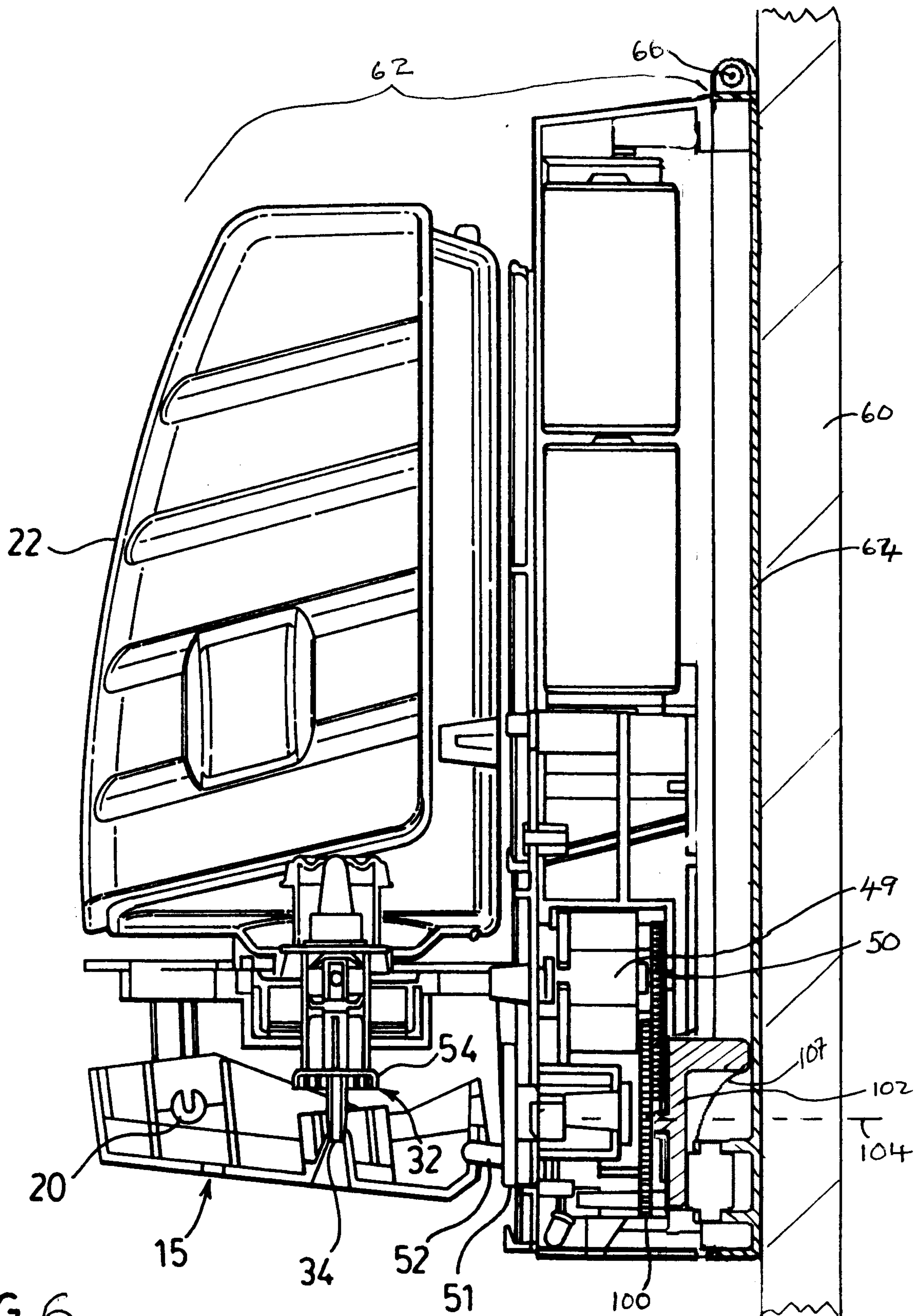


FIG. 6

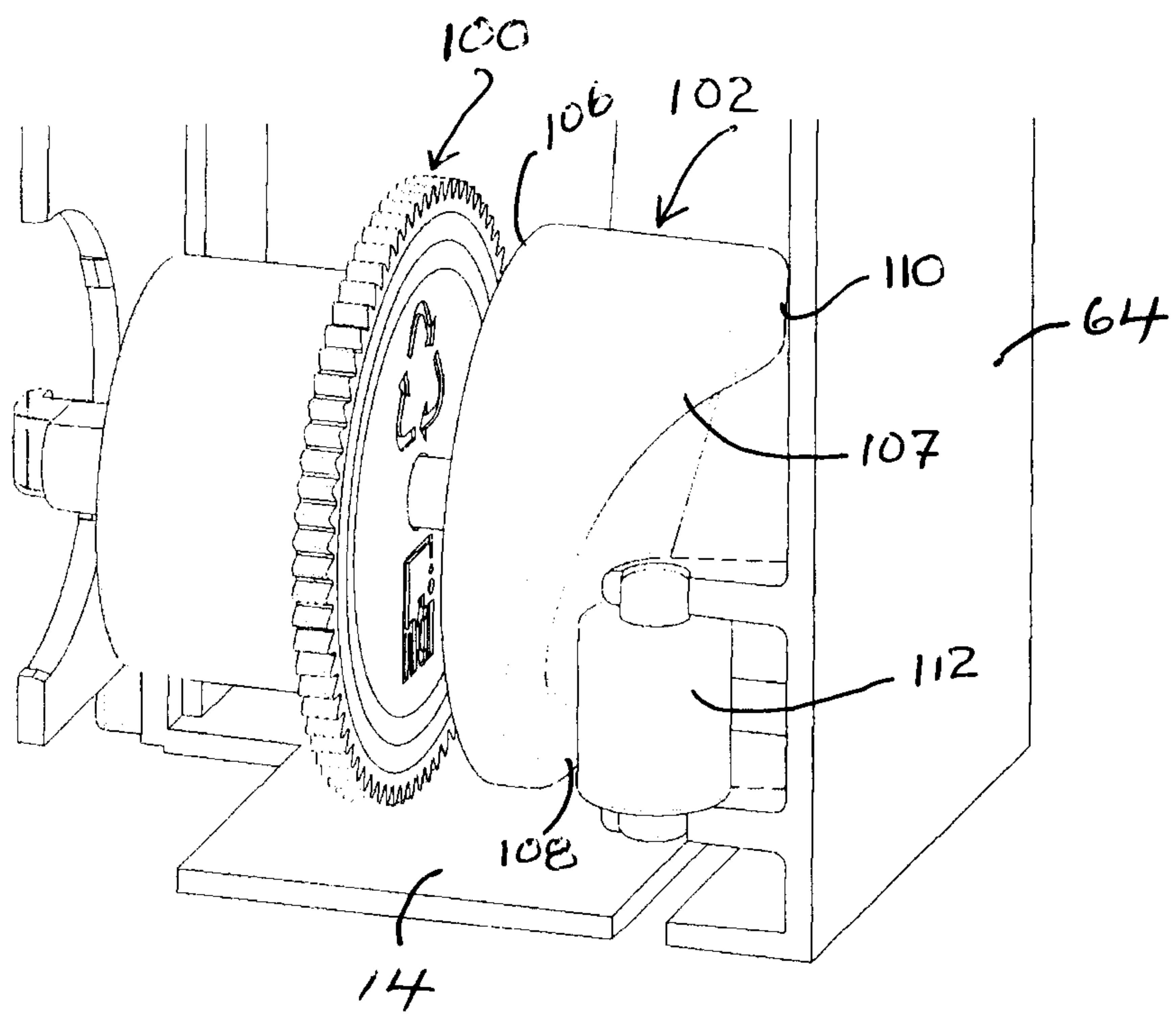


FIG 7

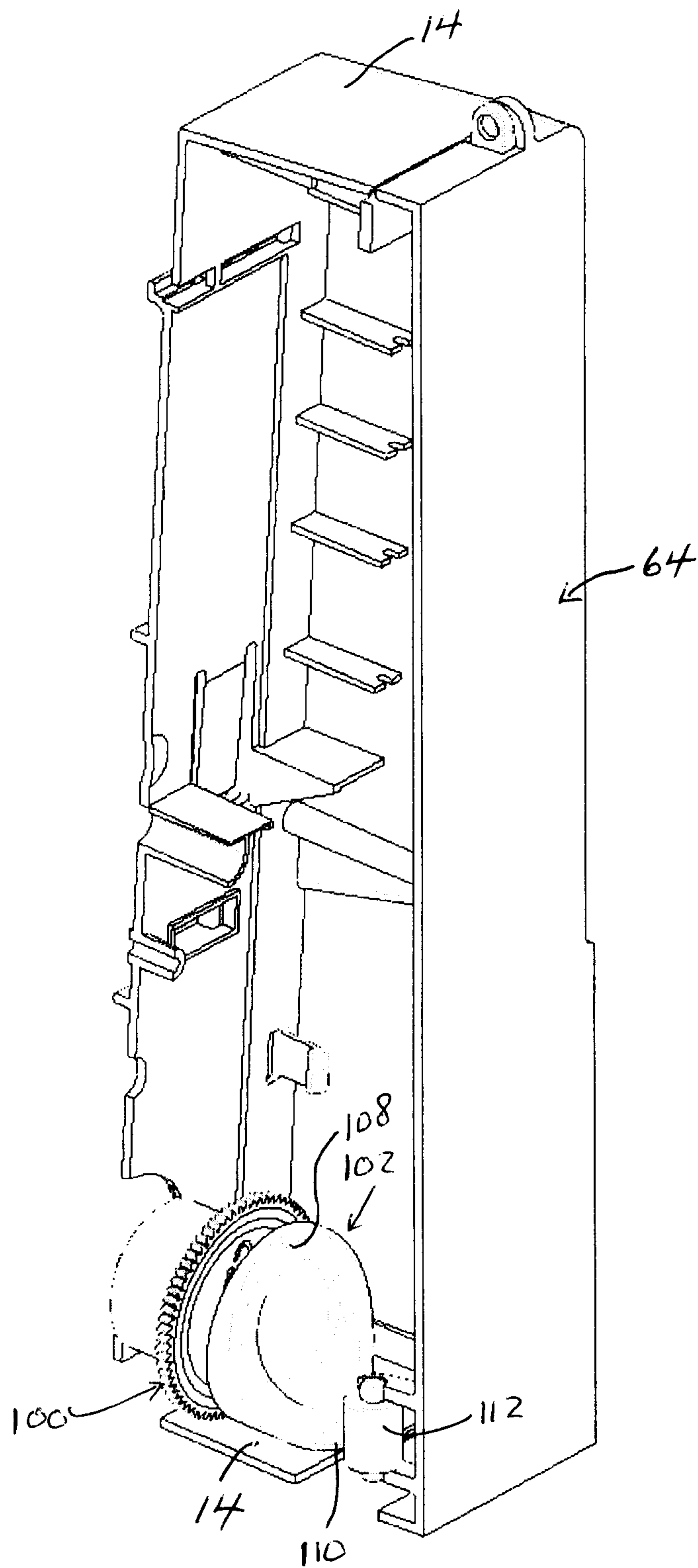
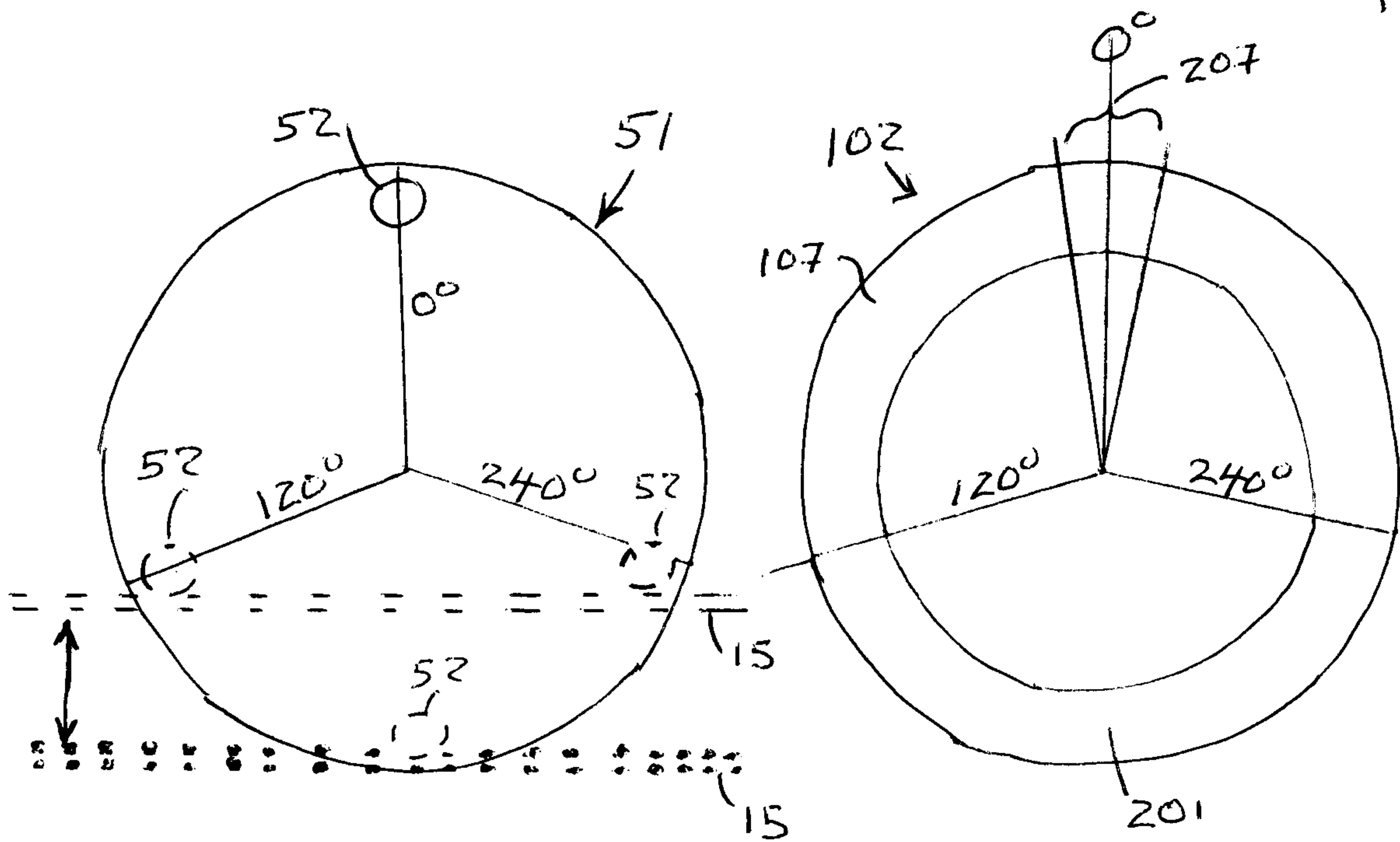
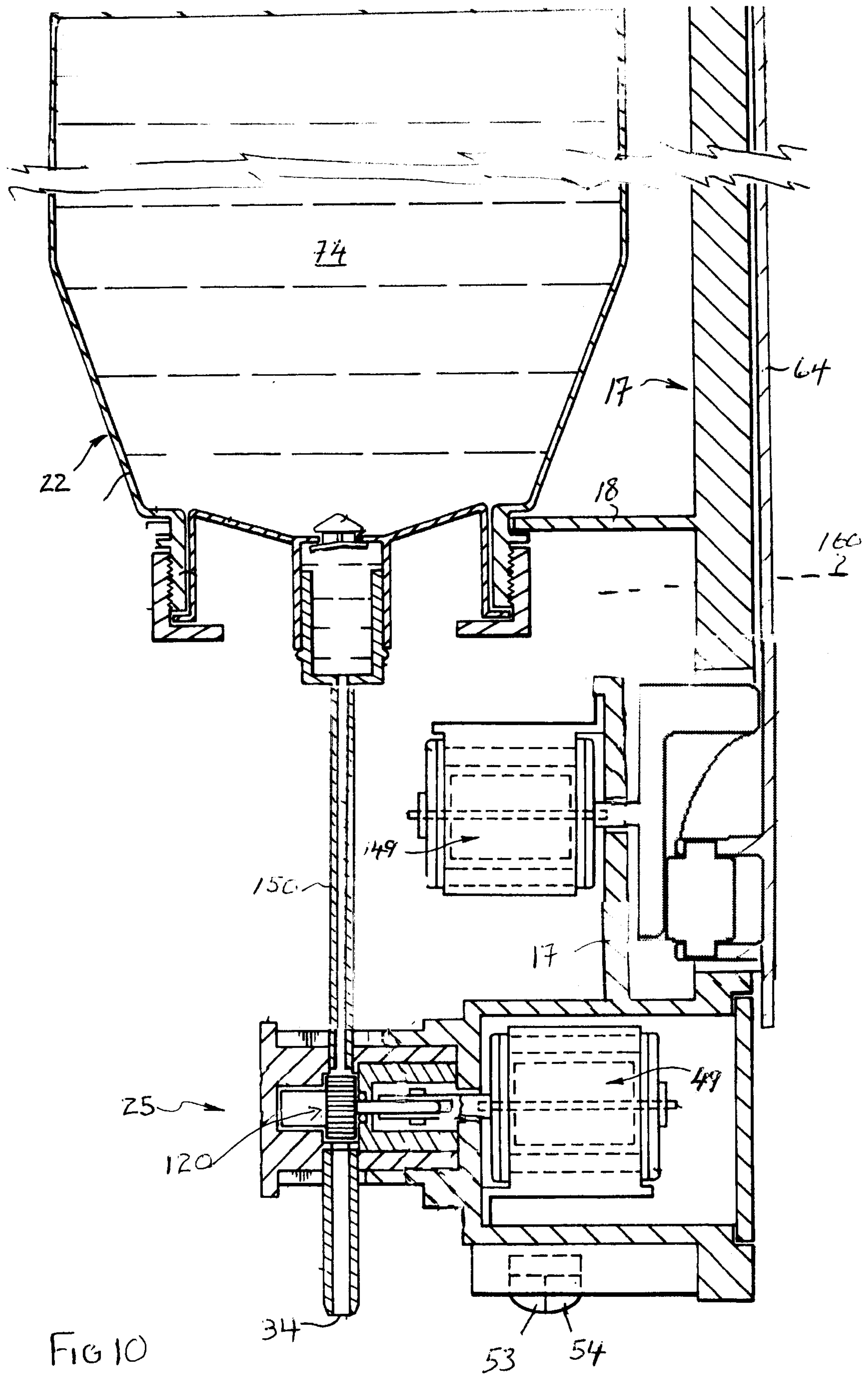


FIG 8

FIG 9





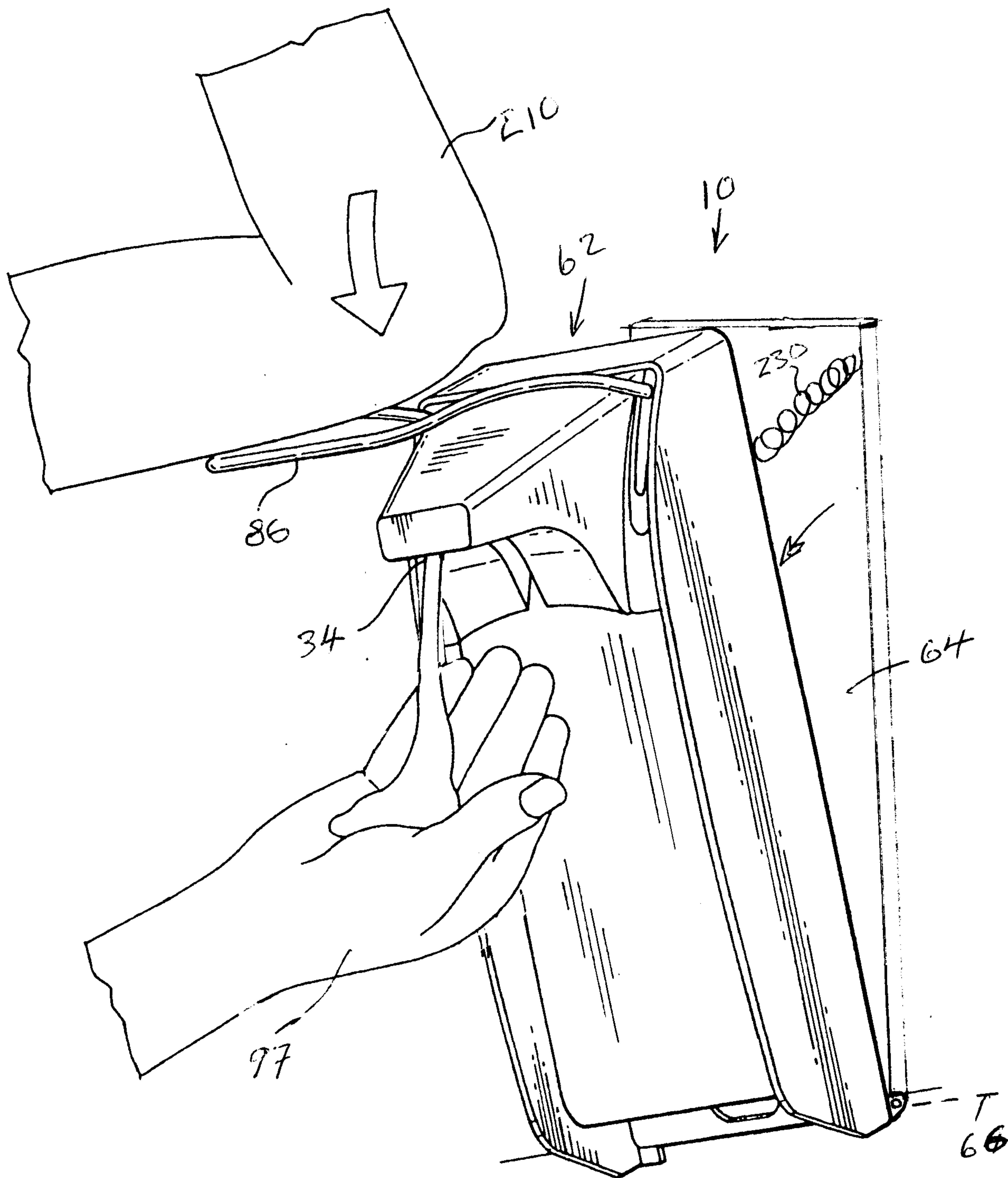
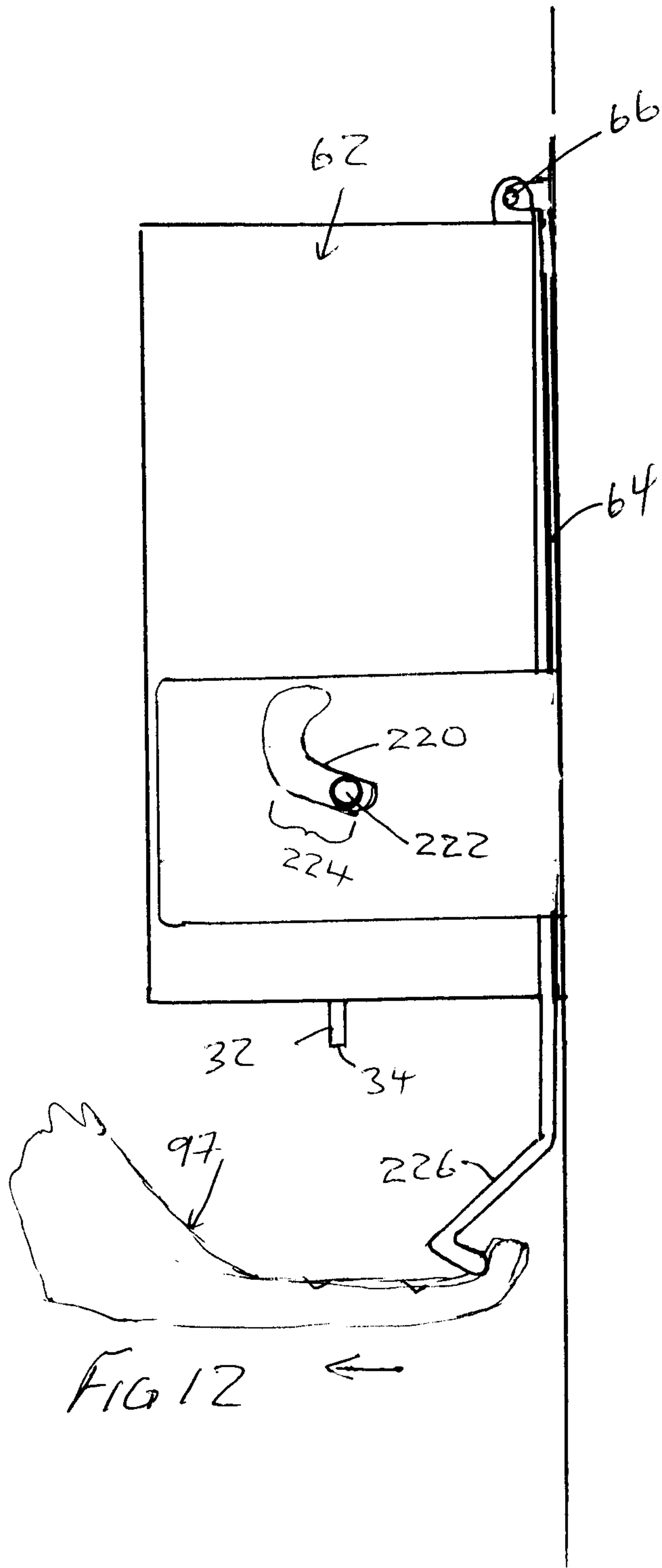


FIG 11



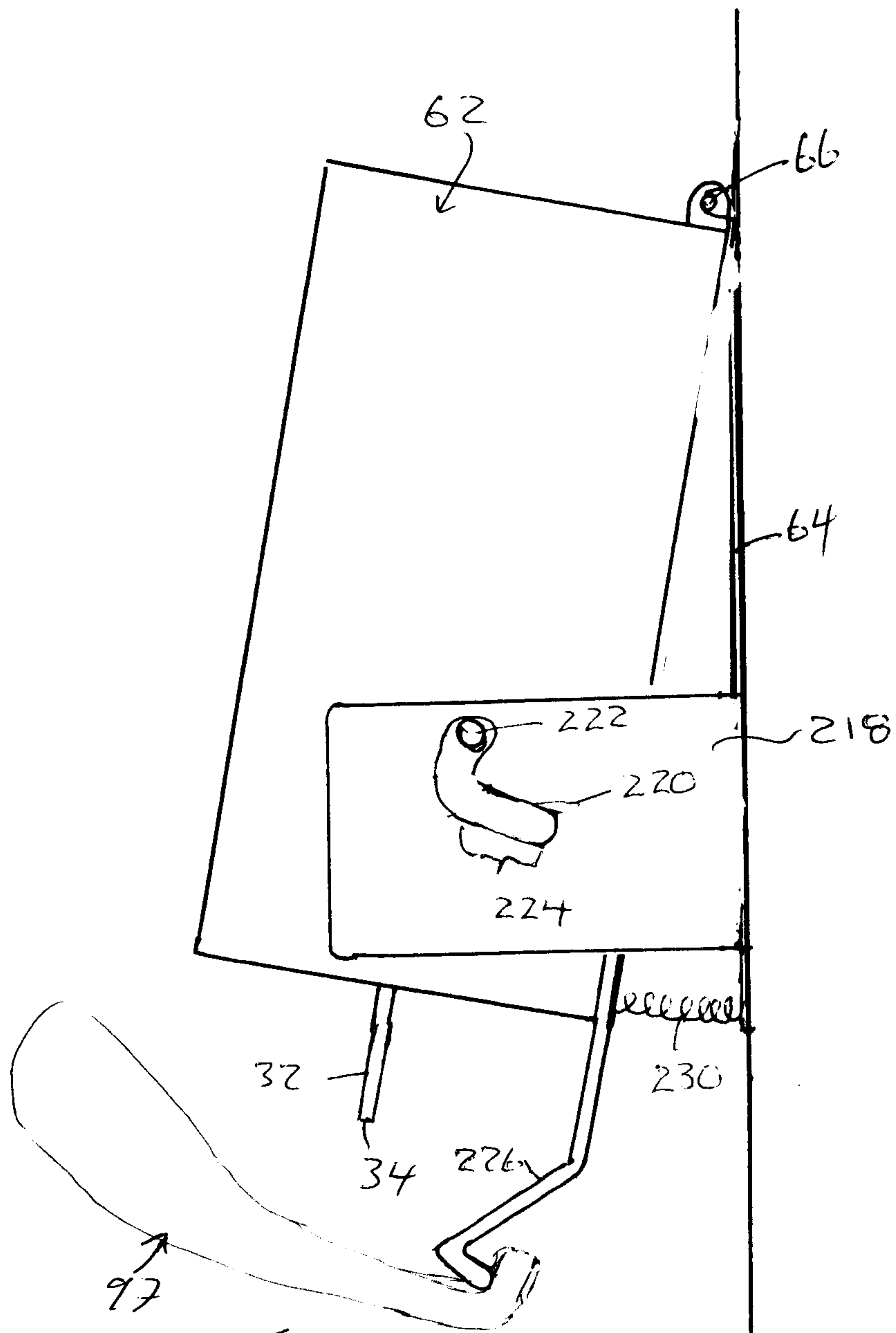


FIG 13

