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(54) **Movable drain valve for a drain outlet**

(57) The invention relates to the provision of a closure system for a drain hole of a bath, sink or the like. The system comprises a closure means (12) which is movable between an open drainage position and closed sealed position. The movement is controlled by a movement assembly (14) mounted in connection with the closure means (12) so as to allow the movement to be achieved without direct contact between the user and the closure means (12) being required. Typically one or more user operable switches (220) or remote control means are provided to allow the selective movement of the closure means by the movement assembly to be achieved.

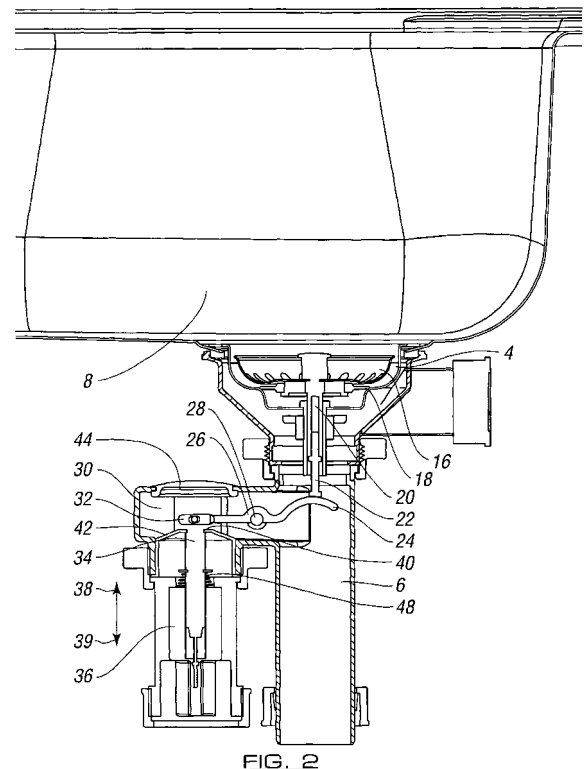


FIG. 2

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Description

[0001] The invention to which this application relates is to apparatus which allows the movement of a closure means, typically one having a waste trap, of the type used in conjunction with the drain hole and drainpipe in a sink or bath or similar item, (hereinafter referred to as sinks in a non limiting manner). In particular, the apparatus is provided to allow the automated or driven movement of the waste trap between open and closed positions.

[0002] Sinks are typically provided with a cavity for the collection of liquid such as water and/or detergents therein, so as to perform washing or rinsing actions in the body of liquid which is collected. The sinks are provided with a base in which at least one drain hole is provided, said drain hole leading to a drain pipe and, in turn, a waste collection system and through said drain hole, water can flow when the drain hole is open.

[0003] In order to allow the liquid to be collected in the sink, a closure means is provided which can be moved between an open and closed position.

[0004] The closure means typically includes a sealing member and in one embodiment, may also include a device known as a waste trap, which has a base portion and a peripheral lip, which is typically upstanding from the base portion so as to form a collecting "basket". The base and lip include a series of apertures of a size which allow liquid to flow therethrough but prevent larger particles, such as debris which can be carried in the liquid, from passing into the drain hole. This trap can be selectively removed from the drain hole to a location for discarding debris which may have been collected in the waste trap.

[0005] Typically, the closure means is moved between a raised, open position, and a lowered, closed position in which the sealing portion on the closure means seals with the drain hole, to close the same and substantially prevent the flow of liquid into the drain hole from the sink. In this position, the body of liquid can be collected in the sink. To allow drainage of the sink, the closure means can be moved vertically to the raised open position with the movement substantially along the longitudinal central axis of the drain hole in which the closure means is fitted. This therefore allows liquid to flow into the drainpipe and, if a waste trap is provided, for the debris to be collected in the waste trap without entering the drainpipe.

[0006] The movement of the closure means is conventionally achieved by the user gripping a portion of the closure means at the top face thereof, and either pulling the closure means upwardly or pushing the same downwardly to move the same between the respective open and closed positions.

[0007] The problem with this form of device is that the user is required to place their hands into the liquid to operate the closure means and, particularly if the body of liquid has been used for washing up purposes, this may be a relatively unpleasant experience for the user due to the debris and grease which may be present in the body of liquid.

[0008] An alternative known means of operating a plug or closure means is to provide a mechanical movement assembly which includes at least one elongate member which, at one end, contacts with the closure means to cause movement of the same between open and closed positions, and, at the other end, there is provided an exposed portion, said portion exposed outwith the body of liquid on the sink which can be gripped and moved by the user so as to cause movement of the assembly and hence movement of the closure means. However, it is found that this mechanical movement assembly is prone to malfunction which may cause the closure means to be difficult to move to the open position and/or also to not provide a sufficient seal when in the closed position.

[0009] These conventional systems can be difficult to operate for elderly or infirm persons, particularly those who may suffer from arthritis or the like. Similarly the mechanical assembly may also be difficult to operate by people whose hands are greasy or covered in soap.

[0010] It is also known to provide electrically powered closure systems, but these systems typically require relatively complex and expensive apparatus to be used which therefore makes them suitable primarily for industrial purposes rather than domestic uses and furthermore, it is often found that insufficient power or movement force can be created in the conventional systems to allow the closure means to be moved to the open position against the weight of the body of liquid. Furthermore, even when opened, the force of the drainage and/or weight of liquid, may cause the closure means to return to the closed position and hence prevent drainage of liquid until the user is forced to place their hands into the body of liquid and manually move the closure means.

[0011] The aim of the present invention is therefore to provide an improved powered movement system which allows the powered movement of a closure means with respect to a drain hole between an open, drainage position, and a closed, liquid collection position.

[0012] In a first aspect of the invention, there is provided a closure system for a sink, bath or similar device in which a body of liquid can be selectively collected, said closure system located with respect to a drain hole in the sink, bath or similar device, and includes a closure means mounted with respect to the drain hole so as to be movable between a closed position in which the closure means substantially prevents the passage of liquid through the drain hole, and an open position in which the closure means is moved upwardly to allow the passage of liquid through the drain hole wherein the system includes a movement assembly including a selectively operated movement means, control means selectively actuable by a user and, when said control means are actuated, said movement means is powered to act on at least one member, which in turn is in contact with the closure means, to move the closure means in a first direction to a closed

position or in an opposing direction to the open position.

[0013] In one embodiment the member is rotated by the powered movement means when actuated. Typically the axis of rotation is substantially perpendicular to the axis along which the closure means is moved.

[0014] In one embodiment the member contacts with the closure means via a lever arm which may include a cam surface which contacts with the closure means.

[0015] In this embodiment the provision of the movement means in the form of a motor is preferred.

[0016] In one embodiment of the invention the member is in contact with a pivot arm on one side of a pivot axis and the pivot arm is in contact with the closure means on the other side of the pivot.

[0017] In one embodiment, the said member is provided as part of a solenoid and is caused to move by the selective provision of electrical power to the solenoid by user actuation of the control means.

[0018] In one embodiment the solenoid is moved in a first direction in response to the receipt of power in a first polarity, and is movable in a second direction in response to the receipt of power in a reverse polarity.

[0019] Typically the solenoid includes a shaft which is connected to drive and move a member of the closure means thereby moving the closure means between the open and closed positions.

[0020] In one embodiment the shaft of the solenoid is connected to rotate a rotatable member on which an arm is provided to contact the member of the control means.

[0021] In one embodiment the solenoid is located in a housing which is sealed from water ingress. Typically the rotatable member passes from the said housing along a channel, to depend into the drainage passage leading from the sink or bath. Typically one or more sealing members is provided on the rotatable member and/or the channel to allow the seal between the housing and the drainage passage to be achieved.

[0022] In one embodiment, the solenoid is of a double latch type which means that the member, when in a lowered position, is locked in that position until electrical power is supplied to the same and, when in a raised position, is locked in that position until electrical power is provided.

[0023] The latching of the member in the open and closed positions, ensures that the closure means, especially in the open condition, can be maintained in that condition as the member connected thereto is maintained in the raised position.

[0024] Typically, the movement of the member is along an axis which is substantially parallel with the axis of movement of the closure means.

[0025] Typically, the axis of movement of the member is offset to one side of the axis of movement of the closure means, with said offset distance, spanned by the pivot arm.

[0026] In one embodiment, the pivot arm, at the area of location with the closure means, is curved so as to ensure reliable contact with the closure means during movement of the closure means between open and closed positions.

[0027] In one embodiment, the member passes through an aperture in a seal which is located over the chamber in which the solenoid is located, so as to prevent the ingress of liquid into the chamber. In one embodiment, the seal is provided to have a resilience such as to act as a diaphragm in conjunction with movement of the member and preferably is provided such as to bias the member to a raised position when the member has been moved to that position. In one embodiment, a resilient means, typically in the form of a spring may be provided to encourage the retention of the member in said raised position.

[0028] Typically, when the member is in the raised position, the closure means is in a closed sealing position and when the member is in a lowered position, the closure means is in an open drainage position.

[0029] In one embodiment, at least one aperture is provided into a channel in which the pivotal member is located so as to allow any debris which may collect in said channel, to be removed. Preferably, at least the bottom face of this chamber is sloped so as to encourage the flow of fluid back into the main drainpipe to which the said channel is connected at one end.

[0030] Preferably, the closure system is provided in connection with a length of drainpipe, which is preferably of a standard length and having conventional fittings so as to allow the closure system to be fitted as a replacement part to a conventional drainpipe for a sink and if the sink is new, to allow the closure system to be fitted using conventional fittings and not requiring any additional expertise or equipment.

[0031] Typically, the control means for the control system, are one or more switches, which, in a preferred embodiment, are located on an external face of the sink, or adjacent work surface, but removed from the body of liquid so as to allow the same to be operated by the user, without the need to place their hands into the liquid.

[0032] Typically the switches are connected via appropriate wiring or alternatively, a remote control system may be used.

[0033] In one embodiment, the movement means requires a 12 volt power supply which may be provided from the mains supply via a transformer or alternatively, via a battery pack which may be located at a suitable location and connected to provide the required power to the movement means upon user actuation of the operation means.

[0034] In one embodiment power is only supplied to the movement means when a user has actuated the control system in order to open or close the closure means. Once the closure means has reached the desired position the power

supply is stopped..

[0035] This therefore means that electrical power is only required to be provided to move the member between the open and closed positions but once in said positions, no power is required to be provided.

[0036] In one embodiment, the closure means comprises a body, a downwardly depending portion with which the pivotal member contacts, the length of said portion being adjustable to ensure that the appropriate contact is achieved, and maintained, during movement of the closure means between the open and closed positions. The body also includes, typically, a sealing means which is located so as to contact with the drain hole so as to seal the same when the closure means is in a closed position.

[0037] In a preferred embodiment, the closure means incorporates a waste trap, said waste trap movable with the closure means between the open and closed positions.

[0038] In one embodiment, the closure means may also comprise a cover or canopy portion which is located at the top of the closure means. In one embodiment the canopy or cover is provided to be movable with the closure means. Alternatively, the canopy or cover is mounted independently of the closure means and may be provided in a fixed position so as not to be influenced by the movement of the closure means.

[0039] In a further aspect of the invention there is provided an assembly for use with a bath or sink to allow the drainage of liquid therefrom via a drainage opening to be controlled, said assembly movable between a drainage position in which liquid can drain through the opening and a closed position in which the opening is substantially sealed to prevent liquid passing therethrough, said assembly including, or acted upon by, a movement means, to move the assembly between said positions in response to at least one control signal generated at a location remote from the assembly.

[0040] Typically the movement means are powered and the control signal is generated by user operation of a control means mounted on, or linked to, the bath or sink by cable or wireless means. Typically the movement of the assembly between positions requires no further user intervention.

[0041] Typically the movement means can be provided with standard attachment means to allow the same to be fitted as an integral part of the drainage passage and, in accordance with this embodiment of the invention, can be located in storage space underneath the sink or bath without using up significant amounts of said space.

[0042] In one embodiment the control signal is generated by a person interacting with a switch device. In one embodiment the switch is provided with a device to prevent repeated operation of the same with a given time period. This is in order to prevent repeated operation of the switch causing the failure of the solenoid. In one embodiment a visual indication is generated to indicate to the user when the switch can and cannot be used.

[0043] In one embodiment power to the movement means is provided via one or more batteries or mains power connection connected to the closure means and control means. The supply of the power to the movement means is typically only provided when appropriate actuation of the control means by the user is performed. Typically processing means are provided to allow the control of the power supply to the movement means.

[0044] In a further aspect of the invention there is provided a closure system for a drain hole of a sink or bath, said closure system including closure means moveable between a closed sealing position, and an open drainage position, and movement means selectively operable in response to user actuation of control means wherein said movement of the closure means between said open and closed positions occurs automatically upon appropriate user actuation of the control means.

[0045] In one embodiment, the closure means are moved between positions without user contact therewith.

[0046] In a yet further aspect of the invention there is provided a method of opening and closing a closure means for a drain hole of a sink or bath, said method comprising placing the closure means in the drain hole, operating control means to cause movement means, and hence the closure means in contact therewith, to be in either of an open drainage or closed sealing position and wherein subsequent movement of the closure means between said positions is achieved by user operation of the control means which causes movement of the movement means and automatic movement of the closure means.

[0047] There is therefore provided, in accordance with the invention, a closure means and operating assembly therefor, which allows the closure means to be moved successfully between open and closed positions, and to be retained therein in a successful manner and to do so using an operating assembly which can be fitted to existing or new drainage assemblies of sinks.

[0048] Specific embodiments of the invention will now be described with reference to the accompanying drawings, wherein:-

Figure 1 illustrates a view of the apparatus in partial cross section showing the external appearance of the apparatus in one embodiment of the invention;

Figures 2 and 3 illustrate respectively a vertical sectional elevation and perspective sectional view of the apparatus along line A-A with the closure means in a closed position;

Figures 4 and 5 illustrate respectively a vertical sectional elevation and perspective sectional view of the apparatus along line A-A with the closure means in an open position;

Figure 6 illustrates a further embodiment of the apparatus in accordance with the invention;

Figure 7 illustrates the embodiment of Figure 6 with the components of the apparatus illustrated in greater detail;

Figures 8a-b illustrate the apparatus in accordance with one embodiment of the invention in an assembled condition, in position in a sink shown in cross section; and

Figures 9a - c illustrate the movement means of the apparatus.

[0049] Referring firstly to Figure 1, there is illustrated closure system apparatus for a sink 2, in accordance with one embodiment of the invention. The sink 2 is provided with a drain hole 4, leading to a drainpipe 6. The sink is provided with a cavity 8 having a base 10 and, in the cavity, liquid can be selectively collected when the closure means 12 of the system is in the closed position. In addition, in accordance with the invention the drainpipe is provided in conjunction with a movement assembly 14 provided as part of the closures system. Thus when fitting the drainpipe section 6' the movement assembly 14 can be provided as an integral part thereof. In new build properties, the system can be fitted as part of the initial fitting process. In existing drainage systems the length of pipeline 6 can be removed and replaced by the drainpipe with the system 6', 14. Said movement assembly 14 includes actuation means which will be described in more detail subsequently, and which actuation means, operate the movement means which in turn cause movement of the closure means 12. The actuation means are connected to a power supply 16 and include (not shown) one or more switches which are located on an external surface of the sink or adjacent thereto so as to allow operation by a user of the sink.

[0050] The operation of the apparatus will now be described with reference to Figures 2 and 3 which show the closure means in a closed, sealing position, and Figures 4 and 5 which show the closure means in an open, drainage position.

[0051] The closure means 12 comprises, in this embodiment, a waste trap 16 and a seal 18 mounted on a body 20. The waste trap and seal are provided, in the closed position, so that liquid which pours into the sink cavity 8, is collected therein and, in an open position, water can drain into the drainpipe, through apertures 21 in the trap and around the gap 23 between the trap and the drain hole 4 and the sealing means 18. The gap and apertures are of a size so as to prevent larger items of debris from passing into the drainpipe and said items of debris are collected in the waste trap 16 and the waste trap can subsequently be removed to allow debris to be discarded.

[0052] The closure means further comprises a downwardly depending portion or member 22 which depends downwardly from the body into the drainpipe 6. At the free end of this portion, there is provided contact with an end 24 of a pivot arm 26 of the movement means. The pivot arm can be pivoted around axis 28 and is positioned to lie substantially centrally of a channel 30. The channel 30 is part of the assembly which is connected to the drainpipe and the channel depends to one side of the drainpipe 6. At the opposing end 32 of the pivotal arm, the same is connected to an end of member 34. This member is provided as part of a movement means which in this embodiment are in the form of a solenoid 36 and is movable in the direction of arrows 38, 39. The solenoid is in turn connected to the power supply and/or operating means. The member passes through an aperture 40 in a seal 42 so as to prevent the ingress of liquid into the chamber in which the solenoid is provided.

[0053] The channel also includes an access opening 44 which is normally closed but which may be opened by removing the cap to allow any debris which collects in the channel 30 to be removed. Furthermore, the lower surface 46 of the channel 30 is sloped downwardly in the direction of the drainpipe so as to encourage liquid to flow back into the drainpipe and hence prevent the collection of liquid in the channel. The assembly is connected to the drainpipe via standard fittings and therefore can be fitted as part of a normal fitting operation.

[0054] In Figures 2 and 3, the closure means 12 is shown in the closed position with the closure means at its lowest position and seal 18 engaging with the drain hole and the member 34 which is part of the solenoid, is at its highest position. In Figures 4 and 5, the closure means 12 is shown in its open position with the closure means 12 at its highest position with the seal 18 removed from the drain hole and the member 34 of the solenoid 36 at its lowest position.

[0055] In both the open and closed positions, the member 34 of the solenoid 36, is latched or locked in position and hence the closure means is latched or locked in position.

[0056] This therefore prevents unexpected or unwanted movement of the closure means 12 between the positions and which is especially important when the closure means is in an open position so as to ensure that the required drainage of the body of liquid can occur. When the solenoid member 34 is in its lowest position, the latching can be achieved via magnets provided in the solenoid and, when the member is in its raised position, the latching can be achieved via the resilience of the seal 42 and, if required, the resilience of a biasing means in the form of a spring 48.

[0057] In order to move the closure means 12 between the open and closed positions, the user will press a button or

switch of the control means. This causes the provision of power to the solenoid 36 which in turn causes the movement of the member 34 of the solenoid from its raised position to its lowered position or vice versa. Once the member 34 is detected as having moved from one position to the other, the power supply is shut off and the member is located in the new position. It should therefore be appreciated that power is only required to be provided during the movement of the member and not to maintain the member at one of the raised or lowered positions. This therefore reduces the power supply requirements.

[0058] Furthermore, it is found that as the movement of the member 34 is in parallel with the movement of the closure means 12, then the power which is required to move the closure means via the pivot arm 26 is significantly reduced with respect to the more complex conventional systems. The movement of the member 34 is transferred via the pivot arm 26 to the closure means 12 effectively and efficiently and therefore provides for the powered movement of the closure means upon the user actuation of the operation.

[0059] Turning now to the Figures 6 and 7 there is shown a further embodiment of the apparatus in accordance with the invention. In Figure 6 there is shown a closure system 102 fitted in a drain hole assembly 104 which in turn would be fitted in a sink (not shown). The closure system includes a closure means 106 which is movable between the closed position shown to an open position in which the same is raised from the position shown as indicated by arrow 103, so as to allow liquid in the sink to leave the same through the drain hole 104. The drain hole leads to a drainpipe arrangement 110 which has an aperture 112 through which liquid from the drain hole can leave and enter the drainage system. Intermediate the aperture 112 and the drain hole 104 there is provided the movement assembly 114. The movement assembly includes movement means in the form in this embodiment of a motor 116 connected to move a shaft and member (not shown) which are in connection with a member on the underside of the closure means so as to move the same between the raised and lowered positions. The motor is also connected to a control means to allow the selective operation of the motor in response to user operation of the control means.

[0060] Figure 7 illustrates the system of Figure 6 in more detail with the separate components shown. The closure means 106 has a trap 117 and downwardly depending member 118 which passes through the drain hole 104 and into a cylinder 120 connected to a sealing means 122 which is mounted as part of the closure means and which, when the closure means is in the lowered closed position seals against surface 119 so as to seal the drain hole 104 so as to prevent liquid passing therethrough into the drain pipe.

[0061] The free end 124 of the member 118 and/or the base of the cylinder 120 and/or underside of the sealing means 122 are provided to contact with an arm 126 via a cam surface 128. The arm is mounted on a member 130 which in turn is mounted on the shaft of the motor so as to be rotatable about its longitudinal axis 132 and hence rotate the arm 126. The arm 126 and forward part 134 of the member 130 are located within the drainpipe passage 136 so as to lie in contact with the closure means. The member 130 passes through an aperture 138 in the drainpipe which will typically be provided with sealing means to prevent the seepage of liquid from the drainpipe towards the motor 116.

[0062] Thus in use, the member 130 and arm 126 are rotatable between a first position in which the closure means 106 is in a lowered closed position, and a second position in which the closure means is moved to a raised open position. Typically the member and lever arm are held in one of the two positions until power is supplied to the motor 116 from the control means which will cause the motor to rotate the member 130 and arm 126 to move the same to the other of the two positions. Typically the rotation is in forward or reverse directions so as to move the same between the two positions.

[0063] Referring now to Figures 8a-b there is illustrated apparatus in accordance with another embodiment of the invention. The apparatus is shown in use in a sink 202 although it should be appreciated that it may equally well be used with a bath or similar apparatus, as may all of the embodiments of the invention.

[0064] The apparatus includes a closure means 204 for a drainage opening 206 leading to a drainage passage from the sink. The closure means, although only partially shown is largely of a conventional form and includes a waste collecting means 210 mounted on an elongate shaft 212 which is provided of a length so as to depend down into the drainage passage for reasons that will be described subsequently. Underneath the waste collecting means 210 there is provided a sealing means which when the assembly is in the closed position, seals the opening 206 to prevent liquid leading into the drainage passage 208.

[0065] The closure means is capable of being moved between a closed position, in which the same is shown and a raised, drainage position in which the same is moved upwardly as indicated by arrow 214. This removes the sealing means from the opening and allows any liquid in the sink to drain into the passage 208. In this position the waste collecting means 210 acts to allow liquid to pass therethrough but traps solids or debris and prevents the same from entering the drainage passage. The specific design of the waste collecting means can be dependent upon the use of the same, for example a waste collecting means for use in a sink, may be of a slightly different design to that used for a bath due to the different forms of debris which are being collected in each.

[0066] In accordance with this invention the movement is achieved by the use of a movement assembly 216 located within housing 218 and connected to the drainage passage 208 underneath the opening. The housing is offset to the passage 208 and sealed from the same. Also provided is a connection (not shown) to at least one switch 220 which is

user actuatable and is located, in this instance on the top surface of the sink in one of the apertures formed for selective location of a tap. However the switch can be located at any suitable location so as to aid user activation and/or design requirements. It should be appreciated that the switch arrangement shown can be used with any of the embodiments of the invention.

[0067] The switch 220 is operable by a person to cause the movement of the assembly between the raised drainage and closed sealing positions in a manner that will be described subsequently.

[0068] Turning now to the Figures 9a-c there is illustrated the movement assembly of the apparatus in more detail. A face of the housing has been removed to allow the components of the movement assembly to be viewed more easily. Located within the housing there is provided a movement means in the form of a solenoid, typically of the thrust type, 222 which is selectively connected to a power supply to allow movement of the shaft 224. The shaft is connected to a rotatable member 226 on which is located an arm 228 which is pivotally moved about the axis of rotation of the rotatable member 226.

[0069] The arm 228 is provided to contact with the free end 230 of the shaft 212 of the assembly so as to provide the movement force on the same and hence allow the movement of the closure means between drainage and sealing positions as previously described.

[0070] The solenoid and part of the rotatable member are located within the housing and sealed from the drainage passage via sealing rings 232 which locate with the inner walls of the tight fitting channel through which the same passes into the drainage passage to thereby seal the housing from liquid ingress.

[0071] Operation of the apparatus of any of the embodiments described can be achieved in the following manner with regard to the switch and movement of the closure means in the sink or bath.

Switch Operation	Power Supply	Closure means status
None	None	Closure means stable
Depress switch	Power movement means in first Direction.	Closure means moved to open drain position
Release switch	None	Closure means maintained in drain position
None	None	Closure means maintained in drain position
Depress switch	Power movement means in reverse direction.	Closure means moved to closed seal position
Release switch	None	Closure means stable in Sealing/ down position
None	None	Assembly stable

[0072] Thus, in a preferred method of operation when the user touches/presses the switch unit for a period of time, such as 2 seconds, this then illuminates (the illumination will remain on for a period of time such as 4 seconds) and sends a control signal to the control unit. The control unit then transfers power from the mains supply to the movement means. If the movement means is a solenoid it may change the polarity of the supply. The movement means then moves to cause the movement assembly to move the closure means position and the power is then turned off. Typically, even if the user is still operating the switch there will be no more power supplied to the movement means once the new position has been reached. The movement means will only be able to be re-activated when the illumination of the switch turns off. This is a safety mechanism so that the movement means will not burn out from repeated frequent use.

[0073] When the user requires the movement means to be moved to the other open position they touch/press the switch unit for a period of time which illuminates (typically another colour and the illumination will remain on for a period of time), this then sends a control signal to the control means which then supplies the appropriate power from the mains supply to the movement means. The movement means then moves to cause the closure means to close and the power is then turned off. Again, typically the movement means will only be able to be re-activated when the illumination of the switch turns off.

[0074] There is therefore provided in accordance with the invention, a system for movement of a closure means in a sink, which is efficient, and is of a form which means that the same can be used in industrial and also domestic sinks.

Claims

- 5 1. A closure system for a sink, bath or similar device in which a body of liquid can be selectively collected, said closure system located with respect to a drain hole in the sink, bath or similar device, and includes a closure means mounted with respect to the drain hole so as to be movable between a closed position in which the closure means substantially prevents the passage of liquid through the drain hole, and an open position in which the closure means is moved upwardly to allow the passage of liquid through the drain hole wherein the system includes a movement assembly including a selectively operated movement means, control means selectively actuatable by a user and, when said control means are actuated, said movement means is powered to act on at least one member, which in turn is in contact with the closure means, to move the closure means in a first direction to a closed position or in an opposing direction to the open position.
- 10 2. A system according to claim 1 wherein the member passes through a chamber and a seal is provided to prevent ingress of liquid to the movement means.
- 15 3. A system according to claim 1 wherein the control means include one or more switches.
- 20 4. A system according to claim 3 wherein the switches are located on an external face of the sink, bath or similar item, or adjacent surface, removed from the body of liquid so as to allow the same to be operated by the user, without the need to place their hands into the liquid.
- 25 5. A system according to claim 1 wherein visual indication means are provided to indicate when the control means are available to be used.
- 30 6. A system according to claim 1 wherein the control means are operated via a remote control system.
- 35 7. A system according to claim 1 wherein the closure means comprises a body, a portion with which the member of the movement assembly contacts to move the closure means and a sealing means which, when the closure means is in the closed position substantially seals the drain hole from the passage of liquid therethrough.
- 40 8. A system according to claim 7 wherein the closure means incorporates a waste trap, said waste trap movable with the closure means between the open and closed positions.
- 45 9. A system according to claim 8 wherein the closure means includes a cover or canopy portion which is located at the top of the closure means.
- 50 10. A system according to claim 1 wherein the member is rotated by the powered movement means when actuated.
- 55 11. A system according to claim 10 wherein the axis of rotation is substantially perpendicular to the axis along which the closure means is moved.
12. A system according to claim 10 wherein the member contacts with the closure means via an arm.
13. A system according to claim 12 wherein the arm includes a cam surface which contacts with the closure means.
14. A system according to claim 10 wherein the movement means is a motor.
15. A system according to claim 1 wherein the movement means includes a solenoid to which power is selectively supplied in response to user generated control signals.
16. A system according to claim 15 wherein the solenoid is moved in a first direction in response to the receipt of power in a first polarity, and is movable in a second direction in response to the receipt of power in a reverse polarity, with the respective polarities selected by a control system in response to the selective control means actuation by the user..
17. A system according to claim 16 wherein the solenoid includes a member which is connected to drive and move a shaft of the closure means thereby moving the closure means between the open and closed positions.
18. A system according to claim 17 wherein the member is connected to rotate a rotatable member on which an arm is

provided to contact with the shaft of the closure means.

19. A system according to claim 18 wherein the rotatable member depends into the drainage passage leading from the drain hole.

20. A system according to claim 17 wherein a seal is provided with a resilience such as to act as a diaphragm in conjunction with movement of the member.

21. A system according to claim 20 wherein the seal biases the member to a predetermined position when the member has been moved to that position.

22. A system according to claim 1 wherein a resilient means is provided to encourage the retention of the member in a predetermined position.

23. A system according to claim 22 wherein when the member is in the predetermined position, the closure means is in a closed position.

24. A system according to claim 1 wherein at least one aperture is provided in the system to allow any debris which may collect in said system, to be removed.

25. A system according to claim 1 wherein the movement means is provided such that the closure means, when in the open or closed positions, is locked in that position until electrical power is supplied to the movement means.

26. A system according to claim 1 wherein said member is in contact with a pivot arm on one side of a pivot axis and the pivot arm is in contact with the closure means on the other side of the pivot axis.

27. A system according to claim 26 wherein the movement of the member is along an axis which is substantially parallel with the axis along which the closure means moves.

28. A system according to claim 26 wherein the pivot arm, at the area of location with the closure means, is curved so as to ensure reliable contact with the closure means during movement of the closure means between open and closed positions.

29. A system according to claim 1 wherein the movement assembly is provided in connection with a length of drainpipe, so as to allow the assembly to be fitted to a conventional drain hole and drainpipe.

30. A system according to claim 1 wherein power to the movement means is provided via one or more batteries or mains power connection connected to the closure means and control means.

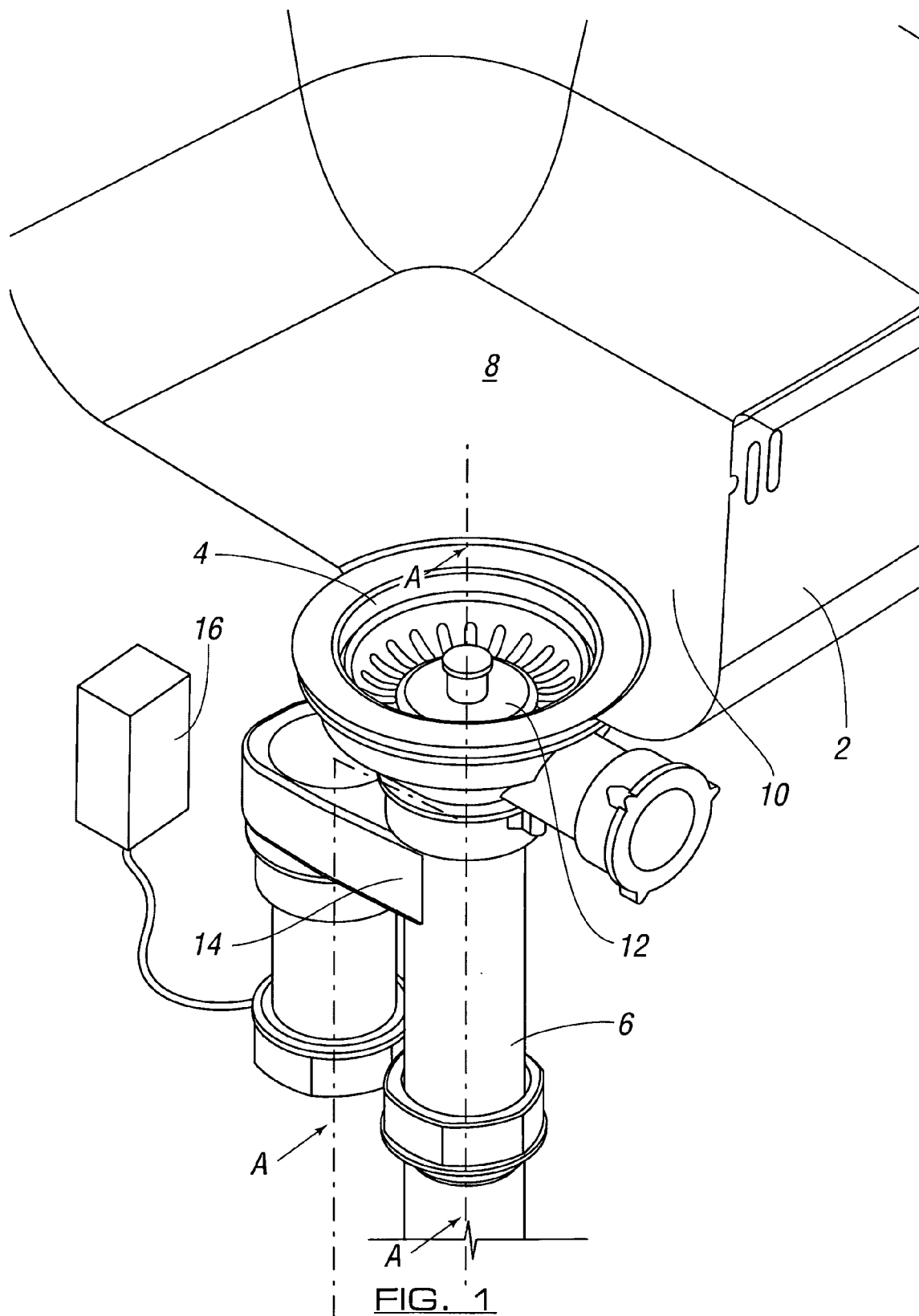
31. A system according to claim 30 wherein the supply of the power to the movement means is only provided when appropriate actuation of the control means by the user is performed.

32. A system according to claim 31 wherein processing means are provided to allow the control of the power supply to the movement means.

33. A closure system for a drain hole of a sink or bath, said closure system including closure means moveable between a closed sealing position, and an open drainage position, and movement means selectively operable in response to user actuation of control means wherein said movement of the closure means between said open and closed positions occurs automatically upon appropriate user actuation of the control means.

34. A system according to claim 33 wherein the closure means are moved between positions without user contact therewith.

35. A method of opening and closing a closure means for a drain hole of a sink or bath, said method comprising placing the closure means in the drain hole, operating control means, to cause movement means, and hence the closure means in contact therewith, to be in either of an open drainage or closed sealing position and wherein subsequent movement of the closure means between said positions is achieved by user operation of the control means to which causes movement of the movement means and automatic movement of the closure means.



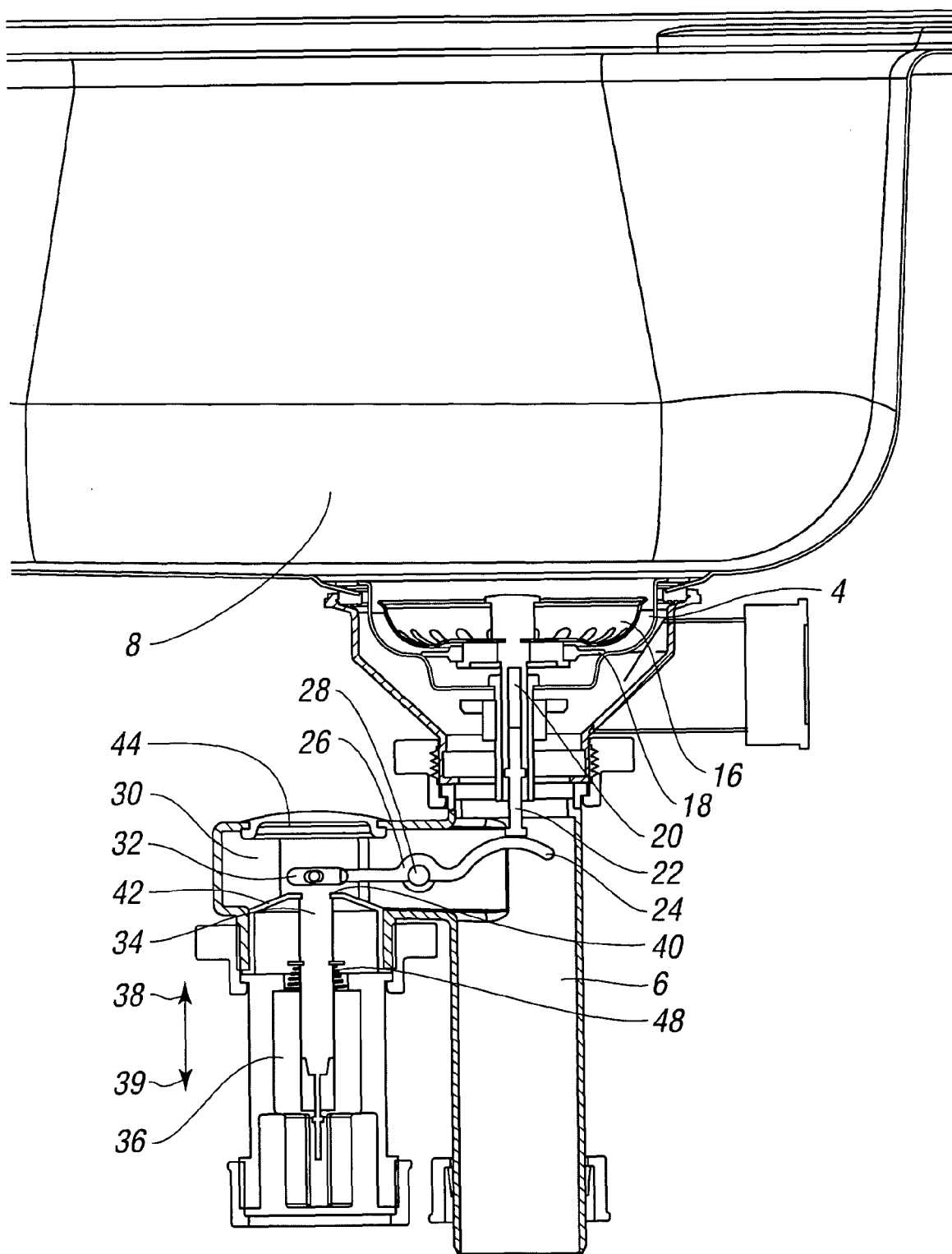
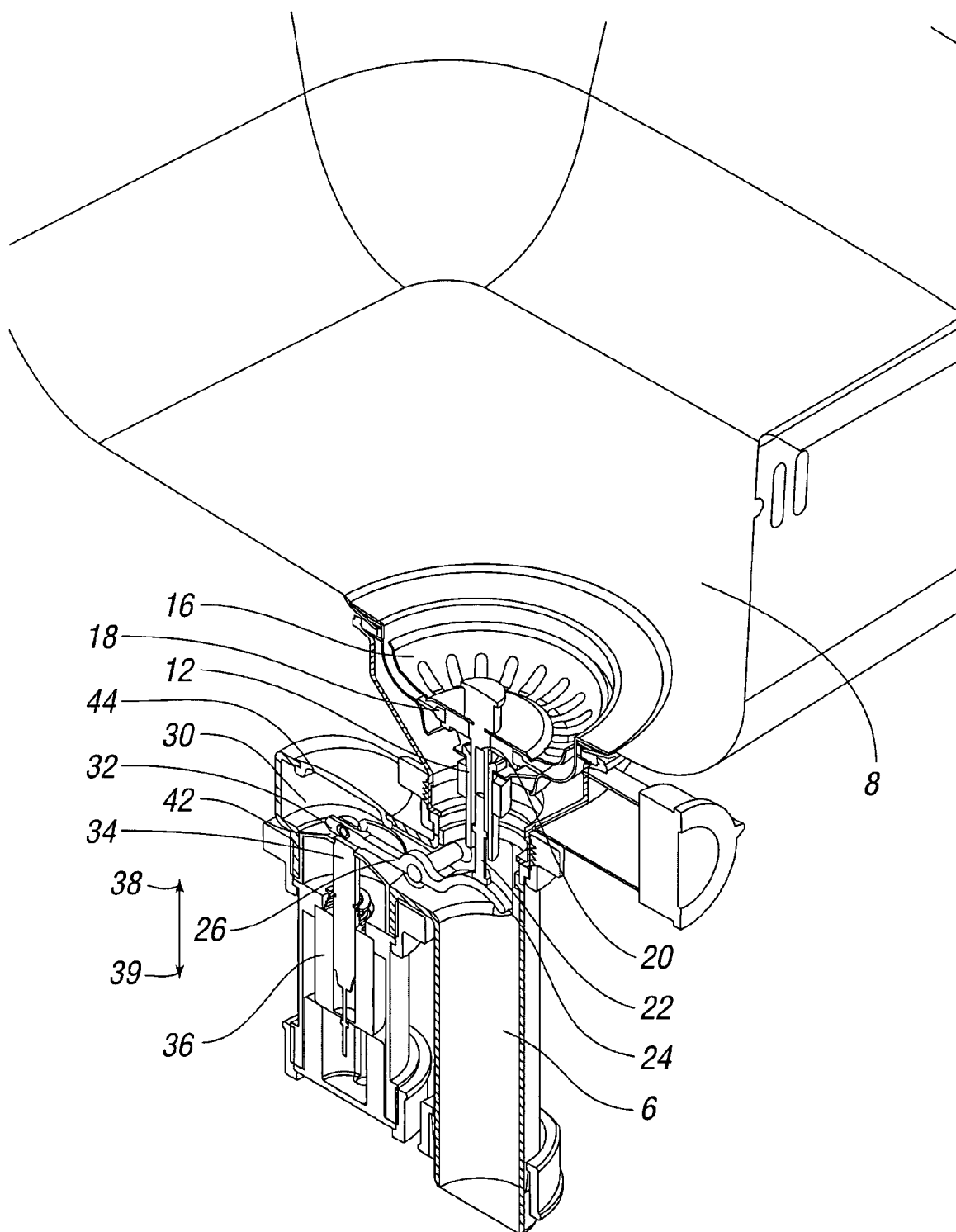
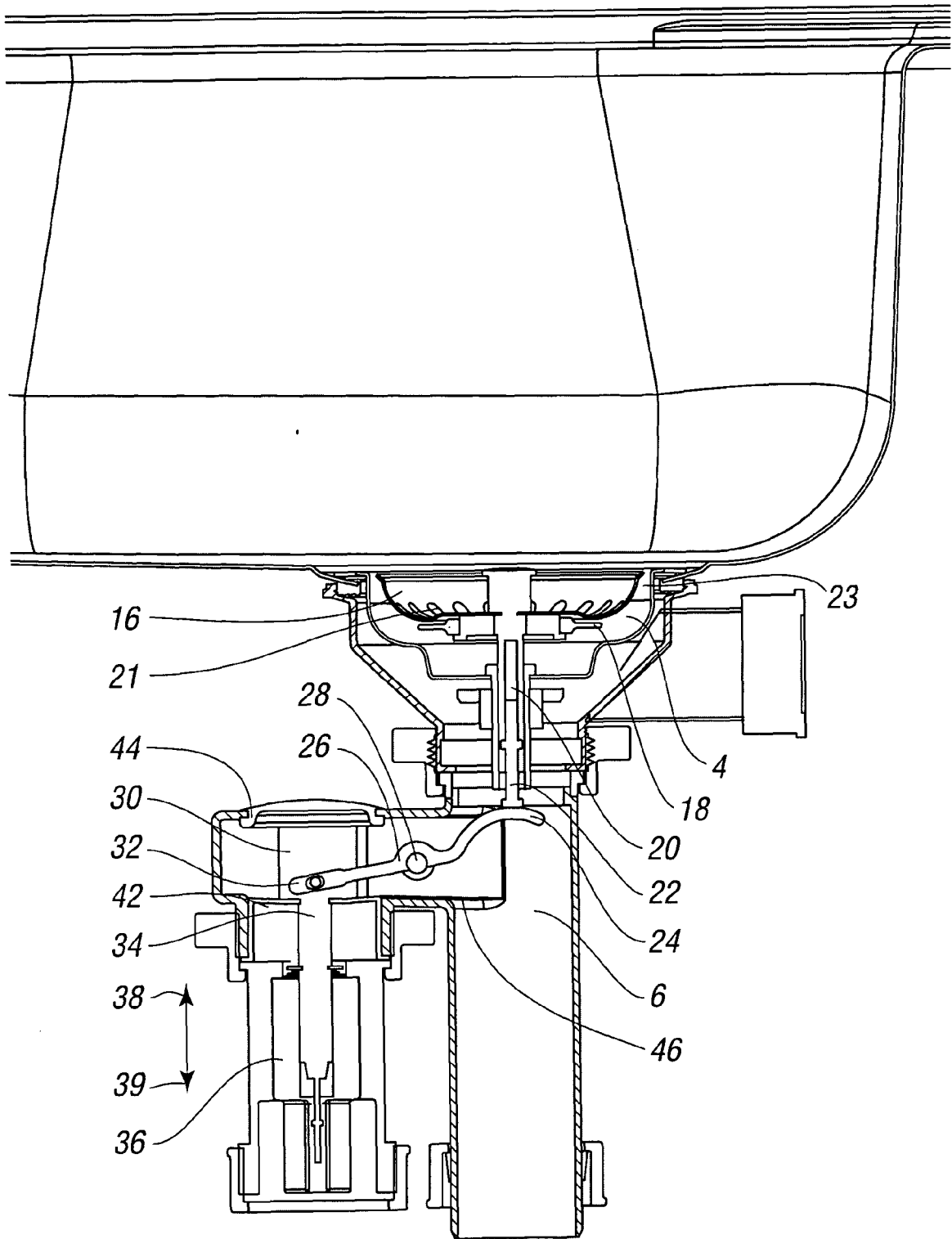


FIG. 2





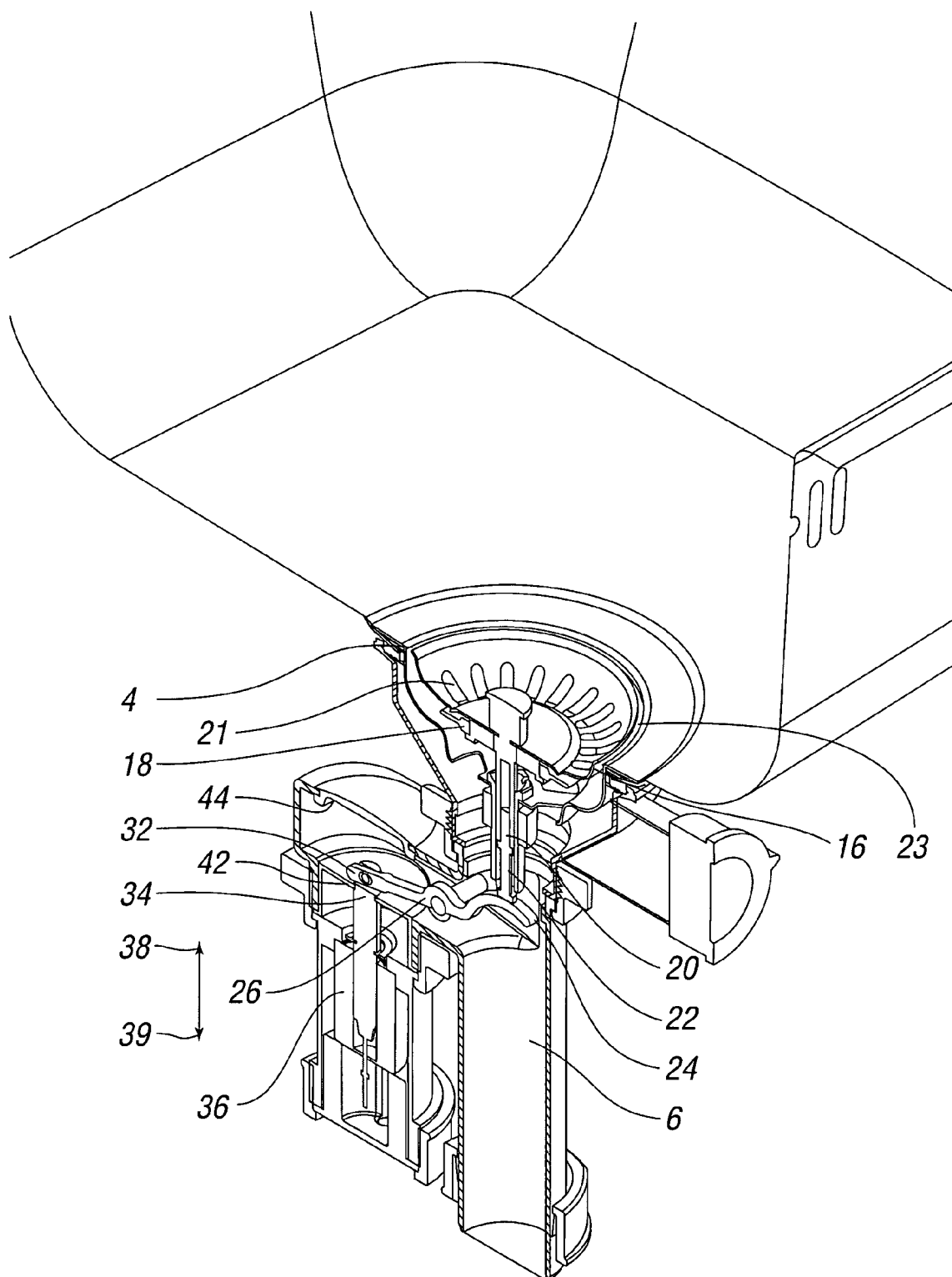


FIG. 5

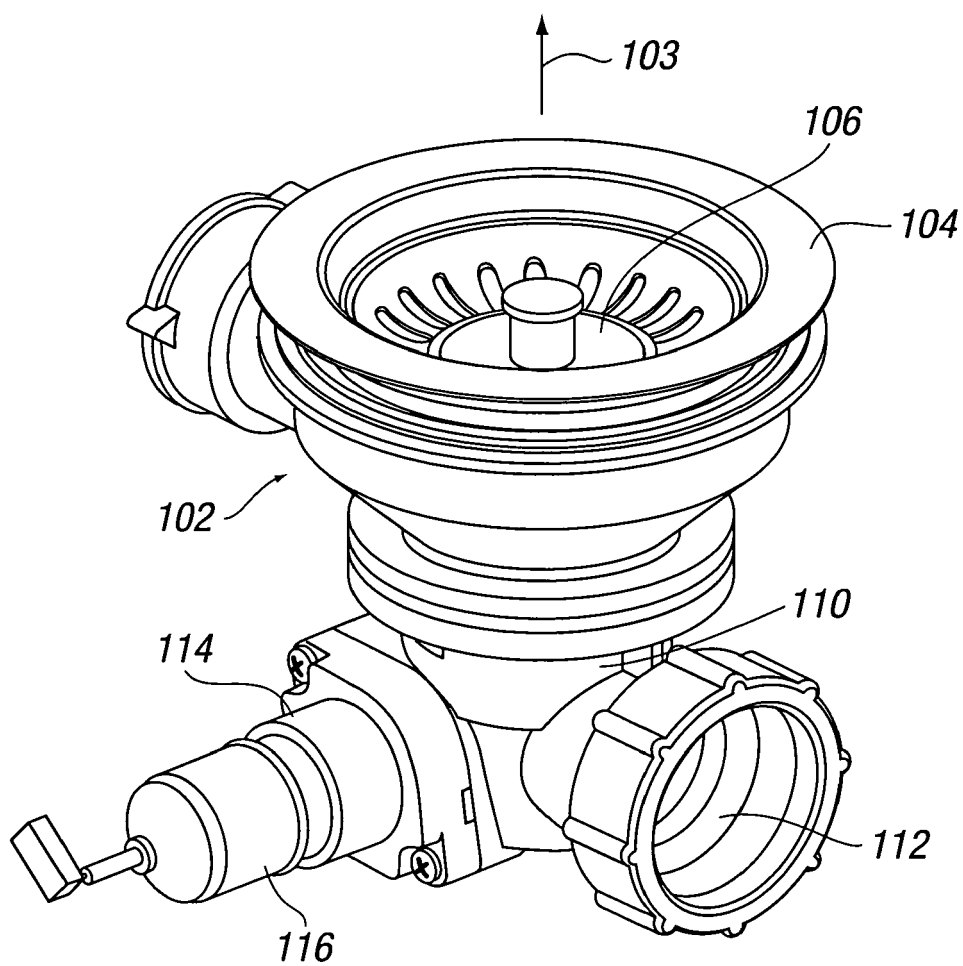


FIG. 6

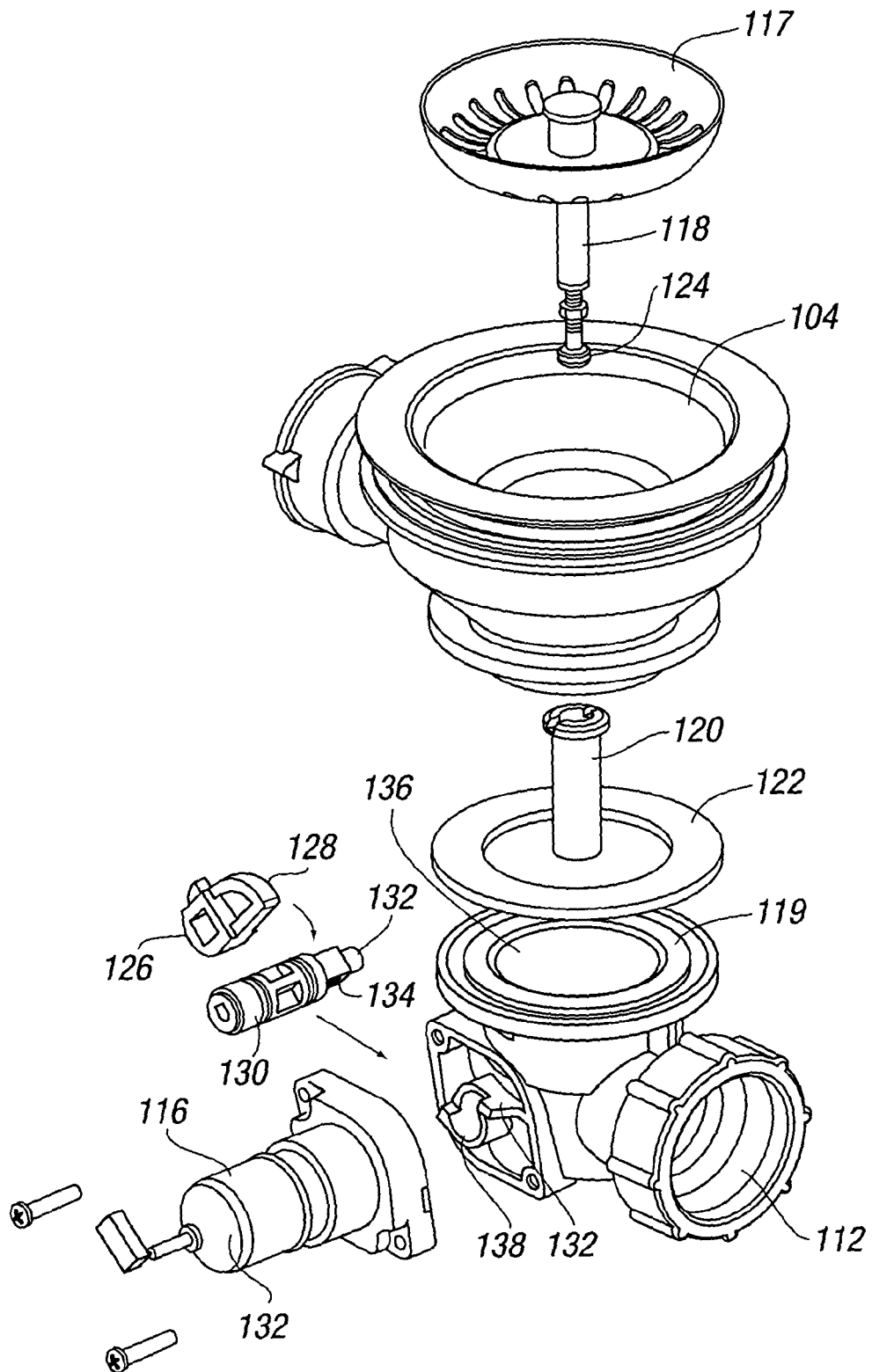


FIG. 7

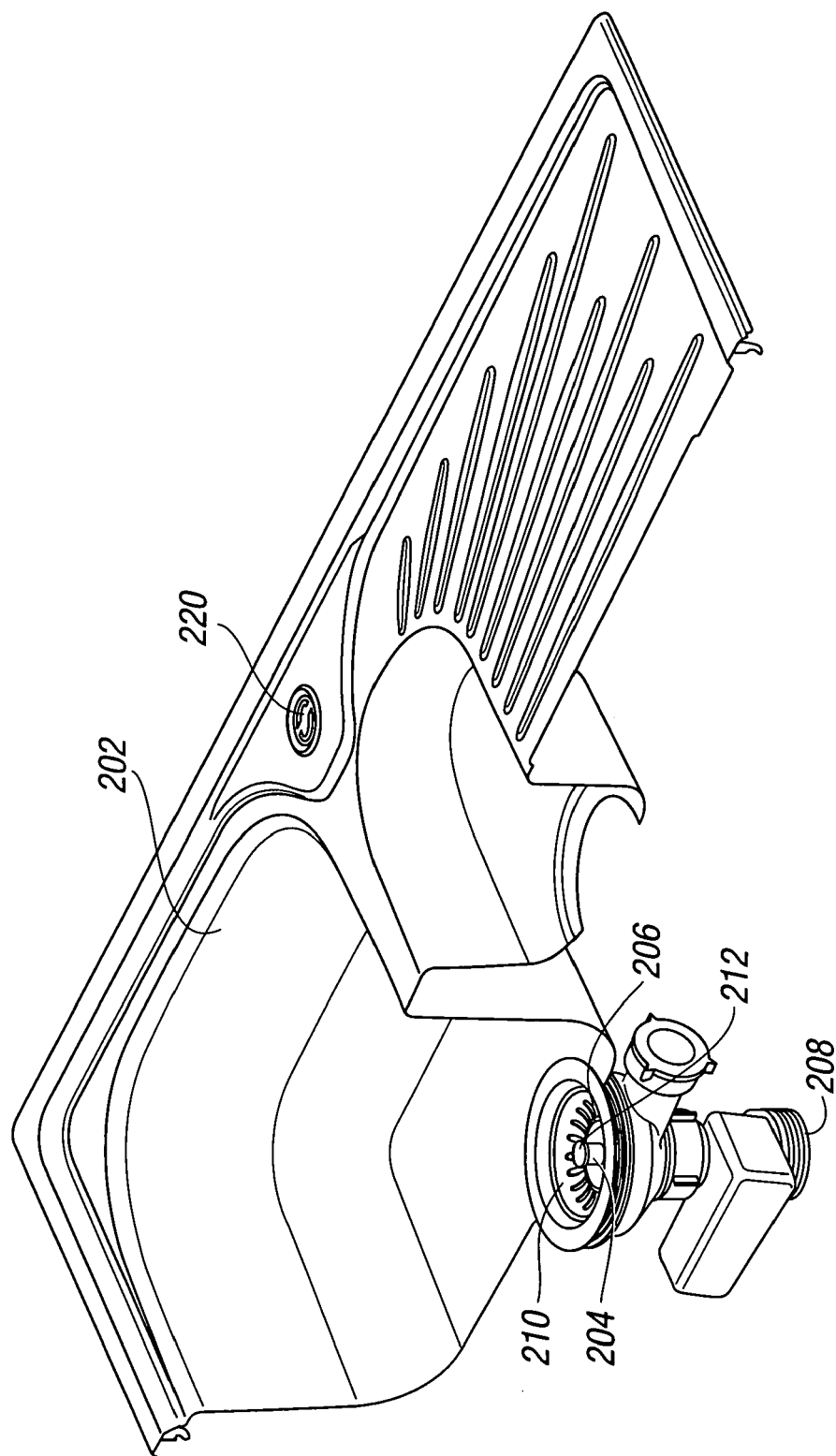
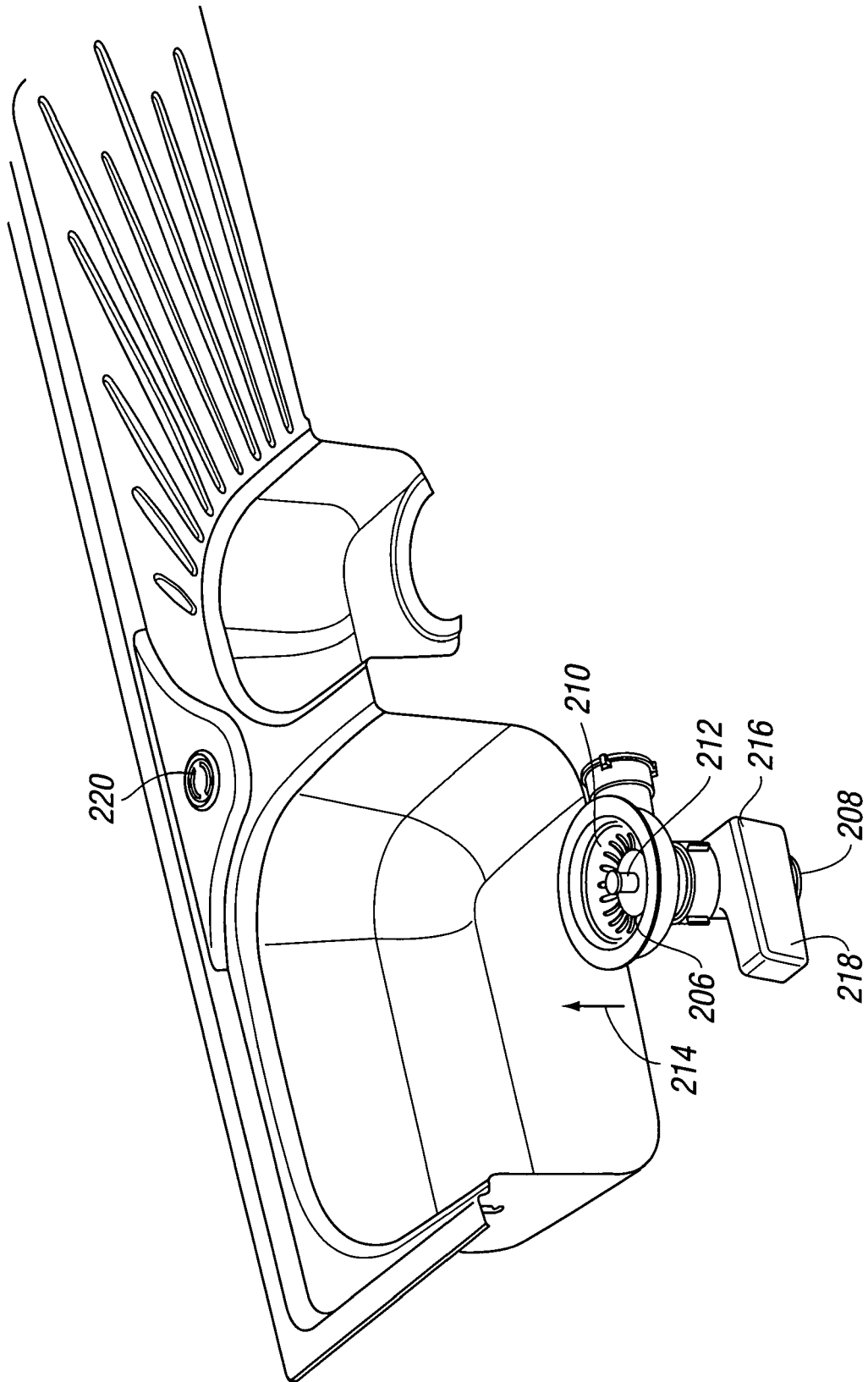


FIG. 8a

Fig. 8b

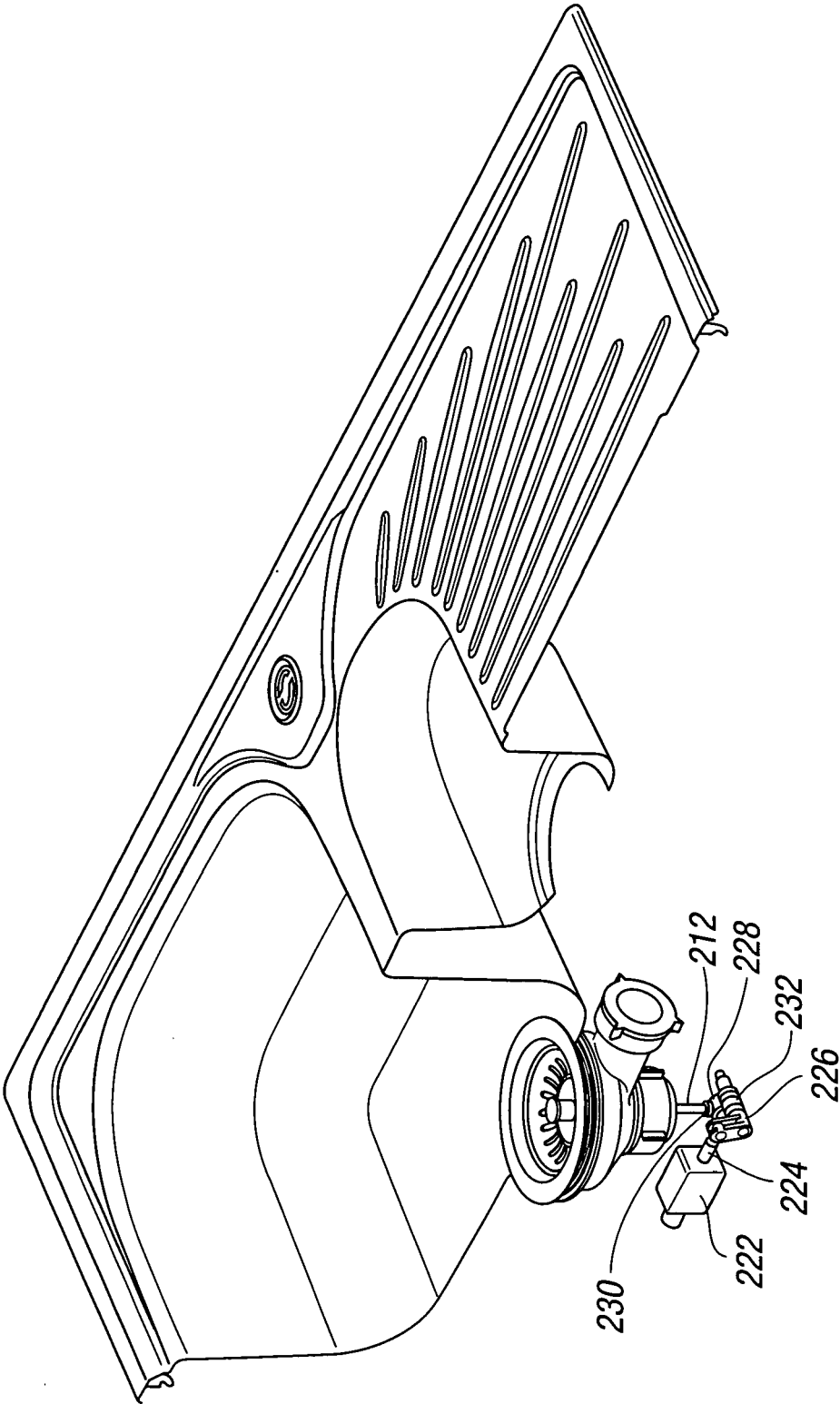


FIG. 9a

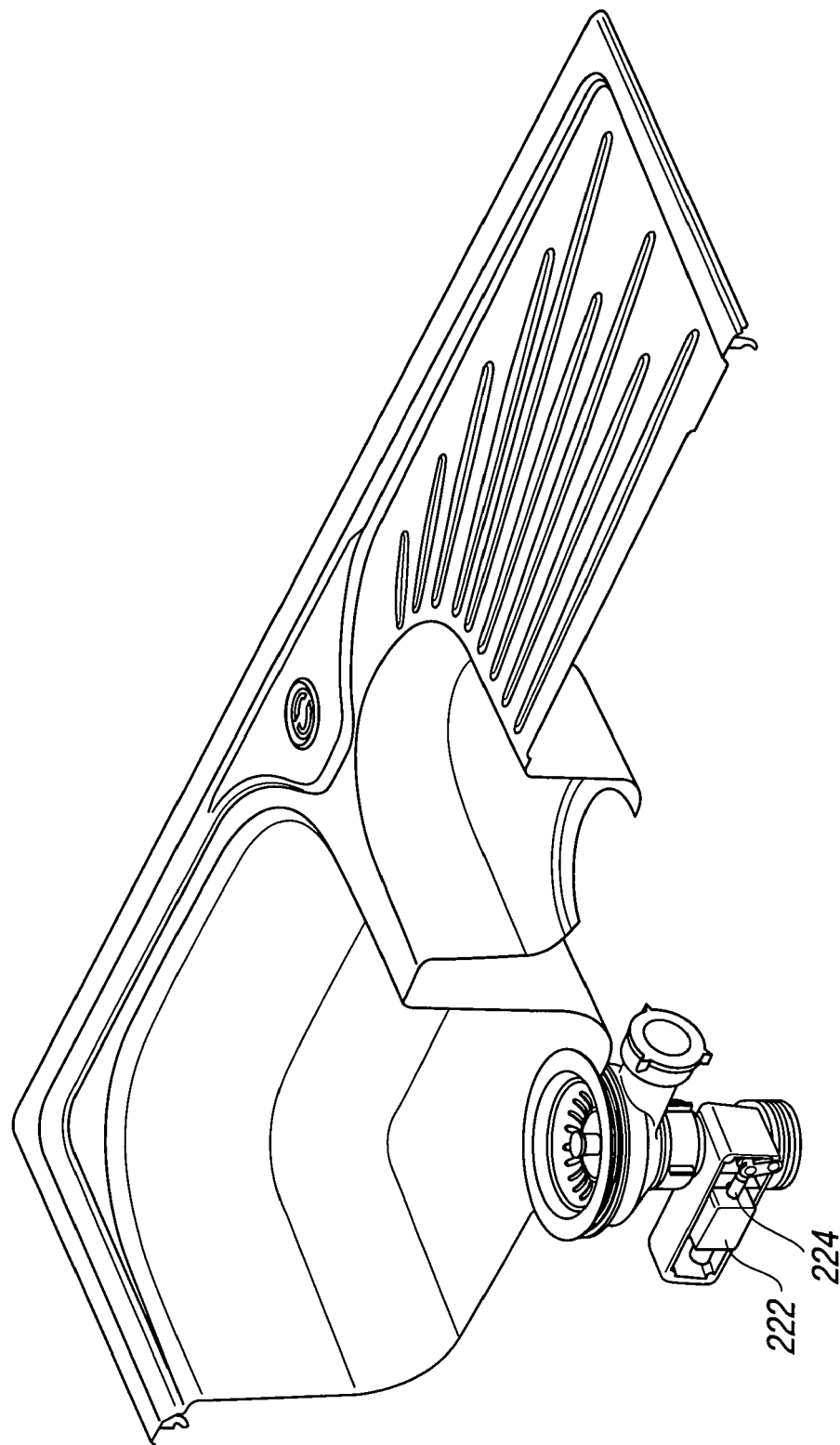
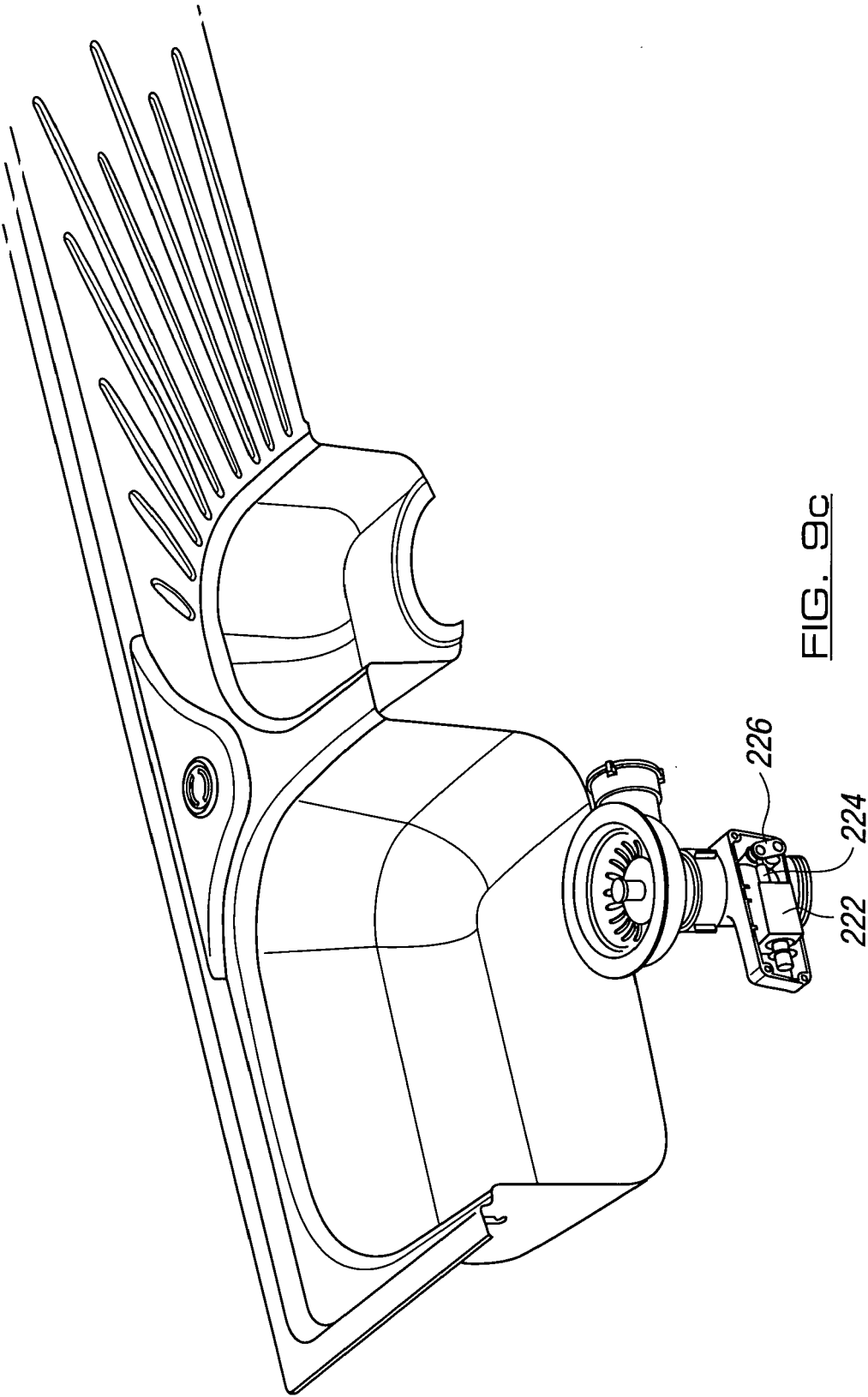


FIG. 9b





EUROPEAN SEARCH REPORT

Application Number
EP 08 25 2024

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2 989 758 A (TUREK JAMES R ET AL) 27 June 1961 (1961-06-27) * figure 1 * * column 2, line 68 - column 3, line 27 * -----	1-5, 7-15, 30-35	INV. E03C1/23 E03C1/242
X	WO 2005/012657 A (BLANCO GMBH & CO KG [DE]; SPRUNER V MERTZ GERT [DE]; BITTGER DIRK [DE]) 10 February 2005 (2005-02-10) * figures 1,11,12 * * page 27, paragraph 2 * -----	1,3, 6-12,33, 35	
X	US 5 504 950 A (NATALIZIA MARK L [US] ET AL) 9 April 1996 (1996-04-09) * column 9, line 62 - column 10, line 15 * -----	1,15,33, 35	
X	WO 2005/068732 A (CHANG CHOONG-SAM [KR]) 28 July 2005 (2005-07-28) * page 10, paragraph 1 * -----	1,33,35	
X	EP 0 421 520 A (TEUCO GUZZINI SRL [IT]) 10 April 1991 (1991-04-10) * column 2, line 31 - column 3, line 18 * -----	1,33,35	TECHNICAL FIELDS SEARCHED (IPC) E03C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 October 2008	Examiner Flygare, Esa
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 25 2024

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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02-10-2008

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2989758	A	27-06-1961	NONE	

WO 2005012657	A	10-02-2005	CA 2532843 A1	10-02-2005
			CN 1826449 A	30-08-2006
			DE 10333658 A1	10-03-2005
			DE 202004021416 U1	10-01-2008
			DE 202004021417 U1	03-01-2008
			EP 1649114 A1	26-04-2006
			JP 2006528738 T	21-12-2006
			US 2006156460 A1	20-07-2006

US 5504950	A	09-04-1996	NONE	

WO 2005068732	A	28-07-2005	NONE	

EP 0421520	A	10-04-1991	IT 218875 Z2	10-11-1992

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82