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(54) **Submersible pump**

(57) A submersible pump comprises switching on/off means (40) for switching on/off said submersible pump (1), said switching on/off means (40) being connected with sensor means (29) of the level of liquid (10) arranged for detecting the presence of said liquid (10) and for controlling said switching on/off means (40) depending on a detected level of liquid, said sensor means (29) of the level of liquid (40) is deformable so that in a deformed configuration activates said switching on/off means.

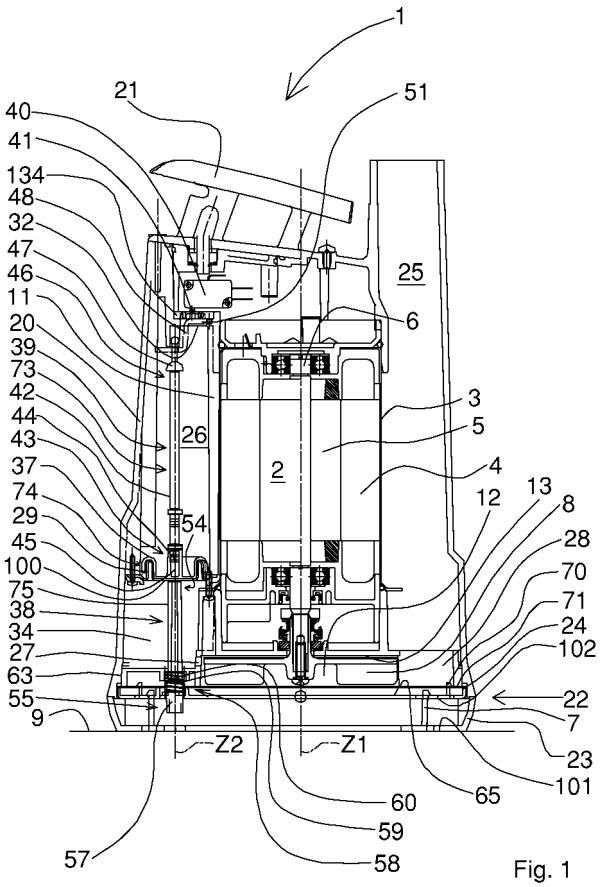

Fig. 1

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Description

[0001] The invention relates to a submersible pump arranged for emptying wet wells, basements, tanks, or similar.

[0002] In particular, the invention relates to a switching on/off device arranged for switching on/off a submersible motor-driven pump.

[0003] Submersible motor-driven pumps are known comprising an external case provided at the interior thereof with a watertight casing arranged for receiving an electric motor.

[0004] The electric motor is arranged for rotating an impeller, facing, during the use, a bottom surface of an environment from which a liquid is desired to be removed.

[0005] The known submersible motor-driven pumps are further provided with a switching on/off device arranged for switching on/off the motor-driven pump.

[0006] In particular, the switching on/off device comprises a pushbutton switch controlled by automatic control means arranged for switching on/off the motor-driven pump in automatic manner, i.e. for switching on/off the motor-driven pump according to a threshold level, with respect to the bottom surface, reached by the liquid present in the environment to be emptied.

[0007] The automatic control means comprises a float system.

[0008] In particular float systems are known, wherein the float is associated with a free end of a rotatable arm, protruding from the external case and arranged for controlling the push-button switch.

[0009] The rotatable arm is pivoted at a further end thereof, opposed to said end, on a pivot positioned in an internal portion of the external case.

[0010] The float, floating on the liquid present in the environment to be emptied, moves upwards and rotates the arm that controls the switch.

[0011] A drawback of said float systems relates to the large size of the rotating arm - float group, which makes particularly narrow environments hard to be emptied.

[0012] Float systems are as well known wherein the float is positioned and axially sliding along a vertical axis in a flotation chamber obtained within the external case.

[0013] Thus, when the level of the liquid begins to rise, the flotation chamber is filled with liquid that rises the float until to cause said float to interact with the push-button switch, so as to actuate said push-button switch.

[0014] A drawback of said float systems is the poor reliability.

[0015] Actually, it can occur that the float comes to stop within the flotation chamber, for example as a result of an undesired rotation of the float within the flotation chamber with respect to the vertical axis, or encrustation present on the float and/or on the walls of the flotation chamber.

[0016] The switching on/off device further comprises manual control means arranged for enabling a user to switch on/off the motor-driven pump in manual mode.

[0017] Such manual control means comprises a lever that protrudes outwards from a lateral surface of said external case.

[0018] Thus, by properly rotating the lever, the push-button switch can be actuated.

[0019] A drawback of said manual control means relates to the poor safety for the user.

[0020] Actually, it can occur that such lever is accidentally hit so that the pump is actuated, even when the impeller is not positioned in an operating position, i.e. when said impeller is not directed towards the bottom surface of the environment to be emptied.

[0021] An object of the invention is to improve the submersible pumps arranged for emptying drain wells, basements, tanks, or similar.

[0022] A further object is to provide particularly reliable submersible pumps.

[0023] A still further object is to obtain submersible pumps that are compact and have limited overall dimensions.

[0024] A still other object is to provide submersible pumps that assure a greater safety for the user than the known submersible pumps.

[0025] In a first aspect of the invention, a submersible pump is provided comprising switching on/off means for switching on/off said submersible pump, said switching on/off means being connected with sensor means for sensing a level of liquid for detecting the presence of said liquid and for controlling said switching on/off means depending on a detected level of liquid, characterized in that said sensor means for sensing a level of liquid is deformable so that in a deformed configuration said sensor means for sensing a level of liquid activates said switching on/off means.

[0026] Owing to this aspect of the invention, particularly compact submersible pumps can be obtained.

[0027] Actually, the sensor means for sensing a level of liquid may be positioned in a chamber obtained within the external case of the submersible pump.

[0028] Furthermore, owing to this aspect of the invention, submersible pumps more reliable than the known submersible pumps can be provided.

[0029] Actually, there is no relative movement between the sensor means for sensing a level of liquid and the chamber where said sensor means for sensing a level of liquid is positioned, which prevents undesired blocking.

[0030] In a second aspect of the invention, a submersible pump is provided comprising a case provided with switching on/off means arranged for switching on/off said submersible pump, said switching on/off means being connected with control means arranged for controlling said switching on/off means, characterized in that said control means exhibits a sensitive element movable between a neutral position wherein said sensitive element lies near an intended resting surface of said case and an active position wherein said sensitive element lies more internally with respect to said resting surface.

[0031] Owing to this aspect of the invention submers-

ible pumps can be obtained that assure a greater safety for a user than the known pumps.

[0032] Actually, the control means may comprise a rod element positioned within the external case of the submersible pump, said rod element being axially movable between the active position and the neutral position where said rod element respectively turns on and off the submersible pump.

[0033] The rod element further comprises an end protruding from a bottom portion of the submersible pump protected by a protective grid.

[0034] That enables the rod element to be prevented from being accidentally actuated.

[0035] Actually, in order to actuate the rod element and consequently to control the switching on/off means, the pump has to be risen and a proper tool has to be inserted through the protective grid in order to position the rod element in the active position.

[0036] Furthermore, by removing the protective grid, the rod element can be moved by simply laying the pump on the floor, with the impeller directed towards said floor.

[0037] That enables the pump to be turned on/off simply, by respectively being laid on, or raised from, the floor.

[0038] The invention can be better understood and carried out with reference to the enclosed drawings that illustrate an exemplifying and not restrictive embodiment thereof, wherein:

Figure 1 is a lateral, partially sectioned view of a submersible pump;
Figure 2 is a broken away view of Figure 1 showing the submersible pump in a first operating configuration;
Figure 3 is a view like Figure 2 showing the submersible pump in a second operating configuration;
Figure 4 is a view like Figure 2 showing the submersible pump in a third operating configuration;
Figure 5 is a view like Figure 2 showing the submersible pump in a fourth operating configuration;
Figure 6 is a schematic lateral view of an enlarged and broken away detail contained in the submersible pump in a first working position;
Figure 7 is a schematic lateral view of the detail of Figure 6 in a second working position;
Figure 8 is a perspective, partially sectioned and broken away view of a holding device contained in the pump of Figure 1 in a neutral position;
Figure 9 is a perspective, partially sectioned and broken away view that shows the holding device of Figure 8 in an active position.

[0039] With reference to Figure 1 a submersible pump 1 is shown arranged for emptying drain wells, basements, tanks, or similar.

[0040] The pump 1 comprises an external protective case 20 having substantially a shape of hollow cylinder and extending along a first longitudinal axis Z1.

[0041] A handle 21 is associated with the external case 20 arranged for being held by a user in order to raise and/or transport the pump 1.

[0042] The pump 1 further comprises grid means 22 associated with said external case 20 by means of a supporting element 71 extending transversally with respect to the first axis Z1 and provided with a hole, not shown, for allowing the flow of a liquid 10 to be removed.

[0043] The grid means 22 is provided with a plurality of holes of suitable dimensions arranged for preventing foreign matter from being drawn by the pump 1.

[0044] The grid means 22 is further arranged for beneath closing, and supporting, the external case 20.

[0045] The grid means 22 comprises a first grid 23 arranged for contacting a bottom surface 9, or floor, of a drain well, or a basement, or a tank, or other similar environments, to be emptied.

[0046] The first grid 23 furthermore defines, during the use, a first resting surface 101 and a first suction limit LP1 for the pump 1 (Figure 5).

[0047] The first grid 23 is removably associated with a second grid 24, by means of fastening elements 7, for example snap fastening elements.

[0048] The second grid 24 is associated, by means of further fastening elements 70, these also being for example snap fastening elements, with the supporting element 71 and is positioned, during the use, above the first grid 23.

[0049] The second grid 24 extends substantially parallel with respect to the first grid 23.

[0050] Furthermore, the first grid 23 can be removed from the second grid 24, so as to define, during the use, a second resting surface 102 for the pump 1.

[0051] Thus, as will be better disclosed hereafter, a second suction limit LP2 is defined for the pump 1 lower than the first suction limit LP1 (Figure 5).

[0052] The submersible pump 1 further comprises a wall 11 integral with the external case 20.

[0053] The wall 11 is adjacent to a watertight casing 3 arranged for receiving an electric motor 2, of known type.

[0054] The electric motor 2 comprises a stator 4 and a drive shaft 6 supporting a rotor 5.

[0055] At one end of the drive shaft 6 an impeller 8 is mounted, facing, during the use, the bottom surface 9.

[0056] The impeller 8 is positioned in a pumping chamber 12 communicating downwards with the bottom surface 9 by means of the hole obtained in the supporting element 71 and is delimited upwards by a base surface 13, the pumping chamber 12 being arranged for being filled, during use, at least partially with the liquid 10 that is desired to be removed.

[0057] In addition, the pumping chamber 12 communicates, by means of a passageway 28, with an outlet duct 25 extending substantially parallel with respect to the first axis Z1 and arranged for conveying outwards the liquid 10 drawn by the pump 1.

[0058] The pump 1 further comprises a chamber 26 having substantially a shape of a truncated cone and extending substantially parallel with respect to the first

axis Z1.

[0059] The chamber 26 is delimited at one side by a first wall 32 and a gasket 134 and at the opposite side by a deformable diaphragm 29.

[0060] The pump 1 further comprises switch means 40, for example a switch provided with a push-button 41, positioned near the first wall 32, outside the gasket 134 and arranged for switching on/off the pump 1.

[0061] The pump 1 is further provided with control means 73 arranged for controlling the switch means 40 for switching on/off the pump 1 in automatic and/or manual manner.

[0062] The control means 73 is provided with sensor means 74 for sensing the level of liquid, said sensor means comprising the deformable diaphragm 29.

[0063] An active chamber 34 is provided on the side of the diaphragm 29 opposite the chamber 26, said active chamber 34 being arranged for being filled, at least partially, with the liquid 10.

[0064] The active chamber 34 is delimited at one side by a sensitive surface 100 of the diaphragm 29 and at the opposite side by a base wall 63 of the body of the pump.

[0065] The active chamber 34 further communicates with the pumping chamber 12 by means of an opening 27 opposite the passageway 28.

[0066] The control means 73 further comprises a small plate 37, properly profiled, associated with the diaphragm 29.

[0067] In particular, the small plate 37 is placed in contact with, and operatively above, the diaphragm 29, within the chamber 26.

[0068] The control means 73 further comprises stem means 39 arranged for controlling the switch means 40.

[0069] The stem means 39 extends and is axially movable along a second longitudinal axis Z2 substantially parallel to the first axis 21.

[0070] The stem means 39 comprises a first stem 38 and a second stem 42, mutually separate, positioned respectively within the active chamber 34 and the chamber 26.

[0071] In particular, the first stem 38 is arranged for manually switching on/off the pump 1, as will be better disclosed here below.

[0072] The first stem 38, of substantially cylindrical shape, comprises a prismatic body 75, for example hexagonal, provided with an end 54 facing, during use, the diaphragm 29, and a further end 55, opposite the end 54, facing, during use, the bottom surface 9 of the environment to be emptied.

[0073] In particular, the further end 55 comprises an active element 57, substantially cylindrical, operatively protruding downwards from the second grid 24 and comprising a notch, not shown, wherein the tip of a tool can be inserted, said tool also being not shown.

[0074] In other words, the active element 57 is interposed, during use, at least partially, between the second grid 24 and the first grid 23.

[0075] The control means 73 further comprises holding means 58 arranged for holding the first stem 38 respectively in a neutral position PA and an active position PS (Figures 8 and 9), wherein respectively said first stem 38 switches off and on the pump 1.

[0076] The holding means 58 comprises a spring 59, wrapping around an end section 60 of the first stem 38, and arranged for axially moving downwards said first stem 38.

[0077] The spring 59 is received in a profiled passageway, not shown, obtained between a first surface 201 of the base wall 63 and a second surface 65 of the second grid 24, the second surface 65 facing, at least partially, the first surface 201.

[0078] Said passageway comprises a through hole, within which the first stem 38 can axially slide, peripherally provided with a plurality of recesses, radially extending and being substantially shaped like a trapezium, in plan view.

[0079] The recesses, for example in number of three mutually, uniformly angularly spaced apart, are arranged for shapingly engaging, in the neutral position PA, respective projections 68 radially protruding from the end section 60 of the first stem 38 and held in such neutral position PA as a result of the force exerted by the spring 59.

[0080] Furthermore, said passageway passes through a portion of the supporting element 71 positioned between the first surface 201 and the second surface 65.

[0081] Said portion comprises a matching surface 76 arranged for being matched by the projections 68 in the active position PS, the projections 68 being held in said active position PS as a result of the force exerted by the spring 59.

[0082] In other words, in the active position PS the projections 68 are disengaged from the respective recesses and rest against the matching surface 76.

[0083] The pump 1 further comprises a tongue, not shown, positioned on the base wall 63 at the opposite side with respect to the first surface 201 and arranged for making contact with the prismatic body 75 of the first stem 38.

[0084] In particular, said tongue is arranged for giving the perception of a snap when the first stem 38 is rotated by means of the tool mentioned above and for holding in position the first stem 38 in order to prevent said first stem 38 from being accidentally rotated and axially blocked, that could compromise a manual operating mode of the pump 1, disclosed here below.

[0085] On the other hand, the second stem 42 comprises a first end 43 provided with a shank 44 arranged for being inserted into a seat 45 obtained in the small plate 37.

[0086] The second stem 42 further comprises a second end 46, opposite the first end 43, provided with an active element 47 having substantially a shape of a half sphere, arranged for making contact with an active surface 50 of a lever 48, projecting into the chamber 26.

[0087] The lever 48, having substantially an "S" shape, is rotatable around a pivot 49 hinged in an upper portion 51 of the wall 11.

[0088] The lever 48 comprises a further active surface 52, opposite the active surface 50, from which a projection 53 protrudes arranged for making contact with the push-button 41 of the switch means 40 (Figures 6 and 7).

[0089] Furthermore, the second stem 42 is movable between a resting position R and a working position L, in which the pump 1 is respectively switched off and on.

[0090] In other words, in the resting position R, shown in Figure 6, the projection 53 of the lever 48 does not contact the push-button 41, whereas in the working position L, shown in Figure 7, the projection 53 contacts the push-button 41.

[0091] The switching on/off modes of the submersible pump 1 are disclosed here below with particular reference to the Figures 2 to 9.

[0092] First of all, an automatic switching on/off mode of the pump 1 is taken into account.

[0093] Initially, the pump 1 is positioned in an environment that is desired to be emptied, such as for example a drain well, a basement, a tank, or similar, with the first grid 23 resting against the bottom surface 9.

[0094] At first, liquid 10 is not present on the bottom surface 9, the pump 1 is switched off and the second stem 42 lies in the resting position R.

[0095] With reference to Figure 2, the pump 1 is shown in a first operating configuration A1, in which the liquid 10 has reached a first level L1.

[0096] In the first operating configuration A1, the liquid 10 fully fills the pumping chamber 12 and fills just partially the active chamber 34, and the second stem 42 lies in the resting position R.

[0097] With reference to Figure 3, the pump 1 is shown in a second operating configuration A2, in which the liquid 10 has reached a second level L2 higher than the first level L1.

[0098] In the second operating configuration A2 the liquid 10 has filled the active chamber 34 up to lick the sensitive surface 100, and the second stem 42 still lies in the resting position R.

[0099] Subsequently, the level of the liquid 10 continues to rise, until said level reaches a further second level L2', higher than the second level L2.

[0100] During such phase, the liquid 10 present in the active chamber 34 exerts a rising pressure on the sensitive surface 100 of the diaphragm 29, that, deforming, causes an axial displacement in the direction indicated by the first arrow F1 of the small plate 37 and consequently of the active element 47 of the second stem 42, so as to approach the switch means 40 (Figure 6).

[0101] Thus, the active element 47, contacting the active surface 50 of the lever 48, rotates said lever 48 in the direction indicated by the second arrow F2.

[0102] Subsequently, the level of the liquid 10 continues to rise until the pressure exerted by the liquid 10 present in the active chamber 34 on the sensitive surface 100, has reached a value such as to deform the diaphragm 29 so that the second stem 42 lies in the working position L.

[0103] In the working position L, the impeller 8 is actuated, which impeller starts to draw liquid 10 so as to evacuate said liquid 10 via the outlet duct 25, which enables the level of liquid 10 in the environment to be reduced.

[0104] With reference to Figure 4, the pump 1 is shown in a third operating configuration A3, in which the liquid 10 has reached a third level L3, lower than the second level L2.

[0105] In the third operating configuration A3 the liquid 10 fully fills the pumping chamber 12 and passes through the opening 27.

[0106] Furthermore, in the third operating configuration A3, the second stem 42 still lies in the working position L.

[0107] That is made possible by the impeller 8, that, rotating at high speed, introduces from the opening 27 an amount of liquid 10 that produces at the interior of the active chamber 34 a pressure capable to keep deformed the diaphragm 29, which diaphragm 29 controls in the manner disclosed above the push-button 41.

[0108] Subsequently, the level of the liquid 10 continues to decrease, until it reaches the first suction limit LP1, lower than the third level L3 (Figure 5).

[0109] Figure 5 shows the pump 1 in a fourth operating configuration A4, in which the liquid 10 is no more present in the pumping chamber 12.

[0110] In such fourth operating configuration A4, the impeller 8 is no longer capable of introducing the liquid 10 into the active chamber 34 and automatically stops rotating.

[0111] Actually, the diaphragm 29, no longer forced by the pressure caused by the liquid 10 introduced through the opening 27, recovers an undeformed configuration in which said diaphragm 29 repositions the second stem 42 in the resting position R. It is to be noticed that, as a result of to the liquid 10 introduced by the impeller 8 in the active chamber 34, the pump 1 is held running even during a phase wherein the level of the liquid 10 in the external environment to be emptied lies at a level lower than the level of the diaphragm 29.

[0112] Two manual modes of switching on/off the pump 1 are disclosed here below.

[0113] In order to manually switch on/off the pump 1 two different modes can be used, a first mode that enables liquid 10 to be drawn at the first suction limit LP1 and a second mode that enables liquid 10 to be drawn at the second suction limit LP2.

[0114] The first mode comprises rising the pump 1 so that a proper tool, for example a screwdriver, not shown, is introduced through a hole 78 (Figure 8) present in the first grid 23, until a tip of said tool is inserted within the notch of the first stem 38, positioned in the neutral position PA.

[0115] By acting against the force exerted by the spring

59, the first stem 38 is axially moved closer to the diaphragm 29 and is rotated until said first stem 38 is placed in the active position PS, that is until a snap is perceived between the tongue and the prismatic body 75 (Figure 9).

[0116] In such position, the end 54 of the first stem 38 interacts with the diaphragm 29, deforming said diaphragm 29 until the second stem 42 is moved in the working position L.

[0117] In order to switch off the pump 1 the tool has to be reintroduced, and the first stem 38 has to be properly actuated until said first stem 38 is brought again in the neutral position PA, i.e. until a further snap is perceived between the tongue and the prismatic body 75.

[0118] It is to be noticed that such an operation assures a remarkable safety for the user, and prevents fortuitous starts-up of the pump 1.

[0119] Conversely, the second mode of switching on/off the pump 1 comprises rising the pump 1, removing the first grid 23 from the second grid 24 and laying the pump 1 on the bottom surface 9.

[0120] Thus, the first stem 38, without the protection offered by the first grid 23, contacts the bottom surface 9 with the further end 55.

[0121] Consequently, the weight of the pump 1 compresses the spring 59 that moves upwards the first stem 38, held in a proper axial position by the tongue, from the neutral position PA to a risen position wherein said first stem 38 switches on the pump 1.

[0122] In order to switch off the pump 1 it is then sufficient to raise said pump 1 from the bottom surface 9.

Claims

1. Submersible pump comprising switching on/off means (40) for switching on/off said submersible pump (1), said switching on/off means (40) being connected with sensor means (29) sensing a level of liquid (10), said sensor means being arranged for detecting the presence of said liquid (10) and for controlling said switching on/off means (40) depending on a detected level of liquid, **characterized in that** said sensor means (29) sensing a level of liquid (40) is deformable so that in a deformed configuration said sensor means activates said switching on/off means.

2. Submersible pump according to claim 1, wherein said sensor means sensing a level of liquid comprises deformable diaphragm means (29).

3. Submersible pump according to claim 2, wherein said diaphragm means (29) is inserted within pressurized chamber means (34) arranged for exerting a deforming pressure on said diaphragm means (29).

4. Submersible pump according to claim 3, wherein said pressurized chamber means (34) is upwards closed by a sensitive surface (100) of said diaphragm means (29).

5. Submersible pump according to any of the preceding claims, and comprising impeller means (8) received in pumping chamber means (12) arranged for being filled at least partially with said liquid (10).

6. Submersible pump according to claim 5 when depending on claim 3, or 4, wherein said pressurized chamber means (34) comprises opening means (27) arranged for connecting said pressurized chamber means (34) with said pumping chamber means (12).

7. Submersible pump according to claim 6, wherein said opening means (27) is obtained in a portion of said pressurized chamber means (34) opposite said diaphragm means (29).

8. Submersible pump according to any of claims 2 to 7, wherein said sensor means sensing a level of liquid comprises connecting means (37, 38, 48) arranged for connecting said diaphragm means (29) with said switching on/off means (40).

9. Submersible pump according to claim 8, wherein said connecting means (37, 38, 42, 48) comprises stem means (42) associated with said diaphragm means (29).

10. Submersible pump according to claim 9, when claim 5 and claim 8 depend on claim 3, wherein said stem means (42) is received in chamber means (26) operatively positioned at a portion of said pressurized chamber means (34) opposite with respect to said diaphragm means (29).

11. Submersible pump according to claim 9, or 10, wherein said stem means (42) is interposed between said diaphragm means (29) and said switching on/off means.

12. Submersible pump according to any of claims 9 to 11, wherein said stem means (42) exhibits an active surface (47) arranged for contacting said switching on/off means (40) in order to switch on/off said submersible pump (1).

13. Submersible pump according to any of claims 9 to 12, wherein said connecting means (37, 38, 42, 48) comprises lever means (48) arranged for controlling said switching on/off means (40), said lever means (48) being interposed between said stem means (42) and said switching on/off means (40).

14. Submersible pump according to any of claims 9 to 13, wherein said connecting means (37, 38, 42, 48)

comprises small plate means (37) associated with said diaphragm means (29) and arranged for supporting said stem means (42).

15. Submersible pump according to any of the preceding claims, wherein said switching on/off means comprises push-button switch means (40).

16. Submersible pump according to any of the preceding claims, and comprising a case (20) arranged for receiving said switching on/off means (40) and said sensor means (29) sensing a level of liquid.

17. Submersible pump according to claim 16, and comprising control means (39) arranged for controlling said switching on/off means (40), said control means (39) being provided with a sensitive element (57) moving between a neutral position (PA) wherein said sensitive element (57) lies near an intended resting surface (101; 102) of said case (20) and an active position (PS) wherein said sensitive element (57) lies more internally with respect to said intended resting surface (101; 102).

18. Submersible pump according to claim 17, wherein said control means (39) comprises an active portion (54) opposite said sensitive element (57) arranged in said active position (PS) for activating said switching on/off means (40).

19. Submersible pump according to claim 17, when claim 16 depends on any of claims 4 to 15, wherein said control means (39) comprises an active portion (54) opposite said sensitive element (57) arranged in said active position (PS) for contacting said sensitive surface (100) in order to deform said diaphragm means (29).

20. Submersible pump according to any of claims 17 to 19, when claim 16 depends on claim 4, wherein said control means (39) is received at least partially within said pressurized chamber means (34).

21. Submersible pump according to any of claims 17 to 20, and comprising grid means (22) associated with said case (20) and defining said intended resting surface (101; 102).

22. Submersible pump according to claim 21, wherein said grid means (22) comprises first grid means (23) removably associated with second grid means (24), said second grid means (24) being positioned within said case (20) more internally with respect to said first grid means (23).

23. Submersible pump according to any of claims 17 to 22, wherein in said active position (PS) said sensitive element (57) is substantially coplanar with said intended resting surface (101; 102).

24. Submersible pump according to any of claims 17 to 22, wherein in said active position (PS) said sensitive element (57) protrudes from said intended resting surface (101; 102).

25. Submersible pump according to any of claims 17 to 24, wherein said sensitive element (57) comprises notch means arranged for receiving a tip of a tool arranged for moving said control means (39) between said neutral position (PA) and said active position (PS).

26. Submersible pump according to any of claims 17 to 25, and comprising holding means (58) arranged for holding said control means (39) in said neutral position (PA) and in said active position (PS).

27. Submersible pump according to claim 26, wherein said holding means (58) is bayonet holding means.

28. Submersible pump according to claim 26, or 27, wherein said holding means (58) comprises a profiled passageway inside which said control means (39) is axially sliding.

29. Submersible pump according to claim 28, wherein said passageway comprises a matching wall (76) provided with a plurality of recesses (67) arranged for shapingly engaging in said neutral position (PA) respective radial projections (68) associated with said control means (39).

30. Submersible pump according to claim 29, wherein in said active position (PS) said projections (68) match said matching wall (76).

31. Submersible pump according to any of claims 26 to 30, wherein said holding means (58) comprises elastic means (59) arranged for moving said sensitive element (57) away from said switching on/off means (40).

32. Submersible pump comprising a case (20) provided with switching on/off means (40), arranged for switching on/off said submersible pump (1), said switching on/off means (40) being connected with control means (39) arranged for controlling said switching on/off means (40), **characterized in that** said control means (39) exhibits a sensitive element (57) moving between a neutral position (PA) in which said sensitive element (57) lies near an intended resting surface (101; 102) of said case (20) and an active position (PS) in which said sensitive element (57) lies more internally with respect to said intended resting surface (101; 102).

33. Submersible pump according to claim 32, wherein said control means (39) is received at least partially within said case (20).

34. Submersible pump according to claim 32, or 33, wherein said control means (39) comprises an active portion (54) opposite said sensitive element (57) arranged in said active position (PS) for activating said switching on/off means (40).

35. Submersible pump according to any of claims 32 to 34, and comprising grid means (22) associated with said case (20) and defining said intended resting surface (101; 102).

36. Submersible pump according to claim 35, wherein said grid means (22) comprises first grid means (23) removably associated with second grid means (24), said second grid means (24) being positioned in said case (20) more internally with respect to said first grid means (23) .

37. Submersible pump according to any of claims 32 to 36, wherein in said active position (PS) said sensitive element (57) is substantially coplanar with said intended resting surface (101; 102).

38. Submersible pump according to any of claims 32 to 36, wherein in said active position (PS) said sensitive element (57) protrudes from said intended resting surface (101; 102).

39. Submersible pump according to any of claims 32 to 38, wherein said sensitive element (57) comprises notch means (56) arranged for receiving a tip of a tool arranged for moving said control means (39) between said neutral position (PA) and said active position (PS) .

40. Submersible pump according to any of claims 32 to 39, and comprising holding means (58) arranged for holding said control means (39) in said neutral position (PA) and in said active position (PS).

41. Submersible pump according to claim 40, wherein said holding means (58) is bayonet holding means.

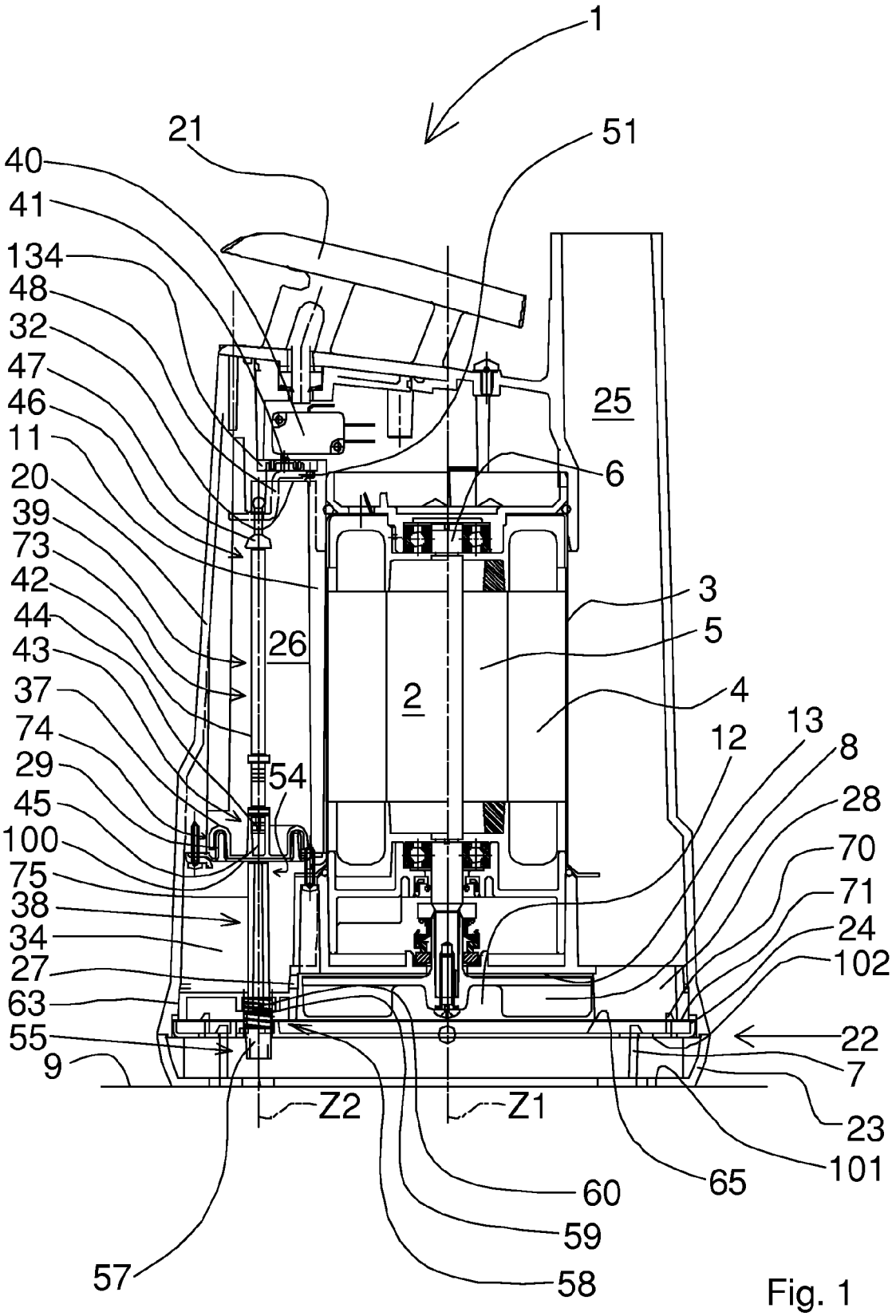
42. Submersible pump according to claim 40, or 41, wherein said holding means (58) comprises a profiled passageway inside which said control means (39) is axially sliding.

43. Submersible pump according to claim 42, wherein said passageway comprises a matching wall (76) provided with a plurality of recesses (67) arranged for shapingly engaging in said neutral position (PA) respective radial projections (68) associated with said control means (39).

44. Submersible pump according to claim 43, wherein in said active position (PS) said projections (68) match said matching wall (76).

45. Submersible pump according to any of claims 40 to 44, wherein said holding means (58) comprises elastic means (59) arranged for moving said sensitive element (57) away from said switching on/off means (40).

46. Submersible pump according to any of claims 32 to 45, wherein said switching on/off means comprises push-button switch means (40).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70
71
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102
22
7
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101
Z2
Z1
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57
65

Fig. 1

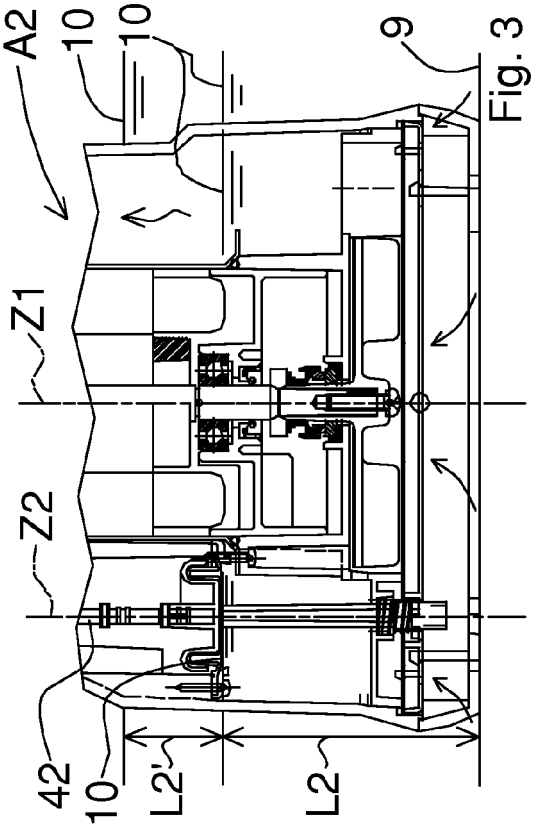


Fig. 3

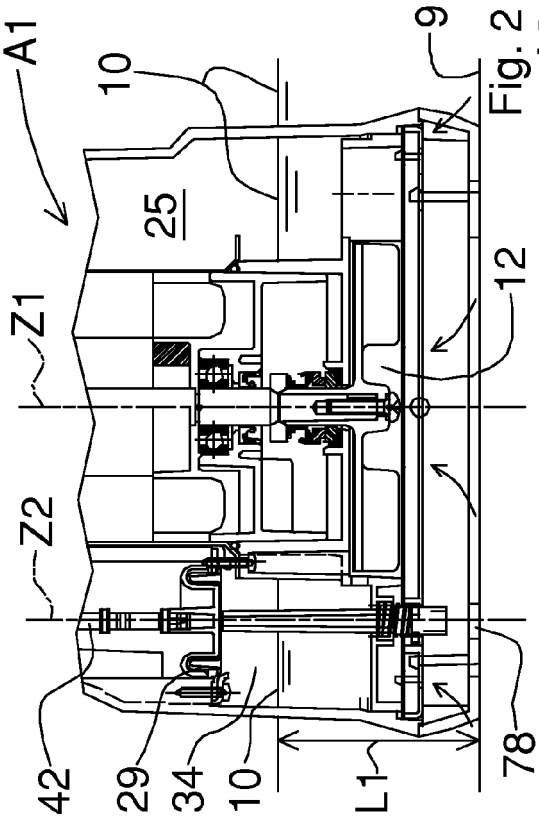


Fig. 2

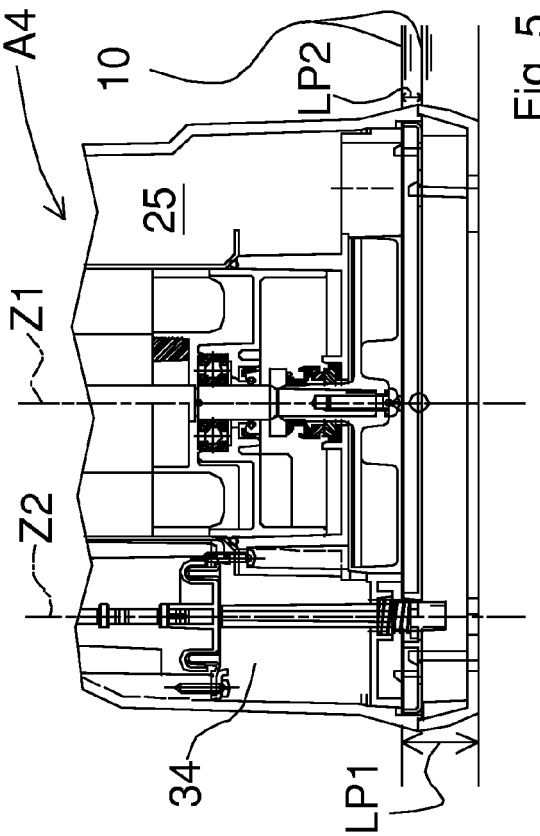


Fig. 5

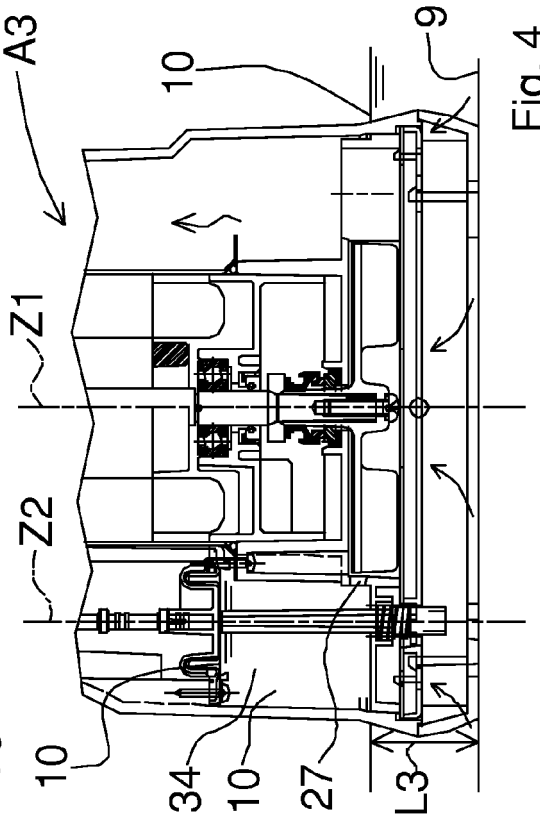
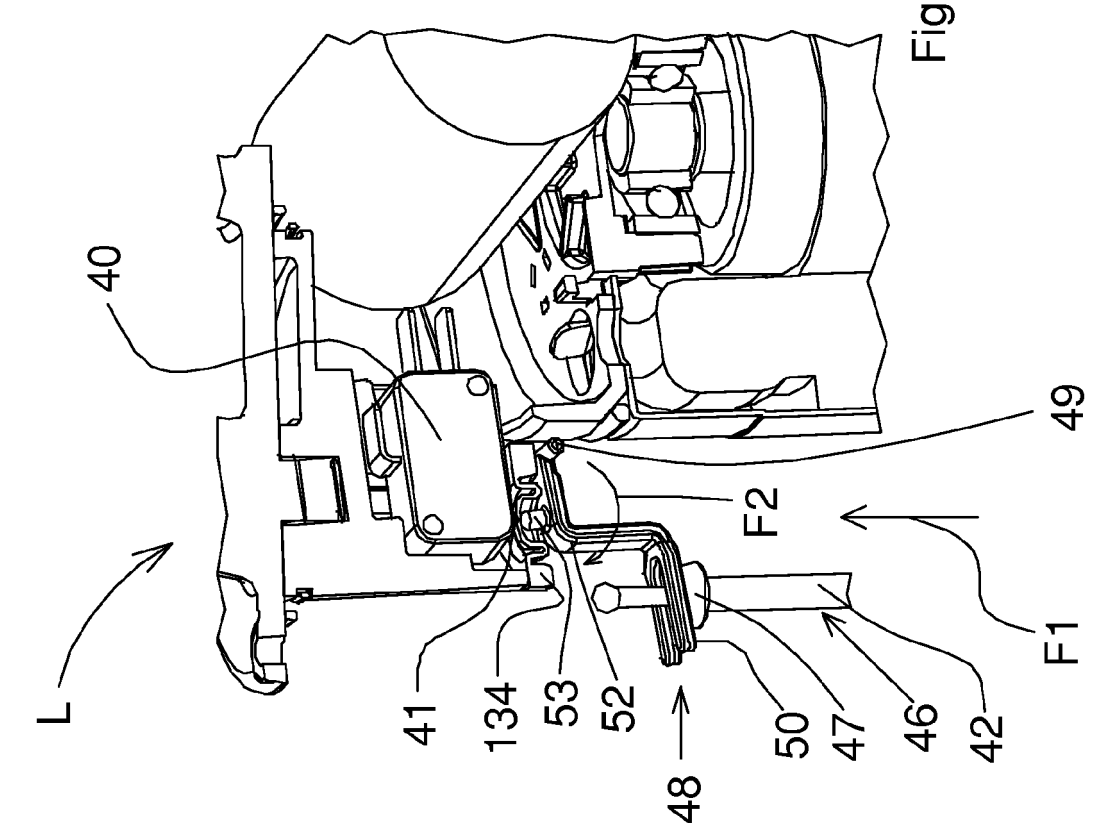


Fig. 4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F2
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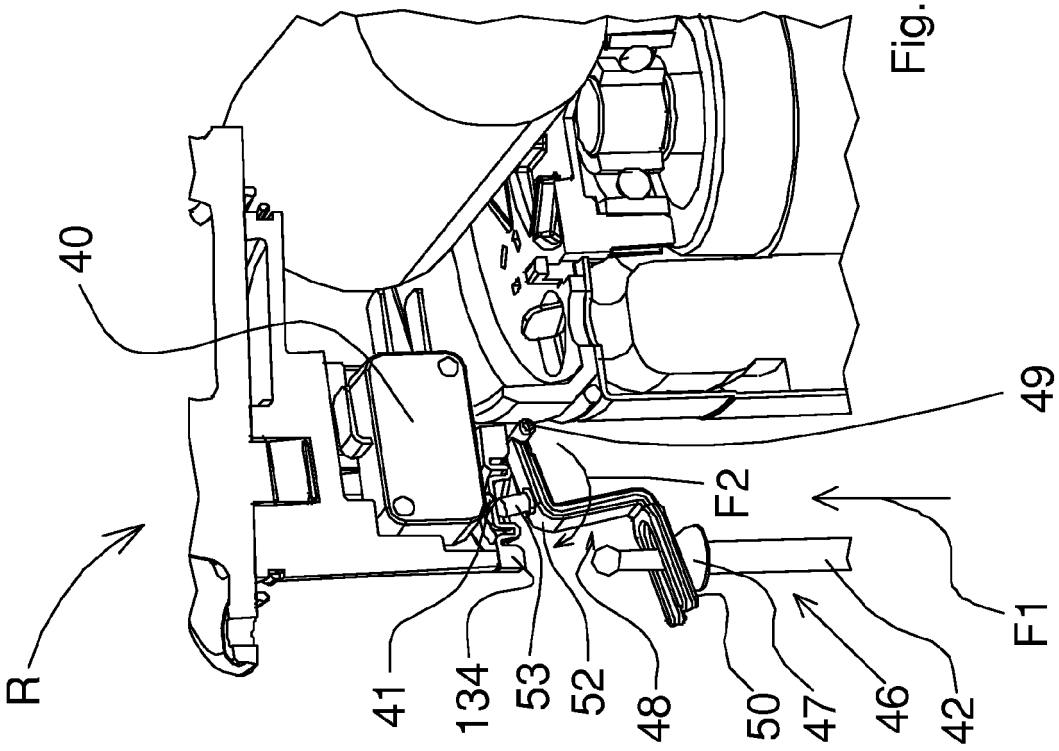
Fig. 7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F2
F1
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Fig. 6

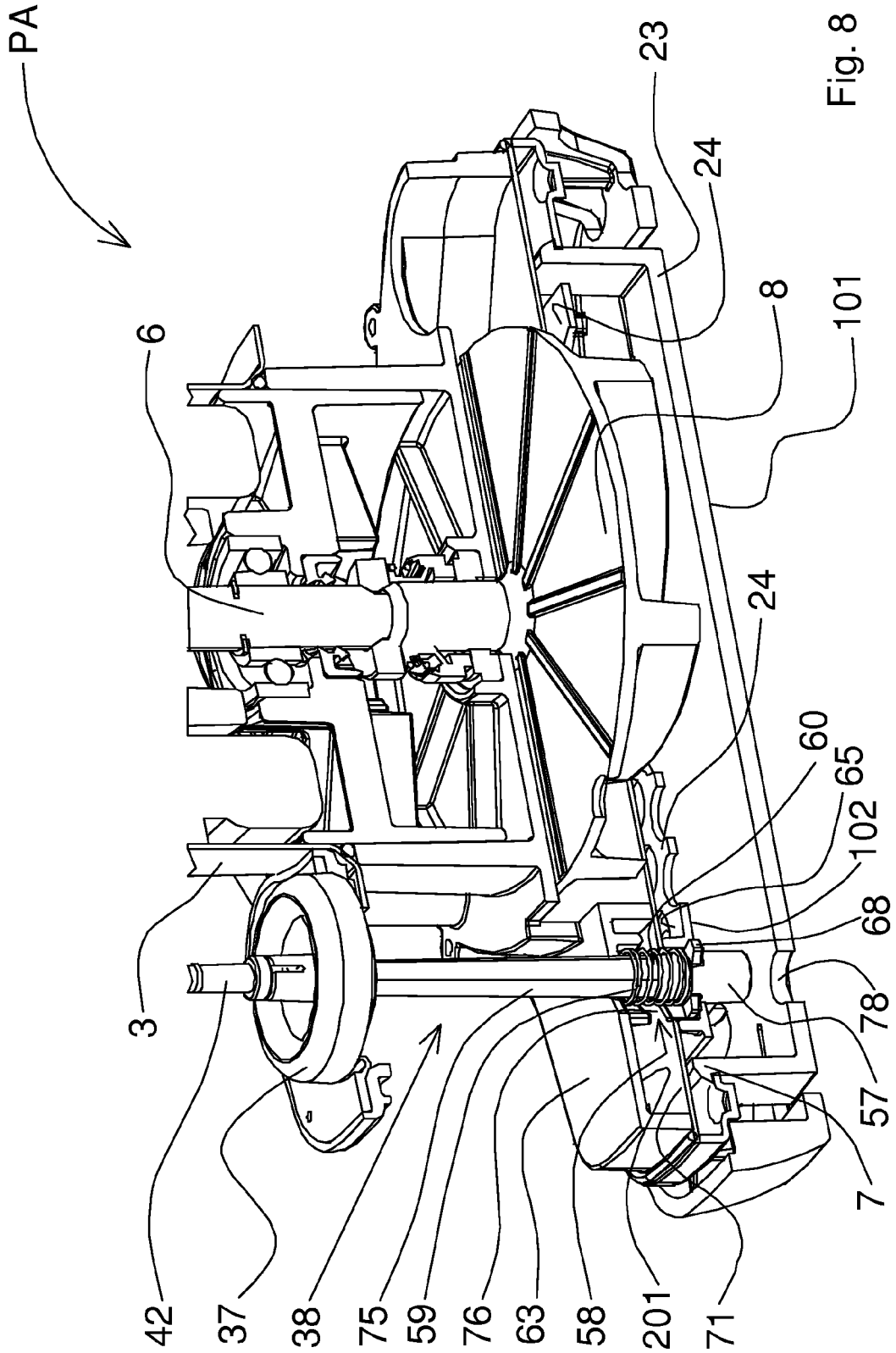

Fig. 8

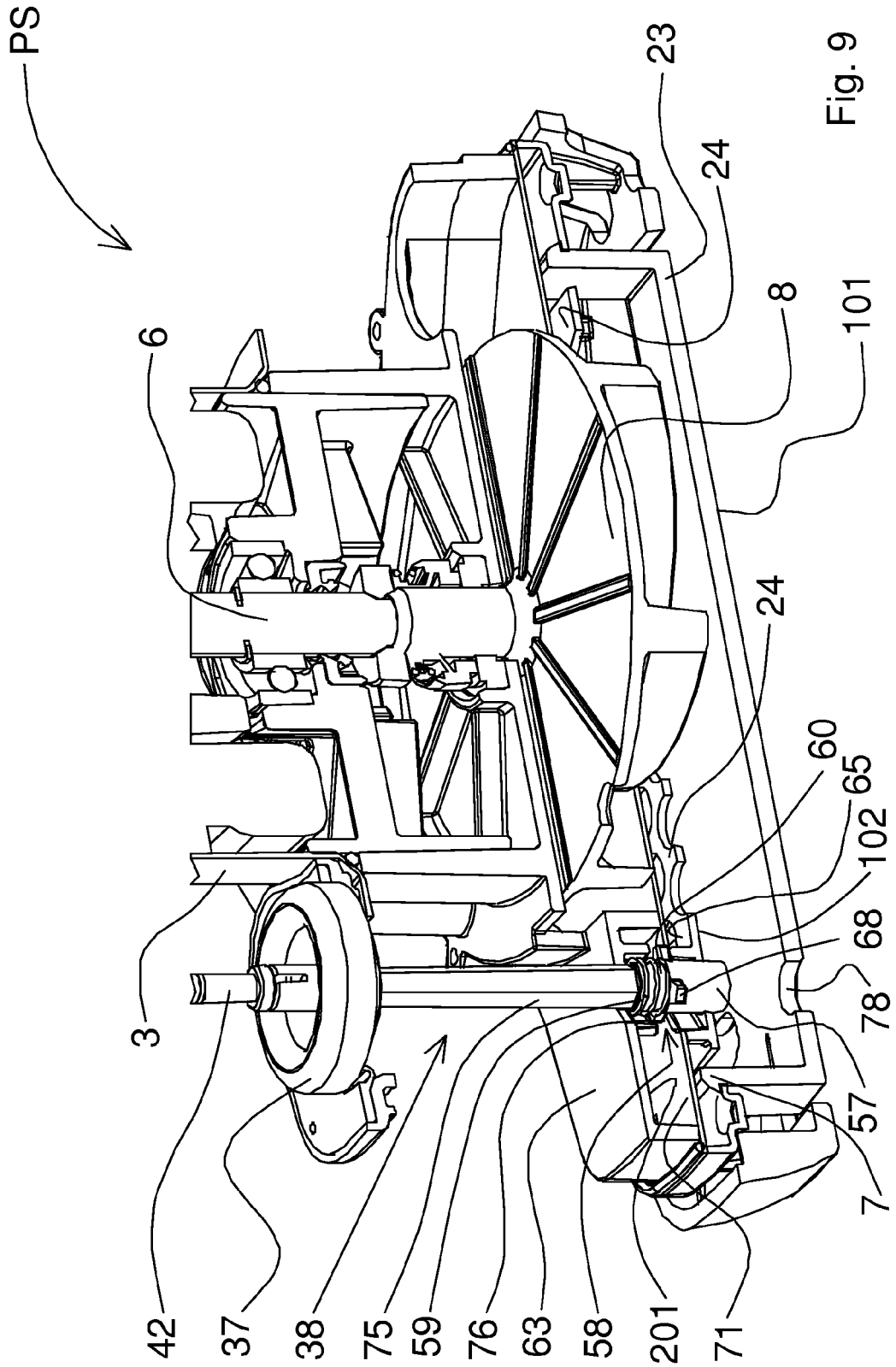

Fig. 9