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(54) Benævnelse: **Afløbsarrangement til bruse- eller badekar**

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The invention relates to an outlet fitting for shower trays or bath tubs according to the preamble of patent claim 1. Such outlet fittings with siphon pumps integrated on the base side are used for such applications in which the outlet lies higher or at the same height as the inlet.

Such an outlet fitting has been disclosed, for example with the object of WO 2011/131503 A1.

The outlet fitting shown here consists substantially of an approximately round cylindrical housing, in the upper part of which a rotatably driven impeller is arranged which has pump vanes arranged distributed uniformly on the circumference which are suitable to compress a water flow running in and to convey it under pressure into the annular housing in the direction of an outlet.

The impeller – designated there as a pump impeller – is connected to the drive wheel of the hydraulic drive via a magnetic coupling.

The disadvantage of the arrangement is the considerable overall height and undesirable development of noise because the hydraulic drive is designed as a free-jet turbine which has considerable water consumption and causes undesirable development of noise.

A further disadvantage is the problematic mounting of the impeller, since the latter is mounted only on the radial outer-lying sliding surfaces with opposing sliding surfaces on the housing of the outlet fitting, which is associated with high frictional losses and corresponding wear.

A further disadvantage is the danger of clogging if no precautions are taken in order to remove polluted waste water, in which in particular foreign bodies, such as for example hair, fibres or granular waste materials are present, from the pump housing.

In particular there are no measures to remove such foreign bodies easily and without problems from the interior of the outlet fitting.

AT 516 201 A1 discloses an outlet fitting with a pump for pumping out water in which an impeller of the pump is mounted to be rotatable on a vertical axis.

A foam-based shower base element has been disclosed with DE 20 2008 011 354 U1, in which the waste water can be conveyed with the aid of a pump having an impeller and driven by electric motor. The rotational axis of the impeller runs perpendicularly to a surface extension of the base element. A non-return valve is provided which is arranged at the input of the outlet channel. The non-return valve opens when the conveying pressure of the pump starts and when the pump shuts down, it closes due to the back-pressure of the water.

The disadvantage of the arrangement is the separate arrangement of the non-return valve arranged in the outlet channel. However, further non-return valve protection is lacking in the direction of the inlet channel. Furthermore, the impeller used does not guarantee comminution of foreign bodies entrained in the water flow.

An outlet with an integrated pump is disclosed in WO 2011/131503 A.

The object of the invention is therefore to develop an outlet fitting for shower trays or bath tubs according to the preamble of patent claim 1 so that with lower development of noise and lower overall height, simple cleaning of the interior and reduction in the danger of pollution is provided.

To achieve the set object, the invention is characterised by the technical teaching of claim 1.

The outlet fitting consists in the interior of a pot-like inlet part, in which one or more inlet openings for the water to be received there are arranged, wherein the inlet part has a central hub, through which a vertical axis engages, on which the impeller is mounted to be rotatable.

Due to the design of a pot-like inlet part which has in its upper, horizontal inlet wall, a central hub through which a vertical axis attached on one side on the base side engages

with radial clearance, on which the impeller is mounted to be rotatable, it is ensured that when withdrawing the pot-like inlet part, the impeller arranged underneath becomes immediately accessible. Since the impeller is mounted to be rotatable on a vertical axis attached only on the base side, it may – without further handling effort – be withdrawn upwards from the vertical axis now open at the top.

A further advantage of the design of a pot-like inlet part with two disc-like surfaces spaced from one another and parallel to one another is that the upper disc-like surface is formed as an inlet wall for the waste water flow running in, in the centre region of which the inlet openings and the central hub for the distancing fixture of the vertical axis is formed.

The lower base wall parallel to the upper inlet wall forms a counter-surface to the rotating impeller below the base wall. Hence, the pot-like inlet part has several functions combined in the narrowest space.

The impeller arranged below the base wall of the inlet part is approximately conical in profile and is formed at its lower side by a disc-like part, on the radial outer edge of which is integrally moulded an elastically flexible and hence elastomeric annular lip. The annular lip is placed on the opposite base wall of the inlet part with elastic deformation.

An additional non-return valve placed downstream of the impeller, but far from the actual outlet, is formed with the design of an impeller with a radially outwardly directed annular lip, which is placed on an inlet-side, fixed base wall of the inlet part with elastic deformation.

A vertical bearing for mounting the rotatably driven impeller is additionally formed with the particular design of the housing, wherein the impeller is preferably coupled to a drive motor arranged in the housing of the outlet fitting via a magnetic coupling.

A feature of the invention is therefore the use of an electric drive motor which, during operation of the outlet fitting, has considerably lower development of noise and a lower

overall height than comparatively a hydraulic drive which is known according to the state of the art and which has high water consumption with low torque.

Therefore, the use of an electromotor is preferred, although the invention is not restricted to the design of the drive motor as an electromotor. Instead of a drive motor designed as an electromotor, other drive elements may also be used, such as for example a pneumatic drive, an electromagnetic disc drive or a rotary-wing drive which is driven either pneumatically or hydraulically. Spindle drives are likewise possible.

It is important in the invention that the drive motor, which is designated in the following description as an electromotor for the sake of simplicity, is coupled to be resistant to rotation to a drive wheel which carries permanent magnets arranged distributed uniformly on the circumference and which are completely sealed in the direction of the impeller via an air gap and a wall lying in-between so that the receiving space for the drive motor is completely separate and sealed from the wet space in which the impeller is rotatably driven.

In the first design, a one-sided vertical bearing is provided for rotary mounting of the impeller. In this case, the base-side vertical axis is connected to be resistant to rotation to the cover wall of an inner sleeve of the housing and on its outer circumference carries an annular bearing which is preferably designed as a sliding bearing on which the hub of the impeller is mounted to be rotatable.

In a second design, the one-sided vertical bearing is designed to be suspended. In this case the vertical axis is attached in a central hub and forms a suspended, rotary mounting for the impeller attached on one side. The free, unsupported part of the vertical axis engages with radial clearance through a radial opening or a central hub which is integrally moulded on the base wall of the inlet part.

The central hub is arranged on the cover wall of the housing, in which the free, unsupported part of the suspended vertical axis engages with radial clearance.

In this second exemplary embodiment with the two designs described above, the advantage consists in that the suspended vertical bearing is arranged on the inlet part so that when withdrawing the inlet part, the vertical bearing is also driven and the impeller becomes freely accessible for dismantling.

Instead of a sliding bearing, of course sealed ball bearings or roller bearings may also be used.

For the sake of simpler description, in the following description the starting point is the first design which relates to a vertical bearing attached on the base side in the cover wall of the housing and which is directed upwards and allows its free, unsupported part to engage with radial clearance in a recess in the cover-side inlet wall of the inlet housing.

It is important that the impeller is arranged on the lower side of an inlet part and the base side of the inlet part forms part of the flow path for the impeller so that the impeller with its radially outwardly directed annular lip rests elastomerically flexibly on a base-side slope of the inlet part and hence there is a superior sealing effect with formation of a second non-return valve. According to the state of the art, it is known to arrange a non-return valve at the outlet. On the other hand, the invention provides a second non-return valve which is arranged directly downstream of the impeller.

The outwardly directed annular lip is closed on the circumference and is placed with its elastomerically flexible outer circumference on the slope of the base wall of the inlet part so that a non-return valve is thus formed.

Hence, the non-return valve also acts in the rest state of the outlet fitting. If the impeller stops, the sealing lip nevertheless acts as a non-return valve which prevents water coming back into the inlet space from the outlet space, because the annular lip forms the non-return valve and is placed on the base surface of the inlet part under elastomeric installation force.

A further advantage of the arrangement of an elastomeric annular lip circulating on the circumference is that the annular lip exhibits a cleaning and comminuting effect.

If namely via an inlet chamber, the waste water polluted with foreign bodies is introduced into the flow space arranged upstream of the sealing lip, the waste water polluted with foreign bodies arrives at the region of the elastomerically flexible annular lip, is divided there, broken down and leads to a self-cleaning effect of the entire upper part, because all foreign bodies are divided and comminuted when the impeller is running due to the circulating elastomeric annular lip and in comminuted form are brought into the outlet space.

Hence, the advantage consists in that only cleaning intervals still lying chronologically apart from one another have to be provided for an outlet fitting according to the invention and particularly also in that the impeller can be removed easily.

Because – see for the first alternative of claim 1 - an upwardly open vertical bearing is used, the advantage results that when removing the pot-like inlet part upwards, the impeller lying underneath becomes accessible and may be withdrawn from the annular bearing of the vertical axis.

Hence, favourable mounting of the impeller results in the form of a vertical bearing and on the other hand, the impeller can thus be removed easily.

This is in contrast to the state of the art, because in the state of the art, the impeller rested only on outer-lying annular surfaces and could not easily be withdrawn from the interior and particularly was not mounted to be rotatable on a one-sided vertical bearing.

Hence, lower frictional losses are to be expected in the outlet fitting with regard to the rotary mounting of the impeller and the impeller also does not close as quickly as in the state of the art.

In addition to the self-cleaning effect, which the impeller of the invention exerts due to the elastomeric annular lip, there is also the additional effect of a non-return valve which the impeller combines in itself.

Provision may therefore be made in a development of the invention that indeed a further non-return valve is arranged at the outlet which is additional protection. However, in a further design, this outlet-side further non-return valve may be omitted.

According to the invention, the annular lip is formed to be elastomeric throughout, that is, it is an elastomerically flexible ring which is connected in sealed manner by its inner circumference to the outer circumference of the impeller consisting of plastic.

The annular lip may either be injection-moulded in the material of the impeller or may be received in clamping and rotation-resistant manner in an outwardly open annular groove.

In addition to this embodiment, which provides an uninterrupted continuous sealing lip on the outer circumference, provision may be made in a further design in that the annular lip is provided with slots distributed uniformly on the circumference and directed radially outwards.

In a third design, provision may be made in that the annular lip consists of individual segment-like, radially outwardly directed elastomeric scale-like parts which mutually overlap in their edge regions.

Moreover, downwardly directed, approximately sleeve-like or cylinder-like permanent magnets are moulded in the plastic body of the impeller and which are paired to the permanent magnets of the rotatably driven drive wheel on the other side of the magnetic coupling.

The invention is illustrated in more detail below using drawings showing only one execution path. Further features and advantages of the invention can thus be seen from the drawings and their description.

The following are shown:

Figure 1: schematically drawn sectional drawing through an outlet fitting according to the invention

Figure 2: perspective plan view of the inlet part

Figure 3: perspective view of the base side of the inlet part

Figure 4: the plan view of the base side of the inlet part

Figure 5: sectional line A-A in Figure 4

Figure 6: the perspective view of the impeller

Figure 7: sectional line A-A in Figure 8

Figure 8: the plan view of the impeller according to Figure 7

Figure 9: an enlarged representation from Figure 1 with representation of further details

Figure 10: further representation with a back-pressure valve

The base wall of a shower tray 2 is generally shown by 1. The base wall 1 may form a shower tray 2 in various embodiments.

In a first embodiment, the base wall 1 of the shower tray 2 is formed from a straight two-dimensional plate which is provided with a slope, and which has a raised collar on the outlet side which rests on one or two sides in sealed manner on the wall of a building.

Three support surfaces may also be formed for the base wall 1 and the raised collar integrally moulded there.

In further designs, the shower tray 2 may also be formed in traditional manner as a wall closed in itself with circulating support edges. It may consist of a plastic material, a metal material or of other arbitrary materials.

Likewise, the outlet fitting of the invention may be installed in other arbitrary outlet openings, such as for example in bath tubs or just in traditional shower trays available on the market.

For simplification reasons, Figure 1 shows only the base wall 1 of a shower tray 2 not shown in more detail, wherein the shower tray 2 is symbolised only by the reference number 2.

The inlet opening is formed by an inlet grid 3 which may be made of an arbitrary material.

The inlet grid 3 is placed in a depression 5 of the base wall 1 level with the base and the shower water runs in arrow direction 4 over the inlet grid 3 into an inlet chamber 24 of the outlet fitting.

The outlet fitting consists substantially of an outer-lying screw sleeve 6 which rests on the outer circumference of the recess 51 with its upper circulating flange-like wall.

The screw sleeve has on the outer circumference a screw thread with which it is screwed into a flange seal 7, wherein the flange seal is part of the outer housing 11 of the outlet fitting.

The housing part 8 is connected firmly to the outer housing 11 of the outlet fitting, wherein the flange seal 7 produces seals via the shower tray 2.

In a manner still to be described later, the water flows in arrow direction 4 into the inlet chamber 24, is compressed there by a rotatably driven impeller 36, and is pressed over an elastomerically deformable annular lip 40, which serves as a non-return valve, from the inlet chamber 24 downwards into an assigned annular space 35, wherein the annular space 35 has a liquid-conducting connection with a discharge-side outlet connection piece 14, in the discharge region of which an additional non-return valve 50 may also be arranged.

The outlet fitting 10 therefore consists of an outer housing 11 which is formed to be approximately pot-like and is closed off in sealed manner at its base side by a base wall 12. The side walls are closed in themselves all around.

An inner housing 15, which is formed to be pot-like and is placed with lower housing flanges 16 on the inner circumference of the outer housing 11 and has radially circulating O-ring seals 17, with which the inner housing 15 rests in sealed manner on the inner circumference of the outer housing 11, is arranged in the interior of the outer housing 11.

The inner housing forms an inner sleeve 18 which is formed to be pot-like and which receives in its interior an electromagnetic drive motor 19.

The drive motor 19 is preferably designed as a low-voltage direct-current motor.

The driving axle 20 of the drive motor 19 is connected to be resistant to rotation to a disc-like drive wheel 21, on the upper side and outer side of which a number of permanent magnets 22 are arranged distributed uniformly.

The drive wheel 21 forms on the other side of the cover wall 23, a coupling gap 49 (see Figure 9) which is formed by the cover wall 23.

Hence, a magnetic coupling operating in contactless manner between the lower, rotatably driven drive wheel 21 and the upper impeller 36 operating separately through the coupling gap 49, is formed through the coupling gap 49.

In the upper region of the outlet fitting 10, in the region of the inlet chamber 24 is arranged an inlet part 25 in sealed manner which is formed to be substantially pot-like. This is shown in Figures 2 to 4.

It consists of two disc-like wall surfaces approximately parallel to one another, namely an upper inlet wall 28 and a base wall 29 arranged parallel thereto (see Figure 2 and 3).

The two disc-like walls 28, 29 are separated from one another by transverse ribs 32 and form the pot-like inlet part 25.

According to Figure 3, distancing transverse ribs 32 are present between the walls 28, 29 of the inlet part 25 and directed radially outwards define an inner-lying annular space 33 which is formed between the two walls 28, 29.

In the region of the upper inlet wall 28 is arranged an upwardly directed axial central hub 27, below which the inlet openings 30 for receiving the dirty water are arranged.

The dirty water arrives at the upper inlet wall 28 and runs centrally inwards into the inlet openings 30 arranged distributed uniformly on the circumference between the support ribs 26 lying at the top.

To remove the inlet part 25, one or more recesses 31 are provided on the outer circumference of the inlet wall 28 and are opened outwards. Here there may be inward movement using a tool in order to release the entire inlet part 25 from the inlet chamber 24.

The inlet part 25 is arranged in sealed manner in the inlet chamber 24 and carries in the region of the lower base wall 29 on its outer circumference an annular O-ring seal 34, with which the inlet part 25 is mounted in sealed manner in the inlet chamber 24.

The base wall 29 of the inlet part 25 has a central recess, through which the central hub 27 is accessible.

Figures 6 to 8 show the impeller 36 which preferably consists of a disc-like plastic part which has on its outer circumference an elastomerically deformable annular lip 40 which in a preferred design, is integrally moulded continuously on the outer circumference of the impeller 36.

A number of permanent magnets 41, which are paired to the permanent magnets 22 of the opposite drive wheel 21, are arranged on the lower side of the disc-like part of the impeller 36.

The drive motor 19 drives the drive wheel 21 and due to the contactless, magnetic coupling, the impeller 36 is driven and rotatably driven by transferring the magnetic induction over the coupling gap 49.

A number of pump vanes 39 arranged distributed uniformly on the circumference, which are formed as regards their design so that there is in a certain direction of rotation, compression of the water flow lying on the impeller 36, which is diverted in radial

direction from the upper side to the outer circumference, as shown in Figure 9, are arranged on the upper side and outer side of the impeller 36.

Figure 9 shows in conjunction with Figures 6 to 8 that the impeller 36 has a hub 37 lying at the top which forms a central recess 38. A fixed vertical axis 46, which forms at its graduated outer circumference, an annular bearing 48 for placing of the impeller 36 with its hub 37, engages through the central recess 38.

Therefore, according to Figure 9, the impeller 36 is mounted to be rotatable on the fixed vertical axis 46, and integrally moulded with the cover wall 23 of the inner housing 15.

The upper part of the vertical axis 46 is self-supporting in an opening 47 in the inlet part 25 and has no further support surface there.

In order to avoid driving-up of the impeller 36 from its annular bearing 48 on the vertical axis 46, a stop fixed to the housing is provided.

Instead of a stop fixed to the housing, it is also sufficient to use the magnetic coupling with its attractive force between the magnets 22 and 41 which ensure the impeller 36 is held down instead of a mechanical stop.

The keeping-clean and non-return effect of the invention, which is generated by the elastomerically deformable annular lip 40 arranged on the outer circumference of the impeller 36, is important.

According to Figure 9, the water flow is in arrow direction 4, which is possibly polluted with foreign materials, through a flow space 42 which is formed on one side by the surface of the impeller 36 and on the other side by a slope 43 on the inner circumference of the inlet part 25 in the region of the base wall 29.

The annular lip 40 is placed with its outer circumference on the slope 43 fixed to the housing and forms a sealing surface which forms a non-return valve. The slope 43 is inclined so that the annular lip 40 cannot give way upwards. The annular lip 40 acts as a

non-return valve in the inlet direction and as a gate valve downwards in arrow direction 44.

However, at the same time the annular lip 40 slides along the slope 43 during rotary driving of the impeller 36 and thus comminutes materials which are entrained by the shower water in the flow space 42, in particular hair, granular waste materials or the like.

Likewise, there is prevention of deposits being formed in this region, because the deposits are reliably removed due to the friction of the elastomeric annular lip on the slope 43.

The annular lip 40 thus forms an annular surface 45 which is always kept free of deposits and which at the same time acts as a grinding or comminuting surface on the assigned opposite slope 43 if the impeller 36 rotates.

The water flow running in arrow direction 44 into the annular space 35 in the intermediate region between the outer sleeve and inner sleeve may then flow either through an additionally present non-return valve 50 in arrow direction 9 into the outlet connection piece 14 or the non-return valve 50 may also be omitted.

Figure 10 shows a further embodiment in which a back-pressure valve 52, which can be closed in spring-loaded manner and which in conjunction with the elastic annular lips 40 of the pump vanes 39 forms a double outlet valve, is arranged in the outlet connection piece 14. The spring 53 acts upon this back-pressure valve 52.

The elastically deformable annular lips 40 of the pump vane 39 of the impeller 36 are placed upwards on the inlet housing or on the slope 43, whereas the spring-loaded back-pressure valve 52 forms a constant water level in the interior of the outlet housing and thus fulfils a siphon function and in order to thus maintain a constantly present siphon trap. This prevents unpleasant smells in the form of sewer gases emerging from the drains.

The present invention is thus not restricted to the use of one or more springs. All clamping devices which may store potential energy can be combined with the back-pressure valve

52 of the invention in order to move the latter with a force. Also a movement by means of weight is claimed by the present invention.

It is important for the invention that a good cleaning effect, a long service life, low development of noise at low overall height of the shower tray is achieved, which was not possible in the state of the art.

Drawing legend

1. Base wall (shower tray)
2. Shower tray
3. Inlet grid
4. Arrow direction
5. Depression
6. Screw sleeve
7. Flange seal
8. Housing part (of 10)
9. Arrow direction
10. Outlet fitting
11. Outer housing
12. Base wall (of 11)
13. Side wall
14. Outlet connection piece
15. Inner housing
16. Housing flange
17. O-ring seal
18. Inner sleeve (of 15)
19. Drive motor
20. Driving axle
21. Drive wheel
22. Permanent magnet
23. Cover wall (of 15)
24. Inlet chamber
25. Inlet part
26. Support rib
27. Central hub
28. Inlet wall
29. Base wall
30. Inlet opening
31. Recess

32. Transverse rib
33. Annular space
34. O-ring seal
35. Annular space
36. Impeller
37. Hub
38. Recess
39. Pump vane (of 36)
40. Annular lip
41. Magnet
42. Flow space
43. Slope
44. Arrow direction
45. Annular surface
46. Vertical axis
47. Opening
48. Annular bearing
49. Coupling gap
50. Non-return valve
51. Recess
52. Back-pressure valve
53. Spring

PATENTKRAV

1. Afløbsarrangement til bruse- eller badekar, bestående af et brusekar (2) med en bundvæg (1), hvor afløbsarrangementet omfatter et hus (11, 15, 18), hvor der i det øvre område af afløbsarrangementet (10) i området ved et indløbskammer (24) tætnende er anbragt en skålformet indløbsdel (25), og afløbsarrangementet yderligere omfatter en med huset (11) forbundet afløbsstuds (14), idet den skålformede indløbsdel (25) har en øvre vægflade, som er udformet som indløbsvæg (28) med indløbsåbninger (30) for en indløbende spildevandsstrøm, og hvor der i den skålformede indløbsdel (25) er anbragt et af en drivmotor (19) roterende drevet vingehjul (36), som tryksat tilfører spildevand til afløbsstudsen (14), idet vingehjulet (36) er lejret roterbart på en vertikal aksel (46), hvor den vertikale aksel (46) enten er fastgjort på fodsiden på en dækvæg (23) for en drivmotoren (19) optagende og af et indvendigt hus (15) dannet indvendig bøsning (18) og hvis opadrettede ikke understøttede frie del, med radial frigang griber igennem et midternav (27) i den skålformede indløbsdel (25), eller at den vertikale aksel er fastgjort ensidigt hængende i midternavet (27) i indløbsdelen (25) og hvis frie, ikke understøttede del med radial frigang indgriber i et midternav på dækvæggen (25) i det indvendige hus (15), idet vingehjulet (36) ved sin radiale udvendige kant er forsynet med en elastomer ringformet læbe (40), som under elastisk deformation ligger an imod en overfor vingehjulet (46) liggende nedre bundvæg (29) i den skålformede indløbsdel (25).

2. Afløbsarrangement ifølge krav 1, **kendetegnet ved, at** den nedre bundvæg (29), som er parallel med den øvre indløbsvæg (28) i den skålformede indløbsdel (25), danner en modflade til det under bundvæggen (29) anbragte og roterende vingehjul (36).

3. Afløbsarrangement ifølge ethvert af kravene 1 eller 2, **kendetegnet ved, at** vingehjulet (36) med sin elastomere deformerbare ringformede læbe (40) danner en kontraventil direkte nedstrøms for vingehjulet (36).

4. Afløbsarrangement ifølge ethvert af kravene 1 til 3, **kendetegnet ved, at** vingehjulet (36) via en berøringsløs magnetisk kobling er forbundet med den i den indvendige bøsning (18) i afløbsarrangementet anbragte elektriske drivmotor (19).

5. Afløbsarrangement ifølge ethvert af kravene 1 til 4, **kendetegnet ved, at** den vertikale aksel (46) ved sin udvendige omkreds bærer et ringformet leje, som er udformet som glideleje, hvorpå et nav (37) i vingehjulet (36) er drejeligt lejret.

6. Afløbsarrangement ifølge ethvert af kravene 1 til 5, **kendetegnet ved, at** den elastomere deformerbare ringformede læbe (40) ved den udvendige omkreds af vingehjulet (36) er optaget i en udadtil åben ringformet not eller er indstøbt i plastmaterialet for vingehjulet (36).

7. Afløbsarrangement ifølge ethvert af kravene 1 til 6, **kendetegnet ved, at** der i plastlegemet for vingehjulet (36) er indstøbt nedadrettede, omtrent bøsningsformede eller cylinderformede permanentmagneter (41).

8. Afløbsarrangement ifølge ethvert af kravene 1 til 7, **kendetegnet ved, at** huset omfatter et udvendigt hus (11), i hvis indvendige rum det indvendige hus (15) er anbragt, som er udformet skålformet og som med nedadvendende husflanger (16) ligger an mod den indvendige omkreds af det udvendige hus (11), og omfatter radialt rundtgående O-ringstætninger (17), hvormed det indvendige hus (15) ligger tætnende an imod den indvendige omkreds af det udvendige hus (11).

9. Afløbsarrangement ifølge ethvert af kravene 1 til 8, **kendetegnet ved, at** en drivaksel (20) for drivmotoren (19) er forbundet rotationsfast med et skiveformet drivhjul (21), på hvis øvre og/eller yderside et antal permanentmagneter (22) er anbragt jævnt fordelt langs omkredsen.

10. Afløbsarrangement ifølge ethvert af kravene 8 til 9, **kendetegnet ved, at** der imellem den indvendige bøsning (18) og det udvendige hus (11) er dannet et ringrum, som er anbragt under vingehjulet (36) og som er forbundet væskeførende med afløbsstudsen (14).

11. Afløbsarrangement ifølge ethvert af kravene 1 til 10, **kendetegnet ved, at** der i afløbsstudsen (14) er anbragt en under kraftpåvirkning lukbar modtryksventil (52), som i forbindelse med den elastiske ringlæbe (40) i vingehjulet (36) danner en dobbelt afløbsventil.

DRAWINGS

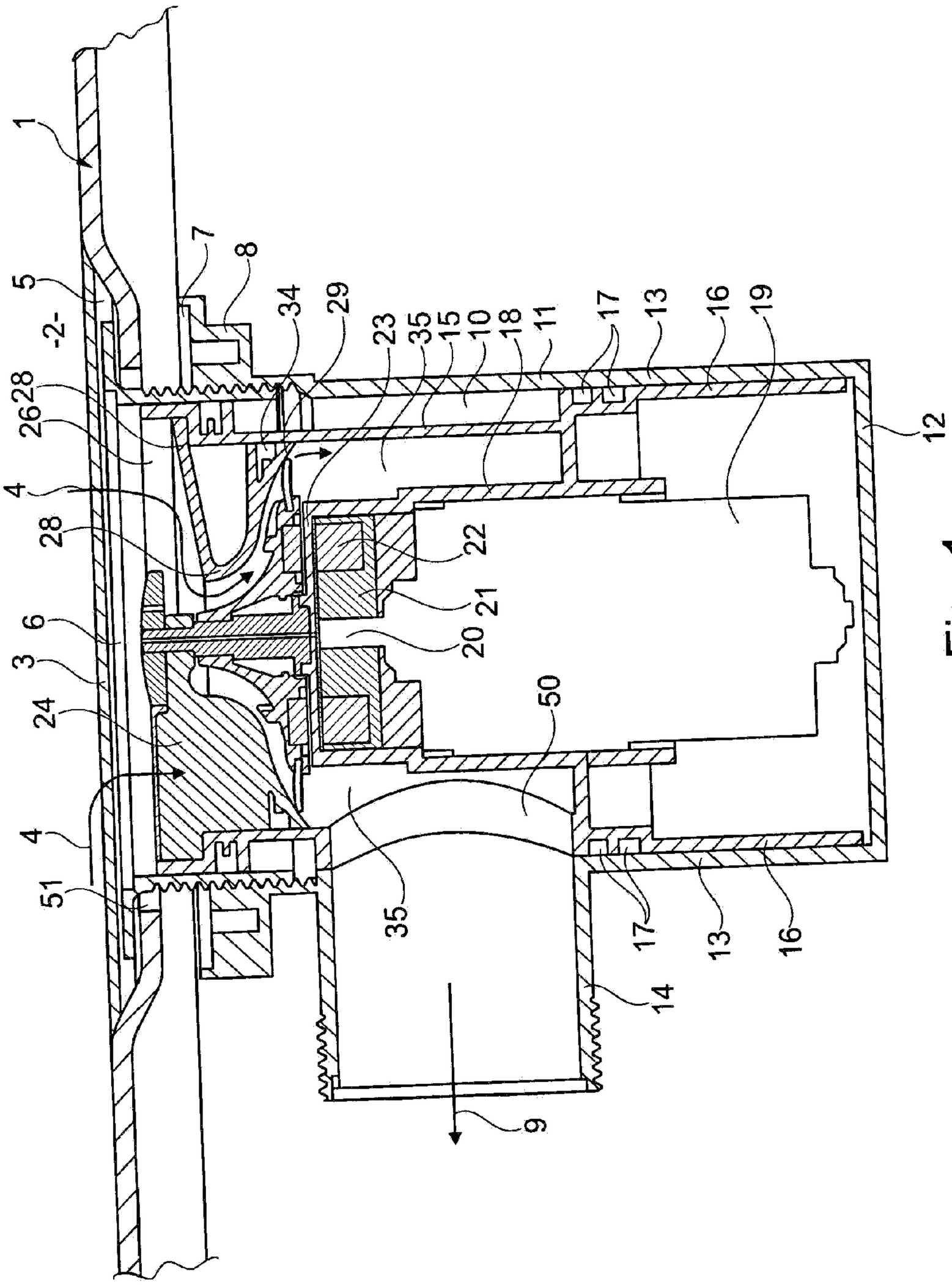


Fig. 1

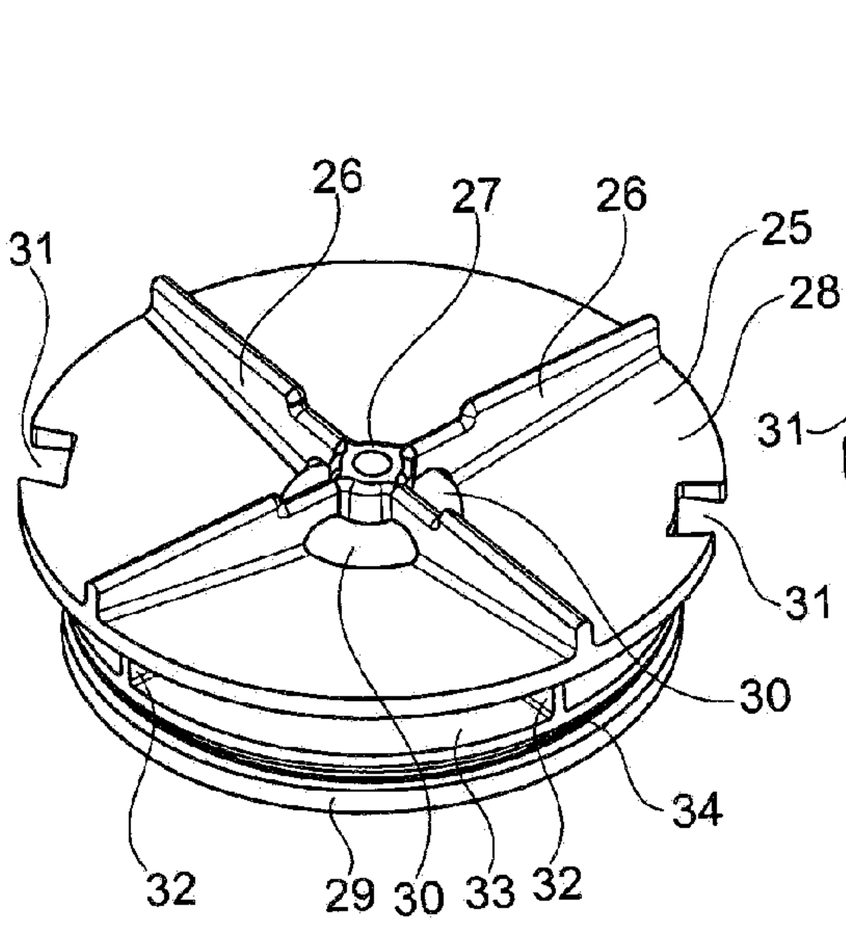


Fig. 2

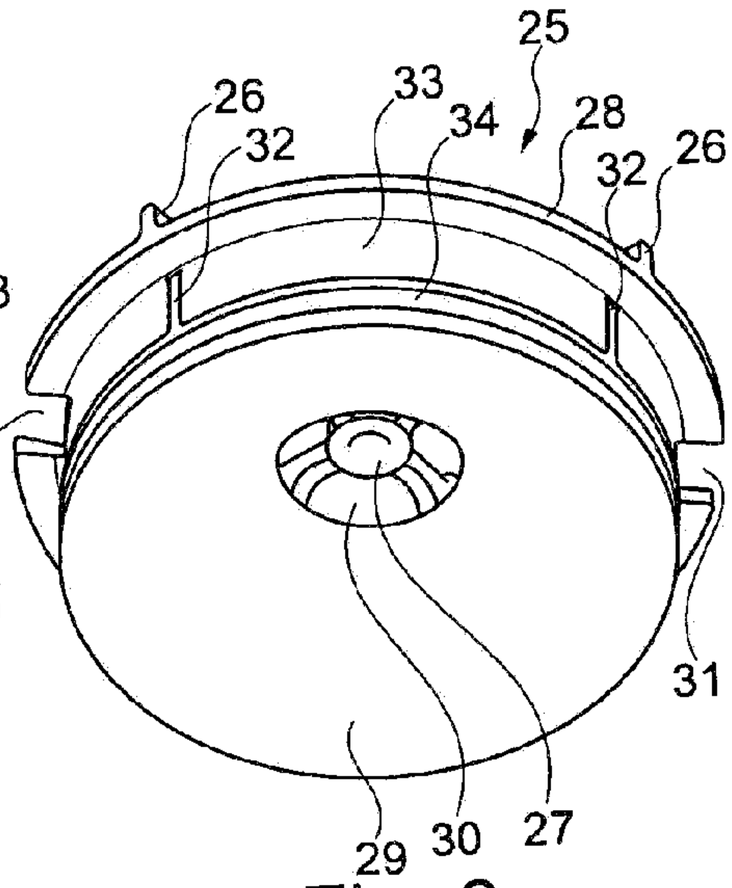


Fig. 3

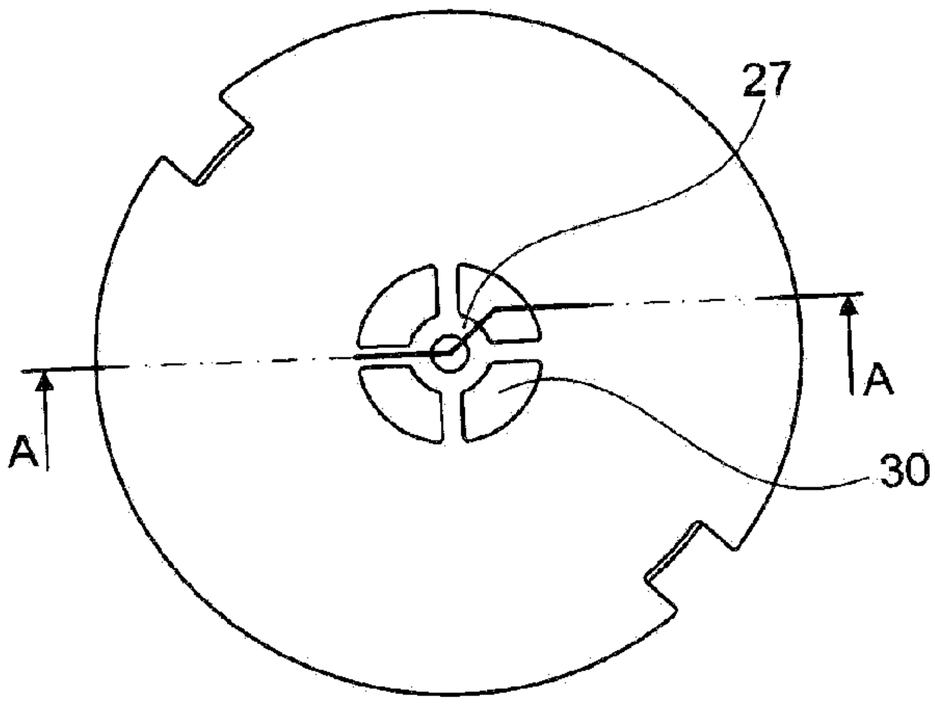


Fig. 4

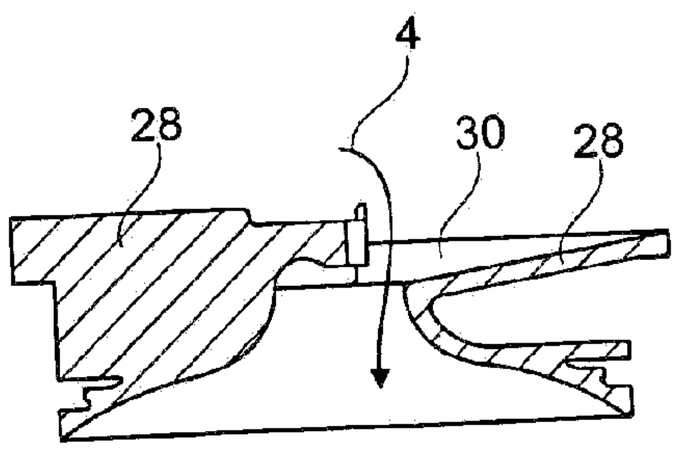


Fig. 5

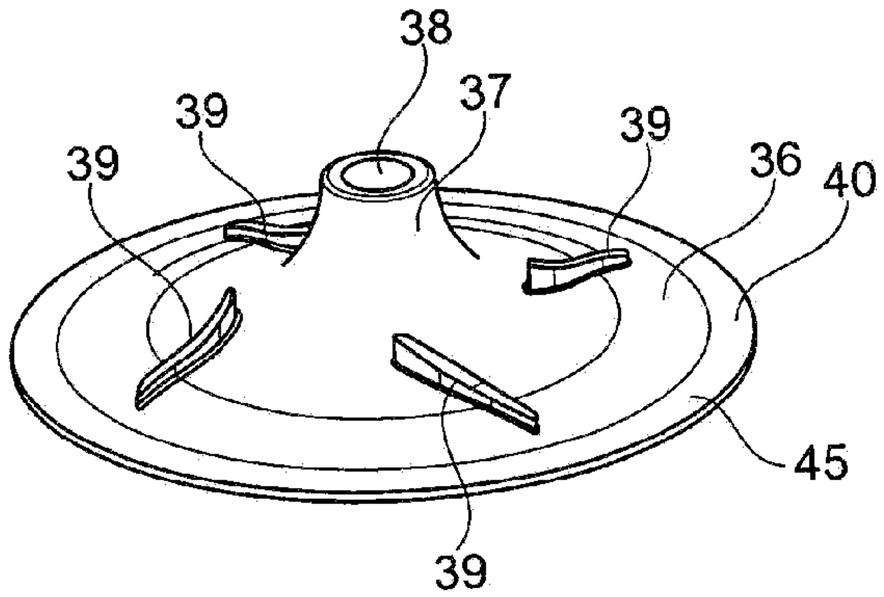


Fig. 6

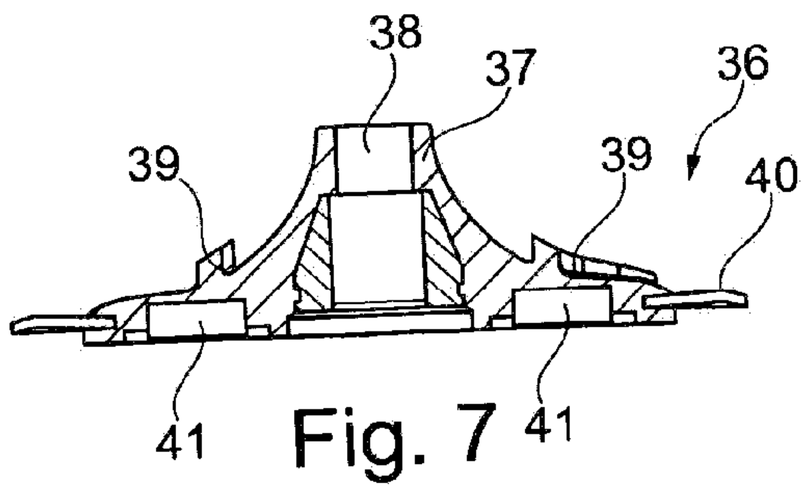
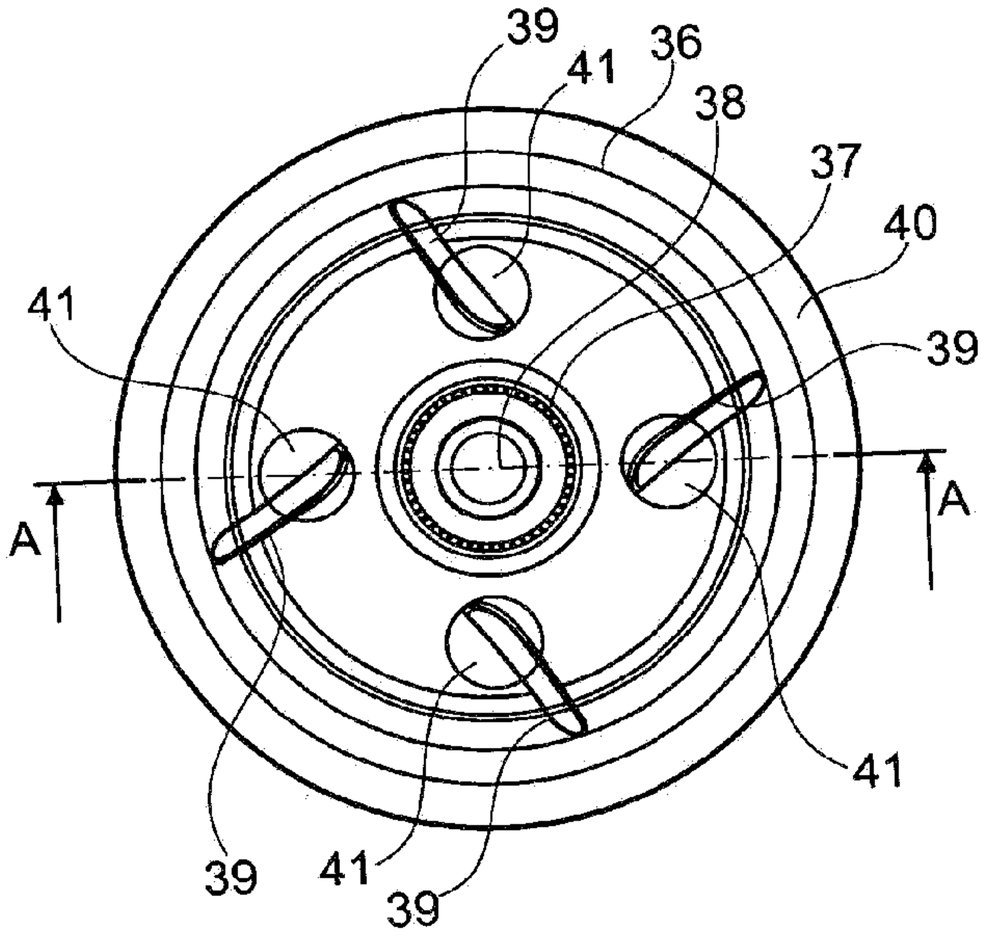


Fig. 7



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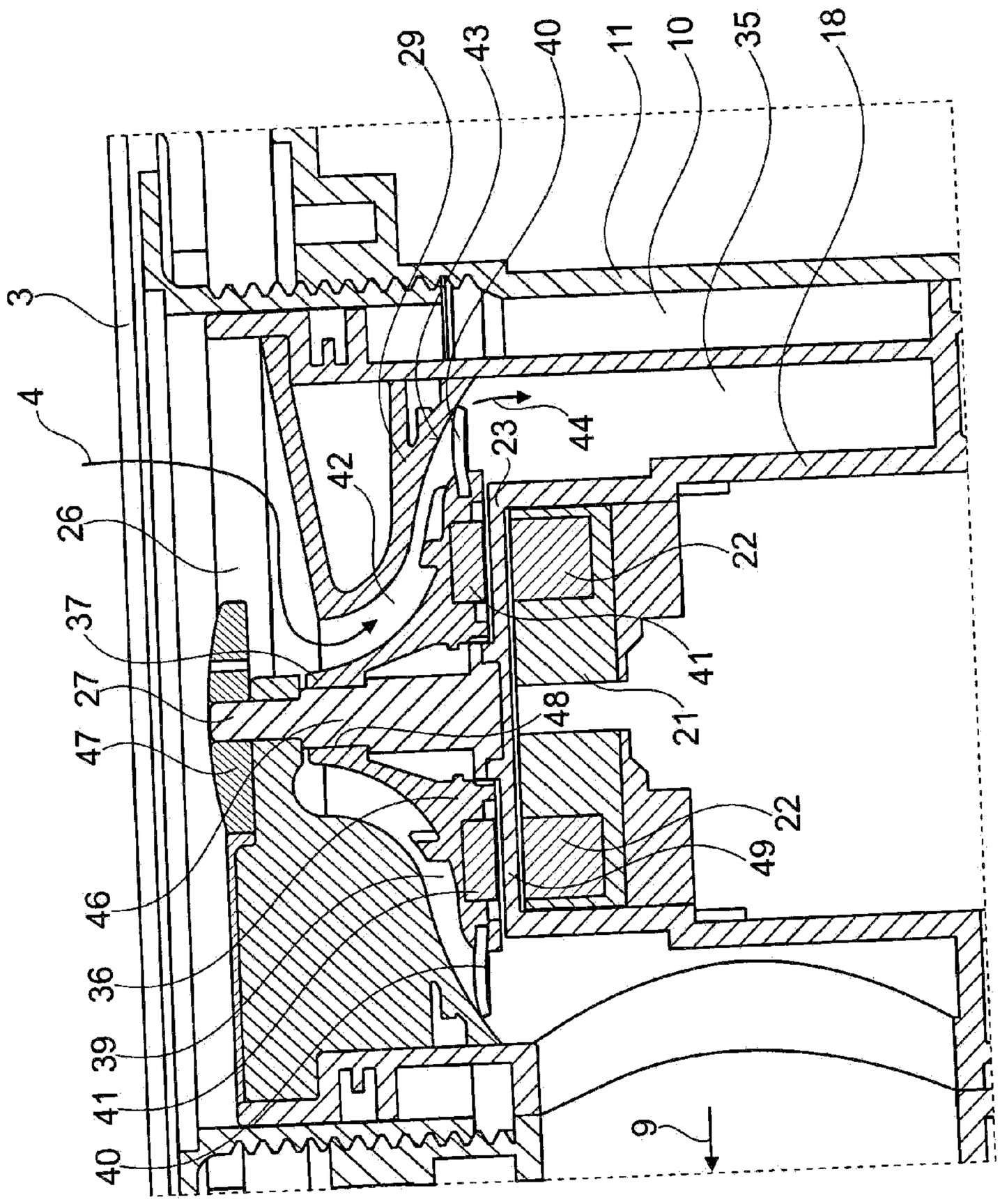
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Fig. 9

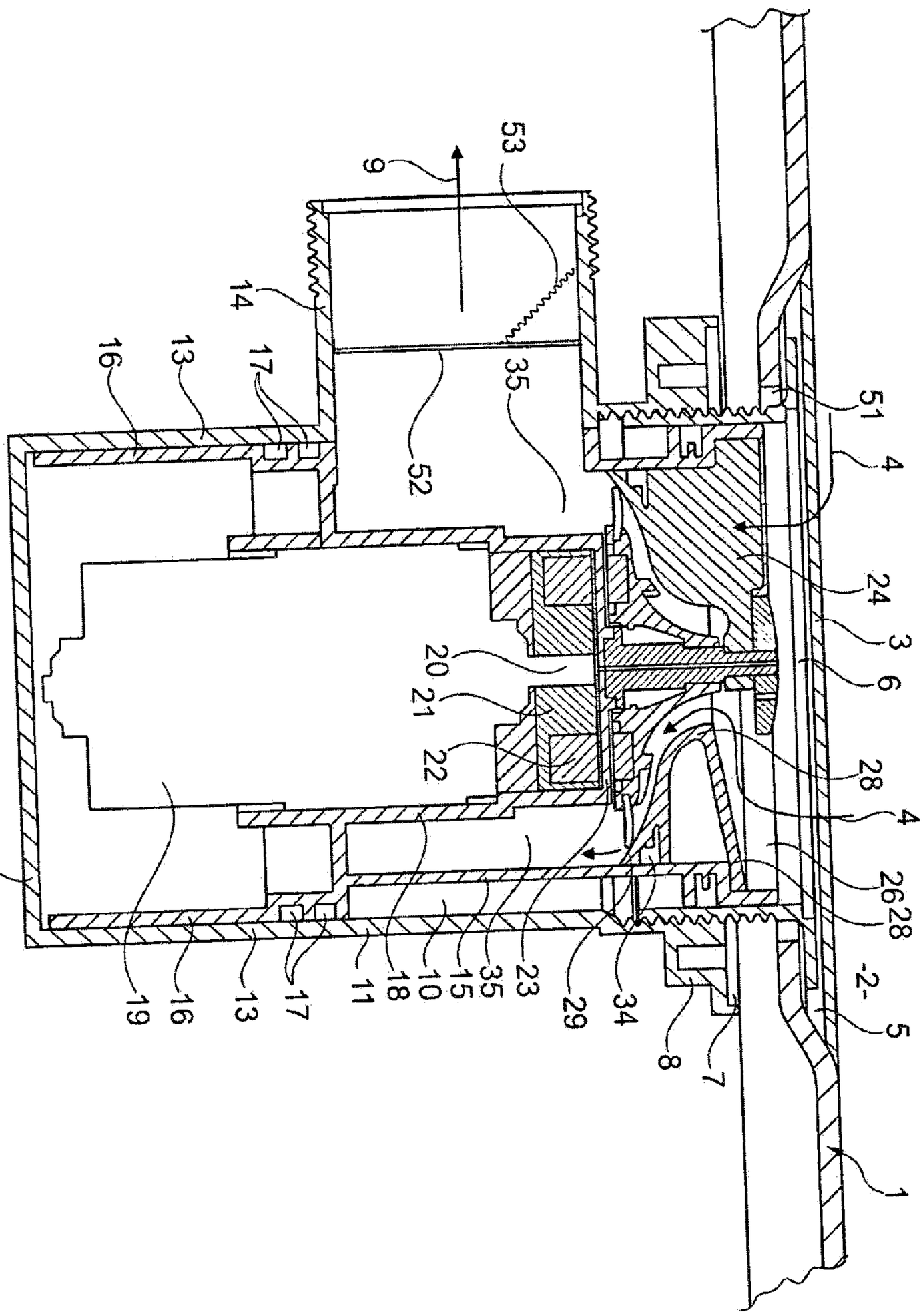
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Fig. 10