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(54) **Pumped shower draining device**

Pumpenvorrichtung zum Entleeren einer Duschtasse

Dispositif à pompe pour drainer un bac de douche

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(73) Proprietor: **DLP Limited**
Braddan (Isle of Man) IM4 4LH (GB)

(72) Inventors:
- **Stimpson, Robert William**
Douglas, Isle of Man, IM2 5BN (GB)
- **Felmeri, Ian**
Castletown, Isle of Man, IM9 1BD (GB)

(74) Representative: **Hocking, Adrian Niall**
Marks & Clerk LLP
27 Imperial Square
Cheltenham
GL50 1RQ (GB)

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EP 1 975 328 B1

Description

[0001] The present invention relates to a pumped shower draining device.

[0002] Various attempts have been made in the past to regulate the speed of a shower drain pump to that of the water entering the waste, such that the shower base or tray is effectively drained and does not flood. Frequently, this has relied upon an electronic flow sensor or sensors in the water supply pipe or pipes to the shower unit, and an electrical or electronic control system which matches the sensed flow rate entering the shower unit to the pumping capacity of the shower drain pump.

[0003] This method requires extensive and often sophisticated electronics control systems, as typified by the Digipump control system supplied by DLP Limited of Snugborough, Isle of Man.

[0004] This known arrangement requires flow sensors to be placed in all water supply pipes to a shower water heater. The electronics detects the output of the flow sensors through electric cable connections which must be run from the shower inlet to the electronics controller, which for various safety and regulatory reasons must be located a distance from the shower area. The electronics compares the detected flow rate to a pre-stored performance curve of pump speed and voltage applied to pumping capacity, and issues a pump motor control voltage to operate the pump, hopefully matching the pump performance to the flow rate of the incoming water to the waste.

[0005] Such flow sensors typically also require fine particulate filters on the supply line to them, due to the small clearances between internal components located in the water flow, and are precision instruments of often high cost, requiring sensitive installation, which may not always be carried out by installers.

[0006] Other known systems rely upon a flow switch to start and stop a drain pump, with various types of regulatory control electronic or electric controls, incorporating various degrees of what is effectively artificial intelligence programmed in to them as computer logic controls within embedded microprocessors or programmable logic controllers. These are often complex, expensive and of variable reliability and robustness.

[0007] W02005/059259 (XL Pumps Limited) describes a pump for use with a shower base wherein water drains directly into the pump chamber from the shower base, the sump acting as the pump chamber. Sensors can be used for detecting the presence/absence of water to activate or stop the pump.

[0008] GB 2 424 368-A discloses a pumped drainage apparatus, wherein a plurality of sensors is used for variable flow control by changing pumping capacity in accordance signals received from the sensors.

[0009] The present invention seeks to overcome problems in the prior art by suggesting an alternative control for the drainage pumps in showers.

[0010] According to the present invention, there is provided a pumped shower draining device for a shower installation, the pumped shower draining device comprising a housing having a waste water inlet and a waste water outlet, a pump element provided within the housing, a pump driving device for driving the pump element, and a variable-engagement clutch being a viscous coupling for providing variable driving engagement between the pump driving device and the pump element, an amount of engagement imparted by the in use clutch being determined by an amount of waste water flowing from a shower unit of the shower installation.

[0011] Preferably, the clutch is self-regulating, so that the amount of engagement is determined by an amount of water in or at the clutch.

[0012] Furthermore, the housing may form part of a waste water unit into which water from a surface of a showering area directly drains.

[0013] Beneficially, the housing may be directly provided on a shower tray or former.

[0014] The viscous coupling may include a first plurality of concentric rings provided on the pump driving device, and a second plurality of concentric rings provided on the pump element, the first rings being provided in closely spaced alternating relationship with the second rings.

[0015] Advantageously, the viscous coupling may be provided on a flow path defined in the housing between the waste water inlet and the waste water outlet.

[0016] Preferably, the viscous coupling includes one or more drain channels for draining water from between the first and second concentric rings. In this case, the second concentric rings may be provided on a sloping surface to promote draining.

[0017] Optionally, one or more of the first and/or second concentric rings may include a cutting and/or grinding edge for macerating detritus to prevent or reduce blocking of the viscous coupling.

[0018] Furthermore, a flow path through the housing may include a bypass portion which bypasses the clutch.

[0019] The invention will now be more particularly described, by way of example only, with reference to the accompanying drawing, which shows a side cross-sectional view through a shower-floor former, and showing one embodiment of a pumped shower draining device in accordance with the present invention.

[0020] Referring to the drawing, there is shown a pumped shower draining device 10 for a shower installation. The pumped shower draining device 10 comprises a housing 12, a pump element 14 providing within the housing 12, a pump driving device 16, and a self-regulating variable-engagement clutch 18 for providing variable driving engagement between the pump driving device 16 and the pump element 14.

[0021] In this embodiment, the housing 12 is directly connected to a recessed waste aperture 20 of a shower-floor former 22. As such, the waste aperture 20 forms a waste water inlet 24 of the housing 12.

[0022] The waste aperture 20 is recessed to accept a clamping ring 26. Once in position, flexible plastics wa-

terproof floor covering material 28 can be laid across the former 22 and clamped in place by the clamping ring 26 at the recessed waste aperture 20.

[0023] The housing 12 also includes a waste water outlet 30, in use connected to a drain. In this case, the waste water outlet 30 is formed in a side 32 of the housing 12 and spaced below the waste water inlet 24. However, the waste water outlet 30 can be formed in a base 34 of the housing 12.

[0024] The pump element 14 is rotatably supported in the housing 12, on the base 34 thereof The pump element 14 is an impeller for forcing waste water through the waste water outlet 30 and thus to the drain.

[0025] The pump driving device 16 is typically an electric motor 36. The motor 36 is provided in a waterproof motor housing 38, which projects from the recessed waste aperture 20 of the former 22. Electrical cables to energise the motor 36 are preferably run beneath the former 22 to a suitable power supply. Basic control circuitry for controlling the motor 36 can be provided either on-board the motor 36, within the motor housing 38, or remote from the motor 36. The control circuitry typically energises the motor 36 when water begins flowing from the shower unit, either immediately or after a pre-set time interval, and then deenergises the motor 36 when water flow stops, again either immediately or after a predetermined time interval. Energisation and deenergisation of the motor 36 can typically be effected by a flow switch or sensor at the shower unit and hard-wired or in wireless communication with the control circuitry of the motor 36. Alternatively, a user-operable switch can be provided at or in the vicinity of the showering area.

[0026] Although further control can be provided, it is not necessary.

[0027] An output shaft 40 of the motor 36 projects into the housing 12, and the pump element 14 is conveniently mounted on the output shaft 40 for rotation thereon.

[0028] The clutch 18 is interposed between the pump driving device 16 and the pump element 14, on a flow path defined in the housing 12 between the waste water inlet 24 and the waste water outlet 30.

[0029] In this embodiment, the clutch 18 is a viscous coupling. The pump element 14 includes a sloping, preferably frusto-conical, upper surface 42 with a plurality of radially-spaced concentric first rings 44 upstanding thereon. The first rings 44 project upwardly in parallel with a rotational axis R of the pump element 14.

[0030] The clutch 18 also includes a disk element 46 which is angularly fixed to the output shaft 40 of the motor 36 of the pump driving device 16, for example by splines or keying. A lower surface 48 of the disk element 46 includes a plurality of radially-spaced concentric second rings 50 depending therefrom. A bearing 52 is provided between the disk element 46 and the pump element 14. The first and second rings 44, 50 are coaxial and project sufficiently so as to alternate in parallel with each other when the disk element 46 is supported by the bearing 52.

[0031] To allow waste water to flow in between the adjacent surfaces of the first and second rings 50, apertures 54 are formed in the disk element 46.

[0032] To then allow waste water to adequately drain from between the adjacent surfaces of the first and second rings 44, 50, one or more radial drain channels (marked by an arrow referenced as 56) are provided through the first and second rings 44, 50, either by notching the first and second rings 44, 50, or by including complete breaks in the circumference of the first and second rings 44, 50. This, in conjunction with the slope of the upper surface 42 of the pump element 14, allows water to drain from the clutch 18 towards the base 34 of the housing 12.

[0033] The flow path through the housing 12 includes a bypass portion B which bypasses the clutch 18. This allows excess waste water to flow freely from the waste water inlet 24 to the waste outlet. Typically this water is entrained by the water being pumped by the pump element 14.

[0034] To prevent or reduce the chance of blockage through detritus and other particulate matter, such as hair and skin, one or more of the first and/or second rings 44, 50 can include a cutting and/or grinding edge 58. The edge 58 may be directed to be parallel with the rotational axis R of the pump element 14, or formed as an inwardly and/or outwardly turned lip which projects transversely to the rotational axis of the pump element 14. The or each cutting and/or grinding edge 58 therefore macerates the detritus and particulate matter entering the housing 12.

[0035] The use of the viscous coupling described above provides a self-regulating variable-engagement clutch 18 between the pump driving device 16 and the pump element 14. As waste water begins to flow into the housing 12, through the waste water inlet 24, it enters space between one or some of the adjacent surfaces of the first and second rings 44, 50. Drag is thus imparted on the already rotating second rings 50 by the stationary or substantially stationary first rings 44. Frictional engagement between the first and second rings 44, 50 thus occurs via the liquid therebetween, causing the first rings 44 and thus the pump element 14 to rotate at a rotational speed which is, at least initially, typically less than that of the second rings 50.

[0036] As more water enters the housing 12, and thus more space S between adjacent surfaces of the first and second rings 44, 50 is filled, the rotational speed of the first rings 44, and thus also of the pump element 14, increases.

[0037] As the flow of waste water tails off, for example, once showering has finished, the water between the adjacent surfaces of the first and second rings 44, 50 drains away, thus allowing the first rings 44 to slip relative to the second rings 50. Consequently, the pump element 14 slows.

[0038] Although a viscous coupling is described above, the variable-engagement clutch can take other forms. For example, although not shown, the clutch can include a mechanical drive mechanism which can en-

gage and disengage the pump driving device and the pump element, and a float. The float is provided within the housing such that, as waste water flows into the housing, the float rises and causes the drive mechanism to engage the pump driving device and the pump element, allowing the pump element to be driven. This initial engagement can be partial, so that as a greater volume of water enters the housing, the float rises further, allowing greater or full engagement between the pump driving device and the pump element.

[0039] By providing a clutch which permits limited slip between the pump driving device and the pump element, the pump element can be driven at a speed which is preferable for a volume of water to be pumped.

[0040] The viscous coupling, in particular, has only a few parts, none of which are complex or prone to breakage, thus making this arrangement particularly suitable for use in the relatively harsh environment of a pumped shower drain.

[0041] Although it is suggested that the housing can be provided directly on the former, in place of a standard waste device, such as a sump or trap, the housing can be connected to a sump or trap of a former, either directly or indirectly via intervening pipework.

[0042] It is also envisaged that the housing can be a pipe which is connectable inline with a drain system.

[0043] Although the invention has been described with reference to a shower-floor former, it is equally applicable to a shower tray, for example being of the level-access variety or with raised sides.

[0044] Flow, coupling and clutch operation damping features may also be introduced as modifications.

[0045] It is thus possible to provide a pumped shower draining device for a shower installation, which utilises a solely mechanical self-regulating variable-engagement clutch by which an amount of engagement between the pump driving device and the pump element is directly determined by an amount of waste water at or in the clutch. Since the engagement of the clutch varies automatically with the ebb and flow of the waste water in the housing, the dynamic action is cyclic as the pump element follows the flow rate of the waste water.

[0046] The embodiments described above are given by way of examples only, and various other modifications will be apparent to persons skilled in the art without departing from the scope of the invention, as defined by the appended claims.

Claims

1. A pumped shower drain (10) for a shower installation, the pumped shower drain (10) comprising a housing (12) having a waste water inlet (24) and a waste water outlet (30), a pump element (14) provided within the housing (12), a pump driving device (16) for driving the pump element (14), and a variable-engagement clutch (18) being a viscous coupling for providing variable driving engagement between the pump driving device (16) and the pump element (14), an amount of engagement imparted by the in use clutch (18) being determined by an amount of waste water flowing from a shower unit of the shower installation.

2. A pumped shower drain as claimed in claim 1, wherein the clutch (18) is self-regulating, so that the amount of engagement is determined by an amount of water in or at the clutch (18).

3. A pumped shower drain as claimed in claim 1 or claim 2, wherein the housing (12) forms part of a waste water unit into which water from a surface of a showering area directly drains.

4. A pumped shower drain as claimed in any one of claims 1 to 3, wherein the housing (12) is to be directly provided on a shower tray or former (22).

5. A pumped shower drain as claimed in any one of claims 1 to 4, wherein the viscous coupling includes a first plurality of concentric rings provided on the pump driving device (16), and a second plurality of concentric rings provided on the pump element (14), the first rings (44) being provided in closely spaced alternating relationship with the second rings (50).

6. A pumped shower drain as claimed in any one of the preceding claims, wherein the viscous coupling is provided on a flow path defined in the housing (12) between the waste water inlet (24) and the waste water outlet (30).

7. A pumped shower drain as claimed in any one of the preceding claims, wherein the viscous coupling includes one or more drain channels (56) for draining water from between the first and second concentric rings (44, 50).

8. A pumped shower drain as claimed in claim 7, wherein the second concentric rings (50) are provided on a sloping surface to promote draining.

9. A pumped shower drain as claimed in as claimed in any one of claims 5 to 8, wherein one or more of the first and/or second concentric rings (44, 50) includes a cutting and/or grinding edge for macerating detritus to prevent or reduce blocking of the viscous coupling.

10. A pumped shower draining device as claimed in any one of the preceding claims, wherein a flow path through the housing (12) includes a bypass portion which bypasses the clutch (18).

Patentansprüche

1. Pumpenvorrichtung (10) zum Entleeren einer Duschwanne für eine Duschinstallation, wobei die Pumpenvorrichtung (10) zum Entleeren einer Duschwanne aufweist: ein Gehäuse (12) mit einem Abwassereinlass (24) und einem Abwasserauslass (30); ein Pumpenelement (14), das innerhalb des Gehäuses (12) vorhanden ist; eine Pumpenantriebsvorrichtung (16) für das Antreiben des Pumpenelementes (14); und eine regelbare Kupplung (18), die eine Viskosekupplung für das Bewirken eines regelbaren Antriebseingriffs zwischen der Pumpenantriebsvorrichtung (16) und dem Pumpenelement ist, wobei der Grad der Einkupplung, der durch die Kupplung (18) beim Einsatz bewirkt wird, durch die Menge des Abwassers bestimmt wird, die aus der Duscheinheit der Duschinstallation fließt.

2. Pumpenvorrichtung zum Entleeren einer Duschwanne nach Anspruch 1, bei der die Kupplung (18) selbstregulierend ist, so dass der Grad der Einkupplung durch eine Menge an Wasser in oder an der Kupplung (18) bestimmt wird.

3. Pumpenvorrichtung zum Entleeren einer Duschwanne nach Anspruch 1 oder Anspruch 2, bei der das Gehäuse (12) einen Teil einer Abwassereinheit bildet, in die sich Wasser von einer Oberfläche eines Duschbereiches direkt entleert.

4. Pumpenvorrichtung zum Entleeren einer Duschwanne nach einem der Ansprüche 1 bis 3, bei der das Gehäuse (12) direkt an einer Duschwanne oder einem Duschboden (22) bereitgestellt werden soll.

5. Pumpenvorrichtung zum Entleeren einer Duschwanne nach einem der Ansprüche 1 bis 4, bei der die Viskosekupplung eine erste Vielzahl von konzentrischen Ringen, die bei der Pumpenantriebsvorrichtung (16) bereitgestellt werden, und eine zweite Vielzahl von konzentrischen Ringen umfasst, die beim Pumpenelement (14) bereitgestellt werden, wobei die ersten Ringe (44) in einer dicht beabstandeten abwechselnden Beziehung mit den zweiten Ringen (50) bereitgestellt werden.

6. Pumpenvorrichtung zum Entleeren einer Duschwanne nach einem der vorhergehenden Ansprüche, bei der die Viskosekupplung in einem Strömungsweg bereitgestellt wird, der im Gehäuse (12) zwischen dem Abwassereinlass (24) und dem Abwassserauslass (30) definiert wird.

7. Pumpenvorrichtung zum Entleeren einer Duschwanne nach einem der vorhergehenden Ansprüche, bei der die Viskosekupplung einen oder mehrere Entleerungskanäle (56) für das Entleeren von Wasser von zwischen den ersten und zweiten konzentrischen Ringen (44, 50) umfasst.

8. Pumpenvorrichtung zum Entleeren einer Duschwanne nach Anspruch 7, bei der die zweiten konzentrischen Ringe (50) auf einer schrägen Fläche bereitgestellt werden, um das Entleeren zu unterstützen.

9. Pumpenvorrichtung zum Entleeren einer Duschwanne nach einem der Ansprüche 5 bis 8, bei der einer oder mehrere der ersten und/oder zweiten konzentrischen Ringe (44, 50) eine Schneid- und/oder Mahlkante für das Auslaugen des Detritus umfasst, um das Blokkieren der Viskosekupplung zu verhindern oder zu reduzieren.

10. Pumpenvorrichtung zum Entleeren einer Duschwanne nach einem der vorhergehenden Ansprüche, bei der ein Strömungsweg durch das Gehäuse (12) einen Umgehungsabschnitt umfasst, der die Kupplung (18) umgeht.

Revendications

1. Avaloir de douche à pompe (10) pour une installation de douche, l'avaloir de douche à pompe (10) comprenant un boîtier (12), comportant une entrée des eaux usées (24) et une sortie des eaux usées (30), un élément de pompe (14) agencé dans le boîtier (12), un dispositif d'entraînement de la pompe (16) pour entraîner l'élément de pompe (14), et un embrayage à engagement variable (18) comportant un accouplement visqueux pour assurer un engagement à entraînement variable entre le dispositif d'entraînement de la pompe (16) et l'élément de pompe (14), une profondeur d'engagement entraînée par l'embrayage en service (18) étant déterminée par une quantité des eaux usées s'écoulant à partir de l'unité de douche de l'installation de douche.

2. Avaloir de douche à pompe selon la revendication 1, dans lequel l'embrayage (18) comporte un réglage automatique, de sorte que la profondeur d'engagement est déterminée par une quantité d'eau dans l'embrayage (18) ou au niveau de celui-ci.

3. Avaloir de douche à pompe selon les revendications 1 ou 2, dans lequel le boîtier (12) forme une partie d'une unité des eaux usées, dans laquelle l'eau provenant d'une surface d'une zone de douche est évacuée directement.

4. Avaloir de douche à pompe selon l'une quelconque des revendications 1 à 3, dans lequel le boîtier (12) est destiné à être agencé directement sur un bac ou un receveur de douche (22).

5. Avaloir de douche à pompe selon l'une quelconque des revendications 1 à 4, dans lequel l'accouplement visqueux englobe une première pluralité de bagues concentriques agencées sur le dispositif d'entraînement de la pompe (16) et une deuxième pluralité de bagues concentriques agencées sur l'élément de pompe (14), les premières bagues (44) étant agencées dans une relation alternée à espacement étroit par rapport aux deuxièmes bagues (50).

6. Avaloir de douche à pompe selon l'une quelconque des revendications précédentes, dans lequel l'accouplement visqueux est agencé sur une trajectoire d'écoulement définie dans le boîtier (12) entre l'entrée des eaux usées (24) et la sortie des eaux usées (30).

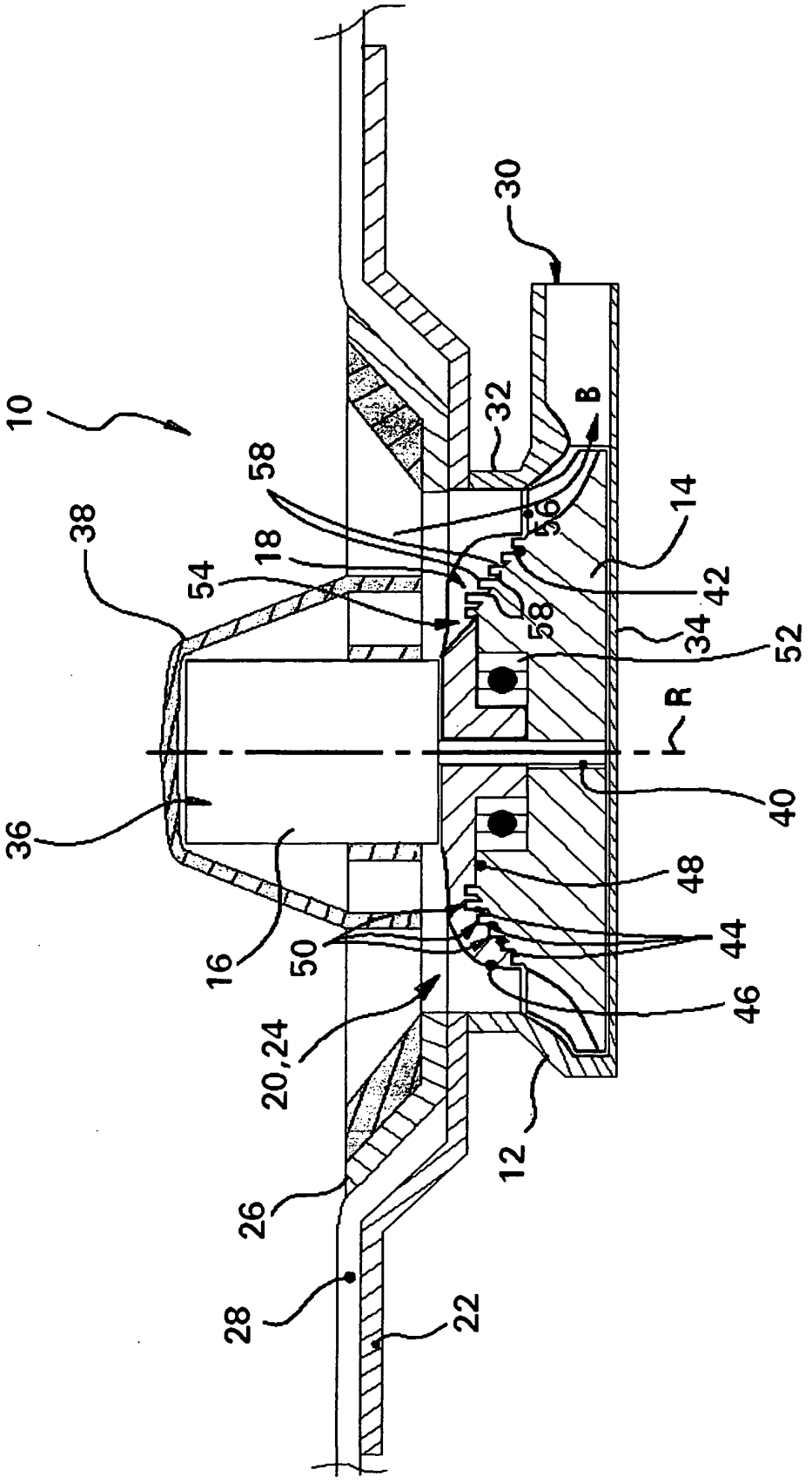
7. Avaloir de douche à pompe selon l'une quelconque des revendications précédentes, dans lequel l'accouplement visqueux englobe un ou plusieurs canaux d'évacuation (56) pour évacuer l'eau d'entre les premières et deuxièmes bagues concentriques (44, 50).

8. Avaloir de douche à pompe selon la revendication 7, dans lequel les deuxièmes bagues concentriques (50) sont agencées sur une surface inclinée pour faciliter l'évacuation.

9. Avaloir de douche à pompe selon l'une quelconque des revendications 5 à 8, dans lequel une ou plusieurs des premières et/ou deuxièmes bagues concentriques (44, 50) englobent une arête de coupe et/ou une arête de broyage pour macérer les détritus en vue d'empêcher ou de réduire un blocage de l'accouplement visqueux.

10. Avaloir de douche à pompe selon l'une quelconque des revendications précédentes, dans lequel une trajectoire d'écoulement traversant le boîtier (12) englobe une partie de dérivation contournant l'embrayage (18).

Fig.1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REFERENCES CITED IN THE DESCRIPTION

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