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(54) **METHOD FOR BLOCKING DRAINAGE OF WASTE WATER COMPRISING DISSOLVED MATERIAL, DEVICE AND USE OF A FLOATER**

(57) The invention relates to a method for blocking drainage of waste water (2) comprising a specific concentration of dissolved material. The method comprises the steps of supplying waste water into a housing (10) through an inlet (20), collecting the waste water within the housing and draining the waste water from the housing through a first outlet (30), in particular when at least a minimum volume of waste water is collected, whereby the drainage of waste water through the first outlet is automatically blocked when the waste water collected inside the housing comprises the specific concentration of dissolved material. Further, the invention relates to a device (1) and a use of the floater (40).

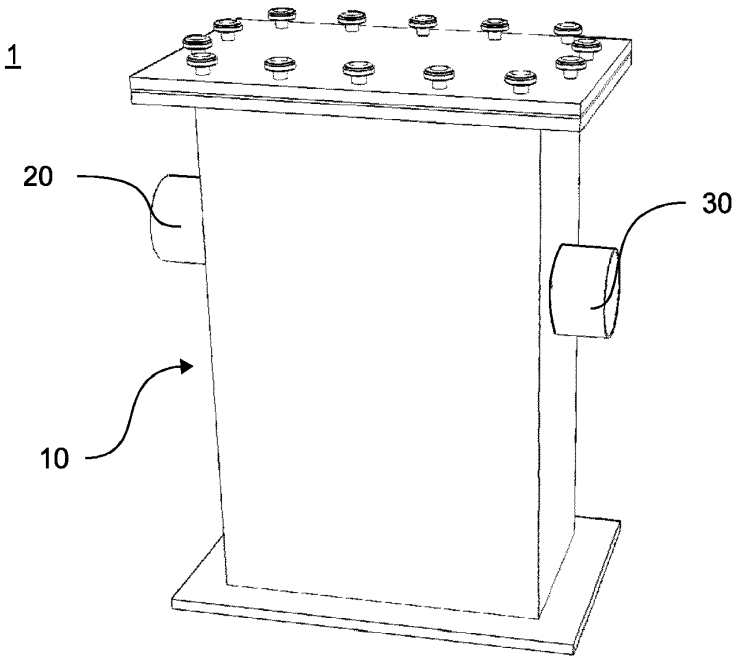

Fig. 1

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Description

[0001] The invention relates to a method for blocking drainage of waste water comprising a specific concentration of dissolved material. Furthermore, the invention relates to a device and the use of a floater, in particular to perform the method according to the invention.

[0002] Waste water contains several different substances which can cause dangerous conditions at least when a specific concentration of at least one of these different substances is reached or exceeded. One of these substances can be urea. Thus, drainage of waste water which comprises a critical, specific concentration of a specific substance such as urea, into the usual waste water drainage system has to be prevented. Waste water could be rainwater also. Especially in cases that rainwater is running off hard surfaces like streets, roofs etc., the rainwater is very often contaminated and therefore waste water.

[0003] Use of floater for providing a temporary blockage of fluid paths is known. E.g. fluid paths can be unblocked by the floater which starts to float as soon as a certain volume of fluid is collected, thereby allowing a fluid path to become unblocked. Thus, bad odors being returned from a drain can be avoided for example.

[0004] However, such use of a floater usually depends on the volume of fluid collected inside a housing or the like, but is independent from ingredients or substances comprised by the collected fluid volume.

[0005] It is an object of the invention to provide a method for blocking drainage of waste water comprising a specific concentration of Adblue, whereby the method allows to be easily applied and conductable in a cost-efficient manner. Further, it is an object of the invention to provide a device and the use of a floater for blocking drainage of waste water.

[0006] According to the present invention a method for blocking drainage of waste water comprising a specific concentration of dissolved material is provided, whereby the method comprises the following steps:

- supplying waste water into a housing through an inlet;
- collecting the waste water within the housing; and
- draining the waste water from the housing through a first outlet, in particular when at least a minimum volume of waste water (2) is collected or exceeded;

whereby drainage of waste water through the first outlet is automatically blocked when the waste water collected inside the housing reaches / comprises the specific concentration of dissolved material, and in particular when a minimum volume of waste water is collected within the housing.

[0007] The invention is based on the idea to provide an automatically, self-acting mechanism which is capable of preventing drainage or discharge of fluid which comprises a critical concentration of dissolved material such as urea. Thus, a floater is utilized which is configured to react to the concentration of dissolved material, preferably to the concentration of urea.

[0008] Drainage of waste water through the first outlet can be provided when a minimum amount of waste water collected in the housing is reached or exceeded. Thus, at least a minimum volume of waste water is collected and stored within the housing before a drainage or a block of the drainage of the waste water can occur.

[0009] According to one embodiment, the specific concentration of dissolved material, causes the waste water to be heavier or lighter than water.

[0010] According to a preferred embodiment of the invention, the dissolved material is urea, glycol, alcohol and/or salt.

[0011] Preferably, the term dissolved material can specifically be referred to urea in the sense of the present invention. Thus, in particular a specific concentration of urea can be relevant with regard to an automatical blockage of waste water drainage according to the method of the present invention.

[0012] According to a preferred embodiment, the floater begins to float at the specific concentration of dissolved material such that the first outlet can be blocked.

[0013] Thus, the floater is configured to provide a reaction to a change of, namely an increase of, the concentration of dissolved material. Consequently, a concentration of dissolved material reaching and/or exceeding the predeterminable specific concentration of dissolved material causes the floater to float and to block the first outlet such that waste water comprising at least the specific concentration of dissolved material, in particular of urea, cannot be drained through the first outlet anymore.

[0014] The predeterminable, specific concentration of dissolved material can thus be considered as a concentration limit in the context of the present invention. In particular, this concentration limit of dissolved material in terms of the specific concentration is decisive for the drainage of waste water through the first, usual outlet. It can be avoided that waste water being polluted / contaminated with a critical concentration of dissolved material, such as urea or the like, is drained / discharged along the first outlet, preferably representing a usually used drainage system in the sense of the present invention.

[0015] In another embodiment, the specific concentration of dissolved material, in particular of urea, is set to less than 50 %, preferably to 30 %, more preferably to 25%, more preferably to 20%, even more preferably to 10%.

[0016] Consequently, the floater can be configured to provide blockage of the first outlet at an predeterminable specific concentration of dissolved material.

In a further preferred embodiment of the invention, the floater performs a movement, in particular a linear movement, to block the outlet such that waste water cannot be drained through / along the first outlet.

[0017] Thus, the floater can move at least between a blocked state of the first outlet and a release / free state in order to provide a blockage of drainage of waste water temporarily and dependent on the concentration of dissolved material within the collected volume of waste water.

[0018] According to one embodiment of the invention, the waste water is drained from the housing through the first outlet when a minimum volume of waste water collected within the housing is reached or exceeded and the concentration of dissolved material is below the specific concentration.

[0019] In consequence, the first outlet is arranged such that at least a minimum volume of waste water is collected and stored within the housing. In particular, this minimum amount of waste water represents a certain fluid height within the housing. Preferably, by arranging the first outlet at a certain height along the housing, the minimum volume of waste water to be collected before any drainage of waste water can be achieved, is predeterminable.

[0020] In another embodiment of the invention, the waste water is drained through a second outlet when a maximum volume of waste water is collected and the first outlet is at least partially blocked by the floater.

[0021] In particular, a second outlet can be arranged along the housing such that a maximum volume of waste water collectable within the housing is predefined, preferably in case of at least a partial blockage of the drainage through the first outlet.

[0022] Thus, in case the waste water comprises at least a specific concentration of dissolved material and the first outlet is blocked for drainage consequently, the collected volume of waste water can increase until a maximum volume of waste water is collected within the housing. Drainage of the waste water, collected until a maximum volume is reached and comprising at least the specific concentration of dissolved material, can be drained through the second outlet.

[0023] The second outlet is provided as a special fluid path to provide a secure drainage of the polluted / contaminated waste water. Thus, a secure removal of the waste water comprising too much dissolved material is achieved.

[0024] Another aspect of the invention is to provide a device for blocking drainage waste water comprising a specific concentration of dissolved material, whereby the device comprises:

- a housing,
- an inlet such that waste water is introducible into the housing,
- an outlet such that waste water is drainable from the housing, in particular when a minimum volume of waste water collected in the housing is collected or exceeded, and
- a floater,

whereby the floater is configured to block the first outlet when the waste water collected in the housing comprises / reaches the specific concentration of dissolved material.

[0025] Thus, the floater can be configured to react to the concentration of dissolved material within the collected volume of waste water. Preferably, only if a minimum volume of waste water is collected, the first outlet can be blocked by the floater.

[0026] According to another embodiment, the floater is arranged within a frame which is provided in the housing, whereby the floater is replaceable together with the frame as a floater assembly.

[0027] In consequence, the floater is exchangeable in an easy and comfortable manner. An option for adjusting the floater to a predeterminable specific concentration of dissolved material is provided.

[0028] Preferably, the floater can be provided in combination with a guidance means, e.g. a cage, which is arranged within the frame as well. Thus, the floater is configured to move along a predetermined path, provided by the guidance means, in order to block the first outlet temporarily. Preferably, the guidance means can be provided as a cage, in particular as at least three parallel, longitudinal beams, in order to guide the floater along a linear movement direction.

[0029] In a further embodiment, the housing comprises a second outlet which is arranged to provide drainage of waste water collected in the housing when the first outlet is at least partially blocked by the floater.

[0030] By arrangement of the second outlet at a height along the housing which exceeds the height of the first outlet, waste water comprising at least the specific concentration of dissolved material can be drained when a maximum volume of waste water is collected and the first outlet is at least partially blocked by the floater.

[0031] Another aspect of the invention refers to a use of the floater for blocking drainage of waste water comprising a specific concentration of dissolved material, in particular pursuant to the method according to present invention.

[0032] Preferably the floater can be used in the context of the device according to the present invention.

[0033] In the following, the present invention is described in more detail with reference to an embodiment as illustrated by the enclosed Figures.

[0034] It is shown:

Fig. 1 a perspective illustration of an embodiment of a device according to the present invention;

Fig. 2 a section view of the device according to Fig. 1, when the first outlet is unblocked;

Fig. 3 a perspective section view of the device according to Fig. 1, when the first outlet is blocked by a floater; and

Fig. 4 a detail view of the floater within a frame.

[0035] In Fig. 1 a preferred embodiment of the device 1 is illustrated comprising a housing 10.

[0036] Furthermore, the device 1 is provided with an

inlet 20 and a first outlet 30 arranged along the housing 10. Preferably, the inlet 20 is arranged at a higher height along the housing 10 than the first outlet 30. Thus, fluid, in particular waste water, can be collected within the housing 10 and drained through the first outlet 30 when a minimum volume of fluid 2, reaching to a minimum height, is collected.

[0037] According to Fig. 1, the inlet 20 and the first outlet 30 are arranged at opposing sides of the housing 10. However, it is also possible to arrange the inlet 20 and the first outlet at the same side or adjacent sides of the housing 10.

[0038] In Fig. 2 a section view of the device 1 according to Fig. 1 is shown when the first outlet 30 is unblocked.

[0039] According to Fig. 2, a minimum volume of waste water 2 is collected within the housing 10 such that drainage through the first outlet 30 can be provided, in particular drainage of additional waste water 2 being collected.

[0040] Next to the inlet 20, a flow barrier 12 is arranged to provide a controlled inflow of waste water 2 through the inlet 20 into the housing 10.

[0041] Further, the floater 40 is in a free state or release state according to Fig. 2 as the minimum volume of collected waste water 2 comprises a concentration of dissolved material which is lower than a predetermined specific concentration of dissolved material. Thus, despite a minimum volume of waste water collected inside the housing 10, the first outlet 30 is unblocked and the collected waste water 2 can be drained through the first outlet 30.

[0042] Additionally, according to Fig. 2, the device 1 is provided with a second outlet 32. The second outlet 32 is positioned above the first outlet 30 and preferably above the inlet 20. In case drainage of waste water along the first outlet 10 is blocked by the floater 40, the drainage through the second outlet 32 can be provided. Thus, waste water 2 comprising a concentration of e.g. urea, which is equal to or exceeding the predefinable specific concentration, can be drained in a controlled manner along the second outlet 32 whereas drainage along the usual first outlet 30 is prevented. The second outlet can be considered as a special outlet for draining polluted / contaminated waste water 2.

[0043] Furthermore, the floater 40 is arranged within a frame 50 according to Fig. 2. Thus, the floater 40 is easily exchangeable, e.g. to be adaptable to a specific concentration of dissolved material at which drainage of waste water along the first outlet 30 shall be blocked blocked.

[0044] In Fig. 3 a perspective section view of the device 1 according to Fig. 1 is illustrated, when the first outlet 30 is blocked by the floater 40. Namely, the floater 40 starts to float when the specific concentration of dissolved material within the collected waste water 2 inside the housing 10 is reached or exceeded.

[0045] In particular, the floater 40 provides a fluid tight closure of the first outlet 30 according to Fig. 3. Thus, drainage of waste water 2 along the first outlet 30 is blocked.

[0046] Consequently, according to Fig. 3 the waste water 2 will be collected until a maximum volume is reached and the waste water 2 can be drained along the second outlet 32.

[0047] In Fig. 4 a detail view of the floater 40 within a frame 50 is shown, particularly in accordance with Fig. 3.

[0048] The floater 40 is arranged within the frame 50. In particular, the floater 40 is arranged in combination with a guidance means 42 within the frame 50, whereby the guidance means 42 enables the floater 40 to be movable along a linear movement direction.

[0049] In particular, the guidance means 42 is provided with at least three, preferably four, longitudinal beams in order to guide the floater 40 between a free / unblocked / release state and a floating / blocked state, whereby drainage of waste water along the first outlet 30 is blocked. By providing the floater 40, in particular in combination with the guidance means 42, within the frame 50, an easily adaptable solution for different predeterminable specific concentrations of dissolved material within the waste water 2 can be achieved.

[0050] In summary, the present invention provides a comfortable and adaptable solution to prevent polluted / contaminated waste water 2, comprising a specific concentration of dissolved material such as urea, to be drained along / through a first outlet 30 of a device 1, and thus along a usually used drainage system.

[0051] Consequently, drainage of contaminated waste water 2 can be avoided in a self-acting and passive manner, dependent on the dissolved material concentration of the collected waste water 2.

List of reference signs

[0052]

1	Device
2	Waste water
10	Housing
12	Flow barrier
20	Inlet
30	First outlet
32	Second outlet
40	Floater
42	Guidance element
50	Frame

Claims

1. Method for blocking drainage of waste water (2) comprising a specific concentration of dissolved material, whereby the method comprises the following steps:

   - supplying waste water into a housing (10) through an inlet (20);
   - collecting the waste water (2) within the housing (10);

- draining the waste water (2) from the housing (10) through a first outlet (30), in particular when at least a minimum volume of waste water (2) is collected,

whereby the drainage of waste water (2) through the first outlet (30) is automatically blocked when the waste water (2) collected inside the housing (10) comprises the specific concentration of dissolved material.

2. Method according to claim 1,
characterized in that
the specific concentration of dissolved material, causes the waste water to be heavier or lighter than water.

3. Method according to claim 1 or 2,
characterized in that
the dissolved material is urea, glycol, alcohol and/or salt.

4. Method according to one of the preceding claims,
characterized in that
the floater (40) begins to float at the specific concentration of dissolved material such that the first outlet (30) can be blocked.

5. Method according to one of the preceding claims,
characterized in that
the specific concentration of dissolved material is set to less than 50 %, preferably to 30 %, more preferably to 25%, more preferably to 20%, more preferably to 10%.

6. Method according to one of the preceding claims,
characterized in that
the floater (40) performs a movement, in particular a linear movement, to block the outlet (30) such that waste water cannot be drained through the first outlet (30).

7. Method according to one of the preceding claims,
characterized in that
the waste water (2) is drained from the housing (10) through the first outlet (30) when a minimum volume of waste water (2) collected within the housing (10) is reached and the concentration of dissolved material is below the specific concentration.

8. Method according to one of the preceding claims,
characterized in that
the waste water (2) is drained through a second outlet (32) when a maximum volume of waste water (2) is collected and the first outlet (30) is at least partially blocked by the floater (40).

9. Device (1) for blocking drainage waste water (2) comprising a specific concentration of dissolved material, whereby the device (1) comprises:

- a housing (10),
- an inlet (20) such that waste water (2) is introducible into the housing (10),
- an outlet (30) such that waste water (2) is drainable from the housing (10), in particular when at least a minimum volume of waste water (2) is collected or exceeded,and
- a floater (40),

whereby the floater (40) is configured to block the first outlet (30) when the waste water (2) collected in the housing (10) reaches a minimum volume and comprises the specific concentration of dissolved material.

10. Device (1) according to claim 9,
characterized in that
the floater (40) is arranged within a frame (50) which is provided in the housing (10), whereby the floater (40) is replaceable together with the frame as a floater assembly.

11. Device (1) according to claim 9 or 10,
characterized in that
the housing (10) comprises a second outlet (32) which is arranged to provide drainage of waste water (2) collected in the housing (10) when the first outlet (30) is at least partially blocked by the floater (40).

12. Use of the floater (40), preferably in combination with a device (1) according to one of the claims 9 to 11, for blocking drainage of waste water (2) comprising a specific concentration of dissolved material, in particular pursuant to the method according to one of the claims 1 to 8.

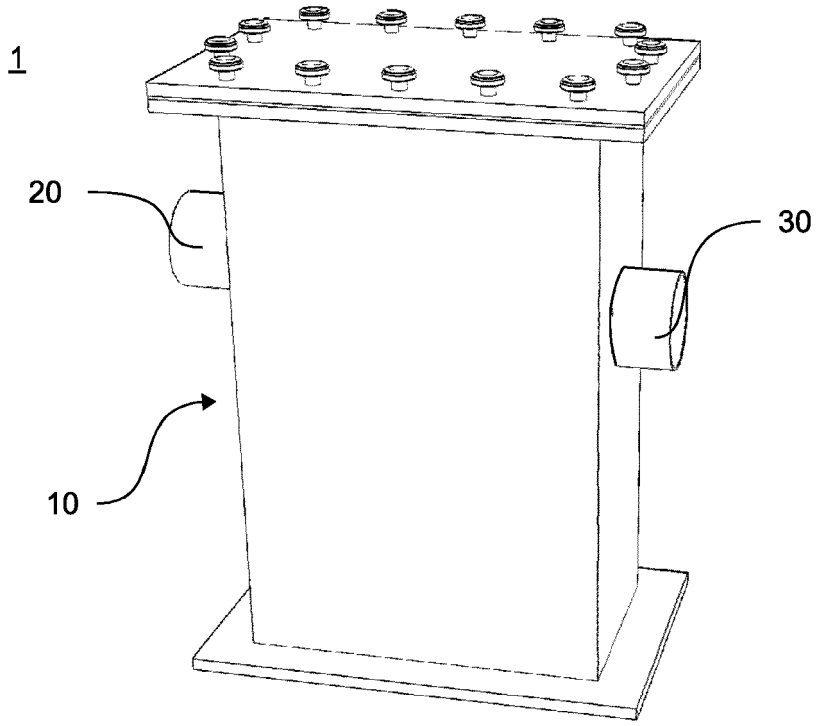

Fig. 1

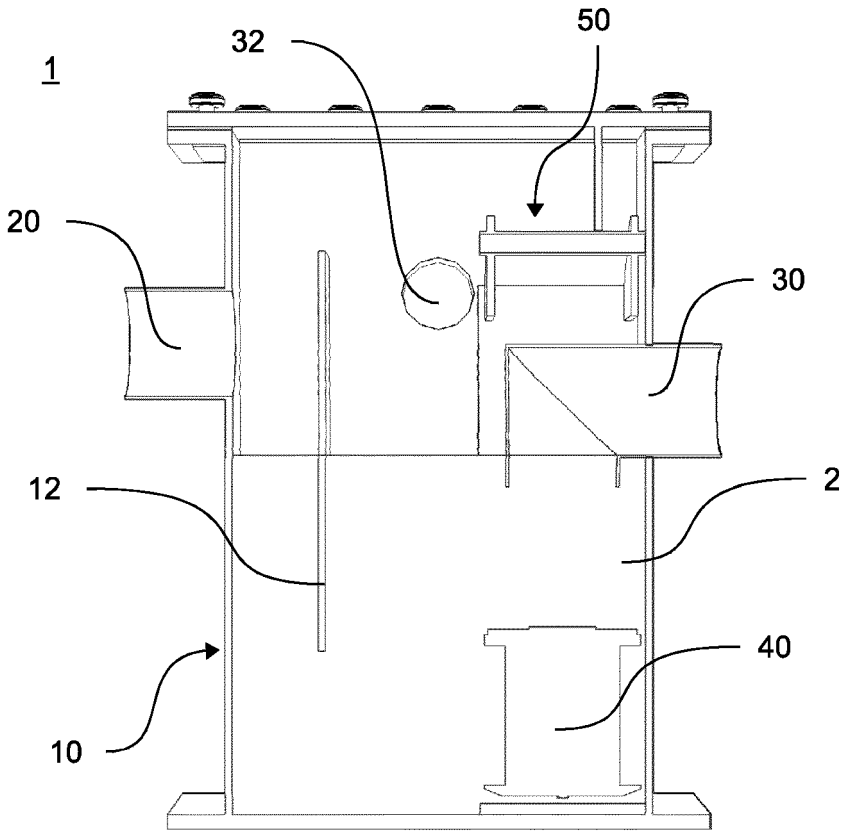

Fig. 2

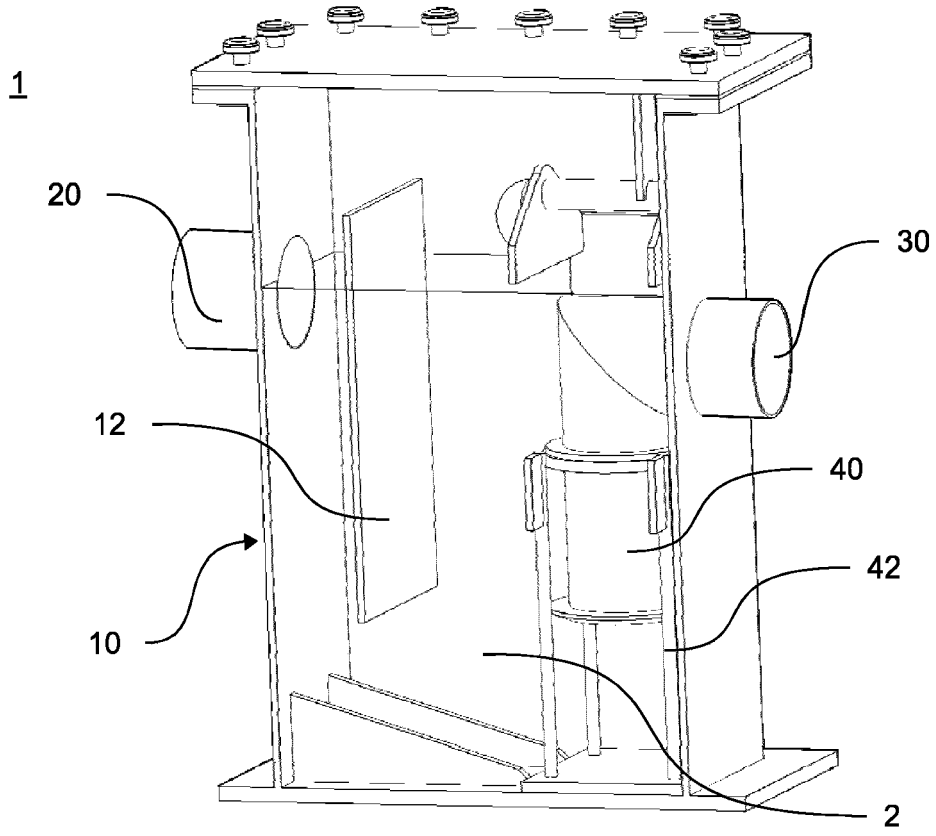

Fig. 3

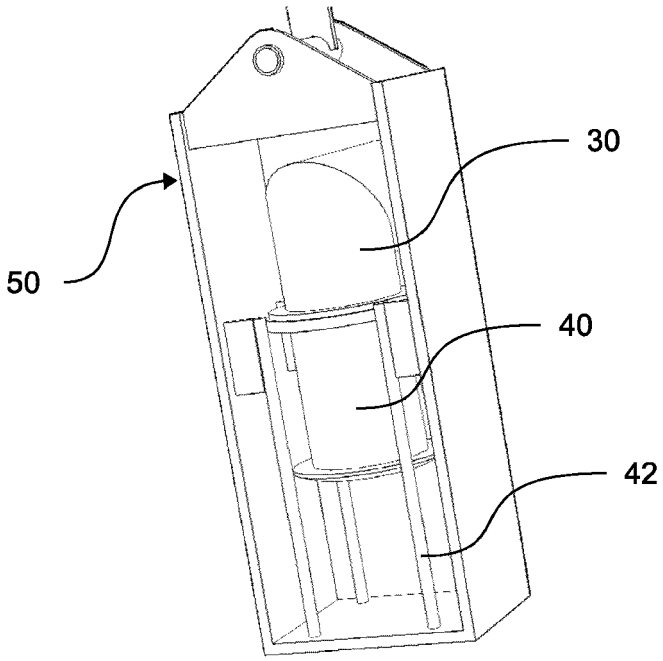

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 20 15 3282

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 899 774 A (KELLER JR R DAVIDSON [US]) 13 February 1990 (1990-02-13) * the whole document * -----	9-12	INV. E03F5/10
X	DE 102 21 208 A1 (BRENNECKE PEER [DE]) 28 November 2002 (2002-11-28) * the whole document * -----	1-3,5,7,8	

TECHNICAL FIELDS SEARCHED (IPC)

E03F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 June 2020	Flygare, Esa

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 15 3282

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22-06-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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DE 10221208 A1	28-11-2002	NONE	

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