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(54) Pressure sewer system and work method

(57) A description is given of a pressure sewer system and a work method in which water collected in a well is normally pushed through an outlet by means of a pump mounted on guides in the well, via a pump-specific coupling and footing coupling mounted on it. When removing the pump, the pump-specific coupling is also removed from the footing coupling and removed. A bypass is connected to the footing coupling that is held against it liquid tight by clamp units supported against the guides, possibly sprung. In particular, a removable bypass is installed on a flat connection of the footing coupling that is connected to the discharge side of an external auxiliary pump, and guides mounted in the well against which clamp units are supported that hold the bypass and that press it against the flat connection of the footing coupling to produce a liquid tight seal.

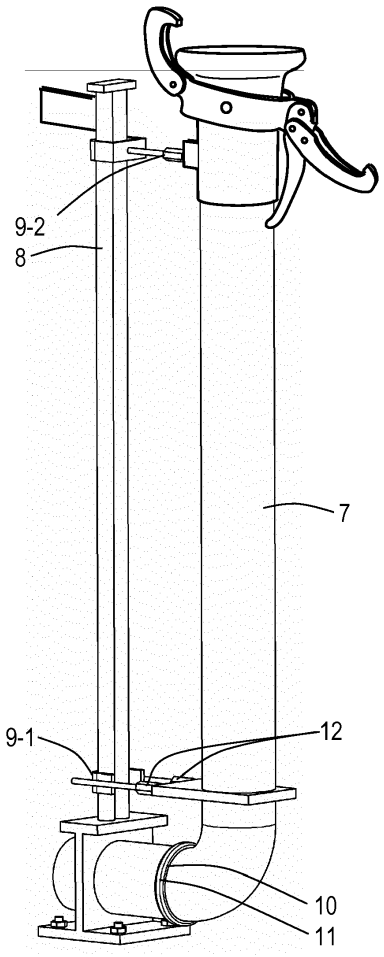

Fig.2

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Description

[0001] The present invention concerns a work method in which water flowing into a well is normally pressed through an outlet by means of a pump mounted in the well on guides via a pump-specific coupling and footing coupling fastened to it. When removing the pump, the pump-specific coupling is disconnected from the footing coupling and removed together with the pump.

[0002] The present invention also relates to a pressure sewer system in which such a work method is applied.

[0003] Especially when replacing a pump usually placed underwater, a component of such a pump or a leaking connection or pipe in an often out-dated pressure sewer system a lot of time and manpower is lost when resolving problems, and a substantial amount of equipment is necessary. If the well as used in a pressure sewer is pumped empty, sometimes manually, and is cleaned somewhat and the pump is accessible in the well to be removed, something occasionally breaks off due to its age, especially if work needs to be done quickly under certain circumstances. Due to the wide variety the types and dimensions in the field of the footing couplings present and pumps installed, the technician sometimes needs to return to the workshop to obtain replacement parts of the correct type, to make modifications if necessary, or to order parts. In the meantime, the well flows full of water, making it necessary to pump it empty and clean it again upon returning.

[0004] The purpose of this invention is to provide a work method that can be implemented quickly on site that is not limited to pumps or fittings of a certain type of certain dimensions, and that even makes it possible to use temporary emergency measures with which the system remains sufficiently operational while waiting for the arrival of replacement parts.

[0005] To that end, the work method according to the invention has the features of claim 1 and the pressure sewer system corresponding with the invention has the features of claim 8.

[0006] The advantage of the work method and the pressure sewer system corresponding with the invention is that the pump and its associated specific coupling are removed and both can be replaced by one bypass that is universal because this can be connected to any normal footing coupling present in the well. Such a connection is liquid tight and is secured by guides that are normally only intended for the pump present in the well, but that are now provided with the clamping units supported on the guides that not only hold the bypass, but also hold it against the footing coupling liquid tight. This makes it possible to repair malfunctions quickly and effectively, especially with the variety of types of pumps present in the wells. With this, a possibly necessary temporary active emergency measure can even be taken, with which the functionality, operational safety and reliability of a normally-operating well with compressor pump is achieved. Maintenance and repairs can then even be done by one person and in a shorter time.

[0007] Further detailed possible configurations that are laid out in the other claims are listed together with the corresponding advantages in the following description.

[0008] Now, the work method and the pressure sewer system will be explained further as used with this invention on the basis of the figures below, in which the corresponding elements are given the same reference numbers. In this:

- Figure 1 shows a diagram of a conventional well with fittings in the field; and
- Figure 2 shows a possible configuration of a pressure sewer system corresponding with the invention, outside the well for the sake of clarity, with which the same work method can be applied.

[0009] Figure 1 schematically shows a pressure sewer system 1 that is used in those places in a sewer system from the Netherlands in particular in which waste water, surface water or sewer water is to be moved by pumping. This water is collected in a well 2, in which the pipes (not shown) connected to it go via an intake 3 that opens to the well. The system shown in figure 1 further contains a pump 4, in this case placed in the well 2, as is normally present there. As circumstances require, this pump 4 must be removed from this for a repair or by means of a correction procedure to be done. Such a pump 4 is mounted with the discharge side and a pump-specific coupling on a footing coupling 5 shown that is in fluid communication with an outlet 6 installed in the well 2 from which the water collected in the well 2 may be transported via a ball check valve and a Plasson coupling to a further water treatment station.

[0010] It is now proposed that when removing the pump 4, the pump-specific coupling is also disconnected from the footing coupling 5 and therefore to remove pump 4 together with its pump-specific coupling. In its place, a temporary bypass 7 is connected to the footing coupling 5 in the well 2.

[0011] The connection of the bypass that is shown in figure 2 is made liquid tight and held by engaging to the clamping units 9 supported on the guides 8 previously installed in the well 2 for the pump 4.

[0012] In practice, this is usually done by mounting the underside of the bypass 7 to a flat connection 10 present of the footing coupling 5, to which the pump-specific coupling was previously connected, in a removable way. The other side of the bypass 7 is then in fluid communication with the discharge side of an external temporary or auxiliary pump (not shown), of which the suction side is connected to a usually separate hose that opens to the well 2 to draw in water collected in the well 2 and to push it to the outlet 6 via the bypass 7 and the footing coupling 5. Upon later installation of a replacement pump 4 in the well 2, the removable underside and the clamp units 9 are disconnected from the guides 8, after which the bypass 7 is removed. On the flat connection 10, a replace-

ment pump-specific coupling and a new pump are installed which can be mounted quickly, again using the same guides 8 in the well 2.

[0013] In order to obtain good liquid-tightness, including temporarily for as long as the repair or recovery period with an emergency solution lasts, for the water pushed out under pressure by the pump 4, the system 1 is provided with a flexible sealing ring 11 installed between the bypass 7 and the flat connection 10 of the footing coupling 5. The clamp units 9 are preferably sprung so that they are for example provided with spring-loaded arms 12, which press the bypass 7 to the flat connection 10, and if present the ring 11 is compressed by the spring force exerted in this way, producing the good seal that is desired. In terms of the structure, the spring-loaded arms 12, grip, especially on opposite sides, on, in or around the guides 8 that are fastened for this with guide rails or guide rods in the well 2.

[0014] In a special preferred embodiment that is also shown in figure 2, the clamp units 9 have two supporting sets of devices 9-1, 9-2 spaced from each other on the aforementioned guides 8 that exert spring pressure on the footing coupling 5. Using the two spaced sets of units 9-1, 9-2 a direct normal force almost perpendicularly oriented to the surface of the flat connection 10 can be applied to the underside of the bypass 7. This is done specifically by adjusting the correct longitudinal and lateral position of the two sets. In this way, even if that surface and that underside in practice do not naturally fit with each other, they can still be placed straight onto each other, creating a leak-free fluid contact between the two.

[0015] With the temporary or semi-permanent application of the work method with the system 1, the system often has an electronic controller that is connected to a water level sensor installed in the well 2 and that is temporarily connected to the external auxiliary pump. If the level of the water collected in the well 2 is too high, the sensor responds to this by switching on the auxiliary pump 4, causing the water to be pumped away via the outlet 6 as explained above.

Claims

1. Work method:

- where water collected in a well is normally pushed through an outlet by means of a pump mounted on guides in the well via a pump-specific coupling and a footing coupling secured upon it, and
- when removing the pump, the pump-specific coupling is removed from the footing coupling and removed, and
- a bypass is connected to the footing coupling that is held against it liquid-tight by clamp units supported against the guides.

2. Work method according to claim 1, **characterised in that** the clamp units are supported on the guides with springs.

3. Work method according to claim 1 or 2, **characterised in that** the clamp units grip on opposite sides around the guides.

4. Work method according to any one of the claims 1-3, **characterised in that** the clamp units are two spaced sets supported on the guides, which exert pressure on the footing coupling via the bypass.

5. Work method according to any one of the claims 1-4, **characterised in that** the footing coupling is provided with a flat connection that is coupled to the bypass via a flexible O-ring.

6. Work method according to any one of the claims 1-5, **characterised in that** an auxiliary pump placed outside the well and connected to the bypass pumps the water collected out of the well via a pipe or hose that opens to the well and pushes it through the outlet via the bypass.

7. Work method according to any one of the claims 1-6, **characterised in that** the water is sewage, waste or surface water.

8. Pressure sewer system comprising:

- a well,
- an intake opening in the well,
- a pump with a suction side and a discharge side,
- an outlet installed in the well that is connected via a footing coupling in the well to the discharge side of the pump from which the suction side can draw in water collected in the well via the intake,
- a bypass removable installed on a flat connection of the footing coupling, which bypass is connected to the discharge side of the pump, and
- guides mounted in the well against which clamp units are supported that hold the bypass and that press it against the flat connection of the footing coupling in a liquid tight manner.

9. System according to claim 8, **characterised in that** the system contains a flexible sealing ring installed between the bypass and the flat connection of the footing coupling.

10. System according to claim 8 or 9, **characterised in that** the clamp units with spring-loaded arms grip around and are supported on guides provided with guide rails or guide rods.

11. System according to any one of the claims 8-10, **characterised in that** the system includes a controller that is connected to a water level sensor installed in the well, and is connected to the pump serving as an auxiliary pump that is placed inside or outside the well. The pump may or may not be a submersible impeller pump.

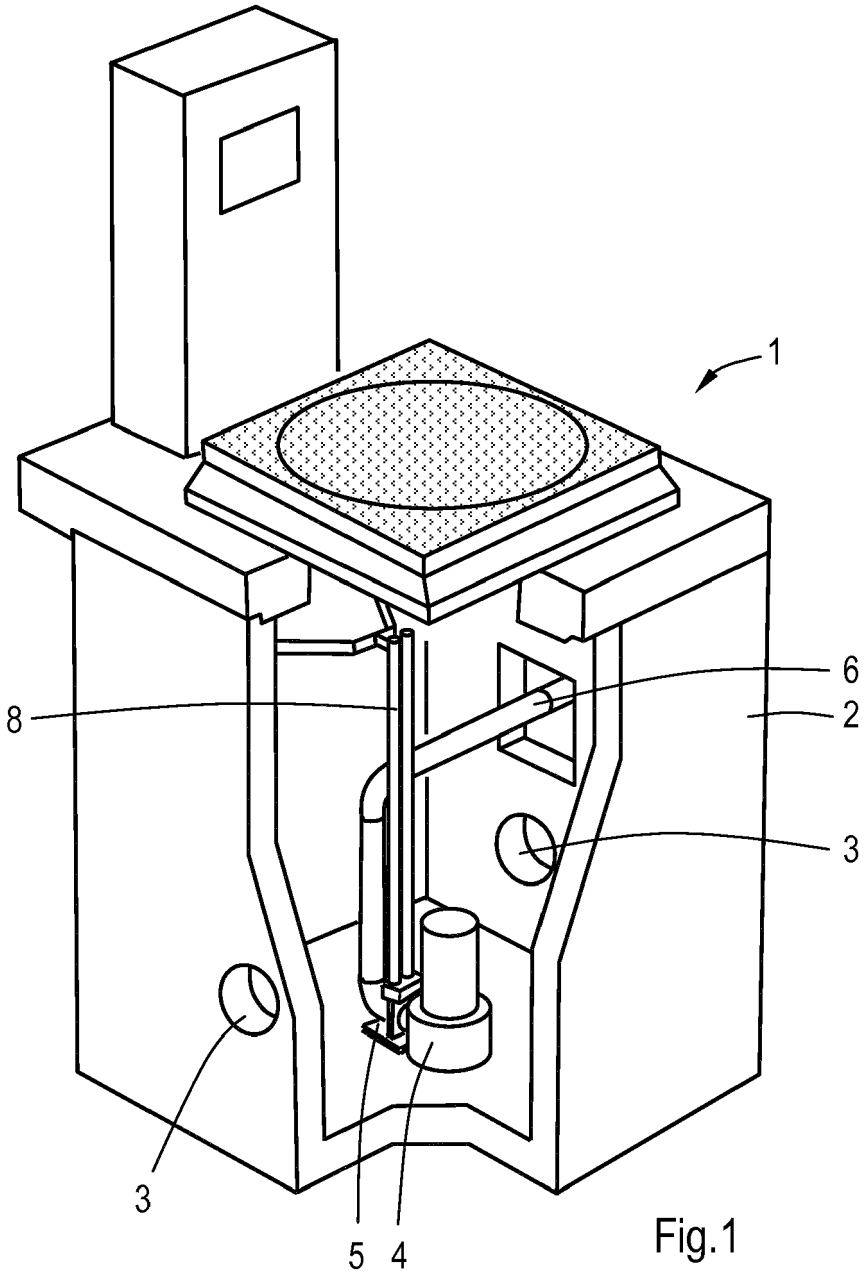

Fig.1

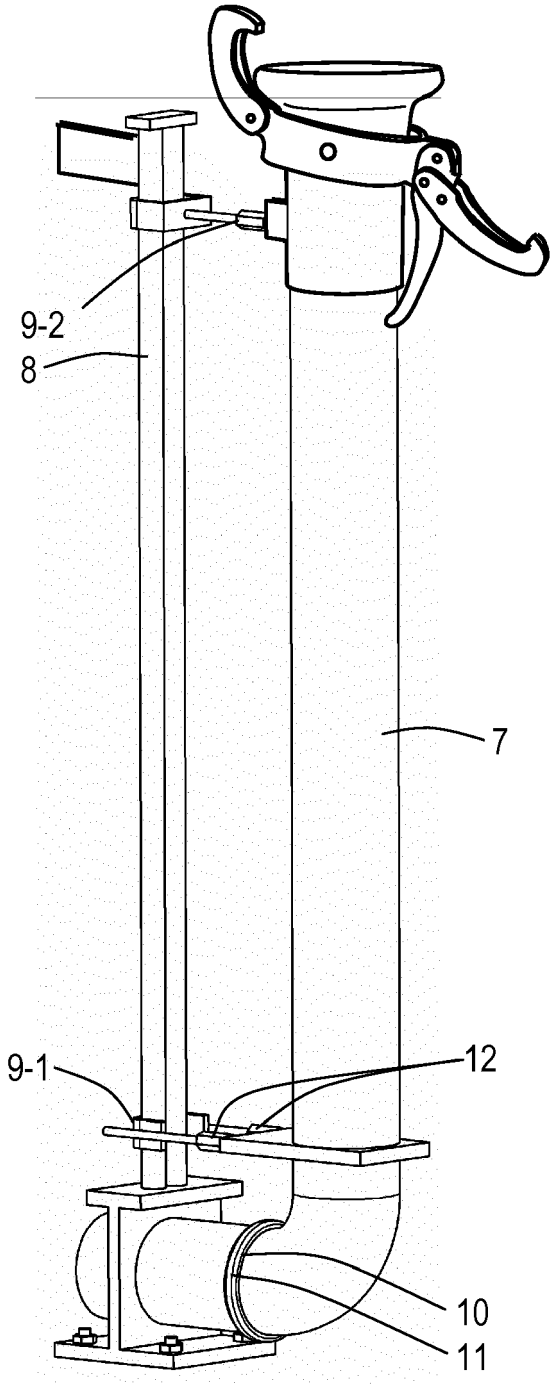

Fig.2

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EUROPEAN SEARCH REPORT

Application Number
EP 14 16 5304

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 4 886 426 A (SURINAK JOHN J [US]) 12 December 1989 (1989-12-12) * column 2, line 37 - column 5, line 6; figures * -----	1,7,8	INV. E03F5/22

TECHNICAL FIELDS SEARCHED (IPC)

E03F
F04D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 September 2014	De Coene, Petrus

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 16 5304

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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23-09-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4886426 A	12-12-1989	NONE	

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