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(54) **Manhole cover with seal**

Schachtabdeckung mit Abdichtung

Regard de chaussée avec garniture d'étanchéité

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Description

The present invention concerns a device for sealing pits, in particular a device which consists of a horizontal frame and cover means fitting in the frame, such as a lid.

It is known that devices for sealing pits can be provided with odour seals. These usually consist of grooves in the form of ducts which are provided in the above-mentioned frames and ribs on the bottom side of the lids which extend into the above-mentioned ducts, one and other such that when the ducts are filled with water, a barrier is formed for the odour rising from the pit.

For certain applications it is also desirable that the pit lids can seal in a watertight manner. This is among other the case in control rooms which are situated above the lid of a tank, such as a fuel oil tank. In order to provide for such a watertight seal, various solutions have already been suggested, including the use of elastic sealing rings.

The known devices for sealing pits, whereby an odour seal and/or a seal to prevent the penetration of liquid, such as rain water, is provided (see EP-A-0 390 767), are all disadvantageous in that they no longer meet the above-mentioned requirements after some time, especially when the pit lids used hereby are heavily loaded, for example by vehicles driving over them. Many of the usual defects hereby arise as the pit lids bend and the seatings, where the lids rest in the frames, are damaged. This phenomenon particularly occurs with synthetic lids.

Also, the present invention aims a device for sealing pits which does not have the above-mentioned disadvantages, in other words whereby an optimum sealing is provided on the one hand, in order to prevent that odour escapes and/or that liquid seeps in the pit, and whereby damages to the seal arising under an extremely heavy load are optimally excluded on the other hand, even when the frames and lids are made of synthetic material and when the load is more than 12 tons.

To this end, the invention concerns a device for sealing pits, consisting of a horizontal frame and cover means fitting in this frame, characterized in that the frame has two concentric ducts which can each contain an amount of liquid; in that the cover means have two ribs on their bottom sides which extend into the concentric ducts as the cover means are applied, whereby the ducts and ribs are made such that two liquid seals are created with an inclusion of air in between which prevents liquid from entering; in that the outer rib rests in the outer duct, preferably on the bottom thereof; in that the outer rib serves as a support for at least the part of the cover means which serves as bearing surface; and in that there are free spaces around the ribs in the ducts.

The above-mentioned construction is advantageous in that the load which is exerted on the bearing surface of the cover means is optimally transferred to the frame, without certain ribs being bent in their seatings and breaking off.

The above-mentioned cover means may hereby consist of a single lid which has at least two ribs on its bottom side which work in conjunction with the above-mentioned concentric ducts, or they may consist of two separate lids placed on top of one another, of which the top lid has a rib on its bottom side which works in conjunction with the outer duct and of which the bottom lid has a rib on its bottom side which works in conjunction with the inner duct.

According to a variant of the invention, the device for sealing pits consists of a horizontal frame and cover means fitting in this frame, characterized in that the cover means consist of two lids placed on top of one another; in that the frame has two concentric ducts which can each contain an amount of liquid; in that the top lid has a rib on its bottom side which extends into the outer duct and in that the bottom lid has a rib on its bottom side which extends into the inner duct, such that an inclusion of air is created in between the lids which prevents liquid from entering; and in that there are free spaces around the rib of the top lid. By using two lids, the risk of damages is strongly reduced, as only the top lid has to carry the load and the ribs on the bottom lid and the accompanying seating of said lid are not loaded.

In order to better explain the characteristics of the invention, the following preferred embodiments are described without being limitative in any way, with reference to the accompanying drawings, where:

figure 1 shows a device according to the invention;

figure 2 shows a section according to line II-II in figure 1;

figure 3 shows a section of a variant of a device according to the invention.

As shown in figure 1, the invention concerns a device 1 for sealing pits, consisting of a horizontal frame 2 and cover means 3 fitting in this frame.

According to a first embodiment of the invention, the device 1 is characterized in that the frame 2 has two concentric ducts 4 and 5 which can each contain an amount of liquid 6; in that the cover means 3 have two ribs 7 and 8 on their bottom sides which extend into the concentric ducts 4 and 5 as the cover means 3 are applied, whereby these ducts and ribs are made such that two liquid seals 9 and 10 are created with an inclusion of air 11 in between, which can prevent liquid 6 from entering in the pit; in that the outer rib 7 rests on the bottom 12 of the outer duct 4; and in that the outer rib 7 serves as a support for at least the part of the cover means 3 which serves as bearing surface 13.

In the embodiment shown in figure 2 the cover means 3 consist of a single lid 14.

The outer rib 7 is preferably situated on the inner edge 15 of the lid 14, such that this lid 14 cannot topple, not even under a very heavy load, and does not

come out of the frame 2, for example when heavy vehicles drive over it.

The base 16 of the frame 2 preferably extends under the outer rib 7, such that pressure forces are vertically transferred downward from the rib 7 to the construction provided under the frame 2, as a result of which the frame 2 is not under any strain of bending.

The lid 14, and more in particular the ribs 7 and 8, fit in the ducts 4 and 5 in such a way that free spaces 17, 18, 19 and 20 are created.

The device 1 is preferably also provided with positioning means to position the lid 14, or at least the rib 7 in the frame 2, such that the lid 14, as the pit is sealed, always fits in the same place in the frame 2, and the above-mentioned spaces 17, 18, 19 and 20 are respected. In the example shown, these positioning means consist of a seating 21 for the bottom edge 22 of the rib 7.

The second rib 8 hangs down entirely freely in the duct 5.

The lid 13 is entirely countersunk in the frame 2.

Preferably, the frame 2 and the cover means 3, in this case the lid 14, are made of synthetic material, which may be reinforced with glass fibres.

The device 1 according to the invention is advantageous in that water cannot seep in the underlying pit. When a liquid, for example rain water, enters the space 17, it will seep through into the space 18. After a certain time, the water from the space 18 will run over the wall 23 between the ducts 4 and 5 into the duct 5. Once a certain amount of water has run into it, an inclusion of air 11 is created. As of that moment, a counterpressure is created which finally results in a situation as represented in figure 2 whereby the water column in the space 20 is higher than in the space 19. The pressure which is thus created in the inclusion of air 11, prevents the liquid from flowing any further from the duct 4 into the duct 5, even when the space 17 is entirely filled with liquid. It is clear that the ducts 4 and 5 should hereby be suitably dimensioned, whereby the minimum dimensions can be either calculated or determined by experiment.

As the lid 14 with the ribs 7 on the bottom rests in the duct 4, large forces are optimally transferred onto the frame 2, as a result of which damages to the ribs 7 and 8 are practically excluded and the above-mentioned working is guaranteed at all times.

Figure 3 shows a variant whereby the cover means 3 consist of two lids 24 and 25 situated on top of one another. The above-mentioned rib 7 is hereby part of the lid 24 and the above-mentioned rib 8 is part of the lid 25. The lid 25 rests on the inner edge 26 of the frame 2, and there is an air slot between the two lids.

As the lid 25 does not make contact with the lid 24, this is not subject to possible deformations of the lid 24, and the good working of the above-mentioned effect, which is brought about thanks to the presence of the inclusion of air 11, is always guaranteed.

The embodiment of figure 3 is also advantageous

in that the space of the inclusion of air 11 is bigger than in the embodiment of figure 2 and in that a downward pressure force is exerted on the lid 25, as a result of which it is pressed onto the inner edge 26.

Another advantage of the embodiment of figure 3 consists in that the liquid 6, as an underpressure is created in the pit, is not sucked inside, as in this case the lid 25 is sucked onto the inner edge 26 and the suction of the liquid 6 is prevented.

As explained in the introduction, the invention also concerns a device 1 which is provided, as represented in figure 3, with two lids 24 and 25, whereby the top lid 24 has a rib 7 which fits in the duct 4, and the bottom lid 25 has a rib 8 which fits in the duct 6, regardless of whether the rib 7 serves as a support or not.

With the exception of the fact that the cover means 3 consist of two lids 24 and 25 instead of one single lid 14, all characteristics which are described by means of figure 2 are also valid for the embodiment of figure 3.

The present invention is by no means limited to the embodiments described by way of example and shown in the accompanying drawings; on the contrary, such a device for sealing pits can be made in various forms and dimensions while still remaining within the scope of the invention as defined in the claims.

Claims

1. Device for sealing pits, consisting of a horizontal frame (2) and cover means (3) fitting in this frame (2), characterized in that the frame (2) has two concentric ducts (4, 5) which can each contain an amount of liquid (6); in that the cover means (3) have two ribs (7, 8) on their bottom sides which extend into the concentric ducts (4, 5) as the cover means (3) are applied, whereby these ducts and ribs are made such that two liquid seals (9, 10) are created with an inclusion of air (11) in between which prevents liquid (6) from entering in the pit; in that the outer rib (7) rests in the outer duct (4); in that the outer rib (7) serves as a support for at least the part of the cover means (3) which serves as bearing surface (13); and in that there are free spaces (17, 18, 19, 20) around the ribs (7, 8) in the ducts (4, 5).
2. Device according to claim 1, characterized in that the outer rib (7) rests on the bottom of the outer duct (4).
3. Device according to claim 1 or 2, characterized in that the outer rib (7) is situated on the outer edge (15) of the cover means (3).
4. Device according to any of the above claims, characterized in that it is provided with positioning means, which provide at least for the positioning of

the outer rib (7) in the outer duct (8), and which consist of a seating (21) for the bottom edge of the above-mentioned outer rib (7).

5. Device according to any of the above claims, characterized in that the base (16) of the frame (2) extends under the outer rib (7) of the cover means (3).

6. Device according to any of the above claims, characterized in that the cover means (3) consist of one single lid (14), onto whose bottom side both above-mentioned ribs (7, 8) are provided.

7. Device according to any of claims 1 to 5, characterized in that the cover means (3) consist of two lids (24, 25) situated on top of one another, whereby the outer rib (7) is situated on the top lid (24) and the inner rib (8) is situated on the bottom lid (25).

8. Device for sealing pits, consisting of a horizontal frame (2) and cover means (3) fitting in this frame (2), characterized in that the cover means (3) consist of two lids (24, 25) placed on top of one another; in that the frame (2) has two concentric ducts (4, 5) which can each contain an amount of liquid (6); in that the top lid (24) has a rib (7) on its bottom side which extends into the outer duct (4), and in that the bottom lid (25) has a rib (8) on its bottom side which extends into the inner duct (5), such that an inclusion of air (11) is created in between the lids (24, 25) which prevents liquid (6) from entering in the pit; and in that there are free spaces (17-18) around the rib (7) of the top lid (24).

9. Device according to claim 7 or 8, characterized in that the bottom lid (25) rests on the inner edge (26) of the frame (2), and in that there is a continuous air slot between both lids (24, 25).

10. Device according to any of the above claims, characterized in that both the frame (2) and the cover means (3) are made of synthetic material.

11. Device according to claim 10, characterized in that the synthetic material is reinforced with glass fibres.

Patentansprüche

1. Vorrichtung zum Abdichten von Schächten, bestehend aus einem horizontalen Rahmen (2) und in diesen Rahmen (2) passenden Abdeckmitteln (3), dadurch gekennzeichnet, daß der Rahmen (2) zwei konzentrische Kanäle (4, 5) aufweist, die jeder eine Flüssigkeitsmenge (6) aufnehmen können; dadurch, daß die Abdeckmittel (3) an ihren Unterseiten zwei Rippen (7, 8) haben, die sich in die konzentrischen Kanäle (4, 5) erstrecken, wenn die Ab-

deckmittel (3) angebracht werden, wobei diese Kanäle und Rippen so ausgeführt sind, daß zwei Flüssigkeitsdichtungen (9, 10) mit dazwischen einem Lufteinschluß (11) gebildet werden, die das Eindringen von Flüssigkeit (6) in den Schacht verhindern können; dadurch, daß die äußere Rippe (7) im äußeren Kanal (4) aufliegt; dadurch, daß die äußere Rippe (7) als Stütze dient für zumindest den Teil der Abdeckmittel (3), der als tragende Fläche (13) dient; und dadurch, daß freie Räume (17, 18, 19, 20) um die Rippen (7, 8) in den Kanälen (4, 5) vorhanden sind.

2. Vorrichtung gemäß Anspruch 1, dadurch gekennzeichnet, daß die äußere Rippe (7) auf dem Boden des äußeren Kanals (4) aufliegt.

3. Vorrichtung gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß die äußere Rippe (7) sich an der äußeren Kante (15) der Abdeckmittel (3) befindet.

4. Vorrichtung gemäß einem der obigen Ansprüche, dadurch gekennzeichnet, daß sie mit Positionierungsmitteln versehen ist, die zumindest für das Positionieren der äußeren Rippe (7) im äußeren Kanal (8) sorgen, und die aus einem Sitz (21) für die Unterkante der obenerwähnten äußeren Rippe (7) bestehen.

5. Vorrichtung gemäß einem der obigen Ansprüche, dadurch gekennzeichnet, daß die Basis (16) des Rahmens (2) sich bis unter die äußere Rippe (7) der Abdeckmittel (3) erstreckt.

6. Vorrichtung gemäß einem der obigen Ansprüche, dadurch gekennzeichnet, daß die Abdeckmittel (3) aus einem einzigen Deckel (14) bestehen, an dessen Unterseite die beiden obenerwähnten Rippen (7, 8) angebracht sind.

7. Vorrichtung gemäß einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Abdeckmittel (3) aus zwei übereinander angeordneten Deckeln (24, 25) bestehen, wobei die äußere Rippe (7) sich am oberen Deckel (24) befindet und die innere Rippe (8) sich am unteren Deckel (25) befindet.

8. Vorrichtung zum Abdichten von Schächten, bestehend aus einem horizontalen Rahmen (2) und in diesen Rahmen (2) passenden Abdeckmitteln (3), dadurch gekennzeichnet, daß die Abdeckmittel (3) aus zwei übereinander angeordneten Deckeln (24, 25) bestehen; dadurch, daß der Rahmen (2) zwei konzentrische Kanäle (4, 5) aufweist, die jeder eine Flüssigkeitsmenge (6) aufnehmen können; dadurch, daß der obere Deckel (24) eine Rippe (7) an seiner Unterseite hat, die sich in den äußeren Kanal (4) erstreckt, und daß der untere Deckel (24) an sei-

ner Unterseite eine Rippe (8) aufweist, die sich in den inneren Kanal (5) erstreckt, so daß zwischen den Deckeln (24, 25) ein Lufteinschluß (11) erzeugt wird, der das Eindringen von Flüssigkeit (6) in den Schacht verhindert; und dadurch, daß freie Räume (17-18) um die Rippe (7) des oberen Deckels (24) vorhanden sind.

9. Vorrichtung gemäß Anspruch 7 oder 8, dadurch gekennzeichnet, daß der untere Deckel (25) auf der Innenkante (26) des Rahmens (2) aufliegt, und dadurch, daß zwischen beiden Deckeln (24, 25) ein fortlaufender Luftspalt vorhanden ist.
10. Vorrichtung gemäß einem der obigen Ansprüche, dadurch gekennzeichnet, daß sowohl der Rahmen (2) als auch die Abdeckmittel (3) aus Kunststoff gefertigt sind.
11. Vorrichtung gemäß Anspruch 10, dadurch gekennzeichnet, daß der Kunststoff mit Glasfasern verstärkt ist.

Revendications

1. Dispositif pour fermer des puits de manière étanche, constitué par un cadre horizontal (2) et par un moyen de recouvrement (3) venant s'insérer dans ce cadre (2), caractérisé en ce que le cadre (2) comporte deux conduits concentriques (4, 5) qui peuvent chacun contenir une quantité de liquide (6); en ce que le moyen de recouvrement (3) possède deux nervures (7, 8) sur leurs côtés inférieurs, qui s'étendent dans les conduits concentriques (4, 5) lorsqu'on applique le moyen de recouvrement (3), par lequel ces conduits et ces nervures sont réalisés de telle sorte que l'on crée deux joints étanches au liquide (9, 10) avec une inclusion d'air (11) entre les deux, qui empêche du liquide (6) de pénétrer dans le puits; en ce que la nervure externe (7) s'appuie sur le conduit externe (4); en ce que la nervure externe (7) sert de support pour au moins la partie du moyen de recouvrement (3) qui fait office de surface d'appui (13); et en ce que des espaces libres (17, 18, 19, 20) sont ménagés autour des nervures (7, 8) dans les conduits (4, 5).
2. Dispositif selon la revendication 1, caractérisé en ce que la nervure externe (7) s'appuie sur le fond du conduit externe (4).
3. Dispositif selon la revendication 1 ou 2, caractérisé en ce que la nervure externe (7) est située sur le bord externe (15) du moyen de recouvrement (3).
4. Dispositif selon l'une quelconque des revendications ci-dessus, caractérisé en ce qu'il est muni de

moyens de positionnement qui permettent au moins de positionner la nervure externe (7) dans le conduit externe (8) et qui sont constitués d'un appui (21) pour le bord inférieur de la nervure externe (7) susmentionnée.

5. Dispositif selon l'une quelconque des revendications ci-dessus, caractérisé en ce que la base (16) du cadre (2) s'étend en dessous de la nervure externe (7) du moyen de recouvrement (3).
6. Dispositif selon l'une quelconque des revendications ci-dessus, caractérisé en ce que le moyen de recouvrement (3) est constitué d'un couvercle unique (14) sur le côté inférieur duquel on prévoit les deux nervures (7, 8) susmentionnées.
7. Dispositif selon l'une quelconque des revendications 1 à 5, caractérisé en ce que le moyen de recouvrement (3) est constitué par deux couvercles (24, 25) situés l'un par-dessus l'autre, par lequel la nervure externe (7) est située sur le couvercle supérieur (24) et la nervure interne (8) est située sur le couvercle inférieur (25).
8. Dispositif pour fermer des puits de manière étanche, constitué par un cadre horizontal (2) et par un moyen de recouvrement (3) venant s'insérer dans ce cadre (2), caractérisé en ce que le moyen de recouvrement (3) est constitué par deux couvercles (24, 25) placés l'un par-dessus l'autre; en ce que le cadre (2) comporte deux conduits concentriques (4, 5) qui peuvent chacun contenir une quantité de liquide (6); en ce que le couvercle supérieur (24) possède une nervure (7) sur son côté inférieur, qui s'étend jusque dans l'autre conduit (4); en ce que le couvercle inférieur (25) possède une nervure (8) sur son côté inférieur, qui s'étend jusque dans le conduit interne (5) de telle sorte qu'une inclusion d'air (11) est générée entre les couvercles (24, 25), qui empêche du liquide (6) de pénétrer dans le puits; et en ce qu'on ménage des espaces libres (17-18) autour de la nervure (7) du couvercle supérieur (24).
9. Dispositif selon la revendication 7 ou 8, caractérisé en ce que le couvercle inférieur (25) s'appuie sur le bord interne (26) du cadre (2) et en ce qu'on obtient une fente continue pour l'air entre les deux couvercles (24, 25).
10. Dispositif selon l'une quelconque des revendications ci-dessus, caractérisé en ce qu'à la fois le cadre (2) et le moyen de recouvrement (3) sont réalisés en une matière synthétique.
11. Dispositif selon la revendication 10, caractérisé en ce que la matière synthétique est renforcée avec

des fibres de verre.

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