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(54) **GULLEY**

ABLAUF

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(73) Proprietors:
- **J.C. Willemsen Beheer B.V.**
  3921 EB Elst (NL)
- **Schotanus, Jacobus Gerhard Nicolaas**
  2121 XC Bennebroek (NL)
- **Van Nuland, Franciscus Hendricus**
  1764 GK Breezand (NL)

(72) Inventors:
- **SCHOTANUS, Jacobus Gerhard Nicolaas**
  2121 XC Bennebroek (NL)
- **VAN NULAND, Franciscus Hendricus**
  1764 GK Breezand (NL)
- **WILLEMSEN, Johannes Cornelis**
  3921 EB Elst (NL)

(74) Representative: **de Hoog, Johannes Hendrik**
Octrooibureau de Hoog
Gouverneurslaan 18 A
3905 HE Veenendaal (NL)

(56) References cited:
WO-A1-2011/049253
CN-A- 106 219 758
CN-U- 206 205 290
CN-U- 207 062 678
DE-A1- 2 618 199
DE-A1- 10 348 520
FR-A1- 2 903 433
KR-A- 20140 126 467

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Description

TECHNICAL FIELD

[0001] The subject disclosure relates to gullies for receiving storm water, usually collected from street surfaces, and discharging the storm water through an outlet in a rainwater sewer system.

BACKGROUND ART

[0002] Gulley's as described above are well known for collecting rain water or storm water in streets, sidewalks, gutters etc. and generally comprise a gulley pot, e.g. a plastic, cast-iron or concrete receptacle buried in the ground and comprising a bottom wall and a number of side walls. In a side wall of the gulley pot an outlet is positioned which is coupled to a sewer system. Water received in the gulley pot exits via the outlet to the sewer system. The drain is generally offset from the bottom wall. In the volume between the bottom wall of the gulley pot and the underside of the outlet, water and pollution (refuse, debris, leaves, sand, oil, etc....) can accumulate. A baffle extending to below the underside of the outlet serves as an odour trap and it may prevent pollution floating on the water from entering the sewer system.

[0003] NL1005621 discloses a drain sump for road gutters, comprising a concrete body and a cast iron connection into the concrete drain pipe. The cast iron connection is anchored by a flange into the sump body during moulding of the concrete of the sump body. The cast iron connection comprises a front chamber. In the cast iron connection a cast iron baffle for an odour trap may be installed such that it is rotatable.

[0004] EP2796628A1 discloses a gulley comprising a gulley pot, an outlet and a baffle. The baffle is attached to the gulley pot such that the baffle is movable between a first stable position with respect to the gulley pot in which position the baffle overlaps and covers the outlet and extends below an underside of the outlet and a second stable position with respect to the gulley pot in which position the outlet is substantially uncovered by the baffle.

[0005] CN207062678U discloses a road drainage structure. The structure includes a roadbed, a vegetation layer, a soil layer, a water filtering sand layer, a water filtering gravel layer, a water filtering channel, a drainage body, an overflow pipe, an overflow well, and a liquid level sensor. The water flows from the roadbed, through the layers and water filtering channel into the drainage body. When the liquid level in the drainage body exceeds a top edge of the overflow pipe in the drainage body, the water flows through the overflow pipe into the overflow well. This document is considered as representing the closest prior art and discloses the features described in the preamble of claim 1.

[0006] CN206205290U discloses a roof rainwater collecting and processing system. The system comprises a rainwater seepage well with an inlet pipe, infiltration pipe and an outlet pipe. The infiltration pipe extends radially outward. A gravel layer surrounds the infiltration pipe. The bottom of the seepage well is covered with gravel and another gravel layer below the gravel forming the bottom of the seepage well. After two layer filtering the water enters the ground to replenish groundwater.

SUMMARY OF INVENTION

[0007] It is an object of the present technology to provide a gulley which supplies storm water only to the sewer system if more than a specific amount of water has entered the gulley pot in a particular short period of time and which reduces the need to expand the discharge capacity of the sewer system to prevent water problems during heavy rain shower due to climate changes.

[0008] According to an aspect of the subject technology, this object is achieved by a gulley having the features of claim 1. Advantageous embodiments and further ways of carrying out the present technology may be attained by the measures mentioned in the dependent claims.

[0009] A gulley according to the subject technology comprises a gulley pot, a sewer outlet in a side wall of the gulley pot and a baffle configured to act as odour trap. The sewer outlet is configured to couple the gulley to a sewer system and has an underside defining a normal outflow level L_{norm}. The baffle has an underside defining a minimal liquid level L_{min} to enable the baffle to act as odour trap. The gulley pot further comprises at least one infiltration outlet being configured to transfer liquid in the gulley pot to the ground around the gulley when the liquid level in the gulley pot exceeds a drainage outflow level L_{drain}, wherein $L_{min} < L_{drain} \leq L_{norm}$.

[0010] The concept of the present technology is to have a gulley pot which is coupled to an additional reservoir that is filed with an amount of storm water before substantially all further storm water is supplied to the sewer system. The additional reservoir facilitates infiltration of the collected water as a reverse drainage system into the soil around the gulley. Thus before it's going to rain, the additional reservoir will normally be empty. Then the first storm water will be collected in the gulley pot. Due to evaporation of water in the gulley pot during the dry period, the water level will be below the level L_{drain}. As soon as the liquid level will become higher than L_{drain} liquid will flow through the at least one infiltration outlet into the additional reservoir that is in fluid flow connection with the infiltration outlet. The additional reservoir will almost immediately start infiltration of the liquid in the soil. The liquid level in the gulley pot will start rising as soon as the liquid level in the additional reservoir becomes at the same level in the gulley pot. From that moment, substantially all storm water will flow away via the sewer outlet into the sewer system. When it stops raining, the water in the additional reservoir infiltrates the soil around the gulley pot till the additional reservoir is empty and the procedure above can be started again. In this way, it

might be possible that during a small rain shower most storm water is released to the soil around the gulley pot and that only during heavy rain shower a considerable part of storm water is discharged through the sewer outlet into the sewer system. When L_{drain} is smaller than L_{norm} the inflowing storm water has to fill the additional reservoir first before some storm water will flow into the sewer system. Another advantage of the present technology is that the gulley pot retains its function to accumulate dirt at its bottom. As a result, only parts that float in or float on the water can reach the infiltration outlet and probably after accumulation in the infiltration outlet obstruct the flow of water to infiltrate the soil around the gulley pot.

[0011] In an embodiment, the gulley further comprises an insert part configured to be inserted in the sewer outlet and further configured to increase the liquid outflow level L_{norm} for liquid in the gulley pot to the sewer system to a new outflow level L_{new}, wherein $L_{norm} < L_{new}$. This feature allows one to reuse existing gullies without changing the specification of the baffle acting as strainer or odour trap, while providing the gulley the characteristic to discharge only liquid to the sewer system after the liquid level in the additional reservoir and gulley pot exceeds the new outflow level.

[0012] In a further embodiment, the sewer outlet has a height H, and $H/3 < (L_{new} - L_{norm}) < H/2$. It has been found that an insert part which increases the outflow level of the gulley pot in the range H/3 - H/2 still provides the outlet enough outflow capacity to discharge enough storm water to the sewer system during heavy rain showers.

[0013] In an embodiment, the insert part is a removable part. This feature enables one to provide full access to duct coupled to the outlet for inspection and or cleaning.

[0014] In an embodiment, the gulley comprises a filter element positioned in each of the at least one infiltration outlet. In a further embodiment, the filter element comprises a material that makes the filter element impermeable for oil and permeable for water. The filter element counteracts accumulation of dirt in the reservoir. The impermeability to oil reduces the risk of contamination of the soil around the gulley.

[0015] In an embodiment, the filter element comprises a layer of pervious concrete arranged in an opening through the side wall of the gulley pot for the infiltration outlet. This feature provides a robust filter that could easily be cleaned by for example a high pressure washer.

[0016] In an embodiment, the filter element further comprises a check valve arrangement configured to block liquid to flow through an infiltration outlet into to gulley pot. These features prevent groundwater from flowing into the sewer via the gulley pot. In an embodiment, the gulley further comprises a porous layer attached to at least a portion of the outer surface of the side wall of the gulley pot, wherein the porous layer extends over the openings of the at least one infiltration outlet. The cavities in the porous layer from the reservoir and surfaces of water-filled porous layer that are contact with the soil drain liquid to the soil. In this way, the infiltration surface to the soil is enlarged. In a further embodiment, the porous layer extends along a bottom wall of the gulley pot. This feature enlarges to surface being in contact with the soil and consequently the flow capacity to drain storm water to the soil.

[0017] In an embodiment, the porous layer is a layer of pervious concrete. This feature provides a gulley with reservoir that can be applied in a similar way as existing gullies with a concrete gulley pot.

[0018] In an embodiment, the filter element comprises pervious concrete, made of finer gravel than gravel of the porous layer attached to the outer surface of the side wall. This feature has the advantage that when dirt is accumulated in the filter, the filter can be cleaned with a pressure washer. As the openings in the filter to pass water are smaller than the openings in the porous layer, when cleaning the filter the dirt particles accumulated in the filter will flow to the bottom of the porous layer and not accumulate at the level of the infiltration outlet.

[0019] In an embodiment, the porous layer has a thickness of at least 4 cm, more particular 6 cm.

[0020] In an embodiment, sewer outlet has a first radius and each of the at least one infiltration outlet has a second radius, wherein the second radius is smaller than the first radius. In an alternative embodiment, the gulley pot comprises four or more plane sidewalls. Side walls other than the side wall comprising the sewer outlet comprise one or more infiltration outlets. This feature enlarges the drainage flow capacity to drain water to the soil.

[0021] In an embodiment, the gulley comprises drainage means coupled to the at least one infiltration outlet, wherein the drainage means are configured to transfer liquid from the gulley pot to the ground around the gulley. In a further embodiment, the drainage means comprises at least one of: infiltration pipes, perforated ducts and infiltration box. These features allow enlarging the volume of the additional reservoir and/or the area to which the storm water is discharged.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] These and other aspects, properties and advantages will be explained hereinafter based on the following description with reference to the drawings, wherein like reference numerals denote like or comparable parts, and in which:

Fig. 1 shows schematically a sectional view of a first embodiment of a gulley;
Fig. 2 shows schematically a sectional view of a second embodiment of a gulley;
Fig. 3 shows schematically a sectional view of a third embodiment of a gulley;
Fig. 4 shows schematically a perspective view of a gulley pot according to the subject disclosure;
Fig. 5 shows schematically a perspective view of a gulley pot provided with porous layer;

Fig. 6 shows schematically a sectional view along VI-VI in Fig. 5;
Fig. 7 shows schematically a sectional view along VII-VII in Fig. 6; and,
Figs 8A and 8B show schematically a section view of two states of an embodiment of a filter element.

DESCRIPTION OF EMBODIMENTS

[0023] It is noted that the drawings are schematic, not necessarily to scale and that details that are not required for understanding the present invention may have been omitted. The terms "upward", "downward", "below", "above", and the like relate to the embodiments as oriented in the drawings, unless otherwise specified or functionally required. Further, elements that are at least substantially identical or that perform an at least substantially identical function are denoted by the same numeral.

[0024] Figs. 1 and 2 show a gulley 100 comprising a lid or cover grate 110 for collecting rain water or street cleaning water in streets, sidewalks, gutters etc. and a gulley pot 102 having an interior volume for receiving the water and associated pollution passing the cover grate 110. The gulley pot 102 comprises a bottom 102A and side walls 102B, a sewer outlet 104, at least one infiltration outlet 108 and a drainage means 112. The drainage means 112 enables the water flowing through an infiltration outlet 108 to be absorbed by the soil around the gulley. In Fig 1, the drainage means 112 is a porous layer which is attached to the outside of one or more side walls 102B of the gulley pot 102 and preferably extends along the sidewall from the bottom of the side wall to at least a level above the hole through the sidewall for the infiltration outlet 108.

[0025] The sewer outlet 104 is configured to be coupled to a drain piping of e.g. a storm water drainage system (not shown) and comprises a baffle assembly 106. The sewer outlet has an opening with a height H. Examples of baffle assemblies are known from NL100561C2 and NL2004578C. The baffle assembly 106 is configured to act as odour trap. In principle any arrangement configured to act as odour trap in a gulley could be used.

[0026] The infiltration outlet 108 of the gulley forms a passage for water in the gulley pot 102 to drainage means. In Fig. 1, the sewer outlet 104 has a water outflow level L_{norm} that is defined by the underside 104A of opening of the sewer outlet 104. The infiltration outlets 108 are holes through the side wall of the gulley pot 102 and arranged at substantially the same height in the side walls 102B. The undersides 108A of the infiltration outlets 108 define an additional outflow level L_{drain}. The additional outflow level L_{drain} is at a lower level than the normal level L_{norm}. Furthermore, the baffle assembly 106 defines a level L_{min} by the lower side 106A of the baffle. As long as the water level is above level L_{min}, the baffle means 106 prevent escaping sewer odour from the storm water drainage system. It should be noted that the height difference between L_{drain} and L_{min} depends on the climate wherein the gulley is used. The height difference should be sufficient such that during dry periods, less water evaporates than is present in the pot between said two levels.

[0027] The drainage means 112 is a porous layer. In an embodiment, the porous layer has a thickness of at least 4 cm, and more particular 6 cm. In an embodiment the porous layer is a layer of pervious concrete. The porous layer may be obtained by a mixture of two or three component epoxy bonding mortar and gravel with a grainsize of 4-16mm. In another embodiment gravel with a grainsize of 4-12mm is used. Other mortars and gravel sizes might be used for obtaining the porous layer as long as the layer comprises sufficient cavities and passages between the gravel to pass the water from the infiltration outlet to the soil and to buffer an amount of water. The gulley according to the present technology functions as follows. Rainwater enters the gulley pot 102 through openings of the lid or cover grate 110 on top of the gulley pot 102. As soon as the water level is above the additional outflow level L_{drain} rainwater leaves the gulley pot 102 through the one or more infiltration outlets 108 and passes the porous material of the drainage means 112 to the soil and the soil will absorb said rainwater by infiltration. When the soil absorbs less water than is supplied via the one or more infiltration outlets 108, cavities in the porous material of the drainage means will be filled with water. As soon as the cavities below the additional outflow level L_{drain} are filled with water, the water level in the gulley pot will rise. When the water level rises above the water outflow level L_{norm} in Fig. 1 liquid will flow along the lower side of the baffle through the sewer outlet 104 into a sewer system or storm water drainage system. As long as the soil is not saturated, water will be extracted from the drainage means. In normal circumstances before it is going to rain, the cavities in the drainage means will be empty and form a buffer that could be filled relatively fast via the one or more infiltration outlets when it is going to rain. Furthermore, the volume in the gulley pot defined by the height difference L_{norm} and L_{drain} functions as additional buffer that has to be filled before water will be discharged from the gulley pot through the sewer outlet into the storm water drainage system. Only during heavy rain showers, the absorbency of the soil, the buffer capacity of the drainage means and buffer capacity of the gulley pot defined by the height difference L_{norm} - L_{drain} will not be sufficient to store and drain the water into the soil. In that case, water will leave the gulley via outlet 104 into the storm water drainage system. When it stops raining, the soil will absorb the water supplied by the drainage means and consequently the water level in the gulley pot will be lowered to the level L_{drain}. So, the volume of water in the gulley pot present between the levels L_{norm} and L_{drain} will be absorbed by the soil and the emptied corresponding volume is available as buffer for the next rain shower. The present technology enables the gulley to drain most of the rain water to the soil around the gullet and significantly

reduces the amount of water that is drained via the storm water drainage system.

[0028] Fig. 2 shows schematically a sectional view of a second embodiment of a gulley according to the present technology. In this embodiment an existing gulley pot 102 used as part of a gulley according the present technology. The one or more infiltration outlets 108 are drilled in the side walls such that the lower side of the one or more infiltration outlets 108 is at substantially the same level as the lower side of the sewer outlet 104. This ensures that there is enough water in the gulley to prevent escaping of sewer odours from the storm water drain system over dry periods. Furthermore, porous material is arranged against sidewalls of the gulley pot 102 from the bottom up to a level above the infiltrations outlets 108 to form the drainage means 112. An insert part 214 is positioned in the opening of the sewer outlet 104 to increase the outflow level from the gulley to the storm water drain system to level L_{new}. In this way, the discharge capacity of the drainage means 112 and soil around the gulley has to be used before rain water leaves the gulley via the sewer outlet 104. It should be noted that in this embodiment $L_{drain} = L_{norm}$. To ensure that the sewer outlet 104 has enough outflow capacity the height of the insert is preferably smaller than H/2, wherein H is the diameter/height of the opening of the sewer outlet 104. In an embodiment to ensure that the outflow capacity via six drain openings is sufficient, the height of the insert (= $L_{new} - L_{drain}$) is larger than H/3 wherein H is the diameter height of the opening of the sewer outlet. In an embodiment, the diameter of the sewer outlet 104 is 125 mm and the diameter of the infiltration outlets 108 is 80 mm. It is noted that other diameters might be used, however preferably the diameter is the infiltration outlets is smaller than the diameter of the sewer outlet.

[0029] Fig. 3 shows schematically a sectional view of a third embodiment of a gulley according to the present technology using an existing gulley pot 102 with another type of baffle assembly 306. The one or more infiltration outlets 108 are drilled in the side walls such that the lower side of the one or more infiltration outlets 108 is at substantially the same level as the lower side of the sewer outlet 104. Furthermore, porous material is affixed against sidewalls of the gulley pot 102 from the bottom up to a level above the infiltration outlets 108 to form the drainage means 112. An insert part 314 is positioned directly in the discharge pipe coupling the gulley to the storm water drain system to increase the outflow level of the existing gulley pot 102 to the new level L_{new}.

[0030] Fig. 4 shows schematically a perspective view of a gulley pot 102 according to the subject disclosure. The gulley pot is obtained by drilling 6 infiltration outlets 108 in an existing block shaped gulley pot 102 with four flat rectangular sidewalls. Therefore, the underside of the sewer outlet 104 is at the same level as the underside of the infiltration outlets. By placing an insert in the sewer outlet as described above, the outflow level into the storm water system could be increased while the existing baffle (not shown) could be used to provide the same odour trap as in the original gulley pot. Fig. 5 shows schematically a perspective view of the gulley pot in Fig. 4 provided with a porous layer forming the drainage means 112. It shows the sewer outlet 104 at one side wall of the gulley pot and six infiltration outlets 108 at the three other side walls. Each other sidewall of the gulley pot102 comprises two infiltration outlets. The diameter of the infiltration outlets 108 is preferably smaller than the diameter of the sewer outlet 104. The number and size of the infiltration outlets define the drain capacity water from the volume in the gulley pot 102 to the drainage means 112. The porous layer forming the drainage means 112 is applied against three side walls. Furthermore, the porous layer extends below the bottom of the gulley pot 102. Fig. 6 shows schematically a sectional view along VI-VI in Fig. 5 and Fig. 7 shows schematically a sectional view along VII-VII in Fig. 6.

[0031] In the embodiments described above, the sewer outlet 104 has a first radius and each of the infiltration outlets have a second radius, wherein the second radius is smaller than the first radius.

[0032] In the embodiments described above, the openings in the gulley pot 102 forming the infiltration outlets 108 might be used to position a filter element. The filter element is configured to prevent that the porous layer attached to the outer surface of the gulley pot gets blocked by dirt that flows into the gulley. The filter element could be a replaceable filter element. In an embodiment, the filter element is made from pervious concrete obtained by a mixture of epoxy mortar and sand with a grain-size of 0,6 - 1,2mm. The openings through the gulley pot for the infiltration outlets are filled with said mixture. The filter element is thus made of finer gravel than the gravel of the porous layer. With such a filter only small particles could pass the filter element which would subsequently not form an obstruction in the cavities of the porous layer outside the gulley pot but will flow downwards in the porous layer. The outside of the filter element might be cleaned by using a pressure washer and/or a vacuum cleaner.

[0033] Figs 8A and 8B show schematically a section view of two states of an embodiment of another embodiment of a filter element 800. Preferably, the filter element is a replaceable filter element. The filter element 800 comprises a material 802 that is impermeable for oil and permeable for water. Furthermore, the filter element 800 comprises a check valve arrangement which opens when water pressure in the gulley pot acting on the shutters is higher than the water pressure acting on the other side of the shutters and which closes when the water pressure acting on the other side of the shutters is higher than the water pressure acting on the side facing the inside of the gulley pot 102. The shutters prevent groundwater to flow into the gulley pot. In this way, ground water is blocked to flow through the gulley into the storm water drainage system or sewer system that when the ground water level is higher than the level L_{drain} .

[0034] In the embodiments described above, the drainage means 112 are a porous layer 112 attached to at least one side wall of the gulley pot and wherein the porous layer extends fully across the hole in the sidewall of the gulley pot for the at least one infiltration outlet. Furthermore, it is shown that the porous layer might extend along a bottom wall of the gulley pot. In an embodiment the porous layer is a layer of pervious concrete. It might be clear that other materials can be used that have the characteristics of permeable for water and capacity to store temporarily an amount of water to be absorbed by the soil abutting the porous layer. Furthermore, the material of the layer should be strong enough to withstand the pressure of the soil acting on the outer surface of the layer. In an embodiment, the drainage means is a plastic tray with reinforcement ribs in which the gulley is placed and where the outer wall is perforated. The reinforcement ribs function as spacers between the outer wall and gulley pot. The space between the outer wall and the gulley pot forms the cavity to buffer rain water before it is absorbed by the soil surrounding the gulley pot.

[0035] In an alternative embodiment, the drainage means configured to transfer water from the gulley pot to the ground around the gulley. For example at least one of: infiltration pipes, perforated ducts and infiltration boxes could be coupled to the infiltration outlets. The pipes or tubes might be twisted around the gully pot. In another embodiment, the pipes or tubes extend horizontally or slope downward away from the gulley pot to enlarge the ground surface that could absorb directly water coming from the gully pot. In these embodiments, the space in the tubes will function as buffer to store temporarily rain water before it infiltrates the soil around the tubes or pipes.

[0036] The buffer to temporarily store rain water before it infiltrates the soil around the gulley pot can be extended by channels in the ground, which adjoin the porous layer affixed to the outside of the gulley pot. The channels should preferably be filled with broken stone with a grain-size of 7-32mm, wherein the channel of broken stones is encapsulated by PE filter fabric.

[0037] It might be clear for the skilled person, that the present subject technology is not limited to gulley pots with a block shape but could also be applied to gulley pots with a cylindrical sidewall.

[0038] It is contemplated that alternatives, modifications, permutations and equivalents thereof will become apparent to those skilled in the art upon reading the specification and upon study of the drawings. The invention is not limited to the illustrated embodiments. Changes can be made without departing from the scope of the appended claims.

Claims

1. Gulley (100) comprising a gulley pot (102), a sewer outlet (104) in a side wall of the gulley pot and a baffle (106) configured to act as odour trap, wherein the sewer outlet is configured to couple the gulley to a sewer system and has an underside (104A) defining a normal outflow level L_{norm}, and wherein the baffle has an underside (106A) defining a minimal liquid level L_{min} to enable the baffle to act as odour trap; wherein the gulley pot further comprises an additional reservoir in the form of a drainage means (112), and at least one infiltration outlet (108) through the side wall, **characterised in that** the at least one infiltration outlet (108) being configured to transfer liquid in the gulley pot to the drainage means (112) facilitating infiltration of collected water into the ground around the gulley when the liquid level in the gulley pot exceeds an additional outflow level L_{drain}, wherein $L_{min} < L_{drain} \leq L_{norm}$.

2. Gulley according to claim 1, wherein the gulley further comprises an insert part (214) configured to be inserted in the sewer outlet and further configured to increase the liquid outflow level L_{norm} for liquid in the gulley to the sewer system to a new outflow level L_{new}, wherein $L_{norm} < L_{new}$.

3. Gulley according to claim 2, wherein the sewer outlet has a height H, and $H/3 < (L_{new} - L_{norm}) < H/2$.

4. Gulley according to any of the claims 2 - 3, wherein the insert part is a removable part.

5. Gulley according to any of the claims 1-4, wherein the gulley comprises a filter element positioned in each of the at least one infiltration outlets.

6. Gulley according to claim 5, wherein the filter element comprises a layer of pervious concrete arranged in an opening through the side wall of the gulley pot for the infiltration outlet (108).

7. Gulley according to any of the claims 5 -6, wherein the filter element comprises a material that is impermeable for oil and permeable for water.

8. Gulley according to any of the claims 5 - 7, wherein the filter element further comprises a check valve arrangement configured to block liquid to flow through an infiltration outlet into to gulley pot.

9. Gulley according to any of the claims 1 - 8, wherein the drainage means (112) is a porous layer attached to at least a portion of the outer surface of the side wall of the gulley pot, and wherein the porous layer extends over openings of the at least one infiltration outlet and optionally along a bottom wall of the gulley pot.

10. Gulley according to claim 9, wherein the porous layer attached to at least a portion of the outer surface of

the side wall of the gulley pot is a layer of pervious concrete.

11. Gulley according to claim 10 in conjunction with claim 6, wherein the layer of pervious concrete of the filter element is made of finer gravel than gravel of the porous layer attached to the outer surface of the side wall.

12. Gulley according to any of the claims 9 - 11, wherein the porous layer attached to at least a portion of the outer surface of the side wall of the gulley pot has a thickness of at least 4 cm, more particular 6 cm.

13. Gulley according to any of the claims 1 - 12, wherein outlet (104) has a first radius and each of the at least one infiltration outlet (108) has a second radius, wherein the second radius is smaller than the first radius.

14. Gulley according to any of the claims 1 - 13, wherein the gulley comprises drainage means coupled to the at least one infiltration outlet (108), wherein the drainage means are configured to transfer liquid from the gulley pot to infiltrate the ground around the gulley.

15. Gulley according to claim 14, wherein the drainage means comprises at least one of: infiltration pipes, perforated ducts and infiltration box.

Patentansprüche

1. Ablauf (100), umfassend einen Senkkasten (102), einen Abwasserkanalauslass (104) in einer Seitenwand des Senkkastens und ein Ablenkblech (106), das dazu ausgelegt ist, als Geruchsverschluss zu wirken, wobei der Abwasserkanalauslass dazu ausgelegt ist, den Ablauf mit einem Abwasserkanalsystem zu koppeln, und eine Unterseite (104A) aufweist, die ein normales Abflussniveau L_{norm} definiert, und wobei das Ablenkblech eine Unterseite (106A) aufweist, die ein minimales Flüssigkeitsniveau L_{min} definiert, um zu ermöglichen, dass das Ablenkblech als Geruchsverschluss wirkt;

wobei der Senkkasten ferner einen zusätzlichen Speicher in Form einer Ablasseinrichtung (112) und mindestens einen Einsickerungsauslass (108) durch die Seitenwand aufweist, **dadurch gekennzeichnet, dass**
der mindestens eine Einsickerungsauslass (108) dazu ausgelegt ist, Flüssigkeit im Senkkasten zur Ablasseinrichtung (112) zu leiten, wodurch das Einsickern des gesammelten Wassers in den Boden um den Ablauf herum ermöglicht wird, wenn das Flüssigkeitsniveau im Senkkasten ein zusätzliches Abflussniveau L_{Ablass} übersteigt, wobei Folgendes gilt: $L_{min} < L_{Ablass} \leq L_{norm}$.

2. Ablauf nach Anspruch 1, wobei der Ablauf ferner ein Einsatzteil (214) umfasst, das dazu ausgelegt ist, im Abwasserkanalauslass eingesetzt zu werden, und ferner dazu ausgelegt ist, das Flüssigkeitsabflussniveau L_{norm} für Flüssigkeit im Ablauf zum Abwasserkanalsystem auf ein neues Abflussniveau L_{neu} zu erhöhen, wobei Folgendes gilt: $L_{norm} < L_{neu}$.

3. Ablauf nach Anspruch 2, wobei der Abwasserkanalauslass eine Höhe H aufweist und $H/3 < (L_{neu} - L_{norm}) < H/2$.

4. Ablauf nach einem der Ansprüche 2 - 3, wobei das Einsatzteil ein entfernbares Teil ist.

5. Ablauf nach einem der Ansprüche 1 - 4, wobei der Ablauf ein Filterelement umfasst, das in jedem des mindestens einen Einsickerungsauslasses positioniert ist.

6. Ablauf nach Anspruch 5, wobei das Filterelement eine Schicht aus Dränbeton umfasst, die in einer Öffnung durch die Seitenwand des Senkkastens für den Einsickerungsauslass (108) angeordnet ist.

7. Ablauf nach einem der Ansprüche 5 - 6, wobei das Filterelement ein Material umfasst, das für Öl undurchlässig und für Wasser durchlässig ist.

8. Ablauf nach einem der Ansprüche 5 - 7, wobei das Filterelement ferner eine Rückschlagventilanordnung umfasst, die dazu ausgelegt ist, die Flüssigkeitsströmung durch einen Einsickerungsauslass in den Senkkasten zu blockieren.

9. Ablauf nach einem der Ansprüche 1 - 8, wobei die Ablasseinrichtung (112) eine poröse Schicht ist, die an mindestens einem Abschnitt der Außenfläche der Seitenwand des Senkkastens befestigt ist, und wobei sich die poröse Schicht über Öffnungen des mindestens einen Einsickerungsauslasses und optional entlang der Bodenwand des Senkkastens erstreckt.

10. Ablauf nach Anspruch 9, wobei die poröse Schicht, die an mindestens einem Abschnitt der Außenfläche der Seitenwand des Senkkastens befestigt ist, eine Schicht aus Dränbeton ist.

11. Ablauf nach Anspruch 10 zusammen mit Anspruch 6, wobei die Schicht aus Dränbeton des Filterelements aus feinerem Korn besteht als die an der Außenfläche der Seitenwand befestigte poröse Schicht.

12. Ablauf nach einem der Ansprüche 9 - 11, wobei die

poröse Schicht, die an mindestens einem Abschnitt der Außenfläche der Seitenwand des Senkkastens befestigt ist, eine Stärke von mindestens 4 cm, insbesondere 6 cm, aufweist.

13. Ablauf nach einem der Ansprüche 1 - 12, wobei der Auslass (104) einen ersten Radius aufweist und jeder des mindestens einen Einsickerungsauslasses (108) einen zweiten Radius aufweist, wobei der zweite Radius kleiner ist als der erste Radius.

14. Ablauf nach einem der Ansprüche 1 - 13, wobei der Ablauf eine Ablasseinrichtung umfasst, die mit dem mindestens eine Einsickerungsauslass (108) gekoppelt ist, wobei die Ablasseinrichtung dazu ausgelegt ist, Flüssigkeit vom Senkkasten zum Einsickern in den Boden um den Ablauf herum zu leiten.

15. Ablauf nach Anspruch 14, wobei die Ablasseinrichtung mindestens eines der folgenden Elemente umfasst: Sickerrohre, perforierte Leitungen und eine Sickerbox.

Revendications

1. Puisard (100) comprenant un pot de puisard (102), une sortie d'égout (104) dans une paroi latérale du pot de puisard et un déflecteur (106) conçu pour agir comme piège à odeurs, la sortie d'égout étant conçue pour accoupler le puisard à un système d'égout et ayant une face inférieure (104A) définissant un niveau d'écoulement sortant normal L_{norm}, et le déflecteur ayant une face inférieure (106A) définissant un niveau de liquide minimal L_{min} pour permettre au déflecteur d'agir comme piège à odeurs ;

le pot de puisard comprenant en outre un réservoir supplémentaire sous la forme d'un moyen de drainage (112), et au moins une sortie d'infiltration (108) à travers la paroi latérale, **caractérisé en ce que,**
l'au moins une sortie d'infiltration (108) est conçue pour transférer le liquide dans le pot de puisard vers le moyen de drainage (112) facilitant l'infiltration de l'eau collectée dans le sol autour du puisard lorsque le niveau de liquide dans le pot de puisard dépasse un niveau d'écoulement sortant supplémentaire L_{drain}, où $L_{min} < L_{drain} \leq L_{norm}$.

2. Puisard selon la revendication 1, le puisard comprenant en outre une partie d'insertion (214) conçue pour être insérée dans la sortie d'égout et conçue en outre pour augmenter le niveau d'écoulement sortant de liquide L_{norm} pour le liquide dans le puisard vers le système d'égout à un nouveau niveau d'écoulement sortant L_{new}, où $L_{norm} < L_{new}$.

3. Puisard selon la revendication 2, la sortie d'égout ayant une hauteur H, et $H/3 < (L_{new} - L_{norm}) < H/2$.

4. Puisard selon l'une quelconque des revendications 2 - 3, la partie d'insertion étant une partie amovible.

5. Puisard selon l'une quelconque des revendications 1 - 4, le puisard comprenant un élément filtrant positionné dans chacune de l'au moins une sortie d'infiltration.

6. Puisard selon la revendication 5, l'élément filtrant comprenant une couche de béton perméable disposée dans une ouverture à travers la paroi latérale du pot de puisard pour la sortie d'infiltration (108).

7. Puisard selon l'une quelconque des revendications 5 - 6, l'élément filtrant comprenant un matériau qui est imperméable à l'huile et perméable à l'eau.

8. Puisard selon l'une quelconque des revendications 5 - 7, l'élément filtrant comprenant en outre un dispositif de clapet de retenue conçu pour empêcher le liquide de s'écouler à travers une sortie d'infiltration dans le pot de puisard.

9. Puisard selon l'une quelconque des revendications 1 - 8, le moyen de drainage (112) étant une couche poreuse fixée à au moins une partie de la surface extérieure de la paroi latérale du pot de puisard, et la couche poreuse s'étendant sur les ouvertures de l'au moins une sortie d'infiltration et éventuellement le long d'une paroi inférieure du pot de puisard.

10. Puisard selon la revendication 9, la couche poreuse fixée à au moins une partie de la surface extérieure de la paroi latérale du pot de puisard étant une couche de béton perméable.

11. Puisard selon la revendication 10 en liaison avec la revendication 6, la couche de béton perméable de l'élément filtrant étant constituée de gravier plus fin que le gravier de la couche poreuse fixée à la surface extérieure de la paroi latérale.

12. Puisard selon l'une quelconque des revendications 9 - 11, la couche poreuse fixée à au moins une partie de la surface extérieure de la paroi latérale du pot de puisard ayant une épaisseur d'au moins 4 cm, en particulier de 6 cm.

13. Puisard selon l'une quelconque des revendications 1 - 12, la sortie (104) ayant un premier rayon et chacune de l'au moins une sortie d'infiltration (108) ayant un second rayon, le second rayon étant inférieur au premier rayon.

14. Puisard selon l'une quelconque des revendications

1 - 13, le puisard comprenant un moyen de drainage accouplé à l'au moins une sortie d'infiltration (108), le moyen de drainage étant conçu pour transférer du liquide depuis le pot de puisard pour infiltrer le sol autour du puisard.

15. Puisard selon la revendication 14, le moyen de drainage comprenant au moins l'un des éléments suivants : tuyaux d'infiltration, conduits perforés et boîte d'infiltration.

Fig. 1

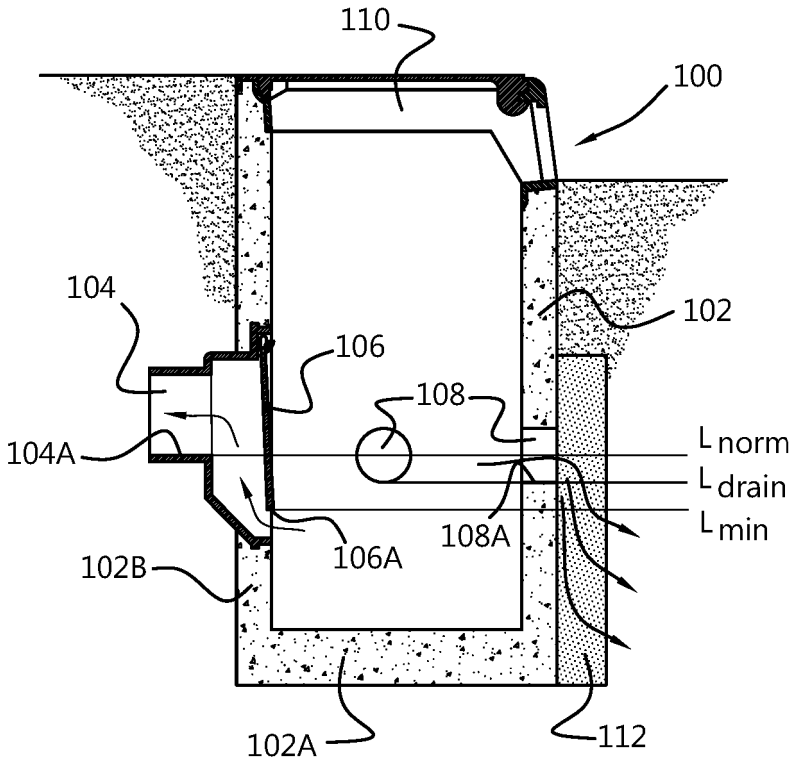

110
100
104
102
106
108
104A
L norm
L drain
L min
108A
106A
102B
102A
112

Fig. 2

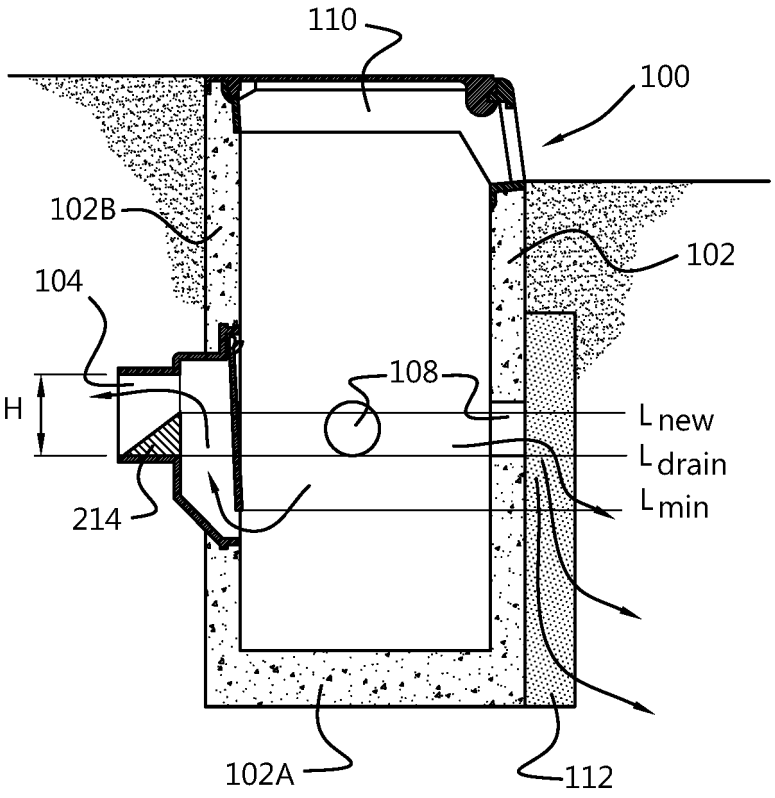

110
100
102B
102
104
108
H
L new
L drain
L min
214
102A
112

Fig. 3

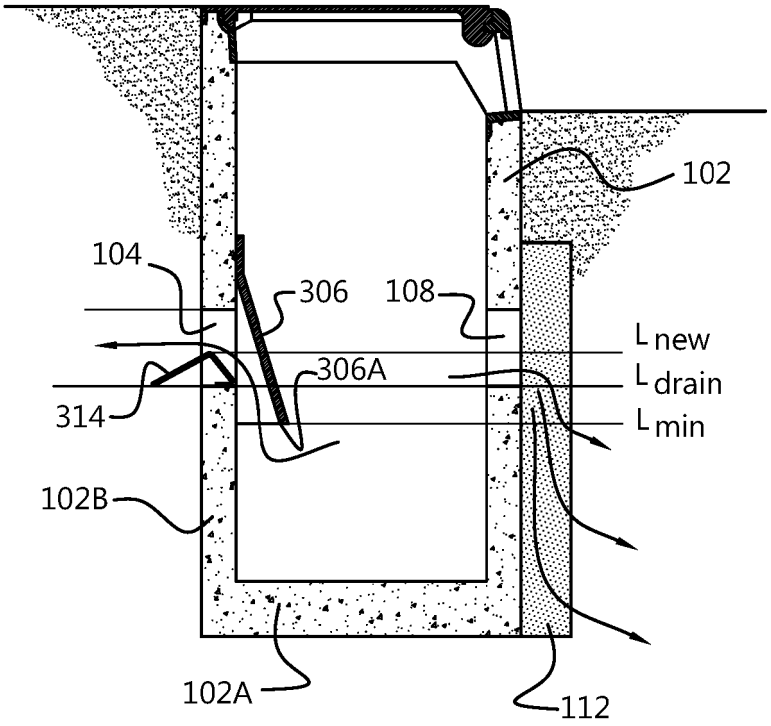

102
104
306
108
L new
306A
L drain
314
L min
102B
102A
112

Fig. 4

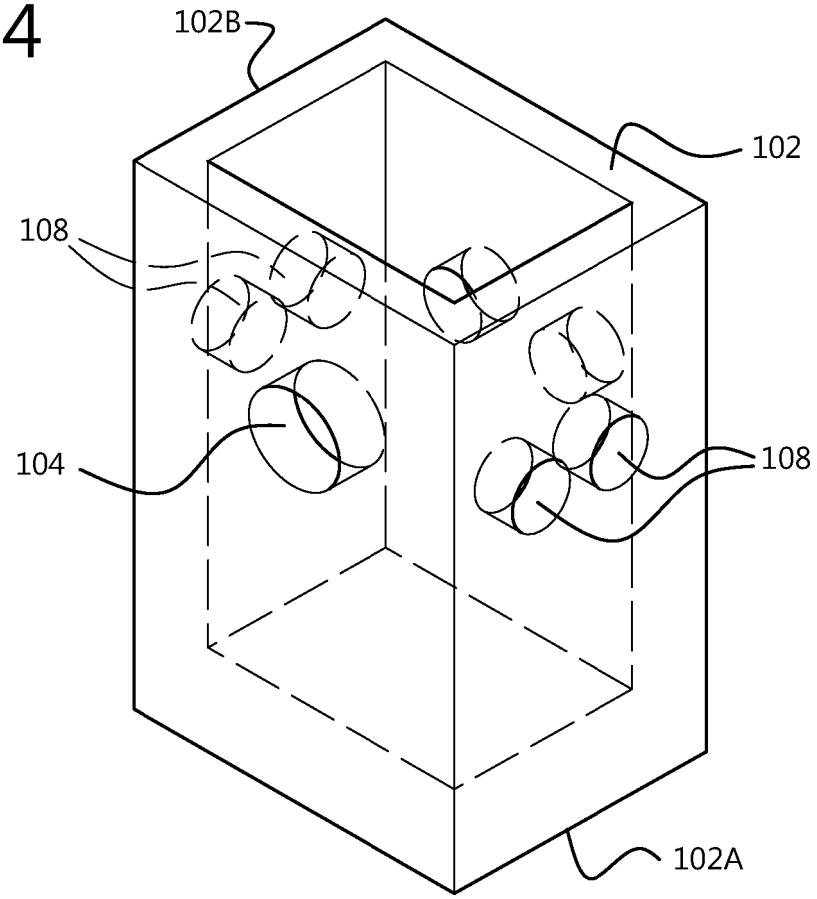

102B
102
108
104
108
102A

Fig. 5

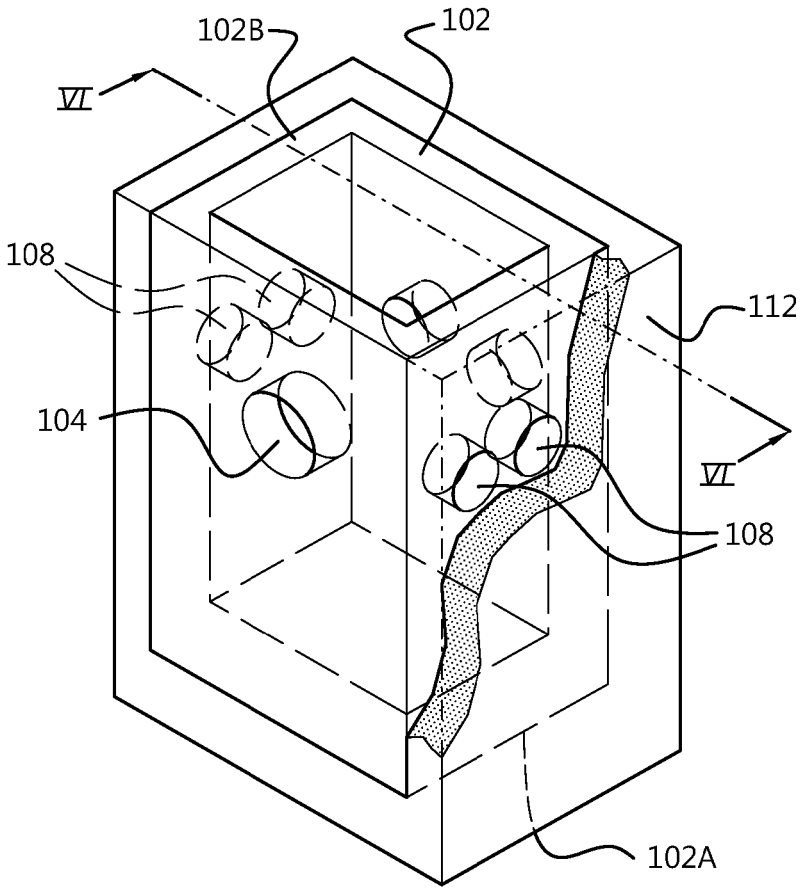

102B
102
VII
108
112
104
VII
108
102A

Fig. 6

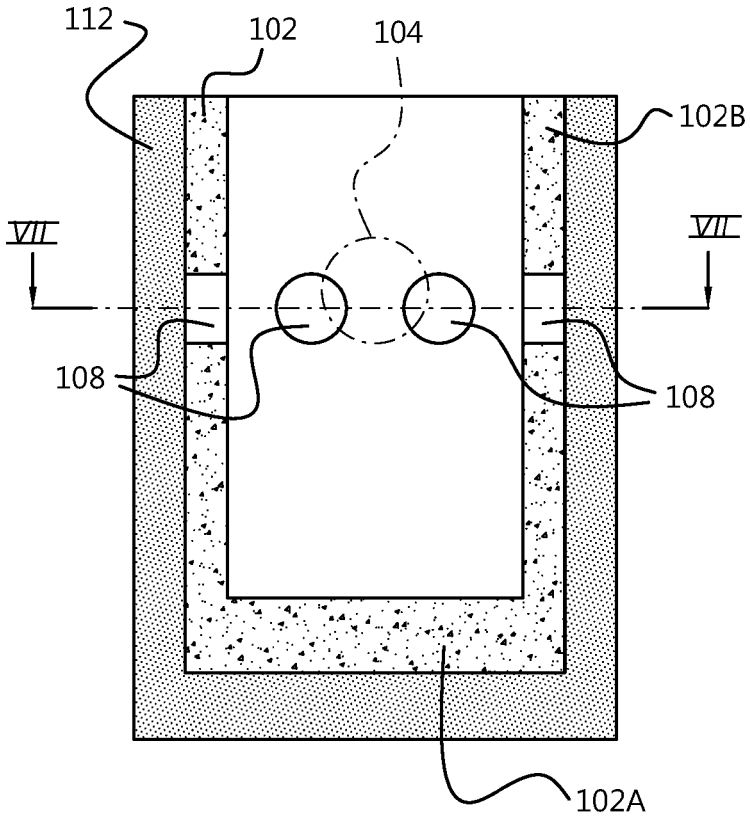

112
102
104
102B
VII
VII
108
108
102A

Fig. 7

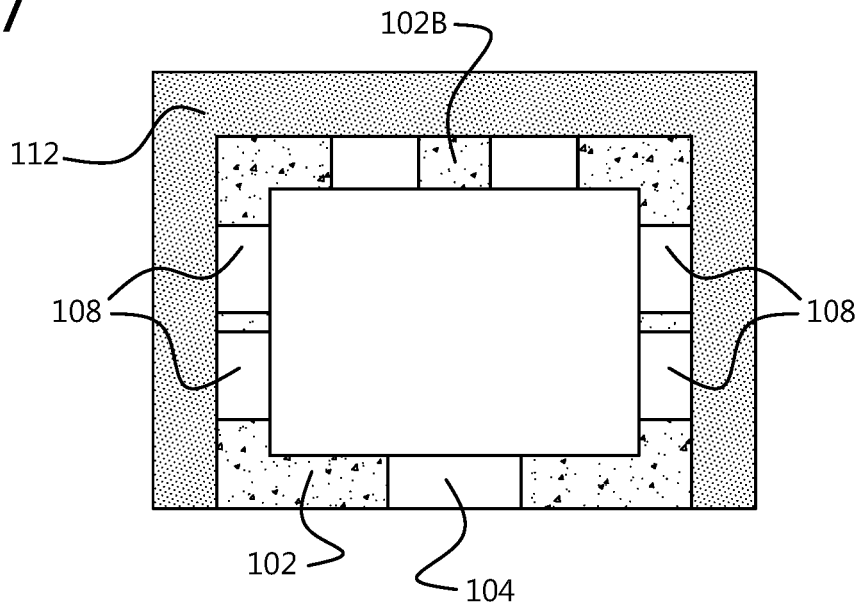


Fig. 8A

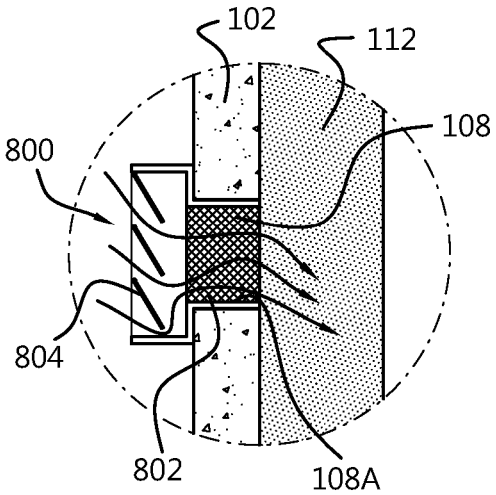
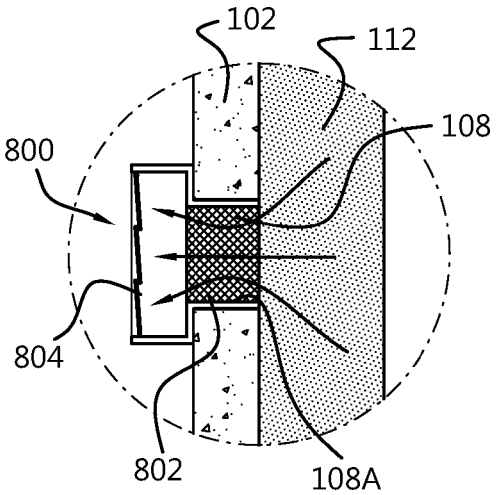


Fig. 8B



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- NL 1005621 **[0003]**
- EP 2796628 A1 **[0004]**
- CN 207062678 U **[0005]**
- CN 206205290 U **[0006]**
- NL 100561 C2 **[0025]**
- NL 2004578 C **[0025]**