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(54) CONTACT MEMBER FOR USE WITH A MANHOLE STRUCTURE

KONTAKTGLIED ZUR VERWENDUNG MIT EINER SCHACHTSTRUKTUR

ORGANE DE CONTACT S'UTILISANT AVEC UNE STRUCTURE DE REGARD

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Description

TECHNICAL FIELD OF THE INVENTION

5 **[0001]** The present invention relates to manholes and the like. In particular, the present invention relates to a contact member adapted to be positioned at least partially between the cover and the frame of a manhole.

BACKGROUND OF THE INVENTION

10 **[0002]** Manhole structures and other relevant structures comprise a cover and a frame, i.e. the end portion of the pipe or tube, which is supposed to receive the cover. A massive polymer member may be positioned between the cover and the frame to adjust for the deviation between the outer diameter of the cover and the inner diameter of the frame. However, the cover and the frame are typically prepared from cast iron and the exact dimensions may therefore vary dependent on process parameters during manufacturing, such as e.g. composition, cooling program, wear state of
15 mould, etc. The flexibility and compressibility of a massive polymer member is limited, which leads to a small tolerance. A tedious and costly process control must therefore be used during manufacturing of the cover and the frame to ensure that these are within the dictated tolerance. There is hence a need for a way to reduce the tolerance requirements of the cover and the frame.

OBJECTS OF THE INVENTION

[0003] It is the object of the invention to provide a contact member, which allows for larger tolerance of the cover and/or the frame dimension for a manhole or the like.

25 **[0004]** It is a further object of the invention to provide a method of preparing a closed manhole or the like.

STATE OF THE ART

[0005] US 4,834,574 disposes a member for raising the level of a manhole cover. One embodiment consists of a rigid member with slots for receiving rings. The rings form contact to the cover and to the frame.

30 **[0006]** GB 2 102 479 discloses a manhole for a road. The manhole has a resilient gasket arranged between the cover and the frame. In one embodiment, the gasket forms a compartment, which compartment is closed when the manhole is closed.

DISCLOSURE OF THE INVENTION :

35 **[0007]** The above objects and other objects of the invention are realised with a contact member for a manhole structure and the like adapted to be positioned at least partially between a cover of the manhole and a frame of the manhole, wherein a cross-section of the contact member comprises a first side adapted to form contact to the frame of the manhole structure, a second side adapted to form contact to the cover of the manhole structure, and a compartment open to the
40 outer surface of the contact member. The compartment is positioned between the first side and the second side of the contact member.

[0008] A contact member of this type is typically formed as a closed loop, but other embodiments are also feasible, examples being plate- or box-shaped contact member and unclosed loops or lengths of contact member. Furthermore, a closed loop contact member need not be round but may e.g. also be triangular, quadrangular, rectangular or in any
45 other way follow the shape of the cover and/or the frame.

[0009] Manhole structure and the like or just manhole structure is herein meant to include a wide range of structures similar to manholes, such as structures for flushing manholes, stop cocks, drains and other inspection or access chambers etc. Such structures typically have cover diameters in the range of 100 to 800 mm or even larger such as up to 1000 mm, 1200 mm or even 1500 mm. For structures having non-circular covers, the dimensions may also vary considerably
50 and typically at least one dimension is in the order of 100 to 1500 mm. These dimensions represent the preferred sizes of covers, but structures with larger or smaller cover dimensions are feasible and may benefit from the present invention. The present invention is most advantageous for structures with covers of dimensions in the order of 100 to 800 mm.

[0010] It should be understood that the term first side adapted to form contact to the frame of the manhole structure is not limited to the whole of the first side being such adapted. The term is intended to also include situations where only
55 a part of the first side is such adapted. The same considerations apply equivalently with regard to the second side.

[0011] The positioning of the compartment between the first side and the second side of the contact member is to provide for a smaller wall thickness of the contact member in at least a fraction of the sections, which is to form contact to the cover and/or the frame.

[0012] This again facilitates that the contact member is able (by e.g. compressing and/or flexing) to adapt to larger variations in the dimensions of the cover and/or the frame. In other words, the contact member according to the invention will allow for higher tolerance of the cover and/or the frame dimension than the prior art.

[0013] The depth of the compartment(s) may therefore be deeper than, shallower than or equivalent to the expected contact area at the first side or the second side of the contact member.

[0014] The compartment is preferably open either towards to the outer surface of the manhole structure or away from the outer surface of the manhole, but of these orientations it is most preferred that the compartment is open towards the outer surface of the manhole, since this allows for a filling material to be easily introduced into the compartment (see below). The orientation of the opening of the compartment away from the outer surface of the manhole is particularly advantageous when the contact member is fixed to the frame prior to the connection to the cover.

[0015] In a highly preferred embodiment according to the invention, the first side and the second side are in flexible communication with each other whereby the distance between a point on each of the sides may be changed by biasing one or both of the sides. The flexible communication should be understood as connected but not necessarily directly to one another, whereby at least part of one of the sides may flex relative to the other side. If a wedge-shaped orientation between at least parts of the first side and the second side is provided in the unbiased state, and the compartment is positioned between the sides, then a substantial variation in the distance between the sides of contact member may be realised by flexing one or both of the sides (or part of the side(s)). Since the distance between the sides of the contact member corresponds to the effective size of the contact member, a higher tolerance towards the dimensions of the cover and/or the frame may also be realised through such flexing.

[0016] The biasing is typically realised by biasing at least a part of one or both sides towards each other in the section near the compartment, and the direction of the biasing is usually orthogonal to the longitudinal direction of the compartment. Hence, it is preferred that the biasing is in a direction substantially orthogonal to the first side of the contact member as this direction is advantageous in being the easiest direction to bias the sides.

[0017] In a preferred embodiment, the compartment(s) is adapted to receive a filling material to at least temporarily fix the relative positioning of the first side relative to the second side. It is advantageous to be able to introduce a filling material into the compartment as this may fix or lock the movement/flexing of the sides. Hence, the filling material may prevent or at least reduce the tendency of the cover to loosening relative to the frame gradually over a period of time or suddenly at an undesired time. The adaptation may e.g. include separating the compartment into a number of smaller subcompartments as discussed elsewhere, providing a wear-resistant coating or member near the bottom of a compartment to prevent damage if the filling material is to be removed or to provide the inner surface of a compartment with a micro or macro surface roughness to enhance fixing of the filling material in the compartment after an at least partial filling. However, in many cases, the typical as-manufactured properties will provide adequate properties and hence further adaptation may not be needed.

[0018] Vibration and/or noise may arise upon impact on a manhole structure, such as when a car rolls over the cover of the manhole. Therefore, it is desirable to reduce the source of such vibration/noise and/or the transfer of vibration/noise between the frame and the cover. This may be realised by a damping means, which may e.g. work through one or more of: Preventing permanent or temporary direct metal-metal contact between the cover and the frame; locking the cover in the horizontal plane (e.g. by biased flexibility of one or more of the sides of the contact member); and locking the cover in the vertical direction or at least prevent vertical banging of the cover optionally including the contact member into the frame.

[0019] In a preferred embodiment, such a damping means is integrated into the contact member whereby a simple and multifunctional contact member is realised.

[0020] Typically, the frame and the cover are made of cast iron. Since different types and in some cases even different batches of the same type of cast iron may have different corrosion potential, galvanic corrosion may take place upon direct contact between such parts. In a preferred embodiment of the present invention, the contact member consists of an isolating material or at least no conducting connection may be realised through the contact member. In this embodiment it is e.g. not desired to use a material, which is reinforced with carbon fibres as carbon fibres are electrically conducting unless an isolating coating is provided on the contact member. Furthermore, according to this embodiment, the contact member is shaped and/or adapted to be positioned to prevent direct contact between the cover and the frame. Such shaping may e.g. involve a tongue of the contact member extending under the cover in the area where contact to the frame may arise. It should be noticed that corrosion might take place even if there is no direct contact between the cover and the frame when a conducting fluid, such as sodium chloride containing water, is in simultaneous contact with the two. Therefore, the present invention provides another advantage by possible sealing action provided by the sides if biased towards the frame and the cover, respectively. Hence, water and dirt, such as sodium chloride, is prevented from entering the space between the cover and the frame except into the compartment, where no direct contact with the cover or the frame is possible.

[0021] In another aspect of the invention, a method for preparing a closed manhole structure comprising a contact member according to the invention is provided. The method comprises the steps of providing a frame for a manhole, a

cover for the manhole and a contact member according to the first aspect of the invention, whereby the contact member is positioned at least partially between the cover and the frame, and at least partially filling a compartment positioned between a first side and a second side of the contact member with a filling material to at least temporarily fix the relative positioning of the first and second sides of the contact member.

[0022] The contact member, cover and frame may be provided in several different orders dependent on the actual geometry and properties of the elements. For example, the frame may be provided first, then the contact member and finally the cover. Another example is to provide the frame first, then the cover and finally the contact member.

[0023] The filling material may be many different materials. In a preferred embodiment, the filling material is simply dirt supplied over time from the environment to the compartment. In another preferred embodiment, a dedicated filling material is applied. In theory, the filling material may be anything having a rigidity greater than air, introduction of such material would lead to decrease in the flexibility of the sides of the contact member. However, it is preferred that the filling material is of a relatively stable shape and preferred examples are therefore particulate material such as sand, gravel, clay, or a polymer-based material. With regard to polymers, thermosetting polymers are preferred, examples of usable polymers are polyesters, epoxies, silicones, rubbers, etc. It is preferred that the polymer-based material is self-curing, however, other types of curing are also feasible. The choice of filling material should reflect if the filling of the compartment is supposed to be permanent or only temporary. This typically corresponds to the cover of the manhole being closed permanently or only temporarily. If a temporary filling is desired, it is preferred that the filling material may be removed from the compartment either before removing of the cover or after removing of the cover but before re-closing of the manhole if re-closing is desirable.

[0024] In a preferred embodiment, a polymer-based material is used as filling material and the material may be removed in one piece, i.e. when it is loosened in one place it may be removed by pulling the material. This may be facilitated by the cured polymer being relatively flexible and hence capable of deforming elastically during removal from the contact member.

[0025] In a particular embodiment, a compressible material is provided to the compartment for example during the manufacturing of the contact member, shortly after manufacturing of the contact member or at a later stage. Such a compressible material will mainly become compressed when being stressed and will only expand very limited in the transverse direction according to Poisson ratio. The compressible material will therefore prevent or reduce introduction of unwanted material into the compartment during the first stages of preparation of the manhole structure without detrimentally influencing the flexibility of the sides of the contact member or the vertical height of the contact member. After cover, frame and the contact member are provided in the desired positions, the compressible material may either be removed or - preferably - it is transferred to a more rigid state, in which state the former compressible material at least temporarily fixes the relative positioning of the first side and the second side of the contact member. An example of such a material is a foam or a cell-structure comprising an at least partially uncured resin, which may be cured upon e.g. heating, radiation (e.g. by UV-light) or addition of a reagent. Another example is an open structured material, which may be filled with a thermosetting polymer and afterwards cured.

[0026] If the filling material comprises open pores, water is a particular concern, as water in the filling material, such as water in a dirt filling material, will expand upon freezing. Generally speaking, an expansion of the filling material should expand the compartment and hence increase the locking force exerted by the sides of the contact member to the cover and frame, which is desirable as long as the force does not extend beyond the strength of the materials. However, as the compartment is relatively small compared to the size of the frame, the cover and the contact member, the contribution from freezing water should typically not exceed the strength of the other materials.

[0027] In a preferred embodiment, the contact member is fixed to either the cover or the frame before the preparation of the closed manhole. By fixed is herein meant that the freedom to move is considerably reduced. In some preferred embodiments, the reduction of freedom to move relative to where it is fixed is so pronounced that the fixed parts are practically speaking locked to each other.

[0028] The contact member may be fixed to the cover or the frame by chemical means (e.g. by adhesion or by the material of the contact member reacting with the element whereto the contact member is fixed), by mechanical means (e.g. on a micro scale, such as e.g. related to surface roughness, or on a macro scale, such as a combination of protrusions and/or recesses) or a combination of mechanical and chemical means. It may be advantageous that the contact member is fixed to either the cover or the frame, since this allows for a faster preparation of the closed manhole and reduces the risk of misalignment of elements as less individual elements are used. The advantage of using the contact member according to the invention is therefore enhanced further by fixing the contact member to the cover or the frame.

[0029] It is more preferred that the contact member is fixed to the cover, as this typically allows for easy access to introduce filling material into the compartment of the contact member.

[0030] It is preferred to prepare contact member according to the invention by moulding. The contact member may be moulded as a separate part or directly onto the cover or the frame. If the contact member is to be fixed to the cover or the frame, moulding of the contact member directly onto this element is a preferred way to enhance fixation by mechanical means on a micro scale. It is particularly advantageous to mould the contact member onto the element to

which it is to be fixed if the material of the contact member has a relatively low flexibility, such as many polyurethane-based polymers. If the material has a higher flexibility, the contact member may be moulded as a separate part and afterwards connected to the other element to which it is to be fixed.

[0031] The contact member may comprise a wide range of materials, but polymer-based materials are preferred. Particularly materials or mixtures, which are suitable for shaping by moulding, are preferred, as moulding is the preferred method of preparation. Most of the applications for contact member according to the invention involve tough environments and it is therefore preferred that the material is relatively durable. Most preferred materials are polyurethane-based, rubber-based and chloroprene-based materials.

[0032] To enhance the durability, for example towards wear, the contact member may be reinforced by e.g. fibre materials, such as glass fibres, carbon fibres, aramide fibres or natural fibres (e.g. hemp, etc.), or by particulate reinforcement, such as mineral particulates like e.g. quartz, Al_2O_3 , etc.).

[0033] Contact members according to the invention are particularly useful for a number of objects including:

- securing a cover of a manhole structure relative to a frame of a manhole structure,
- sealing a cover of a manhole structure relative to a frame of a manhole structure,
- reducing wear of cover and/or frame,
- vibration damping,
- providing an electrically isolating layer between the cover and the frame,
- absorbing tension between frame and cover, and
- allowing for higher tolerances on cover and/or frame dimensions,

[0034] Securing is discussed extensively throughout the description. Sealing may e.g. arise based on the biasing action between the sides of a contact member positioned between a cover and a frame. A reduction of wear of the cover and/or the frame may e.g. arise through prevention of direct sliding contact between the cover and the frame. Vibration damping and electrical isolation as well as allowing for higher tolerances on cover and/or frame dimensions are discussed elsewhere. A need for absorption of tension or stress may e.g. arise due to a difference in thermal expansion coefficient, E-modulus, etc. of the cover, frame and/or contact member.

[0035] Dependent on the exact used embodiment, these uses may arise individually or in various combinations. It is important to note that when more than one of these uses take place simultaneously, the combined uses provide the further advantage that these uses are being integrated simultaneously into one element only. Hence a relatively simple and affordable member replaces - theoretically speaking - one separate member for each object. Therefore, the simultaneous use for two or more of the above uses is preferred. Examples of even more preferred numbers of simultaneous uses are three, four, five, six or seven simultaneous uses of those mentioned above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036] The invention will be explained more fully below with reference to particularly preferred embodiments as well as the drawings, in which

Fig. 1 shows cross-sections of two examples of contact member according to the invention,

Fig. 2 shows a closed loop contact member,

Fig. 3 shows different distributions of compartments,

Fig. 4 shows different cross-sections of compartments,

Fig. 5 shows cross-sections of contact members fixed to a cover or a frame,

Fig. 6 shows a cross-section of a contact member mounted in a manhole structure,

Fig. 7 shows a cross-section of a manhole structure wherein the contact member and the frame are provided with corresponding frame-locking means and contact-member-locking means, and

Fig. 8 shows a cross-section of a manhole structure wherein the contact member is fixed to the cover by macro mechanical means.

[0037] All the figures are highly schematic and not necessarily to scale, and they show only parts which are necessary

in order to elucidate the invention, other parts being omitted or merely suggested.

DESCRIPTION OF THE DRAWINGS

[0038] In the left part of Fig. 1 a simple contact member according to the invention is provided. The contact member has a first side 4 adapted to be connected to a cover and a second side 6 adapted to be connected to the frame. The sides are oriented in a slightly wedge-like fashion and particularly the upper part of the second side 6 on the level of the depth of the compartment 8 is bent away from the first side 4. Thereby a larger tolerance of the dimension of the cover and the frame is allowed. The contact member in the right part of Fig. 1 is further equipped with a foot or tongue at the bottom for example suitable for supporting the bottom of the cover. This may be advantageous in ensuring that the contact member is fitted right to the bottom of the cover and hence forcing the contact member to be fully inserted during application of the contact member.

[0039] Both of the contact members in Fig. 1 may advantageously further comprise mechanical means for fixing the contact member to the cover e.g. as shown schematically in Fig. 8.

[0040] In Fig. 2 a closed loop contact member corresponding to the contact member shown in the right part of Fig. 1 is shown. The foot or tongue shown in Fig. 1 is also vaguely visible on the inside of the loop. In Fig. 2, compartment 8 consists of one continuous long slot. However, it is important to note that the presence of a compartment in the cross-section of the contact member does not imply that only one compartment running continuously throughout the length of the contact member is present. Many other designs of compartments are feasible within the inventive concept of the invention even though a contact member with one continuous compartment is a preferred embodiment, as this design is simple to manufacture and advantageous in providing very uniform length-wise compression and/or flexibility properties of the contact member. Examples of other preferred types and distributions of compartments of which some are shown in Fig. 3 include:

- A plurality of bores or holes (Fig. 3A), preferably not extending through the contact member, which may be advantageous if the filling material is introduced permanently, as removal is tedious and should not happen accidentally.
- A number of shorter slots, which may be positioned:
 - end to end separated by a relatively thin wall (Fig. 3B), which ensures a highly flexible contact member wherein the filling material in one compartment (and hence the locking force exerted by this compartment) is not influenced by the other compartments,
 - end to end separated by a longer wall (Fig. 3C), which results in a less flexible but more stable contact member, or
 - partially side by side (Fig. 3D), e.g. spiralling inward or outward, which may be advantageous as the distance between the first side and the second side may be adjusted temporary by shearing the sides relative to each other.
- Longer slots extending between 1/10 to 1/3 or even more of the length of the contact member, such as more than 1/5 of the length of the contact member, which may be advantageous in allowing some redistribution along the length of the contact member within one compartment.

[0041] The shape of the cross-section of the compartment(s) may vary particularly dependent on the filling material being introduced permanently or not. In Fig. 4 some preferred embodiments are sketched to indicate preferred general principles of the shaping of the compartment(s). Fig. 4A shows a V-shaped and hence very open compartment. A strict geometrical shape, such as V-shape or parallel edges, is advantageous if a tool is to be used for the removal of the filling material. In this case, an edge of the tool may be equipped with a tooth of similar shape and the filling material may be removed by sliding this tooth along the length of the compartment. Fig. 4B shows a bracket-like compartment. There, the filling material will be more or less trapped inside the compartment and if the filling material cures or in another way solidifies, this design may lead to a highly fixed filling material. Fig. 4C is a variation of Figs. 4A and B where the V-shaped compartment is equipped with arms to secure the filling material. In Fig. 4D, the open end of the compartment is rounded, which may facilitate removal of filling material. The bottom of the compartments is preferably closed even though the bottom may be equipped with holes through the manhole structure, if this is desired. Furthermore, the bottom may be rounded or have sharp edge(s).

[0042] In Fig. 5, cross-sections of contact members 2 are seen. In Fig. 5 left, the contact member 2 is fixed to the cover 12 at the first side 4 to form one unit, which is easier to transport and faster to apply.

[0043] If the contact member 2 is fixed to the cover 12, it is preferred that the compartment 8 is open towards the surface of the manhole as shown in Fig. 2, as this allows for a filling material to be easily introduced into the compartment after positioning the combined cover and contact member in the desired position relative to the frame.

[0044] On the other hand, it is preferred that the compartment is oriented away from the surface of the manhole frame if the contact member is fixed to the frame as this allows for better use of the flexibility if biasing the walls of the contact

member. An example of this orientation is shown in Fig. 5 to the right.

[0045] In Fig. 6, a cross-section of the contact member fixed to the cover 12 shown in Fig. 5 is shown fully mounted to form a manhole 10. Particularly, it is observed that the second side 6 was biased during installation as well as the second side 6 is biased in the static situation shown in Fig. 6. Hence, the sides 4, 6 will exert a force on the cover 12 and the frame 14 and may in that way actually form a seal to prevent matter to pass into or from the manhole via the space between the cover and the frame. To lock the relative position of the sides, a filling material 20 has been provided in the compartment 8. If the filling material is rigid or incompressible, it should prevent the cover from moving or from being completely removed as long as the filling material 20 is in the compartment 8. The locking is further enhanced in that the bottom of the compartment being wider than the opening in the installed biased position.

[0046] In Fig. 7, an embodiment utilising another - or optionally additional - fixing method is shown. The cross-section shows that the contact member is equipped with a frame locking means 26, which interacts with a corresponding contact-member-locking means on the frame. A similar set of locking means (not shown) may equivalently be provided on a set of corresponding contact member and cover.

[0047] The interaction between a set of frame/cover locking means and contact-member-locking means lead to a permanent locking of the manhole structure, whereby the manhole structure may not be opened without damaging the contact member, or a temporary locking of the manhole structure, whereby the manhole structure may be opened and re-closed several times without damaging the contact member.

[0048] In Fig. 7, the frame-locking means is biased during installation and snaps in contact with the contact-member-locking means when the final desired position is reached. In the final position, the side of the contact member may or may not be biased dependent on the desired properties of the connection. However, it is preferred that the side is at least slightly biased in the final position to enhance the locking of the cover.

[0049] The corresponding sets of locking means 26, 28 need not be provided along the full length of the contact member. The contact member may e.g. be equipped with only few sets of locking means of short length; a larger number of sets of locking means or sets of locking means having an extended length; or one set of locking means extending substantially the full length of the contact member.

[0050] In Fig. 8, another embodiment of a contact member with a frame locking means is shown. Fig. 8 further shows an example of means 30 for mechanically fixing of a contact member to a cover. Such means or set of means may advantageously be utilised when the contact member is not moulded directly onto one of the frame and cover. The design of such means may vary considerably and a person skilled in the art would easily derive a range of usable designs based on the disclosure in Fig. 8.

TABLE FOR IDENTIFICATION

[0051]

2	Contact member
4	First side of contact member
6	Second side of contact member
8	Compartment
10	Manhole structure
12	Cover of a manhole structure
14	Frame of a manhole structure
20	Filling material
22	Damping means
24	Area of contact member
26	Frame-locking means
28	Contact-member-locking means
30	Means for mechanically fixing of a contact member to a cover

Claims

1. A contact member (2) for a manhole structure (10) and the like adapted to be positioned at least partially between a cover (12) of said manhole structure (10) and a frame (14) of said manhole structure (10), wherein a cross-section of said contact member comprises:

- a first side (4) adapted to form contact to said frame (14) of said manhole structure (10),
 - a second side (6) adapted to form contact to said cover (12) of said manhole structure (10), and
 - a compartment (8) open to an outer surface of said contact member (2), said compartment (8) being positioned between said first side (4) and said second side (6), **characterised in that** said compartment (8) when used in the manhole structure is open to an outer surface of said manhole structure (10), and said compartment (8) is adapted to receive a filling material to at least temporarily fix the relative positioning of said first side (4) to said second side (6).
2. A contact member according to any one of the claims 1, wherein said first side and said second side are in flexible communication, whereby the distance between a point on each of the sides may be changed by biasing one or both of the sides.
 3. A contact member according to any of the claims 1 to 2, wherein said biasing is in a direction substantially orthogonal to said first side of the contact member.
 4. A contact member according to any of the claims 1 to 3, wherein said contact member comprises more than one compartment, at least one of said compartments are shaped as a bore, a short slot or a longer slot extending more than 1/5 of the length of said contact member.
 5. A contact member according to any one of the claims 1 to 4, wherein said compartment comprises a compressible filling material.
 6. A contact member according to claim 5, wherein said filling material is transformable to a more rigid state, in which state said filling material at least temporarily fixes the relative positioning of said first side to said second side.
 7. A contact member according to any one of the claims 1 to 6 further comprising a damping means to reduce transfer of vibration between said cover and said frame and/or to reduce noise arising upon impact on said manhole structure.
 8. A contact member according to any one of the claims 1 to 7, said contact member consisting of an isolating material and being shaped and/or adapted to be positioned to prevent direct contact between said cover and said frame.
 9. A contact member according to any one of the claims 1 to 8 comprising a polymer-based material, preferably a durable polymer-based material, such as a polyurethane-based material or a chloroprene-based material.
 10. A contact member according to claim 9 wherein said polymer-based material comprises reinforcement, such as fibre-reinforcement or particulate reinforcement.
 11. A contact member according to any one of the claims 1 to 10 further comprising a frame-locking means for at least temporarily locking said contact member to said frame and/or a cover-locking means for at least temporarily locking said contact member to said cover.
 12. A frame (14) for a manhole structure (10) **characterised by** comprising a contact-member-locking means (28) adapted to communicate with said frame-locking means of the contact member (2) according to claim 11.
 13. A cover (12) for a manhole structure (10) **characterised by** having a contact member (2) according to any one of the claims 1 to 11 fixed thereto by mechanical and/or chemical means.
 14. A frame (14) for a manhole structure (10) **characterised by** having a contact member (12) according to any one of the claims 1 to 11 fixed thereto by mechanical and/or chemical means.
 15. A method of preparing a closed manhole structure or the like comprising the steps of
 - providing a frame (14) for a manhole, a cover (12) for said manhole and a contact member (2) according to any one of the claims 1 to 11, whereby said contact member (2) is positioned at least partially between said cover (12) and said frame (14), and
 - thereafter at least partially filling a compartment (8) positioned between a first side (4) and a second side (6) of said contact member (2) with a filling material (20) to at least temporarily fix the relative positioning of said first (4) and second (6) sides of said contact member (2).

16. A method according to claim 15, wherein said first side of said contact member and/or said second side of said contact member is biased (towards the other of said sides) during providing of said contact member in said position at least partially between said cover and said frame.

17. A method according to any one of the claims 15 to 18, wherein said first side of said contact member and/or said second side of said contact member is biased (towards the other of said sides) In said position at least partially between said cover and said frame.

18. A method according to any one of the claims 15 to 17, wherein said filling material is dirt or a polymer-based material.

19. A method according to any one of the claims 15 to 18, wherein said contact member is fixed to said frame or said cover before positioning said contact member at least partially between said cover and said frame.

20. A method according to claim 19, wherein said contact member is fixed to said frame or said cover during moulding of said contact member.

21. Use of a contact member according to any one of the claims 1 to 11 for one or more of

- securing a cover of a manhole structure relative to a frame of said manhole structure,
 - sealing said cover of said manhole structure relative to said frame of said manhole structure,
 - reducing wear of cover and/or frame,
 - vibration damping,
 - providing an electrically isolating layer between said cover and said frame,
 - absorbing tension between said frame and said cover, and
 - allowing for higher tolerances on cover and/or frame dimensions,
- preferably simultaneously for two or more of the above uses, such as two, three, four, five or six simultaneous uses.

Patentansprüche

1. Ein Kontaktglied (2) für eine Schachtstruktur (10) und dergleichen, welches Kontaktglied zur zumindest teilweisen Anbringung zwischen einem Deckel (12) der besagten Schachtstruktur (10) und einem Rahmen (14) der besagten Schachtstruktur (10) geeignet ist, wobei ein Querschnitt des besagten Kontaktglieds folgendes umfasst:

- eine erste Seite (4), die zur Kontaktbildung mit dem besagten Rahmen (14) der besagten Schachtstruktur (10) geeignet ist,
- eine zweite Seite (6), die zur Kontaktbildung mit dem besagten Deckel (12) der besagten Schachtstruktur (10) geeignet ist, und
- eine gegen die Aussenfläche des besagten Kontaktglieds (2) offene Kammer (8), welche Kammer (8) zwischen der besagten ersten Seite (4) und der besagten zweiten Seite (6) angebracht ist, **dadurch gekennzeichnet, dass** die besagte Kammer (8) bei Benutzung in der Schachtstruktur gegen die Aussenfläche der besagten Schachtstruktur (10) offen ist, und die besagte Kammer (8) zur Aufnahme eines Füllstoffes geeignet ist, um die Positionierung der besagten ersten Seite (4) im Verhältnis zu der besagten zweiten Seite (6) zumindest zeitweilig zu fixieren.

2. Ein Kontaktglied gemäss Anspruch 1, wo die besagte erste Seite und die besagte zweite Seite in flexibler Verbindung stehen, wodurch der Abstand zwischen einem Punkt an jeder der beiden Seiten durch die Vorspannung einer oder beider Seiten geändert werden kann.

3. Ein Kontaktglied gemäss einem jeglichen der Ansprüche 1 bis 2, wo die besagte Vorspannung in einer im Wesentlichen orthogonalen Richtung zu der besagten ersten Seite des Kontaktglieds geschieht.

4. Ein Kontaktglied gemäss einem jeglichen der Ansprüche 1 bis 3, wo das besagte Kontaktglied mehr als eine einzelne Kammer umfasst, indem mindesten eine der besagten Kammern in Form eines Bohrlochs, eines kurzen Schlitzes oder eines längeren Schlitzes vorliegt und sich über mehr als 1/5 der Länge des besagten Kontaktglieds erstreckt.

5. Ein Kontaktglied gemäss einem jeglichen der Ansprüche 1 bis 4, wo die besagte Kammer einen komprimierbaren

Füllstoff umfasst.

- 5 6. Ein Kontaktglied gemäss Anspruch 5, wo der besagte Füllstoff in einen festeren Zustand überführt werden kann, in welchem Zustand der besagte Füllstoff zumindest zeitweilig die Positionierung der besagten ersten Seite im Verhältnis zu der besagten zweiten Seite fixiert.
- 10 7. Ein Kontaktglied gemäss einem jeglichen der Ansprüche 1 bis 6, welches Kontaktglied ausserdem ein Dämpfungselement umfasst zur Verminderung der Überführung von Vibrationen zwischen dem besagten Deckel und dem besagten Rahmen und/oder zur Verminderung von Lärm, der durch Einwirkungen auf die besagte Schachtstruktur entsteht.
- 15 8. Ein Kontaktglied gemäss einem jeglichen der Ansprüche 1 bis 7, welches Kontaktglied aus einem Isolierstoff besteht und so geformt und/oder eingerichtet ist, dass es zur Verhinderung von direktem Kontakt zwischen dem besagten Deckel und dem besagten Rahmen positioniert werden kann.
- 20 9. Ein Kontaktglied gemäss einem jeglichen der Ansprüche 1 bis 8, welches Kontaktglied ein Material auf Polymer-Basis, vorzugsweise ein langlebiges Material auf Polymer-Basis, wie z.B. ein Material auf Polyurethan-Basis oder ein Material auf Chloropren-Basis umfasst.
- 25 10. Ein Kontaktglied gemäss Anspruch 9, wo das besagte Material auf Polymer-Basis eine Verstärkung wie z.B. eine Fiberverstärkung oder Partikelverstärkung umfasst.
- 30 11. Ein Kontaktglied gemäss einem jeglichen der Ansprüche 1 bis 10, welches Kontaktglied ausserdem einen Rahmenverschluss zum zumindest zeitweiligen Verschluss des besagten Kontaktglieds mit den besagten Rahmen umfasst und/oder einen Deckelverschluss zum zumindest zeitweiligen Verschluss des besagten Kontaktglieds mit dem Deckel.
- 35 12. Ein Rahmen (14) für eine Schachtstruktur (10), **dadurch gekennzeichnet, dass** dieser einen Kontaktgliedverschluss (28) umfasst, der zur Verbindung mit dem besagten Rahmenverschluss des Kontaktglieds (2) gemäss Anspruch 11 geeignet ist.
- 40 13. Ein Deckel (12) für eine Schachtstruktur (10), **dadurch gekennzeichnet, dass** dieser mit einem Kontaktglied (2) gemäss einem jeglichen der Ansprüche 1 bis 11 versehen ist, welches mit mechanischen und/oder chemischen Mitteln daran befestigt ist.
- 45 14. Ein Rahmen (14) für eine Schachtstruktur (10), **dadurch gekennzeichnet, dass** dieser mit einem Kontaktglied (12) gemäss einem jeglichen der Ansprüche 1 bis 11 versehen ist, welches mit mechanischen und/oder chemischen Mitteln daran befestigt ist.
- 50 15. Ein Verfahren zur Herstellung einer geschlossenen Schachtstruktur oder dergleichen, welches Verfahren folgende Schritte umfasst:
 - Bereitstellung eines Rahmens (14) für einen Schacht, eines Deckels (12) für den besagten Schacht und eines Kontaktglieds (2) gemäss einem jeglichen der Ansprüche 1 bis 11, wobei das besagte Kontaktglied (2) zumindest teilweise zwischen dem besagten Deckel (12) und dem besagten Rahmen (14) angebracht wird, und
 - eine nachfolgende zumindest teilweise Füllung einer Kammer (8), die sich zwischen einer ersten Seite (4) und einer zweiten Seite (6) des besagten Kontaktglieds (2) befindet, mit einem Füllstoff (20) zur zumindest zeitweiligen Fixierung der Positionierung der besagten ersten Seite (4) im Verhältnis zu der zweiten Seite (6) des besagten Kontaktglieds (2).
- 55 16. Ein Verfahren gemäss Anspruch 15, bei welchem die besagte erste Seite des besagten Kontaktglieds und/oder die besagte zweite Seite des besagten Kontaktglieds während der Anbringung des besagten Kontaktglieds in der besagten Position zumindest teilweise zwischen dem besagten Deckel und dem besagten Rahmen (gegen die andere der besagten Seiten) vorgespannt wird.
17. Ein Verfahren gemäss einem jeglichen der Ansprüche 15 bis 16, bei welchem die besagte erste Seite des besagten Kontaktglieds und/oder die besagte zweite Seite des besagten Kontaktglieds in der besagten Position zumindest teilweise zwischen dem besagten Deckel und dem besagten Rahmen (gegen die andere der besagten Seiten)

vorgespannt wird.

18. Ein Verfahren gemäss einem jeglichen der Ansprüche 15 bis 17, bei welchem der besagte Füllstoff Erde oder ein Material auf Polymer-Basis ist.

19. Ein Verfahren gemäss einem jeglichen der Ansprüche 15 bis 18, bei welchem das besagte Kontaktglied an dem besagten Rahmen oder dem besagten Deckel befestigt wird, bevor das besagte Kontaktglied zumindest teilweise zwischen dem besagten Deckel und dem besagten Rahmen positioniert wird.

20. Ein Verfahren gemäss Anspruch 19, bei welchem das besagte Kontaktglied an dem besagten Rahmen oder dem besagten Deckel während des Giessens des besagten Kontaktglieds befestigt wird.

21. Verwendung eines Kontaktglieds gemäss einem jeglichen der Ansprüche 1 bis 11 im Hinblick auf einen oder mehrere der folgenden Punkte:

- Befestigung des Deckels einer Schachtstruktur am Rahmen der besagten Schachtstruktur,
 - Verschluss des besagten Deckels der besagten Schachtstruktur mit dem besagten Rahmen der besagten Schachtstruktur,
 - Verschleiss-Reduktion des Deckels und/oder Rahmens,
 - Vibrationsdämpfung,
 - Bereitstellung einer elektrisch isolierenden Schicht zwischen dem besagten Deckel und dem besagten Rahmen,
 - Absorption von Spannungen zwischen dem besagten Rahmen und dem besagten Deckel, und
 - Gewährleistung höherer Toleranzen der Deckel- und/oder Rahmen-Dimensionen,
- vorzugsweise zwei oder mehrere der obengenannten Verwendungen gleichzeitig, wie z.B. zwei, drei, vier, fünf oder sechs gleichzeitige Verwendungen.

Revendications

1. Organe de contact (2) pour une structure de regard (10) et analogue, adapté pour être positionné au moins partiellement entre une couverture (12) de ladite structure de regard (10) et un cadre (14) de ladite structure de regard (10), dans laquelle une coupe transversale dudit organe de contact comprend:

- un premier côté (4) adapté pour former contact avec ledit cadre (14) de ladite structure de regard (10),
- un deuxième côté (4) adapté pour former contact avec ladite couverture (12) de ladite structure de regard (10), et
- un compartiment (8) ouvert vers une surface extérieure dudit organe de contact (2), ledit compartiment (8) étant positionné entre ledit premier côté (4) et ledit deuxième côté (6), **caractérisé en ce que** ledit compartiment (8), lorsqu'il est utilisé dans la structure de regard, est ouvert vers une surface de ladite structure de regard (10), et ledit compartiment (8) est adapté pour recevoir un matériau de remplissage pour fixer, au moins à titre temporaire, le positionnement relatif dudit premier côté (4) audit deuxième côté (6).

2. Organe de contact selon l'une quelconque des revendications 1, où ledit premier côté et ledit deuxième côté sont en communication flexible, par quoi la distance entre un point sur chacun des côtés peut être changée en biseautant un côté ou les deux côtés.

3. Organe de contact selon l'une quelconque des revendications 1 à 2, où ledit biseautage est dans une direction substantiellement orthogonale audit premier côté de l'organe de contact.

4. Organe de contact selon l'une quelconque des revendications 1 à 3, où ledit organe de contact comprend plus d'un compartiment, au moins un desdits compartiments étant formé en un forage, une fente courte ou une fente plus longue s'étendant plus de 1/5 de la longueur dudit organe de contact.

5. Organe de contact selon l'une quelconque des revendications 1 à 4, où ledit compartiment comprend un matériau de remplissage compressible.

6. Organe de contact selon la revendication 5, où ledit matériau de remplissage peut être transformé en un état plus rigide, dans quel état ledit matériau de remplissage fixe, au moins à titre temporaire, le positionnement relatif dudit

premier côté audit deuxième côté.

- 5 7. Organe de contact selon l'une quelconque des revendications 1 à 6 comprenant en outre un moyen amortissement pour réduire le transfert de vibration entre ladite couverture et ledit cadre et/ou pour réduire le bruit qui survient suite à l'impact sur ladite structure de regard.
- 10 8. Organe de contact selon l'une quelconque des revendications 1 à 7, ledit organe de contact consistant en une matière isolante et étant formé et/ou adapté à être positionné pour prévenir le contact direct entre ladite couverture et ledit cadre.
- 15 9. Organe de contact selon l'une quelconque des revendications 1 à 8 comprenant une matière à base de polymère, de préférence une matière à base de polymère durable, telle qu'une matière à base de polyuréthane ou une matière à base de chloroprène.
- 20 11. Organe de contact selon l'une quelconque des revendications 1 à 10 comprenant en outre un moyen de blocage de cadre pour bloquer, au moins à titre temporaire, ledit organe de contact audit cadre et/ou un moyen de blocage de la couverture pour bloquer, au moins à titre temporaire, ledit organe de contact à ladite couverture.
- 25 12. Cadre (14) pour une structure de regard (10) **caractérisé en** comprenant un moyen de blocage de l'organe de contact (28) adapté pour communiquer avec ledit moyen de blocage du cadre de l'organe de contact (2) selon la revendication 11.
- 30 13. Couverture (12) pour une structure de regard (10) **caractérisée en** ayant un organe de contact (2) selon l'une quelconque des revendications 1 à 11 fixé là-dessus par des moyens mécaniques et/ou chimiques.
- 35 14. Cadre (14) pour une structure de regard (10) **caractérisé en** ayant un organe de contact (12) selon l'une quelconque des revendications 1 à 11 fixé là-dessus par des moyens mécaniques et/ou chimiques.
- 40 15. Procédé de préparation d'une structure de regard fermée ou analogue comprenant les étapes de
 - procurer un cadre (14) pour un regard, une couverture (12) pour ledit regard et un organe de contact (2) selon l'une quelconque des revendications 1 à 11, par quoi l'organe de contact (2) est positionné au moins partiellement entre ladite couverture (12) et ledit cadre (14), et
 - ensuite au moins partiellement remplir un compartiment (8) positionné entre un premier côté (4) et un deuxième côté (6) dudit organe de contact (2) avec un matériau de remplissage (20) pour fixer, au moins temporairement, le positionnement relatif desdits premier (4) et deuxième (6) côtés dudit organe de contact (2).
- 45 16. Procédé selon la revendication 15, où ledit premier côté dudit organe de contact et/ou ledit deuxième côté dudit organe de contact est biseauté (envers l'autre desdits côtés) pendant la réalisation dudit organe de contact dans ladite position au moins partiellement entre ladite couverture et ledit cadre.
- 50 17. Procédé selon l'une quelconque des revendications 15 à 16, où ledit premier côté dudit organe de contact et/ou ledit deuxième côté dudit organe de contact est biseauté (envers l'autre desdits côtés) dans ladite position au moins partiellement entre ladite couverture et ledit cadre.
- 55 18. Procédé selon l'une quelconque des revendications 15 à 17, où ledit matériau de remplissage est du crachat ou une matière à base de polymère.
19. Procédé selon l'une quelconque des revendications 15 à 18, où ledit organe de contact est fixé audit cadre ou ladite couverture avant le positionnement dudit organe de contact au moins partiellement entre ladite couverture et ledit cadre.
20. Procédé selon la revendication 19, où ledit organe de contact est fixé audit cadre ou à ladite couverture pendant le moulage dudit organe de contact.

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21. Utilisation d'un organe de contact selon l'une quelconque des revendications 1 à 11 pour un(e) ou plusieurs de

- l'assurage d'une couverture d'une structure de regard relatif à un cadre de ladite structure de regard,
 - le scellage de ladite couverture de ladite structure de regard relatif audit cadre de ladite structure de regard,
 - la réduction de l'usure de couverture et/ou cadre,
 - l'amortissement des vibrations,
 - la fourniture d'une couche d'isolation électrique entre ladite couverture et ledit cadre,
 - l'absorption de la tension entre ledit cadre et ladite couverture, et
 - la permission de plus hautes tolérances sur les dimensions de couverture et/ou cadre,
- de préférence simultanément pour deux ou plusieurs des utilisations ci-dessus, tel que deux, trois, quatre, cinq ou six utilisations simultanées.

Fig. 1

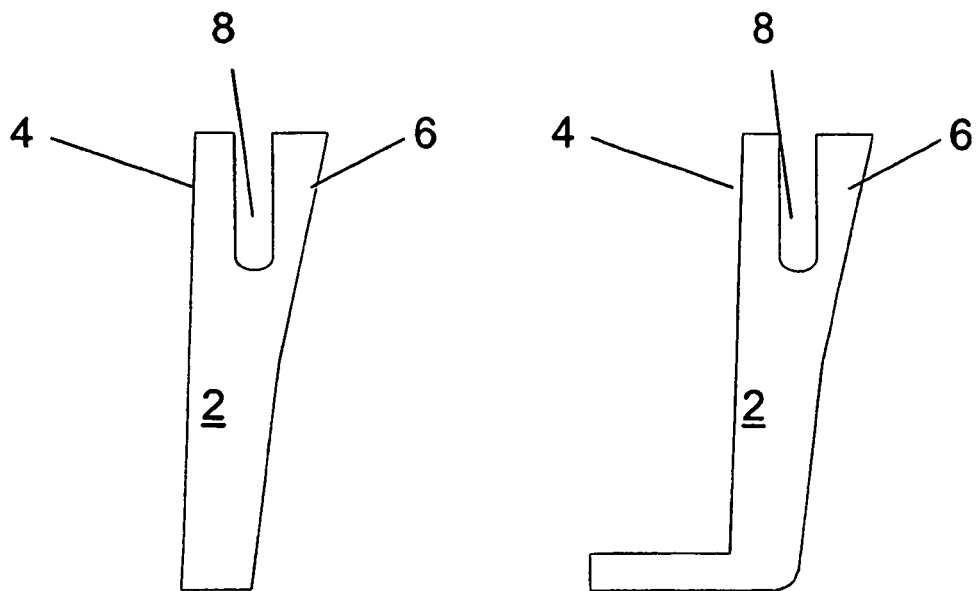


Fig. 2

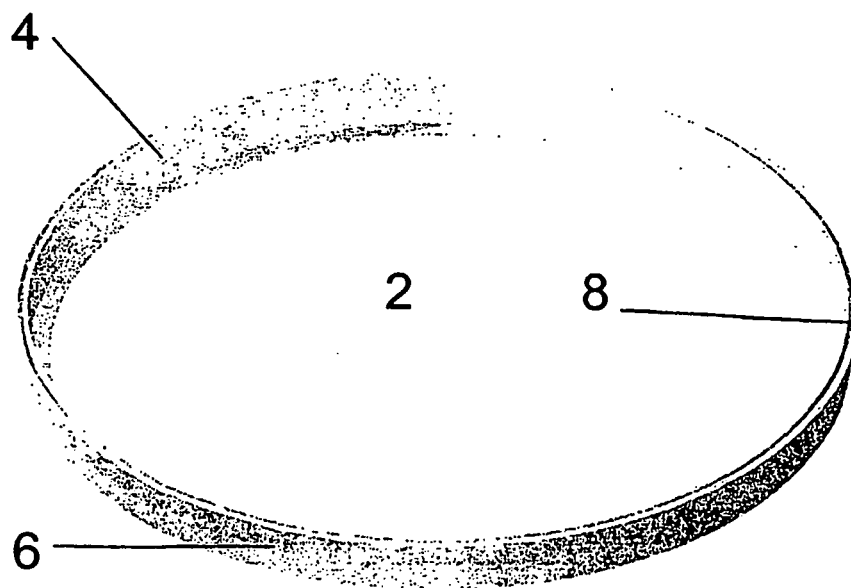


Fig. 3

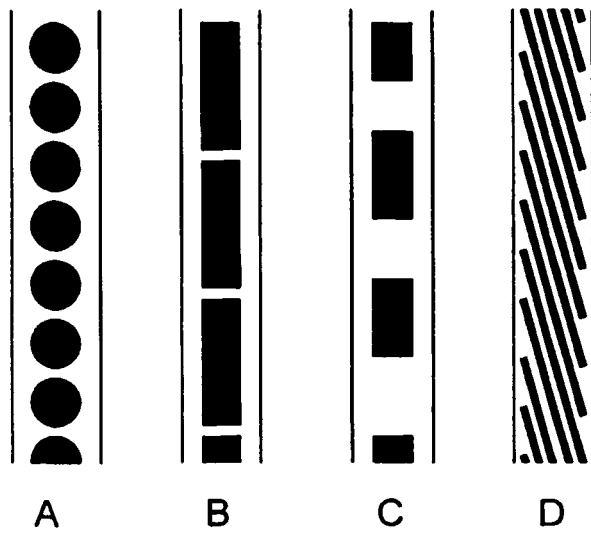


Fig. 4

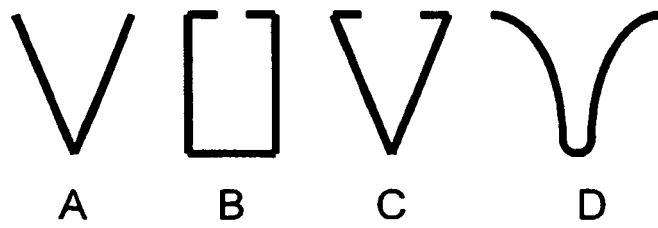


Fig. 5

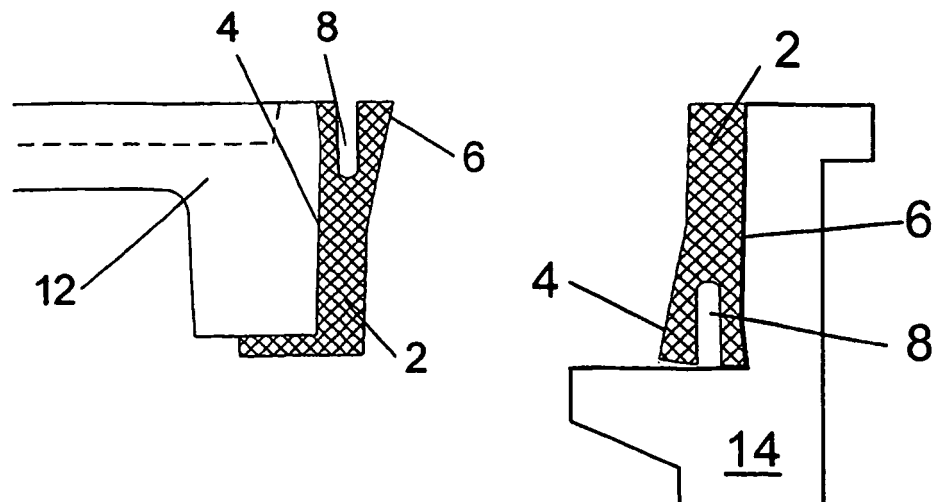


Fig. 6

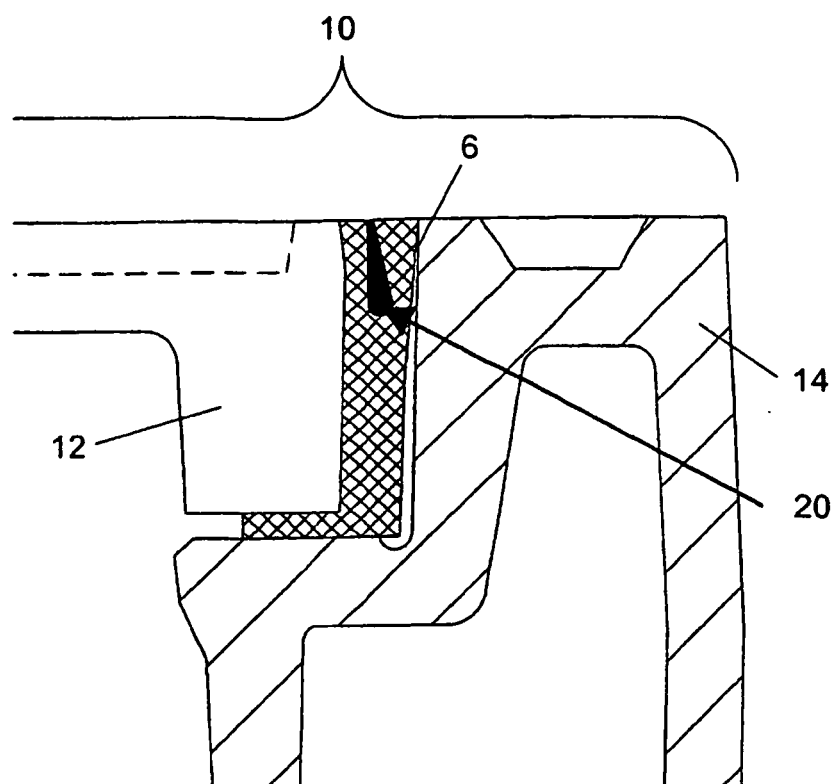


Fig. 7

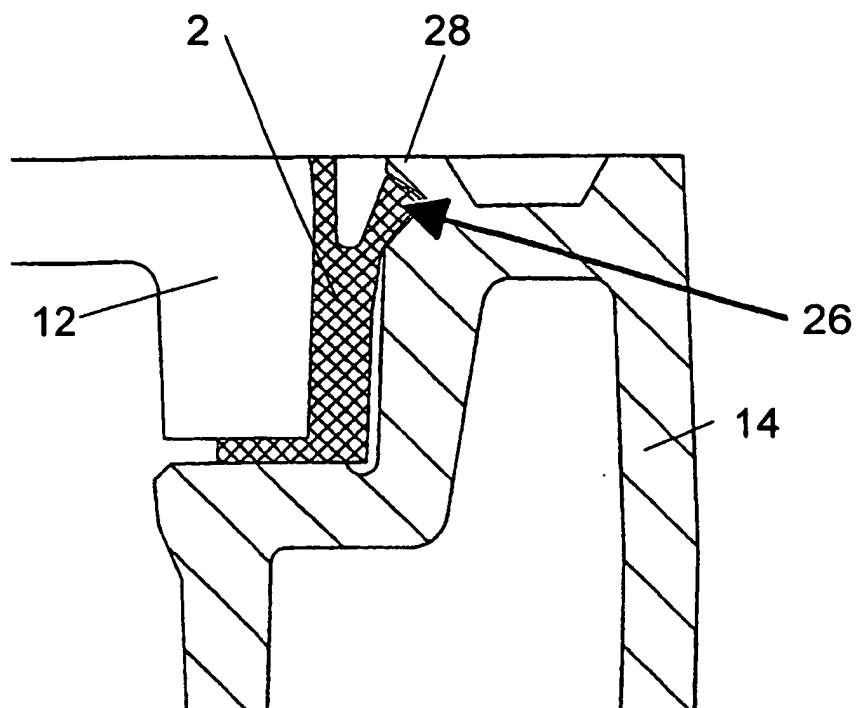
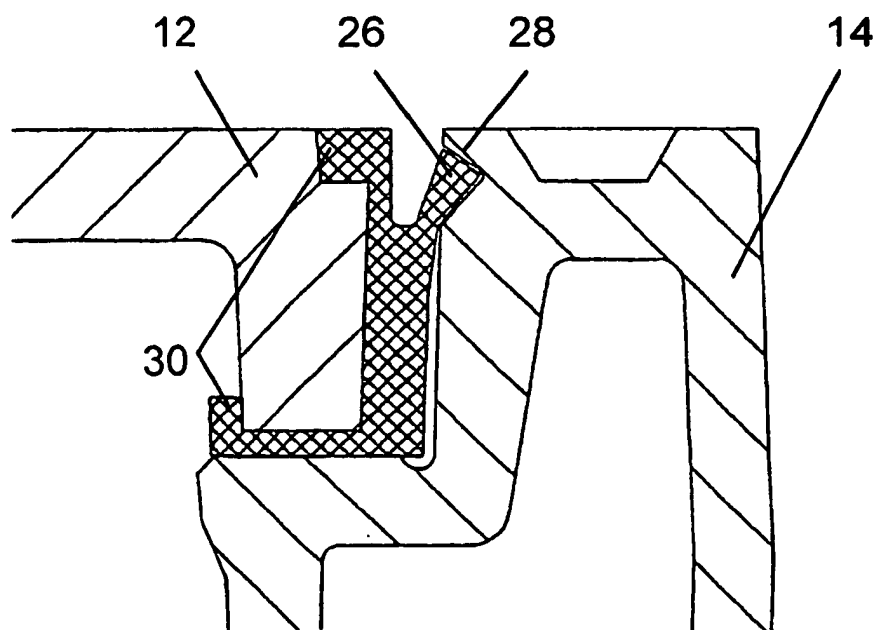


Fig. 8



REFERENCES CITED IN THE DESCRIPTION

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