

(19)



(11)

EP 3 775 395 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
13.12.2023 Bulletin 2023/50

(21) Application number: **19730877.8**

(22) Date of filing: **20.05.2019**

(51) International Patent Classification (IPC):
E02D 29/14^(2006.01)

(52) Cooperative Patent Classification (CPC):
E02D 29/14

(86) International application number:
PCT/GB2019/051392

(87) International publication number:
WO 2019/186211 (03.10.2019 Gazette 2019/40)

(54) **A GROUND SURFACE ACCESS ASSEMBLY REINFORCED COVER**

VERSTÄRKTE ABDECKUNG FÜR BODENOBERFLÄCHENZUGANGSANORDNUNG

COUVERCLE RENFORCÉ D'ENSEMBLE D'ACCÈS À LA SURFACE DU SOL

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(43) Date of publication of application:
17.02.2021 Bulletin 2021/07

(73) Proprietor: **Wrekin Holdings Limited**
Lichfield, Staffordshire WS14 9TZ (GB)

(72) Inventors:
• **TURNER, Barry**
Lichfield
Staffordshire WS14 9TZ (GB)
• **EVANS, Samantha Sarah Elizabeth**
Lichfield
Staffordshire WS14 9TZ (GB)
• **RATCLIFFE, Liam Mark**
Lichfield
Staffordshire WS19 9TZ (GB)

- **GIBSON, Simon John**
Lichfield
Staffordshire WS14 9TZ (GB)
- **TURNER, Stanley**
Lichfield
Staffordshire WS14 9TZ (GB)
- **NEILSON, Paul Drummond**
Lichfield
Staffordshire WS14 9TZ (GB)
- **TURNER, Simon John**
Lichfield
Staffordshire WS14 9TZ (GB)

(74) Representative: **Tart, Keith Raymond**
Four Oaks Patents Ltd.
162 Walsall Road
Four Oaks
Sutton Coldfield, W Mids B74 4RD (GB)

(56) References cited:
EP-A1- 1 826 321

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 3 775 395 B1

Description

Technical Field

[0001] This invention relates to an opening cover for a ground surface access assembly, the cover having an inset and centrally located reinforcement member integrally formed on the underside.

Background Art

[0002] Ground surface access assemblies are typically used in road drainage systems, for example, to provide covered access to an underground chamber. Such assemblies principally comprise a mounting frame and a cover that is removable or opening. These assemblies have to withstand heavy loads and impacts as vehicles drive over them.

[0003] In order to pass British Standard load tests such covers are typically heavy owing to the depth of material required to confer the required strength. British Standards BS EN124 measures cover strength by applying a test load over a specified (circular area) of the cover face. The centre of such covers flex downwardly under load, and this produces wear (that can require replacement of the cover and/or mounting frame) between the rim of the cover and the seat (located within the mounting frame). In order to mitigate this problem such covers are typically reinforced.

[0004] Thus: GB 2299603A (Turner et al.) discloses a branched beam arrangement where two members (30, 34) joined at the geometric centre of the triangular cover (10) radiate outwards towards each of the three sides and adjoin a triangular portion (16, 24) that is located near/at the rim of the cover; and GB 2360807A (Edmonds) discloses a triangular cover reinforced by three arc-shaped strengthening members (18, 19, 20). EP1826321A1 (SAINT-GOBAIN PAM 54000 Nancy) discloses a closure device and support frame, wherein inclined abutment surfaces (52, 56) are provided to hold/support the closure device within said support frame, so as to inhibit vertical and horizontal movement of the closure device relative to the support frame.

Summary of Invention

[0005] An aim of the present invention is to provide a ground surface access assembly cover with improved reinforcement that considerably stiffens the cover and thus reduces rim wear that results from deflection when the cover is subjected to loads. Another aim is to provide a simpler reinforcement member configuration than known for such covers; which can consequently be more easily cast in ductile iron etc. using simpler moulds. Another aim is to provide a cover of reduced weight that is as strong or stronger than known covers.

[0006] These aims are reached by the appended independent claim 1.

[0007] In an aspect the invention comprises a ground surface access assembly cover for a ground surface access assembly comprising a support frame surrounding and defining an aperture; the a cover comprising a main body portion, with a rim or rim sidewall dimensioned to substantially seal the aperture wherein a reinforcement member extending downwardly from on an underside surface of the main body portion; the reinforcement member being inset from said rim or rim sidewall and comprising a continuous angled beam that is substantially annular in plan view and is integrally formed with the main body portion.

[0008] According to the invention, said inset continuous angled beam comprises a first portion which extends downwardly from said underside surface of the main body portion leading to second portion which extends inwardly towards the geometric centre of the cover member.

[0009] According to an alternative of the invention, said continuous angled beam comprises a first portion which extends downwardly from said underside surface of the main body portion leading to second portion which extends outwardly towards the periphery/rim of the cover member.

[0010] In an aspect the invention comprises a ground surface access assembly cover for a ground surface access assembly having a support frame surrounding and defining an aperture; the cover comprising a main body portion with a rim or rim sidewall, dimensioned to substantially seal the aperture and characterised by a reinforcement member, inset from said rim or rim sidewall and comprising a continuous/unbranched angled beam, having no end faces; a first portion of which extends downwardly from on an underside surface of the main body portion; and a second portion of which extends in a direction perpendicular to said first portion.

[0011] In all of the above aspects the continuous angled beam may be of "L-shaped" cross section, "J-shaped" cross section or "T-shaped" in cross section.

[0012] In all of the above aspects, the ground surface access assembly may further comprise a plurality of radially extending outer strengthening ribs located between the outer wall of the vertical planar section of the continuous angled beam and the inner surface of the cover rim.

[0013] In all of the above aspects, the ground surface access assembly may further a plurality of radially extending inner strengthening ribs located between the inner wall of the first vertical planar section of the continuous angled beam and a central ring portion of the cover rim.

Brief Description of Drawings

[0014] The present invention is illustrated by the following diagrammatic figures in which:

Figure 1 shows a perspective view of a ground surface access assembly according to a preferred em-

bodiment of the present invention;

Figure 2 shows the assembly of Figure 1 with the circular cover detached from the support frame, in which it is normally housed, and positioned (horizontally) above the support frame;

Figure 3 shows an underside perspective view of the ground surface access assembly of Figure 1;

Figure 4 shows an underside plan elevation of the ground surface access assembly of Figure 1;

Figure 5 shows a cross sectioned perspective view along the line X-X' of Figure 4;

Figure 6 shows a diametric cross sectioned side elevation of the ground surface access assembly of Figure 1;

Figure 7 is similar to Figure 6, but shows the circular cover lifted clear of the support frame;

Figure 8 shows an underside perspective view of the circular cover of the ground surface access assembly of Figure 1;

Figure 9 is an enlarged view of part of the frame base portion of Figure 1 showing upstanding crests with many distributed smooth protrusions thereon;

Figures 10a to 10 show cross sections of smooth protrusions in accordance with the present invention; and

Figure 11 is an enlarged view of part of the frame base portion of Figure 3 showing in particular the underside surface of individual crests including generally corrugated surfaces located in recessed areas.

Detailed Description

[0015] Figures 1 to 9 and 11 illustrate a preferred embodiment of a ground surface access assembly, and a cover thereof, according to the present invention.

[0016] In particular, Figure 1 illustrates a ground surface access assembly (10) comprising a square (with rounded corners) support frame (12) with a short cylindrical sleeve (14) that defines a circular aperture configured to house a circular cover (16). In this embodiment an extension portion (20) of the circular cover (16) is detachably mounted within a hinge mount assembly (18); allowing the cover to be pivoted about a pivot member (22) seated within a linear recess (24) that has a curved lower portion configured to match the curvature of the pivot member (22) surface. In use, this combination allows the cover to be moved (pivoted) from the position as illustrated in Figure 1 to an open position, where the upper surface of the circular cover (16) is positioned approximately perpendicular to the base plate/portion (26) of the support frame (12); allowing removal of the circular cover (16) from the support frame (12) by lifting upwardly.

[0017] The extension portion (20) is approximately rectangular (in plan view); a first end extends outwardly from the rim sidewall (28) of the cover; and a second end is connected to the pivot member (22). In this embodiment the hinge mount assembly (18) is integrally formed with

the short circular sleeve (14) and the frame base portion (26) of the support frame (12).

[0018] While the present embodiment illustrates a frame base portion (26) that is square with rounded corners in outline (in plan view) the shape may vary; for example, according to the present invention the base portion may be rectangular with rounded corners or circular in outline. Also, the hinge mount assembly may extend outwardly from the rim sidewall (28) without being connected to the frame base portion (26).

[0019] The circular cover (16) also has an aperture (32) located within the planar surface in a position diametrically opposite the hinge members (20, 22, 24); configured to operably engage a standard lifting key - that in use assists an operative when opening and removing the circular cover. That part of the rim sidewall (28) proximate the key aperture (32) also has a locking assembly housing (34) integrally formed with the short circular sleeve (14) and frame base portion (26). The locking assembly housing (34) may extend outwardly from the rim sidewall (28) without being connected to the base portion (26). A locking plate (36), integrally forming part of the circular cover, extends outwardly from the cover rim and cooperates with the locking assembly housing (34) to allow the circular cover to be secured/locked in place when not open for inspection.

[0020] Figure 2 shows the ground surface access assembly (10) of Figure 1 with the circular access cover (16) detached, and located slightly above the normally surrounding support frame (12).

[0021] The rectangular frame base portion (26) has a pair of securing apertures (48) proximal each corner. The short cylindrical sleeve (14) extends downwardly to join an inclined sidewall (46) and this sidewall also extends downward to join the frame base portion (26). Typically, the short cylindrical sleeve (14), the inclined sidewall (46), and the frame base portion (26) are integrally formed.

[0022] The outer surfaces of the inclined sidewall (46) and frame base portion (26) are divided into separate portions/sections by a series of radially extending and integrally formed reinforcement members (44). As the inclined sidewall (46) bridge the short circular sleeve (14) and frame base portion (26) - that in plan view are circular and square with rounded corners in outline, it follows that the outer surface area of individual portions of the inclined sidewall (46) vary accordingly. In the illustrated embodiment the reinforcement members (44) have curved cross sections (see Figure 6). The sidewall (46) is typically inclined at an acute angle (typically of 10-60°) to the plane of the base portion/plate (26).

[0023] The raised position of the circular access cover reveals further details of the cover portion of the hinge mount assembly (18), in particular extension portion 20 and pivot member 22. Likewise, Figure 2 also shows further details of the circular cover locking system; the locking plate (36) that extends outwardly from the rim of the circular cover has a central aperture (38) and a pair of

downwardly extending flexible arms (40) with integral inwardly-facing protrusions that in use engage internal members of the locking assembly housing (34).

[0024] Figure 3 shows an underside perspective view of the surface access assembly (10) of Figure 1; Figure 4 shows an underside plan elevation of the ground surface access assembly of Figure 1; and Figure 5 shows a perspective cross sectioned view of Figure 4 along line X-X'.

[0025] The underside of the circular cover is reinforced by a beam that is annular (when viewed from above or below - plan view); has a beam cross section that is substantially a "L-section; is integrally formed within the overall structure of the circular cover; and extends downwardly from a none-peripheral portion of the underside surface of the main body portion (30). This annular/circular reinforcement beam (60) is illustrated in Figure 3, and the "L-shaped" cross section is shown in the cross sectioned view of Figure 5. The reinforcement member (60) comprises a continuous angled and circular beam; that has no end faces; is inset from and additional to the rim (52) and/or rim sidewall (28); and is integrally formed with the remainder of the cover (16); thereby substantially reducing downward flexing at the centre of said removable cover (16) when subjected to impact and heavy loads.

[0026] The "L-shaped" cross section comprises: a first vertical planar portion/section (62) that adjoins the underside surface of main body portion (30); of the cover (16); a second planar section (64); and an intermediate section (63); where first and second planar sections (62, 64) join at right angles to each other. The second planar section (64) extends inwardly towards the geometric centre of the cover (16) and is generally parallel to the plane of the upper and lower surfaces of said main body portion (30).

[0027] The circular cover (16) member and the circular reinforcement beam (60) portion thereof, are typically cast as a single entity, from ductile iron using a traditional casting mould.

[0028] Thus, the ground surface access assembly (10) illustrated in Figures 1-5 comprises a support frame (12) surrounding and defining an aperture; and a cover (16) comprising a main body portion (30) dimensioned to substantially seal the aperture, with a reinforcement member (60), inset from the cover rim, and extending downwardly from a none-peripheral underside surface of the main body portion (30); the reinforcement member (60) comprising a continuous angled beam (having no end faces) that is integrally formed with the remainder of the cover (16); thereby substantially reducing downward flexing at the centre of said removable cover (16) when subjected to impact and heavy loads.

[0029] The inner wall (66) of the first vertical planar portion (62) of the beam (60) has a plurality of inner adjoining strengthening ribs (68) that extend radially inwardly to an integrally formed central upstanding ring (70). Likewise, the outer wall (72) of the first planar portion (62) has a plurality of adjoining outer strengthening ribs

(74) that extend radially outwards adjoining an inner peripheral sidewall (52) of the circular cover (16). The inner peripheral sidewall (52) is configured concentric with and close to the rim sidewall (28). Cylindrical and sealed end undercover (50 - see Figure 3) forms part of the lifting key system.

[0030] Figure 5 illustrates that the inner face (76) of the short cylindrical sleeve (14) of the support frame (12) has an integrally formed inwardly extending annular ledge (54) that has a generally "L-shaped" cross section. In use, a resilient non-metallic annular-shaped member (56) fits over and substantially covers the annular ledge (54). In normal use the lower end of the cover rim sidewall (28) rests on part of the resilient member (56); and this combination helps absorb any shock load applied by vehicles etc., passing over an installed ground surface access assembly (10).

[0031] Figure 6 shows a diametric cross sectioned view of the ground surface access assembly of Figure 1. The circular cover (16) comprises: the rim sidewall (28); inner peripheral sidewall (52); "L-shaped" (in cross section) inset angled beam (60); inner strengthening ribs (68); outer strengthening ribs (74); and central upstanding ring (70) - typically, all of these form as a single integral casting of ductile iron. Figure 6 also shows in more detail how, in normal use, the circular cover (16) seats within the support frame (12); and, in particular, that the resilient non-metallic member (56) is supported by the inwardly extending annular ledge (54) of the support frame (12). The gap between the frame rim sidewall (28) and the cover inner peripheral sidewall (52) is selected such that the (outer surface of) inner peripheral sidewall (52) is in close proximity to the outer vertical side surface of the resilient member (56); thereby assisting retention of the resilient member (56) in its correct position, as illustrated in Figure 6.

[0032] Figure 7 is similar to Figure 6, but shows the circular cover (16) lifted clear of the support frame (12).

[0033] Figure 8 shows an underside perspective view of the circular cover (16) of the ground surface access assembly (10) of Figure 1.

[0034] Figure 9 illustrates a part of the support frame (12) and in particular how the upper surfaces of the frame base portion (26) and the inclined sidewall (46) are not smooth, but rather include many smooth protrusions (82a, 82b) that may be approximately hemispherical in shape. The protrusions on the frame base portion (26a) are not centred on a rectangular matrix, but rather are offset in such a way as to avoid straight paths around sides of the protrusions. The protrusions (82b) on the sidewall (46) are spaced apart rather more than the protrusions (82a) on the frame base portion (26) and when the inclined sidewall portion (between bordering reinforcement members (44) is smallest (see item 46a of Figure 2) these protrusions (82c) may comprise just a single row. Smooth-shaped protrusions other than hemispheres are also advantageous; for example, the protrusions may be semi-ovoid shaped or pyramid (but with

rounded corners rather than sharp corners) shaped.

[0035] The purpose of the protrusions (82a, 82b, 82c) is to provide improved bonding between the support frame (12) and the surrounding bonding materials following installation. Importantly, the protrusions (82a, 82b, 82c) have no sharp edges; and in use this has been found to result in the bonding between the support frame (12) and the surrounding road surface being less liable to crack when encountering shock loads from vehicles etc.

[0036] Thus, the ground surface access assembly (10) comprises: a frame surrounding and defining an aperture; and a cover (16) with a main body portion (30) dimensioned to substantially seal said aperture where: the exterior surfaces of the frame have many closely adjacent protrusions (82) with smooth surfaces that extend outwardly therefrom; and that following installation provide an interlock with structural infill material.

[0037] The smooth exterior surfaces of the adjacent protrusions (82) promote improved interlocking of the frame exterior with bedding material etc., following installation. Advantageously, the smooth surface of the protrusions has been found to deter the formation of cracks in the bedding material etc., which may occur when the installed ground surface access assembly is subject to severe loads or shocks that periodically occur in use. Protrusions with sharp edges do not provide this advantageous effect.

[0038] Ground surface access assemblies are typically used to access underground chambers and in normal use are supported by underground chamber walls. The chamber walls commonly comprise pre-fabricated stacked chamber sections or engineering bricks. The frame base portion is typically bonded to upper surfaces of the chamber using a fast-setting Cement or Resin-based settable material; which normally surrounds the upper and lower surface of the frame base portion. Above this first layer there are normally two further layers; a second layer comprising a fast-setting Cement-based settable material with aggregate additions as bulk filler; and a third (top) layer comprising a Bitumen-based Asphalt with aggregate additions for durability and skid resistance.

[0039] The ground surface access assembly (10) of the present invention is preferably installed using such a three-layer method. During installation the lower surfaces of the support frame (12) base portion (26) are typically bedded upon the upper surfaces an underground chamber by a first layer of fast-setting Cement or Resin-based settable material. This first layer may initially be poured around and optionally over the frame base portion (26) before it is allowed to set hard. Thus, the first layer may also cover all, or part of, the upper surface of the frame base portion.

[0040] Following this a second layer of material is applied on top of the first layer, which will surround and bond to at least a major portion of the inclined sidewall (46) of the frame. This second layer typically comprises a fast-setting Cement or Resin-based settable material.

The smooth protrusions (82b) on the inclined sidewall (46) advantageously enhance bonding between said second layer and the support frame (12).

[0041] Finally, a third (top) layer typically comprising a Bitumen-based Asphalt, with aggregate additions for durability and skid resistance, will surround, and bond to, the rim portion (14) of the frame (12). Optionally, the outer surface of rim portion (14) of the frame may also have many smooth protrusions (not illustrated). Again, this will advantageously enhance bonding of the sleeve portion (14) of the support frame (12) to the surrounding top layer.

[0042] It can be seen that the generally square with rounded corners (in outline and in plan view) frame base portion (26) further comprises a plurality of upstanding crests (80) formed by two angled surfaces (84a, 84b) connected by a curved peak (86); these crests (80) are separated by flat areas 26a (apart from the smooth protrusions 82a) of the frame base portion (26) that are located between adjacent crests (80). Such protrusions (82b) preferably also cover the upper surface (84a, 84b, 86) of the upstanding crests (80) in addition the flat areas (26a) - for example located around the securing apertures (48), as shown in Figure 10. The plurality of upstanding crests (80) advantageously results in improved adhesion between the frame base portion (26) and said first layer of encapsulating material (see above).

[0043] Figures 10a and 10b show cross sectional views of various protrusions (82) in accordance with the present invention. In these cases there are no sharp edges; rather, the protrusions comprise a smooth valley portion (100) and a smooth peak (101) with a smooth transition there-between. The valley (100) may comprise a flat portion (as shown in Figures 10a and 10c) or just a curved portion (as shown in Figure 10b). The protrusions (82) may comprise a curved semi-circular portion; a semi-elliptical portion; or they may be asymmetrical (about a vertical centre-line), as shown in Figure 10b.

[0044] Figure 11 shows an enlarged view of part of the frame base portion of Figure 3, and in particular the underside surface of individual crests (80) comprising generally corrugated surfaces (88) optionally located in recessed areas (90). These recessed areas (90) are located on a major part of the underside of the two angled surfaces (84a, 84b) and the underside of the curved peak (86). The generally corrugated surface (88) therein in this embodiment comprises five half-cylindrical portions (92) located generally side-by-side. In addition Figure 10 shows smooth protrusions (82d) similar or the same as the protrusions (82a, 82b, 82c) on the upper surface; again housed in underside-recessed areas (94) located in said flat areas (26a).

[0045] Thus, the ground surface access assembly (10) comprises: a frame (12) surrounding and defining an aperture; and a cover (16) comprising a main body portion (30) dimensioned to substantially seal said aperture; wherein the frame (12) comprises a base plate member (26) having a series of substantially flat portions (26a) each of which is separated from an adjacent portion by

an intermediate upstanding crest (80). Typically, the series of substantially flat portions (26a) and the intermediate upstanding crests (86) are of approximately similar width, although they typically differ in area.

[0046] The upstanding crests (80) confer improved rigidity to the base plate member thereby reducing deflection and flexing of the frame when which occur when the installed ground surface access assembly is subject to severe loads or shocks that periodically occur in use. This advantageously, reduces the possibility of such events damaging the bedding and sealant materials surrounding the frame and securing the frame in the desired position in a road surface.

Brief Description of variants within scope of invention

[0047] The cover (16) need not be circular in outline. For example, it may be rectangular/ square with rounded corners in outline. In such cases the integral reinforcement member may comprise a continuous angled beam that is annular in shape (in plan view), rectangular in outline (in plan view), or elliptical in outline (in plan view). In such cases, the reinforcement member may also comprise a continuous angled beam in the form of a rounded rectangle in outline (in plan view). In further embodiments the angled beam may comprise predominantly a curved intermediate section (63); for example shaped as or similar to a quarter-circle.

[0048] In all embodiments, the second planar section (64) of the reinforcement member (60) may also extend outwardly towards a rim portion of the cover, or inwardly towards the centre of the cover. Normally, the second planar portion (64) will extend in a plane that is generally parallel to the plane of the upper/lower surface of said main body portion (30).

Claims

1. A ground surface access assembly cover (16) forming part of a ground surface access assembly (10), wherein said ground surface access assembly (10) comprises a support frame (12) surrounding and defining an aperture (A) for said cover; wherein said cover member (16) is of a unitary nature, and comprises: a main body portion (30), with a rim (52) or a rim sidewall (28); dimensioned to substantially seal said aperture (A), wherein a continuous angled beam (60) that is inset from and additional to said rim (52) or rim sidewall (28) extends downwardly from a none-peripheral underside surface of the main body portion (30); and wherein said continuous angled beam (60) is integrally formed with the main body portion (30); thereby substantially reducing downward flexing at the centre of said cover (16) when subjected to impact and heavy loads, **characterised in that:** said inset continuous angled beam comprises a first portion (62) which extends downwardly from

said underside surface of the main body portion (30) leading to a second portion (64) which extends inwardly towards the geometric centre of the cover member (16), or **in that** said inset continuous angled beam comprises a first portion (62) which extends downwardly from said underside surface of the main body portion (30) leading to a second portion (64) which extends outwardly towards the periphery or rim of the cover member (16).

2. A ground surface access assembly cover (16) according to Claim 1 wherein said continuous angled beam (60) is substantially annular in plan view.
3. A ground surface access assembly cover (16) according to any preceding claim further comprising a plurality of radially extending outer strengthening ribs (74) located between the cover rim (52) and said inset continuous angled beam (60).
4. A ground surface access assembly cover (16) according to any preceding claim further comprising a plurality of radially extending inner strengthening ribs (68) located between the inner wall (66) of said first portion (62) of the continuous angled beam (60) and a central ring portion (70) of the cover (16).
5. A ground surface access assembly cover (16) according to any of Claims 1 to 4 wherein the continuous angled beam (60) is of "L-shaped" cross section.
6. A ground surface access assembly cover (16) according to any of Claims 1 to 4 wherein the continuous angled beam (60) is of "J-shaped" cross section.
7. A ground surface access assembly cover (16) according to any of Claim 1 to 4 wherein the continuous angled beam (60) is of "T-shaped" cross section.

Patentansprüche

1. Deckel (16) für eine Bodenflächenzugangsanordnung, der Teil einer Bodenflächenzugangsanordnung (10) ist, wobei die genannte Bodenflächenzugangsanordnung (10) einen Stützrahmen (12) umfasst, der eine Öffnung (A) für den genannten Deckel umgibt und definiert; wobei das genannte Deckelement (16) von einheitlicher Natur ist und umfasst: einen Hauptkörperabschnitt (30) mit einem Rand (52) oder einer Randseitenwand (28), der bzw. die so dimensioniert ist, dass er bzw. sie die genannte Öffnung (A) im Wesentlichen abdichtet, wobei ein durchgehender abgewinkelter Träger (60), der in den genannten Rand (52) oder die genannte Randseitenwand (28) eingesetzt ist, sich von einer nicht-peripheren Unterseitenfläche des Hauptkörperabschnitts (30) nach unten erstreckt; und wobei der

- genannte durchgehende abgewinkelte Träger (60) einstückig mit dem Hauptkörperabschnitt (30) gebildet ist; wodurch die Durchbiegung nach unten in der Mitte des genannten Deckels (16) wesentlich reduziert wird, wenn er Stößen und schweren Lasten ausgesetzt ist, **dadurch gekennzeichnet, dass:** der genannte eingesetzte durchgehende abgewinkelte Träger einen ersten Abschnitt (62) aufweist, der sich von der genannten Unterseite des Hauptkörperabschnitts (30) nach unten erstreckt und zu einem zweiten Abschnitt (64) führt, der sich nach innen zur geometrischen Mitte des Deckelelements (16) hin erstreckt, oder der genannte eingesetzte durchgehende abgewinkelte Träger einen ersten Abschnitt (62) aufweist, der sich von der genannten Unterseite des Hauptkörperabschnitts (30) nach unten erstreckt und zu einem zweiten Abschnitt (64) führt, der sich nach außen zum Umfang oder Rand des Deckelteils (16) hin erstreckt.
2. Deckel (16) für eine Bodenflächenzugangsanordnung nach Anspruch 1, wobei der genannte durchgehende abgewinkelte Träger (60) in der Draufsicht im Wesentlichen ringförmig ist.
 3. Deckel (16) für eine Bodenflächenzugangsanordnung nach einem der vorhergehenden Ansprüche, die ferner mehrere sich radial erstreckende äußere Verstärkungsrippen (74) umfasst, die sich zwischen dem Deckelrand (52) und dem genannten eingefügten durchgehenden abgewinkelten Träger (60) befinden.
 4. Deckel (16) für eine Bodenflächenzugangsanordnung nach einem der vorhergehenden Ansprüche, die ferner eine Vielzahl von sich radial erstreckenden inneren Verstärkungsrippen (68) umfasst, die zwischen der Innenwand (66) des genannten ersten Abschnitts (62) des durchgehenden abgewinkelten Trägers (60) und einem zentralen Ringabschnitt (70) des Deckels (16) angeordnet sind.
 5. Deckel (16) für eine Bodenflächenzugangsanordnung nach einem der Ansprüche 1 bis 4, wobei der durchgehende abgewinkelte Träger (60) einen "L"-förmigen Querschnitt aufweist.
 6. Deckel (16) für eine Bodenflächenzugangsanordnung nach einem der Ansprüche 1 bis 4, wobei der durchgehende abgewinkelte Träger (60) einen "J"-förmigen Querschnitt aufweist.
 7. Deckel (16) für eine Bodenflächenzugangsanordnung nach einem der Ansprüche 1 bis 4, wobei der durchgehende abgewinkelte Träger (60) einen "T"-förmigen Querschnitt aufweist.

Revendications

1. Couvercle d'ensemble d'accès à la surface du sol (16) faisant partie d'un ensemble d'accès à la surface du sol (10), dans lequel ledit ensemble d'accès à la surface du sol (10) comprend un cadre de support (12) entourant et définissant une ouverture (A) pour ledit couvercle ; dans lequel ledit élément de couvercle (16) est de nature unitaire et comprend : une partie de corps principal (30), avec un rebord (52) ou une paroi latérale de rebord (28) ; dimensionnée pour sceller sensiblement ladite ouverture (A), dans lequel une poutre inclinée continue (60) qui est encastrée dans et en plus dudit rebord (52) ou de la paroi latérale de rebord (28) s'étend vers le bas à partir d'une surface inférieure non périphérique de la partie de corps principal (30) ; et dans lequel ladite poutre inclinée continue (60) est formée d'un seul tenant avec la partie de corps principal (30) ; réduisant ainsi sensiblement la flexion vers le bas au centre dudit couvercle (16) lorsqu'il est soumis à un impact et à de lourdes charges, **caractérisé en ce que** : ladite poutre inclinée continue encastrée comprend une première partie (62) qui s'étend vers le bas depuis ladite surface inférieure de la partie de corps principal (30) menant à une seconde partie (64) qui s'étend vers l'intérieur vers le centre géométrique de l'élément de couvercle (16), ou **en ce que** ladite poutre inclinée continue encastrée comprend une première partie (62) qui s'étend vers le bas depuis ladite surface inférieure de la partie de corps principal (30) menant à une seconde partie (64) qui s'étend vers l'extérieur vers la périphérie ou le rebord de l'élément de couvercle (16).
2. Couvercle d'ensemble d'accès à la surface du sol (16) selon la revendication 1, dans lequel ladite poutre inclinée continue (60) est sensiblement annulaire en vue en plan.
3. Couvercle d'ensemble d'accès à la surface du sol (16) selon l'une quelconque des revendications précédentes, comprenant en outre une pluralité de nervures de renforcement extérieures s'étendant radialement (74) situées entre le rebord de couvercle (52) et ladite poutre inclinée continue encastrée (60).
4. Couvercle d'ensemble d'accès à la surface du sol (16) selon l'une quelconque des revendications précédentes, comprenant en outre une pluralité de nervures de renforcement intérieures s'étendant radialement (68) situées entre la paroi intérieure (66) de ladite première partie (62) de la poutre inclinée continue (60) et une partie annulaire centrale (70) du couvercle (16).
5. Couvercle d'ensemble d'accès à la surface du sol (16) selon l'une quelconque des revendications 1 à

4, dans lequel la poutre inclinée continue (60) a une section transversale en « forme de L ».

6. Couverture d'ensemble d'accès à la surface du sol (16) selon l'une quelconque des revendications 1 à 4, dans lequel la poutre inclinée continue (60) a une section transversale en « forme de J ».
7. Couverture d'ensemble d'accès à la surface du sol (16) selon l'une quelconque des revendications 1 à 4, dans lequel la poutre inclinée continue (60) a une section transversale en forme de « T ».

15

20

25

30

35

40

45

50

55

[Fig.]

1/11

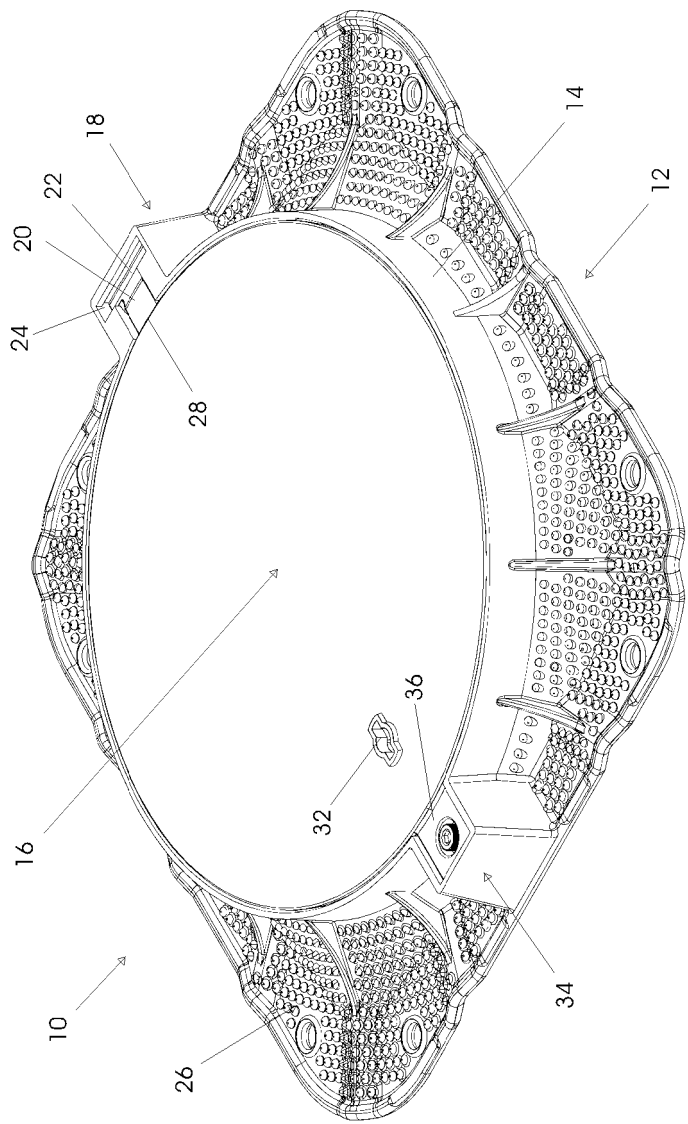


Figure 1

[Fig.]

2/11

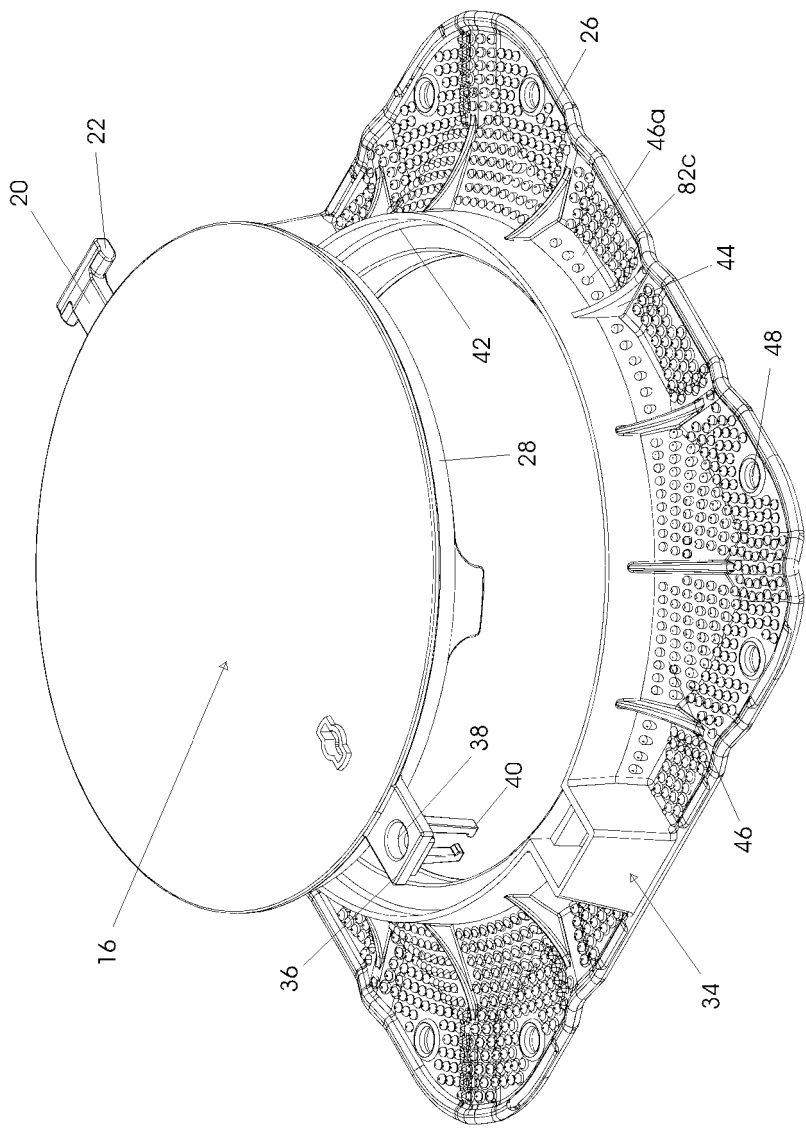


Figure 2

[Fig.]

3/11

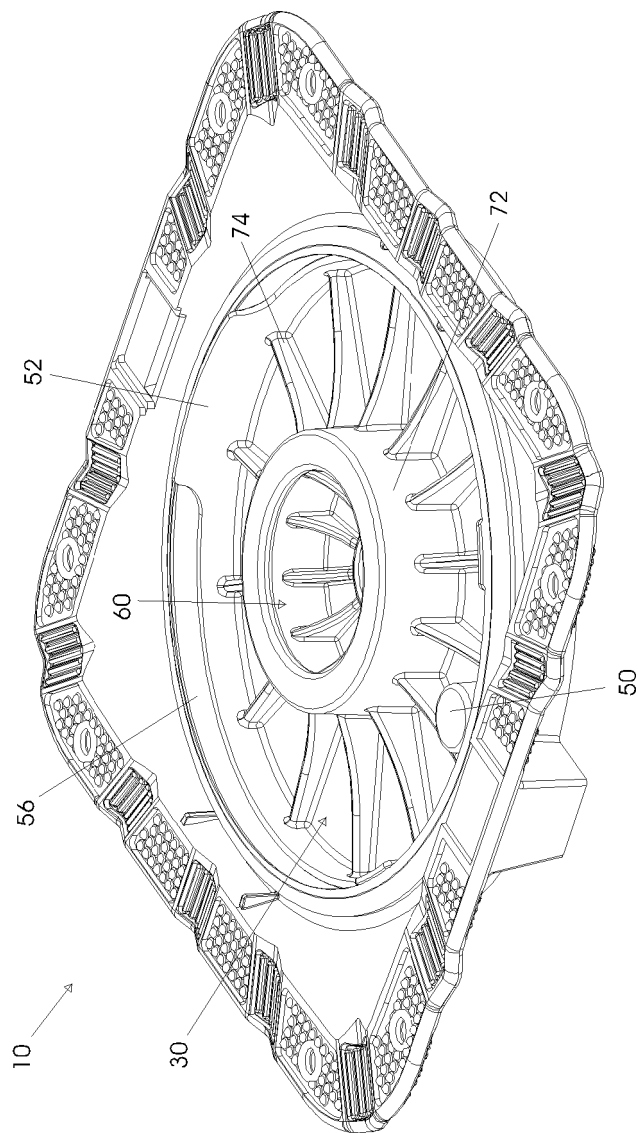


Figure 3

[Fig.]

4/11

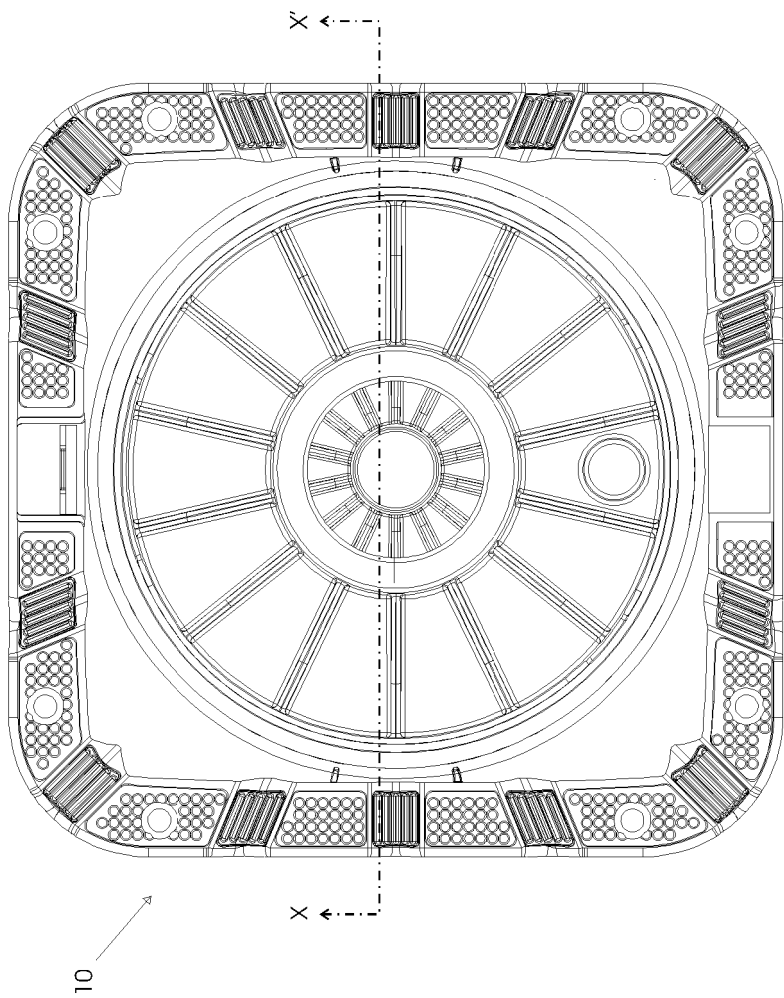


Figure 4

[Fig.]

5/11

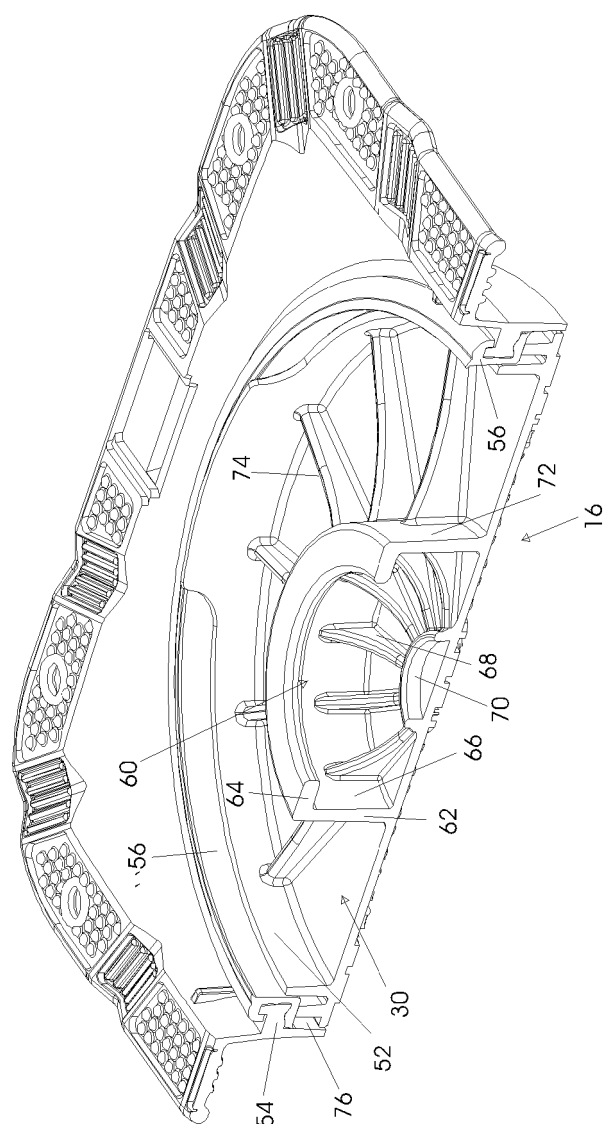


Figure 5

[Fig.]

6/11

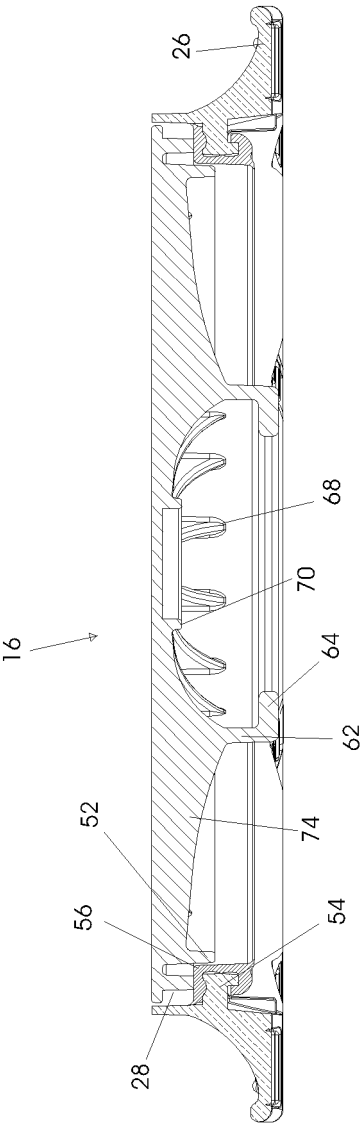


Figure 6

[Fig.]

7/11

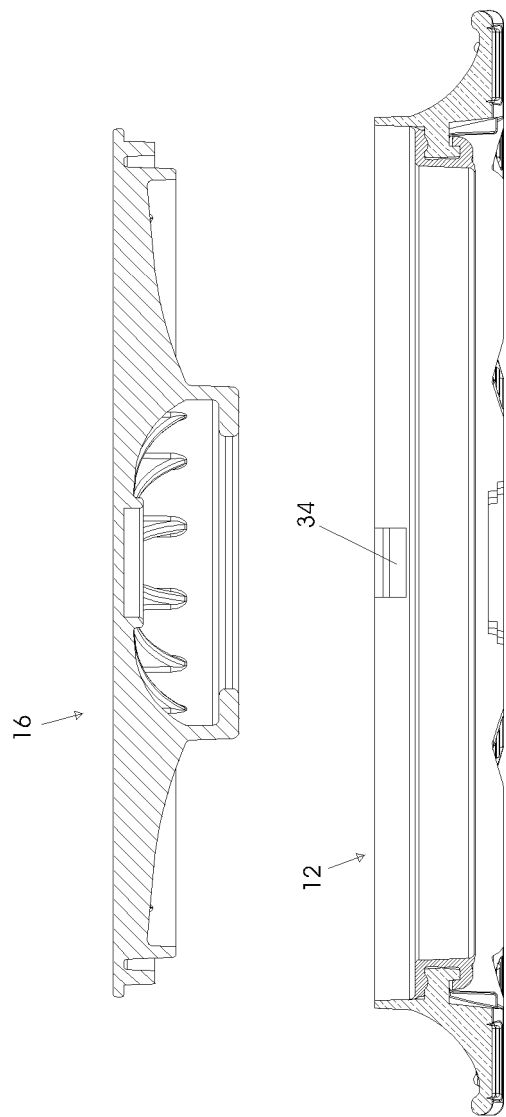


Figure 7

[Fig.]

8/11

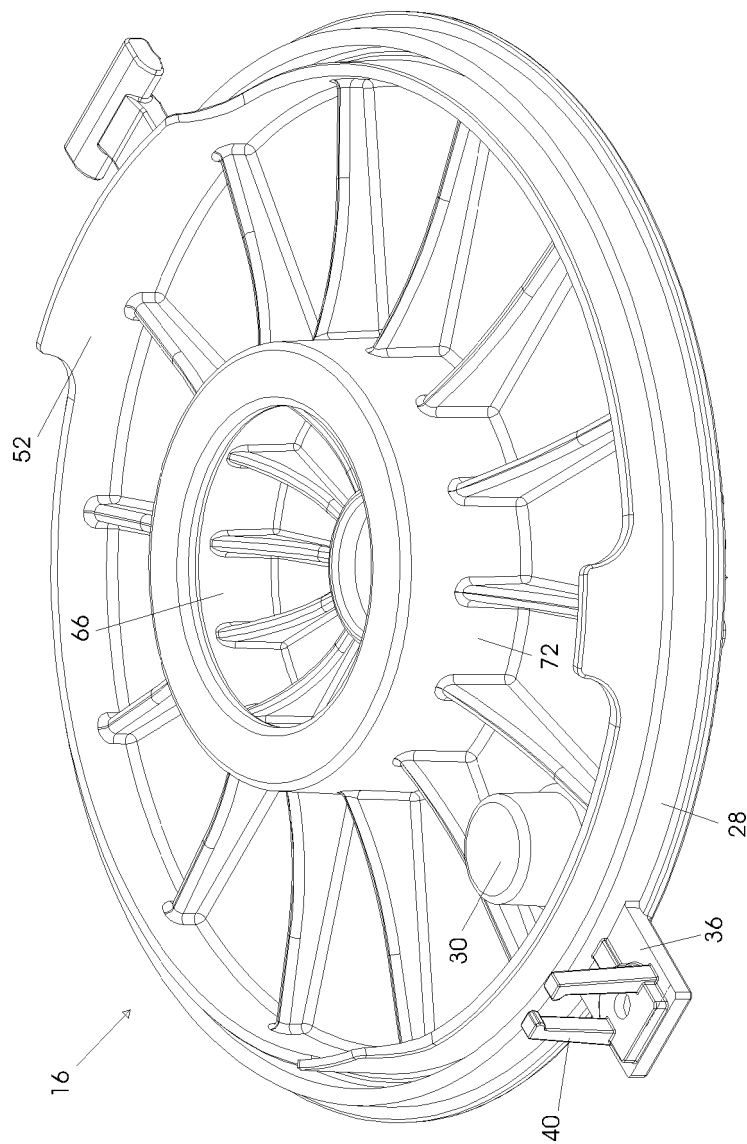


Figure 8

[Fig.]

9/11

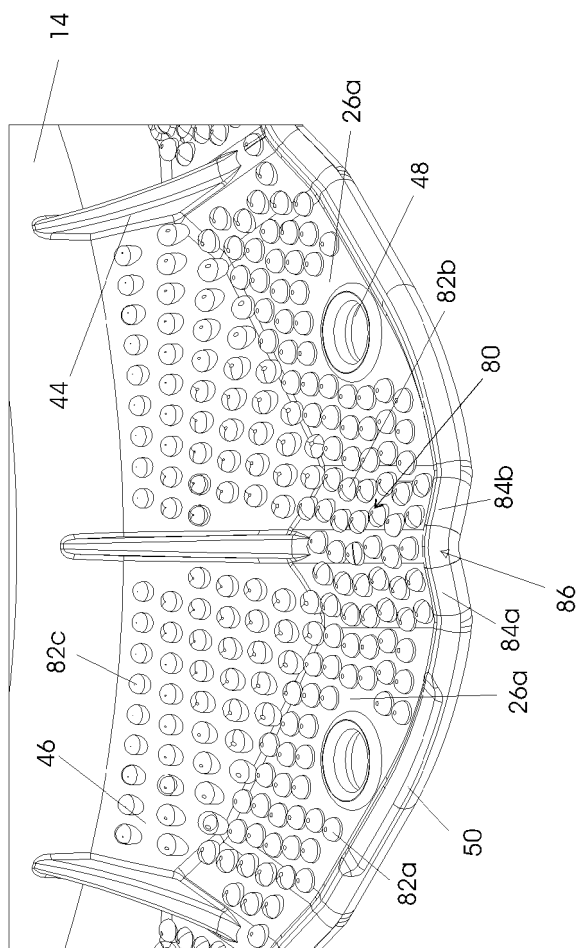


Figure 9

[Fig.]

10/11

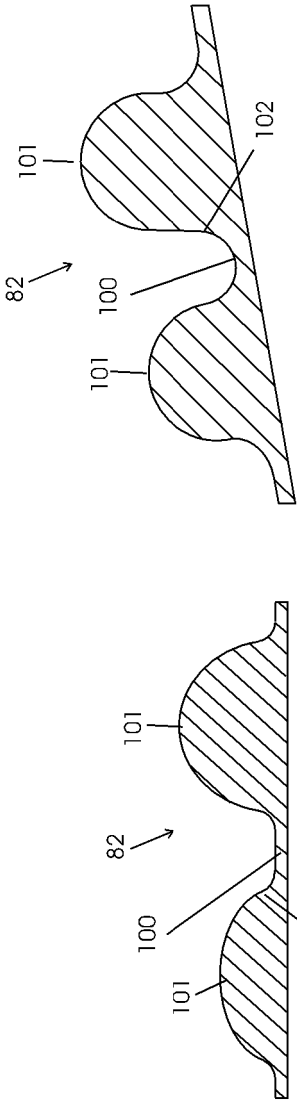


Figure 10b

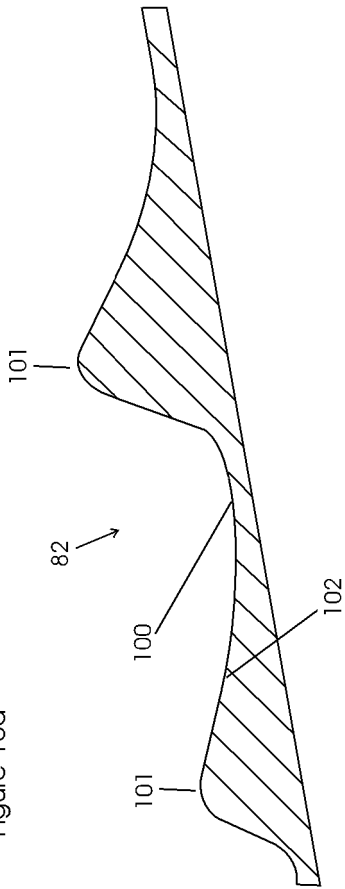


Figure 10c

[Fig.]

11/11

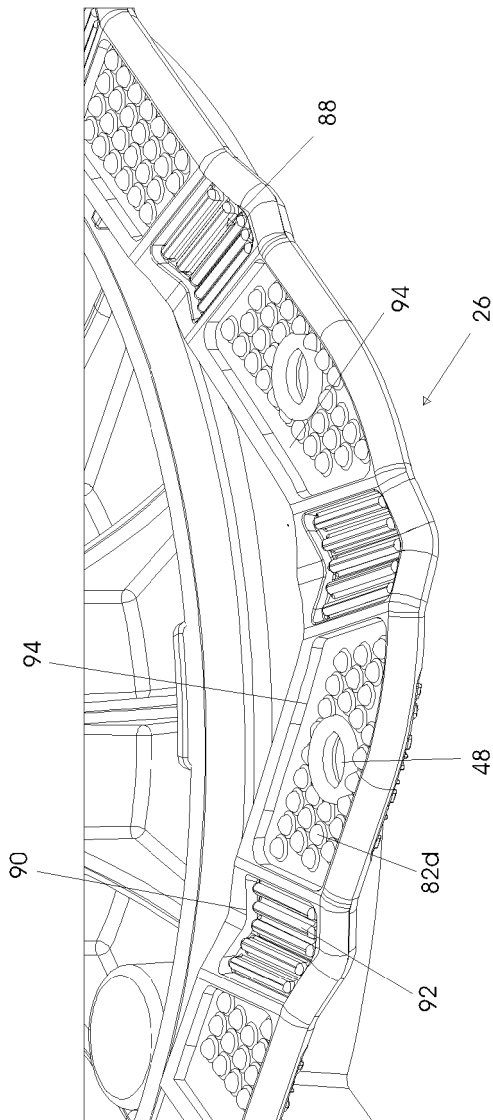


Figure 11

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 2299603 A, Turner **[0004]**
- GB 2360807 A, Edmonds **[0004]**
- EP 1826321 A1 **[0004]**