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(54) **MAT SYSTEM, ESPECIALLY FOR SPORTS PURPOSES**

MATTENSYSTEM, INSBESONDERE FÜR SPORTZWECKE

SYSTEME DE TAPIS, EN PARTIICULIER POUR LE SPORT

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(56) References cited:
EP-B1- 2 957 328
DE-U1- 20 107 338
FR-A5-2 182 378

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Description

Technical field

[0001] The Invention concerns a mat System suitable for sports purposes, comprising a plurality of individual mats, each with a top side, a bottom side running parallel with it, and at least one rectilinear side edge, wherein the individual mats can be joined together by connecting means.

Background Art

[0002] From EP 2 243 895 A2 there is known a mat System with connecting means, in which the connecting means consist of two roughly T-shaped segments, joined to each other by a joining bridge, which engage in corresponding undercut recesses in the rectilinear edges of the individual mats.

[0003] A similar System is also known from EP 2 033 547 A1.

[0004] From EP 2 957 328 B1 there is known a sports mat System from the applicant, with which mat arrangements can be constructed having several colours.

[0005] What is common to the known mat Systems is that when constructing a mat System and joining the individual mats by the connecting means a very precise orienting ofthe mats to each other must be done. In many applications, such as school sports and martial arts, it is necessary howeverto equal out certain tolerances in the orienting ofthe individual mats to each other and those in the arrangement ofthe undercuts in the individual mats which correspond to each other.

[0006] FR 2182378 discloses a coupling System for elastomer plates where circular holes are provided in the bulk of adjacent plates. Coupling pieces fit into the holes and secure the plates with one anotherthrough a bridge pari.

[0007] DE 201 07 338 U1 discloses a floor-plate System where adjacent floor plates are coupled by plugs a having halve-circle shapes. The plugs are to be laterally inserted into openings in the edges ofthe adjacent floor plates and keep the plates together.

[0008] JP 3 122674 U discloses rectangular plate members with recesses attheir edges to be coupled by corresponding connecting members. The connecting members have an 8-shaped outline and may comprise two circular sections next to each other.

Problem to be solved

[0009] Therefore the problem which the present invention proposes to solve is to provide a mat System of this kind, which is especially suitable for sports purposes and which can equal out even large tolerances in the orienting ofthe individual mats with respect to each other and in the arrangement of the undercut recesses of the individual mats.

Disclosure of Invention

[0010] The present invention solves this problem by a mat System according to Claim 1 and a mat arrangement according to Claim 13, preferably in combination with one or more features ofthe dependent Claims 2 to 12.

[0011] One key aspect ofthe present invention is the configuration ofthe connecting means each having two circular segment regions in particular joined together by a short joining bridge. A joining bridge is understood here to mean the region which joins the two circular segments together. If the spacing ofthe centre points ofthe circular segments is less than the sum of their radii, this is the overlapping region of the two circular segments. In this way, it is preferably accomplished that each ofthe two segments engages in rotatable männer within the correspondingly shaped recesses ofthe individual mats, so that when two mats lying nextto one another atthe edges are displaced, the respective circular segment regions ofthe connecting means can rotate within the likewise circular segment undercut recesses and thus equal out considerable tolerances.

[0012] However, the prerequisite for this is that a joining bridge which joins together the interconnected circular segments of the connecting means is relatively small in relation to the radius of the circular segment regions.

[0013] It has been found that a satisfactory function is only obtained if the spacing A between the two centre points of the circular segment regions is larger than 0.8 times the sum of the radii (R + R') and less than 1.3 times the sum of the radii (R + R'):

$$(I)\ 0.8 * (R + R') < A < 1.3 * (R + R').$$

[0014] Preferably, for the spacing A ofthe centre points (M, M') ofthe circular segment regions in relation to the radii

the following relation applies:

$$(II) \quad 0.9 * (R + R') < A < 1.15 * (R + R').$$

[0015] Basically, the connecting means may be asymmetrical in construction with different radii of the circular segment regions. But preferably the two circular segment regions R and R' are identical and the connecting means are symmetrical with respect to an axis of symmetry running through the middle of the connecting region connecting the circular segment regions, i.e. running through the middle of the connecting line of the centre points of the two circular segment regions. Preferably, the radii R and R' are 25 to 50 mm.

[0016] The individual connecting means have, in addition to the two primary circular segment regions that are located next to one another at the spacing - as defined above - or slightly overlap and are connected together by a short joining bridge, further segments, on the two sides, located opposite the joining bridge between the two circular segment regions, of the connecting means. These additional, secondary segments can be further circular segments, in particular with a larger radius than the primary circular segment regions. Although the secondary segments impede the actually desired rotatability of the two primary circular segment regions somewhat, they result in higher overall loadability of the connection of the mats. The impeded rotatability of the two primary circular segment regions can be compensated, in this embodiment of the Invention, if appropriate by greater flexibility of the material used for the connecting means, such that the two primary circular segment regions each undergo a degree of torsion.

[0017] The two primary circular segment regions are joined together by a short joining bridge and additional, secondary circular segment regions, the radii of the primary circular segment regions R and R' are preferably 10 to 30 mm and the secondary circular segment regions preferably 25 to 70 mm.

[0018] The shape of the individual mats is of lesser importance for the Invention, as long as at least one of their edges is rectilinear. It is advantageous, however, if all edges of all mats are rectilinear. Preferably, however, the individual mats have a rectangular shape in the top view and also a rectangular shape in cross section. Each individual mat preferably comprises a plurality of undercut recesses, each having a circular segment region having roughly the same radius as the two circular segment regions of the connecting means. In order to achieve a lower or higher friction torque when rotating the circular segment regions of the connecting means in the corresponding undercut recesses of the mats, it is however possible to design the undercut recesses such that their radius is slightly bigger or smaller than the radius of the circular segment regions of the connecting means. Preferably, the difference between the radius of the undercut recesses and the radius of the circular segment regions of the connecting means is less than 6 % and more preferably less than 3 %.

[0019] The dimensions of the individual mats are likewise basically chosen at will within broad ranges for the Invention, but preferably the edge lengths of the mats are 0.5 to 4 m. The spacings of the individual undercut recesses of the individual mats on each of their edges are preferably 100 to 1000 mm.

[0020] It is essential to the Invention that the individual mats and preferably also the individual connecting means have certain elasticity. This condition is basically fulfilled if the individual mats and connecting means consist mainly of foam material with a certain elasticity, as is specified. According to one especially preferred embodiment of the Invention, both the mats and the connecting means consist at least partly of a foam material with a density between 30 and 150 kg/m^3, especially preferably cross-linked polyolefin foam material with a density between 50 and 100 kg/m^3. The Shore hardness of the materials for the connecting means is preferably 5 to 50 [Shore A, EN ISO 868:2003], which guarantees an adequate elasticity.

[0021] The individual mats may consist homogeneously of a foam material, but they can also consist of various layers of different foam materials and/or of a base of a foam material or various layers of different foam materials and one or two cover layer(s) of compact, but preferably likewise elastic material. Especially preferably, such a cover layer consists of textile-reinforced elastic materials such as rubber, soft PVC or thermoplastic elastomers. Preferably, such cover layer may be laminated to the base foam material thermally or by applying adhesive, e.g. reactive Polyurethane adhesive.

[0022] Insofar as mats are used which consist of a base of foam material and at least one cover layer, a cover layer can preferably cover the undercut recesses on the top side, which serve for the engagement of the individual connecting means. The connecting means are then inserted into the recesses from the bottom side of the individual mats in order to join the mats together. The layer covering the top side of the mats can also comprise a layer of foam material.

[0023] It is also possible that the undercut recesses, which serve for the engagement of the individual connecting means, do not penetrate the entire height of the foam layer, but only a part of its height. In this embodiment of the Invention, the undercut recesses would be covered by foam material of certain height, optionally in addition to a cover layer, e. g of textile-reinforced elastic material. In such embodiment, the height of the individual connecting means is correspondingly less than the height of the mat.

[0024] The thickness of the sports mats or the respective layers can be chosen at will within broad ranges, but preferably the thickness of the individual mats is 5 to 100 mm, more preferably 30 - 60 mm. Insofar as mats consisting of a base

and a cover layer are used, the thickness of the cover layer is preferably 0.2 to 5 mm. Preferably, forthe thickness of the sports mat in relation to the radii of the undercut recesses of the respective mats the following relation applies:

$$\text{(III)} \quad R < \text{thickness} < 3*R$$

[0025] The individual mats can also have a base of several different foam materials, in order to have an optimal cushioning and absorb the forces of the athletes. The choice of suitable layers is basically familiär to the person skilled in the art.

Brief Description of Drawings

[0026] The Invention shall be explained more closely below with the aid ofa sample embodiment according to Fig. 11 and 12, as well as the drawing. There is shown:

Fig. 1 a sports mat in a view of the top side;
Fig. 2 a sports mat in a view of the bottom side;
Fig. 3 a sports mat according to Fig. 1 in a side view (as viewed from the narrow side, not true to scale);
Fig. 4 a view of the connecting means, as used in the sample embodiment per Fig. 1, 2 and 3;
Fig. 5 a matfield constructed with the sports mats of Fig. 1 and the connecting means of Fig. 4 seen from the top side;
Fig. 6-8 three different embodiment types ofthe connecting means, each seen from above;
Fig. 9 two interconnected sports mats, to explain the equalizing of tolerances;
Fig. 10 a further sports mat in a view from above;
Fig. 11 two connected together sports mats according to an embodiment ofthe Invention in a view from below;
Fig. 12 the connecting means according to Fig. 11 in an enlarged form in a view from above.

Modes for Carrying Out the Invention

[0027] Fig. 1 shows a mat 1 looking atthe top side 2 and Fig. 2 shows the bottom side 3. The mat is composed of two layers with a cushion layer 5 of chemically cross-linked polyethylene of bulk density of 60 kg/m^3 with a thickness of 45 mm and a cover layer of fabric-reinforced thermoplastic elastomer (TPE) having a thickness of 1 mm. The cover layer 4 is thermally laminated with the cushion layer 5. The dimensions ofthe mats are 0.75 m * 1.5 m.

[0028] As is especially visible in Fig. 1, the cover layer 4 entirely covers all undercut recesses 6, so that they are not visible from the top side 2. The recesses 6 penetrate the cushion layer 5 entirely in the example depicted and have a substantially circular segment shape in cross section. The recesses 6 each have a circular segment region with a radius of 35 mm.

[0029] Fig. 4 and 7 show the connecting means 10 consisting of two circular segment halves joined together by a shortjoining bridge (circularsegment regions 11, 11' in Fig. 7), wherein thetwo halves correspond exactlytothe recesses 6 of the mats 1. The connecting means consist of chemically cross-linked polyethylene with a bulk density of 60 kg/m^3, having a thickness of 45 mm.

[0030] Fig. 5 shows a mat field of 18 individual mats 1, being joined together by a total of 42 connecting means 10. Atthe top side shown in Fig. 5, the connecting means 10 are covered by the cover layer 4 and therefore are not visible.

[0031] Fig. 7 shows in enlarged view the connecting means 10 represented and used in Fig. 4 and 5. The connecting means 10 consists of two substantially circular segments with identical radii R, R', whosespacing A' corresponds exactly to 2 * R or R + R'. Thetwo circular segments are joined together by a shortjoining bridge. Fig. 6 shows another example ofthe connecting means 10': this likewise consists oftwo identical circular segments, each with a radius R, which are joined together by a somewhat longer joining bridge. The spacing A ofthe two centre points ofthe two circular segments in this sample embodiment is 1.1 * R.

[0032] Fig. 8 shows yet another example ofthe connecting means 10", likewise consisting oftwo circular segments with identical radius R. In this sample embodiment, the spacing A" ofthe centre points M, M' ofthe two circular segments is 0.9 R.

[0033] In all examples, the radii R and R' are 35 mm.

[0034] The functional principle is explained more closely by means of Fig. 9: the two mats 1 are shown in Fig. 9 from the bottom side and are joined together by two connecting means 10 per Fig. 7. The two mats are displaced somewhat relative to one another, as symbolized by means ofthe two arrows in the centre of Fig. 7. In accordance with this displacement of the mats relative to each other, the circular segment regions 11, 11' of the connecting means 10 can rotate slightly in the respective recesses 6 ofthe two mats 1 and additionally deform on account of their elasticity, in order to thereby equal out the necessary tolerances. In this process, the edges 7 ofthe two mats 1 abutting each other

are likewise slightly deformed in the region of the recesses 6 orthe two connecting means 10, which is readily possible because of the elasticity of the materials used. Such a displacement of the two mats 1 relative to each other is made considerably easier by the rotation of the respective circular segment regions 11, 11' of the two connecting means in the recesses 6.

[0035] Fig. 10 shows a slightly modified example of a mat 1'. This mat 1' is composed oftwo layers with a cushion layer 5 of chemically cross-linked polyethylene of bulk density of 70 kg/m^3 with a thickness of 49 mm and a cover layer of fabric-reinforced PVC-p having a thickness of 1 mm. The dimensions of the mats are 1 m * 2 m, the recesses each having a circular segment region with a diameter of 70 mm.

[0036] Fig. 11 and 12 show an embodiment of the Invention. The two mats 1" according to this sample embodiment of the Invention are composed oftwo layers with a cushion layer of chemically cross-linked polyethylene of bulk density of 60 kg/m^3 with a thickness of 45 mm and a cover layer of fabric-reinforced thermoplastic elastomer (TPE) having a thickness of 1 mm. The cover layer is thermally laminated with the cushion layer. The dimensions of the mats 1" are each 1 m * 2 m. On its longer sides, the mat 1" has in each case four recesses 6' and on the two narrow sides in each case two recesses 6'. In the sample embodiment shown in Fig. 11, the spacing of the recesses 6' with respect to the edge is in each case 150 mm, the spacing of the two recesses 6' on the narrow sides is in each case 700 mm, the spacing of the two recesses 6' in the middle of the two longer sides is in each case 300 mm and the spacing of the two outer recesses 6' on the longer sides is again 700 mm.

[0037] In Fig. 12, the connecting means 12 used in the sample embodiment according to Fig. 11 is shown on a larger scale. The connecting means 12 in this case comprises first of all the two slightly overlapping smaller circular segments, the primary circular segments 13, 13', and the two outer, larger circular segments 14, 14', which in turn overlap slightly with the two primary circular segments 13, 13'. In the sample embodiment illustrated, the two radii R, R' of the primary circular segments 13, 13' are each 17.5 mm, the radii of the two larger outer (secondary) circular segments 14, 14' are each 35 mm. The spacing A'" of the centre points M, M' of the two primary circular segments 13, 13' is 32 mm.

[0038] The functional principle of the embodiment of the Invention is explained more closely by means of Fig. 11: the two mats 1" are illustrated from the underside in Fig. 11 and joined together via two connecting means 12 according to Fig. 12. The two mats are displaced somewhat relative to one another, as symbolized by means of the two arrows in the centre of Fig. 11. In the case of a displacement of the mats relative to each other, the two primary circular segment regions 13, 13' of the connecting means 12 can deform, on account of their elasticity, into the respective recesses 6' of the two mats 1" with a certain torsional movement and possibly rotate slightly in the adjacent subregions, in order in this way to compensate the necessary tolerances. In this case, the abutting edges of the two mats 1" are likewise deformed slightly in the region of the recesses 6' or ofthe four connecting means 12, this being readily possible on account of the elasticity ofthe materials used.

Legend

[0039]

I, 1', 1"	Mat
2	Top side
3	Bottom side
4	Cover layer
5	Cushion layer
6, 6'	Recess
7	Edge
8, 9	not used
10,10',10"	Connecting means
II, 11'	Circular segment regions
12	Connecting means
13, 13'	Primary circular segment regions
14, 14'	Secondary circular segment regions
R, R'	Radius
A, A', A", A'"	Spacing
M, M'	Centre point

Claims

1. Mat System, especially for sports purposes, comprising

- a plurality of individual mats (1") each with a top side (2), a bottom side (3) running parallel to said top side (2), and at least one rectilinear side edge (7),
-wherein the rectilinearsideedges (7) ofthe individual mats (1") each have at least one undercut recess (6'), and
- connecting means (12) having a shape enabling, by engagement of each one of their halves in an undercut recess (6'), a connecting of two mats (1") along their rectilinear side edges (7),
wherein the individual mats (1") and the connecting means (12) each comprise at least one layer of foam material,
characterized in that
the connecting means (12) each comprise two interconnected primary circular segment regions (13, 13') having radii (R, R') and centre points (M, M') , wherein forthe spacing A (A'") ofthe centre points (M, M') ofthe primary circular segment regions (13,13') the following relation applies:

$$(I)\ 0.8 \times (R + R') < A < 1.3 \times (R + R'),$$

and
the connecting means (12) further comprise secondary segment regions (14, 14'), wherein the secondary segment regions (14, 14') are located on two sides opposite a joining bridge between the two primary circular segment regions (13, 13') ofthe connecting means (12).

2. Mat System according to Claim 1,
characterized in that
each ofthe two primary circular segment regions (13, 13') engages in a rotatable männer within the correspondingly shaped undercut recesses (6') ofthe individual mats (1").

3. Mat System according to Claim 2,
characterized in that
that, when two mats (1") lying next to one another at the edges (7) are displaced, the respective primary circular segment regions (13, 13') ofthe connecting means (12) can rotate within the likewise circular segment undercut recesses (6').

4. Mat System according to one of Claims 1 to 3,
characterized in that
forthe spacing A ofthe centre points (M, M') ofthe primary circular segment regions (13, 13') the following relation applies:

$$(II)\ 0.9 \times (R + R') < A < 1.15 \times (R + R').$$

5. Mat System according to one of Claims 1 to 4,
characterized in that
the connecting means (12) arefashioned in mirrorsymmetry with the same radii R=R' ofthe primary circular segment regions (13, 13').

6. Mat System according to one of Claims 1 to 5,
characterized in that
the secondary segment regions (14,14') are circular segments.

7. Mat System according to Claim 6,
characterized in that
the secondary circular segment regions (14, 14') have a larger radius than the primary circular segment regions (13, 13').

8. Mat System according to one of Claims 1 to 7,
characterized in that
the individual mats (1") have a rectangular cross section and have an undercut recess (6') on each of their edges every 100- 1000 mm of edge length.

9. Mat System according to one of Claims 1 to 8,

characterized in that
the undercut recesses (6'), which serve forthe engagement ofthe individual connecting means (12), do not penetrate the entire height ofthe foam layer, but only a pari of its height.

10. Mat System according to one of Claims 1 to 9,
characterized in that
the individual mats (1") comprise several layers of foam material of different densities.

11. Mat System according to one of Claims 1 to 10,
characterized in that
the individual mats (1") and/or connecting means (12) have at least one layer of foam material based on cross-linked polyolefin, especially polyethylene.

12. Mat System according to one of Claims 1 to 11,
characterized in that
the undercut recesses (6') ofthe individual mats (1") on the top side (2) ofthe mats are covered by a cover layer (4), so that the undercut recesses (6') are not visible when looking down on the top side (2).

13. Mat arrangement, consisting of several mats (1") connected to each other by connecting means (12) according to one of Claims 1 to 12.

Patentansprüche

1. Mattensystem, insbesondere für Sportzwecke, aulweisend:

- mehrere Einzelmatten (1") mit jeweils einer Oberseite (2), einer parallel zur Oberseite (2) verlaufenden Unterseite (3) und mindestens einer geradlinigen Seitenkante (7),
- wobei die geradlinigen Seitenkanten (7) der einzelnen Matten (1") jeweils mindestens eine hinterschnittene Ausnehmung (6') aulweisen, und
- Verbindungsmittel (12), die eine Form aulweisen, die durch Eingriff jeder ihrer Hälften in eine hinterschnittene Ausnehmung (6') eine Verbindung zweier Matten (1") entlang ihrer geradlinigen Seitenkanten (7) ermöglicht,

wobei die einzelnen Matten (1") und die Verbindungsmittel (12) jeweils mindestens eine Schicht aus Schaumstoff aufweisen,
dadurch gekennzeichnet, dass
die Verbindungsmittel (12) jeweils zwei miteinander verbundene primäre Kreissegmentbereiche (13, 13') mit Radien (R, R') und Mittelpunkten (M, M') aufweisen, wobei für den Abstand A (A'") der Mittelpunkte (M, M') der primären Kreissegmentbereiche (13, 13') die folgende Beziehung gilt:

$$(I)\ 0{,}8 \times (R + R') < A < 1{,}3 \times (R + R'),$$

und
die Verbindungsmittel (12) ferner sekundäre Segmentbereiche (14, 14') aulweisen, wobei die sekundären Segmentbereiche (14, 14') auf zwei Seiten gegenüber einer Verbindungsbrücke zwischen den beiden primären Kreissegmentbereichen (13, 13') der Verbindungsmittel (12) angeordnet sind.

2. Mattensystem nach Anspruch 1,
dadurch gekennzeichnet, dass
jeder der beiden primären Kreissegmentbereiche (13, 13') drehbar in die entsprechend geformten hinterschnittenen Ausnehmungen (6') der einzelnen Matten (1") eingreift.

3. Mattensystem nach Anspruch 2,
dadurch gekennzeichnet, dass
beim Verschieben zweier an den Kanten (7) nebeneinander liegender Matten (1") die jeweiligen primären Kreissegmentbereiche (13, 13') derVerbindungsmittel (12) innerhalb derebenfalls kreissegmentförmigen hinterschnittenen Ausnehmungen (6') drehbar sind.

4. Mattensystem nach einem der Ansprüche 1 bis 3,
dadurch gekennzeichnet, dass
fürden Abstand Ader Mittelpunkte (M, M') der primären Kreissegmentbereiche (13, 13') die folgende Beziehung gilt:

$$(II)\ \ 0{,}9 \times (R + R') < A < 1{,}15 \times (R + R')$$

5. Mattensystem nach einem der Ansprüche 1 bis 4,
dadurch gekennzeichnet, dass
die Verbindungsmittel (12) spiegelsymmetrisch mit den gleichen Radien R=R' der primären Kreissegmentbereiche (13, 13') ausgebildet sind.

6. Mattensystem nach einem der Ansprüche 1 bis 5,
dadurch gekennzeichnet, dass
die sekundären Segmentbereiche (14, 14') Kreissegmente sind.

7. Mattensystem nach Anspruch 6,
dadurch gekennzeichnet, dass
die sekundären Kreissegmentbereiche (14, 14') einen größeren Radius aulweisen als die primären Kreissegmentbereiche (13, 13').

8. Mattensystem nach einem der Ansprüche 1 bis 7,
dadurch gekennzeichnet, dass
die einzelnen Matten (1") einen rechteckigen Querschnitt aufweisen und an ihren Kanten jeweils alle 100 - 1000 mm Kantenlänge eine hinterschnittene Ausnehmung (6') aufweisen.

9. Mattensystem nach einem der Ansprüche 1 bis 8,
dadurch gekennzeichnet, dass
die hinterschnittenen Ausnehmungen (6'), die dem Eingriff der einzelnen Verbindungsmittel (12) dienen, nicht in die gesamte Höhe der Schaumstoffschicht, sondern nur in einen Teil ihrer Höhe eindringen.

10. Mattensystem nach einem der Ansprüche 1 bis 9,
dadurch gekennzeichnet, dass
die einzelnen Matten (1") aus mehreren Schaumstoffschichten mit unterschiedlichen Dichten bestehen.

11. Mattensystem nach einem der Ansprüche 1 bis 10,
dadurch gekennzeichnet, dass
die einzelnen Matten (1") und/oder Verbindungsmittel (12) mindestens eine Schicht aus Schaumstoff auf Basis von vernetztem Polyolefin, insbesondere Polyethylen, aulweisen.

12. Mattensystem nach einem der Ansprüche 1 bis 11,
dadurch gekennzeichnet, dass
die hinterschnittenen Ausnehmungen (6') der einzelnen Matten (1") auf der Oberseite (2) der Matten durch eine Deckschicht (4) abgedeckt sind, so dass die hinterschnittenen Ausnehmungen (6') bei Blick auf die Oberseite (2) nicht sichtbar sind.

13. Mattenanordnung, bestehend aus mehreren Matten (1"), die durch Verbindungsmittel (12) nach einem der Ansprüche 1 bis 12 miteinander verbunden sind.

Revendications

1. Systeme de tapis, notamment pour le sport, comprenant :

- plusieurs tapis individuels (1") ayant chacun une face superieure (2), une face Interieure (3) s'etendant parallelement ä la face superieure (2), et au moins un bord lateral rectiligne (7),
- dans lequel les bords lateraux rectilignes (7) des tapis individuels (1") ont chacun au moins un evidement en contre-depouille (6'), et

- des moyens de liaison (12) ayant une forme permettant, par engagement de chacune de leurs moities dans un evidementen contre-depouille (6'), une liaison dedeuxtapis (1") le longde leurs bords laterauxrectilignes (7), dans lequel les tapis individuels (1") et les moyens de liaison (12) comprennent chacun au moins une couche de materiau en mousse,

caracterise en ce que

les moyens de liaison (12) comprennent chacun deux regions de segments circulaires primaires (13,13') reliees entre elles ayant des rayons (R, R') et des points centraux (M, M'), la relation suivante s'appliquant ä un espacement A (A"') entre les points centraux (M, M') des regions de segments circulaires primaires (13, 13') :

$$(I)\ 0{,}8 \times (R + R') < A < 1{,}3 \times (R + R'),$$

et

les moyens de liaison (12) comprennent en outre des regions de segment secondaire (14, 14'), dans lequel les regions de segment secondaire (14,14') sont situees sur deux cötes opposes ä un pont de jonction entre les deux regions de segment circulaire primaire (13, 13') des moyens de liaison (12).

2. Systeme de tapis selon la revendication 1,
caracterise en ce que
chacune des deux regions primaires de segment circulaire (13, 13')s'engagedemaniererotativedansles evidements en contre-depouille (6') de forme correspondante des tapis individuels (1").

3. Systeme de tapis selon la revendication 2,
caracterise en ce que
lorsdu deplacement de deux tapis (1") situes l'un ä cöte de l'autre au niveau des bords (7), les regions de segments circulaires primaires (13, 13') respectives des moyens de liaison (12) peuvent tourner ä l'interieur des evidements ä contre-depouille de segments egalement circulaires (6').

4. Systeme de tapis selon l'une des revendications 1 ä 3,
caracterise en ce que
pour l'espacement A des points centraux (M, M') des regions de segments circulaires primaires (13, 13'), la relation suivante s'applique :

$$(II)\ 0{,}9 \times (R + R') < A < 1{,}15 \times (R + R')\_$$

5. Systeme de tapis selon l'une des revendications 1 ä 4,
caracterise en ce que
les moyens de liaison (12) sont realises en symetrie miroir avec les memes rayons R=R' des regions de segments circulaires primaires (13, 13').

6. Systeme de tapis selon l'une des revendications 1 ä 5,
caracterise en ce que
les regions de segments secondaires (14, 14') sont des segments circulaires.

7. Systeme de tapis selon la revendication 6,
caracterise en ce que
les regions de segments circulaires secondaires (14, 14') ont un rayon plus grand que les regions de segments circulaires primaires (13, 13').

8. Systeme de tapis selon l'une des revendications 1 ä 7,
caracterise en ce que
les tapis individuels (1") ont une section transversale rectangulaire et presentent sur chacun de leurs bords un evidement en contre-depouille (6') tous les 100 ä 1000 mm de longueur de bord.

9. Systeme de tapis selon l'une des revendications 1 ä 8,
caracterise en ce que
les evidements en contre-depouille (6'), qui servent ä l'engagement des moyens de liaison individuels (12), ne

traversent pas toute la hauteur de la couche de mousse, mais seulement une partie de sa hauteur.

10. Systeme de tapis selon l'une des revendications 1 ä 9,
caracterise en ce que
les differents tapis (1") comprennent plusieurs couches de materiau en mousse de densites differentes.

11. Systeme de tapis selon l'une des revendications 1 ä 10,
caracterise en ce que
les tapis individuels (1") et/ou les moyens de liaison (12) presentent au moins une couche de materiau en mousse ä base de polyolefine reticulee, notamment de polyethylene.

12. Systeme de tapis selon l'une des revendications 1 ä 11,
caracterise en ce que
les evidements en contre-depouille (6') des differents tapis (1") sur la face superieure (2) des tapis sont recouverts d'une couche de recouvrement (4), de sorte que les evidements en contre-depouille (6') ne sont pas visibles en regardant vers le bas sur la face superieure (2).

13. Agencement de tapis, constitue de plusieurs tapis (1") relies entre eux par des moyens de liaison (12) selon l'une des revendications 1 ä 12.

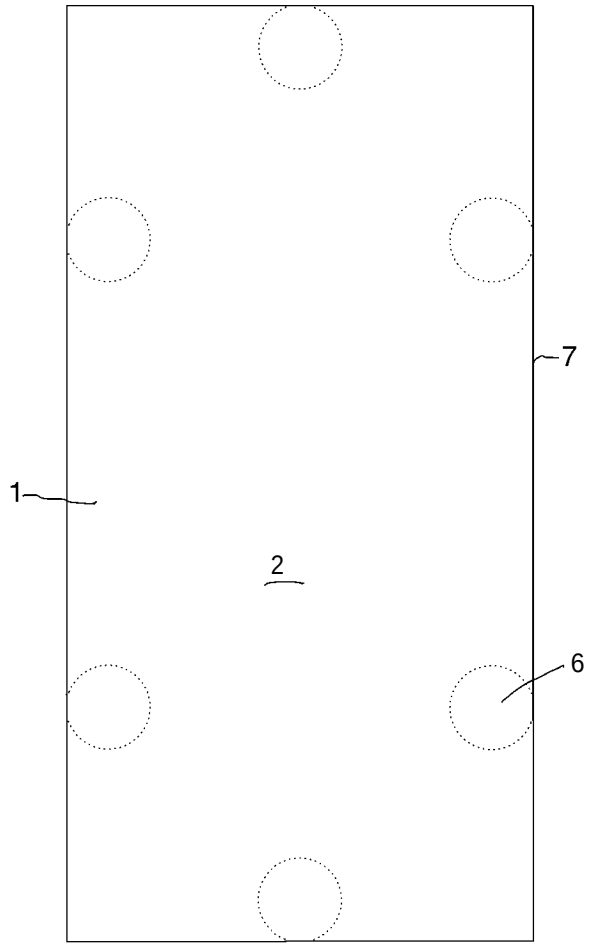


Fig. 1

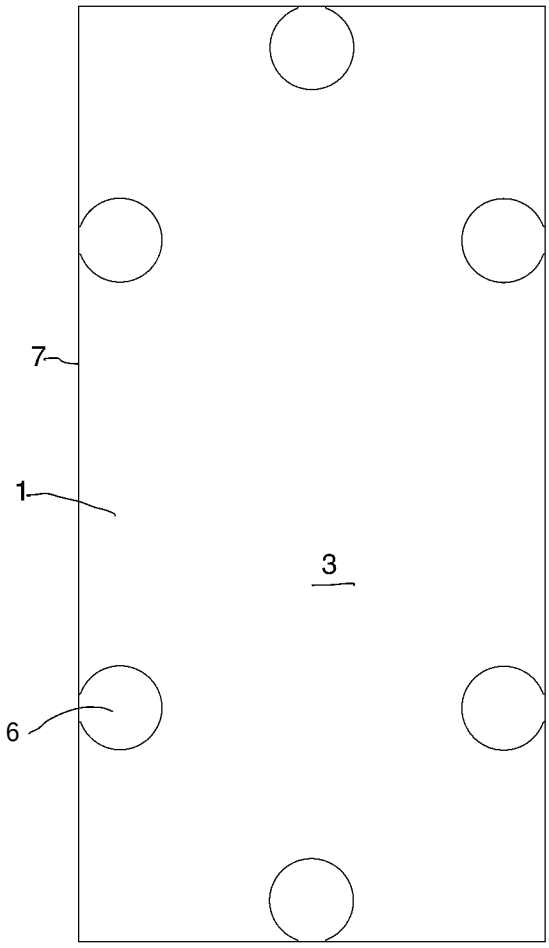


Fig. 2

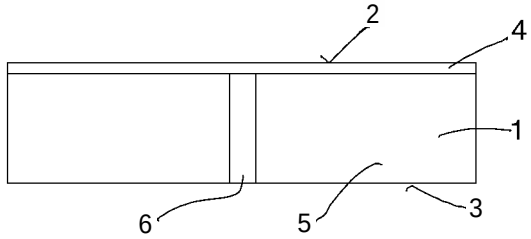


Fig. 3

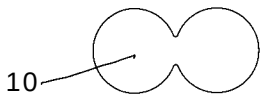
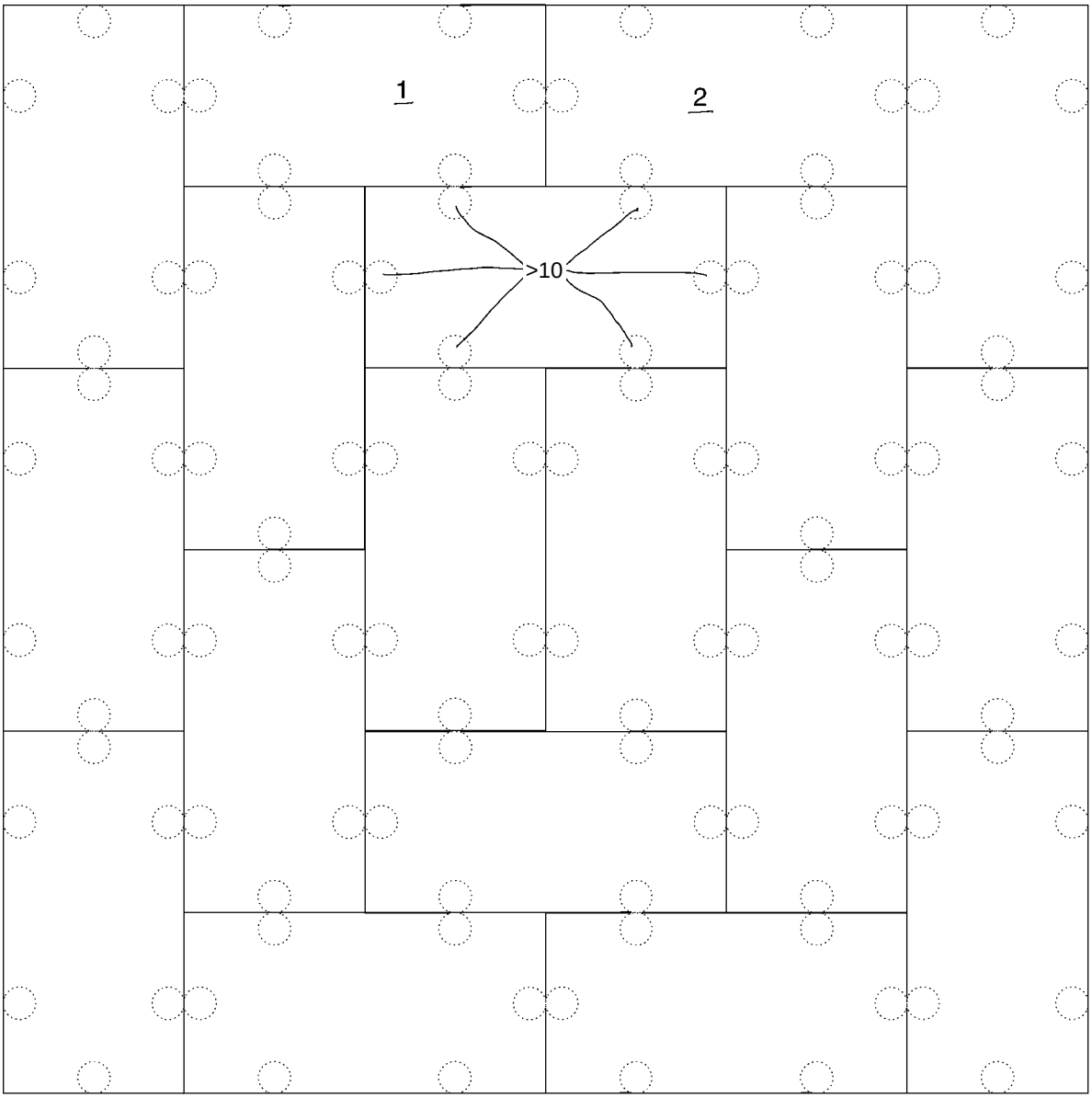


Fig. 4



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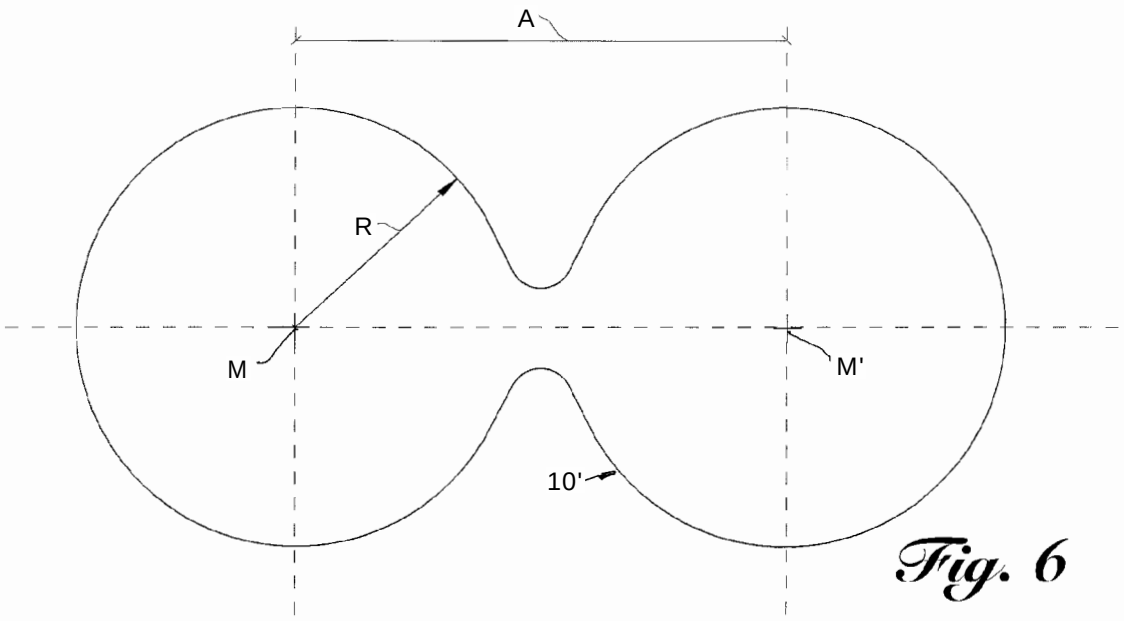


Fig. 6

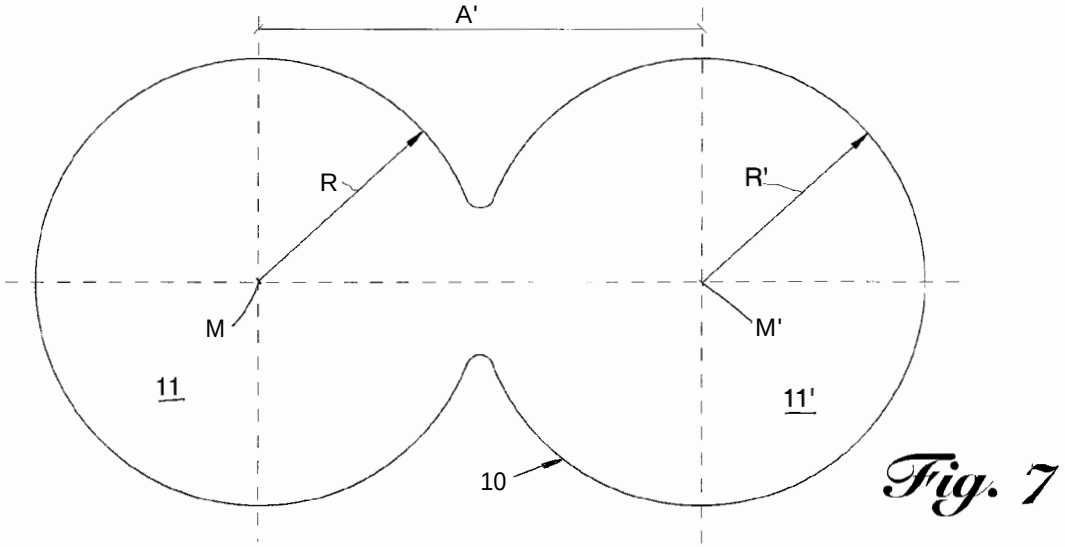


Fig. 7

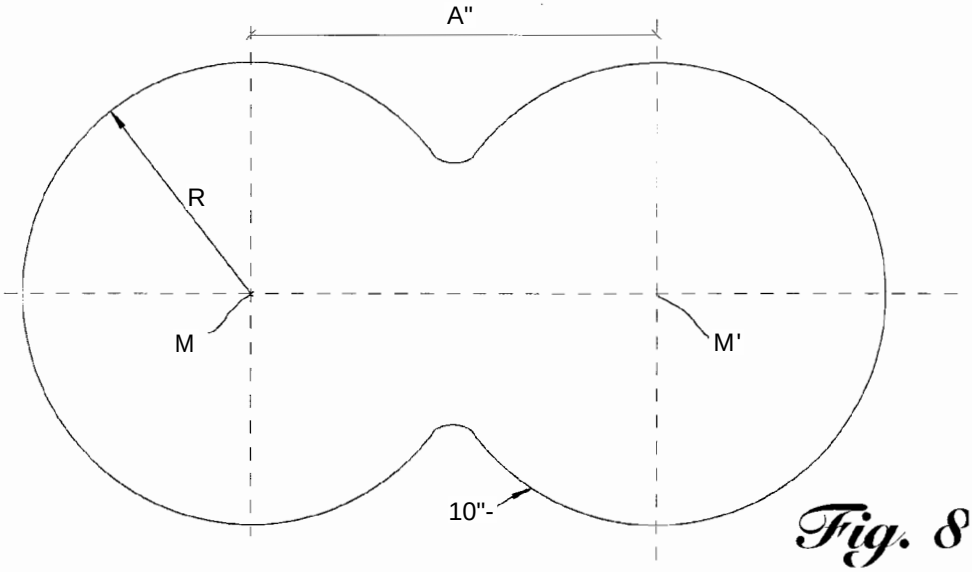
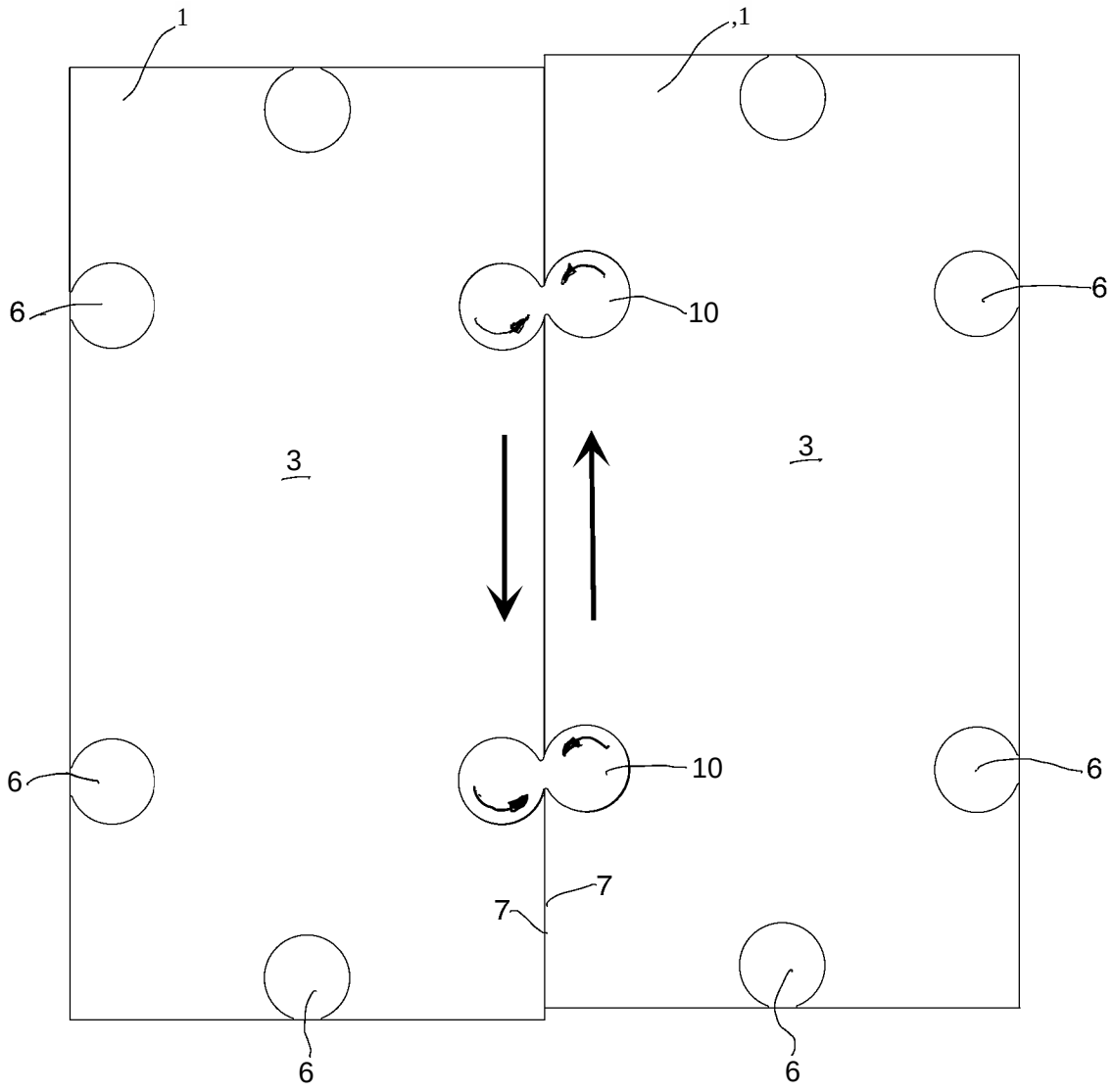


Fig. 8



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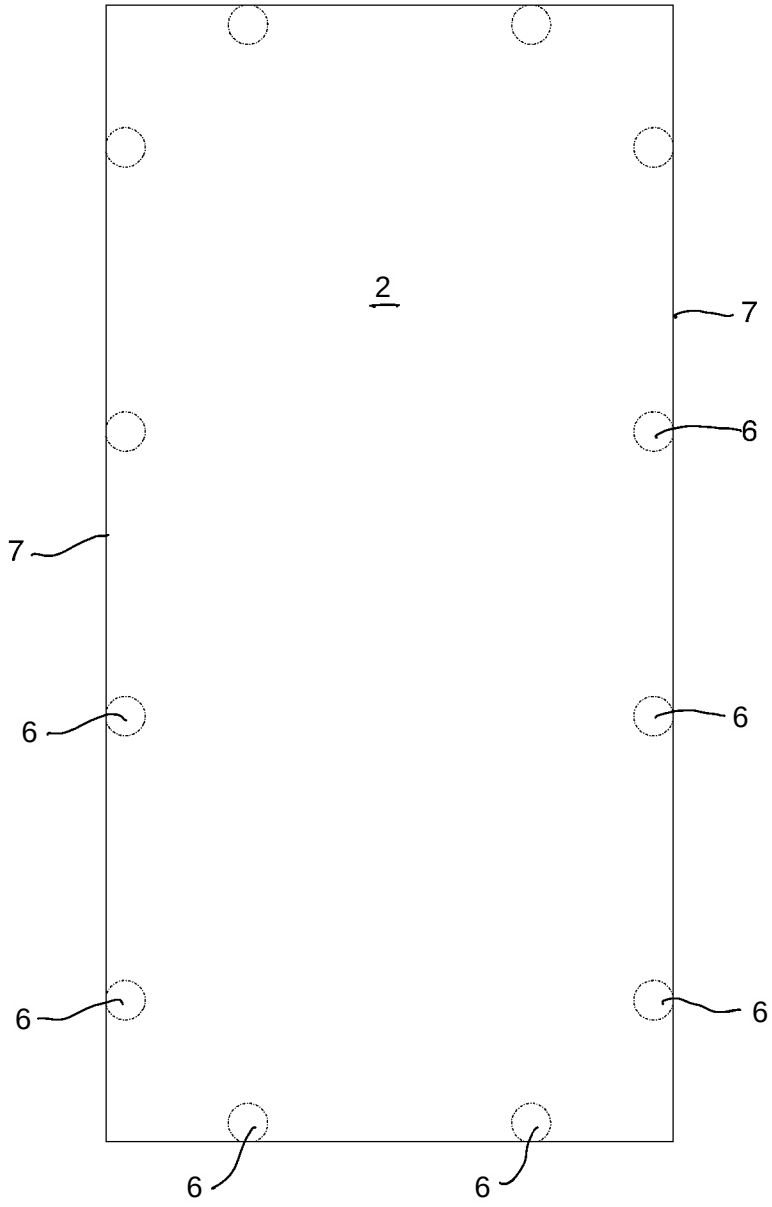

Fig. 10

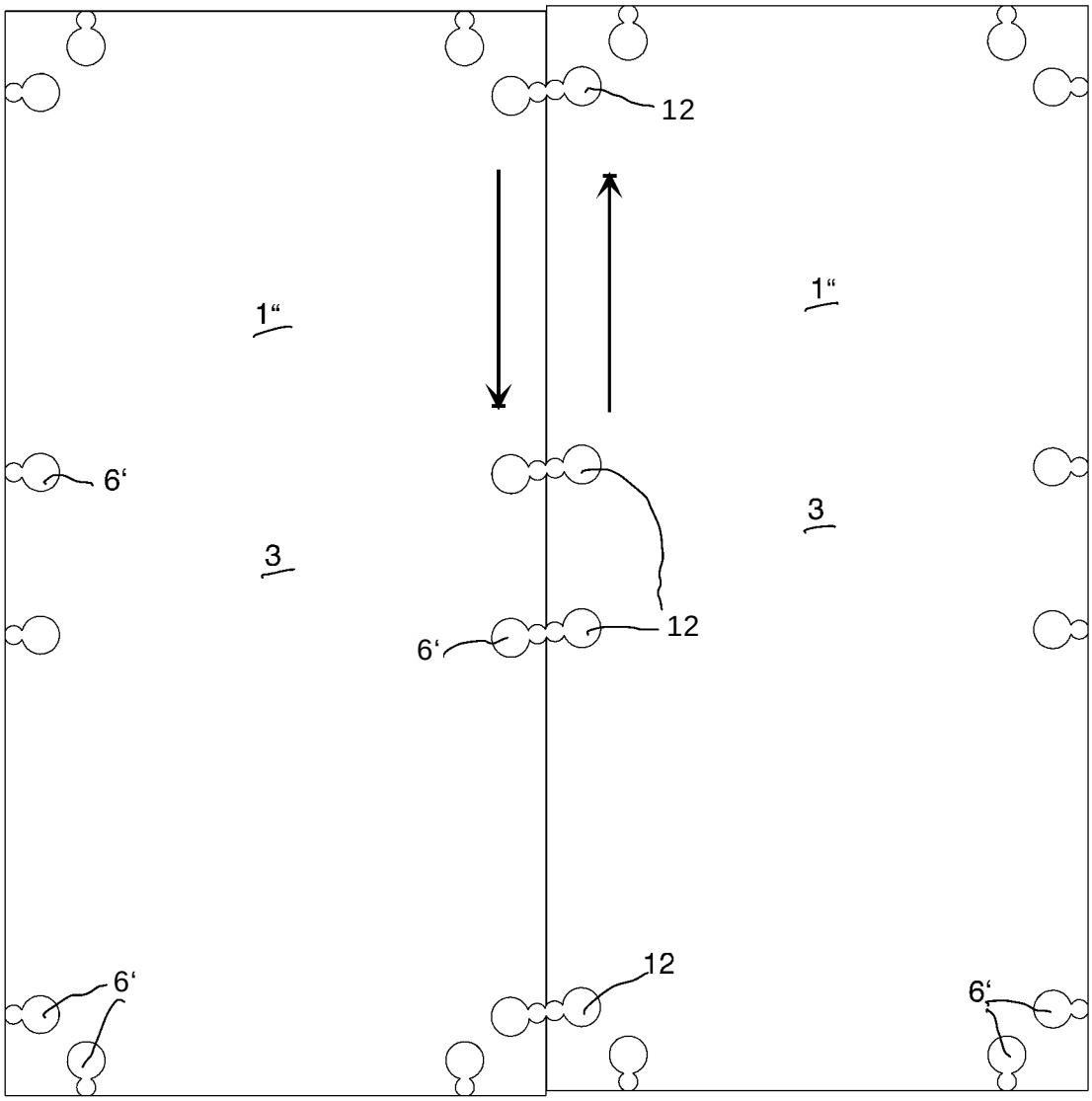

Fig. 11

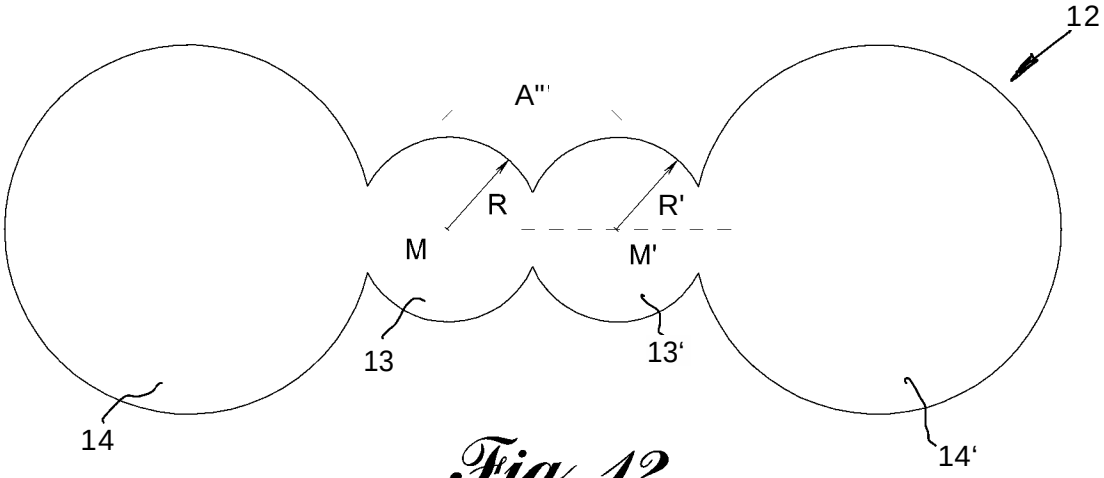

Fig. 12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 2243895 A2 [0002]
- EP 2033547 A1 [0003]
- EP 2957328 B1 [0004]
- FR 2182378 [0006]
- DE 20107338 U1 [0007]
- JP 3122674 U [0008]