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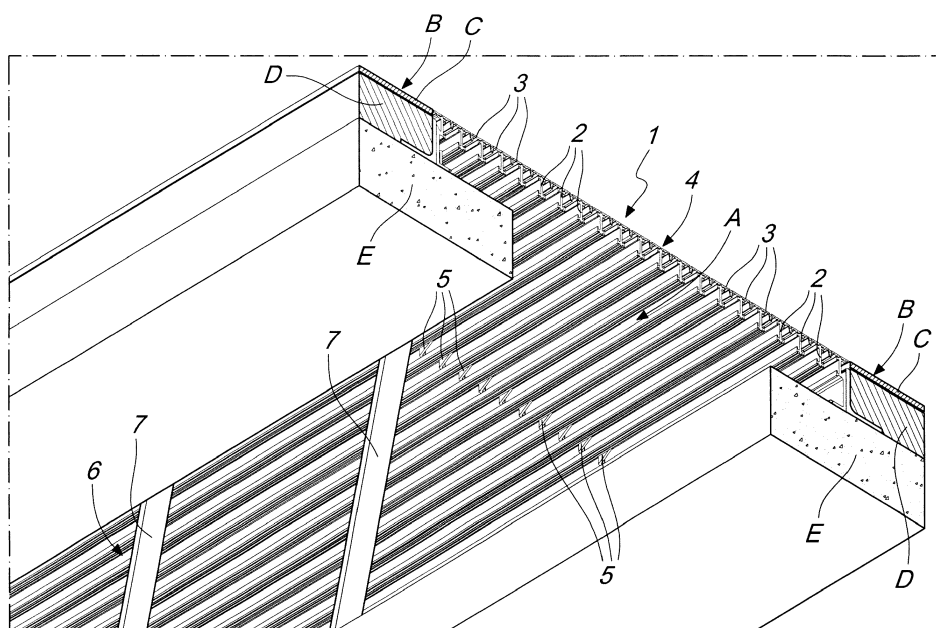
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(54) STRUCTURAL JOINT

(57) A structural joint, which can be arranged at an interspace (A) between two structural blocks (B) and comprises a plurality of beams (2) arranged side by side in a mutually parallel arrangement; the beams (2) are movable to vary the mutual center distance following corresponding spacing or approach movements between the structural blocks (B) and support respective deformable covering elements (3) which are arranged side by side, so as to form a sort of walkable mat (4) with variable extension.

At least one bar (5) is interposed between each pair of adjacently arranged beams (2) in order to contrast the rotation of the beams (2) about rotation axes which are parallel to the longitudinal axes of the beams (2), each end (5a, 5b) of the bar (5) is mated to a respective beam (2) with a coupling at least of the rotary type, configured at least for a free rotation of the bar (5) with respect to the corresponding beam (2) about an axis that is perpendicular to the mat (4).

*Fig. 3***EP 3 875 712 A1**

Description

[0001] The present invention relates to a structural joint.

[0002] As is known, in order to contain or eliminate the damage caused by an earthquake, a building construction method is becoming widespread which provides for their seismic isolation, which is achieved by decoupling the motion of the ground from the motion of the buildings by means of appropriately distributed disconnections.

[0003] In this manner, the building (which in this case is termed isolated structure) can withstand even very intense seismic events, and indeed for this reason this method is used mostly for structures such as hospitals, airports, fire stations, etc., for which it is essential to ensure full operational capability even in emergency conditions.

[0004] The need to prevent or at least contain damage and collapses, in case of a seismic event, does not involve just the building but also extends to the routes for access thereto, in order to ensure the possibility of transit from and toward the building itself.

[0005] For this purpose, therefore, the practice is known of arranging, between structural blocks that belong to (are associated with) the building and the access route (a road, a bridge, etc.) respectively, appropriately designed joints at interspaces, which constitute appropriately provided interruptions in continuity between the structural blocks identified above (and the buildings to which they relate).

[0006] If the function of the interspace is indeed to allow the relative movement and oscillation of one structural block with respect to the other, the joint (which is called "structural joint") has the task of accommodating these movements, ensuring in any case the continuity of the walking surface, which is necessary indeed to allow the transit of pedestrians and especially vehicles even following the occurrence of a seismic event.

[0007] For this purpose, therefore, the joint comprises a plurality of rubber strips, which are arranged side by side along the walking surface in a direction that is perpendicular to the transit direction. These strips are provided in an accordion-like manner, so that they can expand or contract elastically and accommodate the relative movements of one structural block with respect to the other. The strips can cover the entire width of the discontinuity or only a part thereof, and in this case are flanked by a rigid plate.

[0008] In any case, according to a known method, the strips are supported by respective beams having a reduced cross-section, which are arranged mutually side by side in a direction that is perpendicular to the transit direction (therefore like the strips) and are normally spaced adequately, so as to be able to move closer or further apart when one of the structural blocks moves toward the other or in the opposite direction. The beams are crossed at right angles by one or more rigid tubular elements, which are inserted slidingly in respective mu-

tually aligned slots provided in said beams. When one structural block moves with respect to the other, the beams move mutually away or closer by sliding along the tubular blocks, which have the task of maintaining the vertical orientation of said beams, preventing them from tilting or jamming due to the stresses transmitted upward by the strips, in particular upon the transit of vehicles.

[0009] However, this constructive solution is not free from drawbacks.

[0010] In order to avoid interfering with relative movement, each tubular element (which is rigid, as mentioned) must be able to enter one of the structural blocks when the distance between them decreases.

[0011] However, this is a considerable structural limitation, since for existing geometric or functional constraints, or even for practical construction difficulties, it is often difficult or impossible to provide, for this purpose, an adequate space inside the structural blocks.

[0012] The aim of the present invention is to solve the problems described above, providing a joint that can be arranged easily between two structural blocks, ensuring the continuity of the walking surface even in case of relative movement between said blocks.

[0013] Within this aim, an object of the invention is to provide a versatile joint, which can be arranged easily between any two structural blocks, without requiring or providing particular solutions or interventions for adaptation on said blocks.

[0014] Another object of the invention is to provide a structural joint that ensures maximum versatility in use and continuity of the walking surface, ensuring at the same time a broad range of relative motion between the structural blocks involved.

[0015] Another object of the invention is to provide a structural joint that ensures high reliability in operation.

[0016] Another object of the invention is to propose a structural joint that adopts a technical and structural architecture that is alternative to those of joints of the known type.

[0017] Another object of the invention is to provide a structural joint that has low costs and is safe in application.

[0018] Not least object of the invention is to provide a structural joint that can be obtained easily starting from commonly commercially available elements and materials.

[0019] This aim and these and other objects which will become better apparent hereinafter are achieved by a structural joint, which is configured to be arranged at an interspace between two structural blocks and comprises a plurality of beams arranged side by side in a mutually parallel arrangement and movable to vary the mutual center distance following corresponding spacing or approach movements between the structural blocks and supporting respective deformable covering elements which are arranged side by side, so as to form a sort of walkable mat with variable extension, characterized in

that at least one bar is interposed between each pair of said adjacently arranged beams in order to contrast a rotation of said beams about rotation axes which are parallel to the longitudinal axes of said beams, each end of said at least one bar being mated to a respective said beam with a coupling at least of the rotary type, configured at least for a free rotation of said bar with respect to the corresponding said beam about an axis that is perpendicular to said mat.

[0020] Further characteristics and advantages of the invention will become better apparent from the description of some preferred but not exclusive embodiments of the structural joint according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a top perspective view of the structural joint in a first embodiment;

Figure 2 is a bottom perspective view of the structural joint of Figure 1;

Figure 3 is a highly enlarged-scale view of a detail of Figure 2;

Figure 4 is an exploded perspective top view of the structural joint of Figure 1;

Figure 5 is a highly enlarged-scale view of a detail of Figure 4;

Figure 6 is an exploded sectional top perspective view of the structural joint of Figure 1, taken along planes that are transverse to the beams;

Figures 7 and 8 are top views of the structural joint of Figure 1 with part of the covering elements removed, in two different mutual arrangements of the beams,

Figure 9 is a front elevation view of the structural joint in a second embodiment;

Figure 10 is a front elevation view of the structural joint in a third embodiment;

Figure 11 is a highly enlarged-scale view of a detail of Figure 10;

Figure 12 is a view of the detail of Figure 10 as it appears following a mutual spacing movement of the structural blocks;

Figure 13 is a perspective view of a bar;

Figure 14 is a top view of the bar of Figure 13, interposed between the respective beams seen in cross-section.

[0021] With reference to the figures, the reference numeral 1 generally designates a structural joint, which can be arranged at an interspace A between two structural blocks B.

[0022] Without abandoning the protective scope claimed herein, the structural joint 1 can connect blocks B of any type, which are separated by an interspace A to allow their relative movement. For example, the two blocks B can be part of the same building or in any case of the same civil engineering structure. In the preferred application (not exclusive), in any case one of the blocks

B is associated (coupled) with an isolated structure, and therefore with a building the full operational capability of which one wishes to ensure even in case of an earthquake and for which therefore suitable solutions to isolate it from the surrounding ground have already been used.

The second block B can instead be associated with or belong to a route for access to said building, and in this case, while the interspace A indeed allows the building to oscillate and move independently of the access route (a bridge, a road, etc.), the joint 1 ensures (in the manners that will be shown hereinafter) the necessary continuity between the blocks B and/or with the isolated structure.

[0023] Furthermore, it should be noted that Figures 1-9 and 11-12 show blocks B comprising tiles C which lie above slabs D, which in turn rest on floors E. The tiles C of the two blocks B are mutually aligned so as to form a walking surface the continuity of which is indeed ensured by the joint 1.

[0024] In the embodiment of Figure 10, instead, one of the two blocks B is constituted by a single body F (a wall of a building, for example).

[0025] In any case, it is stressed that the solutions indicated above are mentioned by way of example: the blocks B can be of any type and can have any configuration without thereby abandoning the protective scope claimed herein.

[0026] The structural joint 1 comprises a plurality of beams 2 arranged side by side in a mutually parallel arrangement: as can be noticed for example in Figures 7 and 8, the beams 2 run parallel to mutually opposite margins of the blocks B that delimit the interspace A.

[0027] The beams 2 can move so as to be able to vary the mutual center distance (remaining in a mutually parallel arrangement) following corresponding spacing or approach movements between the structural blocks B (i.e., such as to increase or reduce the distance between the blocks B and therefore the width of the interspace A). In practice, by being moved (directly or indirectly) by the blocks B the beams 2 can only change their mutual center distance.

[0028] It is stressed that in this context the "width" of the interspace A as well as the width of the beams 2 is to be understood as the dimension that is transverse to the longitudinal extension of the beams 2.

[0029] The beams 2 support respective deformable covering elements 3, which are arranged side by side, so as to form a sort of walkable mat 4 with a variable extension (width). In other words, the covering elements 3 are arranged in mutual contact (along the sides) and their width (the dimension that corresponds to the width of the beams 2) can vary as a consequence of deformation, thus accommodating the mutual spacing or approach movement of the underlying beams 2 that support them and of the blocks B.

[0030] Therefore, the mat 4, by deforming, maintains its continuity and integrity even following seismic events or in any case when, for any reason, one of the blocks B moves toward the other one or away from it.

[0031] In this regard, it is useful to specify right now that each covering element 3 is preferably of the type of an accordion-like strip.

[0032] Furthermore, in the solution of greatest practical interest each covering element 3 is made of an elastically deformable material and is preferably (but not exclusively) chosen of the elastomeric type (rubber or the like for example).

[0033] According to the invention, at least one bar 5 for contrasting the rotation of the beams 2 about rotation axes which are parallel to their longitudinal axes, is interposed between each pair of adjacent beams 2. In other words, the bars 5 are configured to keep the beams 2 perpendicular to the mat 4, preventing them from being able to tilt with respect to it; for example, this inclination might otherwise occur following the transit of a vehicle due to its wheels which transmit stresses to the covering elements 3, making them slide by friction parallel to themselves.

[0034] As can be noticed also in the accompanying figures, a plurality of bars 5, arranged substantially in a mutually parallel arrangement, is advantageously interposed between each pair of adjacently arranged beams 2.

[0035] With their presence, the bars 5 simply hinder by interference the rotation of the beams 2, and in order to increase the effect it is possible to choose for the bars 5 a suitable height (the dimension perpendicular to the mat 4) with respect to the corresponding height of the beams 2: the person skilled in the art may choose the measurement that in each instance is most appropriate, but it can be noticed that by using a height of the bars 5 that is for example comprised between one quarter and three quarters of the height of the beams 2, or even outside of this range, it is possible to maximize the indicated purpose.

[0036] Each end 5a, 5b of the bars 5 is coupled to a respective beam 2 with a coupling at least of the rotary type, i.e., configured to allow at least the free rotation of the bar 5 with respect to the corresponding beam 2 about an axis that is perpendicular to the mat 4.

[0037] In this manner, when the blocks B, and the beams 2 with them, move closer or apart, as can be seen from the comparison between Figures 7 and 8, the bars 5 simply change the angle formed with the beams 2, in any case maintaining their prerogative, i.e., prevention of the unwanted rotation of said beams 2, which thus maintain their vertical configuration (at right angles to the mat 4).

[0038] In a first possible embodiment of the invention, each end 5a, 5b of the bars 5 can be simply left free to slide with respect to the corresponding beam 2.

[0039] In the preferred embodiment, instead, each bar 5 is mated with a first end 5a thereof to a first beam 2 with a rotary and sliding coupling, which is indeed configured not only for the free rotation of the bar 5 with respect to the corresponding first beam 2 about an axis that is perpendicular to the mat 4 but also for the free

sliding of said first end 5a with respect to the corresponding first beam 2. At the same time, in this preferred embodiment, a second end 5b of each bar 5, which is opposite the first end 5a, is mated to a second beam 2 with a coupling of the rotary type associated with means for contrasting the free sliding of said second end 5b with respect to the corresponding second beam 2. In this manner, when the beams 2 move mutually apart or closer, one of the two ends (the second end 5b) of the bars 5 remains in the same position with respect to the corresponding beam 2, while on the opposite side the other end (the first end 5a) slides along the other beam 2 and in general the bar 5 is inclined in order to accommodate the variation of the center distance between the two beams 2.

[0040] In particular, the contrast means are chosen between a grub, a screw, a pin, a clip, a choke (but in any case other practical solutions, which are in any case within the protective scope claimed herein, are not excluded).

[0041] Usefully, the beams 2 can move slidably on a respective supporting structure 6, which can be arranged in the interspace A on the opposite side with respect to the mat 4. The structure 6 has the task of supporting the beams 2, leaving them in any case free to move in order to vary their center distance as a consequence of the relative movement between the blocks B.

[0042] In one possible embodiment, the structure 6 can be simply constituted by a rigid plate, which is arranged parallel to the mat 4 and on which the beams 2 can indeed slide.

[0043] In this configuration (but also in the presence of different supporting structures 6), the mat 4 does not fill the entire discontinuity between the blocks B but only a part of it, being flanked by an additional rigid platform.

[0044] In the embodiment specifically shown in the accompanying figures, the supporting structure 6 instead comprises at least one rod 7, which at opposite ends can be associated even indirectly with respective structural blocks B with a coupling at least of the rotary type, i.e., configured to allow at least the free rotation of the rod 7 with respect to each structural block B about an axis that is perpendicular to the mat 4. More particularly, the structure 6 comprises a plurality of said rods 7, which are arranged in a mutually parallel arrangement between the structural blocks B.

[0045] In a manner which is in some way similar to what occurs for the bars 5 between each pair of beams 2, when the blocks B move closer or mutually apart, the rods 7 follow this movement by varying their inclination (remaining in any case mutually parallel). At any time, therefore, the beams 2 rest on the rods 7 but are free to move (slide) thereon.

[0046] In the embodiment of the accompanying figures, which is a non-limiting illustration of the invention, each bar 5 comprises an elongated central portion 5c (for the sake of simplicity, the reference "5c" is shown only in some of the accompanying figures) and two mutually opposite terminal portions 5d (in this case also, for

the sake of convenience the reference "5d" is indicated only in some figures). The terminal portions 5d comprise respective ends 5a, 5b and are arranged substantially at right angles to the central portion 5c; furthermore, they are arranged on opposite sides with respect to the longitudinal axis of the central portion 5c, so as to define for each bar 5 a substantially S-shaped longitudinal extension (clearly visible in Figure 14, for example).

[0047] The shape thus given to the bar 5 is of particular practical interest: when the beams 2 move mutually apart up to the maximum allowed mutual distance, the bars 5 can in fact be arranged (with the central portion 5c) substantially at right angles to the beams 2. In this configuration, the terminal portions 5d rest in a parallel arrangement with respect to the respective beams 2, hindering any overturning thereof. Vice versa, by choosing to give a minimum longitudinal extension to the terminal portions 5d (between one third and one tenth, or less, of the longitudinal extension of the central portion 5c), when the blocks B and the beams 2 move closer the central portions 5c they are arranged parallel or almost parallel to the beams 2 and the terminal portions 5d increase only to a minimum extent the transverse space occupation (width), allowing the beams 2 to practically make mutual contact.

[0048] In the preferred embodiment, shown in the accompanying figures by way of non-limiting example of the application of the invention, at least one beam 2 (and preferably all, except possibly for the outermost ones) comprises a main plate 2a which is kept at right angles to the mat 4 and to crossmembers 2b, which are arranged on opposite sides of the plate 2a, so as to define a transverse cross-section of the beam 2 that is substantially shaped like a double T (the reference numerals of the plate 2a and of the crossmembers 2b are indicated in Figure 6).

[0049] Each crossmember 2b has at least one terminal lip which is folded toward the other crossmember 2b, so as to define (together with the plate 2a) respective channels for rotary accommodation and/or sliding guiding channels for the ends 5a, 5b of the bars 5.

[0050] It is indeed in the channels that the contrast means above mentioned can be accommodated when they are constituted by a grub, a screw, a pin, a clip; while the choke can indeed be a localized constriction of the channel.

[0051] Even more particularly, in a preferred but not exclusive embodiment, each bar 5 forms, at each end 5a, 5b, a sort of pivot 8 that is perpendicular to the mat 4; the terminal flaps of each pivot 8 which protrude externally (from the profile of the central portion 5c) rotatably engage respective channels.

[0052] In practice, therefore, in the preferred embodiment the desired coupling at least of the rotary type between the bars 5 and the beams 2 above described, is obtained indeed by virtue of the pivot 8 of each bar 5, which rotatably engages the channels formed by the folded crossmembers 2b and by the plates 2a of each beam

2.

[0053] Conveniently, the two beams 2 arranged so as to face the structural blocks B (the outermost ones) are mated to the structural blocks B with coupling elements 9a, 9b which are chosen between rigid coupling elements 9a (screws, bolts, nails and the like) and sliding coupling elements 9b (Figure 9), the latter being suitable for clearance for the relative translation of the respective beam 2 with respect to the corresponding structural block B along a direction that is parallel to the beam 2. For example, the sliding coupling elements 9b can have dovetail guides or the like, provided by shaping appropriately a segment of the outermost beam 2 and a corresponding accessory which is rigidly mated to the block B.

[0054] In practice, the choice to resort to sliding coupling elements 9b allows the joint 1 according to the invention to support not only the relative spacing or approach movement between the blocks B but also the relative sliding between the blocks B (along the direction identified by the margins thereof or by the longitudinal extension of the beams 2).

[0055] The operation of the structural joint according to the invention has, in practice, already been described above, but in any case a summary thereof is provided hereinafter.

[0056] The joint 1 is applied between two blocks B which are separated by an interspace A which allows the approach or spacing movement of one block B with respect to the other.

[0057] The joint 1 comprises a plurality of mutually parallel beams 2, which are indeed interposed between the blocks B (for example, the first and last beam 2 can be coupled in a parallel arrangement to respective margins of the blocks B by means of coupling elements 9a, 9b). When one of the blocks B moves toward the other one, it pushes the beams 2 which, remaining in a mutually parallel arrangement, move on the supporting structure 6, moving closer or further apart with respect to each other, simply by varying the center distance (Figures 7 and 8 indeed illustrate two different arrangements that can thus be obtained).

[0058] The supporting structure 6 can be constituted by a fixed plate or can comprise rods 7 which in turn can move (and are interposed between the blocks B) or others; in any case, it provides support to the beams 2, leaving them free to slide with respect to it.

[0059] In this context, the mat 4 formed by the deformable covering elements 3 maintains its integrity and continuity even following the movements of the underlying beams 2 that support them.

[0060] As already shown, according to the invention the bars 5 effectively perform the role of keeping the beams 2 correctly oriented (at right angles to the mat 4 and to the walking surface), preventing them from jamming, tilting or tipping over.

[0061] The bars 5 can change their inclination following the movements of the beams 2 by virtue of the at least rotary couplings with which they are mated to said beams

2, thus supporting the variation of the center distance between them but preventing in any configuration the unwanted rotation about axes that are parallel to the longitudinal axes of the beams 2.

[0062] When the blocks B move mutually closer, the bars 5 remain between the respective pairs of beams 2, simply tending to decrease the angle formed with them until they substantially rest parallel to each other. Therefore, the joint 1 according to the invention allows the two blocks B to move significantly closer, until they almost reach a minimum distance which is simply equal to the dimension of the width of the beams 2 and optionally of the central portion 5c of the bars 5. In this regard, the choice to resort to bars 5 that have a central portion 5c which can be given a minimum thickness and terminal portions 5d having a reduced longitudinal extension, so as to affect to a minimum extent the overall space occupational (the width) when indeed the beams 2 are closer, is particularly useful.

[0063] Each bar 5 remains in any condition between the respective two beams 2 (like the rods 7 remain between the blocks B), without requiring additional spaces in the blocks B, as occurs instead in known solutions.

[0064] The joint 1 according to the invention can therefore be easily arranged between two structural blocks B, thus ensuring the continuity of the walking surface even in case of relative movement between said blocks and without requiring or providing particular solutions or interventions for adaptation on the blocks.

[0065] While it has already been shown that the joint 1 allows an approach of the blocks B up to a minimum distance (equal to the thickness of the beams 2 and optionally of the bars 5), it should also be noted, on the opposite side, that the joint 1 also allows a spacing stroke of significant extent between the blocks B. The correct functionality of the joint 1 is in fact ensured up to the condition in which the bars 5 are substantially perpendicular to the beams 2 and therefore the distance between the blocks B is equal to the sum of the length of the bars 5 (to which the sum of the widths of the beams 2 must be added).

[0066] The structural joint 1 therefore ensures maximum versatility in use and continuity of the walking surface, ensuring at the same time a broad range of relative movement between the structural blocks B involved.

[0067] In this context, it already been shown in the preceding pages that the choice to give an S-shaped contour to the bars 5 is particularly useful, since it effectively contrasts overturning.

[0068] The joint 1 according to the invention can also be provided with components that are commonly commercially available and have low costs, which moreover require simple assembly, giving rise to a solution with high practicality and reliability.

[0069] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may furthermore be replaced with other technically equiv-

alent elements.

[0070] In the exemplary embodiments shown, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0071] In practice, the materials used, as well as the dimensions, may be any according to the requirements and the state of the art.

[0072] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A structural joint, which is configured to be arranged at an interspace (A) between two structural blocks (B) and comprises a plurality of beams (2) arranged side by side in a mutually parallel arrangement and movable to vary the mutual center distance following corresponding spacing or approach movements between the structural blocks (B) and supporting respective deformable covering elements (3) which are arranged side by side, so as to form a sort of walkable mat (4) with variable extension, **characterized in that** at least one bar (5) is interposed between each pair of said adjacently arranged beams (2) in order to contrast a rotation of said beams (2) about rotation axes which are parallel to the longitudinal axes of said beams (2), each end (5a, 5b) of said at least one bar (5) being mated to a respective said beam (2) with a coupling at least of the rotary type, configured at least for a free rotation of said bar (5) with respect to the corresponding said beam (2) about an axis that is perpendicular to said mat (4).
2. The structural joint according to claim 1, **characterized in that** a plurality of said bars (5), arranged substantially in a mutually parallel arrangement, is interposed between each pair of said adjacently arranged beams (2).
3. The structural joint according to claim 1 or 2, **characterized in that** each bar (5) is mated with a first end (5a) to a first beam (2) with a rotary and sliding coupling, configured for the free rotation of said bar (5) with respect to the corresponding said first beam (2) about an axis that is perpendicular to said mat (4) and for the free sliding of said first end (5a) with respect to said corresponding first beam (2), a second end (5b), which is opposite said first end (5a), of each bar (5) being coupled to a second beam (2) with a coupling of the rotary type associated with means for contrasting the free sliding of said second

end (5b) with respect to said corresponding beam (2).

4. The structural joint according to claim 3, **characterized in that** said contrast means are chosen between a grub, a screw, a pin, a clip, a choke.
5. The structural joint according to one or more of the preceding claims, **characterized in that** said beams (2) can move slidingly on a respective supporting structure (6), which can be arranged in the interspace (A) on the opposite side with respect to said mat (4).
6. The structural joint according to claim 5, **characterized in that** said structure (6) comprises at least one rod (7), even indirectly associable on opposite sides with respective structural blocks (B) with a coupling at least of the rotary type, configured at least for the free rotation of said rod (7) with respect to the corresponding structural block (B) about an axis that is perpendicular to said mat (4).
7. The structural joint according to claim 6, **characterized in that** said structure (6) comprises a plurality of said rods (7), arranged in a mutually parallel arrangement between the structural blocks (B).
8. The structural joint according to one or more of the preceding claims, **characterized in that** each one of said bars (5) comprises an elongated central portion (5c) and two mutually opposite terminal portions (5d), comprising respective said ends (5a, 5b), and arranged substantially at right angles to said central portion (5c), said terminal portions (5d) being arranged on opposite sides with respect to the longitudinal axis of said central portion (5c), in order to define for each bar (5) a substantially S-shaped longitudinal extension.
9. The structural joint according to one or more of the preceding claims, **characterized in that** at least one of said beams (2) comprises a main plate (2a) which is kept at right angles to said mat (4) and two crossmembers (2b), which are arranged on opposite sides of said plate (2a), for the forming of a transverse cross-section of said beam (2) that is substantially double T-shaped, each one of said crossmembers (2b) having at least one terminal lip which is folded toward the other one of said crossmembers (2b), in order to form respective channels for the rotary accommodation and/or sliding guiding for said ends (5a, 5b) of said beams (2).
10. The structural joint according to claim 9, **characterized in that** each one of said bars (5) forms, at each one of said ends (5a, 5b), a sort of pivot (8) which is perpendicular to said mat (4), respective terminal

flaps, which protrude externally, of each one of said pivots (8) engaging rotatably in respective said channels.

- 5 11. The structural joint according to one or more of the preceding claims, **characterized in that** each one of said covering elements (3) is substantially of the type of an accordion-like strip.
- 10 12. The structural joint according to one or more of the preceding claims, **characterized in that** each one of said covering elements (3) is made of an elastically deformable material, preferably of the elastomeric type.
- 15 13. The structural joint according to one or more of the preceding claims, **characterized in that** the two said beams (2) arranged so as to face the two structural blocks (B) are coupled to said structural blocks (B) with coupling elements (9a, 9b) which are chosen between rigid coupling elements (9a) and sliding coupling elements (9b), adapted to provide clearance for the relative translation of the respective said beam (2) with respect to the corresponding structural block (B) along a direction that is parallel to said beam (2).
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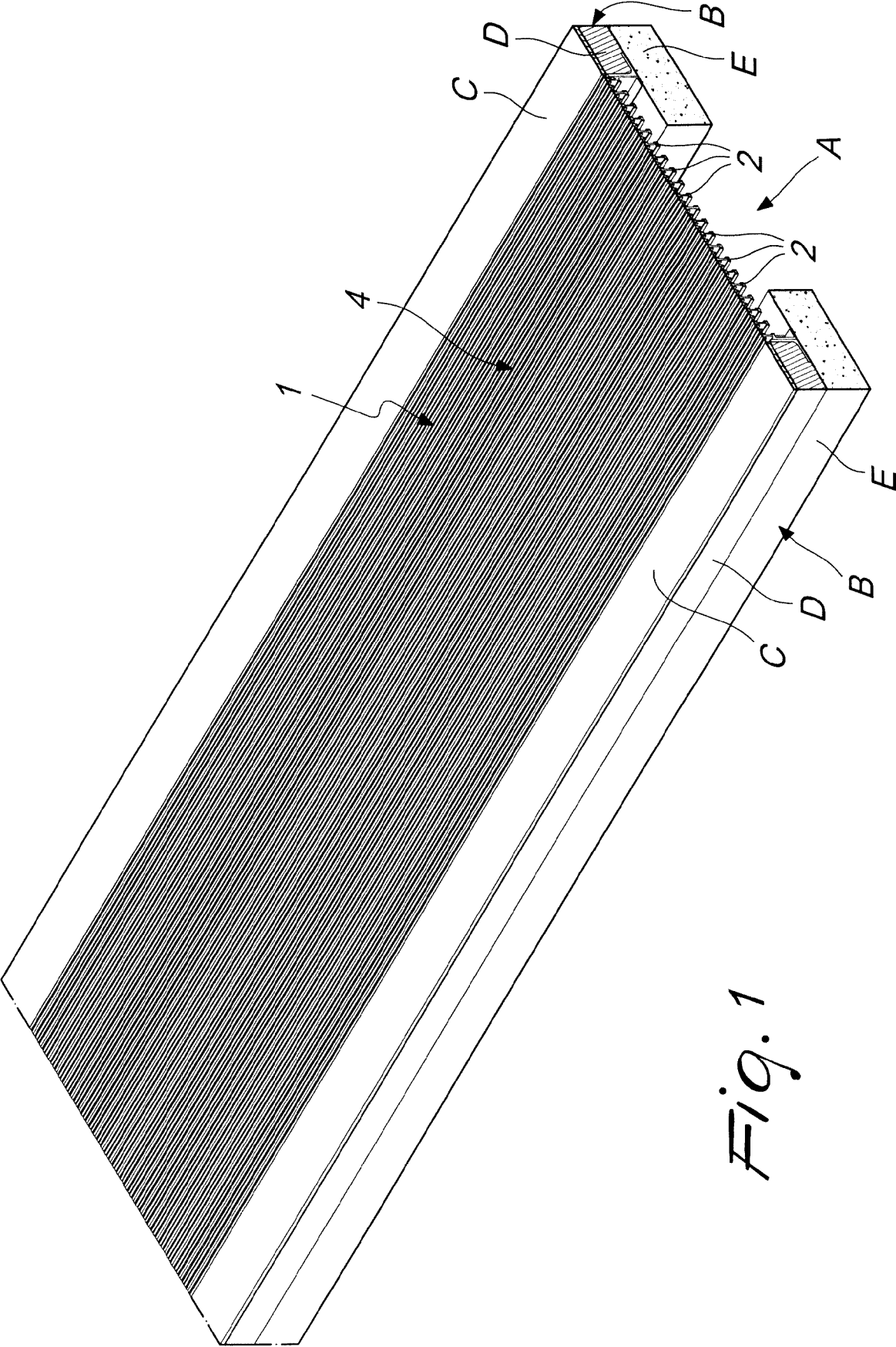
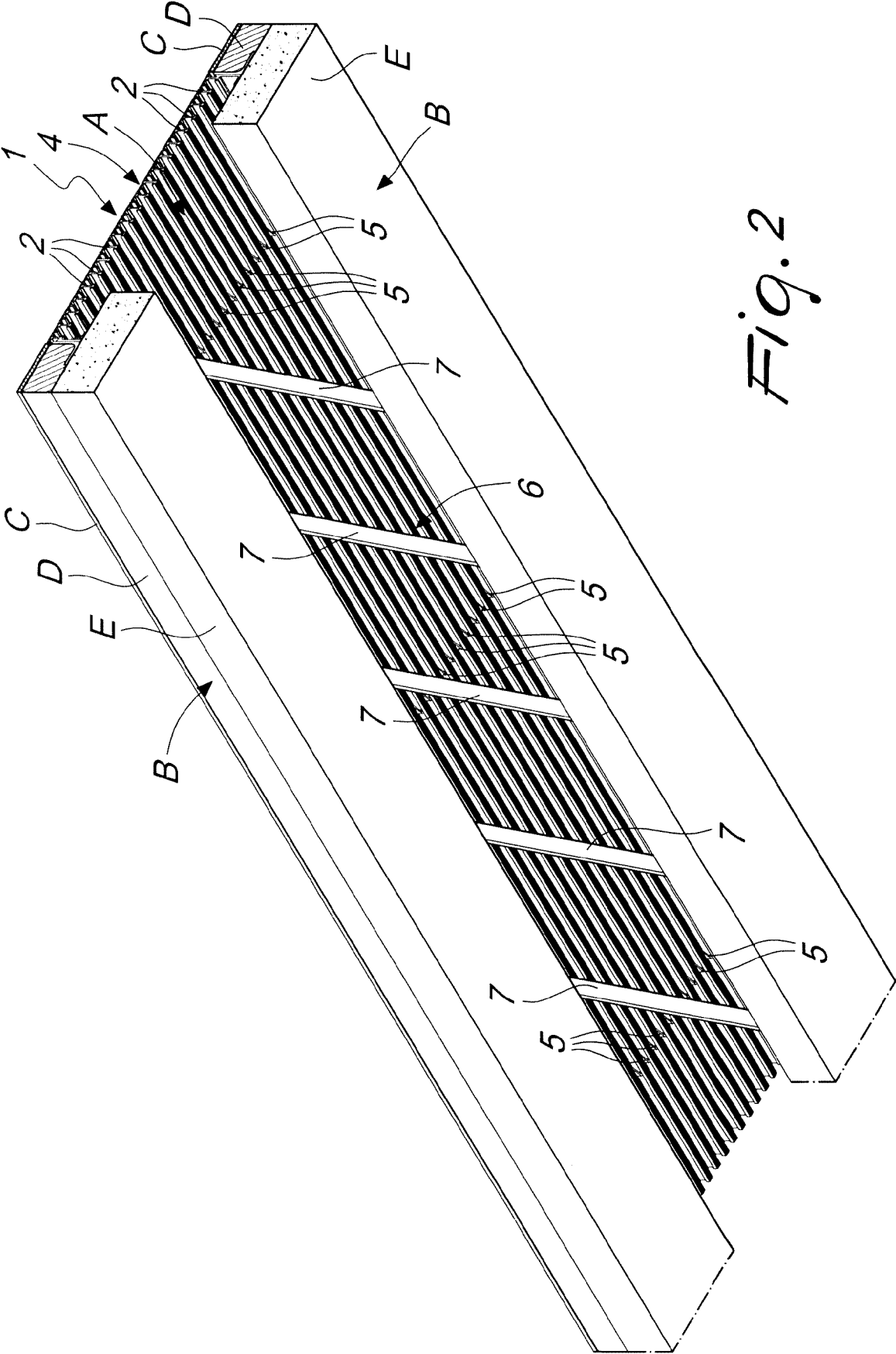


Fig. 1



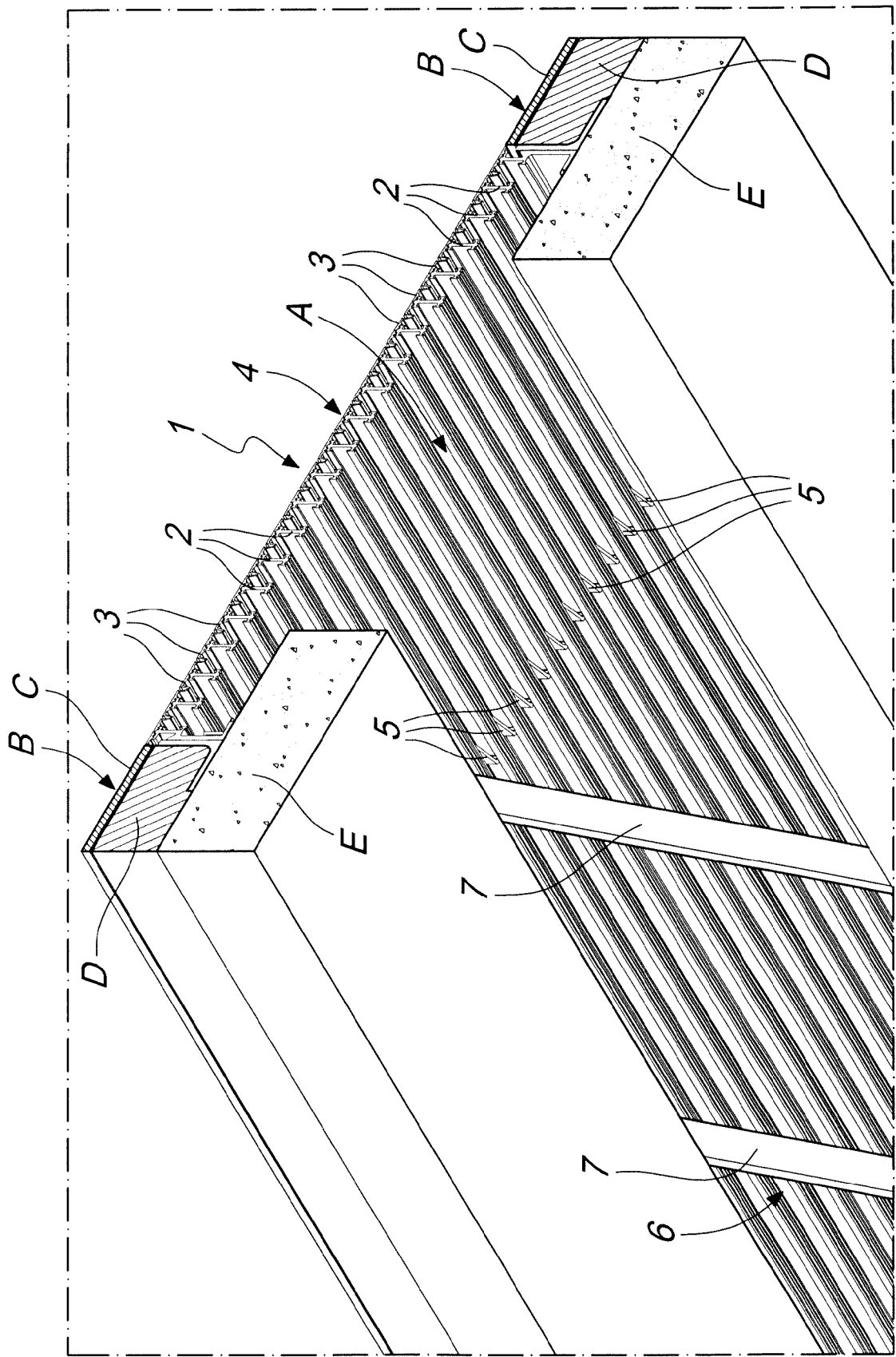
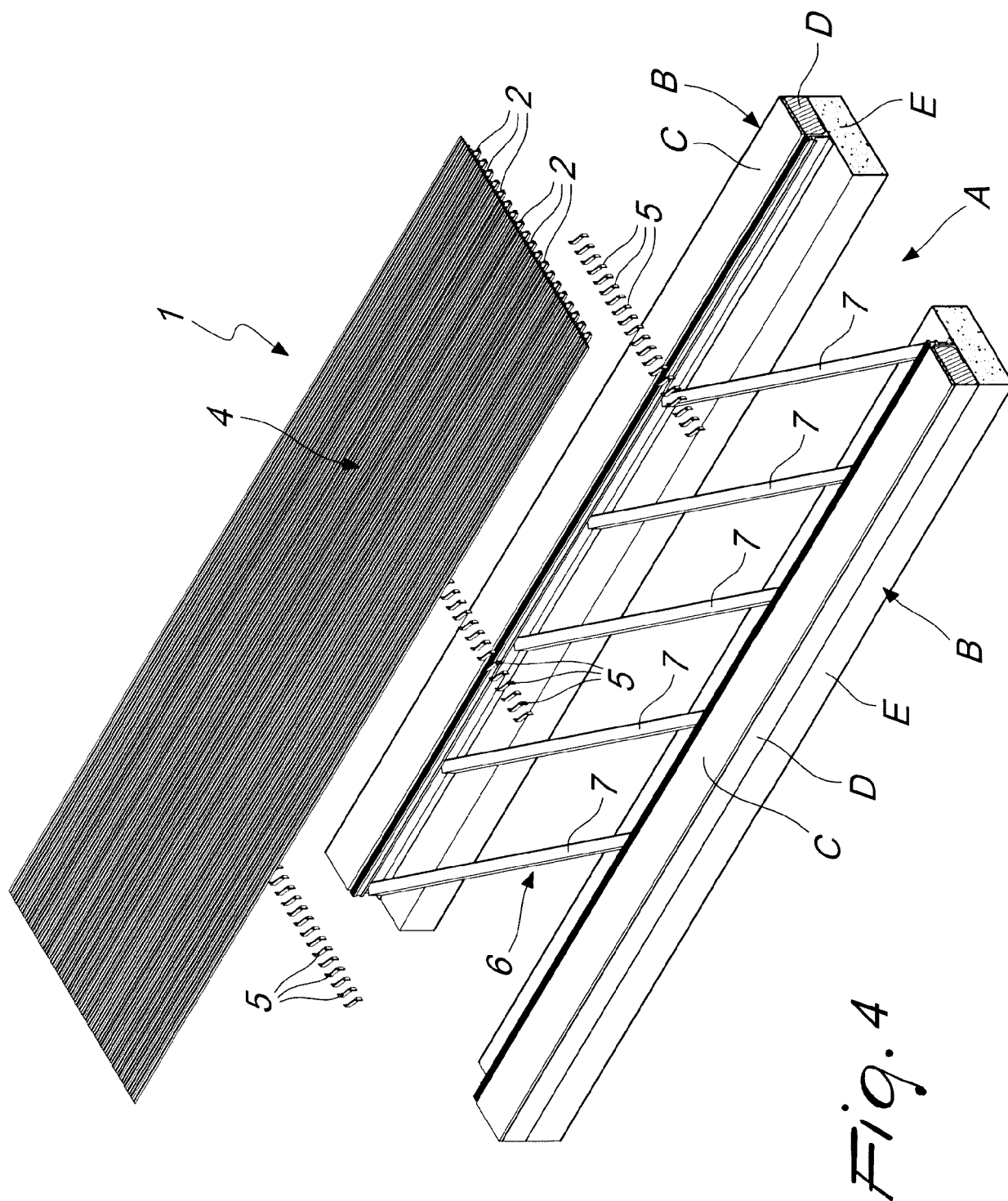
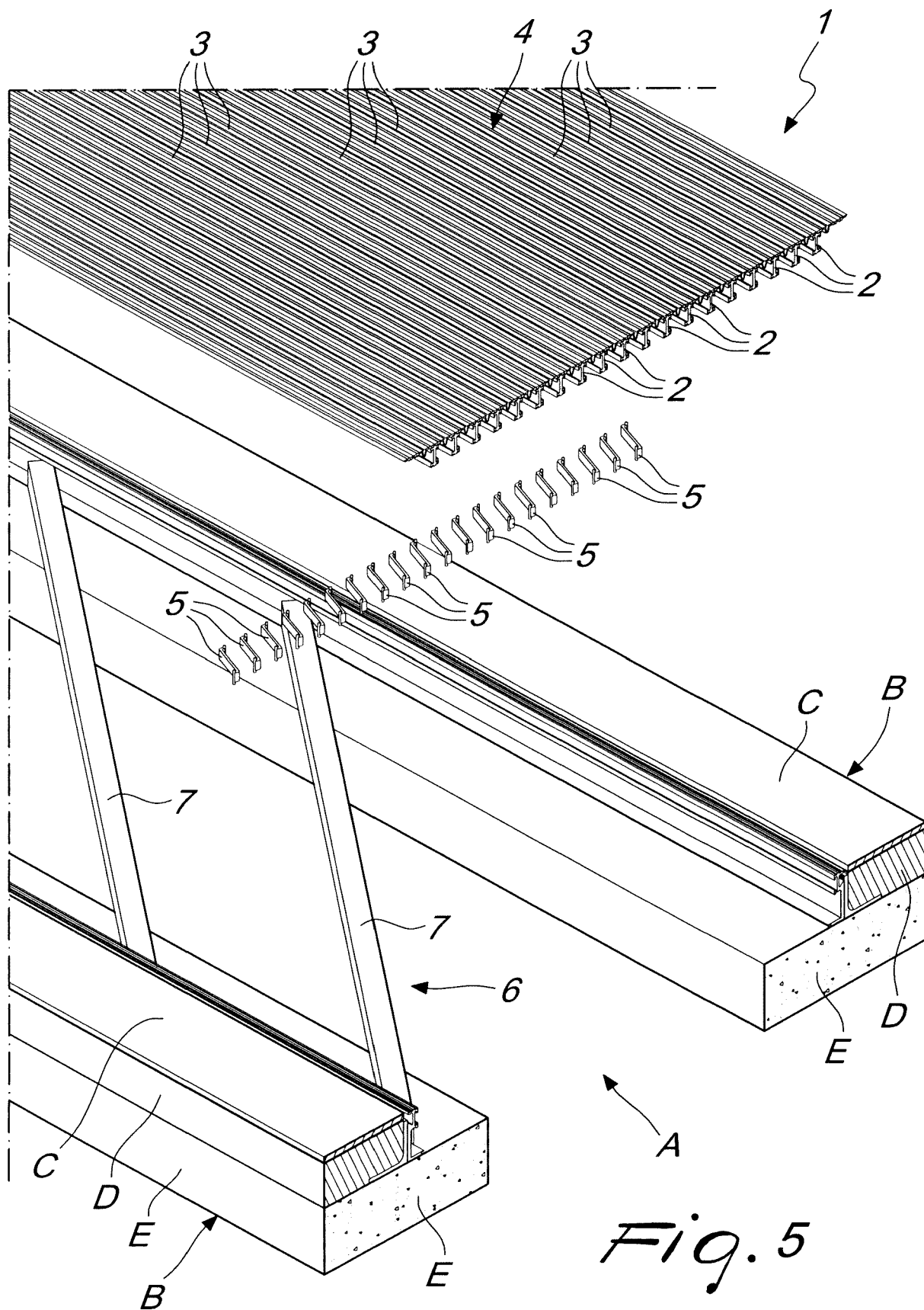


Fig. 3





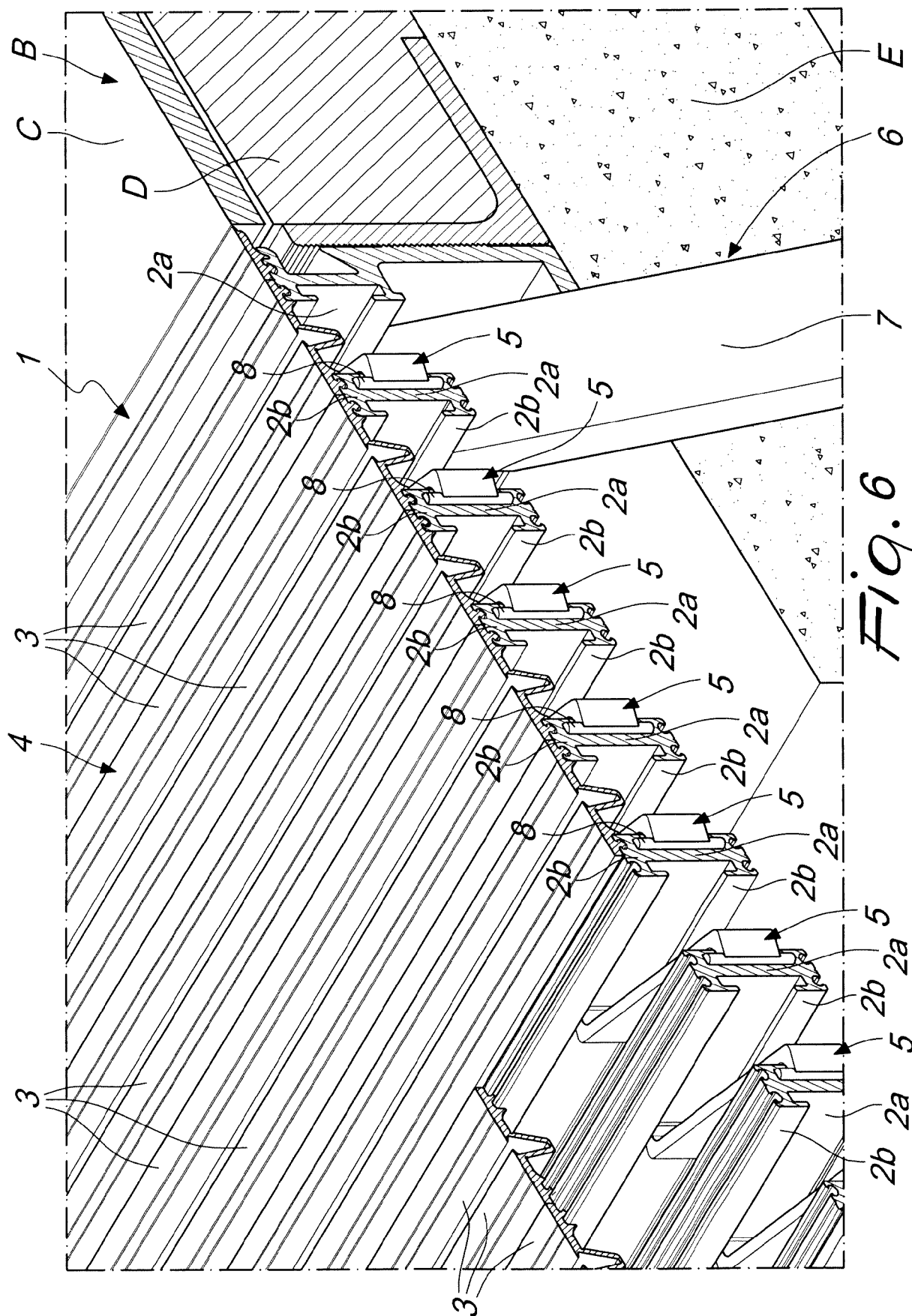


Fig. 6

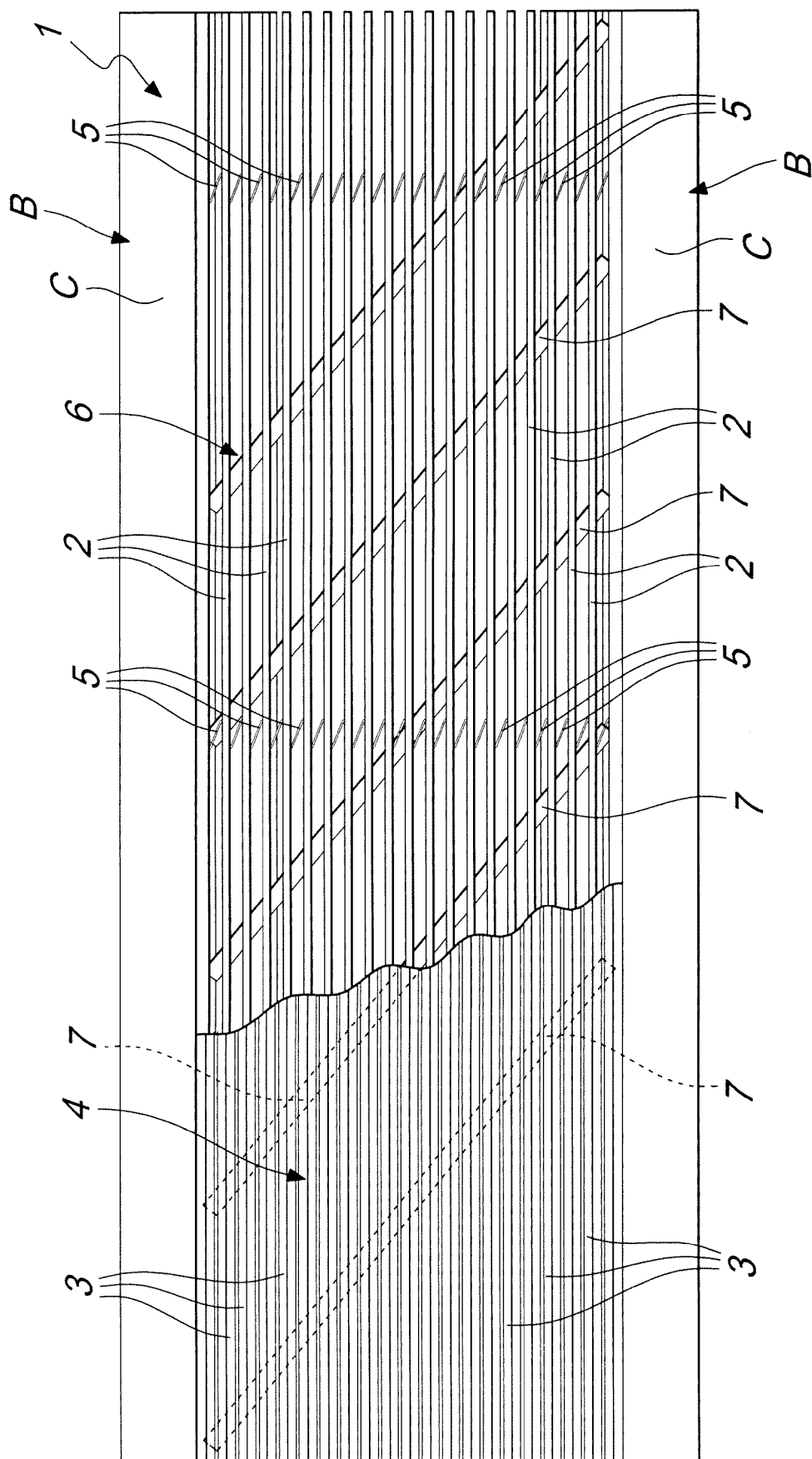
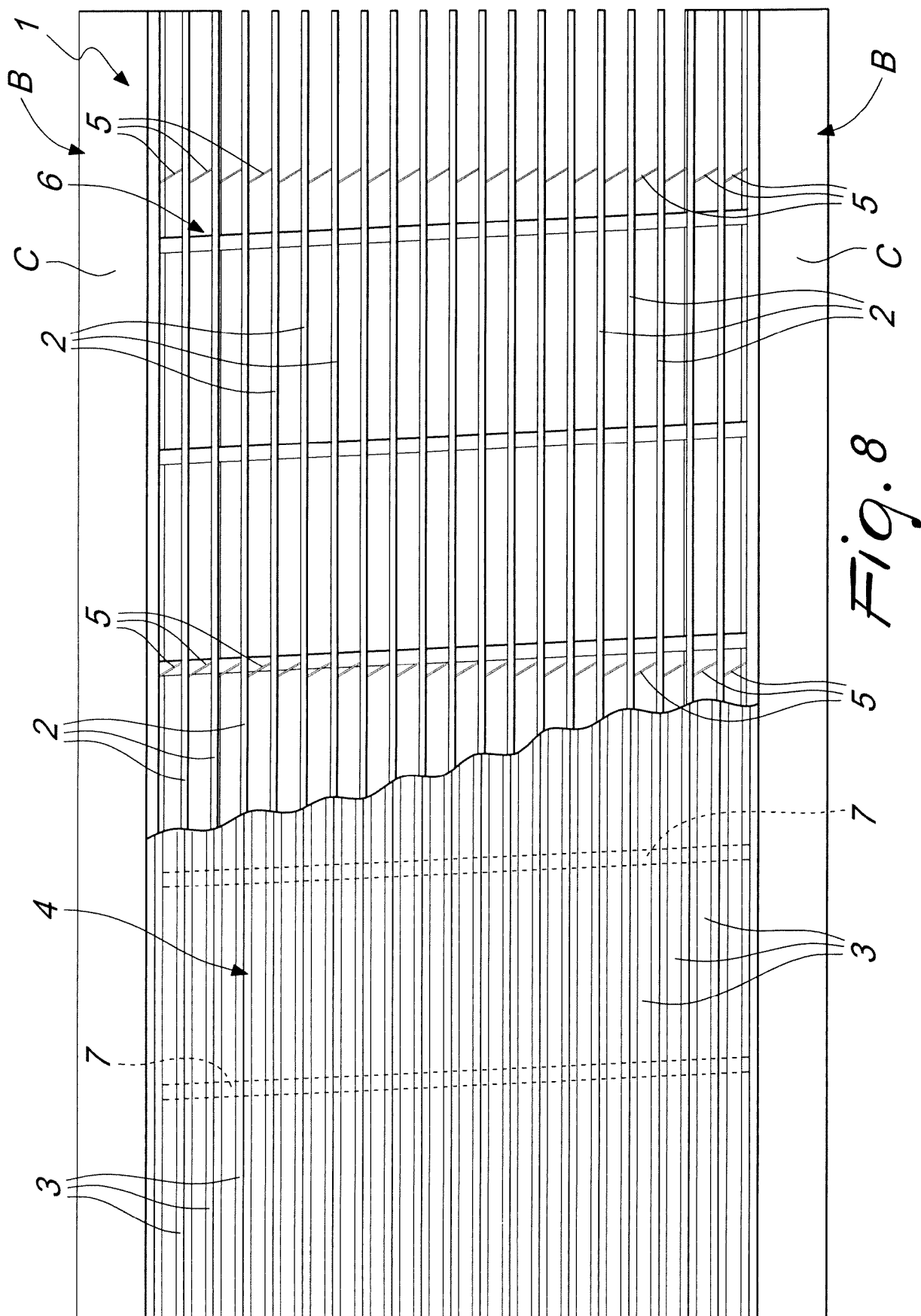


Fig. 7



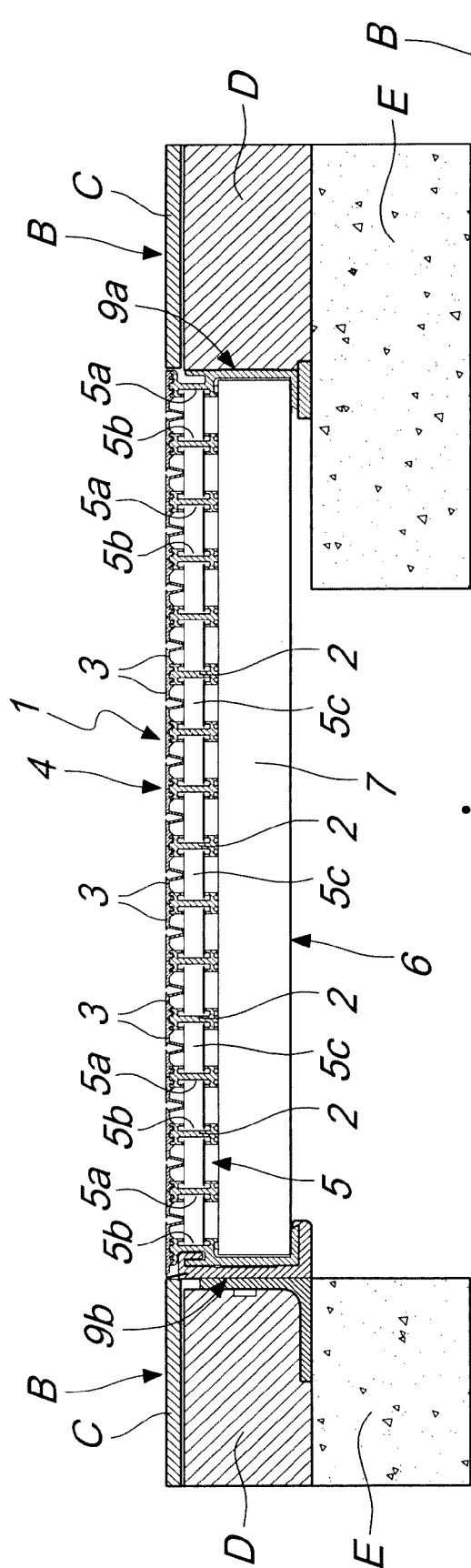


Fig. 9

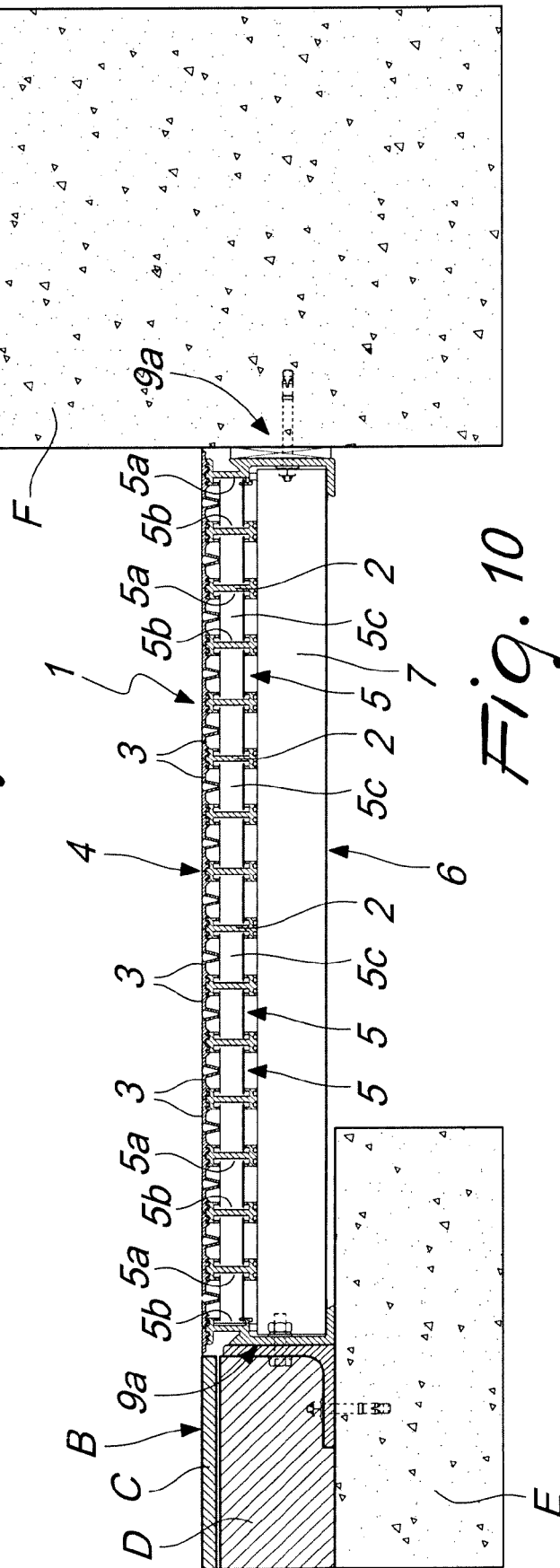


Fig. 10

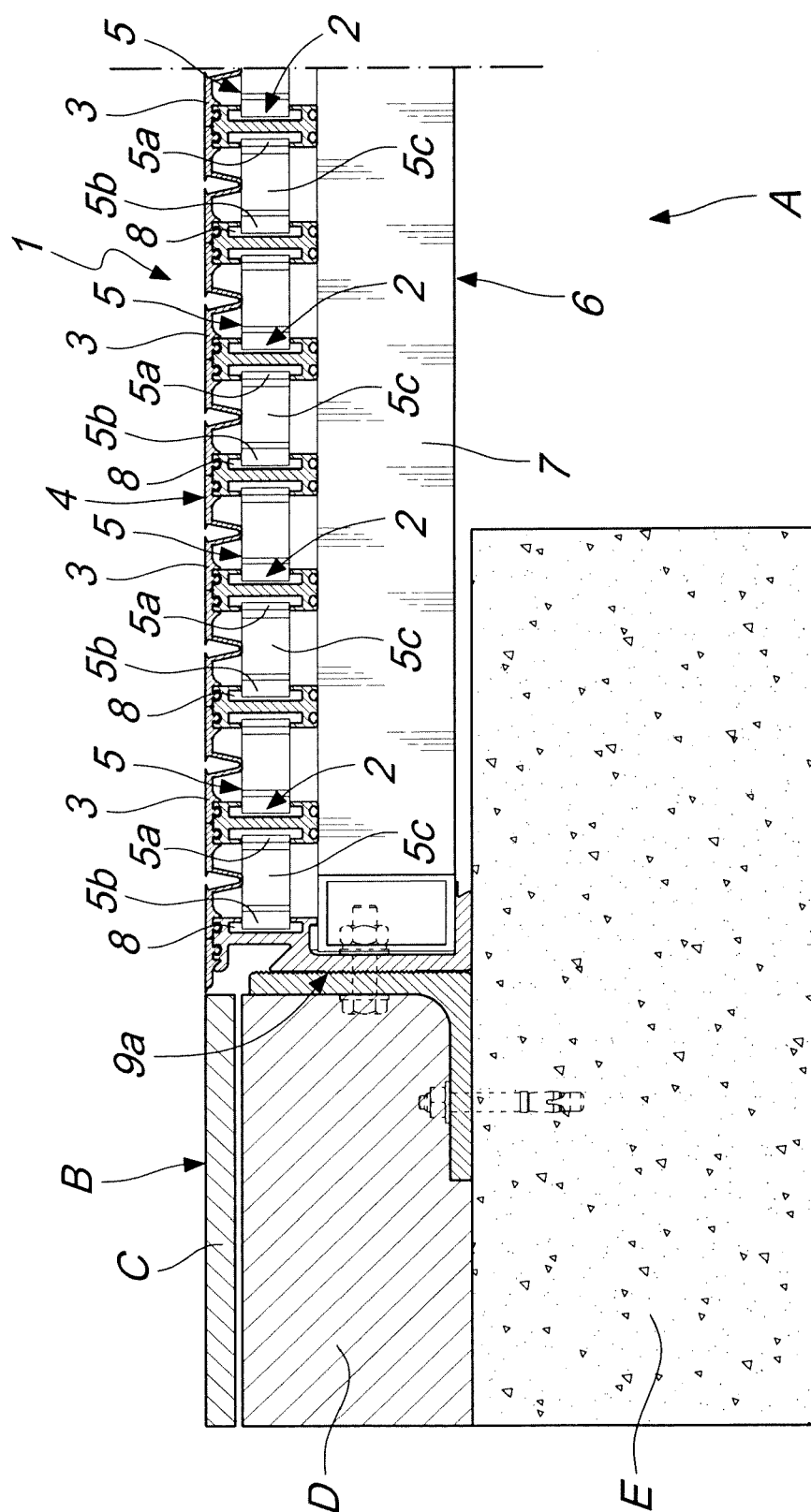


Fig. 11

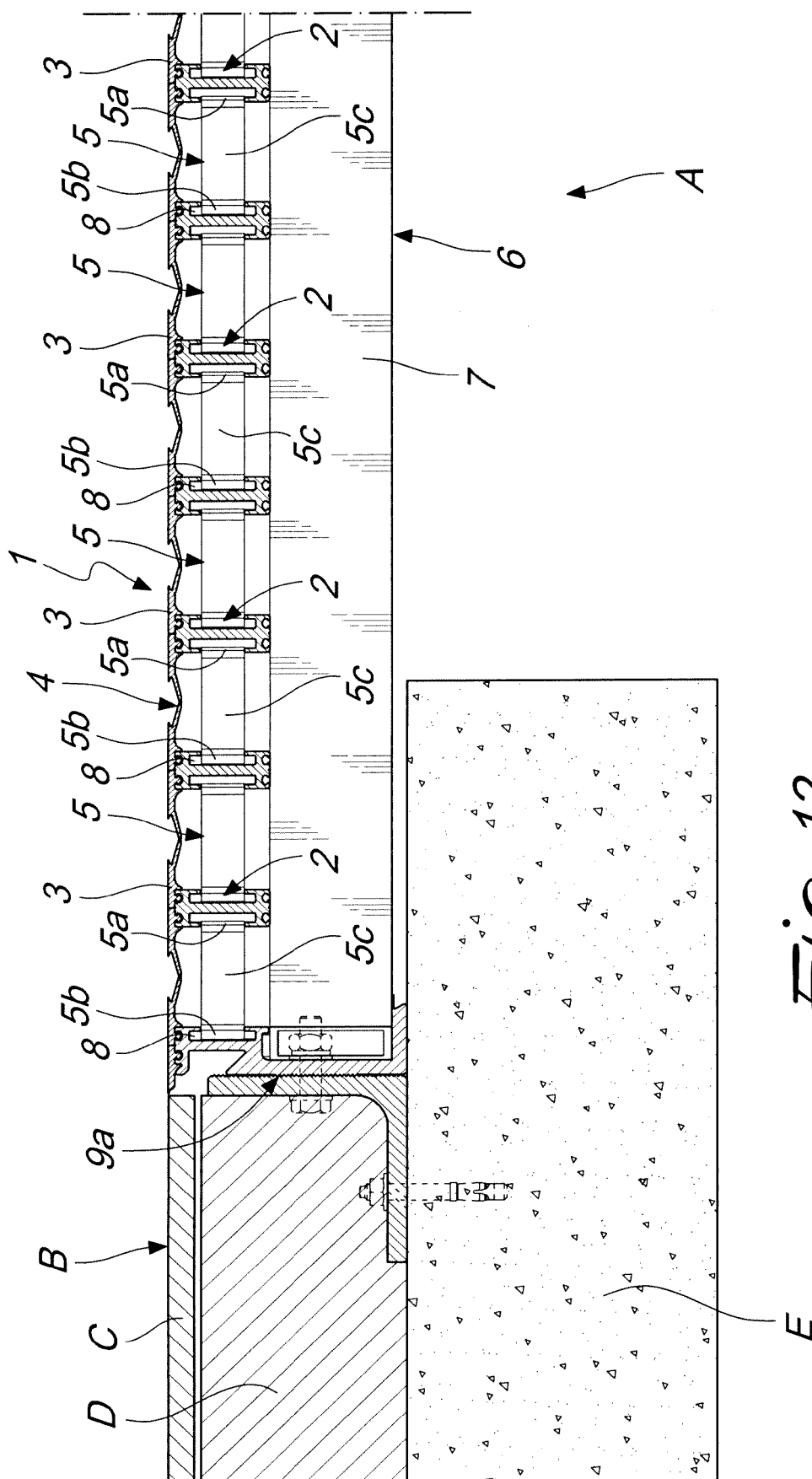
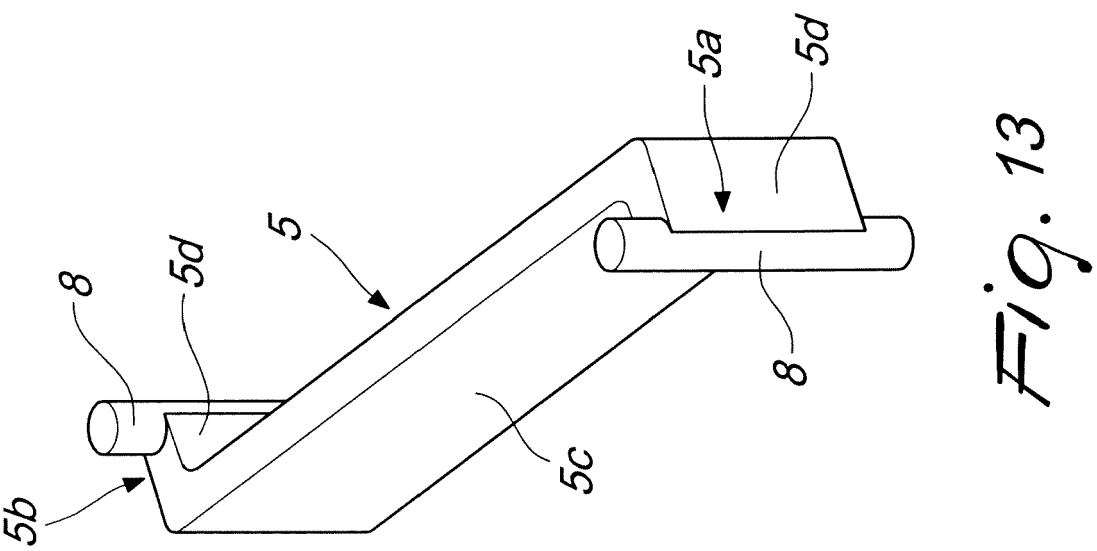
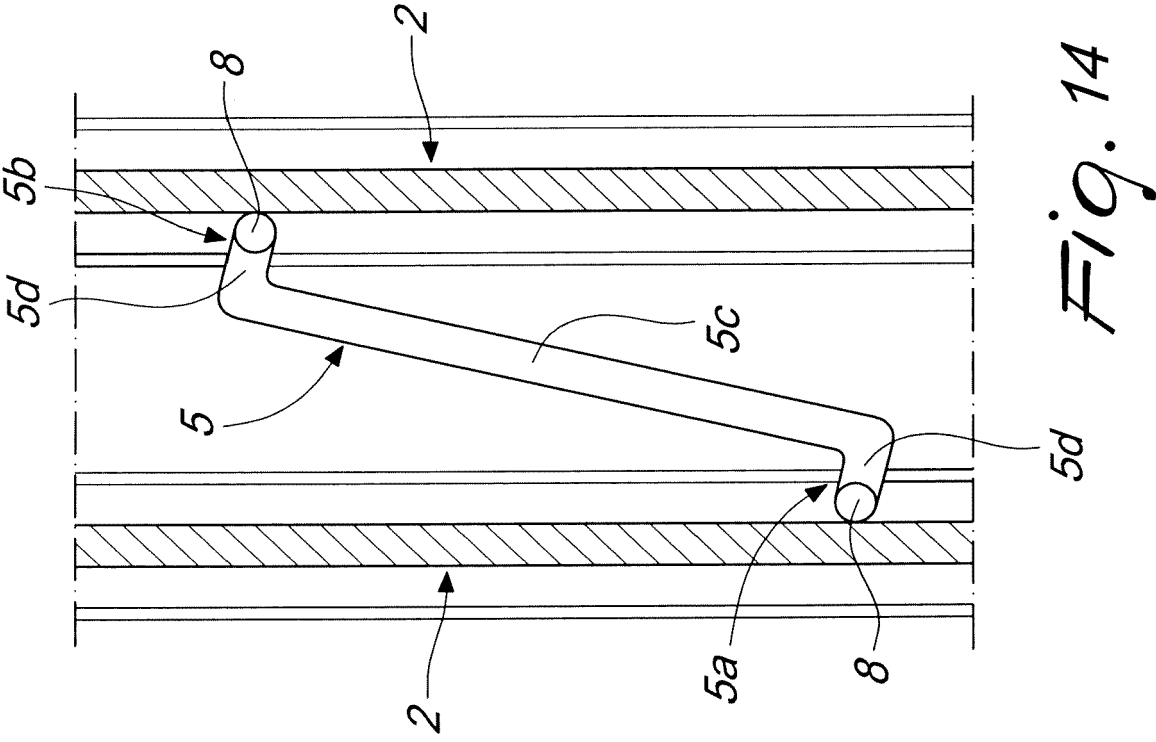


Fig. 12





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			E04H E04B E01D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 July 2020	Examiner López-García, G
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