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(54) **Method and means for constructing masonry walls**

Verfahren und Vorrichtung zum Errichten von Mauerwerk

Méthode et dispositif pour construire des murs de maçonnerie

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Description

[0001] The present invention relates to a method and means for constructing masonry walls of prefabricated cementitious blocks.

[0002] The method currently used to construct masonry walls of cementitious blocks is based essentially on exhausting slow manual work. In this respect, on examining this method in detail it will be noted that the (qualified) bricklayer applies to the upper face of a horizontal succession of blocks relatively thick runs of mortar along two sides of the blocks, which have already received a layer of mortar applied to one of their lateral faces to obtain a lateral bond between one block and the next. The bricklayer places on the resultant row of blocks a row of blocks offset from the underlying row, this operation involving:

- I. careful horizontal and vertical positioning of the individual blocks, and
- II. falling of the excess mortar, which not only soils the wall under erection but also constitutes an irrecoverable wastage, which is disposed of.

[0003] The patent US 4,091,587 discloses a method of and means for constructing a cement block wall without mortar by use of block interengaging members.

[0004] The main object of the present invention is to provide a method and means which represent an innovation compared with the aforescribed method and enable:

- A. a definite acceleration in the construction of the masonry wall;
- B. a simplification of this construction such that it can be carried out by unqualified personnel;
- C. a considerable saving in mortar consequent on the practical reduction in wastage;
- D. complete verticality of the masonry wall obtained.

[0005] These and further objects of the present invention are attained by the method and means in accordance with the accompanying claims.

[0006] The invention will be more apparent from the ensuing detailed description of preferred embodiments thereof provided by way of non-limiting example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a spacer/centering element representative of the essence of the invention, the view showing one side of said spacer/centering element;

Figure 2 is a perspective view of the spacer/centering element taken on the opposite side;

Figure 3 is a schematic side view of three cementitious blocks partially shown by dashed lines, with an interposed spacer/centering element prior to injection of the consolidating mortar;

Figure 4 is a perspective view of a number of blocks arranged with the spacer/centering elements located on the holes of these blocks;

Figure 5 is a perspective view from above of a partially reproduced block, the view showing the position of the underlying spacer/centering element in situ;

Figure 6 is a schematic view showing the finishing operation by injecting mortar into the interspaces between blocks using an injection machine schematically reproduced.

[0007] With reference to the figures, the cementitious blocks 1 with which a wall is to be erected are widely known and standardized; they are similar in shape to a right (rectangular) parallelepiped having two parallel through holes 2, 3 for lightening purposes separated by an intermediate internal wall 4. The holes are conical or tapered.

[0008] A row of blocks 1 with their minor faces side by side is laid on a predisposed cementitious bed or similar cementitious surface. This row of blocks forms the base from which the wall is erected by superposing rows of mutually offset blocks.

[0009] A spacer/centering element D (described in detail hereinafter) is positioned on the base blocks, i.e. the blocks of the lower row, in correspondence with the openings of each of their holes 2, 3. This spacer/centering element D, of annular shape (moulded in plastic material, for example filled polypropylene made fireproof) comprises, preferably peripherally and/or in proximity to the periphery, support feet 5 for example of cylindrical or pin shape, which rest along the contour of these openings, these latter having rectilinear sides connected together by arcuate corners (see Figure 5). The spacer/centering element D also presents (in this example) on one side (Figure 1) a first peripheral skirt 6 which follows the contour of the hole in the block and enters the hole itself (via said opening). In this manner the spacer/centering element D rests on and is centered about the underlying block.

[0010] On the row of base blocks arranged with the spacer/centering elements, without applying mortar the operator lays in an offset arrangement a second row of blocks, into the lower hole openings of which there is inserted a second skirt 7 similar to the first but having a smaller contour substantially offset from said first skirt 6 by about the same amount as the blocks of the second row are offset from the underlying blocks.

[0011] This achieves verticalized centering of said second row of blocks. The blocks of this second row rest on the top of said peripheral feet 5 of the spacer/centering elements D. It is apparent that each of these feet acts as a support and spacer between one row and another of the blocks, to hence obtain the horizontal interspaces A between one row of blocks and the next.

[0012] When this second row of blocks has been superposed dry, i.e. without mortar, the spacer/centering elements D are placed in position (as already stated) in

the upper openings of the holes 2, 3 of the second row of blocks, a third row of blocks then being located in the aforestated manner, then proceeding from row to row in the stated manner until a certain wall height is achieved, this height being related to or limited by the strength of those support feet 5 most loaded by the overlying weight. After this, mortar is injected into both the horizontal and vertical interspaces.

[0013] For the injection, a nozzle 8 is provided having a wide and narrow exit mouth 9 (similar to the interspaces) and fed with mortar from a vessel 10 by means of a screw feeder 13; the feed can be controlled by a valve (not shown). To the side of the nozzle 8 there is provided a profiled smoother bar 11 with which the external face of the injected mortar layer is finished.

[0014] As can be seen from the figures showing the spacer/centering element D, the skirts 6, 7 of the spacer/centering element D comprise rounded corner portions 6a, 7a with a tapered lead-in end to provide effective centering, and intermediate parts 6b, 7b of undulated shape. With their depressions and the facing surrounding surface of the hole in the block, the undulations form channels 13' (Figure 6) through which the mortar also reaches the sides of these holes, to give rise to the formation of inward projections when the mortar has set.

[0015] The injected mortar solidifies to replace the support feet 5 for the static support of the wall.

[0016] When one wall height has been finished, the wall erection can be continued until completion by proceeding in the aforedescribed manner.

[0017] Finally it should be noted that in order to enable the blocks to be removed from their production moulds, their holes 2, 3 narrow from one end to the other. To take account of this the skirts 6 and 7 are of different perimeters but of substantially equal design (as can be seen especially from Figures 1.2).

[0018] In a variant of the invention the undulations can be dispensed with, the centering function being entrusted to only the corner portions 6a, 6b.

[0019] The spacer/centering element D defines an aperture A to enable possible passage of reinforcing rods for constructing pillars obtainable, as in the known art, by casting cementitious mortar into the holes 2, 3 of the blocks, which are virtually superposed in the erected wall.

superposed a second row of blocks to zonally rest on feet (5) provided on said spacer/centering elements which are provided with second parts (7) engaging in the holes of said second row for the purpose of centering the blocks of the second row, said operations involving said spacer/centering elements being repeated until at least a part of the wall has been erected, in the wall or its thus erected part there appearing interspaces (F) between the rows of blocks, which are sealed by injecting mortar thereinto.

2. A spacer/centering element for implementing the method claimed in the preceding claim, **characterised by** comprising, preferably on its periphery and/or close thereto, feet (5) as zonal resting intermediaries for blocks (1) pertaining to two superposed rows, and further comprising on one side thereof, first centering means (6a) for engaging a hole (2, 3) in a block (1), and, on the opposite side thereof, second centering means (7a) offset from the first and arranged to engage a hole in an overlying block, wherein the first and second centering means (6a, 6b) are peripheral skirts (6, 7) or parts thereof shaped in accordance with at least part of the profile of the hole (2, 3) of the block (1) in which they are to engage, and wherein the skirts (6, 7) comprise undulating intermediate parts or portions (6b, 7b) to enable injected mortar to also pass into the interior of the holes (2, 3) in the blocks when the spacer/centering element has been mounted.
3. A spacer/centering element as claimed in claims 2, wherein the feet (5) are pin shaped and are at least partly disposed along the outer contour of said element.
4. A spacer/centering element as claimed in the preceding claims, **characterised by** having a central aperture.
5. A spacer/centering element as claimed in the preceding claims, **characterised by** being moulded of fireproof plastic material.

Claims

1. A method for constructing a wall with prefabricated cementitious blocks in the form substantially of a right prism and provided with lightening through holes which extend vertically in the constructed wall in which the blocks are arranged offset from row to row, and zonally resting, on the contour of the openings in the through holes of the blocks of one row, spacer/centering elements are provided with first parts (6) engaging in said holes for the purpose of centering said elements, on said one row there being

Patentansprüche

1. Verfahren zur Errichtung einer Wand mit vorgefertigten, zementartigen Blöcken in Form eines im wesentlichen geraden Prismas und ausgestattet mit durchgehenden Erleichterungsbohrungen, welche sich vertikal in der errichteten Wand erstrecken, in welcher die Blöcke von Reihe zu Reihe versetzt angeordnet sind, und zonenförmig auf der Kontur der Öffnungen der durchgehenden Erleichterungsbohrungen der Blöcke einer Reihe aufliegen, wobei Distanz-/Zentrierelemente mit ersten Teilen (6) vorge-

sehen sind, welche in die Bohrungen zum Zweck der Zentrierung der Elemente eingreifen, wobei über der ersten Reihe eine zweite Reihe von Blöcken zur zonenförmigen Auflage auf Füßen (5), die an den Distanz-/Zentrierelemente vorgesehen sind, angeordnet ist, welche zweite Teile (7) aufweisen, die in die Bohrungen der zweiten Reihe zum Zwecke der Zentrierung der Blöcke in der zweiten Reihe eingreifen, wobei dieser Ablauf zur Folge hat, dass die Distanz-/Zentrierelemente wiederholt werden, bis mindestens ein Teil der Wand errichtet ist, wobei in der Wand oder in ihrem derart errichteten Teil Zwischenräume (F) zwischen den Reihen der Blöcke erscheinen, welche durch das Einbringen von Mörtel abgedichtet werden.

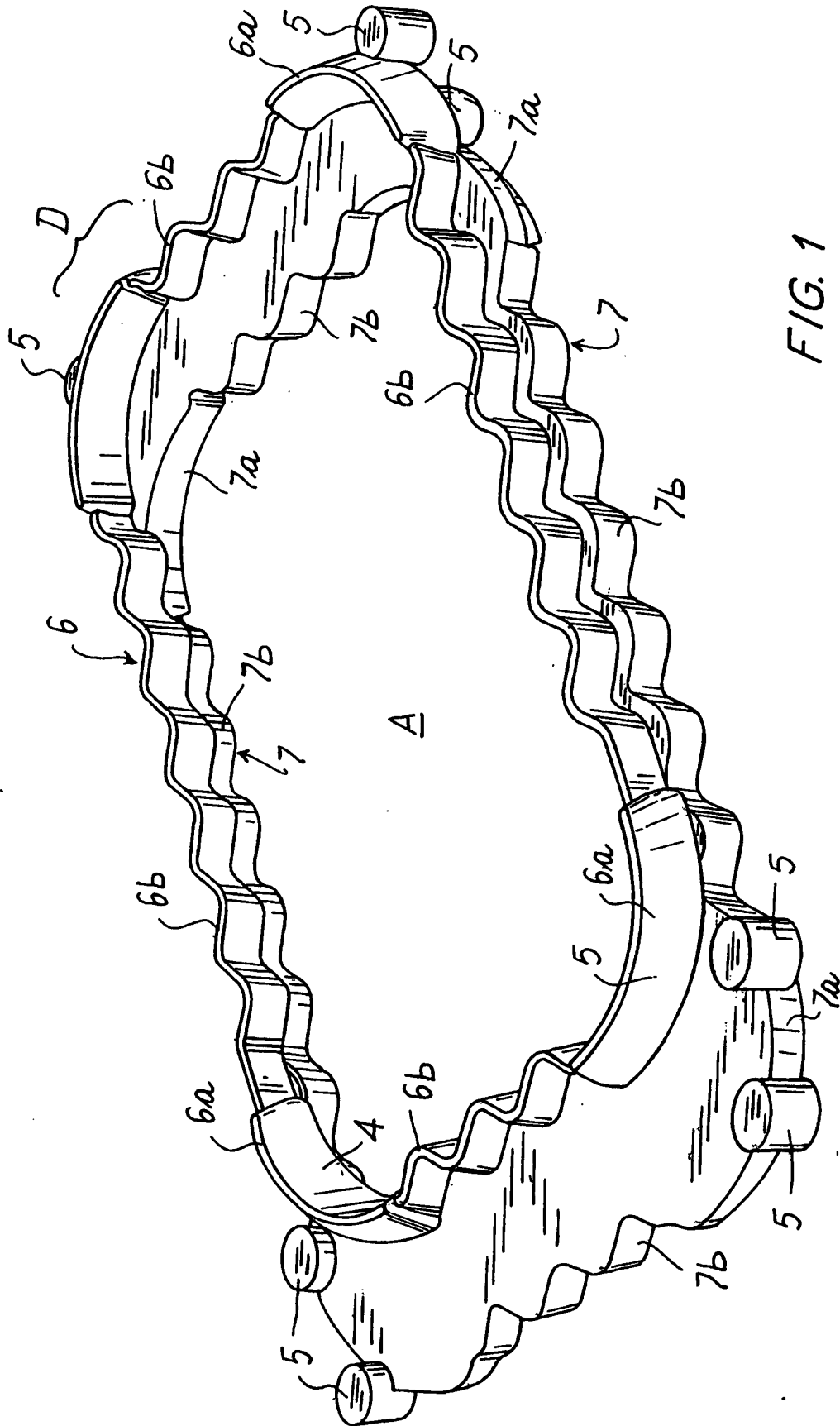
2. Distanz-/Zentrierelement zur Ausführung des Verfahrens nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** es vorzugsweise an seinem Umfang und/oder in dessen Nähe Füße (5) als zonenartige Zwischenauflage für Blöcke (1) von zwei übereinander angeordneten Reihen aufweist, und ferner, auf einer Seite hiervon, erste Zentriermittel (6a), zur Einbringung in eine Öffnung (2, 3) in einem Block (1) aufweist, und auf der gegenüberliegenden Seite davon, zweite Zentriermittel (7a) versetzt zu den ersten, die zur Einbringung in eine Öffnung eines darüber liegenden Blocks ausgebildet sind, wobei die ersten und zweiten Zentriermittel (6a, 6b) umlaufende Ränder (6, 7) oder Teile davon sind, die in Übereinstimmung mit mindestens einem Teil des Profils der Öffnung (2, 3) des Blocks (1), in welche diese eingebracht werden sollen, geformt sind, und wobei die Ränder (6, 7) wellenförmige, dazwischenliegende Teile oder Teilbereiche (6b, 7b) aufweisen, um ein Einbringen von Mörtel zu ermöglichen, um auch in das innere der Bohrungen der Blöcke (2, 3) zu laufen, wenn die Distanz-/Zentrierelemente montiert sind.
3. Distanz-/Zentrierelement nach Anspruch 2, worin die Füße (5) bolzenförmig geformt sind und mindestens teilweise entlang der äußeren Kontur des Elementes angeordnet sind.
4. Distanz-/Zentrierelement nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dieses eine zentrale Öffnung aufweist.
5. Distanz-/Zentrierelement nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es aus feuerfestem Kunststoffmaterial geformt ist.

Revendications

1. Procédé pour construire une paroi avec des blocs

préfabriqués cimentaires sensiblement sous la forme d'un prisme droit et pourvus de trous de passage d'allègement qui s'étendent verticalement dans la paroi construite dans lequel les blocs sont agencés en décalage de rangée à rangée, et reposant zonalement, sur le contour des ouvertures dans les trous de passage des blocs d'une rangée, des éléments d'espacement/centrage sont pourvus de premières parties (6) s'engageant dans lesdits trous afin de centrer lesdits éléments sur ladite rangée, une seconde rangée de blocs étant superposée de manière à reposer zonalement sur des pieds (5) disposés sur lesdits éléments d'espacement/centrage qui sont pourvus de secondes parties (7) s'engageant dans les trous de ladite seconde rangée afin de centrer les blocs de la seconde rangée, lesdites opérations mettant en oeuvre lesdits éléments d'espacement/centrage étant répétées jusqu'à ce qu'au moins une partie de la paroi ait été érigée, dans la paroi ou sa partie ainsi érigée apparaissant des espaces intermédiaires (F) entre les rangées de blocs, qui sont scellés en injectant du mortier dans ceux-ci.

2. Élément d'espacement/centrage pour mettre en oeuvre le procédé selon la revendication précédente, **caractérisé en ce qu'il** comprend, de préférence sur sa périphérie et/ou à proximité de celle-ci, des pieds (5) en tant qu'intermédiaires de repos zonal pour les blocs (1) appartenant à deux rangées superposées, et comprenant en outre sur un côté de celui-ci, un premier moyen de centrage (6a) pour s'engager dans un trou (2, 3) dans un bloc (1), et sur le côté opposé à celui-ci, un second moyen de centrage (7a) décalé par rapport au premier et agencé pour engager un trou dans un bloc sus-jacent, dans lequel les premier et second moyens de centrage (6a, 6b) sont des jupes périphériques (6, 7) ou des parties de celles-ci formées en correspondance avec au moins une partie du profil du trou (2, 3) du bloc (1) dans lequel elles s'engagent, et dans lequel les jupes (6, 7) comprennent des parties ou portions intermédiaires ondulées (6b, 7b) pour permettre que du mortier injecté passe également à l'intérieur des trous (2, 3) dans les blocs lorsque l'élément d'espacement/centrage a été monté.
3. Élément d'espacement/centrage selon la revendication 2, dans lequel les pieds (5) sont en forme de tige et sont au moins partiellement disposés le long du contour externe dudit élément.
4. Élément d'espacement/centrage selon les revendications précédentes, **caractérisé en ce qu'il** comporte une ouverture centrale.
5. Élément d'espacement/centrage selon les revendications précédentes, **caractérisé en ce qu'il** est moulé en matériau plastique résistant au feu.



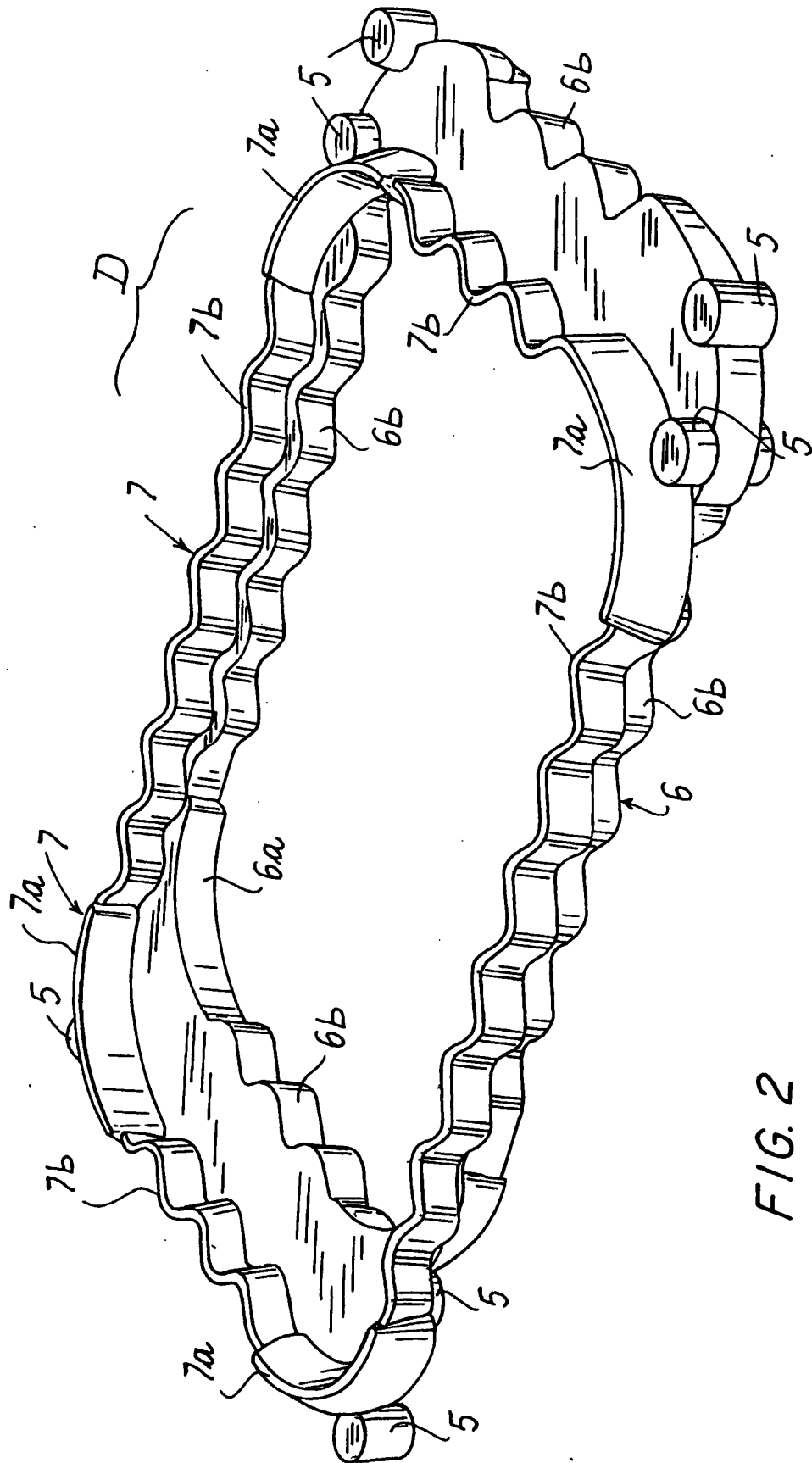


FIG. 2

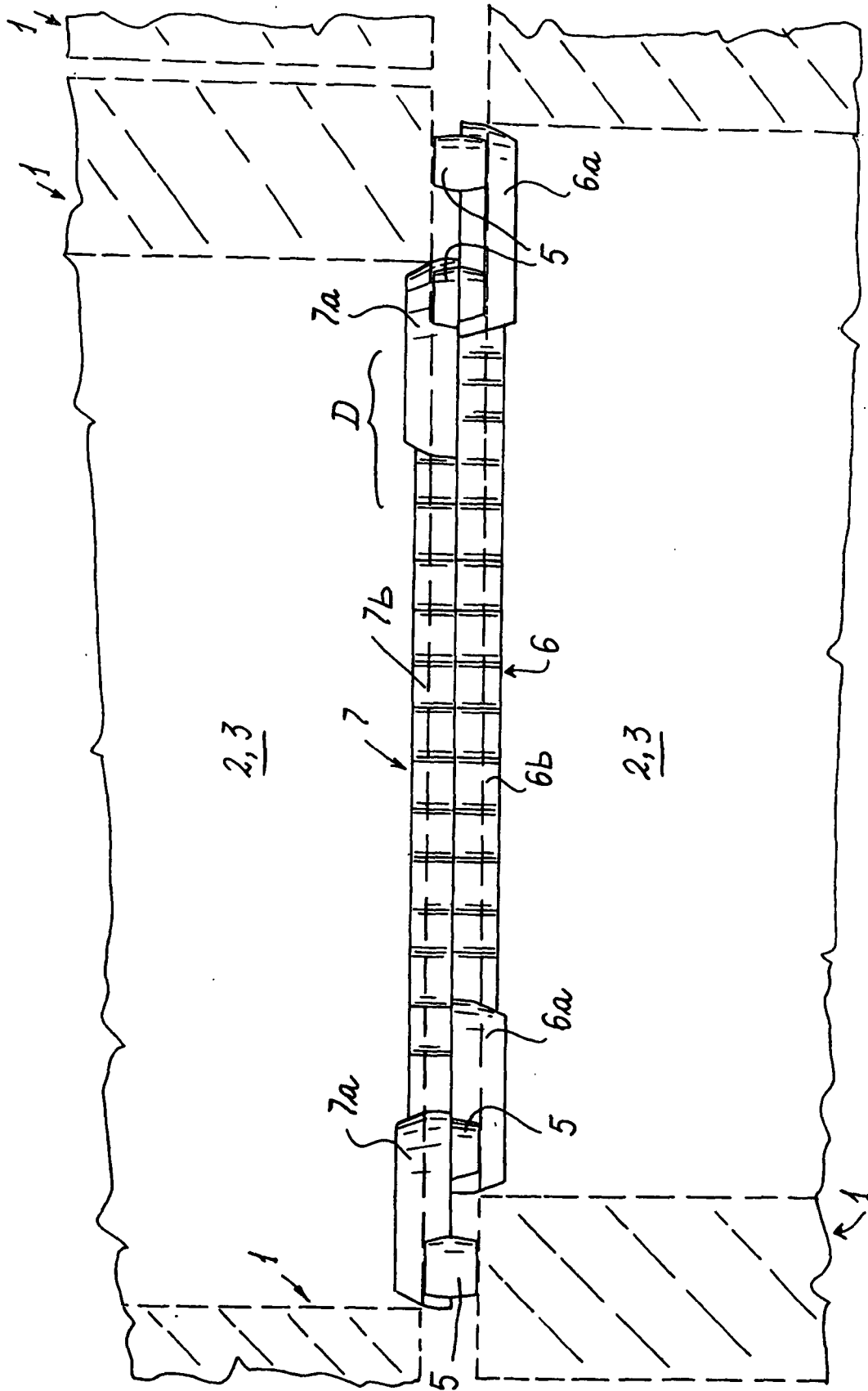


FIG. 3

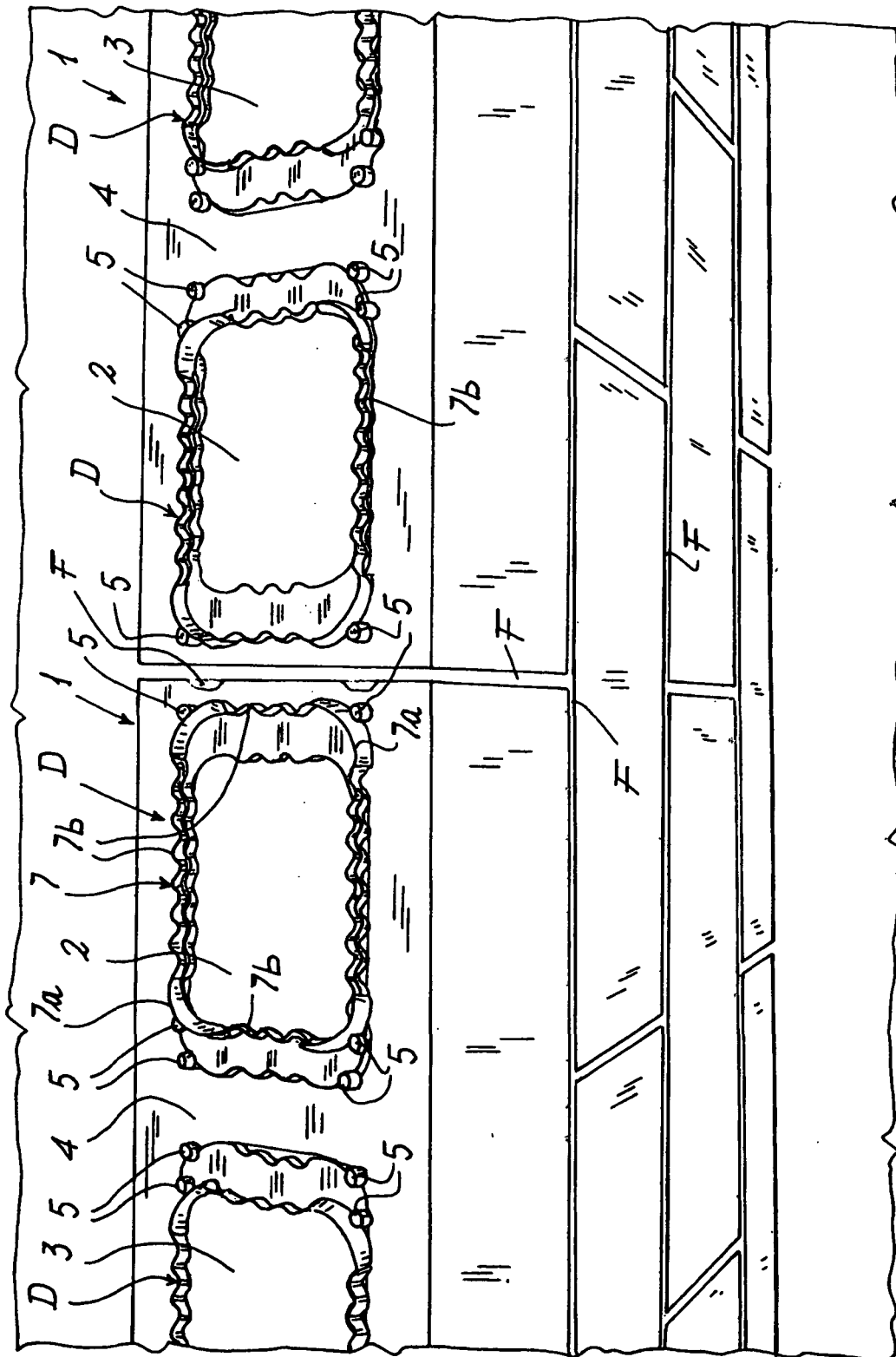


FIG. 4

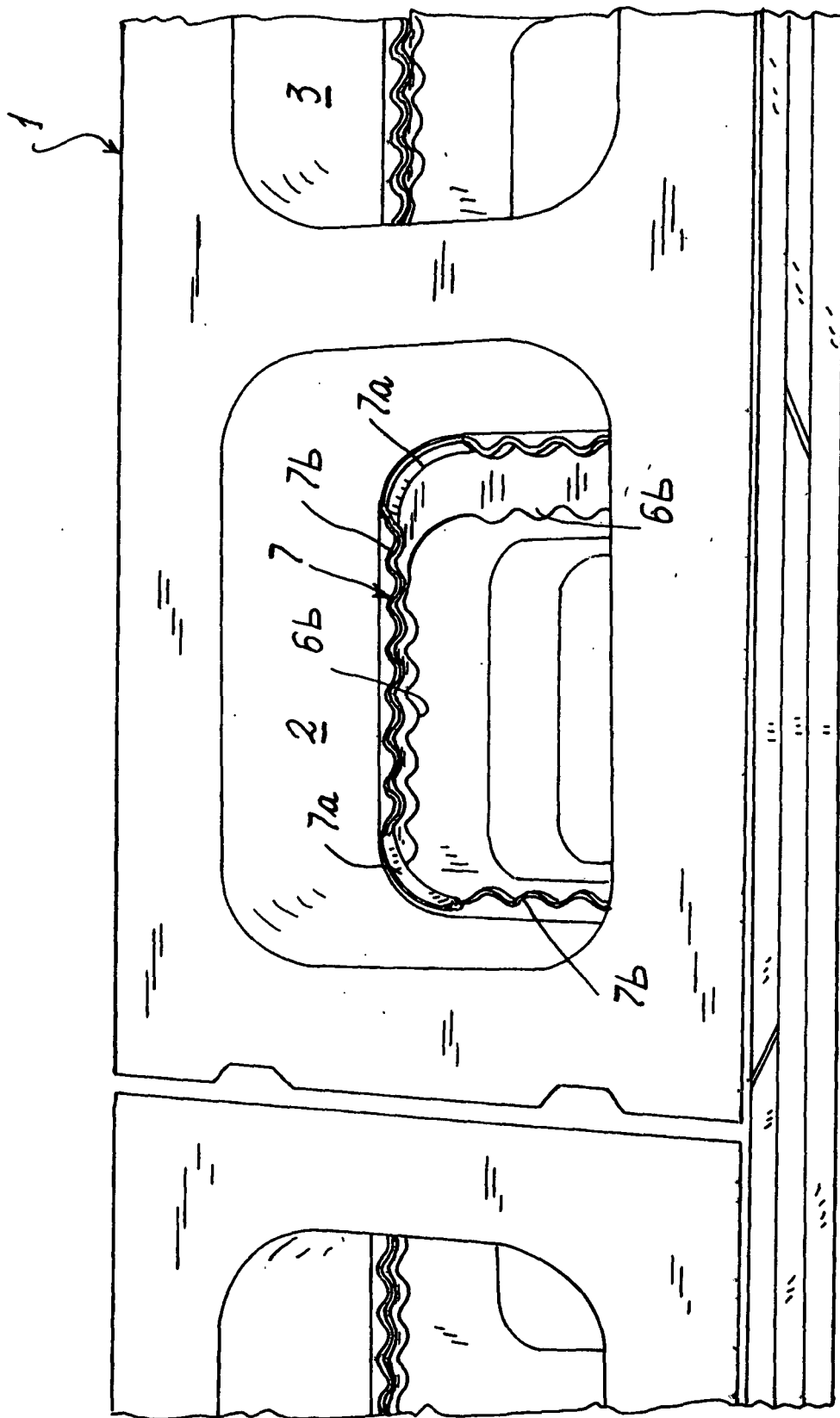


FIG. 5

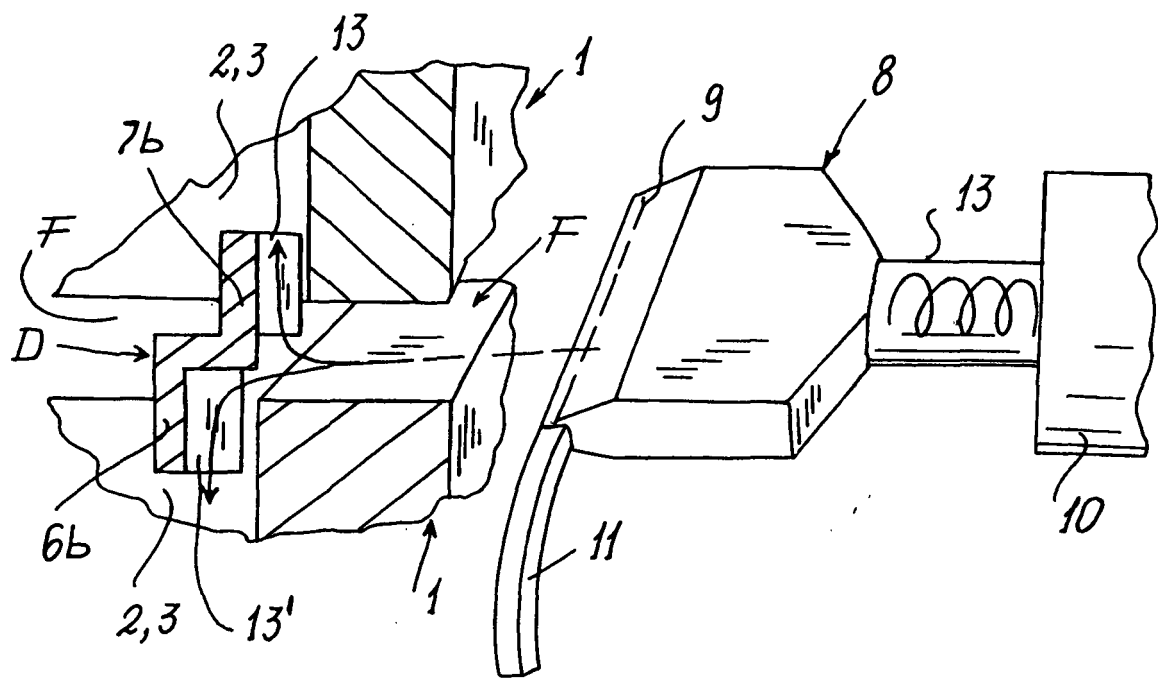


FIG. 6