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(54) **Title:** PREFABRICATED ELEMENT FOR FLOORING

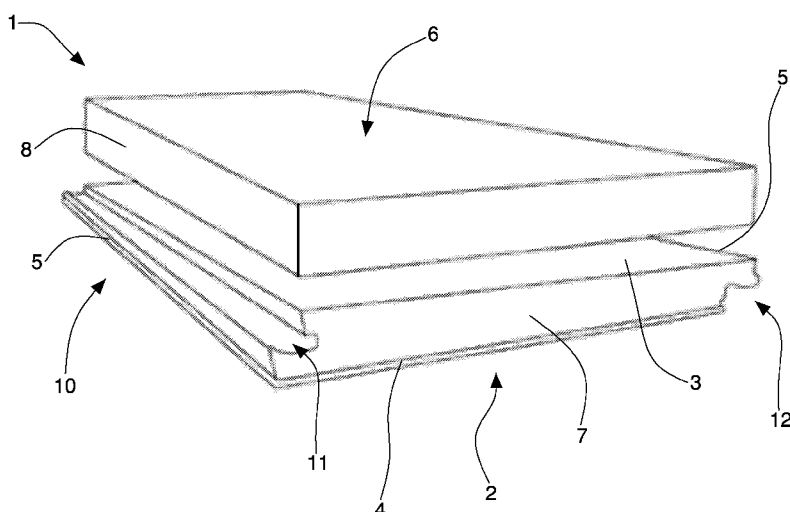


Fig. 1

(57) **Abstract:** A low thickness/pressed or standard thickness laminar element (6) of ceramic or stone material for floors is glued with bonding system to a support element (2) of rigid/flexible PVC, HDF standards or with different mix of mineral fibers, ceramic or other, having side interlocking connection sections with female (11) and male (12); the union of the laminar element (6) and the support element (2) allows to obtain an assembled prefabricated element (1) for floating floors that do not require the use of glue.

PREFABRICATED ELEMENT FOR FLOORING

Background of the invention

[0001] The invention relates to a prefabricated element for floors. In particular, the invention relates to a prefabricated element formed by coupling a laminar element with a support element by gluing. The laminar element may be made of low-thickness/pressed or standard thickness ceramics for floors having a thickness of between 3 mm and 20 mm, or in stone materials, such as stone or marble. The support element may be made of rigid/flexible PVC, standards HDF or with different mineral, ceramic, or other fibers, and has side faces and end faces with male/female connection profiling adapted to mate one another to form a floating floor.

[0002] With floating floor is meant a modular flooring that is mounted by assembling a plurality of elements above a flat level surface, such as a cement screed or an existing level floor.

[0003] It is noted that the prefabricated elements may be employed to make floors both in indoor and outdoor environments.

[0004] There are known in the art different types of prefabricated elements that present shaped profiles on the side edges, thanks to which they can be assembled with other prefabricated elements.

[0005] The shaped profiles of known type are able to ensure an interlocking connection between adjacent prefabricated elements. For example, tongue-groove type connections are known. In general, the profiles of two adjacent elements intended to be coupled together are made in such a way as to provide a shape coupling between a male profile and a female profile, which may be of tongue-groove type, or such as to form a snap or "click" fitting between adjacent elements. Different assembly techniques of click floating floor are known depending on the shape of the shaped profiles. For example, the assembly of the elements to form the floor can be realized by combining the elements to be joined laterally or vertically (laying from above downwards).

[0006] The floating floors have had a remarkable expansion. They undoubtedly have the advantage of offering a laying that is fast and with no use of glues, and the advantage of being installable on existing flooring or leveled screeds. This system ensures that these floors are widely used especially in redeveloping locations because they allow the work for the floor construction to be less invasive, faster and economic.

[0007] However, the use of profiled elements to create a floating floor is limited to

certain types of flooring, known as laminate flooring, LVT (“luxury vinyl tiles”) and wooden parquet.

[0008] A drawback is that the click profiling section cannot be directly accomplished in the ceramic floors, because of the hardness and brittleness of the material.

5 [0009] In fact, the profiling processing cannot be performed directly on the ceramic since, during the profiling process, the milling cutters fail to affect and shape the profile to obtain the aforesaid connection system with the decimal tolerance required by the market of laminate flooring, LVT, or wooden parquet. In addition, the profiling can chip the ceramic material and give rise to breakages/abrasions/cracks or fissures so as to
10 compromise the aesthetic appearance of the profiled element and the traction connection/sealing of the click joint.

Summary of the invention

[0010] One aim of the invention is to provide a prefabricated element intended to provide a floating floor (for example of the “click” type) with ceramic material.

15 [0011] An advantage is to make a click interlocking ceramic floor obtained by connecting adjacent elements with joint male/female connection of the tongue-groove or click type (for example with known systems such as the vertical down-fold system, angle-angle system, or the like), in which the elements comprise a top panel of ceramic or stone material coupled to a panel that may be made with rigid/flexible PVC, or standard HDF or
20 with different mineral, ceramic or other fibers.

[0012] Another advantage is that the coupling between the top panel of ceramic or stone material and the support element allows to obtain a finished element with variable thickness, comprised between 5 and 20 mm, that is ready to be installed with the system known as “tongue & groove” system, or the vertical click fold down system, or angle-angle
25 system, or the like, without the use of any type of glues during laying, in which the installation times and removal times are also reduced by up to 70% compared to traditional laying systems with floors glues.

[0013] An advantage is to obtain a ceramic or stone or marble floor in which during the laying there is no generation of dirt (for example due to the use of adhesives) and dust
30 (for example caused by the cutting to size of the tiles) with reduced final thicknesses.

[0014] An advantage is to obtain a ceramic or stone or marble floor that can be removed (in whole or in part) very quickly and without requiring masonry work. This is very advantageous because it makes much cheaper to replace a prefabricated element

damaged or stained, limiting considerably (compared to the refurbishment of a traditional floor with ceramic or marble tiles) the labor costs, as well as the costs for the substitute material.

[0015] An advantage is to meet a need strongly felt by the market since the prefabricated elements of the invention allow to realize a ceramic floor equipped with the typical advantages of floating floors.

[0016] An advantage is to provide an element that is suitable to replace conventional glued ceramic tiles to make a floor.

[0017] An advantage is that the prefabricated elements have a limited thickness, similar to the typical thickness of the ceramic tiles.

[0018] An advantage is that the production of the prefabricated elements of the invention is not complex and expensive.

[0019] An advantage is that the prefabricated elements of the invention are suitable, like the ceramic tiles, to meet the high volumes required by the market.

[0020] An advantage is that the prefabricated elements according to the invention are endowed with a high mechanical strength and good tensile strength such as to make them perfect for all restructuring locations.

[0021] These aims and advantages, and others, are achieved by a prefabricated element and/or a floor according to one or more of the claims set out below.

Brief Description of the Drawings

[0022] The invention will be better understood and implemented with reference to the accompanying drawings, which illustrate an exemplifying but not limitative embodiments thereof, in which:

[0023] Figure 1 is an exploded perspective view of a prefabricated element according to the invention.

[0024] Figure 2 is a schematic perspective view of a portion of a floor formed by connecting two prefabricated elements according to the invention, shown in a stage of assembly.

[0025] Figures 3a and 3b are schematic front views which illustrate two prefabricated elements in two successive moments of the stage of assembly to make the floor.

Detailed description

[0026] With reference to Figures 1 to 3, with 1 has been indicated as a whole a prefabricated element comprising a top panel 6 coupled with a support element 2. The top

panel 6 may be made with ceramic or stone material, e.g. it can be made of ceramic, or stone, or marble, or similar.

[0027] The support element 2 is provided with an upper face 3, a bottom face 4, side faces 5 and end faces 7. In this version, the support element 2 has a rectangular shape, wherein the side faces 5 and the end faces 7 define the perimeter (in particular the side faces 5 form the long sides and the end faces 7 form the short sides).

[0028] It is understood that, in other versions, the support element 2 may assume various shapes, different from the shown rectangular shape. For example, the support element 2 may have diamond or square shape. In this case, the side faces 5 and the end faces 7 have the same length and are alternated to each other so as to be opposite faces. In still other versions, the support element may be a polygon with a number of sides greater than four. Also in this case the side faces 5 and the end faces 7 are consecutive one to the other and alternate in sequence to each other.

[0029] The support element 2 may be made with rigid/flexible polyvinyl chloride (PVC) with different composition standard HDF or with different mineral, ceramic or other fibers.

[0030] In another version, the support element 2 may be achieved with a wood-plastic composite material, in which the fillers of polymeric material inserted in a wood-based matrix may be chosen, by way of example and not of limitation, in the group of materials consisting of: high density polyethylene (HDPE), low density polyethylene (LDPE), polyvinyl chloride (PVC), polypropylene (PP), acrylonitrile butadiene styrene (ABS), polystyrene (PS), polylactic acid (PLA), or still others.

[0031] In general, the support element 2 is made of a material resistant to water and moisture and which has a heat stable behavior.

[0032] The support element 2 has a thickness T (Figure 3b) between 2 and 6 millimeters, preferably between 3 and 4 millimeters.

[0033] Coupling means 10 is made on the lateral faces 5 and on the end faces 7 to form "tongue & groove", or vertical click fold down, or vertical angle-angle, or similar systems with profiling through which a prefabricated element 1 can be connected to another prefabricated element 1' (Figure 2).

[0034] The coupling means 10 is a shape coupling means and comprises female connecting means 11 and male connecting means 12. The female connecting means 11 is made on one of the two side faces 5 and the male connecting means 12 is made on the

other lateral face 5, i.e. on the opposite side. The female connecting means 11 is arranged to engage with the male connecting means of a prefabricated element 1' that is adjacent to the prefabricated element 1, while the male connecting means 12 is arranged for receiving the female connecting means of another prefabricated element adjacent thereto. In this way, thanks to the female and male connecting means 11 and 12 it is possible to provide a modular system which can be assembled to form a floor.

[0035] The female connecting means 11 may be configured as a recess, while the male connecting means 12 may be configured as a projection. The recess and the projection have a complementary shape so as to ensure a perfect fit between the prefabricated elements. Also, the shape of the connecting means 11, 12 is such as to keep the elements locked in position and prevent their accidental disassembly.

[0036] One shape of the connecting means 11, 12, such as that illustrated in Figures 3a and 3b, allows to assemble together the prefabricated elements by laying them next to one another with a vertical movement from above downwards (vertical fold down application), as shown schematically by the arrows F in figure 2.

[0037] The top panel 6 is configured as a laminar element and is fixed to the upper face 3 of the support element 2.

[0038] The top panel 6 is made of ceramic or stone material, for example low-thickness/pressed ceramic material.

[0039] The top panel 6 may have a thickness H (Figure 3b) comprised between 2 and 20 millimeters, preferably between 3 and 6 millimeters.

[0040] It is noted that the top panel 6 can optionally be achieved with machining technologies that allow to obtain a low-thickness/pressed ceramic that has reduced thickness, much lower than traditional thicknesses of a ceramic tile, typically comprised between 10:14 mm.

[0041] The top panel 6 may then present a variable thickness, up to 20 millimeters, and be made with different materials, such as ceramic, stone, marble or others.

[0042] Thanks to the previously indicated values of the thicknesses T and B (respectively of the support element 2 and the top panel 6) the overall thickness of the prefabricated element 1 may be essentially similar to that of a ceramic tile. This allows to maintain a uniform level of the floor in an apartment where, for example, in some locations there is a floor made by assembling prefabricated elements, and in other locations there are floors formed with ceramic tiles.

[0043] It is noted that the top panel 6 does not protrudes outside the perimeter of the upper face 3. In particular, the top panel 6 has the same shape of the support element 2. In this version the top panel 6 thus presents a rectangular shape. It is understood that in other versions in which the support element 2 has a shape different from the rectangular one, for example a square or diamond shape, also the top panel 6 is square or diamond shaped.

[0044] The prefabricated element 1 further comprises an adhesive layer (not shown) which extends, at least in part, on the upper face 3 for joining the top panel 6 to the support element 2 by gluing.

[0045] It is described hereafter an example of a machining process to provide a prefabricated element 1.

[0046] It is executed the machining for profiling the side faces 5 and the end faces 7 of the support element 2, which typically is a machining in which a cutting tool removes material from the side faces so as to obtain the shape of the profile provided on each lateral face (i.e. the female connecting means 11, i.e. the male connecting means 12).

[0047] Once achieved the support element 2, the top panel 6 is coupled by gluing to the support element 2 (in particular on its upper face 3) through an adhesive layer.

[0048] In this way the profiling can be performed in the absence of the ceramic material so as to avoid damage to the latter.

[0049] Alternatively, the profiling machining can also be performed after gluing the top panel 6 to the upper face 3. In this case, during machining, it must however be carefully avoided that the cutting tool comes into contact with the top panel 6 to avoid damaging.

[0050] As shown in Figures 2, 3a, and 3b, it is possible to realize a floor comprising two or more prefabricated elements 1, 1' which are connected together by means of a snap or "click" interlocking connection realized by the coupling means 10.

[0051] It is noted that the prefabricated elements 1 and 1' are substantially identical to one another. Accordingly, all that has been described above with reference to a prefabricated element 1 also extends to the prefabricated element 1', and in general to the plurality of prefabricated elements, all equal to each other, which are assembled together to make the floor 20.

[0052] Once assembled, the two (or more) prefabricated elements 1, 1' are arranged adjacent to one another so as to define a distance D (shown in Figure 3b) between side surfaces 8 of adjacent top panels 6.

[0053] The distance D is optionally comprised between 0 and 4 millimeters, preferably between 1 and 2.5 millimeters.

[0054] Once the floor 20 has been installed (i.e. when all the prefabricated elements 1, 1' have been assembled to each other) it is possible to seal the distance D between two adjacent panels.

[0055] The distance D may be sealed, for example, with resins for joints which are typically used in the construction industry and which can be water-based resins, epoxy or cement resins that are already commonly used for the sealing of the distances between adjacent tiles at the end of a floor laying.

CLAIMS

1. Prefabricated element (1) for floors, comprising a support element (2) provided with an upper face (3), a lower face (4), at least two side faces (5), at least two end faces (7), coupling means (10) on said side faces (5) and on said end faces (7) via which said prefabricated element (1) can be connected to at least one other prefabricated element (1'), said prefabricated element (1, 1') further comprising a top panel (6) fixed to said upper face (3), and being characterized in that said top panel (6) is made with ceramic or stone material.
2. Prefabricated element according to claim 1, wherein said top panel (6) is configured as a laminar element and has a thickness (H) comprised between 2 and 20 mm, in particular comprised between 3 and 6 millimeters.
3. Prefabricated element according to claim 1 or 2, wherein said support element (2) has a thickness (T) comprised between 2 to 6 millimeters.
4. Prefabricated element according to one of the preceding claims, wherein said support element (2) is at least partly made with wood-plastic composite materials, or with polyvinyl chloride (PVC), rigid/flexible PVC panel, HDF standards or with different mineral fibers, ceramics fibers or other fibers.
5. Prefabricated element according to one of the preceding claims, further comprising an adhesive layer which extends, at least in part, on said upper face (3) for joining said top panel (6) to said supporting element (2) by gluing.
6. Prefabricated element according to one of the preceding claims, wherein said coupling means (10) is shape coupling means and comprises female connecting means (11) and male connecting means (12), said female connecting means (11) being on at least one side face (5) and one end face (7) and said male connecting means (12) being on at least one side face (5) and one end face (7).
7. Prefabricated element according to one of the preceding claims, wherein said top panel (6) does not protrudes outside the perimeter of said upper face (3).
8. Floor (20) comprising two or more prefabricated elements (1, 1') made according to one of the preceding claims and connected to each other by means of an interlocking connection made by said coupling means (10).
9. Floor according to Claim 8, wherein said two or more prefabricated elements (1, 1') are arranged adjacent to one another so as to define a distance (D) between side surfaces (8) of adjacent top panels (6).

10. Floor according to Claim 9, wherein said distance (D) is optionally comprised between 0 and 4 millimeters, in particular between 1 and 2.5 millimeters.

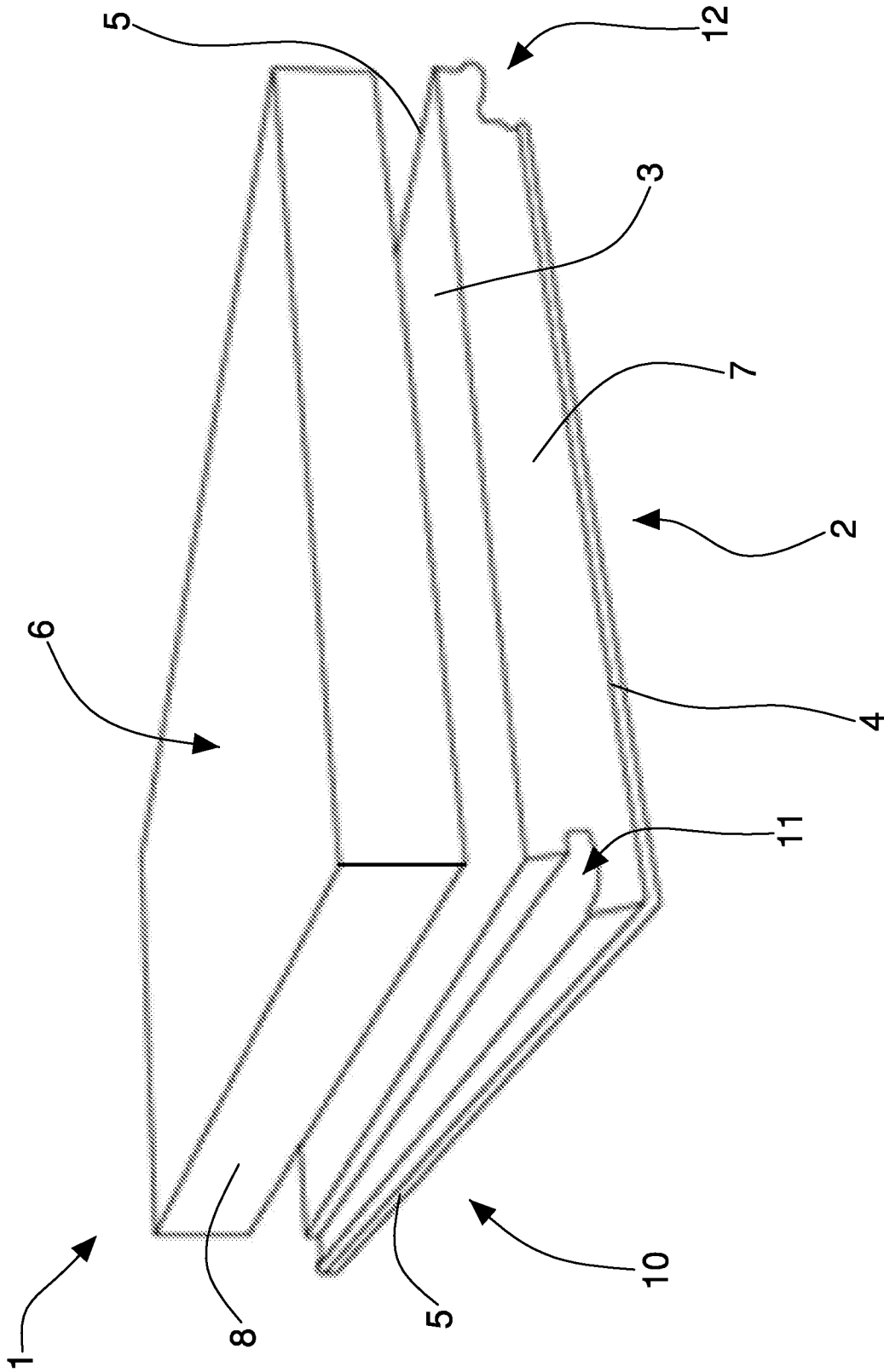


Fig. 1

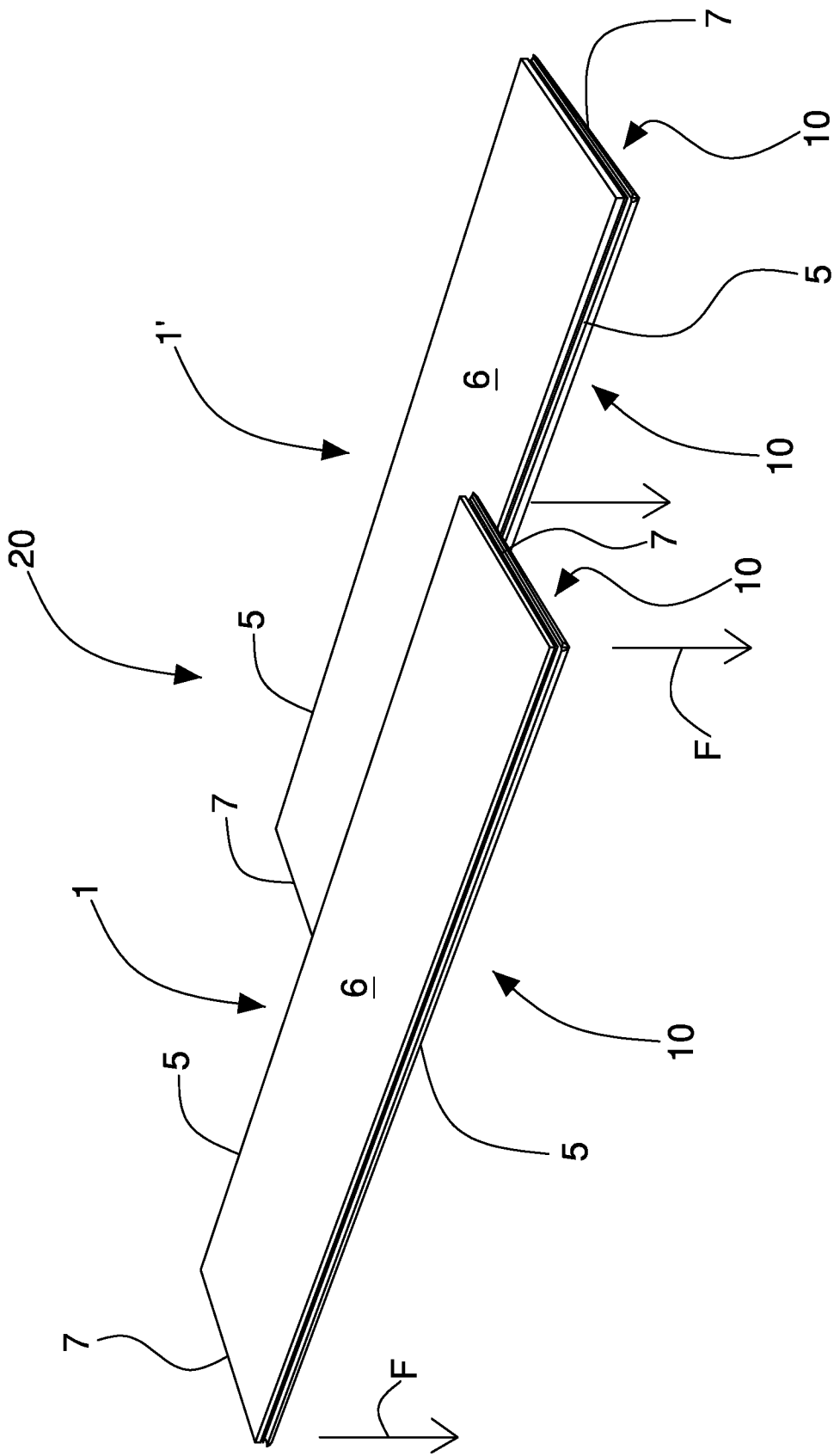


Fig. 2

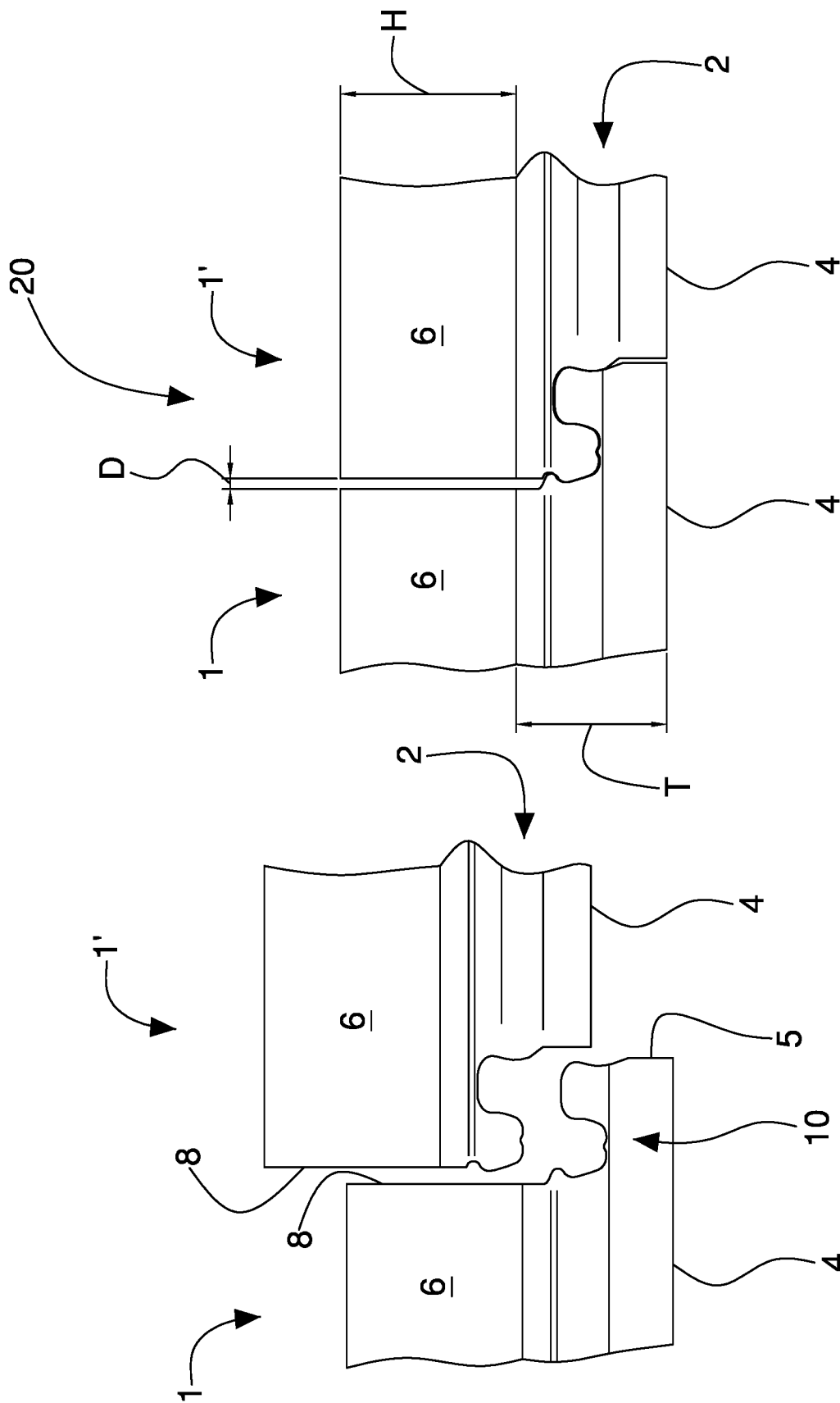


Fig. 3a

Fig. 3b

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/051968

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04F15/08 E04F15/02 B32B9/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E04F B32B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CA 2 523 866 A1 (SHAW IND GROUP INC [US]) 11 November 2004 (2004-11-11)	1,2,4-10
Y	figures 11-14 page 10, line 10 - line 18 page 11, line 8 - line 16 page 11, line 32 - line 34 page 12, line 1 page 12, line 9 - line 13 page 15, line 25 - line 34 page 16, line 17 - line 19 page 16, line 30 - line 32 page 17, line 12 - line 16 -----	3
Y	FR 3 012 994 A1 (LE MONDE DE LA PIERRE [FR]) 15 May 2015 (2015-05-15) figure 1 page 4, line 27 - line 28 page 5, line 12 - line 15 -----	3

☐

Further documents are listed in the continuation of Box C.

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See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2016/051968

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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