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(71) Applicant: **FF-Future Oy**
24100 Salo (FI)

(72) Inventor: **Nieminen, Henri**
24130 Salo (FI)

(74) Representative: **Berggren Oy**
P.O. Box 16
Eteläinen Rautatiekatu 10A
00101 Helsinki (FI)

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(54) **CASTING MOULD, FOUNDATION STRUCTURE AS WELL AS FOOTING AND PILLAR STRUCTURE**

(57) A casting mould (1) comprising a bottom part (2) of the casting mould and at least a first side mould piece (3a) and a second side mould piece (3b), which bottom part and side mould pieces are manufactured of extruded polystyrene (XPS) or expanded polystyrene (EPS), and which bottom part comprises grooves at the upper surface of the bottom part, into which the first and the second side mould pieces are formed to fit at least at one of their

edges. When the first and the second side mould pieces are arranged into the grooves of the opposite edges of the bottom part the side mould pieces tilt towards each other. The casting mould can be used as a foundation mould and the foundation structure comprises the casting mould (1) according to the invention and casting compound arranged inside the casting mould.

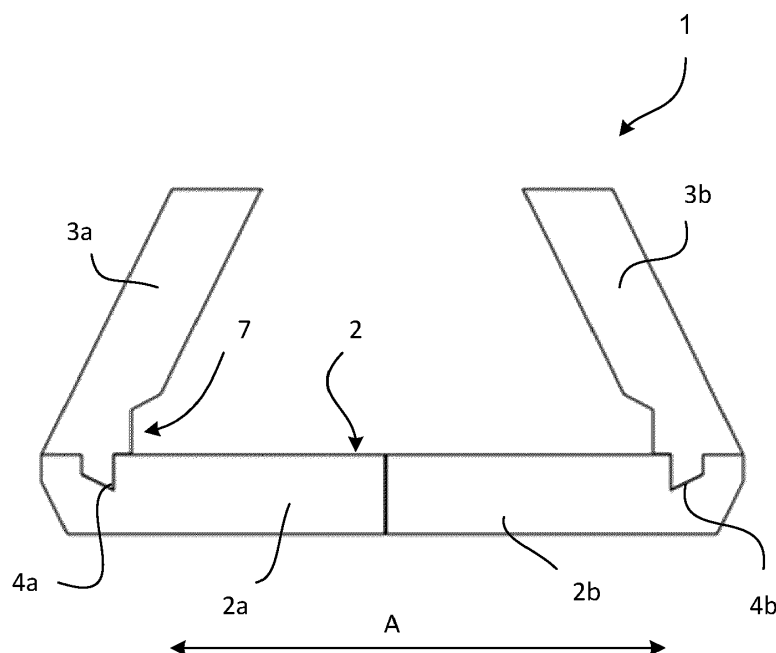


Fig. 1

Description

Field of the invention

[0001] The invention relates to a casting mould according to the appended claim. The invention also relates to a use of the casting mould according to the invention as a foundation mould or as a pillar mould, and a foundation structure. Furthermore, the invention relates to a footing and pillar structure comprising a foundation structure according to the invention and a footing or pillar structure formed on its upper surface.

Background of the invention

[0002] A casting mould is typically needed in forming a foundation for a building. A separate frost insulation is often installed under the foundation. However, it is laborious and time consuming to insulate the foundation and to build casting moulds from boards, for example. There are casting moulds made of heat insulation material which are easy to build from a bottom plate having already made grooves for the vertical walls of the mould. The vertical walls of the mould are pressed into the grooves in the bottom plate of the mould. Such casting mould manufactured of heat insulation material comprises a vertical bottom plate and vertical walls of the mould which are arranged perpendicularly in relation to the bottom plate. An iron reinforcement, such as reinforcement bars, that is required by the foundation, is arranged into the casting mould, and the casting mould is filled with casting compound, such as concrete. However, the foundation moulds may require remarkable amount of casting compound, and therefore, their carbon footprint may rise high. Similar foundation mould can be used for making and insulating pillar foundations.

Object and description of the invention

[0003] An object of the present invention is to reduce or even eliminate the above-mentioned problems appearing in prior art.

[0004] An object of the present invention is to provide a casting mould to be used as a foundation mould which needs less casting compound, such as concrete, for filling the casting mould, but which still enables a strong and durable casting mould structure for use in manufacturing a foundation structure. The object of the invention is further to provide a foundation structure for a footing or pillar structure of a building in a material efficient manner.

[0005] In order to attain this object, the casting mould according to the invention is primarily characterised in what is presented in the characterising part of the independent claim.

[0006] Some preferred embodiments of the invention are disclosed in the other, dependent claims.

[0007] The foundation structure as well as the footing

or pillar structure according to the invention is mainly characterised in what is presented in the claims 11-14.

[0008] A typical casting mould according to the invention comprises a bottom part of the casting mould and at least a first side mould piece and a second side mould piece, which bottom part and side mould pieces are manufactured of extruded polystyrene (XPS) or expanded polystyrene (EPS), and which bottom part comprises grooves on the upper surface of the bottom part, into which the first and the second side mould piece are formed to fit at least at one of their edges, whereby the grooves of the bottom part and the edges of the side mould pieces fitting them are formed so that the side mould pieces tilt towards each other when the first side mould piece and the second side mould piece are placed into the grooves in the opposite edges of the bottom part of the casting mould, and a shape is formed to the side mould pieces whereby a wider space is formed into the lower part of an inner part between the side mould pieces of the casting mould in the lateral direction of the casting mould, and whereby a joining point between the side mould piece and the bottom part forms a right angle when the side mould piece is placed into the groove in the bottom part and is tilting towards the centre part of the casting mould.

[0009] The casting mould according to the invention can be used as a foundation mould or as a pillar foundation mould. A typical foundation structure according to the invention comprises the casting mould according to the invention and casting compound arranged inside the casting mould.

[0010] A typical footing or pillar structure according to the invention comprises a foundation structure according to the invention and a footing or pillar structure formed on its upper surface.

[0011] A casting mould according to the invention makes it possible to construct a foundation structure for the footing or pillar structure of a building with less amount of casting compound. Thus, with the casting mould according to the invention the carbon footprint can be reduced and cost savings achieved.

[0012] A casting mould according to the invention is easy and fast to assemble from readily shaped elements. The parts of the casting mould according to the invention are designed so that the casting mould will be firm and tight without any sawing and fitting. Furthermore, the parts of the casting mould are shaped so that they guide to assemble the casting mould correctly, whereby a space is created for the casting compound between the side walls. The casting mould according to the invention can be rapidly assembled from the parts that are compatible with each other. The casting mould according to the invention enables a more durable casting mould structure needing less casting compound.

[0013] A bottom part and a side mould piece of the casting mould according to an embodiment of the invention are manufactured of a heat insulation material plate, to which plate the required shapes have been formed so

that a part of the bottom part and a side mould piece can be formed from one heat insulation material plate. An advantage of this kind of casting mould according to the invention is especially that the parts of the casting mould are already formed into the heat insulation material plate and the parts are only folded to apart from each other at the construction site. This way the parts of the casting mould can be made from one uniform heat insulation material plate by folding, whereby material is saved and no pieces are wasted.

[0014] The casting mould according to the invention for the foundation structure is manufactured of heat insulation material and it will remain as part of the foundation structure. This way, a thermal bridge can be broken already under the foundation and the heat insulation will be formed to be uniform. The casting mould according to the invention is simultaneously a frost insulation as well as a casting mould. By means of the casting mould according to the invention, the insulation and the casting can be carried out in one working phase and no separate disassembling of the mould is needed but the casting mould will remain as part of the foundation structure.

[0015] In a footing or pillar structure according to the invention, the properties of the foundation structure are combined, and furthermore, rain waters can be easily guided away from the structure by means of an additional element of the footing or pillar structure according to an embodiment of the invention placed on the foundation structure. The method of construction that is based on the foundation described in the present application is clearly the most common method of construction for example in Finland. The casting mould according to the invention enables an overall foundation base arrangement which makes it possible to reduce carbon footprint.

Short description of the drawings

[0016] In the following, the invention will be described in more detail with reference to the appended drawings, in which

- Figure 1 shows a casting mould according to an embodiment of the invention comprising a bottom part and a first and a second side mould piece,
- Figure 2 shows half of a casting mould according to an embodiment of the invention as a perspective view,
- Figure 3 shows a heat insulation material plate according to an embodiment of the invention from which a part of the bottom part and a side mould piece of a casting mould can be made by folding,
- Figure 4 shows the plate of the heat insulation material plate shown in Figure 3 illustrated from the end of the plate,
- Figure 5 shows a casting mould according to another embodiment of the invention comprising

- a bottom part and four side mould pieces which are attached to each other by a folded joint, whereby the side mould pieces form a uniform wall around the bottom part,
- Figure 6 shows a part of the bottom part shown in Figure 5,
- Figure 7 shows a side mould piece used in the casting mould shown in Figure 5,
- Figure 8 shows another side mould piece used in the casting mould shown in Figure 5,
- Figure 9 shows a footing or pillar structure according to the invention, which structure comprises a foundation structure formed by the casting mould according to the invention and a footing structure formed on its upper surface, and
- Figure 10 shows another footing or pillar structure according to the invention, which structure comprises a foundation structure formed by the casting mould according to the invention and a footing structure formed on its upper surface.

Detailed description of the invention

- [0017]** The casting mould according to the invention for a foundation comprises a bottom part of the mould and at least a first side mould piece and a second side mould piece. The bottom part of the casting mould according to the invention comprises grooves on the upper surface of the bottom part, into which grooves the first and the second side mould pieces are formed to fit at one of their edges. The grooves in the bottom part of the casting mould and the edges of the side mould pieces fitting into them are formed so that the side mould pieces tilt towards each other when the first side mould piece and the second side mould piece are placed into the grooves at the opposite edges of the bottom part of the casting mould. According to an embodiment of the invention, the side mould piece is in an angle of about 15-45 degrees, typically in an angle of about 15-25 degrees in relation to the bottom part, measuring the tilting of the side mould piece inwards from the outer surface of the casting mould, but the tilting angle may vary. Thus, in the casting mould according to the invention, the side mould pieces are at the edges of the casting mould and a space is formed between them for casting compound. In the casting mould according to the invention, the space left between the side mould pieces is made smaller, whereby less casting compound, such as concrete, is needed for filling the casting mould. The casting mould according to the invention is open from its upper surface in the area between the side mould pieces. In the casting mould according to the invention, the side mould pieces tilt inwards along the whole distance of the side mould piece. In other words, when the side mould piece is installed to its place, it is inclined along its whole distance inwards the casting mould. The distance between the side mould pieces of

the casting mould shortens during the whole distance from the bottom part upwards, measured from the outer surface of the side mould pieces.

[0018] The bottom part of the casting mould according to the invention can be formed of one or several parts and the vertical walls of the casting mould are formed of side mould pieces. In an advantageous embodiment according to the invention, the bottom part is formed of two parts, such as two adjacently placed plates, both of which comprise a groove on the upper surface into which groove a side mould piece can be arranged. Thus, the first side mould piece is arranged into the groove of one part and the second mould piece is arranged into the groove of the other part, and a space for the casting compound is formed between the first side mould piece and the second side mould piece. According to a typical embodiment of the invention, a groove into which a side mould piece can be arranged is on the surface of the bottom part, at the edge of the bottom part in the direction of the edge, along the entire length of the bottom part. In case the bottom part of the casting mould is made of several parts, the parts of the bottom part of the casting mould, such as plates, are arranged tightly against each other to form a uniform bottom part of the casting mould. In an embodiment, the edges of the parts forming the bottom part have straight edges which are tightly arranged against each other. In an embodiment according to the invention, the parts of the bottom part have tongues and grooves formed at their edges to enable connecting the parts tightly to each other by means of the tongue-and-groove joint, whereby the edge sides of the parts comprise for example a step-like form, in which a tongue (male) is formed at the edge side of the other part and a groove (female) is formed at the side edge of the second part, into which groove the tongue of the adjacent part is arranged to form a tight joint. Other kinds of tongue and groove joints can also be used for connecting parts of the bottom part to each other or the parts of the bottom part can be formed in some other ways to fit one another, for example the edges can be bevelled to fit one another. The side mould piece according to the invention is formed to fit into the groove in the bottom part and to be arranged into the groove so that the side mould piece is tilting inwards in a finished casting mould.

[0019] In the casting mould according to the invention, the edge of the side mould piece is formed to fit into the groove so that the side mould piece is tilting towards the centre of the casting mould when the side mould piece is placed into the groove in the bottom part. In an embodiment according to the invention, the upper surface of the bottom part comprises a groove, the bottom of which groove is formed to be pointed towards the lower surface of the bottom part and the edge of the side mould piece is formed to fit into the groove. This way, the side mould pieces can be easily installed correctly when assembling the casting mould. Furthermore, the side mould pieces can be thus firmly placed into their positions and the side mould pieces can be firmly placed sufficiently

deep into the bottom part. The side mould pieces are further advantageously formed so that the upper edge of the side mould pieces is substantially parallel with the bottom part when the side mould pieces are placed into their positions into the grooves in the bottom part. This way, the upper surface of the foundation can be made even by means of the casting mould according to the invention.

[0020] In the casting mould according to the invention, a thinner area is formed close to the edge of the side mould piece which is against the bottom part of the casting mould inside the casting mould. A shape is formed to the side mould pieces in accordance with the invention, whereby a wider space is formed to the lower part of the casting mould between the side mould pieces in the lateral direction of the casting mould. This way, casting compound can be spread into wider area in the lower part of the inner part of the casting mould structure according to the invention, in the lateral direction of the casting mould, and thus making the foundation structure more durable and firm. Furthermore, the pressure caused by the casting compound can be spread into wider area. Furthermore, due to this shape, there is no sharp edge formed between the side mould piece and the bottom part whereby the joint is more durable and the casting mould can be more easily filled with the casting compound, whereby no air pockets are formed during the filling. Thus, the shape in the side mould piece of the casting mould according to the invention is such that the joining point between the side mould piece and the bottom part form a right angle when the side mould piece is placed into the groove in the bottom part, even though in the finished casting mould the side mould piece is tilting inwards towards the centre of the casting mould.

[0021] According to an advantageous embodiment of the invention, the bottom part of the casting mould and the side mould pieces are made of heat insulation material plates, whereby a part of the bottom part and a side mould piece are formed from one heat insulation material plate. According to an embodiment of the invention, the bottom part of the casting mould and the side mould pieces are formed of heat insulation material plate comprising an upper surface and a lower surface and which plate has long edge sides and, perpendicular in relation to them, short edge sides, and the upper surface of the plate comprises one groove in the direction of the long edge side of the plate, which groove is formed to be pointed towards the lower surface of the plate, i.e. the groove in the bottom part of the casting mould, and furthermore the plate comprises a cutting groove in the direction of the long edge side arranged beside another groove on the upper surface of the plate and by means of which cutting groove the plates can be divided into a first part and a second part, whereby the first part comprises a groove which is formed to be pointed towards the lower surface of the plate, and the second part comprises a protruding part formed to fit into the groove. By means of the cutting groove, the plates can be thus divided into

a first part and a second part, whereby the first part forms the part of the bottom part of the casting mould and the second part forms the side mould piece of the casting mould. These bottom parts and side mould pieces can be arranged next to each other and against each other, whereby the casting mould according to the invention having a bottom part and a first side mould piece and a second side mould piece of the casting mould are arranged into the grooves of the opposite edges of the bottom part so that the side mould pieces tilt towards each other. The length of the long edge side of the heat insulation material plates from which the part of the bottom part and the side mould piece can be formed, is typically 1200-6000 mm and the length of the short edge side is typically 600-1500 mm or 600-1200 mm. Typically, the long edge sides of the plate define the longitudinal direction of the plate and the short edge sides of the plate define the lateral direction of the plate.

[0022] In an embodiment according to the invention, the above described cutting groove and the groove of the heat insulation material plate formed to be pointed towards the lower surface of the plate are arranged in the direction of the long edge sides of the heat insulation material plate, typically in the centre part of the plate. Typically at such distance from the edge side of the plate which corresponds to the height of the side mould piece. The long edge sides of the heat insulation material plate can be shaped. Typically, the long edge side of the heat insulation material plate which is the lower edge of the side mould piece in the casting mould structure comprises shapes that are compatible with the groove in the bottom part, which groove is formed to be pointed towards the lower surface of the plate. The long edge side of the heat insulation material plate which is part of the bottom part of the casting mould can have straight sides or it can comprise shapes for a half-groove joint or a tongue and groove joint, for example, or it can be bevelled.

[0023] Typically, the casting mould according to the invention comprising a bottom part and a first and a second side mould piece at the opposite sides is used as a foundation mould.

[0024] The bottom part of the casting mould according to another embodiment of the invention comprises grooves on each edge side of the upper surface of the bottom part, whereby the casting mould further comprises a third side mould piece and a fourth side mould piece which are arranged substantially perpendicularly in relation to the first and the second side mould pieces, and which third and fourth side mould pieces are placed into the grooves at the opposite edges of the bottom part so that they tilt towards each other. According to an embodiment of the invention, the side mould pieces are in an angle of about 15-45 ° degrees, typically in an angle of about 15-25 ° degrees in relation to the bottom part, when measuring the tilting of the side mould piece from the outer surface of the casting mould inwards, but the tilting angle may vary. In an embodiment according to the invention, the bottom part is formed of four parts, each of

which comprises a groove on one of its sides into which groove the side mould piece can be arranged. The parts of the bottom part are typically formed to fit each other to form a uniform bottom part of the casting mould. The grooves in the bottom part and the side mould pieces are formed to fit each other so that the side mould pieces tilt inwards in the casting mould structure and form a uniform wall around the bottom part. Thus, less casting compound, such as concrete, is needed for filling the casting mould. Typically, the first side mould piece, the second side mould piece, the third side mould piece and the fourth side mould piece are attached to each other by a folded joint, a folded groove joint or the like joint in which the side mould pieces attached to each other are overlapping and mainly perpendicular to each other. This way the side mould pieces form a uniform wall around the bottom part. This kind of joint type makes the casting mould tight and firm. The side mould pieces comprise required shapes for forming a folded joint, a folded groove joint or the like joint. Such casting mould is typically used as a pillar foundation mould in which all sides around the bottom part of the casting mould have a side mould piece. In other casting moulds according to the invention which are used as foundation moulds for footing, also corresponding joint type can be used, the corners and/or end structures can be made with the shapes of the side mould piece enabling a folded joint, a folded groove joint or the like joint.

[0025] Also in a so called pillar casting mould as described above, a thinner area is formed close to the edge of the side mould piece which is against the bottom part of the casting mould inside the casting mould. This way, a wider space is formed into the lower part of an inner part between the side mould pieces of the casting mould in the lateral direction and the longitudinal direction of the casting mould, and casting compound can be spread into a wider area in the lower part of the casting mould structure, whereby the foundation structure can be made more durable and firm. Furthermore, due to this design, there is no sharp edge formed between the side mould piece and the bottom part, so thus the joint is more durable and the casting mould can be more easily filled with the casting compound, whereby no air pockets are formed during the filling. Thus, the shape in the side mould piece of the casting mould according to the invention is such that the joining point between the side mould piece and the bottom part forms a right angle when the side mould piece is placed into the groove in the bottom part, even though in the finished casting mould the side mould piece is tilting inwards towards the centre of the casting mould. Typically, all side mould pieces comprise this shape.

[0026] The casting mould according to the invention is manufactured of extruded polystyrene (XPS) or expanded polystyrene (EPS) or other heat insulation material suitable for long term use in the ground. In an advantageous embodiment of the invention, the casting mould is manufactured of extruded polystyrene (XPS), whereby

the cellular structure of the material is closed and uniform. This way, the moisture cannot get into the material, whereby it does not get wet nor does its insulation properties change over the time. The bottom part and the side mould pieces used in the casting mould according to the invention can also be coated, whereby their core layer is made of any of the afore-mentioned heat insulation material.

[0027] The thickness of the bottom part and the side mould pieces of the casting mould according to the invention is typically 50-200 mm, more typically 50-120 mm and most typically 60-80 mm. The thickness of the bottom part and the side mould pieces may vary depending on the purpose of use of the casting mould. The thickness of the bottom part of the casting mould may be different than the thickness of the side mould piece. In a typical embodiment, the bottom part and the side mould pieces of the casting mould have the same thickness.

[0028] In an advantageous embodiment of the invention, the width of the groove that is arranged onto the surface of the bottom part of the casting mould manufactured of heat insulation material is about 10-30 mm. The depth of the groove may also vary, typically the depth is about 10-30 mm, which enables the side mould pieces to be arranged firmly into their places. At least the other edge of the side mould pieces is formed so that the side mould pieces can be tightly arranged into the grooves in the plate.

[0029] The height of the side mould pieces of the casting mould according to the invention may vary. In a typical embodiment, the casting thickness of the casting mould according to the invention is 100-300 mm, most typically 15-250 mm and most typically about 200 mm, and the side mould pieces are dimensioned accordingly.

[0030] The width of the bottom part of the casting mould according to the invention may also vary depending on the purpose of use. Typically, the width of the bottom part may be for example 600-800 mm. The length of the side mould piece corresponds to a desired length of the foundation structure. In case of a pillar foundation mould, both the length and the width of the bottom part are typically for example 600-800 mm.

[0031] In the casting moulds according to an advantageous embodiment of the invention, the top edge of the side mould pieces is substantially parallel to the bottom part, when the side mould pieces are arranged to their places into the grooves in the bottom part. The upper surface of the casting mould is thus even.

[0032] In a typical method according to the invention for manufacturing a casting mould, the casting mould according to the invention is constructed by means of the bottom parts and the side mould pieces. In a typical embodiment of the invention, a casting mould is manufactured by using heat insulation material plates according to the invention for manufacturing a casting mould, by folding of which a bottom part and a side mould piece can be obtained. The parts forming the bottom part of the casting mould, such as the plates, are typically placed

on an even base. If several plates are needed for forming a bottom plate of a required size, they are arranged tightly one against the other. In an embodiment, the parts of the bottom part can be attached to each other for example by gluing or the parts can for example comprise shapes for a tongue and groove joint. For attaching the parts of the bottom part also separate fastening means or the like means can be used. These can be made of metal and/or plastic, for example. After this, the side mould pieces are arranged into the grooves in the bottom part. Once the casting mould is built up by means of the bottom part and the side mould pieces, the casting mould is ready for assembling reinforcement. The reinforcement may be done by using regular products used in reinforcement, such as reinforcement bars. If fastening means or the like have been used for assembling the bottom part, reinforcement bars may also be supported to them or they can be used to help in supporting the reinforcement. When the casting mould has been iron reinforced, the casting mould can be filled with casting compound, such as concrete. The bottom part of the casting mould and the side mould pieces remain as part of the formed foundation structure. The bottom part of the casting mould according to the invention forms simultaneously a heat insulation layer which is in connection with the casted layer.

[0033] A typical foundation structure according to the invention comprises the casting mould according to the invention and casting compound arranged inside the casting mould.

[0034] A typical footing or pillar structure according to the invention comprises a foundation structure according to the invention and a footing or pillar structure formed on its upper surface. A footing or pillar structure of an embodiment of the invention comprises an additional element arranged on the upper surface of the foundation structure, whereby one side of the additional element is arranged against the footing or the pillar, and the additional element extends outside the outer edge of the side mould piece. The upper surface of the additional element is inclined, whereby the tilting is descending from the footing or the pillar towards the edge of the additional element outside the outer edge of the side mould piece. The additional element is typically manufactured of extruded polystyrene (XPS), or expanded polystyrene (EPS), or other suitable heat insulation material. By means of an additional element rain waters can be easily guided away from the footing or the pillar and thus away from the building. The additional element is easy to arrange on the foundation structure according to the invention and it is advantageously made of the same material as the casting mould according to the invention. The additional element can be easily fitted into contact with all footing or pillar structures. This way, the structure can be made easy to manufacture and durable.

[0035] A piece of felt, that is typically always part of frost insulation and a footing or pillar structure, can be easily arranged on the upper surface of the declining ad-

ditional element of the structure according to the invention. The additional element has a tilting that suits all footing and pillar types together with the foundation. The size of the additional element may vary, but in the solution according to the invention, the additional element always extends outside the side wall of the casting mould in a finished structure. The additional element stands well in the structure without rotting or breaking when the additional element is made of heat insulation material, such as extruded polystyrene (XPS) or expanded polystyrene (EPS). The additional element to be arranged into the structure according to the invention may also comprise a protruding part, a so called drip, that is downwards at the end extending outside the foundation. According to an embodiment of the invention, the edge of the additional element on the outside of the outer edge of the side mould piece is inclining towards the foundation structure. This way, rain waters can be guided to a desired direction.

Detailed description of the drawings

[0036] Same reference numbers have been used in the Figures for parts corresponding to each other.

[0037] Figure 1 shows a casting mould 1 according to an embodiment of the invention comprising a bottom part 2 and a first side mould piece 3a and a second side mould piece 3b. In the casting mould 1 in Figure 1, the bottom part 2 is formed of two parts 2a, 2b which are arranged tightly against each other. Both parts 2a, 2b of the bottom part comprise a groove 4a, 4b on their upper surface, into which groove the side mould piece 3a, 3b can be arranged. When the first side mould piece 3a and the second side mould piece 3b are arranged into the grooves at the opposite edges of the bottom part, the side mould pieces 3a, 3b tilt towards each other. As can be seen in Figure 1, the side mould pieces tilt towards inside along the whole side mould piece. The distance between the side mould pieces of the casting mould shortens during the whole distance from the bottom part upwards, measured from the outer surface of the side mould pieces. The bottom of the grooves 4a, 4b in the bottom part of the casting mould is formed to be pointed towards the lower surface of the bottom part 2 and the edge of the side mould pieces 3a, 3b is formed to fit into the groove. A shape 7 is formed to the side mould pieces 3a, 3b, whereby a wider space is formed inside the casting mould into its lower part between the side mould pieces 3a, 3b in the lateral direction A of the casting mould. Typically, the shape 7 is such that the joining point between the side mould piece 3a, 3b and the bottom part 2a, 2b forms a right angle when the side mould piece is placed into the groove in the bottom part even though the side mould piece 3a, 3b is tilting towards the centre part of the casting mould in a finished casting mould, as is shown in Figure 1. The upper edge of the side mould pieces 3a, 3b is substantially parallel to the bottom part 2 when the side mould pieces 3a, 3b are set into the

grooves in the bottom part 4a, 4b.

[0038] Figure 2 shows half of the casting mould according to an embodiment of the invention as a perspective view. Figure 3 shows a heat insulation material plate 5 by folding of which a part 2a of the bottom part and a side mould piece 3a of a casting mould, that fit each other as shown in Figure 2, can be obtained. The heat insulation material plate 5 shown in Figure 3 comprises an upper surface 5a and a lower surface 5b. The heat insulation material plate 5 further has long edge sides and, perpendicular in relation to them, short edge sides. The upper surface of the heat insulation material plate 5 comprises one groove 4a, 4b in the direction of the long edge side of the plate, the groove being formed to be pointed towards the lower surface 5b of the plate, and the plate 5 comprises a cutting groove 6 in the direction of the long edge side arranged next to the groove 4a, 4b on the upper surface of the plate and by means of which cutting groove 6 the heat insulation material plate 5 can be divided into a first part and a second part, whereby the first part forms the part 2a, 2b of the bottom part of the casting mould and the second part forms the side mould piece 3a, 3b of the casting mould. Figure 4 shows the plate of the heat insulation material plate shown in Figure 3 illustrated from the end of the plate and the part 2a, 2b of the bottom part of the casting mould and side mould piece 3a, 3b divided by a cutting groove.

[0039] Figure 5 shows a casting mould 1 according to another embodiment of the invention comprising a bottom part 2 and four side mould pieces 8a, 8b, 8c, 8d which are attached to each other by a folded joint, whereby the side mould pieces 8a, 8b, 8c, 8d form a uniform wall around the bottom part. The casting mould 1 shown in Figure 5 is typically used as a pillar foundation mould having substantially the same lateral direction A and the vertical direction B as shown in Figure. The folded joint shown in Figure 5 can be also used in the corners of the casting mould structure or in the end structures.

[0040] Figure 6 shows a part 9 of the bottom part used in the casting mould shown in Figure 5, the part having a groove 4c into which the side mould piece can be arranged. Typically, there are four parts 9 of the bottom part, whereby the bottom part of the casting mould shown in Figure 5 can be formed. The bottom of the groove 4c in the bottom part of the casting mould is formed to be pointed towards the lower surface of the bottom part 2.

[0041] Figures 7 and 8 show side mould pieces 8a, 8b, 8c, 8d used in the casting mould shown in Figure 5. The side mould pieces have shapes 10a, 10b, 10c, 10d that enable attachment of the folded joint and the side mould pieces to each other to obtain the casting mould shown in Figure 5. The side mould pieces 8a, 8b, 8c, 8d further comprise a shape at their other edge which is compatible with the groove in the bottom part of the casting mould. Also these side mould pieces have a shape 7, whereby a wider space is formed inside the casting mould to its lower part, between the side mould pieces 3a, 3b, in the lateral direction A and in the vertical direction B of the

casting mould in the embodiment of the casting mould shown in Figure 5.

[0042] Figure 9 shows a footing or pillar structure 11 according to an embodiment of the invention comprising a foundation structure formed by the casting mould according to the invention and a footing or a pillar 13 formed on its upper surface. The casting mould is formed by the side mould pieces 3a, 3b and the parts 2a, 2b of the bottom part. Casting compound, such as concrete, is arranged inside the casting mould. A foundation structure is thus formed. The footing or pillar 13 is formed on the foundation structure. Furthermore, an additional element 14 is arranged on the upper surface of the foundation structure. One side of the additional element 14 is arranged against the footing or the pillar 13 and the additional element 14 extends outside the outer edge of the side mould piece 3a of the casting mould. The upper surface of the additional element 14 is inclined, whereby the tilting is descending from the footing or pillar 13 towards the end edge of the additional element outside the outer edge of the side mould piece 3a. A piece of felt 16, that is typically always part of frost insulation, can be easily arranged on the upper surface of the declining additional element of the structure according to the invention. The structure can be in connection with frost insulation 17.

[0043] Figure 10 shows another footing or pillar structure 11 according to the invention comprising the foundation structure formed by a casting mould according to the invention and a footing or pillar 13 formed on its upper surface. The edge of the additional element 14 outside the outer edge of the side mould piece 3a shown in Figure 10 is formed to incline towards the foundation structure.

[0044] Figures 9 and 10 also show a fastening means 15 or the like which is used for attaching the parts of the bottom part to each other. The design shown in Figures is not limiting the invention, but it only illustrates the position of the fastening means or the like between the parts of the bottom part.

Claims

1. A casting mould (1) comprising a bottom part (2) of the casting mould and at least a first side mould piece (3a) and a second side mould piece (3b), which bottom part and side mould pieces are manufactured of extruded polystyrene (XPS) or expanded polystyrene (EPS), and which bottom part comprises grooves on the upper surface of the bottom part, into which the first and the second side mould pieces are formed to fit at least at one of their edges, **characterized in that** the grooves of the bottom part and the edges of the side mould pieces fitting into them are formed so that the side mould pieces tilt towards each other when the first side mould piece (3a) and the second side mould piece (3b) are placed into the grooves at the

opposite edges of the bottom part of the casting mould, and a shape (7) is formed into the side mould pieces (3a, 3b), whereby a wider space is formed into a lower part of an inner part of the casting mould (1), between the side mould pieces (3a, 3b) in the lateral direction of the casting mould, and whereby a joining point between the side mould piece and bottom part forms a right angle when the side mould piece is placed into the groove in the bottom part and is tilting towards the centre part of the casting mould.

2. The casting mould according to claim 1, **characterized in that** the bottom part (2) is formed of two parts (2a, 2b), both comprising a groove (4a, 4b) on the upper surface of the bottom part, into which groove the side mould piece (3a, 3b) is arrangeable.
3. The casting mould according to claim 1 or 2, **characterized in that** a part (2a, 2b) of the bottom part of the casting mould and the side mould piece (3a, 3b) are formed of heat insulation material plate (5) comprising an upper surface (5a) and a lower surface (5b) and which plate (5) has long edge sides and, perpendicular in relation to them, short edge sides, and the upper surface of the heat insulation material plate comprises one groove (4a, 4b) in the direction of the long edge side of the plate, which groove is formed to be pointed towards the lower surface (5b) of the plate, and furthermore the plate (5) comprises a cutting groove (6) in the direction of the long edge side arranged beside the groove (4a, 4b) on the upper surface of the plate and by means of which cutting groove (6) the heat insulation material plate (5) can be divided into a first part and a second part, whereby the first part forms the part (2a, 2b) of the bottom part (2a, 2b) of the casting mould and the second part forms the side mould part (3a, 3b) of the casting mould.
4. The casting mould according to claim 1, **characterized in that** the bottom part of the casting mould comprises grooves on each edge side of the upper surface of the bottom part, whereby the casting mould further comprises a third side mould piece (8c) and a fourth side mould piece (8d) which are arranged substantially perpendicularly in relation to the first side mould piece (8a) and the second side mould piece (8b), which third and fourth side mould pieces (8c, 8d) are arranged on the grooves at the opposite edges in the bottom part so that they tilt towards each other.
5. The casting mould according to claim 4, **characterized in that** the bottom part (2) is formed of four parts (9), each of which comprises a groove (4c) on one of its sides into which groove the side mould piece is arrangeable.

6. The casting mould according to claim 4 or 5, **characterized in that** the side mould pieces (8a, 8b, 8c, 8d) are attached to each other by a folded joint or the like joint, whereby the side mould pieces form a uniform wall around the bottom part (2). 5
7. The casting mould according to any of the preceding claims, **characterized in that** the upper edge of the side mould pieces (3a, 3b, 8a, 8b, 8c, 8d) is substantially parallel to the bottom part (2) when the side mould pieces are arranged into the grooves in the bottom part (4a, 4b, 4c). 10
8. The casting mould according to any of the preceding claims, **characterized in that** the bottom of the grooves (4a, 4b, 4c) in the bottom part of the casting mould is formed to be pointed towards the lower surface of the bottom part (2). 15
9. The casting mould according to any of the preceding claim 4-8, **characterized in that** a shape (7) is further formed to the third side mould piece (8c) and the fourth side mould piece (8d) whereby a wider space is formed into the lower part of an inner part between the side mould pieces (3a, 3b, 8a, 8b, 8c, 8d) of the casting mould (1) in the lateral direction and the longitudinal direction of the casting mould. 20 25
10. A use of the casting mould according to any of the preceding claims as a foundation mould or as a pillar foundation mould. 30
11. A foundation structure, **characterized in that** the foundation structure comprises the casting mould (1) according to any of the preceding claims 1-9 and casting compound (12) arranged inside the casting mould. 35
12. A footing and pillar structure (11) **characterized in that** the structure comprises the foundation structure according to claim 11 and the footing or pillar (13) formed on its upper surface. 40
13. The footing or pillar structure according to claim 12, **characterized in that** the footing or pillar structure (11) comprises an additional element (14) arranged on the upper surface of the foundation structure, whereby one side of the additional element (14) is arranged against the footing or the pillar (13) and the additional element (14) extends outside the outer edge of the side mould piece (3a) of the casting mould, and the upper surface of which additional element (14) is inclined, where by the tilting is descending from the footing or pillar towards the edge of the additional element outside the outer side of the side mould piece (3a), and which additional element (14) is manufactured of extruded polystyrene (XPS) and/or expanded polystyrene (EPS). 45 50 55
14. The footing or pillar structure according to claim 12 or 13, **characterized in that** the edge of the additional element (14) outside the outer edge of the side mould piece (3a) is inclined towards the foundation structure.

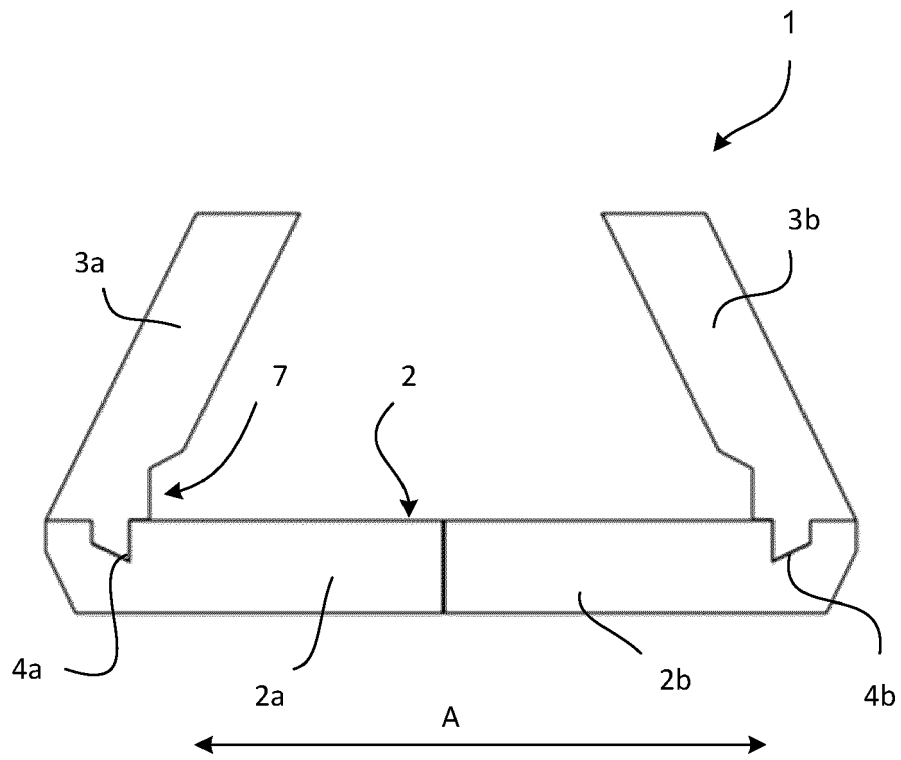


Fig. 1

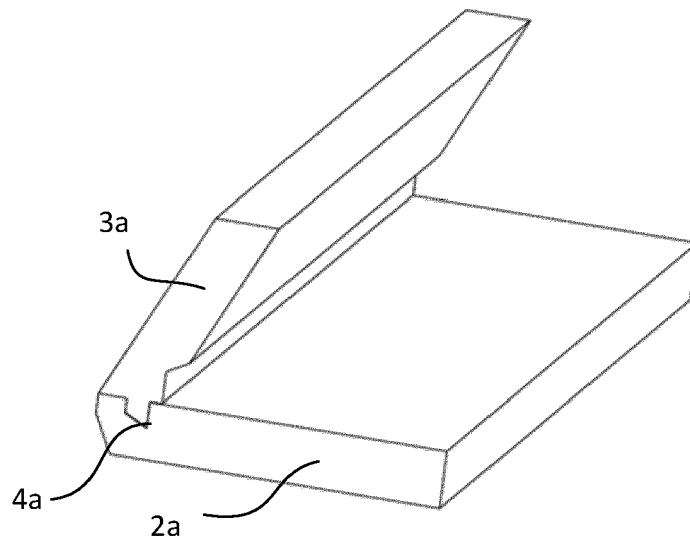


Fig. 2

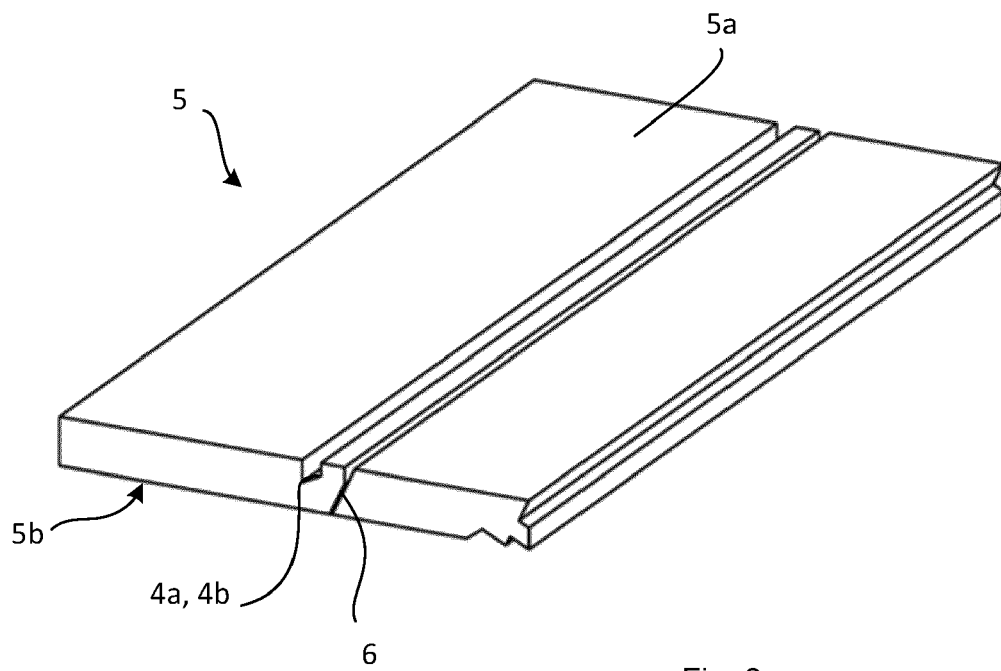


Fig. 3

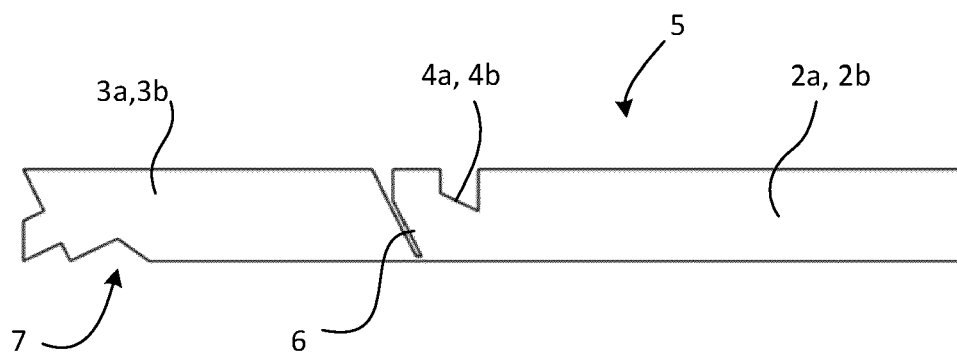


Fig. 4

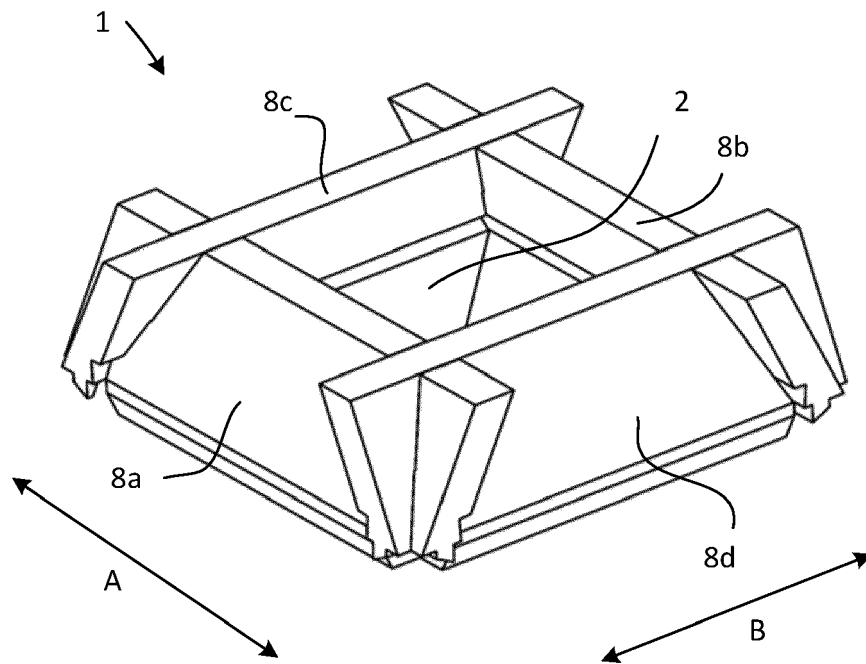


Fig. 5

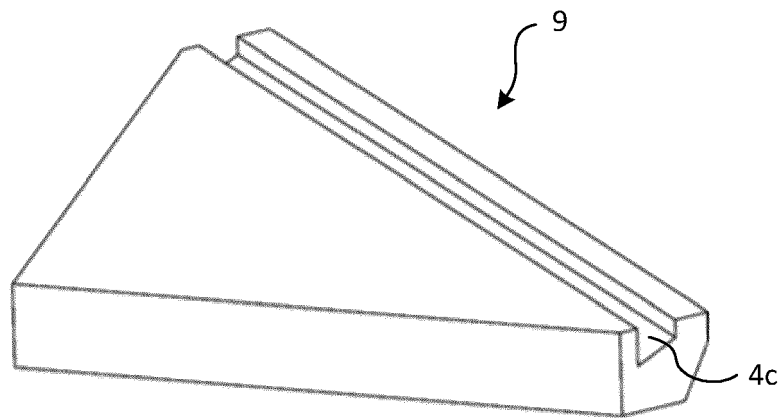


Fig. 6

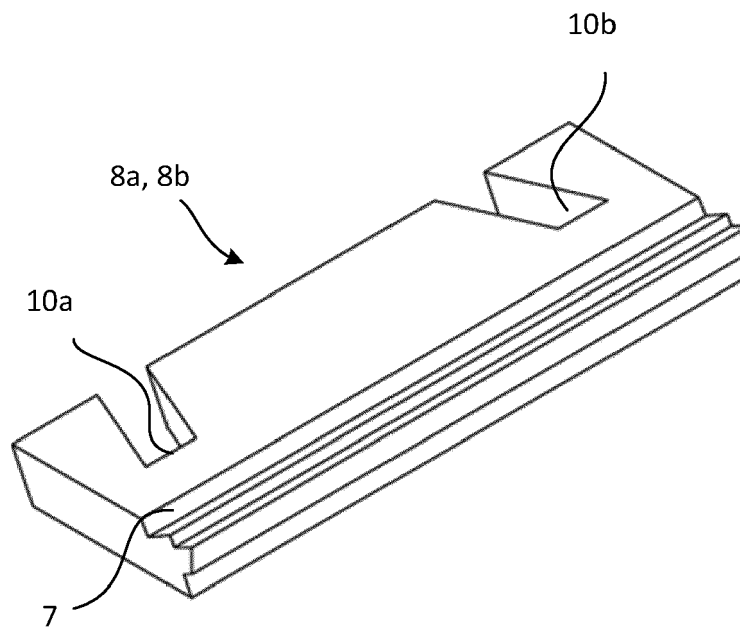


Fig. 7

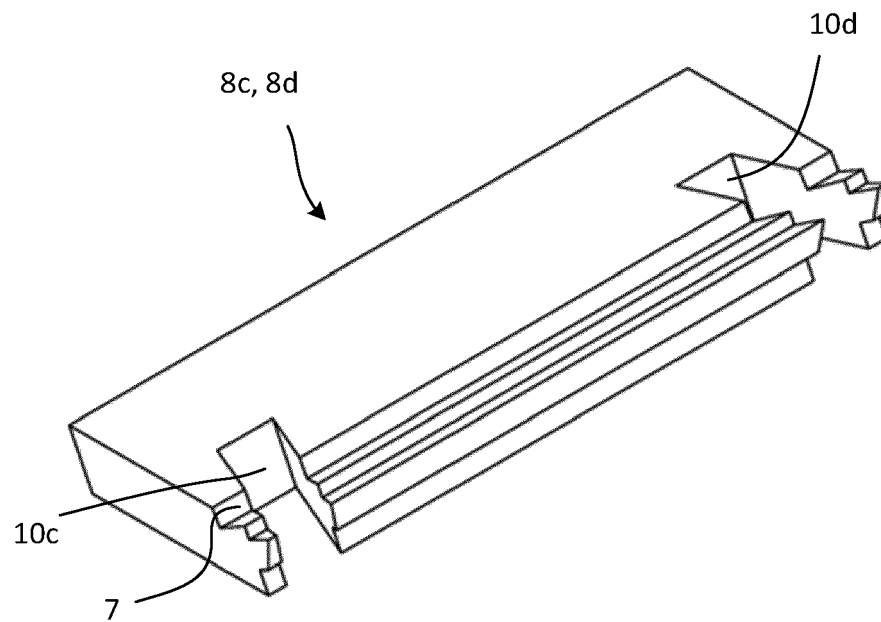


Fig. 8

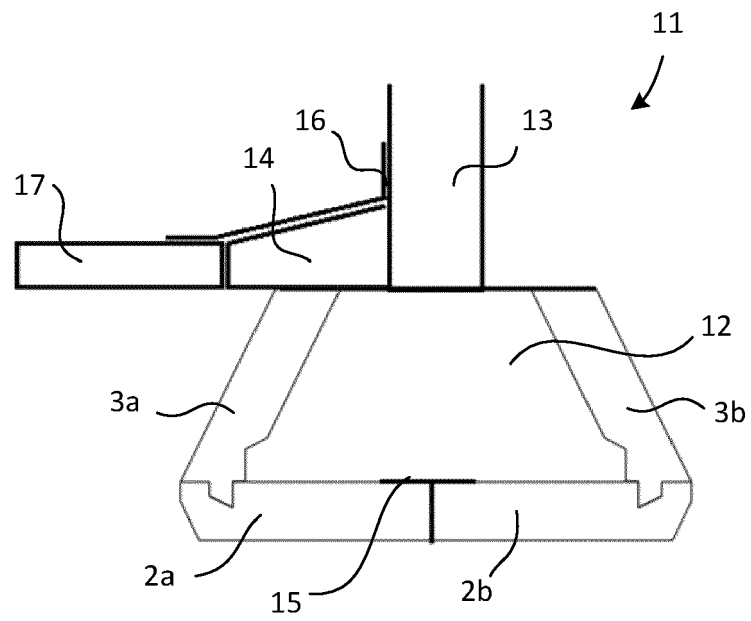


Fig. 9

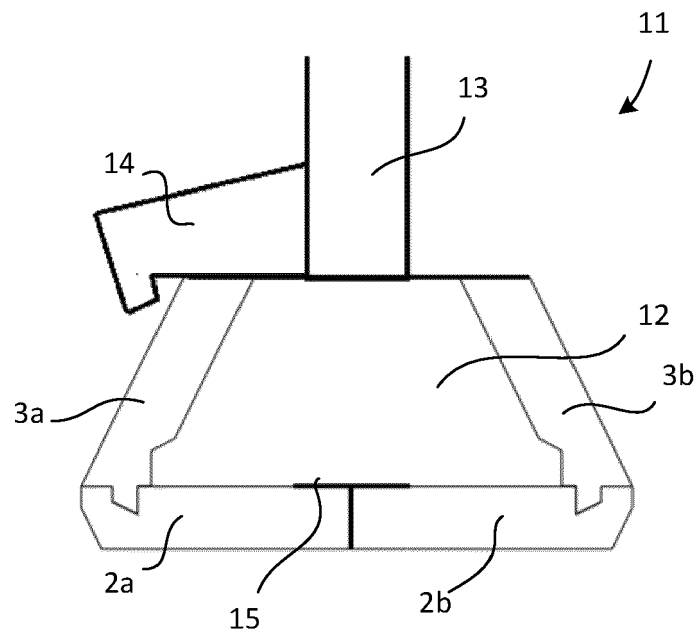


Fig. 10



EUROPEAN SEARCH REPORT

Application Number

EP 22 17 1227

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 241 300 A1 (UNIDEK BOUWELEMENTEN [NL]) 18 September 2002 (2002-09-18) * paragraphs [0001], [0006], [0011], [0013], [0018], [0019], [0020] - [0024]; figures 1-4 * -----	1-14	INV. E02D27/01 E04G9/05
A	EP 2 641 714 A2 (FINNFOAM OY [FI]) 25 September 2013 (2013-09-25) * the whole document * -----	1-14	
A	NL 1 000 989 C2 (ISOBOUW SYSTEMS BV [NL]) 18 February 1997 (1997-02-18) * the whole document * -----	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			E02D E04G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 July 2022	Examiner Patrascu, Bogdan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 22 17 1227

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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27-07-2022

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