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(54) **Foundation**

(57) A formwork system suitable for pouring concrete comprises plate-shaped formwork elements to be positioned substantially transversely to a ground surface, wherein a first set of plate-shaped formwork elements is positioned opposite a second set of plate-shaped formwork elements, substantially parallel thereto and spaced a predetermined distance therefrom. Two plate-shaped formwork elements of at least the first set are each provided with stiffening ribs between a bottom side of the

plate-shaped formwork element, which is located near the ground surface, and an upper side of the plate-shaped formwork element, which extends parallel thereto, spaced therefrom by some distance, which stiffening ribs are located on a side of the plate-shaped formwork elements remote from the second set. The two plate-shaped formwork elements, which practically abut against each other, are movable relative to each other in a longitudinal direction parallel to the ground surface.

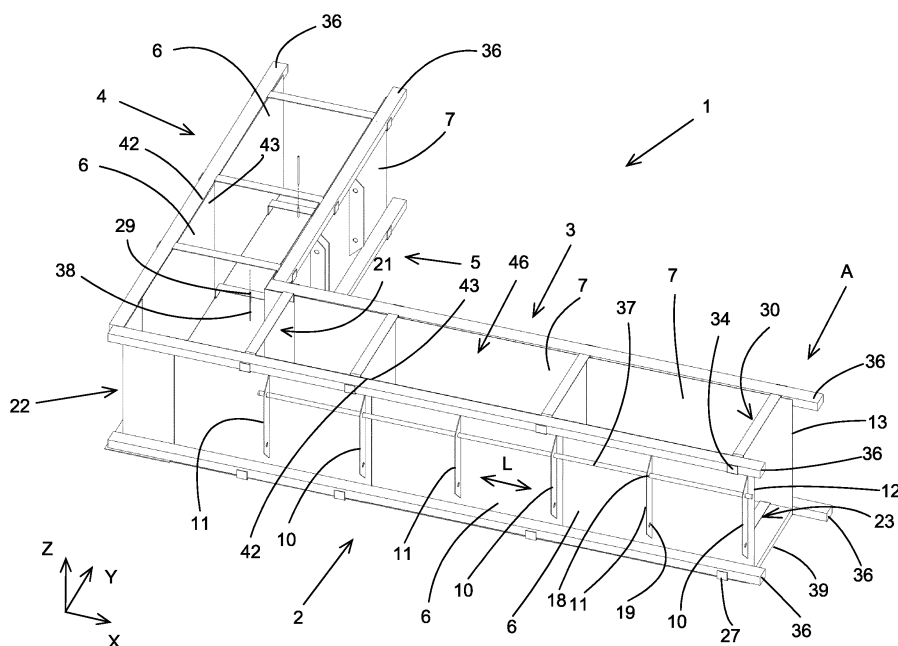


Fig. 1

Description

[0001] The invention relates to a formwork system suitable for pouring concrete, which formwork system comprises plate-shaped formwork elements to be positioned substantially transversely to a ground surface, wherein a first set of plate-shaped formwork elements is positioned opposite a second set of plate-shaped formwork elements, substantially parallel thereto and spaced a predetermined distance therefrom.

[0002] The invention further relates to a plate-shaped formwork element suitable for a formwork system as well as to a method for pouring concrete.

[0003] Such a formwork system, which is known from Dutch patent NL1022075C2, comprises a grid arrangement which is placed on a ground surface. The grid arrangement comprises a number of rods extending in longitudinal direction and in a direction transversely thereto. The known formwork further comprises plate-shaped formwork elements which, on a side facing the grid arrangement, are provided with recesses which can be positioned over the transversely extending rods.

[0004] The formwork elements are further oriented in vertical direction relative to the ground surface by means of pins. Opposing formwork elements are connected by means of clamps near the upper side.

[0005] Formwork systems are used, for example, for forming foundation beams on a ground surface prior to the construction of a building. Concrete mortar is poured into the space defined by the formwork elements for forming the foundation beams.

[0006] Since practically all buildings are different in size, practically all foundation beams differ in size as well, in particular as regards their length. A drawback of this known formwork system is the fact that the grid arrangement and the position of the pins determine the relative positions of formwork elements located adjacent to each other. If all formwork elements have the same length, it is difficult to realise a desired length of the formwork with the known formwork system. If the formwork elements differ from each other in length, a large number of different formwork elements are required to realise a desired length.

[0007] The pins are furthermore required for taking up the forces exerted in transverse direction on the formwork elements by the pouring of the concrete mortar. The placement and the removal of the pins is a relatively time-consuming job.

[0008] The object of the invention is to provide a formwork system whose dimensions are easily adjustable, in particular in longitudinal direction, whilst the forces exerted in transverse direction on the formwork elements by the pouring of the concrete mortar can be easily taken up.

[0009] This object is achieved with the formwork system according to the invention in that at least two plate-shaped formwork elements of at least the first set are each provided with stiffening ribs between a bottom side

of the plate-shaped formwork element, which is located near the ground surface, and an upper side of the plate-shaped formwork element, which extends parallel thereto, spaced therefrom by some distance, which stiffening ribs are located on a side of the plate-shaped formwork elements remote from the second set, wherein the two plate-shaped formwork elements, which practically abut against each other, are movable relative to each other in a longitudinal direction parallel to the ground surface.

[0010] The stiffening ribs, which are located between the bottom side and the upper side of the plate-shaped formwork element, prevent deformation of the plate-shaped formwork elements caused by forces exerted in transverse direction during the pouring of the concrete mortar in a simple manner. The stiffening ribs are located between the bottom side and the upper side of the plate-shaped formwork element, whilst it is possible to move two substantially abutting plate-shaped formwork elements in longitudinal direction relative to each other. A first formwork element abuts against an outer side of a second formwork element in that situation. The first formwork element can be moved in longitudinal direction relative to the second formwork element until the first formwork element abuts against the stiffening rib of the second formwork element with a transverse side thereof.

[0011] The first formwork element is preferably provided with a stiffening rib on a side remote from the second formwork element at the location where the first and second formwork elements overlap, which stiffening rib of the first formwork element also prevents deformation of the second formwork element, which abuts against an inner side of the first formwork element, during the pouring of the concrete mortar.

[0012] The formwork elements are preferably made of a metal, such as steel or aluminium, or a plastic material, such as a fibre-reinforced plastic, so that relatively thin formwork elements can be used, as a result of which the dimension of the foundation beam to be constructed will nevertheless be substantially constant in a direction transversely to the longitudinal direction in spite of the partial overlap of the formwork elements.

[0013] One embodiment of the formwork system according to the invention is characterised in that the stiffening ribs extend substantially transversely to the ground surface.

[0014] In this way the formwork element is properly stiffened, whilst in addition the first formwork element can be moved over a relatively large distance with respect to the second formwork elements before the first formwork element abuts against a stiffening rib of the second formwork element with a transverse side thereof.

[0015] Another embodiment of the formwork system according to the invention is characterised in that the plate-shaped formwork element comprises a first and a second transverse side extending transversely to the longitudinal direction, as well as at least two stiffening ribs, wherein a first of the two stiffening ribs is located near the first transverse side whilst a second of the two stiff-

ening ribs is located near the centre between the first and the second transverse side.

[0016] As a result, the first formwork element can be moved over substantially half the length of the second formwork element relative to the second formwork element, so that a relatively great variation in length of the formwork system can be realised with two formwork elements.

[0017] Another embodiment of the formwork system according to the invention is characterised in that the stiffening ribs of the formwork elements that are located adjacent to each other can be connected to each other.

[0018] Connecting the stiffening ribs of formwork elements located adjacent to each other makes it possible to move the connected formwork elements as a whole and subsequently use them again at another location. This has the advantage that the relative positions of the formwork elements are retained and need not be reset. This is important in particular when forming foundations of a number of identical houses, for example.

[0019] Another embodiment of the formwork system according to the invention is characterised in that the formwork system is provided with spacers to be positioned on a ground surface, which spacers each comprise at least two spaced-apart connecting elements, wherein the opposing formwork elements can be connected to the spaced connecting elements.

[0020] The spacers make it possible in a simple manner to set the spacing between opposing formwork elements in a direction transversely to the longitudinal direction.

[0021] Another embodiment of the formwork system according to the invention is characterised in that the plate-shaped formwork elements are detachably connected to the spacers.

[0022] When the concrete mortar is poured between the plate-shaped formwork elements, the spacers are covered by the concrete mortar. After the pouring of the concrete mortar, the plate-shaped formwork elements can be disconnected from the spacers to be reused for a formwork system to be installed elsewhere.

[0023] Another embodiment of the formwork system according to the invention is characterised in that the spacer is strip-shaped, wherein the connecting elements are U-shaped.

[0024] The plate-shaped formwork elements can be simply placed in the U-shaped connecting elements with a bottom side thereof. Preferably, two overlapping parts of the formwork elements fit in a U-shaped connecting element as well. Because of said U-shape, the formwork elements can be easily removed from the connecting elements.

[0025] Another embodiment of the formwork system according to the invention is characterised in that the plate-shaped formwork element is provided with a flange that extends in longitudinal direction, parallel to the ground surface, which flange can be positioned in the U-shaped connecting element of the spacer.

[0026] If it must be possible to remove the formwork element after the pouring of the concrete mortar, the flange will extend in a direction away from the space present between the formwork elements. The flange enables the - preferably relatively thin - formwork element to stand unsupported, so that no additional measures are needed for supporting the formwork element temporarily during the installation of the formwork system. The flange provides a stiffening of the formwork element at the bottom side thereof.

[0027] Another embodiment of the formwork system according to the invention is characterised in that formwork elements as well as at least one elongate slat can be detachably positioned in adjacent U-shaped connecting elements of the spacers, which elongate slat is located on the side of the formwork elements that is provided with the stiffening ribs.

[0028] The dimensions of the formwork element, the slat and the U-shaped connecting element are preferably such that after the formwork element and the slat have been placed into the U-shaped-connecting element, the slat will provide an adequate clamping of the formwork element in the U-shaped connecting element. The slat is made of wood, for example, and preferably extends over a number of formwork elements. Deformation of the formwork elements during the pouring of the concrete mortar is prevented in a simple manner also by the slat. If the formwork element is provided with a flange, the slat will preferably be positioned on the flange, so that an additional clamping of the formwork element in the U-shaped connecting element is obtained. After the slat has been removed, the formwork element can be easily removed from the U-shaped connecting element. If the flange has a width which is smaller than a spacing between legs of the U-shaped connecting element, the formwork element abutting against one leg can easily move in the direction of the other leg, so that the formwork element will come free from the poured concrete mortar.

[0029] Another embodiment of the formwork system according to the invention is characterised in that the formwork system comprises U-shaped brackets to be positioned over opposing formwork elements on a side remote from the ground surface, wherein each U-shaped bracket is provided with U-shaped holders, wherein at least one slat can be detachably positioned in adjacent U-shaped holders of the U-shaped brackets.

[0030] The slat is made of wood, for example, and preferably extends over a number of formwork elements. Deformation of the formwork elements during the pouring of the concrete mortar is prevented in a simple manner also by the slat that is positioned at the upper side of the formwork elements.

[0031] The invention also relates to a plate-shaped formwork element suitable for a formwork system as described above, which plate-shaped formwork element is provided with stiffening ribs which extend at least partially transversely to a longitudinal direction of the plate-shaped formwork element.

[0032] Deformation of the plate-shaped formwork element is prevented in a simple manner by the stiffening ribs, whilst a relatively thin plate-shaped formwork element, for example made of a metal or a plastic material, can be used, so that a substantially constant dimension in a direction transversely to the longitudinal direction of the foundation beam to be formed is nevertheless realised if plate-shaped formwork elements overlap over a desired distance.

[0033] The invention also relates to a method for pouring concrete, wherein a formwork system as described above is placed on a ground surface, plate-shaped formwork elements are moved relative to each other to a desired relative position, concrete mortar is poured into a space defined by formwork elements of the formwork system, after which the formwork system is at least partially removed.

[0034] Since the plate-shaped formwork elements can be moved relative to each other after placement thereof, any desired length of the formwork system can be realised in a simple manner without there being a need to produce the individual formwork elements to size.

[0035] The invention will now be explained in more detail with reference to the drawings, in which:

Figure 1 is a perspective view of a first embodiment of a formwork system according to the invention;

Figure 2 is a perspective view of a first embodiment of a plate-shaped formwork element according to the invention;

Figure 3 is a perspective view of a second embodiment of a plate-shaped formwork element according to the invention;

Figure 4 is a perspective view of a formwork element of the formwork system according to the invention that is shown in figure 1, which formwork element forms an inside corner;

Figure 5 is a perspective view of a formwork element of the formwork system according to the invention that is shown in figure 1, which formwork element forms an outside corner;

Figure 6 is a perspective view of a U-shaped connecting element of the formwork system according to the invention that is shown in figure 1;

Figure 7 is a perspective view of a U-shaped bracket of the formwork system according to the invention that is shown in figure 1;

Figure 8 is a perspective view of the first embodiment of a formwork system according to the invention shown in figure 1 during the assembly of the formwork system;

Figure 9 is a perspective view of the first embodiment of a formwork system according to the invention that is shown in figure 1 after the pouring of concrete mortar into the formwork system;

Figure 10 is a cross-sectional view of a second embodiment of a formwork system according to the invention after the pouring of concrete mortar into the

formwork system;

Figure 11 is a perspective view of a U-shaped connecting element of the formwork system according to the invention that is shown in figure 10;

Figure 12 is a perspective view of a third embodiment of a formwork system according to the invention; Figures 13A and 13B are perspective views of a second embodiment of a plate-shaped formwork element according to the invention;

Figure 14 is a perspective view of a further embodiment of a U-shaped connecting element;

Figures 15A and 15B are perspective views of a third embodiment of a plate-shaped formwork element according to the invention;

Figure 16 is a perspective view of another embodiment of a U-shaped connecting element.

[0036] Like parts are indicated by the same numerals in the figures.

[0037] Figures 1-9 show a first embodiment of a formwork system 1 according to the invention.

[0038] The formwork system 1 shown in figure 1 comprises four sets 2, 3, 4, 5 of plate-shaped formwork elements 6, 7. The first set 2 of plate-shaped formwork elements 6 extends parallel to the second set 3 of plate-shaped formwork elements 7. The third set 4 of plate-shaped formwork elements 6 extends parallel to the fourth set 5 of plate-shaped formwork elements 7.

[0039] As is clearly shown in figure 2, the formwork element 6 comprises a plate-shaped part 8 which is made of a metal or a plastic material. The plate-shaped part 8 has, for example, a length in x-direction of 0.75 - 1.5 m, preferably 1 m; a height in z-direction of 0.5 - 1 m, preferably 0.65 m, and a thickness in y-direction of 2 - 5 mm, preferably 3 mm.

[0040] Near the bottom side 15 the formwork element 6 is provided with a flange 9 which extends transversely to the plate-shaped part 8. The formwork element 6 is further provided with a first and a second stiffening rib 10, 11. The stiffening ribs 10, 11 extend transversely to the plate-shaped part 8 and in the z-direction. The first stiffening rib 10 is located near a first transverse side 12 of the plate-shaped part 8, whilst the second stiffening rib 11 is located near the centre between the first transverse side 12 and a second transverse side 13 of the plate-shaped part 8. The stiffening ribs 10, 11 extend in the z-direction between an upper side 14 and a bottom side 15 of the plate-shaped part 8, with bevelled ends 16, 17 located spaced from the upper side 14 and the bottom side 15, respectively.

[0041] The stiffening ribs 10, 11 are further provided with passages 18, 19.

[0042] As is clearly shown in figure 3, the formwork element 7 is largely similar to the formwork element 6. The difference between the formwork element and the formwork element 6 is that in the case of the formwork element 6 the first stiffening rib 20 is located near the second transverse side 13 rather than near the first trans-

verse side 12. In both formwork elements 6, 7 the second stiffening rib 11 is located near the centre, between the first transverse side 12 and a second transverse side 13 of the plate-shaped part 8.

[0043] The formwork system 1 shown in figure 1 further comprises angle-shaped formwork elements 21, 22 which, as is clearly shown in figures 4 and 5, are provided with plate-shaped parts 8 that extend transversely to each other. The formwork element 21, which forms an inside corner, is further provided with flanges 9 located in the inside corner of 90 degrees formed by the plate-shaped parts 8. The formwork element 22, which forms an outside corner, is further provided with flanges 9 located in the outside corner of 270 degrees formed by the plate-shaped parts 8.

[0044] The formwork system 1 shown in figure 1 further comprises a number of spacers 23 which, as is clearly shown in figure 6, are provided with a plate-shaped metal strip 24, with U-shaped connecting elements 25 provided at ends of the plate-shaped strip 24. Each connecting element 25 comprises a first leg portion 27, which extends downward, transversely to the plate-shaped strip 24, a second leg portion 27, which extends parallel to the first leg portion 26, and a bridge portion 28, which extends between the leg parts 26, 27, parallel to the plate-shaped strip 24. A passage 29 is provided near the centre of the plate-shaped strip 24.

[0045] The formwork system 1 shown in figure 1 further comprises a number of U-shaped brackets 30 which, as is clearly shown in figure 7, are provided with a plate-shaped metal strip 31, with U-shaped holders 32 provided at ends of the plate-shaped strip 31. Each U-shaped holder 32 comprises a first leg portion 33, which extends downward, transversely to the plate-shaped strip 31, a second leg portion 34, which extends parallel to the first leg portion 33, and a bridge portion 35, which extends between the leg parts 33, 34, parallel to the plate-shaped strip 31.

[0046] The formwork system 1 shown in figure 1 further comprises wooden slats 36, threaded metal rods 37, metal pins 38 and plastic foam plates 39.

[0047] The forming of concrete foundation beams, for example, using the formwork system 1 according to the invention, will now be discussed in more detail with reference to figures 1, 8, 9.

[0048] At the location where the foundation beams are to be formed, insulating plastic foam plates 39 are laid on a ground surface 41 comprising a stable portion 40. The plastic foam plates 39 have a width that equals the spacing between the first legs 26 of the spacers 23. Then a number of spacers are positioned in spaced relationship over the plastic foam plates 39. The spacers 23 are fixed in the ground 41, using metal pins 38. Subsequently, the plate-shaped formwork elements 6, 7 are placed in the U-shaped connecting elements 25, with the formwork elements 6 being positioned opposite to the formwork elements 7. The formwork elements 6 are positioned so that the part 42 provided with a stiffening rib 10 of a first

formwork element 6 abuts with a side remote from the flanged 9 against a part 43 of the second formwork element 6 that is located near the second transverse side 13. The parts 42, 43 of the formwork elements 6 overlap.

The adjoining formwork elements 6, the formwork element 22 adjacent thereto, which forms an outside corner, and the formwork elements 6 adjacent thereto are arranged in successive tile-like overlapping relationship.

[0049] Similarly, adjoining formwork elements 7, the formwork element 21 adjacent thereto, which forms an inside corner, and the formwork elements 7 adjacent thereto are arranged in successive overlapping tile-like relationship. The part 44 provided with a stiffening rib 10 of a first formwork element abuts with a side remote from the flanged 9 against a part 45 of a second formwork element 7 that is located near the first transverse side 12.

[0050] The flanges 8 of the formwork elements 6, 7 rest in the U-shaped connecting elements 25. Due to the provision of the flanges 8, the formwork elements 6, 7 can stand independently without any additional support. To realise the desired dimensions of the formwork system 1, the formwork elements 6 can be moved relative to each other in the longitudinal direction L parallel to the formwork elements 6, wherein the first formwork element 6 can be moved relative to the second formwork element 6 until the first transverse side 12 abuts against the central stiffening rib 11 of the second formwork element 6. The same goes for the formwork elements 7.

[0051] Once all the formwork elements 6, 7, 21, 22 have been placed, wooden slats 36 are placed into the U-shaped connecting elements 25, which slats will be supported on the flanges 9, pressing the plate-shaped parts 8 of the formwork elements 6, 7, 21, 22 against the first legs 26 of the U-shaped connecting elements 25.

[0052] Because the ends 16, 17 of the stiffening ribs 10, 11, 20 are spaced from the bottom side 15 and the upper side 14, the slats 36 can be provided over the entire length of the plate-shaped parts 8.

[0053] Subsequently, U-shaped brackets 30 are placed over the upper sides 14 of the formwork elements 6, 7, 21, 22, thereby bringing the plate-shaped parts 8 of the formwork elements 6, 7, 21, 22 into abutment with the facing sides of the first legs 33 of the U-shaped holders 32.

[0054] Wooden slats 36 are laid also in said U-shaped holders 32.

[0055] Following that, concrete mortar can be poured into the space 46 defined by the formwork elements 6, 7, 21, 22. Preferably, pouring is started on that side of the formwork system 1 where the part 43, 45 is directly pressed against the part 42, 44 upon pouring of the concrete mortar. In the formwork system 1 that is shown in figure 1, this is near position A wherein subsequently concrete mortar is poured into the space 46 over the entire length of the formwork system 1. Forces being exerted on the plate-shaped parts 8 by the concrete mortar will be effectively taken up by the stiffening ribs 10, 11 that extend transversely to the longitudinal direction L

and the wooden slats 36 and flanges 9 that extend in the longitudinal direction L, with substantially no deformations of the plate-shaped parts 8. As a result, the foundation beam 47 thus formed, as shown in figure 9, will have the desired shape. If the plate-shaped parts 8 were to deform, this would make it necessary to use additional concrete mortar so as to obtain the same desired height in z-direction. Moreover, deformed plate-shaped parts 8 can no longer be reused.

[0056] In the formwork system 1, first the slats 36, then the brackets 30 and subsequently the plate-shaped formwork elements 6, 7, 21, 22 are removed after curing of the poured concrete mortar. If desired, the formwork elements 6, 7, 21, 22 can be connected together by means of threaded rods 37 extending through the passages 18, 19, which are connected to the stiffening ribs 10, 11, 20, as a result of which a number of interconnected formwork elements 6, 22; 7, 21 can be jointly moved to another position for forming an identical foundation beam 47.

[0057] Figure 10 shows a second embodiment of a formwork system 51 according to the invention. The formwork system 51 is different from the formwork 1 in that it is provided with spacers 52 which, as is clearly shown in figure 11, are provided with a plate-shaped metal strip 53, with U-shaped connecting elements 54 provided at ends of the plate-shaped strip 53. Each connecting element 54 comprises a first leg portion 55, which extends transversely to the plate-shaped strip 53, and a second leg portion 56, which extends parallel to the first leg portion 53. A passage 57 is provided near the centre of the plate-shaped strip 53.

[0058] The formwork system 51 is suitable for use on a ground surface 41 where no plastic foam plates 39 are used and the foundation beam 47 lies directly on the ground surface 41.

[0059] It is also possible that the stiffening ribs include an angle of, for example, 45 degrees with the longitudinal direction.

[0060] Figures 12-14 show a third embodiment of a formwork system 61 according to the invention.

[0061] The formwork system 61 is different from the formwork system 1 as regards the configuration of the plate-shaped formwork elements 62 and the U-shaped connecting elements 63. The formwork system 61 further functions similarly to the formwork system 1.

[0062] As is clearly shown in figures 13A and 13B, the plate-shaped formwork element 62 is provided with two tubular stiffening ribs 64, which are evenly spaced from the nearby transverse side 65.

[0063] As is clearly shown in figure 14, the U-shaped connecting element 63 is made of a wire-shaped material, such as steel wire, for example. The U-shaped connecting element 63 is otherwise similar to the U-shaped connecting element 23.

[0064] Figures 15A and 15B show another embodiment of a plate-shaped formwork element 66 which is provided with three tubular stiffening ribs 67, with the middle stiffening rib 67 being located near the centre of

the plate-shaped part 8 and the stiffening ribs 67 being present on either side thereof, evenly spaced from the nearby transverse side 68.

[0065] The plate 8 is connected to a side 69 of an angle section 70 at the bottom side, whilst a second side of the angle section 70 forms the flange 9. The angle section 70 and the plate 8 may be welded, bolted or glued together or be joined together by other means.

[0066] In this way a flat plate 8 can be used, after which the plate 8 is provided with the flange 9 by connecting the angle section 70 and the plate 8 together.

[0067] Such an embodiment is for example suitable for use if the plate 8 is made of plastic material, such as plastic-reinforced glass fibre. Also the angle section 70 and the tubular stiffening ribs 67 may be made of plastic material in that case.

[0068] Figure 16 shows another embodiment of a U-shaped connecting element 71 which is made of a wire-shaped material, such as steel wire, for example. The U-shaped connecting element 71 is otherwise similar to the U-shaped connecting element 11.

List of reference numerals

[0069]

- | | |
|----|------------------|
| 1 | formwork system |
| 2 | set |
| 3 | set |
| 4 | set |
| 5 | set |
| 6 | formwork element |
| 7 | formwork element |
| 8 | part |
| 9 | flange |
| 10 | stiffening rib |
| 11 | stiffening rib |
| 12 | transverse side |
| 13 | transverse side |
| 14 | upper side |
| 15 | bottom side |
| 16 | end |

17 end
 18 passage
 19 passage
 20 stiffening rib
 21 formwork element
 22 formwork element
 23 spacer
 24 strip
 25 connecting element
 26 first leg portion
 27 second leg portion
 28 bridge portion
 29 passage
 30 bracket
 31 strip
 32 holder
 33 first leg portion
 34 second leg portion
 35 bridge portion
 36 slat
 37 threaded rod
 38 pin
 39 plate
 40 part
 41 ground surface
 42 part
 43 part
 44 part
 45 part

46 space
 47 foundation beam
 5 51 formwork system
 52 spacer
 53 strip
 10 54 connecting element
 55 first leg portion
 15 56 second leg portion
 57 passage
 61 formwork system
 20 62 formwork element
 63 connecting element
 25 64 stiffening rib
 65 transverse side
 66 formwork element
 30 67 stiffening rib
 68 transverse side
 35 69 side
 70 angle section
 71 connecting element
 40 L longitudinal direction
 A position

45

Claims

1. A formwork system (1, 51, 61) suitable for pouring concrete, which formwork system (1, 51, 61) comprises plate-shaped formwork elements (6, 7, 62, 66) to be positioned substantially transversely to a ground surface, wherein a first set (2, 3, 4, 5) of plate-shaped formwork elements is positioned opposite a second set (2, 3, 4, 5) of plate-shaped formwork elements (6, 7, 62, 66), substantially parallel thereto and spaced a predetermined distance therefrom, **characterised in that** at least two plate-shaped formwork elements (6, 7, 62, 66) of at least the first

- set (2, 3, 4, 5) are each provided with stiffening ribs (10, 11, 20, 64, 67) between a bottom side (15) of the plate-shaped formwork element, which is located near the ground surface, and an upper side (14) of the plate-shaped formwork element, which extends parallel thereto, spaced therefrom by some distance, which stiffening ribs (10, 11, 20, 64, 67) are located on a side of the plate-shaped formwork elements (6, 7, 62, 66) remote from the second set (2, 3, 4, 5), wherein the two plate-shaped formwork elements (6, 7, 62, 66), which practically abut against each other, are movable relative to each other in a longitudinal direction (L) parallel to the ground surface.
2. A formwork system (1, 51, 61) according to claim 1, **characterised in that** the stiffening ribs (10, 11, 20, 64, 67) extend substantially transversely to the ground surface.
 3. A formwork system (1, 51, 61) according to claim 2, **characterised in that** the plate-shaped formwork element comprises a first and a second transverse side (12, 13, 65, 68) extending transversely to the longitudinal direction, as well as at least two stiffening ribs (10, 11, 20, 64, 67), wherein a first of the two stiffening ribs (10, 20, 67) is located near the first transverse side whilst a second of the two stiffening ribs (11, 67) is located near the centre between the first and the second transverse side (12, 13, 68).
 4. A formwork system (1, 51, 61) according to any one of the preceding claims, **characterised in that** the stiffening ribs (10, 11, 20, 64, 67) of the formwork elements (6, 7, 62, 66) that are located adjacent to each other can be connected to each other.
 5. A formwork system (1, 51, 61) according to any one of the preceding claims, **characterised in that** the formwork system (1) is provided with spacers (23, 52) to be positioned on a ground surface, which spacers each comprise at least two spaced-apart connecting elements (25, 54, 63, 71), wherein the opposing formwork elements (6, 7, 62, 66) positioned can be connected to the spaced connecting elements (25, 54, 63, 71).
 6. A formwork system (1, 51, 61) according to claim 5, **characterised in that** the plate-shaped formwork elements (6, 7, 62, 66) are detachably connected to the spacers (23, 52).
 7. A formwork system (1, 51, 61) according to claim 5 or 6, **characterised in that** the spacer (23, 52) is strip-shaped, wherein the connecting elements (25, 54, 63, 71) are U-shaped.
 8. A formwork system (1, 51, 61) according to claim 7, **characterised in that** the plate-shaped formwork element (6, 7, 62, 66) is provided with a flange (9) that extends in longitudinal direction (L), parallel to the ground surface, which flange (9) can be positioned in the U-shaped connecting element (25, 54, 63, 71) of the spacer (23, 52).
 9. A formwork system (1, 51, 61) according to claim or 8, **characterised in that** formwork elements (6, 7, 62, 66) as well as at least one elongate slat (36) can be detachably positioned in adjacent U-shaped connecting elements (25, 54, 63, 71) of the spacers (23, 52), which elongate slat (36) is located on the side of the formwork elements (6, 7) that is provided with the stiffening ribs (10, 11, 20, 64, 67).
 10. A formwork system (1, 51, 61) according to any one of the preceding claims, **characterised in that** the formwork system (1) comprises U-shaped brackets (30) to be positioned over opposing formwork elements (6, 7, 62, 66) on a side remote from the ground surface, wherein each U-shaped bracket (30) is provided with U-shaped holders (32), wherein at least one slat (36) can be detachably positioned in adjacent U-shaped holders (32) of the U-shaped brackets.
 11. A plate-shaped formwork element (6, 7, 62, 66) suitable for a formwork system (1, 51, 61) according to any one of the preceding claims, which plate-shaped formwork element (6, 7, 62, 66) is provided with stiffening ribs (10, 11, 20, 64, 67) which extend at least partially transversely to a longitudinal direction (L) of the plate-shaped formwork element (6, 7, 62, 66).
 12. A plate-shaped formwork element (6, 7, 62, 66) according to claim 11, **characterised in that** the plate-shaped formwork element (6, 7, 62, 66) is provided with a flange (9) that extends parallel to the longitudinal direction (L), transversely to a plate-shaped part (8) of the formwork element.
 13. A method for pouring concrete, wherein a formwork system (1, 51, 61) according to any one of the preceding claims is placed on a ground surface, plate-shaped formwork elements (6, 7, 62, 66) are moved relative to each other to a desired relative position, concrete mortar is poured into a space (46) defined by formwork elements (6, 7, 62, 66) of the formwork system (1, 51, 61), after which the formwork system (1, 51, 61) is at least partially removed.
 14. A method according to claim 13, **characterised in that** after the connected-together formwork elements (6, 7, 62, 66) have been used on the ground surface, said connected-together formwork elements (6, 7, 62, 66) can be positioned elsewhere on the ground surface.

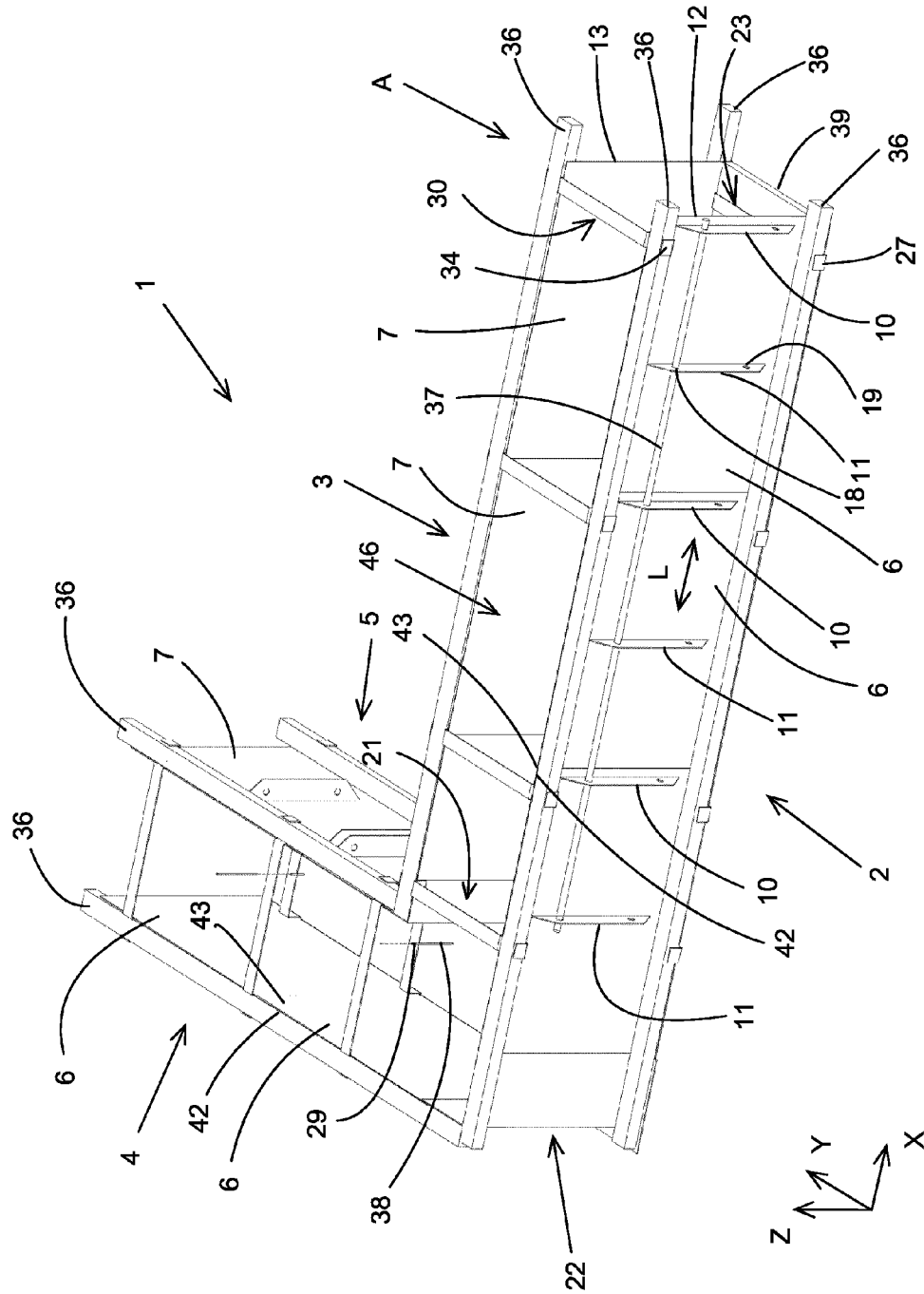


Fig. 1

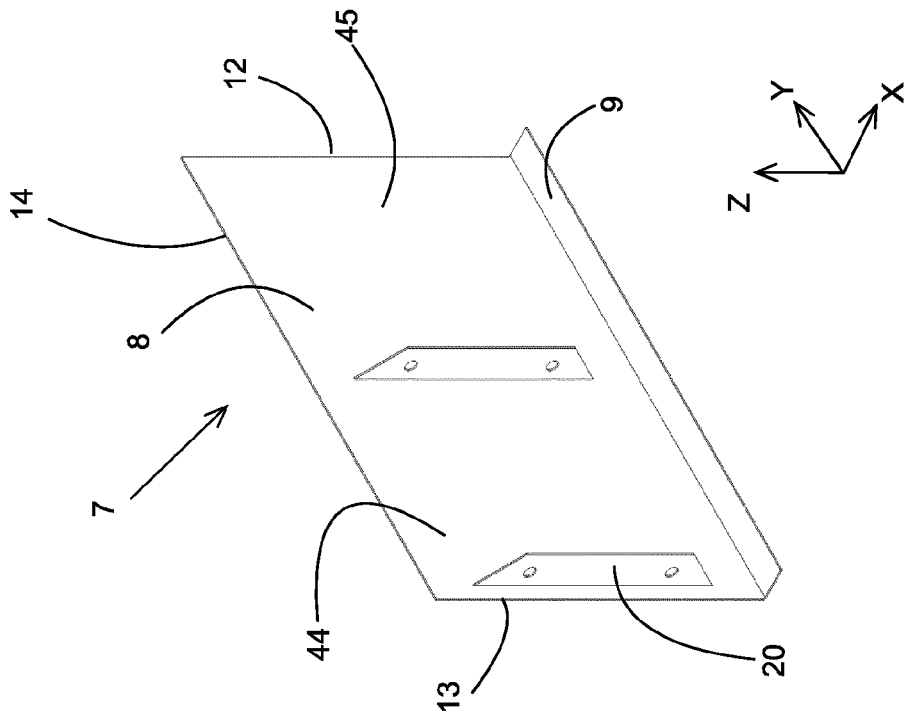


Fig. 2

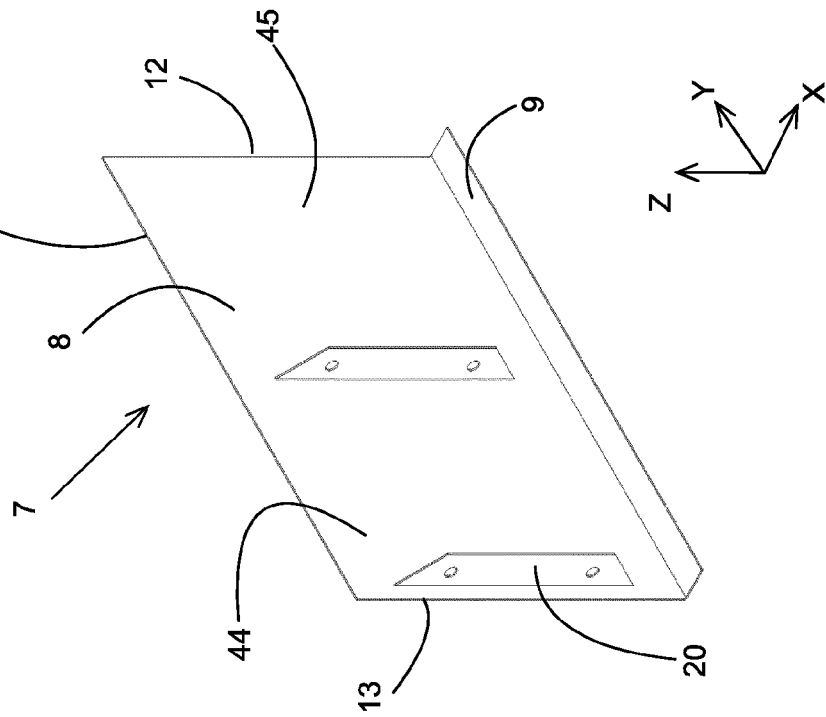


Fig. 3

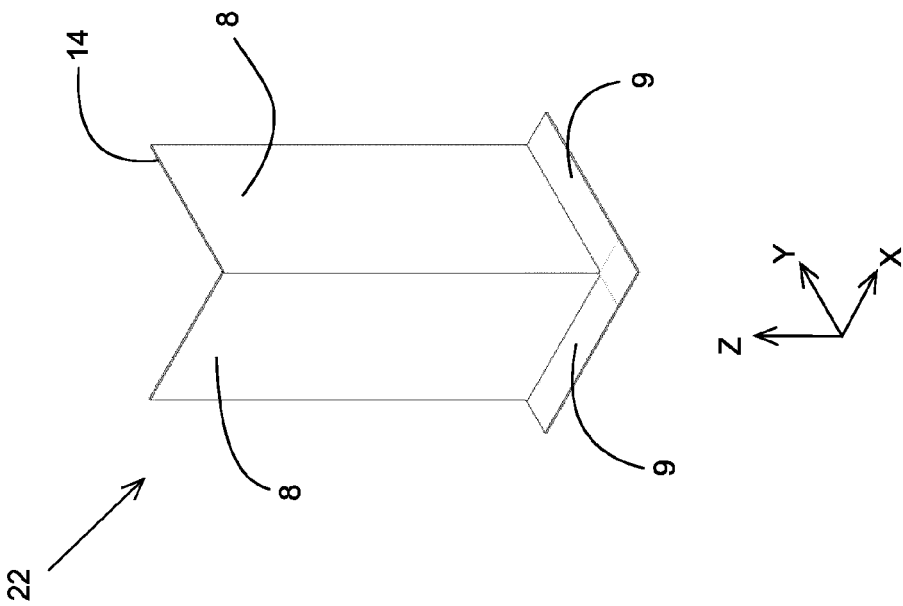


Fig. 5

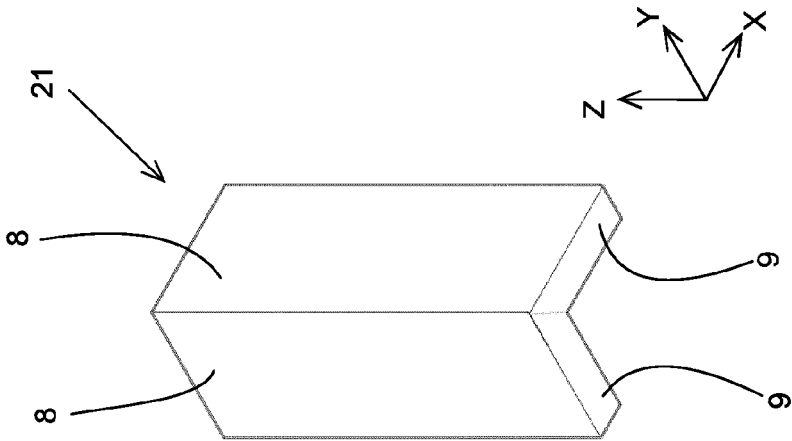


Fig. 4

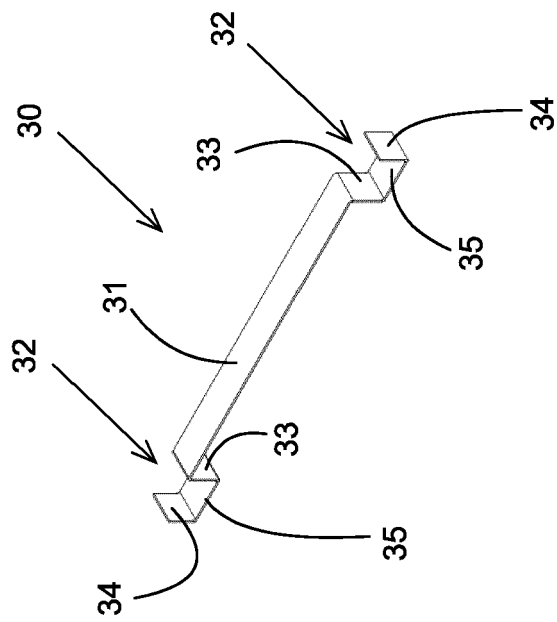


Fig. 7

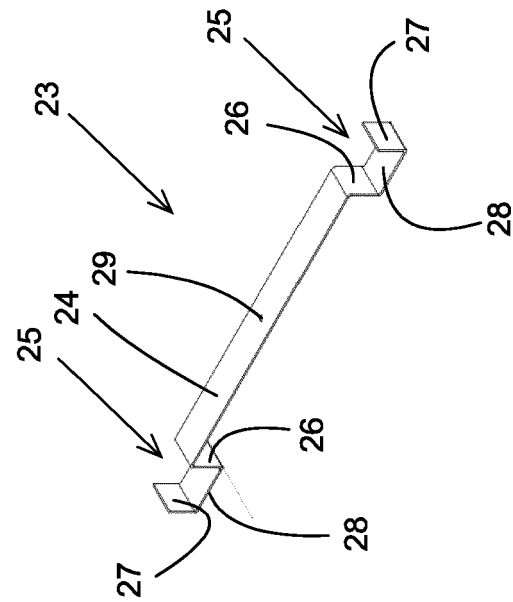
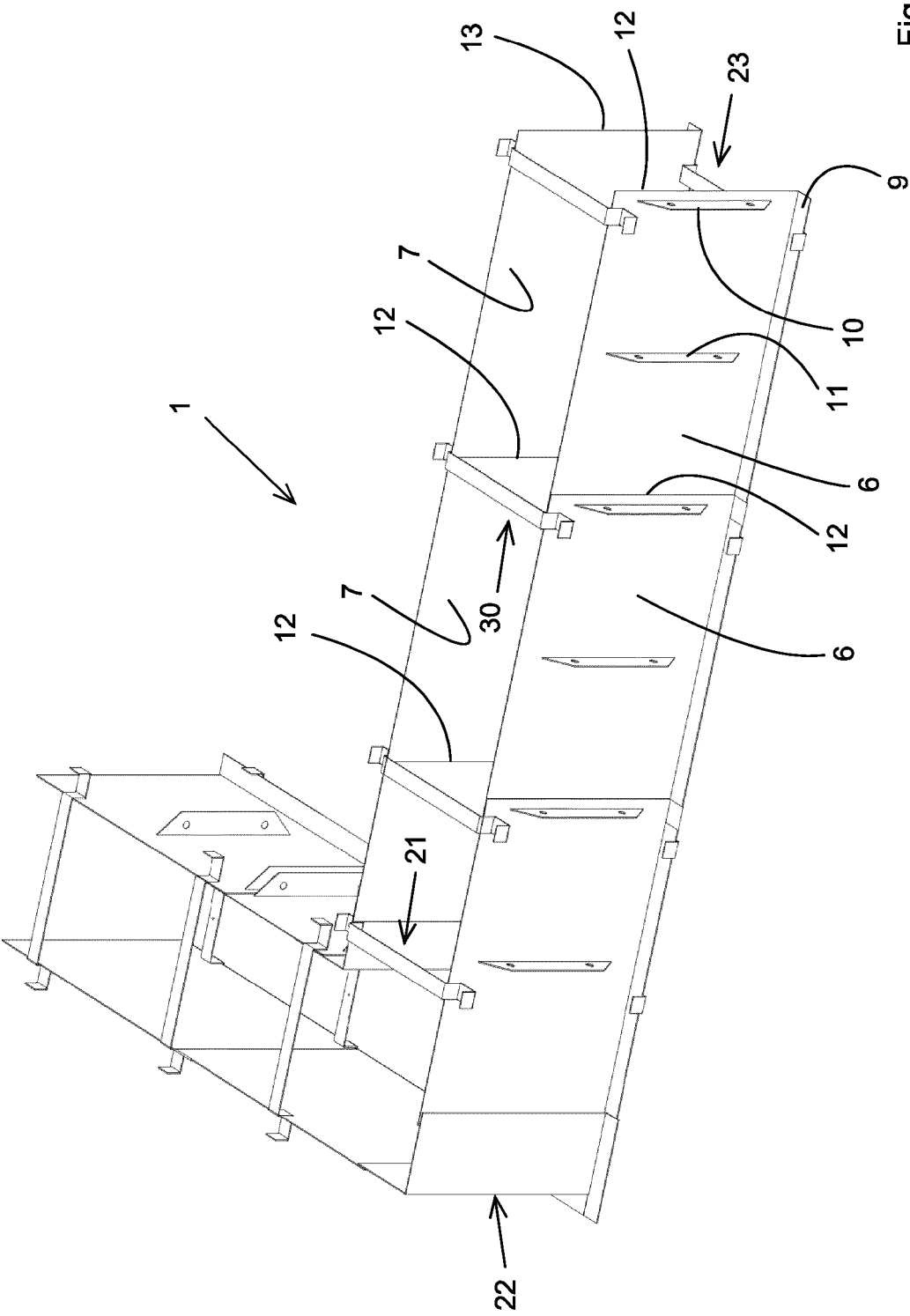


Fig. 6



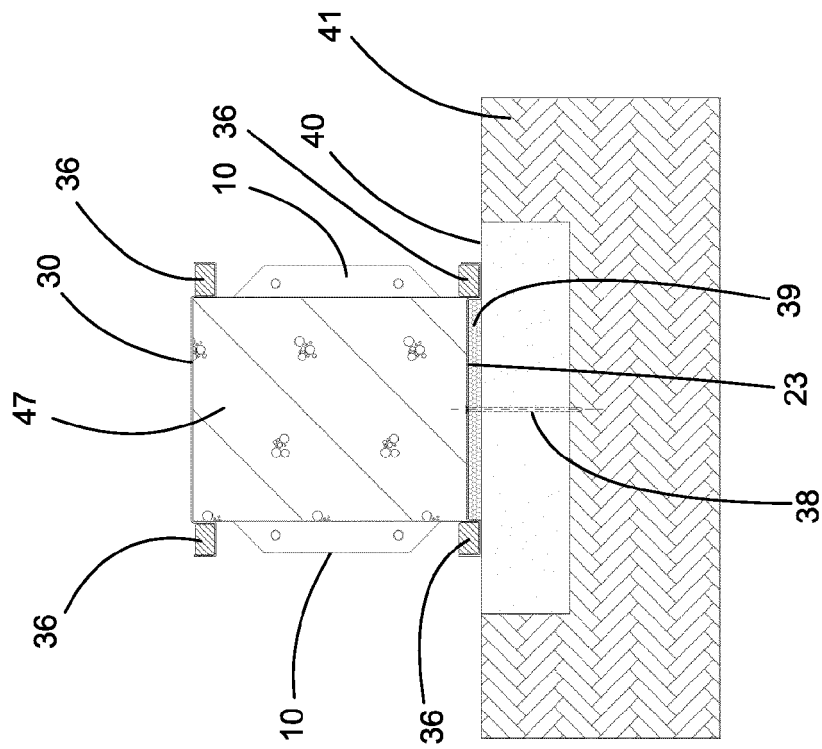


Fig. 9

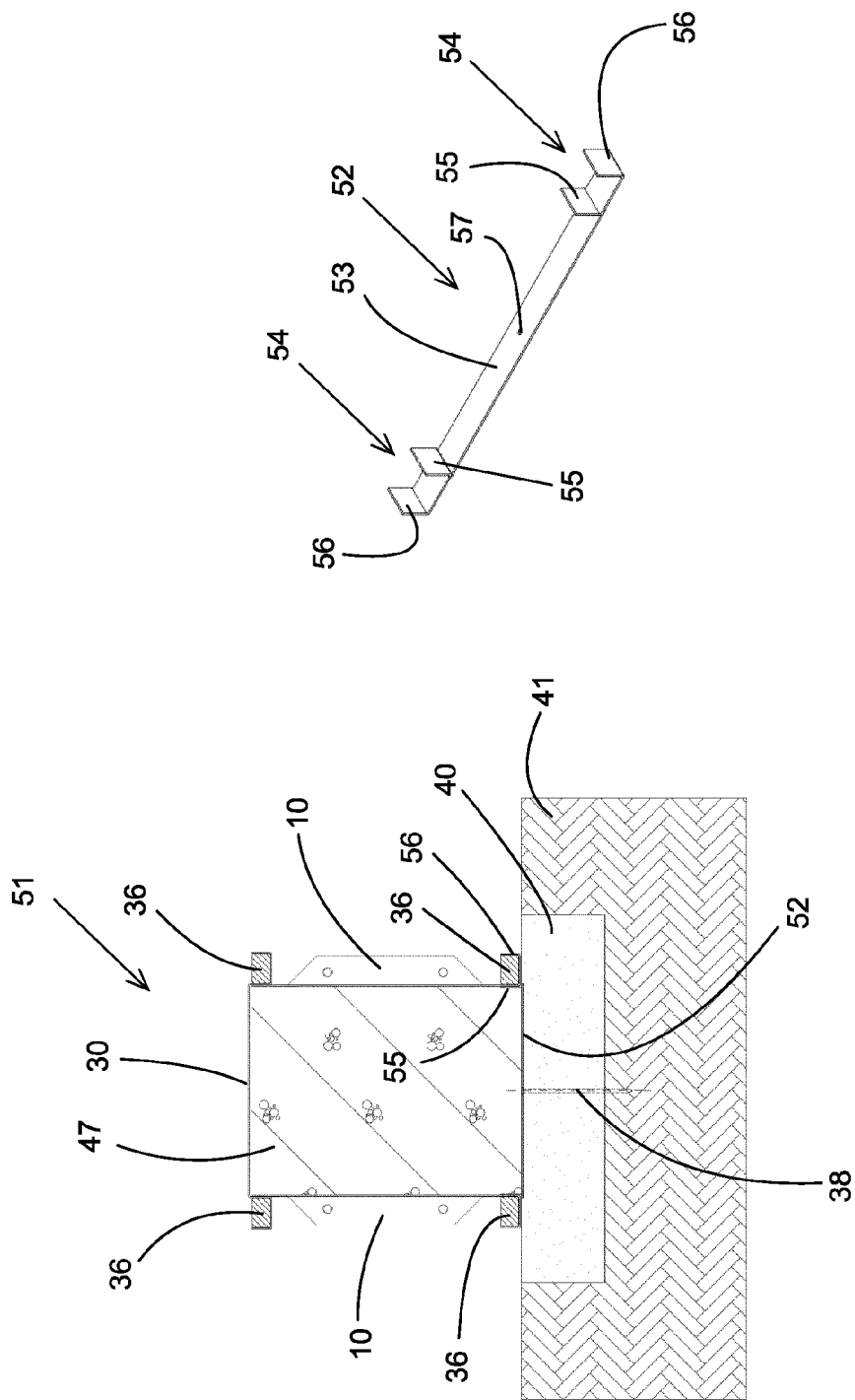


Fig. 10

Fig. 11

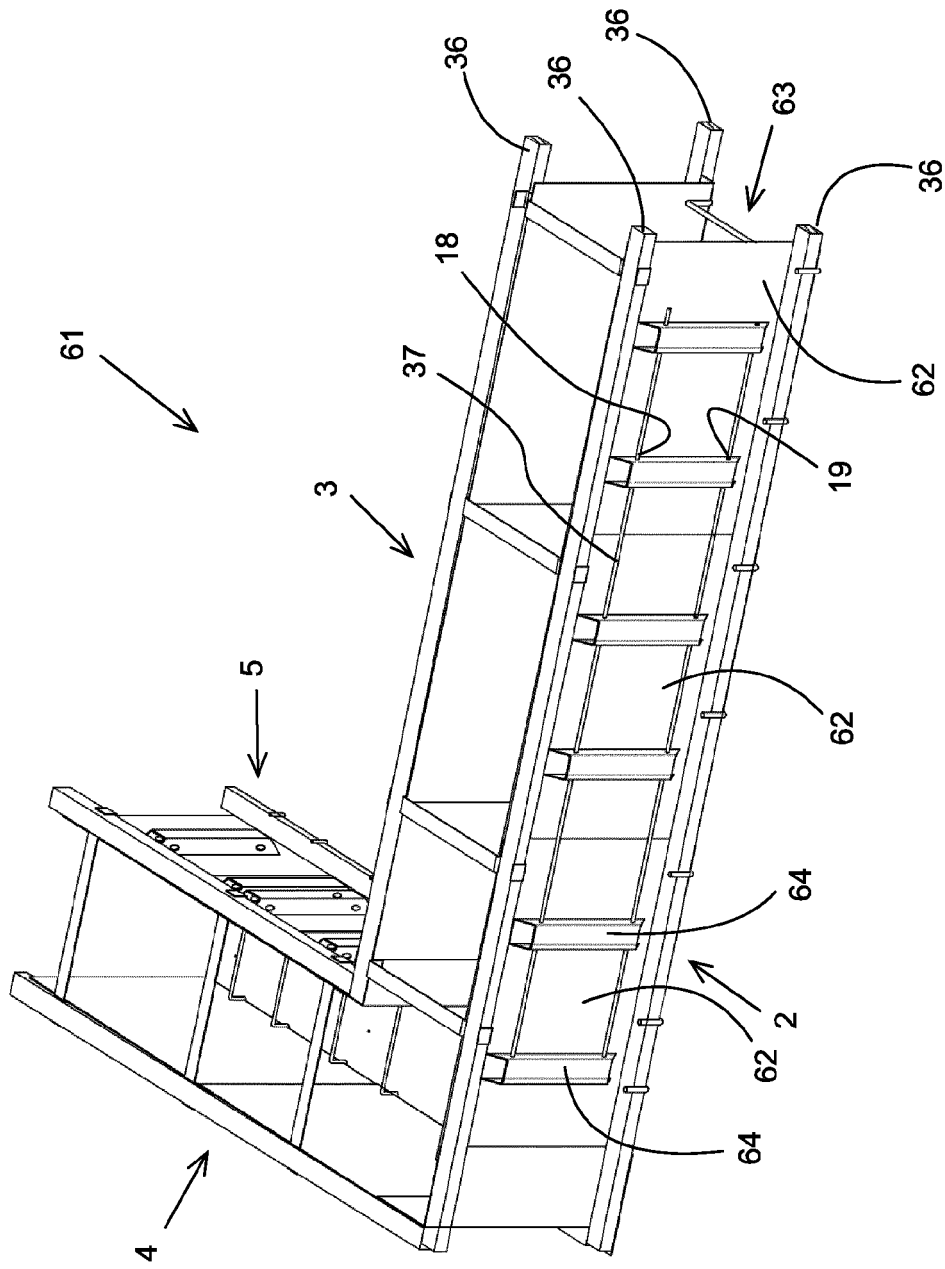


Fig. 12

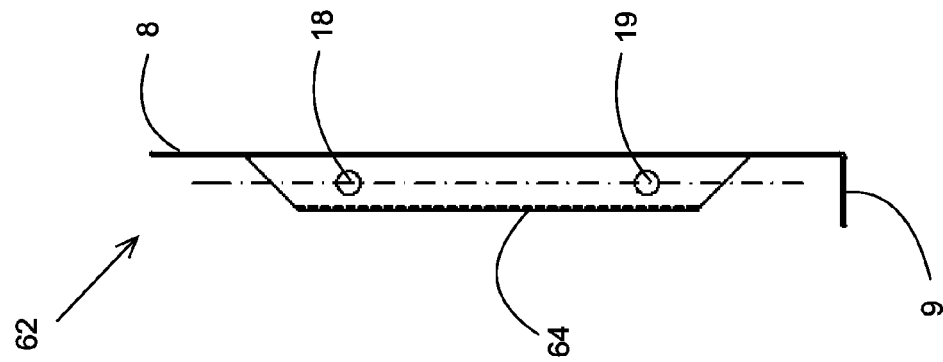


Fig. 13B

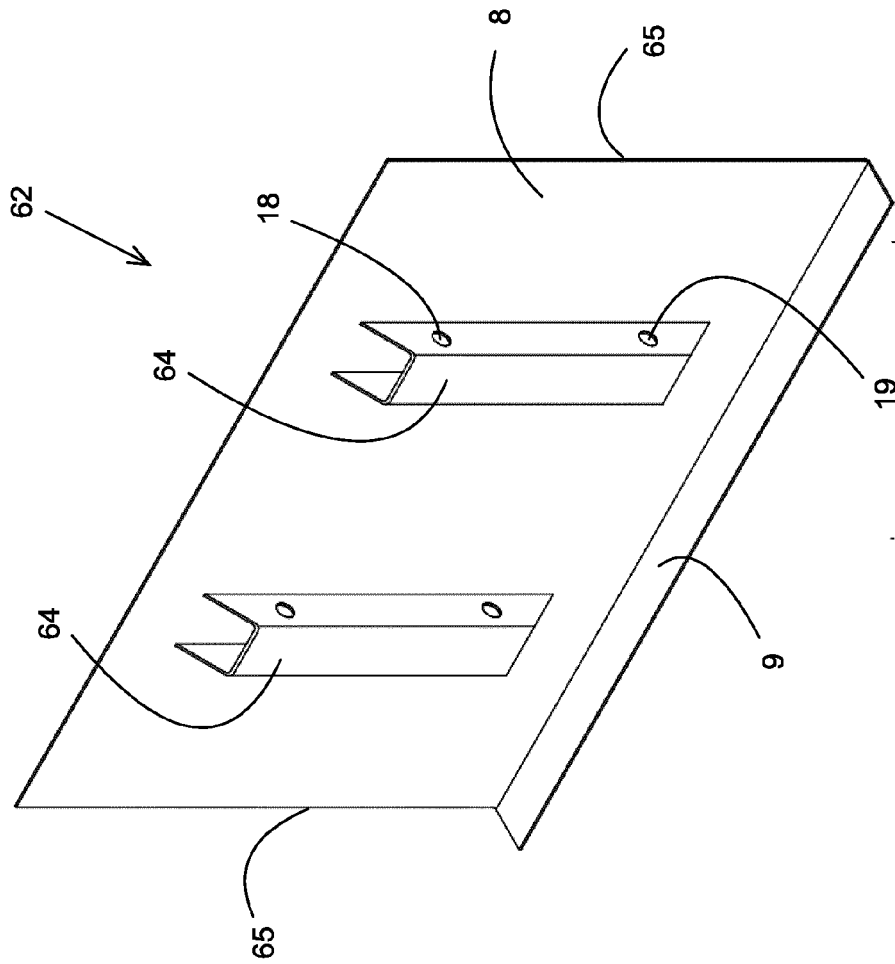


Fig. 13A

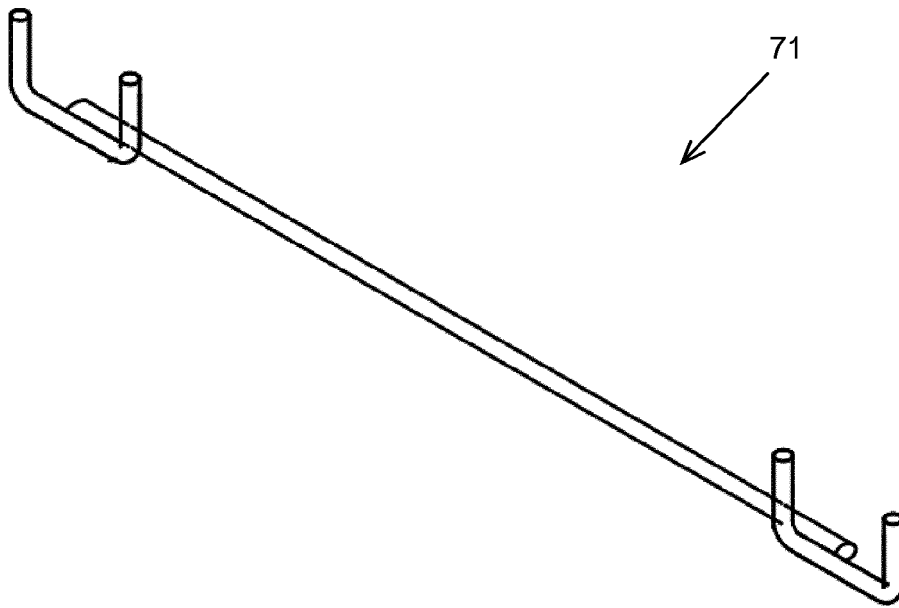


Fig. 14

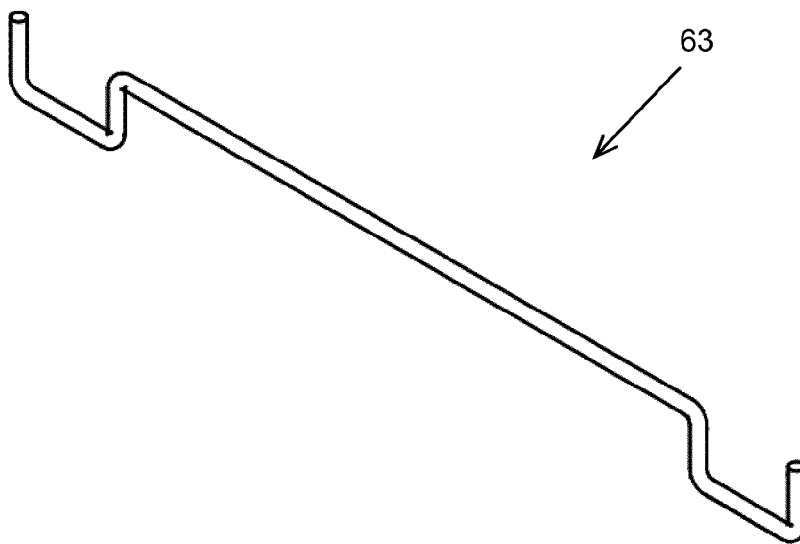
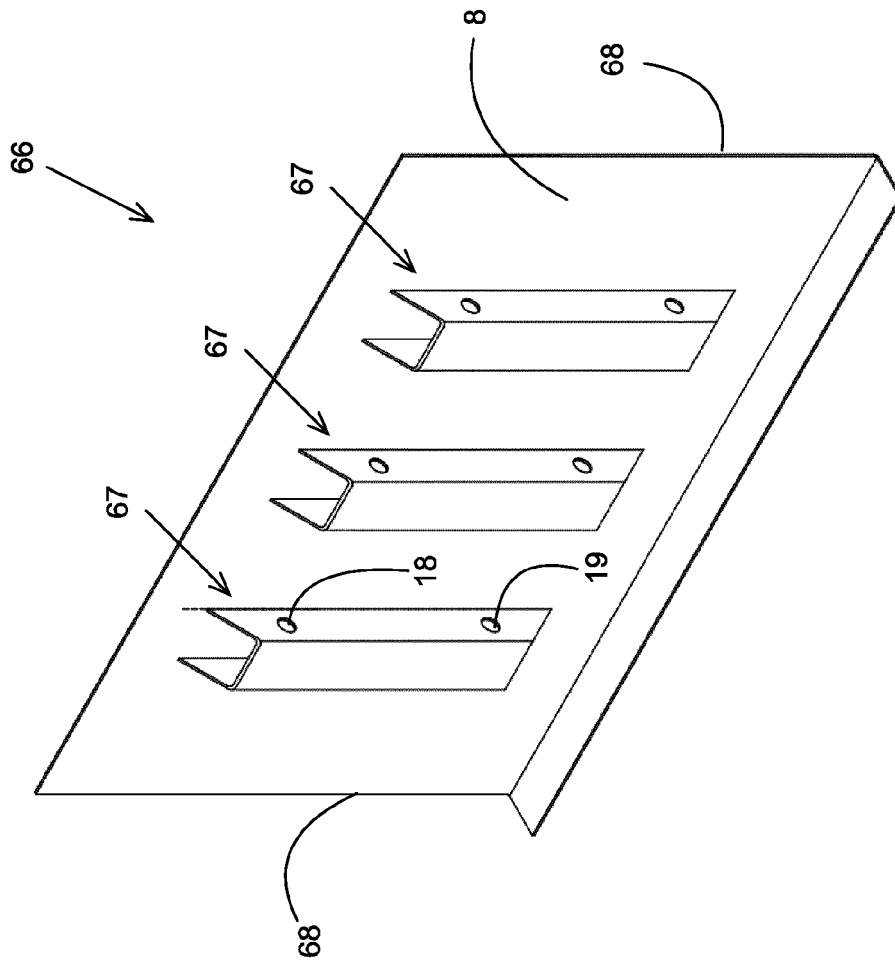
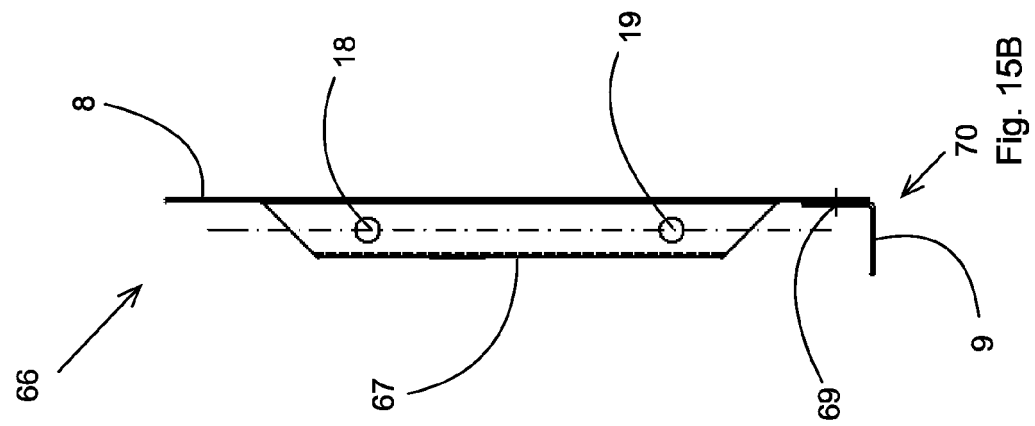


Fig. 16





EUROPEAN SEARCH REPORT

Application Number
EP 14 16 9411

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	NL 1 022 075 C2 (BOUWBEDRIJF VAN DER HEIJDEN B [NL]) 7 June 2004 (2004-06-07) * the whole document * -----	1-14	INV. E02D27/01
			TECHNICAL FIELDS SEARCHED (IPC)
			E02D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 20 October 2014	Examiner Geiger, Harald
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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ON EUROPEAN PATENT APPLICATION NO.**

EP 14 16 9411

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20-10-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
NL 1022075	C2	07-06-2004	NONE

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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