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(71) Applicant: **ULMA C y E, S. COOP.**
20560 Oñati (Guipuzcoa) (ES)

(72) Inventors:
• **COLINO VEGA, Manuel**
01015 VITORIA - GASTEIZ (ES)

• **IBABE GALDOS, Jon Ander**
20560 Oñati (ES)

(74) Representative: **Igartua, Ismael**
Galbaian S. Coop.
Garaia Parke Teknologikoa
Goiru Kalea 1
20500 Arrasate-Mondragón (ES)

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(54) **FORMWORK ASSEMBLY FOR A VERTICAL FORMWORK**

(57) Formwork assembly for a vertical formwork comprising a formwork panel (2), and at least one support (1) coupled to said formwork panel (2) and configured for holding an anchoring assembly formed by a tie (3) and an anchor (4) fixed to said tie (3) on a rear side of the formwork panel (2) when said anchoring assembly is not securing the vertical formwork. The support (1) can be arranged in a suspension position (B) and in a retracted position, and comprises a first part configured for being coupled to at least one opening (5) of the formwork panel (2) which is kept housed in the opening (5) in both positions and a second part (1b) comprising a housing configured for holding the anchoring assembly suspended on the rear side of the formwork panel (2) which in the suspension position (B) protrudes and in the retracted position does not protrude from the formwork panel (2).

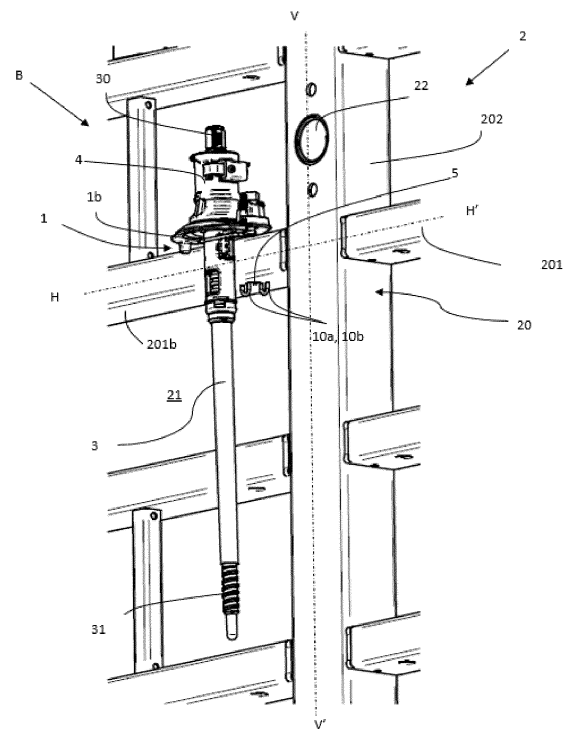


FIG. 2

Description

TECHNICAL FIELD

[0001] The present invention relates to formwork assemblies for vertical formworks, vertical formworks incorporating said formwork assembly, and methods for disassembling said vertical formworks.

PRIOR ART

[0002] Vertical formworks are known to be used for making vertical structures, such as walls for example. A vertical formwork comprises two formwork panels which, when concrete is to be poured, are arranged facing and fixed to one another by means of at least one tie rod, the tie rod being fixed to the formwork panels by means of an anchor fixed to the respective formwork panel.

[0003] When the vertical formwork is arranged in the concrete pouring position, the formwork panels thereof are arranged facing one another, such that concrete can be poured in an intermediate space between the formwork panels, whereas the tie rod fixed to both anchors secures the formwork panels in said position. Once the poured concrete has hardened, an anchoring assembly formed by the tie rod and the anchor fixed to said tie rod can be removed for the next assembling of the vertical formwork.

[0004] Vertical formworks in which one of the formwork panels has coupled thereto at least one support for holding the anchoring assembly on a rear side of the formwork panel when the tie rod is not securing the vertical formwork and methods for disassembling vertical formworks incorporating said formwork assembly are known.

[0005] US2015167330A1 describes a formwork assembly for a vertical formwork and a method for disassembling the vertical formwork incorporating said formwork assembly. The formwork assembly comprises a formwork panel, and a support coupled to said formwork panel and configured for holding an anchoring assembly formed by a tie rod, and an anchor fixed to said tie rod on a rear side of the formwork panel when said anchoring assembly is not securing the vertical formwork. A first part of the support is configured for being coupled to two holes of the formwork panel and a second part of the support comprises a housing configured for holding the anchoring assembly suspended on the rear side of the formwork panel, the support being able to be arranged in a suspension position in which the first part is housed in the holes of the formwork panel whereas the housing of the second part of the support protrudes from the formwork panel such that it allows the tie rod of the anchoring assembly to be introduced to suspend said anchoring assembly. The method for disassembling the vertical formwork incorporating said formwork assembly comprises a first removal step for removing the anchoring assembly when said anchoring assembly is not securing the vertical formwork, and a suspension step in which

said anchoring assembly is arranged suspended on the rear side of the formwork panel.

DISCLOSURE OF THE INVENTION

[0006] The object of the invention is to provide a formwork assembly for a vertical formwork, a vertical formwork comprising said formwork assembly, and a method for disassembling said vertical formwork, as defined in the claims.

[0007] A first aspect of the invention relates to a formwork assembly for a vertical formwork. The formwork assembly comprises a formwork panel, and at least one support coupled to said formwork panel and configured for holding an anchoring assembly formed by a tie rod, and an anchor fixed to said tie rod on a rear side of the formwork panel when said anchoring assembly is not securing the vertical formwork. A first part of the support is configured for being coupled to at least one hole of the formwork panel and a second part of the support comprises a housing configured for holding the anchoring assembly suspended on the rear side of the formwork panel, the support being able to be arranged in a suspension position in which the first part is housed in the hole of the formwork panel whereas the housing of the second part of the support protrudes from the formwork panel such that it allows the tie rod of the anchoring assembly to be introduced to enable suspending said anchoring assembly.

[0008] The support of the formwork assembly is configured for also being arranged in a retracted position in which the first part of the support is kept housed in the hole of the formwork panel and the second part of the support does not protrude from the formwork panel.

[0009] The support arranged in the suspension position allows the anchoring assembly to be suspended on the rear side of the formwork panel so as to have the anchoring assembly handy or so as to transfer the formwork panel together with the anchoring assembly, whereas the support arranged in the retracted position allows the support not to be an impediment in the formwork assembly or in the vertical formwork.

[0010] For example, with the support arranged in the suspension position the operator need not leave his or her position in order to leave the anchoring assembly after the removal thereof, or to pick up the anchoring assembly to secure the formwork panel during the next step of assembling same, which advantageously reduces the time required for assembling the vertical formwork. In the meantime, for example, it allows for good stacking of the formwork assemblies with the support arranged in the retracted position.

[0011] Furthermore, the fact that the first part of the support is kept housed in the hole of the formwork panel both in the suspension position and in the retracted position allows the formwork panel to be handled together with the support as if they were a single part, prevents the loss of the support, and prevents the assembly op-

erator from having to couple the support on the rear side of the formwork panel every time he or she wants to suspend the assembly during construction, which advantageously even further reduces the time required for assembling the vertical formwork.

[0012] Furthermore, a single hole arranged on the rear side of the formwork panel can be used for coupling the support to said formwork panel.

[0013] A second aspect of the invention relates to a vertical formwork comprising a formwork assembly such as the one defined above.

[0014] A third aspect of the invention relates to a method for disassembling a vertical formwork comprising a formwork assembly such as the one defined above.

[0015] These and other advantages and features of the invention will become apparent in view of the figures and of the detailed description of the invention.

DESCRIPTION OF THE DRAWINGS

[0016]

Figure 1 shows a perspective view of a preferred embodiment of the vertical formwork according to the invention.

Figure 2 shows a view of the formwork assembly of the vertical formwork of Figure 1, where the support is in the suspension position and the anchoring assembly is suspended from the support.

Figure 3 shows a view of the formwork assembly of the vertical formwork of Figure 1, where the support is in the retracted position and the anchoring assembly is securing the vertical formwork.

Figure 4 shows a view of the formwork assembly of the vertical formwork of Figure 1, where the support is in the suspension position and the anchoring assembly is securing the vertical formwork.

Figure 5 shows a perspective view of the support of the formwork assembly of Figure 1.

Figure 6 shows a front view of the support of the formwork assembly of Figure 1.

Figure 7 shows a plan view of the support of the formwork assembly of Figure 1.

DETAILED DISCLOSURE OF THE INVENTION

[0017] Figures 1 to 4 show a preferred embodiment of the vertical formwork 100 of the invention.

[0018] The vertical formwork 100 comprises a formwork assembly comprising a formwork panel 2, and at least one support 1 coupled to said formwork panel 2. The vertical formwork 100 also comprises a second form-

work panel 7 configured for being arranged facing the formwork panel 2 of the formwork assembly. Furthermore, the vertical formwork 100 comprises an anchoring assembly formed by a tie rod 3 and an anchor 4 fixed to the tie rod 3, and a second anchor (not shown in the figures). In the concrete pouring position, the anchor 4 is configured for being fixed to the formwork panel 2 of the formwork assembly and the second anchor is configured for being fixed to the second formwork panel 7. The support 1 of the formwork assembly is configured for holding the anchoring assembly formed by the tie rod 3 and the anchor 4 fixed to said tie rod 3 on a rear side of the formwork panel 2 when said anchoring assembly is not securing the vertical formwork 100. The vertical formwork 100 preferably comprises a plurality of anchoring assemblies for fixing the formwork panels 2 and 7 to one another.

[0019] In the context of the invention, the face suitable for being arranged in contact with the concrete will be identified as inner side of the formwork panel 2, and the face opposite to the inner side will be identified as rear side of the formwork panel 2.

[0020] The vertical formwork 100 of the preferred embodiment shown in Figure 1 is a vertical formwork configured for being adjusted from one face, i.e., both the fixing and the removal of the tie rod is performed from the rear side of the formwork panel 2 of the vertical formwork 100 without requiring an operator to be located on the rear side of the second formwork panel 7. However, in other embodiments the vertical formwork could be a two-sided vertical formwork configured for being adjusted from two faces, i.e., the fixing of the tie rod would be performed with an operator being positioned on each rear side of the formwork panels of the vertical formwork, although the removal of the anchoring assembly in this case would also be performed from the rear side of one of the formwork panels of the vertical formwork.

[0021] In the vertical formwork 100 of the preferred embodiment, the second anchor is fixed to the second formwork panel 7 when the latter is supported on the ground. The tie rod 3 comprises a first end 30 fixed to the anchor 4 and a second end 31 which the operator fixes to the second anchor so as to secure the vertical formwork 100 once the second anchor is fixed to the second formwork panel 3 and after the formwork panels 2 and 7 are placed in the concrete pouring position. To suspend the anchoring assembly when said anchoring assembly is not securing the vertical formwork 100, as shown in Figure 2, the operator releases and removes the second end 31 of the tie rod 3 of the second anchor and removes the anchoring assembly of the formwork panel 2 from the formwork assembly.

[0022] As discussed above, the formwork assembly of the invention comprises the formwork panel 2, and at least one support 1 coupled to said formwork panel 2 and configured for holding the anchoring assembly formed by a tie rod 3 and an anchor 4 fixed to said tie rod 3 on a rear side of the formwork panel 2 when said anchoring

assembly is not securing the vertical formwork 100. The formwork panel 2 of the formwork assembly comprises at least one hole 5 on the rear side, and the support 1 of the formwork assembly comprises a first part 1a configured for being coupled to the hole 5 of the formwork panel 2 and a second part 1b comprising a housing 6 configured for holding the anchoring assembly suspended on the rear side of the formwork panel 2.

[0023] The support 1 can be arranged in a suspension position B in which the first part 1a is housed in the hole 5 of the formwork panel 2 whereas the housing 6 of the second part 1b of the support 1 protrudes from the formwork panel 2 such that it allows the tie rod 3 of the anchoring assembly to be introduced to enable suspending said anchoring assembly, as shown in Figures 2 and 4.

[0024] The support 1 of the formwork assembly is configured for also being arranged in a retracted position A in which the first part 1a of the support 1 is kept housed in the hole 5 of the formwork panel 2 and the second part 1b of the support 1 does not protrude from the formwork panel 2, as shown in Figure 3.

[0025] The support 1 is coupled to the formwork panel 2 of the formwork assembly housing the first part 1a of the support 1 in the hole 5 of said formwork panel 2 usually when the formwork panel 2 is supported on the ground with the rear side facing upwards.

[0026] The support 1 of the invention is coupled not only to the formwork panel 2 when it has to hold the anchoring assembly, but it is also coupled when it does not perform said function, as a result of the first part 1a of the support 1 being kept housed in the hole 5 of the formwork panel 2 both in the suspension position B and in the retracted position A. Therefore, although the support 1 may be separated from the formwork panel 2 before beginning construction, once it is coupled to the formwork panel 2 it usually stays coupled at all times during construction, i.e., during the successive assembling and disassembling of the vertical formwork 100 until the end of pouring concrete, regardless of whether or not the support 1 is performing its function. Logically, if the support 1 is required in other vertical formworks the support 1 could be released in order to couple it again to a formwork panel of other vertical formworks.

[0027] The formwork assembly can thereby be handled as if it were a single part during construction. Furthermore, there is no risk of losing the support 1, nor is it required for the operator to take time to couple the support 1 on the rear side of the formwork panel 2 every time the anchoring assembly is to be suspended during construction.

[0028] Furthermore, whether the second part 1b of the support 1 protrudes or not from the formwork panel 2, depending on the position in which the support 1 is arranged, provides a new concept of support. The support 1 arranged in the suspension position B thereby allows the anchoring assembly to be suspended so as to transfer the formwork panel 2 together with the anchoring assembly or so as to have the anchoring assembly handy,

whereas the support 1 arranged in the retracted position A allows the support 1 not to be an impediment in the formwork assembly or in the vertical formwork 100, for example, when stacking the formwork assemblies that are not going to be used in the vertical formwork 100.

[0029] Furthermore, a single hole 5 arranged on the rear side of the formwork panel 2 can be used for coupling the support 1 to said formwork panel 2. It is sufficient for the formwork panel 2 to comprise on the rear side a single hole 5 for housing the first part 1a of the support 1.

[0030] The operator of the vertical formwork 100 can change the arrangement of the position of the support 1 during construction as needed.

[0031] The support 1 preferably has a shape such that, for the support 1 to move from the retracted position A to the suspension position B or vice versa, said support 1 must be rotated a certain angle with respect to an axis of rotation which substantially coincides with the central axis of the hole 5. The operator may thereby very easily change the position of the support 1 with a single rotation of the support 1. The angle is more preferably a ninety-degree angle, as shown in Figures 3 and 4.

[0032] The formwork assembly may comprise retention means for retaining the support 1 with respect to the formwork panel 2 in the retracted position A when the support 1 is arranged in the said retracted position A. Therefore, once the support 1 is arranged in the retracted position A, the support 1 is not loose and cannot move by itself to the suspension position B, ensuring a safe stacking of the formwork assemblies.

[0033] Preferably the hole 5 of the formwork panel 2 to which the first part 1a of the support 1 is coupled is a hole which vertically goes through a horizontal cross-piece 201 of the formwork panel 2, at least one section of the second part 1b of the support 1 being compressed against an upper horizontal surface 201a of the horizontal cross-piece 201 when the support 1 is arranged in the retracted position A such that said compressive force retains the support 1. The elements already existing in standard formwork panels are thereby taken advantage of and only the shape of the support 1 has to be adapted for retaining the support 1 in the retracted position A.

[0034] In the preferred embodiment of the vertical formwork 100, the formwork panel 2 of the formwork assembly, like standard formwork panels, comprises a structure 20 on the rear side, at least one board 21 on the inner side fixed to said structure 20, and at least one housing 22 going through the structure 20 and the board 21 configured for at least partially housing the anchor 4. The boards 21 are preferably made with wood or plastic, and the structure 20 is metallic. The structure 20 has a hollow, rectangular lattice shape, and comprises horizontal cross-pieces 201 and vertical columns 202, the horizontal cross-pieces 201 comprising a plurality of holes. The second formwork panel 7 has the same configuration as the formwork panel 2 of the formwork assembly.

[0035] However, said described configuration is not intended to be limiting, and in other embodiments the form-

work panel of the formwork assembly may comprise a configuration different from the one described. For the sake of clarity, the formwork panel 2 is only partially depicted in Figures 2 to 4.

[0036] The mentioned planes and directions of the plane of the formwork 2 in this description are in reference to the concrete pouring position of the vertical formwork 100. In that sense, the horizontal cross-pieces 201 are longitudinal elements of the structure 20 extending in the horizontal direction HH' in the concrete pouring position of the vertical formwork 100, whereas the vertical columns 202 extend in the vertical direction VV'.

[0037] Likewise, since the hole 5 is a through hole of the horizontal cross-piece 201 extending from the upper horizontal surface 201a to a lower horizontal surface 201b of the horizontal cross-piece, the central axis of the hole 5 extends in the vertical direction VV' of the formwork panel 2 in the concrete pouring position. A plan substantially perpendicular to the central axis of the hole 5 will be identified as horizontal plane of the formwork panel 2.

[0038] Therefore, to couple the support 1, the first part 1a of the support 1 is inserted in said vertical direction VV', being housed in the hole 5. While the first part 1a is kept housed in the hole 5 regardless of the position in which the support 1 is arranged, the second part 1b can rotate with respect to the central axis of the hole 5 extending in the vertical direction VV' in order to move from one position to another.

[0039] Said hole 5 will usually be a hole close to the housing 22 of the formwork panel 2 from which the anchoring assembly is removed.

[0040] The support 1, shown in detail in Figures 5 to 7, is preferably formed by a shaped rod. Said shaped rod comprises a central section 8 which forms the second part 1b of the support 1 demarcating the housing 6 of the support 1, and two end sections 9a and 9b which form the first part 1a of the support 1. The support 1 thereby has a simple shape, requires very little raw material, and has a low manufacturing cost, i.e., it is an inexpensive support.

[0041] The central section 8 preferably comprises a central segment 8c, the central segment 8c being arranged downwards on an inclined plane with respect to the upper horizontal surface 201a of the horizontal cross-piece 201 when the support 1 is arranged in the suspension position B, the central segment 8c being the section of the second part 1b of the support 1 that is compressed against the upper horizontal surface 201a of the horizontal cross-piece 201 in the retracted position A, as shown in Figure 3.

[0042] The central segment 8c is therefore the section of the second part 1b that retains the support 1 in the retracted position A so that it cannot come loose and not move by itself to the suspension position B, ensuring a safe stacking of the formwork assemblies. To take the support 1 out of the retracted position A, the operator must apply a force greater than the compressive force exerted by the central segment 8c.

[0043] In this context, the segment of the central section 8 farthest away and centered with respect to the two end sections 9a and 9b will be identified as the central segment 8c. The central segment 8c is preferably curved, such that the housing 6 protruding from the upper horizontal surface 201a when the support 1 is arranged in the suspension position B will at least in part be a curved housing. The curved central segment 8c is sized so that any tie rod 3 of a vertical formwork 100 known to the person skilled in the art can be inserted with sufficient clearance in said housing and so that at least one part of the anchor 4 fixed to said tie rod 3 can be partially arranged above the curved central segment 8c.

[0044] Each end section 9a and 9b preferably comprises at its free end a bend 10a and 10b protruding from the lower horizontal surface 201b of the horizontal cross-piece 201 and extending laterally, both bends 10a and 10b abutting with the lower horizontal surface 201b of the horizontal cross-piece 201 so as to prevent the removal of the first part 1a of the support 1 of the hole 5, as shown in Figure 2. More specifically, intersecting surfaces 101a and 101b of the bends 10a and 10b abut with the lower horizontal surface 201b of the horizontal cross-piece 201.

[0045] In this context, laterally means in the radial direction with respect to the central axis of the hole 5, i.e., in a horizontal plane of the formwork panel 2 in the concrete pouring position. Preferably both bends 10a and 10b extend in opposite radial directions. It is therefore even more difficult to remove the first part 1a of the support 1 from the hole 5.

[0046] The central section 8 preferably comprises two side segments 8a and 8b attaching the central segment 8c with the end sections 9a and 9b, the side segments 8a and 8b of the central section 8 and the end sections 9a and 9b being perpendicular to one another. Therefore, on the one hand the central section 8 and on the other hand the bends 10a and 10b limit the movement of the first part 1a in the vertical direction VV' of the formwork panel 2 when the first part 1a of the support 1 is housed in the hole 5 arranged on the rear side of the formwork panel 2.

[0047] The end sections 9a and 9b preferably comprise a segment 90a and 90b housed in the hole 5 of the horizontal cross-piece 201, said segments 90a and 90b having a maximum separation (H) from one another sized for said segments 90a and 90b to be compressed in the hole 5, and the central section 8 having a width greater than said maximum separation H. The segments 90a and 90b together with the inner walls of the hole 5 limit the movement of the first part 1a in the radial direction with respect to the central axis of the hole 5 when the first part 1a of the support 1 is housed in the hole 5 arranged on the rear side of the formwork panel 2.

[0048] To enable coupling the first part 1a on the rear side of the formwork panel 2, the operator compresses the first part 1a by moving the segments 90a and 90b closer together and reducing the maximum separation H

until the bends 10a and 10b are able to go through the hole 5. At that time, the operator stops compressing the first part 1a and the first part 1a expands. Then the segments 90a and 90b expand, abutting with the inner wall of the hole 5 before they recover the maximum separation H, such that the segments 90a and 90b exert a slight compressive force which impedes the rotation of the support 1.

[0049] Therefore, once the support 1 is arranged in one of the positions, in the retracted position A or in the suspension position B, the support 1 cannot move by itself to the other position.

[0050] Therefore, even though there is a slight force for fixing the support 1 in both positions which impedes the free rotation of the support 1, the force for fixing the support 1 will be greater in the retracted position A than in the suspension position B as a result of the compressive force of the central segment 8c against the upper horizontal surface 201a mentioned above.

[0051] The segments 90a and 90b of the end sections 9a and 9b are preferably parallel to one another, one of said segments 9b preferably being closer to a front end 80c of the central section 8 than the other segment 9a. Just as the central segment 8c was identified, in this context the end of the central section 8 farthest away and centered with respect to the two end sections 9a and 9b will be identified as the front end 80c.

[0052] The segments 90a and 90b are therefore separated from one another by one and the same maximum separation H along their entire extension, so the compressive force exerted by the segments 90a and 90b is uniformly distributed. Furthermore, when the first part 1a is compressed, the segments 90a and 90b may overlap without running into one another, allowing the bends 10a and 10b to be able to go through the hole 7 more easily or allowing the more laterally extending bends 10a and 10b to be able to go through the hole 7 when the support 1 is coupled in the formwork panel 2.

[0053] The support 1 is preferably elastically deformable. The elasticity of the support 1 thereby allows it to go back to its original shape once force is no longer exerted on it. For example, it allows the support 1 to be at least temporarily compressed for the bends 10a and 10b to be able to go through the hole 5 easily, and after having gone through the hole 5, it expands again, preventing the removal of the support 1 of the hole 7, or also for the central segment 8c to exert a compressive force against the upper horizontal surface 201a retaining the support 1 in the retracted position A, or even for the segments 90a and 90b to exert a slight compressive force against the walls of the hole 5 impeding the free rotation of the support 1.

[0054] Furthermore, the rod preferably is metallic, more preferably made from steel.

[0055] The invention also relates to a method for disassembling a vertical formwork such as the one described above, the method comprising a first removal step for removing the anchoring assembly when said an-

choring assembly is not securing the vertical formwork 100, and a suspension step in which said anchoring assembly is arranged suspended on the rear side of the formwork panel 2. In the suspension step of the method, the support 1 is moved from the retracted position A to the suspension position B, and the tie rod 3 of the anchoring assembly is inserted in the housing 6 of the support 1, such that the anchoring assembly is suspended on the rear side of the formwork panel 2 of the formwork assembly.

[0056] In the suspension step of the method, the support 1 is moved from the retracted position A to the suspension position B. Preferably, for moving the support 1 from the retracted position A to the suspension position B the support 1 is rotated a certain angle with respect to an axis of rotation which substantially coincides with the central axis of the hole 5, the angle preferably being a ninety-degree angle. The operator may thereby very easily move the support 1 with a single rotation of the support 1.

[0057] Therefore, in the method for disassembling the vertical formwork the operator 100 can have the support 1 both in the retracted position A and in the suspension position B, very easily changing the arrangement of the position of the support 1 during construction as needed.

[0058] In the method for disassembling the vertical formwork 100 the support 1 can be arranged by default in the retracted position A, arranging the support 1 in the suspension position B only when the assembly is to be suspended on the rear side of the formwork panel 2.

Claims

1. Formwork assembly for a vertical formwork, said formwork assembly comprising a formwork panel (2), and at least one support (1) coupled to said formwork panel (2) and configured for holding an anchoring assembly formed by a tie rod (3) and an anchor (4) fixed to said tie rod (3) on a rear side of the formwork panel (2) when said anchoring assembly is not securing the vertical formwork (100), the formwork panel (2) comprising at least one hole (5) on the rear side, and the support (1) comprising a first part (1a) configured for being coupled to the hole (5) of the formwork panel (2), and a second part (1b) comprising a housing (6) configured for holding the anchoring assembly suspended on the rear side of the formwork panel (2), the support (1) being able to be arranged in a suspension position (B) in which the first part (1a) of the support (1) is housed in the hole (5) of the formwork panel (2) whereas the housing (6) of the second part (1b) of the support (1) protrudes from the formwork panel (2) such that it allows the tie rod (3) of the anchoring assembly to be introduced to enable suspending said anchoring assembly, **characterized in that** the support (1) is configured for also being arranged in a retracted position (A) in

which the first part (1a) of the support (1) is kept housed in the hole (5) of the formwork panel (2) and the second part (1b) of the support (1) does not protrude from the formwork panel (1).

2. Support assembly according to claim 1, wherein the support (1) has a shape such that, for the support (1) to move from the retracted position (A) to the suspension position (B) or vice versa, said support (1) must be rotated a certain angle with respect to an axis of rotation which substantially coincides with the central axis of the hole (5), the angle preferably being a ninety-degree angle.
3. Formwork assembly according to claim 1 or 2, wherein the formwork assembly comprises retention means for retaining the support (1) in the retracted position (A) when the support (1) is arranged in said retracted position (A).
4. Formwork assembly according to claim 3, wherein the hole (5) is a hole which vertically goes through a horizontal cross-piece (201) of the formwork panel (2), at least one section of the second part (1b) of the support (1) being compressed against an upper horizontal surface (201a) of the horizontal cross-piece (201) when the support (1) is arranged in the retracted position (A), such that said compressive force retains the support (1).
5. Formwork assembly according to claim 4, wherein the support (1) is formed by a shaped rod comprising a central section (8) which forms the second part (1b) of the support (1) demarcating the housing (6) of the support (1), and two end sections (9a, 9b) which form the first part (1a) of the support (1).
6. Formwork assembly according to claim 5, wherein the central section (8) comprises a central segment (8c), preferably curved, the central segment (8c) being arranged downwards on an inclined plane with respect to the upper horizontal surface (201a) of the horizontal cross-piece (201) when the support (1) is arranged in the suspension position (B), the central segment (8c) being the section of the second part (1b) of the support (1) that is compressed against the upper horizontal surface (201a) of the horizontal cross-piece (201) in the retracted position (A).
7. Formwork assembly according to claim 6, wherein the central section (8) comprises two side segments (8a, 8b) attaching the central segment (8c) with the end sections (9a, 9b), being the side segments (8a, 8b) of the central section (8) and the end sections (9a, 9b) perpendicular to one another.
8. Formwork assembly according to any of claims 5 to 7, wherein each end section (9a, 9b) comprises at its free end a bend (10a, 10b) protruding from a lower horizontal surface (201b) of the horizontal cross-piece (201) and extending laterally, both bends (10a, 10b) abutting with the lower horizontal surface (201b) of the horizontal cross-piece (201) so as to prevent the removal of the first part (1a) of the support (1) from the opening (5).
9. Formwork assembly according to any of claims 5 to 8, wherein the end sections (9a, 9b) comprise a segment (90a, 90b) housed in the hole (5) of the horizontal cross-piece (201), said segments (90a, 90b) having a maximum separation (H) from one another sized for said segments (90a, 90b) to be compressed in the hole (5), and the central section (8) having a width greater than said maximum separation (H).
10. Formwork assembly according to claim 9, wherein the segments (90a, 90b) of the end sections (9a, 9b) are parallel to one another, one of said segments (9b) preferably being closer to a front end (80c) of the central section (8) than the other segment (9a).
11. Formwork assembly according to any of the preceding claims, wherein the support (1) is elastically deformable.
12. Formwork assembly according to any of the preceding claims, wherein the support (1) is metallic, preferably made from steel.
13. Vertical formwork **characterized in that** it comprises a formwork assembly according to any of the preceding claims.
14. Method for disassembling a vertical formwork according to claim 13, the method comprising
 - a first removal step for removing the anchoring assembly when said anchoring assembly is not securing the vertical formwork (100), and
 - a suspension step in which said anchoring assembly is arranged suspended on the rear side of the formwork panel (2), **characterized in that** in the suspension step
 - the support (1) is moved from the retracted position (A) to the suspension position (B), and
 - the tie rod (3) of the anchoring assembly is inserted in the housing (6) of the support (1).
15. Method according to the preceding claim, wherein for moving the support (1) from the retracted position (A) to the suspension position (B), the support (1) is rotated a certain angle with respect to an axis of rotation which substantially coincides with the central axis of the hole (5), the angle preferably being a ninety-degree angle.

Amended claims in accordance with Rule 137(2) EPC.

1. Formwork assembly for a vertical formwork, said formwork assembly comprising a formwork panel (2), and at least one support (1) coupled to said formwork panel (2) and configured for holding an anchoring assembly formed by a tie rod (3) and an anchor (4) fixed to said tie rod (3) on a rear side of the formwork panel (2) when said anchoring assembly is not securing the vertical formwork (100), the formwork panel (2) comprising at least one hole (5) on the rear side, and the support (1) comprising a first part (1a) configured for being coupled to the hole (5) of the formwork panel (2), and a second part (1b) comprising a housing (6) configured for holding the anchoring assembly suspended on the rear side of the formwork panel (2), the support (1) having a suspension position (B) in which the first part (1a) of the support (1) is housed in the hole (5) of the formwork panel (2) whereas the housing (6) of the second part (1b) of the support (1) protrudes from the formwork panel (2) such that it allows the tie rod (3) of the anchoring assembly to be introduced to enable suspending said anchoring assembly, **characterized in that** the support (1) also has a retracted position (A) in which the first part (1a) of the support (1) is kept housed in the hole (5) of the formwork panel (2) and the second part (1b) of the support (1) does not protrude from the formwork panel (1).
2. Support assembly according to claim 1, wherein the support (1) has a shape such that, for the support (1) to move from the retracted position (A) to the suspension position (B) or vice versa, said support (1) must be rotated a certain angle with respect to an axis of rotation which substantially coincides with the central axis of the hole (5), the angle preferably being a ninety-degree angle.
3. Formwork assembly according to claim 1 or 2, wherein the support (1) comprises retention means for retaining the support (1) in the retracted position (A) when the support (1) is arranged in said retracted position (A).
4. Formwork assembly according to claim 3, wherein the hole (5) is a hole which vertically goes through a horizontal cross-piece (201) of the formwork panel (2), the retention means being formed by at least one section of the second part (1b) of the support (1) that is compressed against an upper horizontal surface (201a) of the horizontal cross-piece (201) when the support (1) is arranged in the retracted position (A), such that said compressive force retains the support (1).
5. Formwork assembly according to claim 4, wherein the support (1) is formed by a shaped rod comprising a central section (8) which forms the second part (1b) of the support (1) demarcating the housing (6) of the support (1), and two end sections (9a, 9b) which form the first part (1a) of the support (1).
6. Formwork assembly according to claim 5, wherein the central section (8) comprises a central segment (8c), preferably curved, the central segment (8c) being arranged downwards on an inclined plane with respect to the upper horizontal surface (201a) of the horizontal cross-piece (201) when the support (1) is arranged in the suspension position (B), the central segment (8c) being the section of the second part (1b) of the support (1) forming the retention means that is compressed against the upper horizontal surface (201a) of the horizontal cross-piece (201) in the retracted position (A).
7. Formwork assembly according to claim 6, wherein the central section (8) comprises two side segments (8a, 8b) attaching the central segment (8c) with the end sections (9a, 9b), being the side segments (8a, 8b) of the central section (8) and the end sections (9a, 9b) perpendicular to one another.
8. Formwork assembly according to any of claims 5 to 7, wherein each end section (9a, 9b) comprises at its free end a bend (10a, 10b) protruding from a lower horizontal surface (201b) of the horizontal cross-piece (201) and extending laterally, both bends (10a, 10b) abutting with the lower horizontal surface (201b) of the horizontal cross-piece (201) so as to prevent the removal of the first part (1a) of the support (1) from the opening (5).
9. Formwork assembly according to any of claims 5 to 8, wherein the end sections (9a, 9b) comprise a segment (90a, 90b) housed in the hole (5) of the horizontal cross-piece (201), said segments (90a, 90b) having a maximum separation (H) from one another sized for said segments (90a, 90b) to be compressed in the hole (5), and the central section (8) having a width greater than said maximum separation (H).
10. Formwork assembly according to claim 9, wherein the segments (90a, 90b) of the end sections (9a, 9b) are parallel to one another, one of said segments (9b) preferably being closer to a front end (80c) of the central section (8) than the other segment (9a).
11. Formwork assembly according to any of the preceding claims, wherein the support (1) is elastically deformable.
12. Formwork assembly according to any of the preceding claims, wherein the support (1) is metallic, preferably made from steel.

13. Vertical formwork **characterized in that** it comprises a formwork assembly according to any of the preceding claims.
14. Method for disassembling a vertical formwork according to claim 13, the method comprising
- a first removal step for removing the anchoring assembly when said anchoring assembly is not securing the vertical formwork (100), and
 - a suspension step in which said anchoring assembly is arranged suspended on the rear side of the formwork panel (2),
- characterized in that** in the suspension step
- the support (1) is moved from the retracted position (A) to the suspension position (B), and
 - the tie rod (3) of the anchoring assembly is inserted in the housing (6) of the support (1).
15. Method according to the preceding claim, wherein for moving the support (1) from the retracted position (A) to the suspension position (B), the support (1) is rotated a certain angle with respect to an axis of rotation which substantially coincides with the central axis of the hole (5), the angle preferably being a ninety-degree angle.

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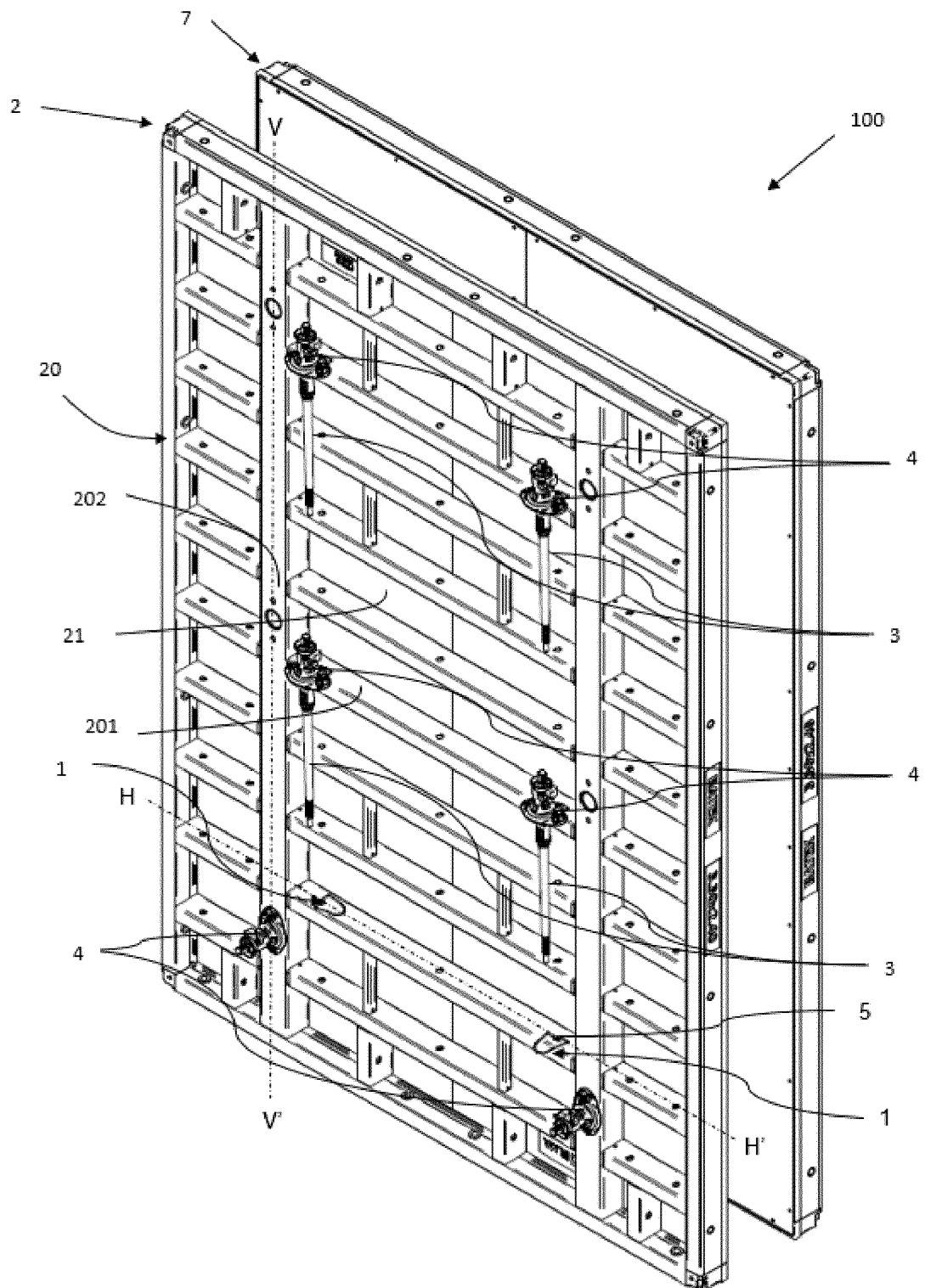


FIG. 1

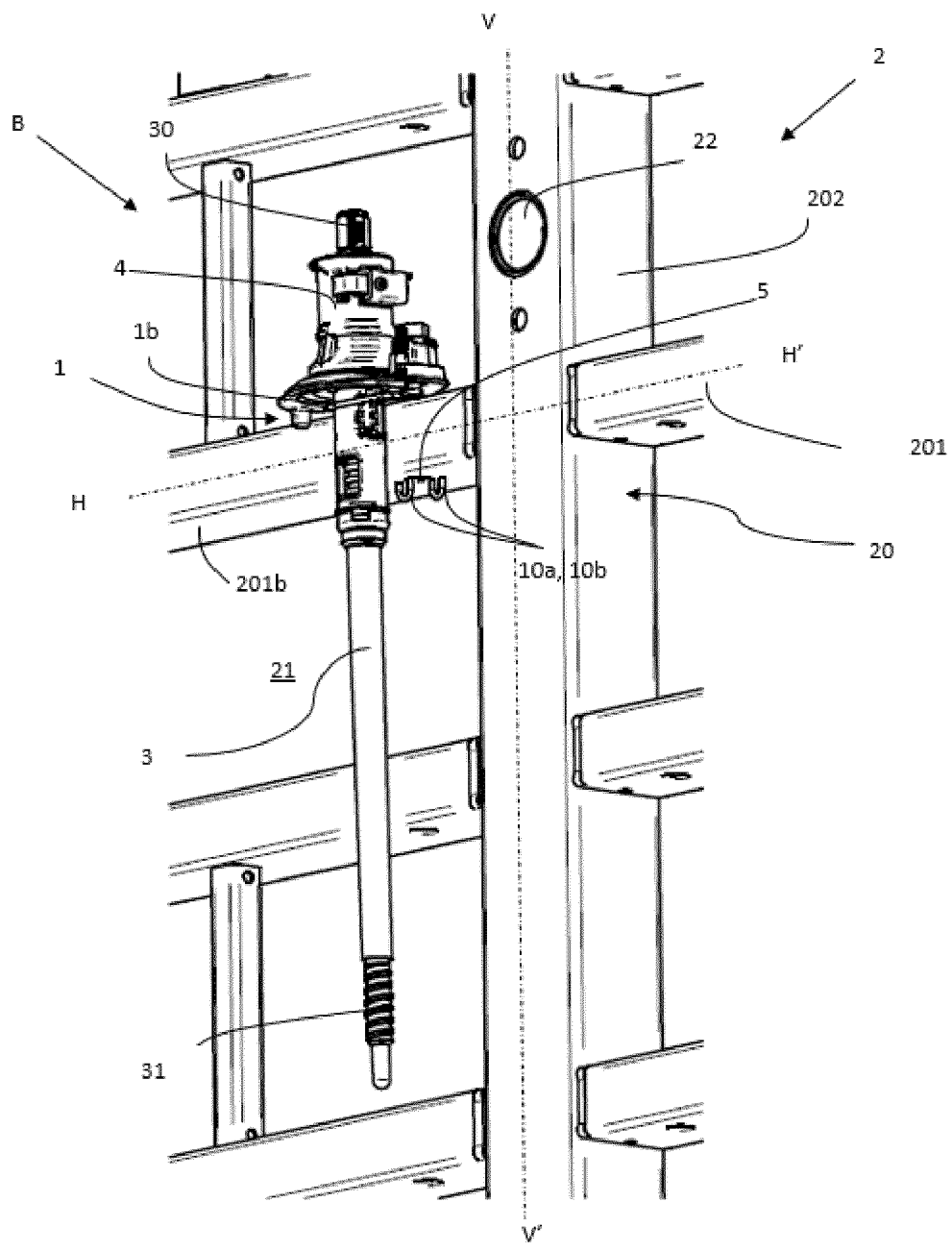


FIG. 2

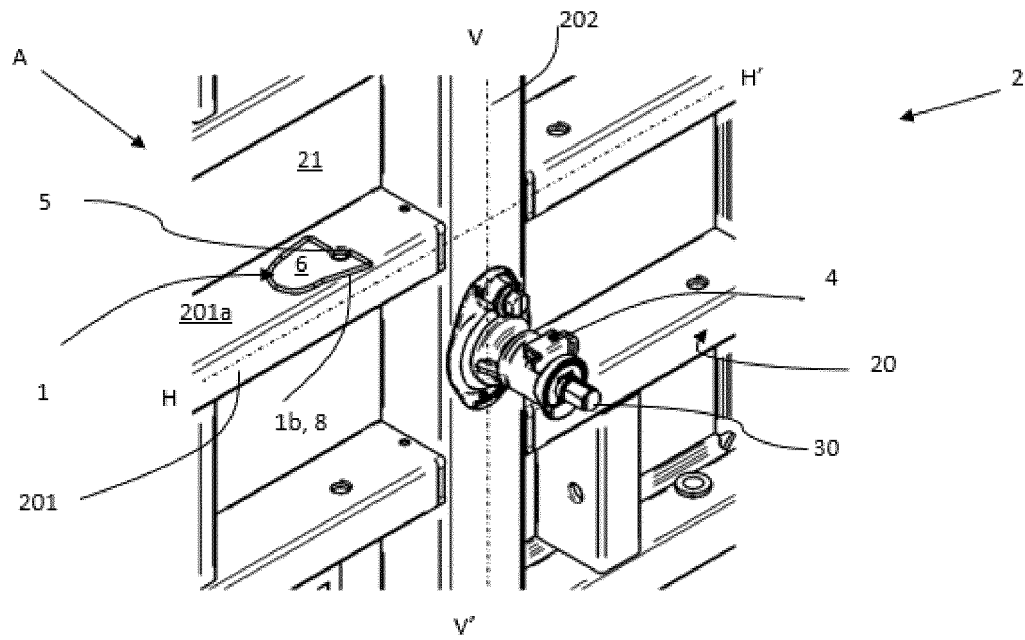


FIG. 3

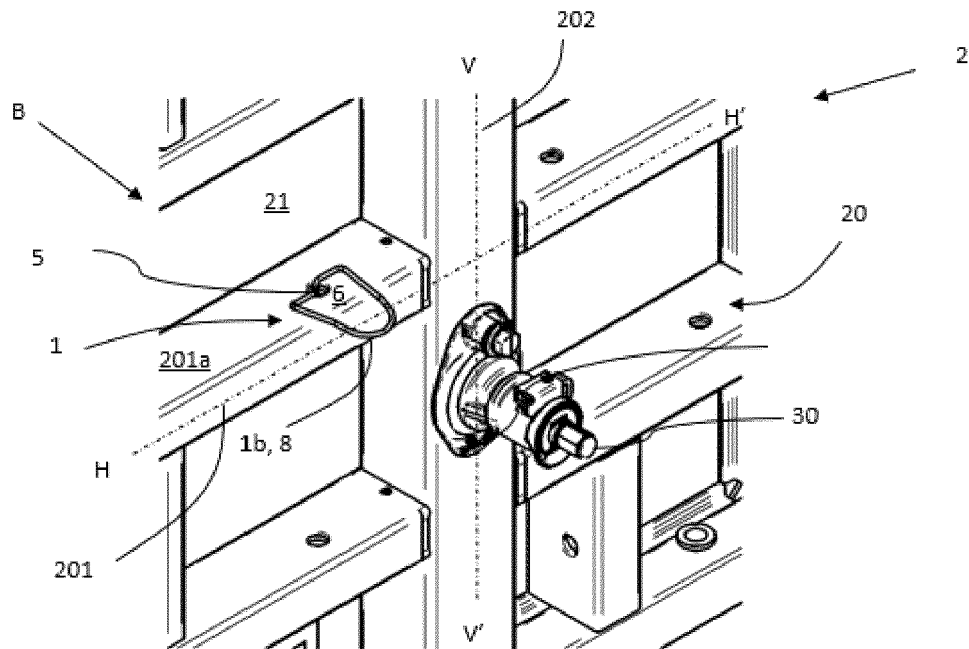


FIG. 4

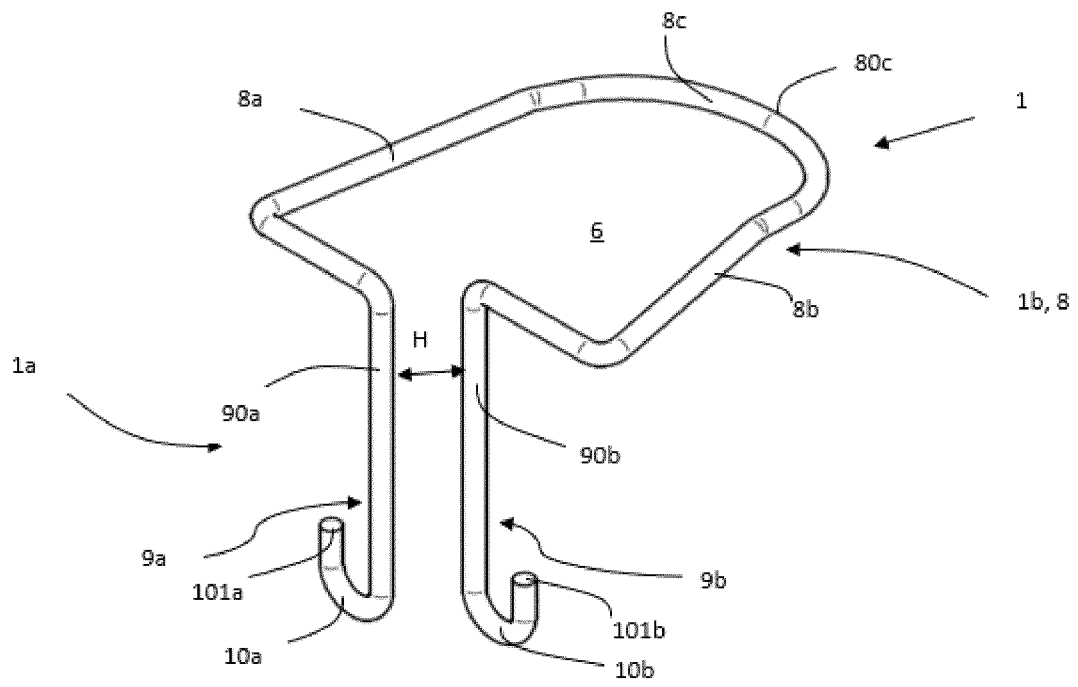


FIG. 5

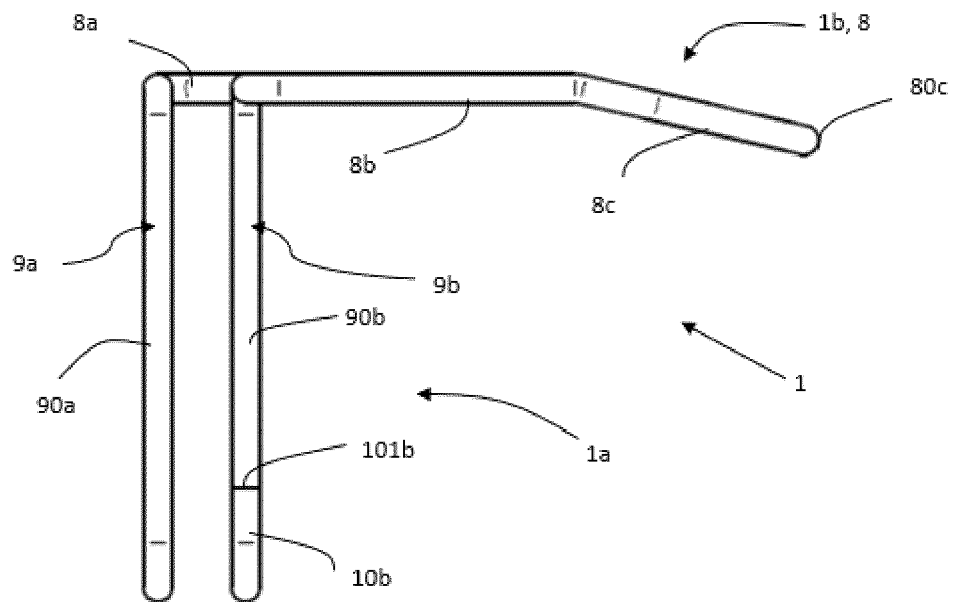


FIG. 6

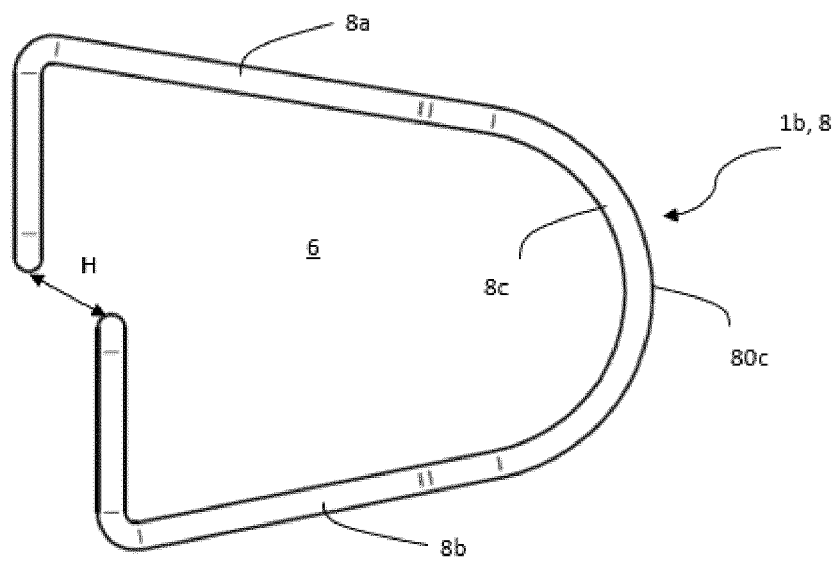


FIG. 7



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A	----- KR 2010 0126002 A (CHOI JAE JU [KR]) 1 December 2010 (2010-12-01) * the whole document *	1-15	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 11 June 2021	Examiner Baumgärtel, Tim
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