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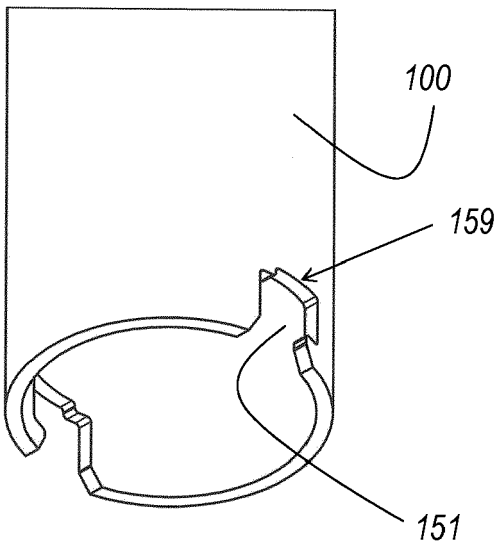
(54) **Bar for a gate and method for manufacturing a gate**

(57) Bar (100) with at least one outer end (110) for use with a beam (120) of a gate, the bar being provided with a transverse channel (130) for receiving a tensioning element, wherein the at least one outer end (110) is further provided with an orienting element (151,152) adapted to ensure a substantially parallel orientation of the transverse channel (130) and the beam (120) during coupling of the bar (100) to the beam (120).

FIGURE 6



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Description

[0001] The present invention relates to a bar with at least one outer end for use with a beam of a gate, the bar being provided with a transverse channel for receiving a tensioning element.

[0002] A bar of the described type is known from the Netherlands patent 8302007 in the name of applicant. Such a bar is used to make a gate element by providing a substantially horizontal beam with a plurality of bars which are mutually connected by means of a tensioning element, which is in turn connected to a substantially vertical post. The tensioning element is for instance a stiff steel wire or other slender element which is able to absorb tensile forces.

[0003] It is a drawback of the bars of the described type that threading the bars together is labour-intensive. This is because two persons are in principle required to perform the threading. A first person places the bars vertically with one outer end into the beam and subsequently rotates the bar in the correct direction to receive the tensioning element, while a second person pushes the tensioning element slowly forward so as to insert it into the transverse channel of the bar that has just been placed. The first person must here have a view of the location where the tensioning element is being threaded through the bar in order to slightly change the orientation of the bar if necessary so that the transverse channel comes to lie wholly parallel to the vertical plane of the gate element to be erected.

[0004] It is an object of the present invention to provide a bar of the above described type with which a gate element can be assembled in less labour-intensive manner, in particular by one person.

[0005] The object is achieved with a bar of the described type, wherein the at least one outer end is further provided with an orienting element adapted to ensure a substantially parallel orientation of the transverse channel and the beam during coupling of the bar to the beam. Since the person placing the bars in the beam can thus be sure that the bars are correctly oriented for receiving the tensioning element, the bar according to the present invention allows a less labour-intensive assembly of the gate element, wherein a single person places the bars successively in the beam at the correct orientation and subsequently threads the tensioning element in one operation through the transverse channels of the respective bars.

[0006] In an embodiment of the bar of the present invention the orienting element has at least one peripheral protrusion which, relative to a longitudinal axis of the bar, forms a predetermined angle with the direction of the transverse channel, this predetermined angle corresponding to an angle between a recess in the beam, which can be coupled to the protrusion, and a longitudinal axis of the beam.

[0007] It is an advantage of this embodiment that during coupling of the bar to the beam the correct orientation of the bar is easily detected by fitting the protrusion on the edge of the outer end of the bar into the recess of the beam provided for this purpose.

[0008] In a more specific embodiment the orienting element comprises two peripheral protrusions lying diametrically opposite each other. This embodiment is particularly advantageous when the bars provided with a transverse channel are rotation-symmetrical in a rotation angle of 180°.

[0009] In an embodiment of a bar according to the present invention the orienting element comprises at least one peripheral recess which, relative to a longitudinal axis of the bar, forms a predetermined angle with the direction of the transverse channel, this predetermined angle corresponding to an angle between a protrusion in the beam, which can be coupled to the recess, and a longitudinal axis of the beam.

[0010] This embodiment has the same advantages as the above stated embodiment with a peripheral protrusion, with the understanding that the function of the recess and that of the protrusion are now interchanged. In a specific embodiment the orienting element comprises two peripheral recesses lying diametrically opposite each other. This embodiment also makes use of the 180° rotation-symmetry of the bar with a transverse channel. It is moreover advantageous in this embodiment that the bar must be rotated through a maximum of 180° in order to arrive at the correct orientation, while in the case of a bar with only one recess this may be 360°.

[0011] In an embodiment of the bar according to the present invention the recess is substantially L-shaped or stepped.

[0012] This embodiment has the advantage that the bar is also locked vertically to certain extent and that, during placing of the bar in the beam, it is readily possible to discern when it has fully reached the correct orientation.

[0013] In an embodiment the recess has a widened entry side.

[0014] This embodiment has the advantage that placing of a bar in the beam becomes easier.

[0015] In an embodiment of the bar according to the present invention the orienting element comprises at least one peripheral recess which, relative to a longitudinal axis of the bar, forms a predetermined angle with the direction of the transverse channel, wherein the at least one peripheral recess is formed such that a lower surface of a part of the bar adjacent at the top to the recess forms a support surface, and an upper surface of a part adjacent at the bottom to the recess forms an immobilizing surface, and wherein the predetermined angle corresponds to an angle between a recessed portion, which is arranged in the beam and which substantially corresponds in shape to the support surface, and a longitudinal axis of the beam.

[0016] In this embodiment the recess in the bar typically has the form of a horizontal slot or a groove, and the bar is rotated during placing such that the upper side

of the slot or groove fits precisely into the recessed portion of the beam. In this configuration the slot or groove receives a portion of the beam (which is plate-like or hollow) so that the support surface gives the bar support, i.e. prevents further downward movement of the bar, while the immobilizing surface retains the bar when the bar is subjected to a tensile force from above.

[0017] The present invention also relates to a beam for use with the above described bar, wherein an upper surface of the beam is provided with a recessed portion substantially corresponding in shape to the support surface of the bar.

[0018] The present invention also relates to a method for manufacturing a gate, comprising of coupling a plurality of bars of the above described type to a beam of the above described type and threading a tensioning element through the transverse channel of each of the bars, wherein coupling of the plurality of bars to the beam takes place at an angular orientation determined by fitting the support surface of each bar into the corresponding recessed portion of the beam.

[0019] The present invention also relates to an assembly comprising at least one beam and a plurality of bars as described above.

In an embodiment the assembly according to the present invention is further provided with a tensioning element.

[0020] In a specific embodiment the tensioning element comprises a steel rod.

[0021] The present invention also relates to a gate comprising the above described assembly.

[0022] The invention also relates to a method for manufacturing a gate, comprising of coupling a plurality of bars with a transverse channel to a beam and threading a tensioning element through the transverse channel of each of the bars, wherein coupling of the plurality of bars with the transverse channel to the beam takes place at an angular orientation which is determined by fitting protrusions into recesses, wherein the plurality of bars are provided with the protrusions and the beam is provided with the recesses, or wherein the plurality of bars are provided with the recesses and the beam is provided with the protrusions.

[0023] In an embodiment of the method according to the present invention the recesses are substantially L-shaped or stepped, and coupling of each of the plurality of bars to the beam comprises of rotating each of the plurality of bars around their respective longitudinal axis.

[0024] The foregoing aspects and advantages of the present invention will now be further elucidated with reference to the figures, wherein:

Figure 1 is an outline view of a bar gate;
Figure 2 illustrates the problems of the prior art;
Figure 3 shows a bar according to an embodiment of the present invention;
Figure 4 shows a bar according to another embodiment of the present invention;
Figure 5 shows a more specific embodiment;
Figure 6 is a partial enlargement of the outer end of a bar such as that in Figure 5;
Figure 7 shows a bar according to yet another embodiment of the present invention; and
Figure 8 shows a part of a beam according to the invention for use with the bar of Figure 6.

[0025] Figure 1 shows a known gate **1** formed by substantially vertical bars **100** placed between substantially horizontal beams **120, 121.** The shown gate element is supported by vertical posts. In order to strengthen the gate element the bars **100** are connected to each other by a tensioning element (not shown) threaded through a transverse channel of bars **100.** The tensioning element is attached to the vertical post, optionally via a hinge and/or other connecting part. In the embodiment of Figure 1 the tensioning element and the transverse channels are inside the substantially hollow beam **120.**

[0026] Figure 2 illustrates the difficulty which occurs during assembly of a known bar gate such as that shown in Figure 1. Since the zone in which the transverse channels of bars **100** are located is inside the substantially hollow horizontal beam **120,** it is very difficult to see whether the placed bars have the correct orientation. Two people are in fact therefore required to assemble such a known gate element, wherein the first looks via small openings at the otherwise covered outer end of the bar **100** to be fitted and rotates the bar **100** until the correct orientation is reached, and the second pushes the tensioning element **140** through the correctly oriented transverse channels. During the assembly a temporary positioning beam **122** can be used to hold the placed bars **100** at the correct height during threading, this positioning beam **122** being removed after proper anchoring of tensioning element **140.**

[0027] Figure 3 shows a bar **100** according to the present invention provided with a transverse channel **130** suitable for receiving a tensioning element **140.** Tensioning element **140** here also has the purpose of threading together different bars and of attaching the whole to the substantially vertical posts bounding the gate element. Tensioning element **140** can be a steel wire or other suitable slender element with sufficient stiffness. The shown bar **100** has on at least one outer end **110** (only the lower outer end is shown here) an orienting means **151** which consists in the shown embodiment of two recesses lying diametrically opposite each other. These recesses **151** are formed in each case such that, at a correct orientation of the bar, they fit precisely into the corresponding protrusions **161** provided for this purpose in beam **120.**

[0028] It is in principle also possible to provide a single recess **151** and a single protrusion **161** or to provide a certain larger number of recesses **151** and the same number of protrusions **161.** Because both the recesses and the protrusions are placed in the shown exemplary embodiment in diametrically opposite pairs, two equivalent orientations are possible, both corresponding to the situation in which the transverse channel **130** runs par-

allel to the longitudinal axis of beam **120,** and in which threading together of the bars is thus possible. The maximum rotation which has to be performed in order to arrive at a correct orientation is thus halved compared to an embodiment with only one recess **151** and one protrusion **161,** this further increasing ease of assembly.

[0029] Figure 4 shows a variant of the bar according to the present invention wherein recess **151** in a hollow bar 100 takes the form of a slot. In order to facilitate assembly this slot has a somewhat widened entry side. This embodiment otherwise has the same operation and features as the above described embodiment of Figure 3.

[0030] In the embodiments of Figures 3 and 4 the bar **100** is provided in each case with a recess **151** while beam **120** is provided with a protrusion **161.** The orienting effect can however also be obtained by providing beam **120** with a recess and providing bar **100** with a protrusion.

[0031] The shown embodiments have the advantage that, due to the contact between the upper outer end of recesses **151** and protrusions **161,** bar **100** finds support on these protrusions **161** and so will not drop through beam **120,** even if this latter takes a substantially hollow form or if the opening in which bar **100** is placed passes through the whole of beam **120.** Compared to the prior art method as shown in Figure 2, the positioning beam **122** can on the one hand be dispensed with and the load on tensioning element 140 can on the other be greatly reduced.

[0032] Figure 5 shows a further variant of the bar according to the present invention, wherein recess **151** in outer end **110** of bar **100** is L-shaped or even stepped. This variant has the advantage that the placing of the bar in the beam takes place with a bayonet coupling, thereby obtaining both rotational and translational locking of the bar in the beam. This makes it even easier for the person placing the bars in the beam to make sure that the bar has reached the correct orientation. Furthermore, it is not possible after assembly to pull the bars upward out of the beam.

[0033] Figure 6 shows a partial enlargement of the outer end of a bar **100** of the type shown in Figure 5. Shown in Figure 6 is an optional additional recessed portion **159** which secures the bar against rotation following assembly.

[0034] Figure 7 shows a further variant of the bar according to the present invention, wherein bar **100** has a square profile with rounded ribs **170.** The flat or hollow beam **120** has a corresponding opening. The orienting element is formed by a set of horizontal slots **152** which, at a correct orientation of bar **100,** find support on the upper side of beam **120.** Particularly the upper side of slots 152 forms a support surface **180** which, at a correct orientation, fits precisely into a recessed portion (not shown) arranged for this purpose in beam **120.** The underside of slots **152** forms an immobilizing surface **190** which retains the mounted bar **100** if a tensile force were to be exerted on bar **100** from above.

[0035] Figure 8 shows the corresponding beam **120,** wherein the recessed portions **162** for receiving the support surfaces **180** are clearly shown.

[0036] Although the invention has been described above on the basis of specific embodiments, these serve only to elucidate and not to limit the invention. The skilled person will appreciate that measures and features of the invention described in the context of one embodiment can be applied in the context of other embodiments without departing from the scope of the invention.

Claims

1. Bar (100) with at least one outer end (110) for use with a beam (120) of a gate, the bar being provided with a transverse channel (130) for receiving a tensioning element, **characterized in that** the at least one outer end (110) is further provided with an orienting element (151, 152) adapted to ensure a substantially parallel orientation of the transverse channel (130) and the beam (120) during coupling of the bar (100) to the beam (120).

2. Bar (100) as claimed in claim 1, wherein the orienting element comprises at least one peripheral protrusion (151) which, relative to a longitudinal axis of the bar (100), forms a predetermined angle with the direction of the transverse channel (130), this predetermined angle corresponding to an angle between a recess (161) in the beam (120), which can be coupled to the protrusion, and a longitudinal axis of the beam (120).

3. Bar (100) as claimed in claim 2, wherein the orienting element comprises two peripheral protrusions lying diametrically opposite each other.

4. Bar (100) as claimed in claim 1, wherein the orienting element comprises at least one peripheral recess (151) which, relative to a longitudinal axis of the bar (100), forms a predetermined angle with the direction of the transverse channel (130), this predetermined angle corresponding to an angle between a protrusion (161) in the beam (120), which can be coupled to the recess (151), and a longitudinal axis of the beam (120).

5. Bar as claimed in claim 4, wherein the orienting element comprises two peripheral recesses (151) lying diametrically opposite each other.

6. Bar (100) as claimed in any of the claims 2 to 5, wherein the recess (151) is substantially L-shaped or stepped.

7. Bar as claimed in any of the claims 2 to 6, wherein the recess (151) has a widened entry side.

8. Bar as claimed in claim 1, wherein the orienting element comprises at least one peripheral recess (152) which, relative to a longitudinal axis of the bar (100), forms a predetermined angle with the direction of the transverse channel (130), wherein the at least one peripheral recess (152) is formed such that a lower surface of a part of the bar (100) adjacent at the top to the recess (152) forms a support surface (180), and an upper surface of a part adjacent at the bottom to the recess (152) forms an immobilizing surface (190), and wherein the predetermined angle corresponds to an angle between a recessed portion (162), which is arranged in the beam (120) and which substantially corresponds in shape to the support surface, and a longitudinal axis of the beam (120).

9. Beam (120) for use with the bar (100) as claimed in claim 8, wherein an upper surface (121) of the beam (120) is provided with a recessed portion (162) substantially corresponding in shape to the support surface (180) of the bar (100).

10. Assembly comprising at least one beam (120) and a plurality of bars (100) as claimed in any of the foregoing claims.

11. Assembly as claimed in claim 10, further provided with a tensioning element (140).

12. Assembly as claimed in claim 11, wherein the tensioning element (140) comprises a steel rod.

13. Gate (1) comprising the assembly as claimed in any of the claims 10 to 12.

14. Method for manufacturing a gate (1), comprising of:

- coupling a plurality of bars (100) with a transverse channel (130) to a beam (120), and
- threading a tensioning element (140) through the transverse channel (130) of each of the bars (100),

wherein coupling of the plurality of bars (100) with the transverse channel (130) to the beam (120) takes place at an angular orientation which is determined by fitting protrusions into recesses,

wherein the plurality of bars (100) are provided with the protrusions and the beam (120) is provided with the recesses, or wherein the plurality of bars (100) are provided with the recesses (151) and the beam is provided with the protrusions (161).

15. Method as claimed in claim 14, wherein the recesses (151) are substantially L-shaped or stepped, and wherein coupling of each of the plurality of bars (100) to the beam (120) comprises of rotating each of the plurality of bars around their respective longitudinal axis.

16. Method for manufacturing a gate (1), comprising of:

- coupling a plurality of bars (100) according to claim 8 to a beam (120) according to claim 9, and
- threading a tensioning element (140) through the transverse channel (130) of each of the bars (100),

wherein coupling of the plurality of bars (100) to the beam (120) takes place at an angular orientation determined by fitting the support surface of each bar (100) into the corresponding recessed portion (162) of the beam (120).

FIGURE 1

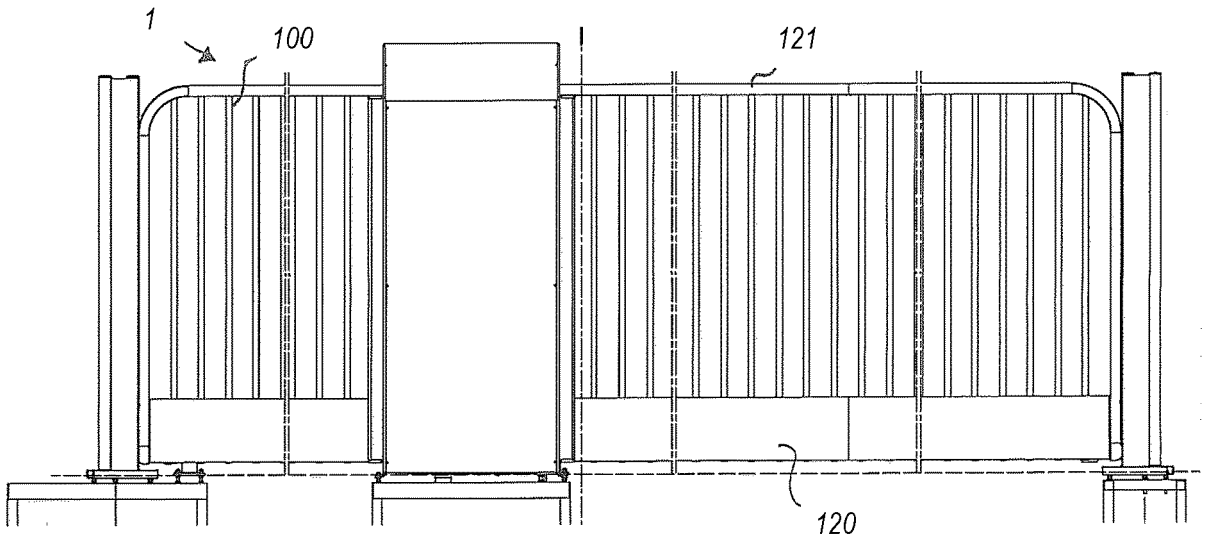


FIGURE 2

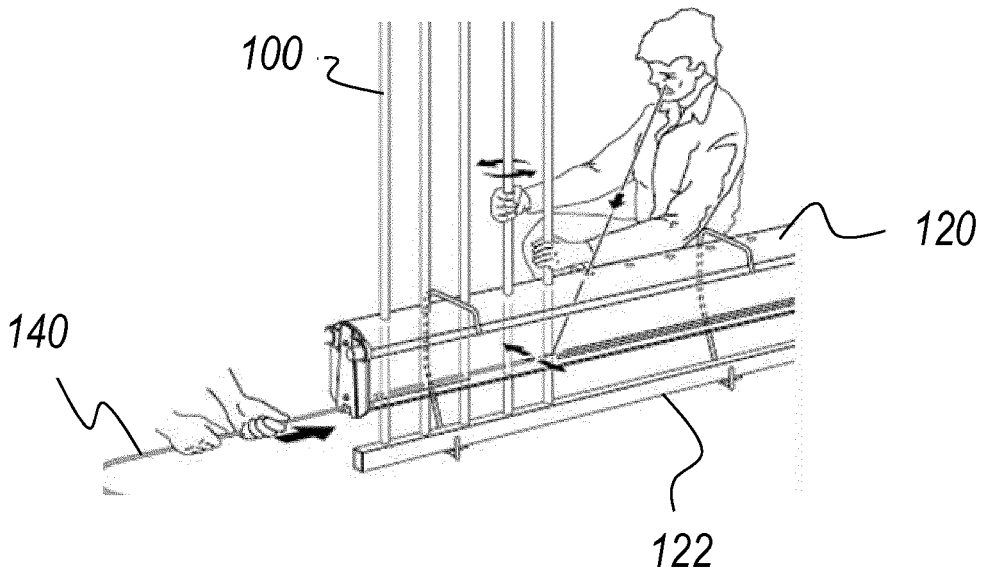


FIGURE 3

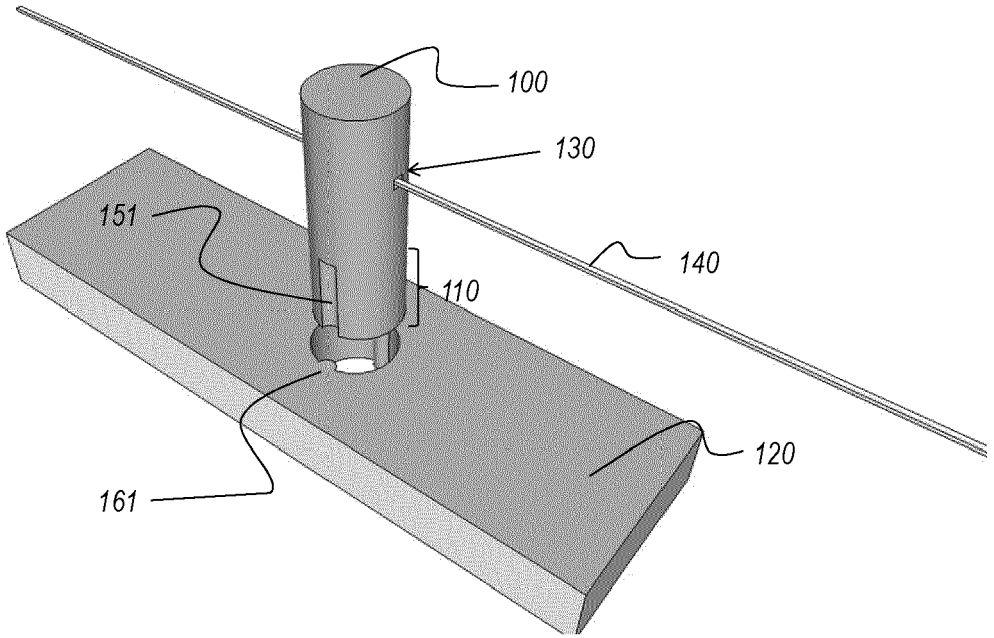


FIGURE 4

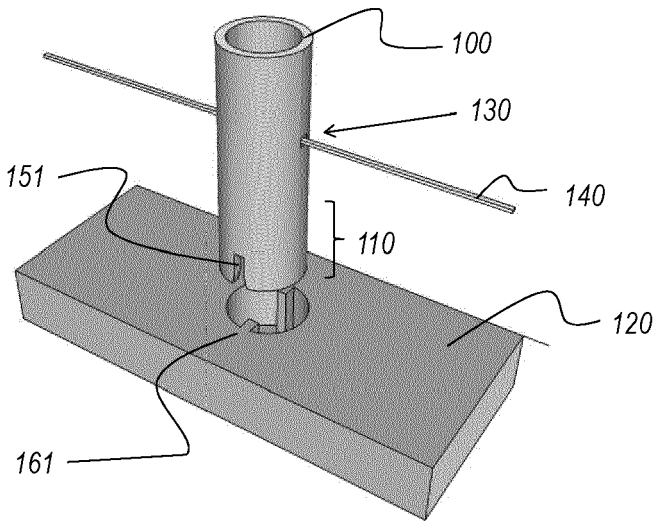


FIGURE 5

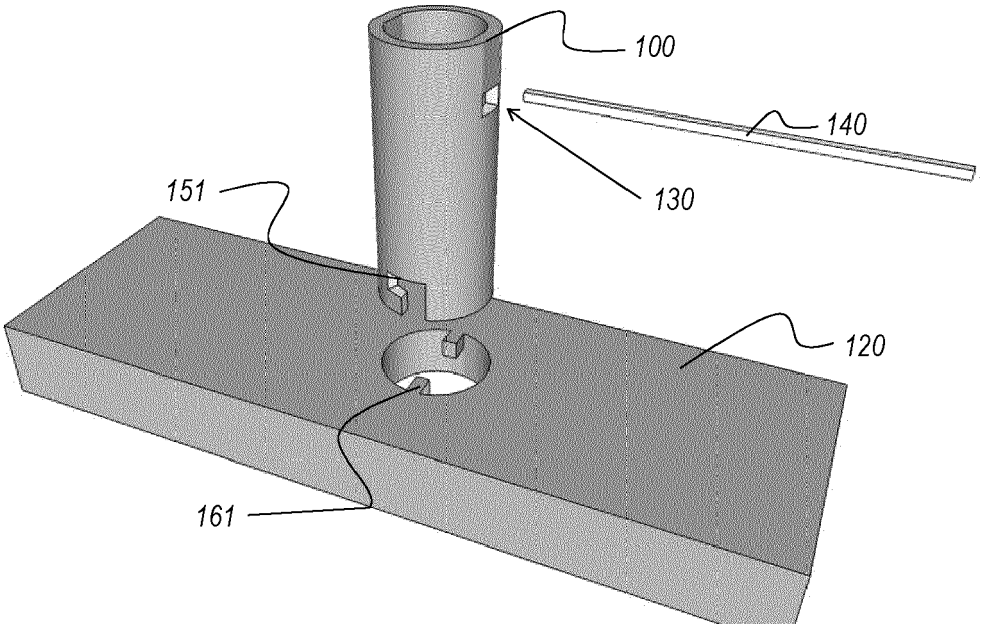


FIGURE 6

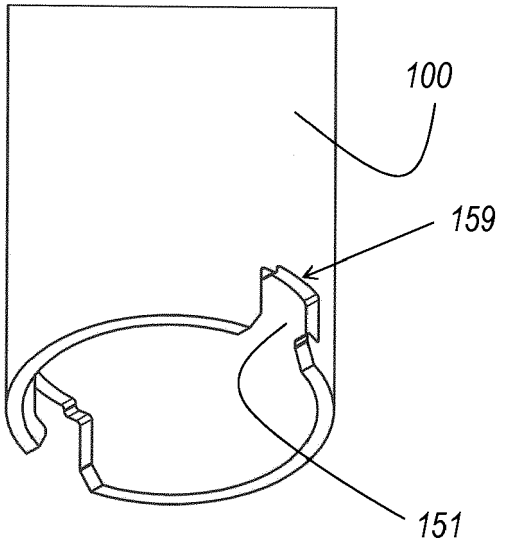


FIGURE 7

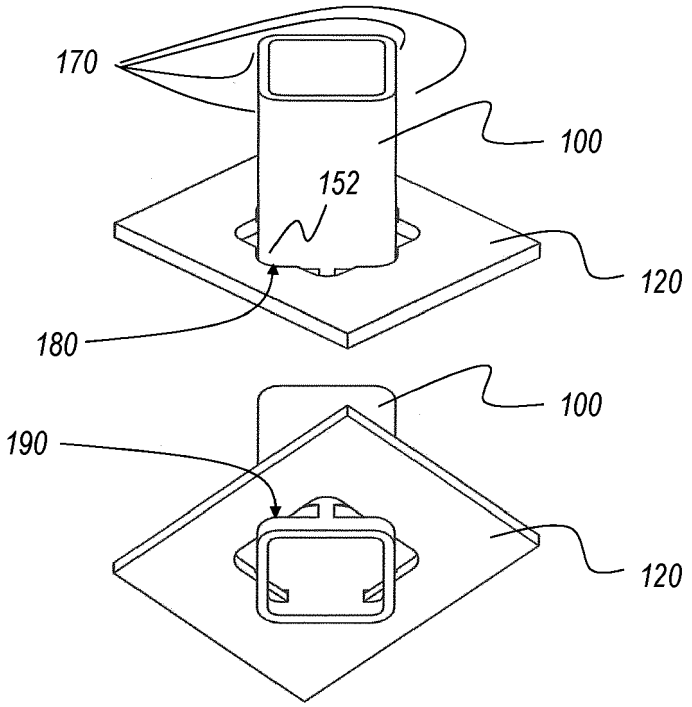
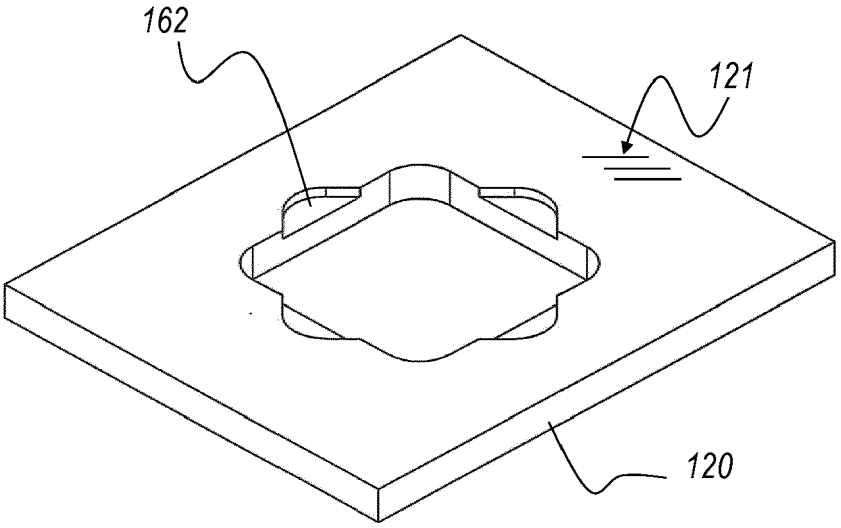


FIGURE 8



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- NL 8302007 **[0002]**