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(71) Applicant: **Grupo Carlos Serrano Vicario, S.L.**
09001 Burgos (ES)

(72) Inventor: **SERRANO VICARIO, SERGIO**
09001 BURGOS (ES)

(74) Representative: **Isern Patentes y Marcas S.L.**
Avda. Diagonal, 463 Bis, 2°
08036 Barcelona (ES)

(54) **CLAMP FOR A FIXATION TO A POST**

(57) A clamp (10) for connecting to a post (1), comprising a first portion (12) and a second portion (11), wherein the first portion (12) comprises one or more teeth bodies (16), provided with first teeth (17), while the second portion (11), comprises retention means which are configured for engaging the first teeth (17) to produce a stable connection between the first portion (12) and the second portion (11) wherein the first teeth (17) are kept retained by the retention means. The invention makes it possible to reduce the time required for connecting, as well as to eliminate tooling requirements.

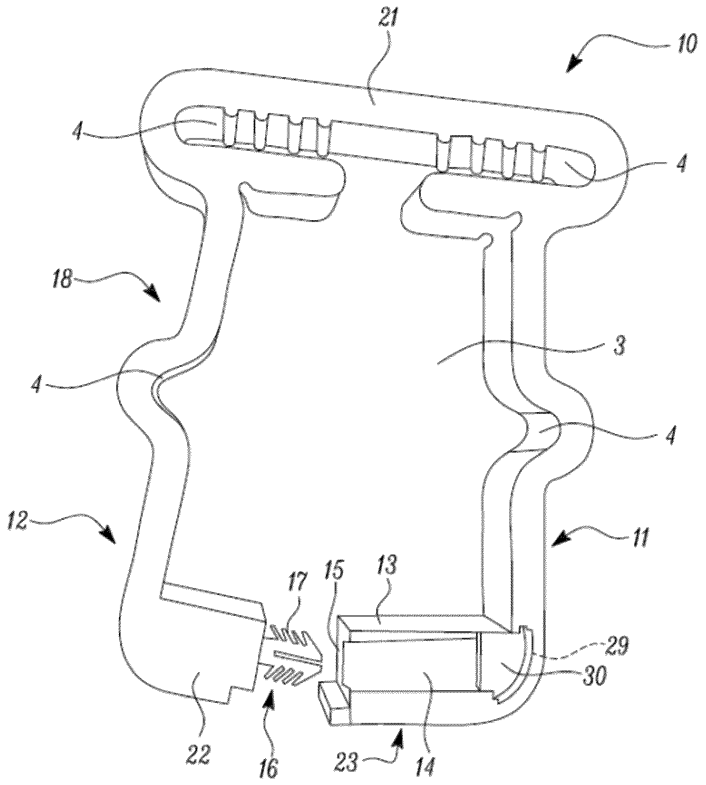

FIG. 2

EP 3 832 054 A1

Description

OBJECT OF THE INVENTION

[0001] The present invention may be included within the field of construction. Specifically, the object of the invention can find preferential application in the field of fencing construction. In this sense, the object of the invention is a clamp of the kind used for connecting elements to a post, wherein particularly, the clamp enables the fences to be executed by connecting fencing sections to a post.

BACKGROUND OF THE INVENTION

[0002] A type of fencing that is widely used in the state of the art comprises a series of posts inserted consecutively into the ground, as well as fencing sections arranged between each pair of consecutive posts, which are fixed to each one of the consecutive posts by means of a plurality of clamps each of which, at different levels, clasp both the post and a portion of the corresponding fencing section.

[0003] To fasten the fencing panels to the posts by means of the clamps, it is necessary to surround the posts and the referred portion of the fencing section and then close the clamp, for which connections such as screws, nuts, bolts, pins, etc., are usually used which require the use of additional tools, which implies a laborious assembly that requires excessive assembly time by the operator.

DESCRIPTION OF THE INVENTION

[0004] The present invention describes a clamp for connecting to a post, wherein the aforementioned connections, such as screws, nuts, bolts, pins, etc., which require the use of tools for the execution thereof, are replaced by, preferably irreversible, teeth-based connections, as explained below.

[0005] Particularly, the clamp comprises a first portion and a second portion, wherein the first portion includes one or more teeth bodies, provided with first teeth, while the second portion comprises retention means that are configured for engaging the first teeth to produce a stable, preferably irreversible, connection between the first portion and the second portion, wherein the first teeth are kept retained by the retention means.

[0006] Preferably, the retention means comprise at least one retention body for retaining the first teeth engaged, as well as optionally further comprising a retention opening defined in each retention body, for enabling the first teeth to access the corresponding retention body thereof. In either case, a defined retention cavity may preferably be included in each retention body to retain the first teeth.

[0007] In a preferred embodiment, when the first portion and the second portion are attached by the first teeth, the clamp adopts a closed shape that clasps the post, the post being housed in an inner housing defined in the clamp.

[0008] According to a possible configuration of the clamp, the first portion and the second portion form part of a single first clamp body. In this case, the first clamp body is preferably configured to be deformable, enabling the first portion and the second portion to surround the post in the inner housing and subsequently engage the first teeth with the retention means bringing them closer to each other, to cause the connection of the first portion and the second portion. Likewise, the first clamp body may include a first intermediate section, on each side of which the first portion and the second portion extend. Moreover, the first portion can comprise, at a distal end with respect to the first intermediate section, a first bend, which includes the teeth body or bodies, while the second portion can comprise, also at a distal end with respect to the first intermediate section, a second bend, facing the first bend, which includes the retention means.

[0009] According to another possible configuration of the clamp, it does not comprise a single clamp body but rather two clamp bodies that form part of separate parts, of which a second clamp body includes the second portion, while a third clamp body includes the first portion. In this case, the second clamp body may comprise retention means with two opposing retention bodies, while the third clamp body may comprise the teeth body, which is able to be inserted into the two retention bodies. Likewise, the second clamp body preferably comprises a second intermediate section, from which respective end members extend towards the sides, in each of which one of the two retention bodies is located.

[0010] The retention body or bodies can be open only frontally, through a corresponding retention opening, but they can also be open laterally. In the latter case, the retention body, or at least one of the retention bodies, comprises two retention arms which define the corresponding retention cavity thereof in the middle of said retention arms, wherein at least one of the two retention arms includes second teeth, antagonistic to the first teeth. The two retention arms can be separated by stiffeners.

[0011] Furthermore, the second clamp body, according to a preferred exemplary embodiment, may define by itself the inner housing for the aforementioned post, although, according to another preferred exemplary embodiment, the clamp comprises a fourth clamp body and a fifth clamp body, which form part of separate parts wherein neither the fourth clamp body nor the fifth clamp body define by themselves the inner housing for the post, but said inner housing is cooperatively defined by the fourth clamp body and the fifth clamp body, once they are connected; as well as the fourth clamp body includes the second portion with at least one retention body, while the fifth clamp body comprises the first portion with at least one teeth body. Moreover, in the second portion there may be two retention bodies, as well as in the first portion there may be two teeth bodies. Likewise, not all

the retention bodies are necessarily located in the second portion, but rather the first portion may comprise at least one additional retention body, as well as, correspondingly, not all the teeth bodies are necessarily located in the first portion, but rather the second portion comprises at least one additional teeth body.

[0012] According to a preferred embodiment, the connection provided by the invention between the first portion and the second portion is preferably provided because the first teeth and/or the retention means are elastically deformable, the first teeth and/or the retention means being configured for engaging by means of elastic deformation. Particularly, the first teeth and/or the corresponding retention body or bodies thereof are elastically deformable so that, by means of a relative approaching movement of the teeth body or bodies and the corresponding retention body or bodies thereof, the first teeth are forced to come into contact with the corresponding retention body thereof, an elastic deformation of the first teeth and/or the retention body taking place, for enabling the first teeth to access the retention body; such that once the first teeth are housed in the retention body thereof, pulling out the first teeth from the retention body is prevented. Both the first teeth, and the retention bodies, or both, can be elastically deformable.

[0013] Moreover, each corresponding retention body can be elastically deformable, such that the two retention arms thereof can be separated from each other, increasing the retention opening so that the first teeth and the second teeth engage together and produce the connection between the first portion and the second portion by means of elastic deformation. Alternatively, the first teeth and/or the second teeth may be elastically deformable, the retention arms not being elastically deformable.

[0014] The clamp, in all the variants that have been explained above, enables irreversible attachments to be created with great time saving, since the time required to engage the first portion with the second portion, in the order of two seconds, is much shorter than that which is usually used to make connections with tools, for example, screwed. Therefore, the clamp of the invention is simpler and faster to assemble than the clamps of the state of the art. Furthermore, similarly to the means cited in the background, the use of teeth also enables connections to be established that are initially less resistant, only a portion of the teeth engaging only partially, and which can later be finished, engaging the rest of the teeth.

DESCRIPTION OF THE DRAWINGS

[0015] As a complement to the description provided herein, and for the purpose of helping to make the features of the invention more readily understandable, in accordance with a preferred practical exemplary embodiment thereof, said description is accompanied by a set of drawings constituting an integral part of the same, which by way of illustration and not limitation, represent the following:

Figure 1 shows a perspective image of an assembled clamp according to the invention, connecting two fencing sections to a post.

Figure 2 shows a perspective view of a first exemplary embodiment of the clamp of the invention, wherein the clamp comprises a single clamp body which includes both the first portion and the second portion.

Figures 3A and 3B show respective perspective views of a second exemplary embodiment of the clamp of the invention, wherein the first portion and the second portion form part of two different clamp bodies, wherein the first portion is represented in Figure 3A and the second portion is represented in Figure 3B.

Figure 4 shows a perspective view of a third exemplary embodiment of the clamp of the invention.

Figure 5 shows a perspective view of a fourth exemplary embodiment of the clamp of the invention.

Figure 6 shows a perspective view of a fifth exemplary embodiment of the clamp of the invention.

Figure 7 shows a perspective view of a sixth exemplary embodiment of the clamp of the invention.

PREFERRED EMBODIMENT OF THE INVENTION

[0016] A detailed description of the clamp (10) for connecting to a post (1), object of the present invention, referred to above, is given below, with the aid of the aforementioned Figures 1-7.

[0017] The clamp (10) of the invention is especially indicated, although not exclusively, for executing fences by fastening one, two or more fencing sections (2) to a post (1), as illustrated in Figure 1. In said Figure 1 a square cross section post (1) is shown, to which two fencing sections (2) are connected, by means of the clamp (10) of the invention, one on each side of the post (1), wherein one of the fencing sections (2), shown on the right of the image, is connected coinciding with a median plane of the post (1), while the other fencing section (2), shown on the left of the image, is connected offset from the median plane, coinciding with the plane of one of the faces of the post (1).

[0018] The clamp (10) of the invention comprises a first portion (12) and a second portion (11). The first portion (12) comprises one or more teeth bodies (16), provided with first teeth (17), while the second portion (11) comprises retention means that are configured for engaging the first teeth (17) to produce a stable connection between the first portion (12) and the second portion (11) wherein the first teeth (17) are retained by the retention means. Preferably, the connection between the first portion (12) and the second portion (11) is irreversible, so that it can only be undone, by means of tools, in a destructive manner. Moreover, when the first portion (12) and the second portion (11) are attached by the first teeth (17), the clamp (10) preferably has an inner housing (3) which houses the post (1), as well as the clamp (10) pref-

erably adopts a closed shape that clasps the post (1).

[0019] Various ways of configuring both the retention means, as well as the teeth body (16), with the first teeth (17) are envisaged. A preferred way, as explained below with various exemplary embodiments, is based on the elastic deformation of the first teeth (17) and/or of the retention means, which are configured so that the engaging is produced by means of elastic deformation. The elastic deformation-based connection provides an irreversible attachment between the first portion (12) and the second portion (11). However, in the clamp (10) of the invention other ways of connection can be implemented that are not necessarily deformation-, or at least elastic deformation-, based, or that do not necessarily lead to irreversible attachments. For example, the first teeth 17 and the housing means may be configured for operating by way of a ratchet, or they may be configured for providing a snap-lock connection, or they may operate similarly to polyamide flanges.

[0020] In general, the clamp (10) of the invention stands out for replacing the connections referred to in the state of the art, which involve high costs in labour, time and tooling, with attachments that involve teeth engagement, which involve a tool-free faster assembly, and without the need for specialized manpower.

[0021] The clamp (10) of the invention can be made of various materials, such as preferably polymeric plastic materials, although they can also be made of other materials, such as metal.

[0022] Next, with the aid of Figures 2-6, the operation of various embodiments of clamps (10) according to the invention is explained in more detail.

[0023] According to the aforementioned Figures 2-6, the clamp (10) of the invention comprises a first portion (12) and a second portion (11), wherein the second portion (11) comprises retention means that preferably include: at least one retention body (13); a retention cavity (14) defined in each retention body (13); and a retention opening (15) made in the retention body (13); as well as the first portion (12) comprises at least one teeth body (16) provided with first teeth (17), intended to be housed and retained in the retention means. According to a preferred exemplary embodiment, the first teeth (17) do not fit through the retention opening (15) without deformation of the first teeth (17) or of the retention body or bodies (13).

[0024] The connection of one or more elements - for example, fencing sections (2) - to the post (1) can be carried out because the first teeth (17) and/or the retention body (13) are elastically deformable, so that, by means of a relative approaching movement between the teeth body or bodies (16) and the retention cavity (14), the first teeth (17) are forced to come into contact with the retention body or bodies (13), producing an elastic deformation of the first teeth (17) and/or the corresponding retention body (13) thereof, which enables the first teeth (17) to access the interior of the retention cavity (14). Once the first teeth (17) are housed within the retention cavity (14), the elastic deformation is recovered, such that a distancing movement in the opposite direction to the approaching movement is no longer possible for pulling the first teeth (17) from the retention cavity (14), because the first teeth (17) do not fit through the retention opening (15), as well as because the configuration and arrangement of the first teeth (17) is such that it does not enable a deformation that enables them to come out. Consequently, as explained, an irreversible attachment between the first portion (12) and the second portion (11) can be achieved, which can only be undone, by means of tools, in a destructive manner.

[0025] When the first portion (12) and the second portion (11) are connected by means of the first teeth (17), the clamp (10) has a closed shape that clasps the post (1), which is housed in an inner housing (3) defined in the clamp (10), in order to fasten one, two or more desired elements to the post (1), such as, according to the aforementioned particular application, various fencing sections (2). The inner housing (3) has a corresponding shape adjusted to that of the cross section of the post (1): circular, square, etc., to provide greater fastening between the post (1) and the elements fastened to the post (1), for example, the fencing sections (2).

[0026] In the exemplary embodiments represented, the first teeth (16) have been considered to be arranged in at least one row of parallel first teeth (16) with an oblique orientation, which is convergent for the approaching movement and divergent for the distancing movement. This distribution is also compatible with cases where no deformation is produced, particularly elastic deformation, wherein the converging orientation facilitates the engagement, while the divergent orientation retains the engagement.

[0027] Next, a more detailed description of various features of the clamp (10) of the invention is presented, in view of the aforementioned Figures 2-6.

[0028] The clamp (10) of the following exemplary embodiments, although not necessarily, may be based, as indicated above, on the elastic deformation of the first teeth (17) and/or of the retention body or bodies (13). In this sense, it is envisaged that, in some exemplary embodiments, the first teeth (17) are elastically deformable, as well as that, in other exemplary embodiments, the retention bodies (13) are elastically deformable and, in other examples, both the first teeth (17) and the retention bodies (13) are elastically deformable.

[0029] Moreover, in a manner compatible with the aforementioned exemplary embodiments, the clamp (10) of the invention can be made up either by a single first clamp body (18), which includes both the first portion (12) and the second portion (11), as described in Figures 2, 4 and 5, or by two clamp bodies (19, 20), of which a second clamp body (19) includes the second portion (11), while a third clamp body (20) includes the first portion (12), as shown in Figures 3A, 3B and 6.

[0030] The first clamp body (18) is configured for being deformable, enabling the first portion (12) and the second

portion (11) to surround the post (1), and thus house said post (1) in the inner housing (3) and subsequently, bringing the first teeth (17) closer together to the retention means to cause the connection of the first portion (12) and the second portion (11). Preferably, the first intermediate section (21), the first portion (12) and the second portion (11) are rigid; this happens because the first clamp body (18) is deformable in the attachment areas of the first intermediate section (21) with the first portion (12) and the second portion (11).

[0031] Preferably, the first clamp body (18) comprises a first intermediate section (21), on each side of which the first portion (12) and the second portion (11) extend. Even more preferably, the first portion (12) comprises, at a distal end with respect to the first intermediate section (21), a first bend (23), which includes the teeth body or bodies (16), while the second portion (11) comprises, also at a distal end with respect to the first intermediate section (21), a second bend (22), facing the first bend (23), which includes the retention means.

[0032] The description in the preceding paragraphs, as regards a single first clamp body (18), is also compatible with the cases wherein there is no deformation, particularly elastic deformation.

[0033] Likewise, in a manner compatible with the exemplary embodiments described above, the retention body or bodies (13) can be open only frontally, through the retention opening (15), as shown in Figures 2, 3A-3B and 6 or, alternatively, they can further be open laterally, see Figures 4 and 5. In the latter case, wherein the retention body or bodies (13) are open both frontally and laterally, at least one of the retention bodies (13), or more, or all of the retention bodies, may comprise two retention arms (24) which define the corresponding retention cavity (14), wherein at least one of the two retention arms (24) includes second teeth (25), antagonistic to the first teeth (17). In the exemplary embodiment represented in Figure 5, there are two teeth bodies (16) located in parallel and separated, although there may also be a single teeth body (16), or more than two teeth bodies (16).

[0034] For the case of second teeth (25), according to a first exemplary embodiment, the connection between the first portion (12) and the second portion (11) takes place, by elastic deformation, because the corresponding retention body (13) is elastically deformable such that the two retention arms (24) thereof can separate from each other, increasing the retention opening (15) so that the first teeth (17) and the second teeth (25) fit together. Only one of the two retention arms (24), as well as the two retention arms (24), may comprise second teeth (25).

[0035] Continuing with the case of second teeth (25), according to a second exemplary embodiment, it is the first teeth (17) and/or the second teeth (25) that are deformed, the retention arms (24) not being elastically deformable, for example, because they are separated by stiffeners (33), such as ribs, see Figure 5. Likewise, there may be two teeth bodies (16), the two teeth bodies (16) arranged separately and in parallel, either with one or two rows of first teeth (17) or second teeth (25) each, for example, in upper and lower opposite positions, so that the retention bodies (13) are configured correspondingly.

[0036] As put forward above, the clamp (10) may comprise a separate second clamp body (19) and third clamp body (20), as shown in Figures 3A-3B, wherein the second clamp body (19), see Figure 3A, comprises two retention bodies (13), with respective retention cavities (14), which face each other, while the third clamp body (20), see Figure 3B, comprises at least one teeth body (16) which is able to be inserted into the two retention cavities (14). As explained above for other embodiments, the teeth body or bodies (16) may include one or more rows of first teeth (17) or second teeth (25), in this case both contiguous and opposite, in correspondence with the retention bodies (13). Likewise, the second clamp body (19) can include a second intermediate section (26), from which respective end members (27) extend towards the sides, in each of which, preferably in a third bend (28) each one of the retention bodies (13) is located. The above description regarding the second clamp body (19) and the third clamp body (20) are also compatible with the case wherein there is no deformation, particularly elastic deformation.

[0037] Consistent with the aforementioned exemplary embodiments, the second clamp body (19) itself defines the inner housing (3) for the post.

[0038] Likewise, for any of the aforementioned exemplary embodiments, the clamp (10) may include a lateral perforation (29) and a cover (30) covering the perforation, as seen in Figures 2 and 3A-3B.

[0039] Moreover, according to a new preferred embodiment, shown in Figure 6, the clamp (10) of the invention further comprises two clamp bodies (31, 32), that is, a fourth clamp body (31) and a fifth clamp body (32), which in this case belong to separate parts, where, contrary to the exemplary embodiments described above, neither the fourth clamp body (31) nor the fifth clamp body (32) define by themselves the inner housing (3) for the post (1), but rather said inner housing (3) is cooperatively defined by the fourth clamp body (31) and the fifth clamp body (32), once they are connected.

[0040] In this embodiment, the fourth clamp body (31) includes the second portion (11) with at least one retention body (13), preferably two retention bodies (13), while the fifth clamp body (32) comprises the first portion (12) with at least one, preferably two, correspondingly, teeth bodies (16). Preferably, as shown in Figure 6, in the second portion (11) there are two retention bodies (13), with respective retention cavities (14), as well as in the first portion (12) there are two teeth bodies (16). Alternatively, not represented in the figures, not all the retention bodies (13) are located in the second portion (11), but there may be additional retention bodies (not represented) in the first portion (12), as well as, correspondingly, not all the teeth bodies (16) are located in the first portion (12), but rather there may be additional teeth bodies (not repre-

sented) in the second portion (11). The previous passages referring to the fourth clamp body (31) and the fifth clamp body (32) are also compatible with the cases wherein there is no deformation, particularly elastic deformation.

[0041] Finally, according to a new embodiment, represented in Figure 7, a clamp (10) with a configuration similar to that of Figure 6 is presented, which it is essentially distinguished in that the fourth clamp body (31) and the fifth clamp body (32) are C-shaped, each one with two free ends. Thus, the corresponding first portions (12) with the teeth bodies (16) thereof are located at the free ends of the fourth clamp body (31), while the corresponding second portions (11) with the retention bodies (13), retention openings (15) and retention chambers (14) thereof are located at the free ends of the fifth clamp body (32), opposite the free ends of the fourth clamp body (31).

[0042] The clamps (10) described in the previous sections are configured, as indicated, for fastening certain elements to the posts (1), for which the clamps (10) include coupling means (4) which enable the post (1) to be fixed to the mentioned elements. Particularly, the elements can be, as previously indicated, fencing sections (2), for example, fencing sections (2) of those comprising mesh made with welded wires, as shown in Figure 1. The coupling means (4) can take very different configurations, as is known in the state of the art. In the exemplary embodiments illustrated in the figures, coupling means (4) have been represented by way of example that enable elements to be coupled to a post (1) in any position and orientation with respect to the post (1), particularly, in anterior or posterior or central orientation, as well as forming angles, etc.

Claims

1. A clamp (10) for connecting to a post (1), comprising a first portion (12) and a second portion (11), **characterized in that** the first portion (12) comprises one or more teeth bodies (16), provided with first teeth (17), while the second portion (11), comprises retention means which are configured for engaging the first teeth (17) to produce a stable connection between the first portion (12) and the second portion (11) wherein the first teeth (17) are kept retained by the retention means.

2. The clamp (10) for connecting to a post (1), according to claim 1, **characterized in that** the retention means comprise at least one retention body (13) intended for keeping the first teeth (17) engaged.

3. The clamp (10) for connecting to a post (1), according to any of claims 1-2, **characterized in that** the first portion (12) and the second portion (11) form part of a single first clamp body (18).

4. The clamp (10) for connecting to a post (1), according to claim 3, **characterized in that** the first clamp body (18) is configured for being deformable, enabling the first portion (12) and the second portion (11) to surround the post (1) in the inner housing (3) and, subsequently, to couple the first teeth (17) with the retention means bringing them closer to each other, to cause the connection of the first portion (12) and the second portion (11).

5. The clamp (10) for connecting to a post (1), according to claim 4, **characterized in that** the first clamp body (18) comprises a first intermediate section (21), on each side of which the first portion (12) and the second portion (11) extend.

6. The clamp (10) for connecting to a post (1), according to claim 5, **characterized in that** the first portion (12) comprises, at a distal end with respect to the first intermediate section (21), a first bend (23), which includes the teeth body or bodies (16), while the second portion (11) comprises, also at a distal end with respect to the first intermediate section (21), a second bend (22), facing the first bend (23), which includes the retention means.

7. The clamp (10) for connecting to a post (1), according to claim 6, **characterized in that** the first intermediate section (21), the first bend (23) and the second bend (22) are rigid, the first clamp body (18) being deformable in the attachment areas of the first intermediate section (21) with the first bend (23) and/or the second bend (22).

8. The clamp (10) for connecting to a post (1), according to any of claims 1-2, **characterized in that** it comprises two separate clamp bodies (19, 20), of which a second clamp body (19) includes the second portion (11), while a third clamp body (20) includes the first portion (11).

9. The clamp (10) for connecting to a post (1), according to claims 2 and 8, **characterized in that** the second clamp body (19) comprises retention means with two opposing retention bodies (13), while the third clamp body (20) comprises the teeth body (16), which is able to be inserted into the two retention bodies (13).

10. The clamp (10) for connecting to a post (1), according to claim 9, **characterized in that** the second clamp body (19) comprises a second intermediate section (26), from which respective end members (27) extend towards the sides in each of which one of the two retention bodies (13) is located.

11. The clamp (10) for connecting to a post (1), according to any of claims 2-10, **characterized in that** the retention body or bodies (13) are open both frontally

and laterally, wherein the retention body (13), or at least one of the retention bodies (13), comprises two retention arms (24) which define the corresponding retention cavity (14) thereof in the middle of said retention arms (24), wherein at least one of the two retention arms (24) includes second teeth (25), antagonistic to the first teeth (17).

12. The clamp (10) for connecting to a post (1), according to claim 11, **characterized in that** the two retention arms (24) are separated by stiffeners (33).

13. The clamp (10) for connecting to a post (1), according to claim 2, **characterized in that** it comprises a fourth clamp body (31) and a fifth clamp body (32), which form part of separate parts wherein neither the fourth clamp body (31) nor the fifth clamp body (32) define by themselves the inner housing (3) for the post (1), but said inner housing (3) is cooperatively defined by the fourth clamp body (31) and the fifth clamp body (32), once they are connected; as well as the fourth clamp body (31) includes the second portion (11) with at least one retention body (13), while the fifth clamp body (32), comprises the first portion (12) with at least one teeth body (16).

14. The clamp (10) for connecting to a post (1), according to claim 13, **characterized in that** in the second portion (11) there are two retention bodies (13), as well as in the first portion (12) there are two teeth bodies (16).

15. The clamp (10) for connecting to a post (1), according to claim 14, **characterized in that** the fourth clamp body (31) and the fifth clamp body (32) are C-shaped, with two free ends each wherein the corresponding first portions (12) and second portions (11) are located.

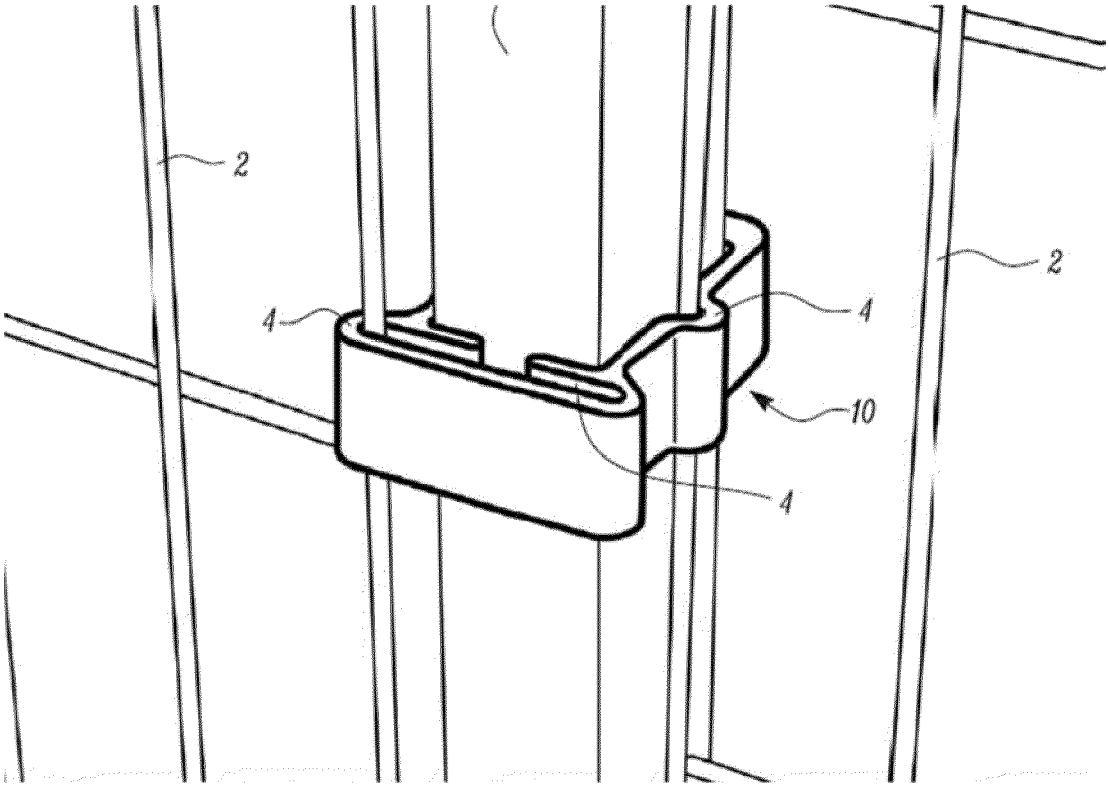

FIG. 1

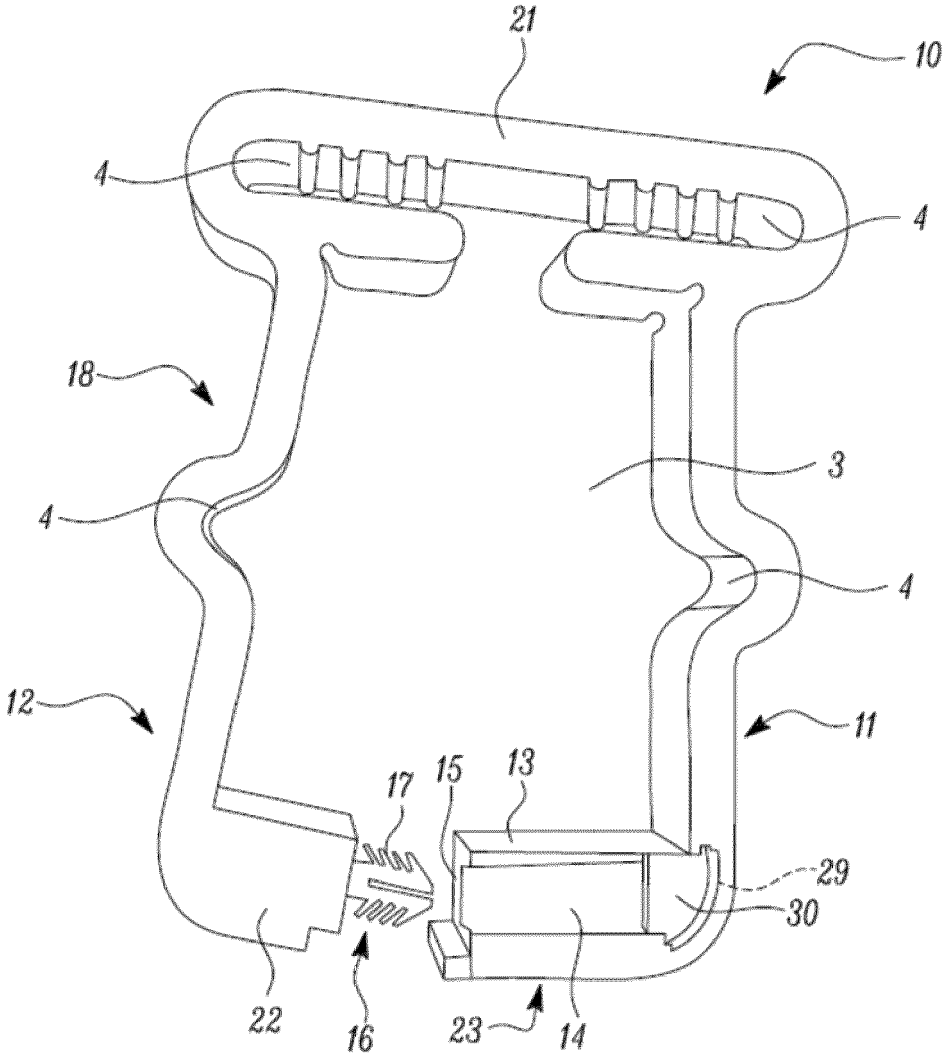

FIG. 2

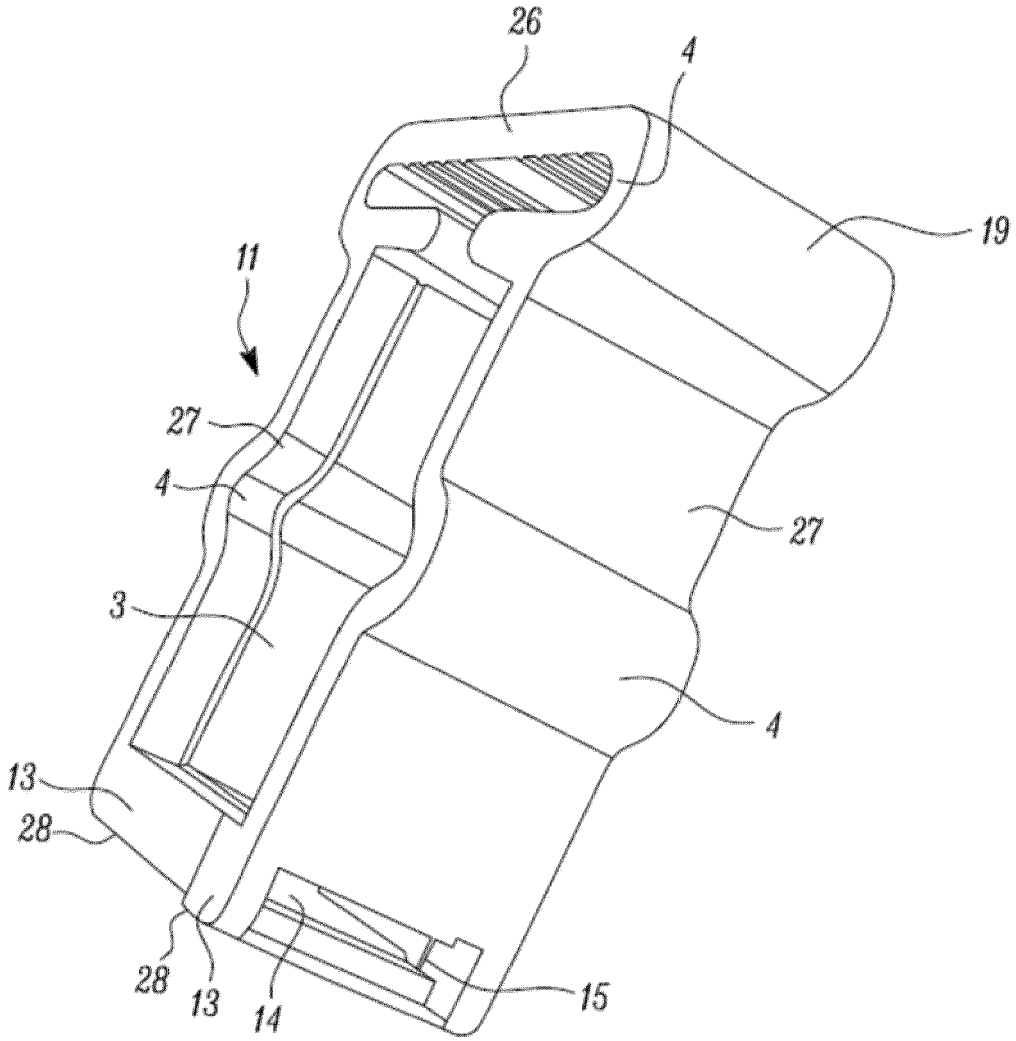

FIG. 3A

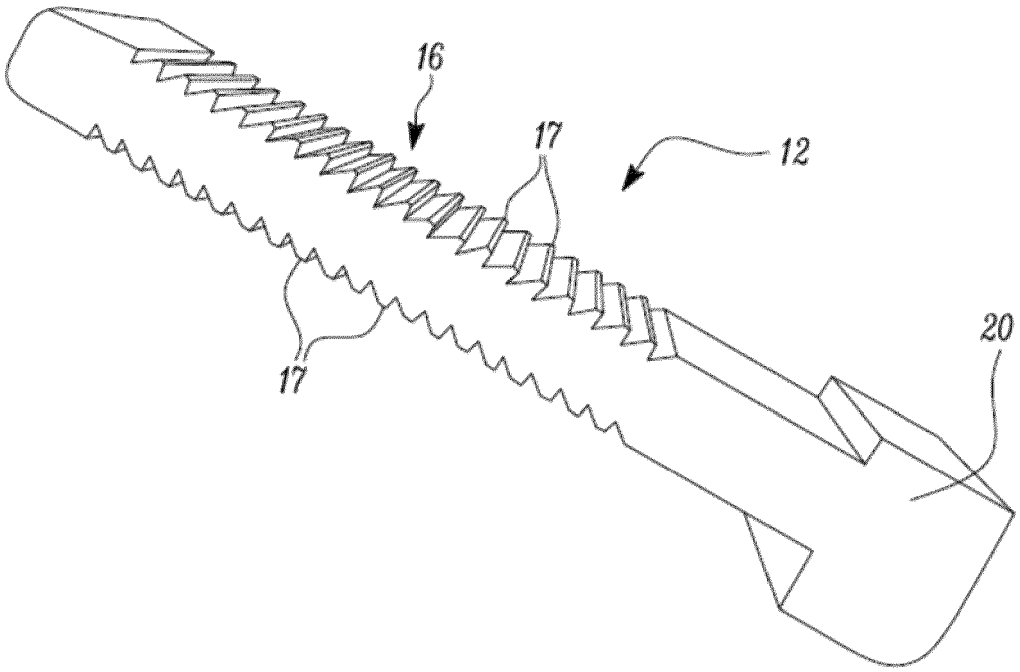

FIG. 3B

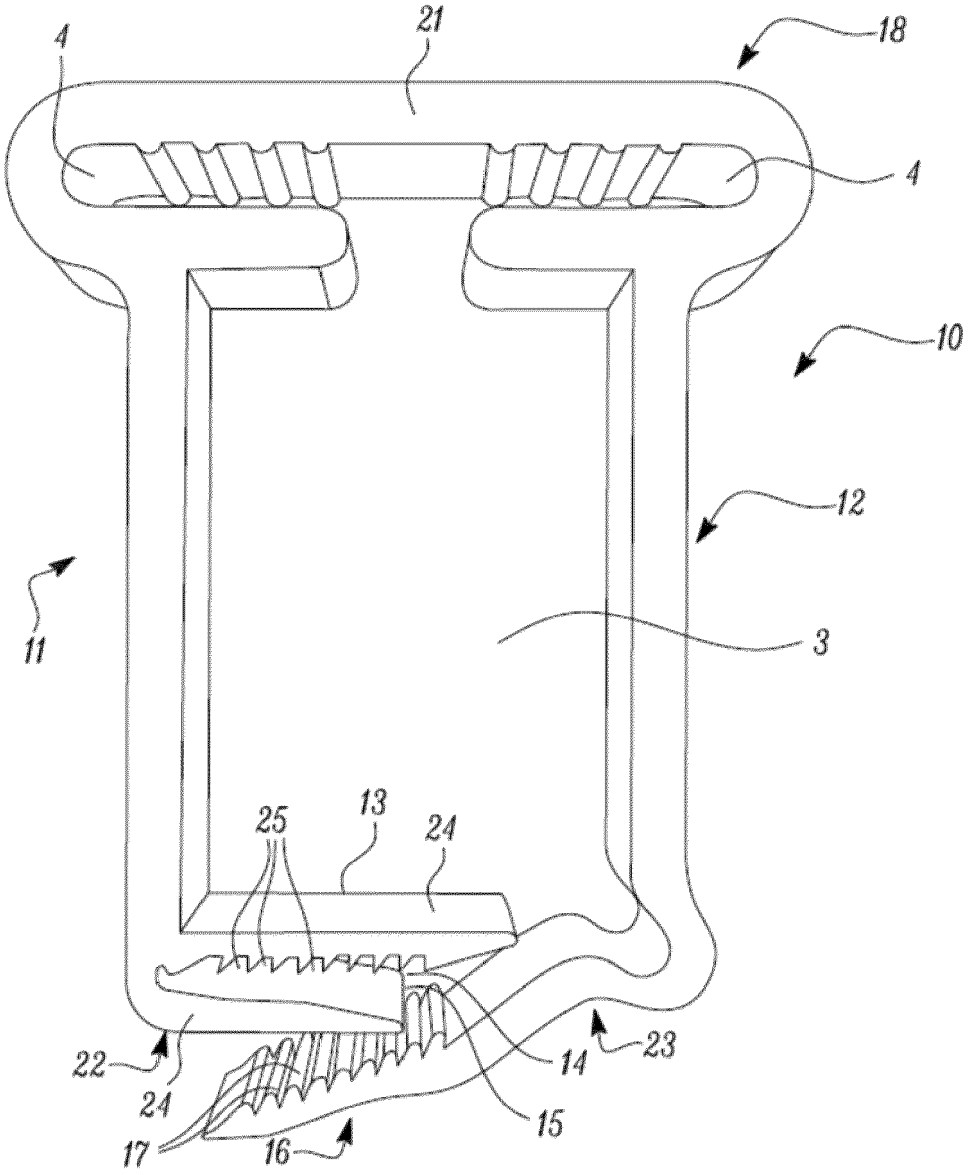

FIG. 4

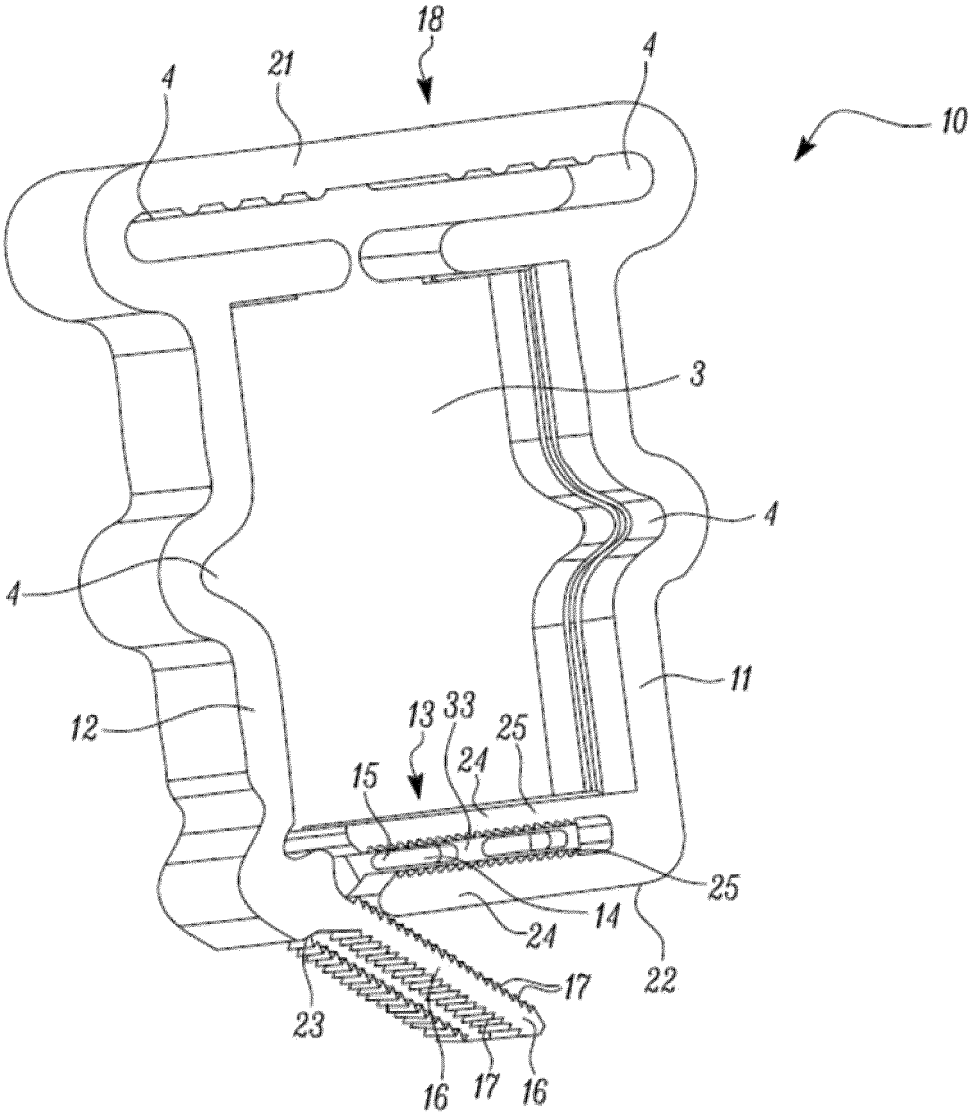

FIG. 5

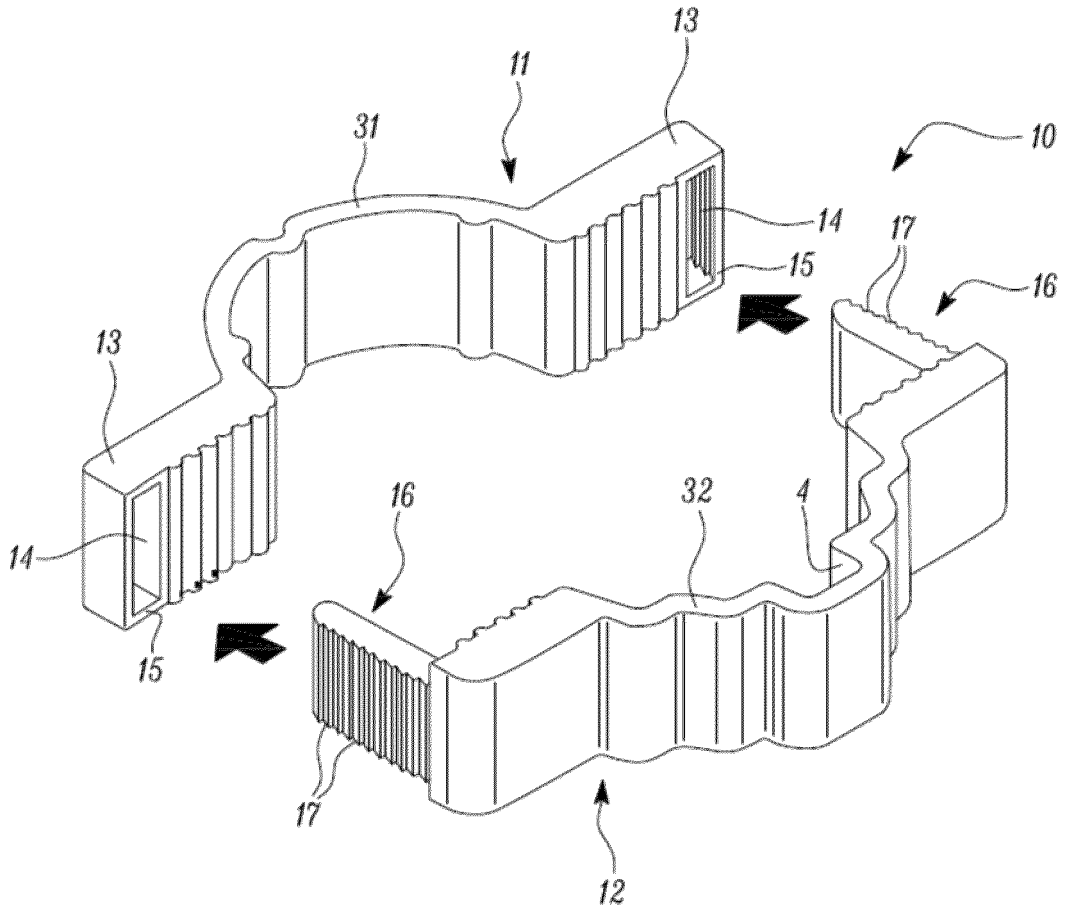

FIG. 6

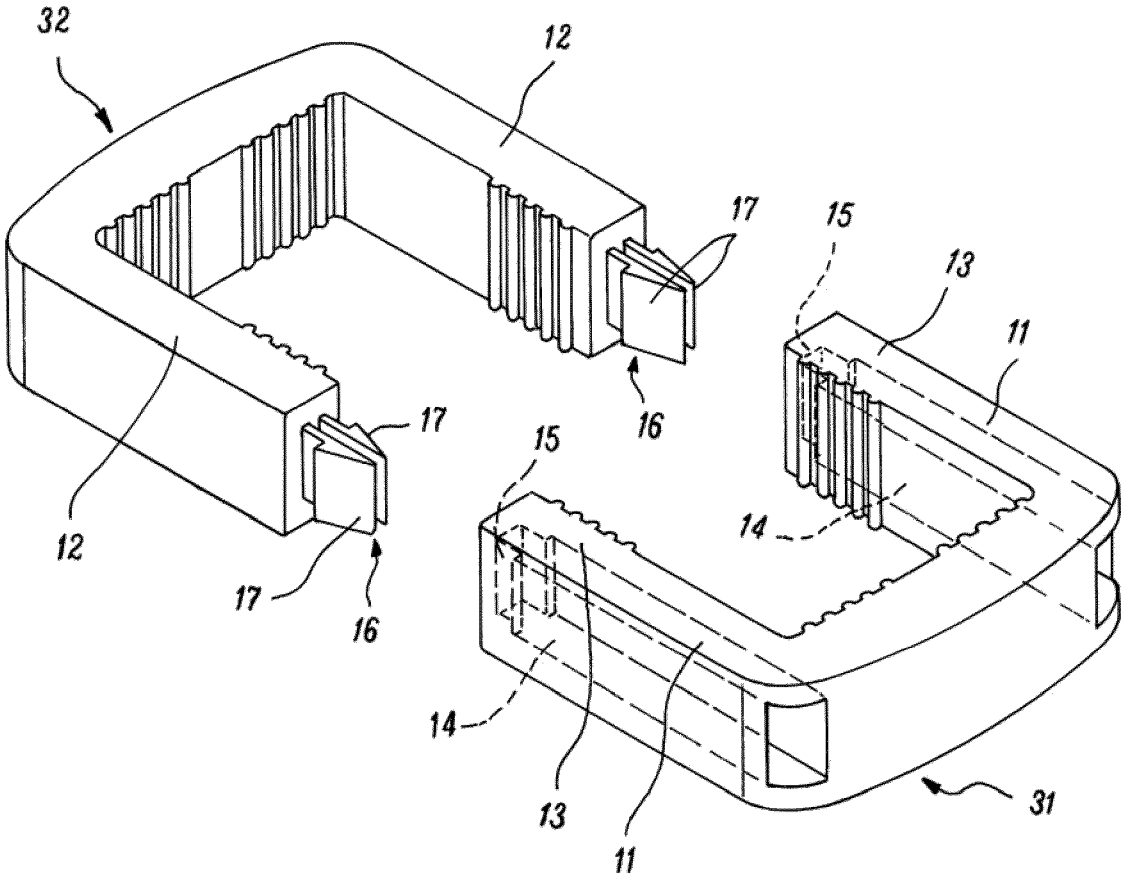

FIG.7

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EUROPEAN SEARCH REPORT

Application Number
EP 20 38 3040

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2 947 055 A (MCHENRY WARREN B) 2 August 1960 (1960-08-02) * column 2, line 50 - column 3, line 62; figures 1-3 *	1-7,11, 12 13-15	INV. E04H17/10
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TECHNICAL FIELDS SEARCHED (IPC)

E04H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 April 2021	Valenta, Ivar

CATEGORY OF CITED DOCUMENTS

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