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(54) **DEVICE FOR FIXING A PANEL TO A FENCE POST**

(57) Piece (1) for fixing a panel (2) to an enclosure profile (3), wherein the panel (2) has an end vertical rod (4.1); and the piece (1) comprises a central section (8), a first face (9) configured to be coupled to the core (3.1) of the profile (3) by said central section (8) and a second opposite face (10) and at least a first housing (12) of a vertical rod having such a dimension that it allows its rotation, wherein the first and second lateral ends (6, 7) form fitting means in the respective projections (3.3) of the wings (3.2) of the profile (3), wherein the first lateral end (6) is substantially straight and perpendicular to the central section (8), and, the second lateral end (7) is curved, both oriented in the opposite direction to the first face (9).

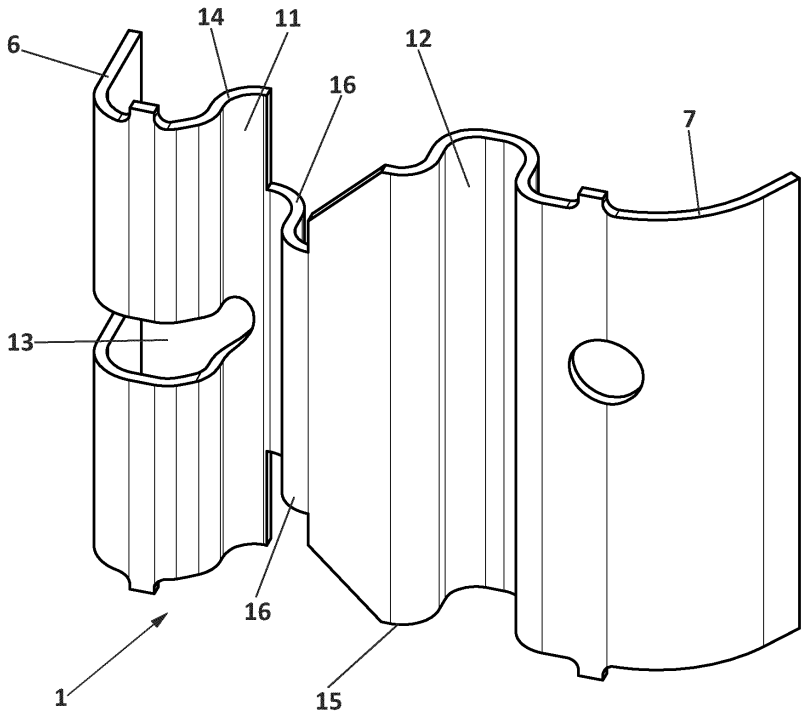

FIG. 1

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Description

Technical field of the invention

[0001] The present invention relates to the technical field of the enclosures formed by mesh panels and specifically to a piece for fixing said mesh panel, either flat or with a reinforcing fold, to the vertical profiles of the enclosure laterally framing said mesh panel.

Background of the Invention

[0002] At present, in the enclosures of facilities such as industrial facilities, parks, sports grounds and others, enclosures are used that are configured using mesh panels that can be flat or with a reinforcing fold, and that are installed by fixing them to vertical profiles anchored to the ground.

[0003] Cable ties were initially used to fix these mesh panels to the vertical profiles.

[0004] In order to obtain means for fixing the mesh panel to the profiles that ensure its inviolability and at the same time be effective and easy to install, at present fixing pieces are used which, at the same time as they are fixed to the profile, they grip the end rod of the panel.

[0005] As an example of the state of the art, reference documents ES1064108 and ES1064109, which are owned by the applicant himself, reference document ES2217714 and FR3084899 can be mentioned.

[0006] In the first two documents, external screwed elements are required for a correct fixing of the mesh panel to the profile of the enclosure.

[0007] For its part, reference document ES2217714 presents means that prevent any sliding of the clip along the projection of the profile, formed by nails on the lateral ends of said clip. However, these nails will generate damage due to scratches on the profile and represent a danger to the installer due to possible damage during installation, due to the handling of this piece having sharp elements.

[0008] Neither does it contemplate the possibility of installing a panel with a certain angle of inclination with respect to the profile, this being a very common option in any enclosure and in practice it is solved by adding special pieces that provide the conditions for that panel configuration, provided that this may be possible.

[0009] Reference document FR3084899 proposes an accessory for fixing a panel to a post, consisting of a locking piece that is placed against the profile and a fastening piece that is immobilized by clamping the locking piece and the profile wings.

[0010] This document values the option of several housings for the vertical rod of the panel, one of them having greater dimension, which will allow a certain internal rotation of the rod. However, this approach has drawbacks because it requires two complementary pieces, so there is a possibility of losing one of them, as a result of which the accessory would be ineffective. In addition, it requires screws for a correct fixing of the accessory to the profile of the enclosure.

[0011] It is therefore required to find a solution that allows the fixing of mesh panels to the profiles of the enclosure, in a simple way, without additional elements (screws, rivets, pins ...), that may be economical, mechanically and weather resistant, discreet (that remains hidden in the groove of the enclosure profile), safe for the installer, and inviolable, being effective both for straight panels or for panels with a reinforcing fold and that allows the arranged panel to be fixed both perpendicular to the profile and at a certain angle with respect to it.

Description of the invention

[0012] The piece for fixing a panel to an enclosure profile presented herein is used to fix panels formed by a mesh of vertical and horizontal rods, with an end vertical rod for fixing to the profile, wherein the profile is provided with a core and wings that are bent at their ends defining facing projections.

[0013] The piece has an elongated sheet shape of small thickness made up of different straight and curved sections. More specifically, the piece comprises a first and second lateral ends and a central section between them, a first face configured to be coupled to the core of the profile by said central section, a second opposite face and at least a first housing of an end vertical rod, having such a dimension that it allows its rotation inside.

[0014] In this piece, the first and second lateral ends form fitting means in the respective protrusions of the profile wings, where the first lateral end is substantially straight and perpendicular to the central section, and, the second lateral end is curved, both oriented in opposite direction to the first face.

[0015] With the piece for fixing a panel to an enclosure profile proposed herein, a significant improvement in the state of the art is obtained, the piece being also both mechanically and weather resistant, and inviolable, in addition to being aesthetic.

[0016] This is so because a simple and economic piece is achieved with which it is possible to fix a panel to a profile easily and quickly. This piece is inserted into the profile by means of a tool and is fixed to it by pressure, not requiring screws or other extra fixing elements. In addition, it is a piece that does not have nails on the contour, so there is no problem of damaging or scratching the profile. In addition, handling is easier and safer for the installer, reducing the risk of cutting by handling it.

[0017] In addition, it allows the installation of the enclosure by absorbing the different angles presented by the plots, making it versatile and it solves the problem that currently exists, since this is achieved simply by coupling the rod to one or another housing thereof, depending on whether the enclosure panel is perpendicular to the profile or has a different angle. Therefore, no additional external elements are required, facilitating the in-

stallation again.

[0018] Likewise, it is effective for both flat panels and panels with a reinforcing fold, due to the existence of two housings. This is so because, with the first housing, the rod arrangement is allowed in those cases in which the panel has an angle of inclination with respect to the profile, since its greater dimensions allow the rod to rotate and, the fact of being more separated from the first end of the piece favors that the panel does not find an obstacle in the profile wing. In this first housing a rod of a panel perpendicular to the profile can also be arranged, with the particularity that it must be a flat panel.

[0019] On the other hand, it may has a second housing in which it is possible to accommodate the rod in those cases in which the panel is located perpendicular to the profile, whether it is a flat panel or with a reinforcing fold. In the latter case, the distance between this second housing and the second end of the piece allows the panel to be fixed without the profile wing being an obstacle to the panel folding.

Brief description of the drawings

[0020] In order to help a better understanding of the features of the invention, in accordance with a preferred example of practical embodiment thereof, a series of drawings is provided as an integral part of said description, wherein, by way of illustration and not limitation, the following has been represented:

Figure 1.- Shows a perspective view of the piece for fixing a panel to an enclosure profile of the invention, according to a preferred embodiment of the invention.

Figure 2.- Shows a plan view of the piece for fixing a panel to an enclosure profile of the invention, according to a preferred embodiment of the invention.

Figure 3.- Shows a perspective view of the piece shown in the previous figures in a position for fixing a panel to an enclosure profile.

Figures 4.1 and 4.2.- Show respective plan and detail A views, respectively, of the piece in a first position for fixing a panel to an enclosure profile, according to a preferred embodiment of the invention.

Figure 4.3.- Shows a view of the detail A of figure 4.1, for a first position prior to fixing a panel to an enclosure profile of the invention, according to a preferred embodiment of the invention.

Figure 5.- Shows a perspective view of the piece of the invention in a second position for fixing a panel to an enclosure profile.

Figures 6.1 and 6.2.- Show plan and detail B views, respectively, of the piece in a second position for fixing a panel to an enclosure profile.

Figure 7.- Shows a perspective view of the piece in a third position for fixing a panel to an enclosure profile.

Figures 8.1 and 8.2.- Show plan and detail C views, respectively, of the piece in a third position for fixing a panel to an enclosure profile.

Figure 9.- Shows a perspective view of the piece in a fourth position for fixing a panel to an enclosure profile.

Figures 10.1 and 10.2.- Show plan and detail D views, respectively, of the piece in a fourth position for fixing a panel to an enclosure profile.

Figures 11.1, 11.2 and 11.3.- Finally, show an elevation view and, two of them, a section view respectively of an example for placing a clip of the invention in the profile so that the function of the recess presented by the second housing is shown.

Detailed description of a preferred embodiment of the invention

[0021] In view of the figures provided, it can be seen how in a preferred embodiment of the invention, the piece (1) for fixing a panel (2) to an enclosure profile (3) proposed herein, is carried out for a panel (2) formed by a mesh of vertical and horizontal rods (4, 5), with an end vertical rod (4.1) for being fixed to the profile (3), which in this first embodiment has a fold, since it is a panel (2) with a reinforcing fold.

[0022] For its part, the profile (3) is provided with a core (3.1) and wings (3.2) that bend at their ends defining projections (3.3) facing each other.

[0023] This piece (1) comprises a first and second lateral ends (6, 7) and a central section (8) between them. It also has a first face (9) configured to couple to the core (3.1) of the profile (3) by means of said central section (8), a second opposite face (10) and at least a first housing (12) of an end vertical rod (4.1), having such a dimension that it allows its rotation inside.

[0024] In this preferred embodiment of the invention, the piece (1) consists of high elastic limit steel.

[0025] As shown in Figures 1 and 2, the first and second lateral ends (6, 7) of this piece (1) form fitting means in the respective projections (3.3) of the wings (3.2) of the profile (3), wherein the first lateral end (6) is substantially straight and perpendicular to the central section (8), for a first fit in one of the wings (3.2) of the profile (3), as shown in Figure 4.3 and, the second end side (7) is curved, both oriented in the opposite direction to the first face (9).

[0026] The curved shape of this second lateral end (7) allows, on the one hand, a reduction in the force required in the assembly process, since it facilitates the deformation and sliding of the piece (1) during its introduction into the profile (3) and, on the other hand, it avoids a vertical movement of the piece (1) and panel (2) assembly with respect to the profile (3), since the stored deformation of said second lateral end (7), together with the fact that the piece (1) is made of high elastic limit steel, causes that it is maintained, producing a strong tension against the inside of the wings (3.2) of the profile (3).

[0027] As can be seen in Figures 1 and 2, in this pre-

ferred embodiment of the invention, the piece (1) comprises at least a second housing (11) having a dimension capable of accommodating an end vertical rod (4.1) and being smaller than the first housing (12). This second housing (11) is located closer to the first lateral end (6) than the first housing (12).

[0028] Likewise, in this case, the distance from the second housing (11) to the second lateral end (7) is such that it allows the end vertical rod (4.1) of a panel (2) with reinforcing fold to be accommodated between said second housing (11) and the wing (3.2) of the profile (3), as will be explained later.

[0029] According to another aspect, in this preferred embodiment of the invention, as shown in Figure 1, piece (1) comprises vertical panel fixing means formed by an intermediate notch (13) at the first lateral end (6) of the piece (1), between two sections thereof, when the end vertical rod (4.1) is accommodated in the second housing (11).

[0030] Said intermediate notch (13) serves, as shown in Figure 3, to accommodate a horizontal rod (5) of the panel (2), when the end vertical rod (4.1) of the panel (2) is accommodated in the second housing (11). In this way, the panel (2) is fixed preventing its vertical movement in both directions.

[0031] In other cases, as can be seen in Figures 5 and 7, when the end vertical rod (4.1) of the panel (2) is housed in the first housing (12), this notch (13) does not have any fixing function and, there is no possibility of accommodating a horizontal rod therein. In these cases the fixing of the vertical position of the panel (2) is achieved by placing a piece (1) just below a horizontal rod (5) of the panel (2) and another piece (1) just above another horizontal rod (5) thereof, so that the vertical movement of the panel (2) in both directions is also avoided.

[0032] Likewise, in this first preferred embodiment, the piece (1) comprises an opposite upper end (14) and lower end (15), and the second housing (11) has at least one high recess (16) with respect to at least one of said upper and lower ends (14, 15), that is, with respect to the end or ends where it is located.

[0033] This recess (16) has the function of allowing the introduction of the piece (1) without colliding with the reinforcing fold of the end vertical rod (4.1) of a panel (2). It is a necessary cut to be able to mount the panel (2) when it has a reinforcing fold, accommodating the end vertical rod (4.1) in the second housing (11) of the piece (1), when this piece (1) is installed in one of the horizontal rods (5) of the base of a reinforcement fold of the panel (2).

[0034] More specifically, in Figures 11.1, 11.2 and 11.3 it can be seen how the piece (1) is coupled in that situation and how it is provided that the curved part of the vertical rod (4.1) escape sideways due to said recess (16).

[0035] More specifically, this functionality is achieved both by the height (d) of said recess (16) and by the opening angle thereof or, in other words, by the amount of circular sector that is cut out of the second housing (11).

[0036] Thus, in the case of height (d), this makes it possible to avoid the interference between the aforementioned curved part of the vertical rod (4.1) and the piece (1) and, for such an example practical embodiment that said piece (1) is not weakened too much by creating a break line if, in addition, said recess is double, that is, at the top and at the bottom as in the example represented in the figure.

[0037] As for the portion of the circular sector that is cut from the second housing (11), it is recommended that it be at least 90°. The uncut area indicated in the figures with an angular arc is otherwise at least 90°.

[0038] This is so because, as seen in Figures 11.2 and 11.3, two extreme cases can occur when mounting panels (2) to profiles (3). The first is the one shown in figure 11.2, wherein the fit has been perfect and the vertical rod (4.1) is stuck or adjusted to the core (3.1) of the profile (3) or, a second one that can be seen in the figure 11.3, in which the operator has not calculated well enough when inserting the profile (3) and the vertical rod (4.1) is separated by a few millimeters from the core (3.1) of the profile (3), therefore remaining stuck to the first face (9) of the piece (1).

[0039] Therefore, in the first case, wherein the vertical rod (4.1) is stuck to the core (3.1) of the profile (3), it would be sufficient if the portion of the circular sector cut in the second housing (11) was smaller than 90°, but, in the second case, when the vertical rod (4.1) was stuck to the first face (9) of the piece (1), an opening of a circular sector equal to or greater than 90° would be necessary and, therefore, an uncut zone equal to or less than 90°.

[0040] In this preferred embodiment of the invention, as shown in Figures 3 and 4.1 to 4.3, the panel (2) has a reinforcing fold and is arranged perpendicular to the profile (3), therefore, in this case, the end vertical rod (4.1) must be attached to the second housing (11). In this second housing (11) the reinforcing fold of the panel (2) is not a problem, since the second housing (11) is located close to the first lateral end (6) of the piece (1) and as has already been indicated, the distance from the second housing (11) to the second side end (7) is such that it allows to accommodate the end vertical rod (4.1) of a panel (2) with reinforcing fold, between said second housing (11) and the wing (3.2) of the profile (3).

[0041] As can be seen in Figures 5, 6.1 and 6.2, the panel (2) can be arranged in other positions with respect to the piece and, in these figures, a second position is represented in which the panel (2) is arranged perpendicular to the profile (3) and it is a flat panel (2), so that the end vertical rod (4.1) is straight and there is no condition that there is a minimum distance between the second housing (11) in which said end vertical rod (4.1) is attached and the second side end (7), since there is no fold in the panel (2). Thus, as shown in said Figures, the end vertical rod (4.1) can be accommodated in the second housing (11), as occurs in the first position proposed in Figures 3 and 4.1 to 4.3, or it can be accommodated

in the first housing (12), as occurs in this second position.

[0042] A third possible position of the panel (2) is that in which the panel (2) is flat, but it must be placed at a certain angle with respect to the profile (3). Under these conditions, as can be seen in Figures 7, 8.1 and 8.2, the end vertical rod (4.1) of the panel (2) must be accommodated in the first housing (12), which is the one with dimensions that allow rotation thereof, in order to install the panel (2) with the required inclination. In this way, in addition, the profile (3) wing is prevented from creating an obstacle to the inclination of the panel (2).

[0043] On the other hand, there is a fourth possible position, for a panel (2) that must be installed with a certain inclination with respect to the profile (3) but it is a panel (2) with a reinforcing fold. In this case, as shown in Figures 9, 10.1 and 10.2, again the end vertical rod (4.1) must be accommodated in the first housing (12), which will allow its rotation until reaching the required inclination for the panel (2) and also, has a distance with the wing of the profile (3) that is close to the first side end (6) of the piece (1), so that the inclined position of the panel (2) is allowed without this wing being an obstacle.

Claims

1. Piece (1) for fixing a panel (2) to an enclosure profile (3), wherein

   - the panel (2) comprises a mesh of vertical and horizontal rods (4, 5), with an end vertical rod (4.1) for being fixed to the profile (3);
   - the profile (3) comprises a core (3.1) and wings (3.2) that bend at their ends defining facing projections (3.3);
   - the piece (1) comprises a first and second lateral ends (6, 7) and a central section (8) between them, a first face (9) configured to be coupled to the core (3.1) of the profile (3) by said central section (8), a second opposite face (10) and at least a first housing (12) of an end vertical rod (4.1), having such a dimension that it allows its rotation inside;

   characterized in that the first and second lateral ends (6, 7) form fitting means in the respective projections (3.3) of the wings (3.2) of the profile (3), wherein the first lateral end (6) is substantially straight and perpendicular to the central section (8), and, the second lateral end (7) is curved, both oriented in the opposite direction to the first face (9).

2. Piece (1) for fixing the mesh panel (2) to an enclosure profile (3), according to claim 1, **characterized in that** it comprises a second housing (11) of dimension capable of accommodating an end vertical rod (4.1) and smaller than the first housing (12), located closer to the first lateral end (6) than said first housing (12).

3. Piece (1) for fixing the mesh panel (2) to the enclosure profile (3), according to claim 2, **characterized in that** the distance from the second housing (11) to the second lateral end (7) is such that it allows accommodating the end vertical rod (4.1) of a panel (2) with reinforcing fold, between said second housing (11) and the wing (3.2) of the profile (3).

4. Piece (1) for fixing the mesh panel (2) to the enclosure profile (3), according to any one of claims 2 or 3, **characterized in that** it comprises vertical panel fixing means formed by an intermediate notch (13) in the first lateral end (6) of the piece (1).

5. Piece (1) for fixing the mesh panel (2) to the enclosure profile (3), according to any one of the preceding claims, **characterized in that** it comprises opposite upper end (14) and lower end (15), and the second housing (11) comprises at least one high recess (16) with respect to at least one of said upper and lower ends (14, 15).

6. Piece (1) for fixing the mesh panel (2) to the enclosure profile (3), according to claim 5, **characterized in that** the recess (16) comprises a cutout of a circular sector of at least 90 °.

7. Piece (1) for fixing the mesh panel (2) to the enclosure profile (3), according to any one of the preceding claims, **characterized in that** it is made of high elastic limit steel.

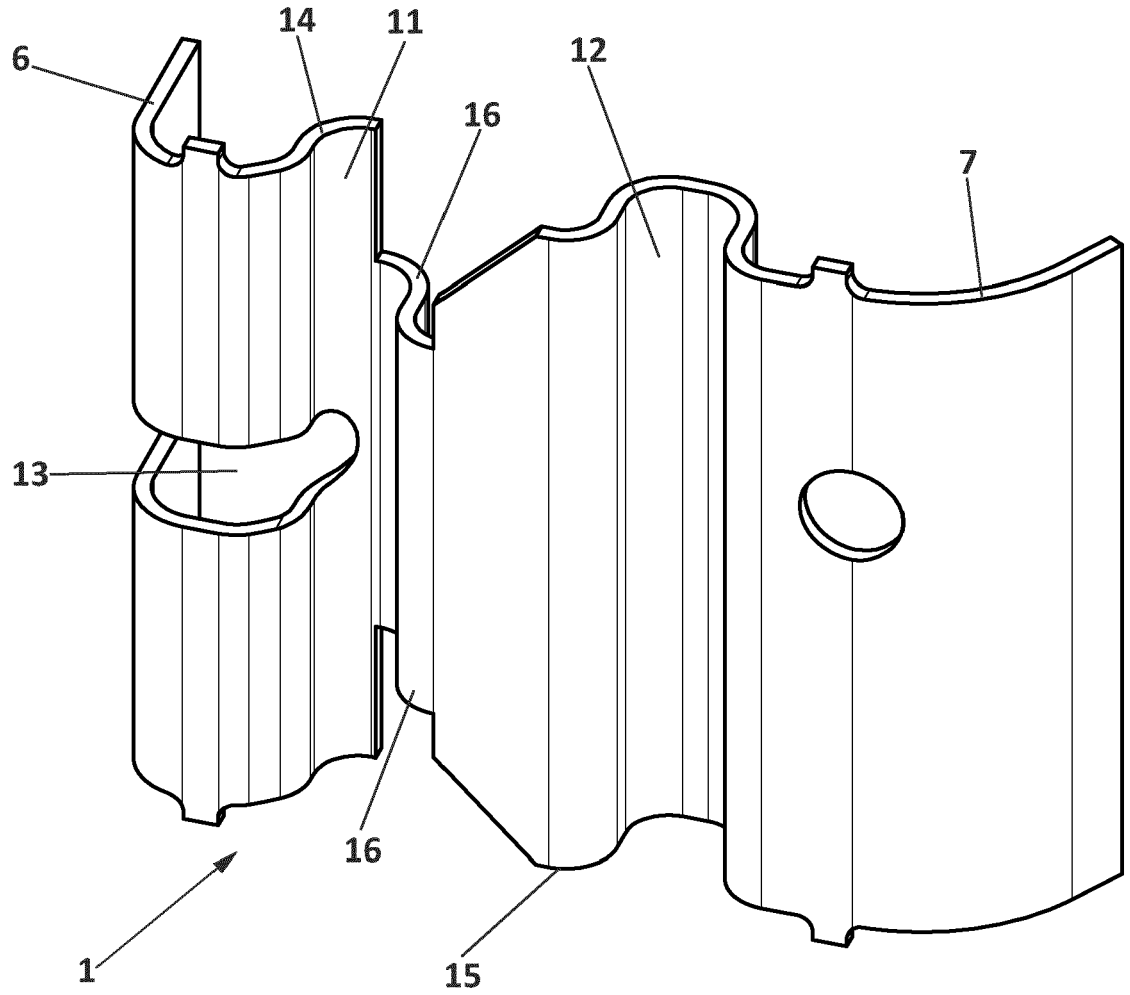

FIG. 1

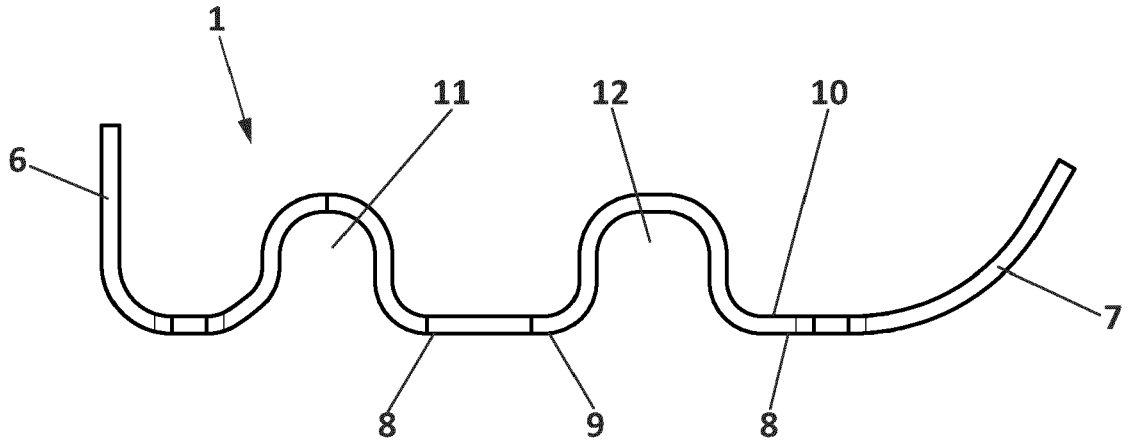

FIG. 2

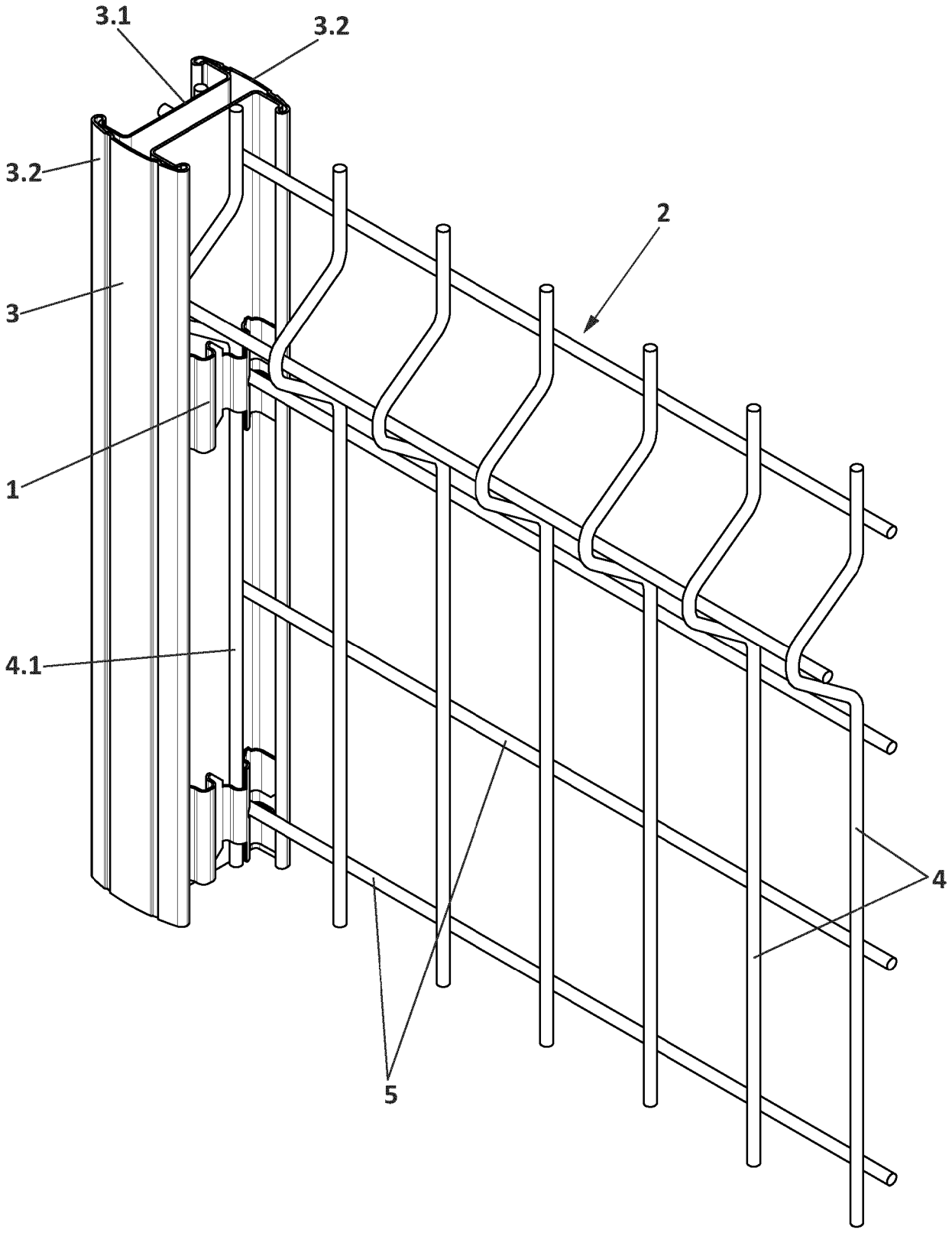

FIG. 3

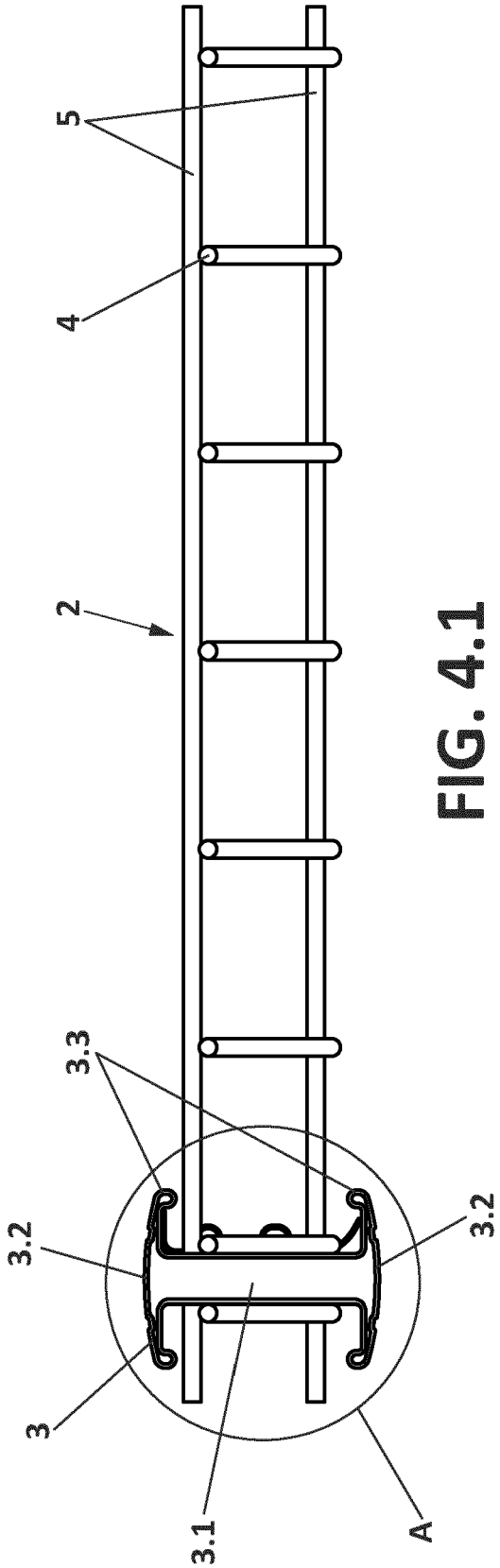

FIG. 4.1

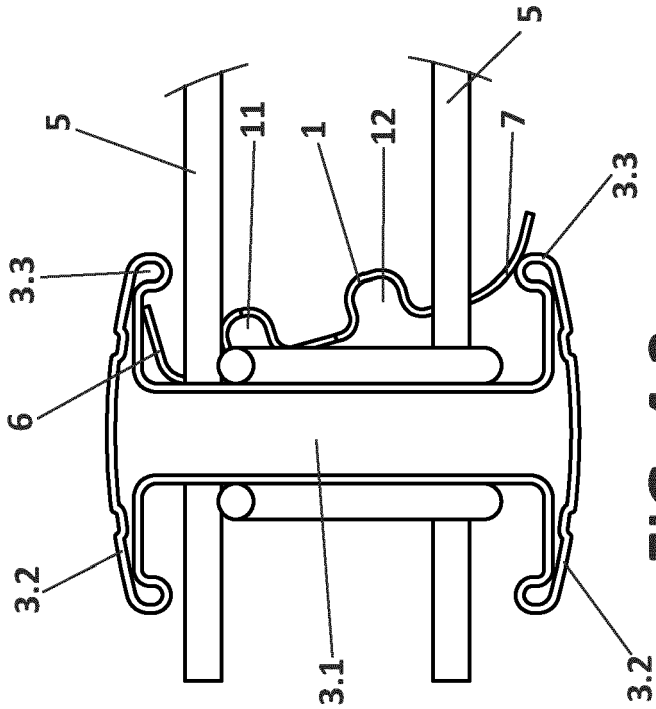

FIG. 4.3

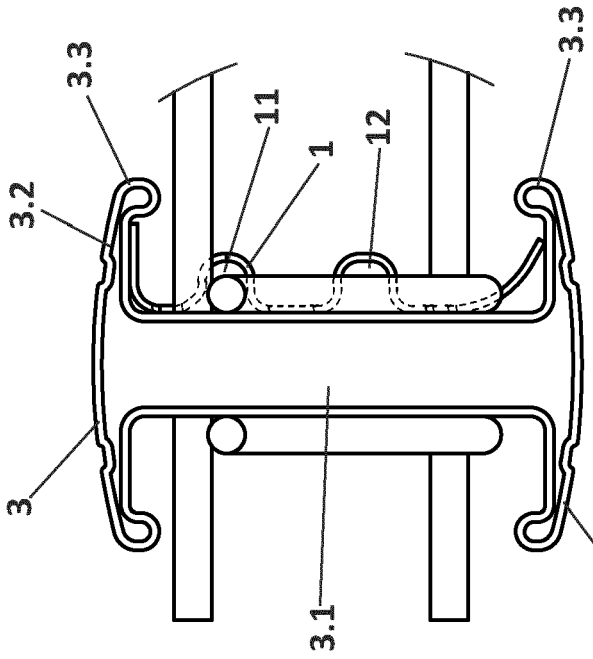

FIG. 4.2

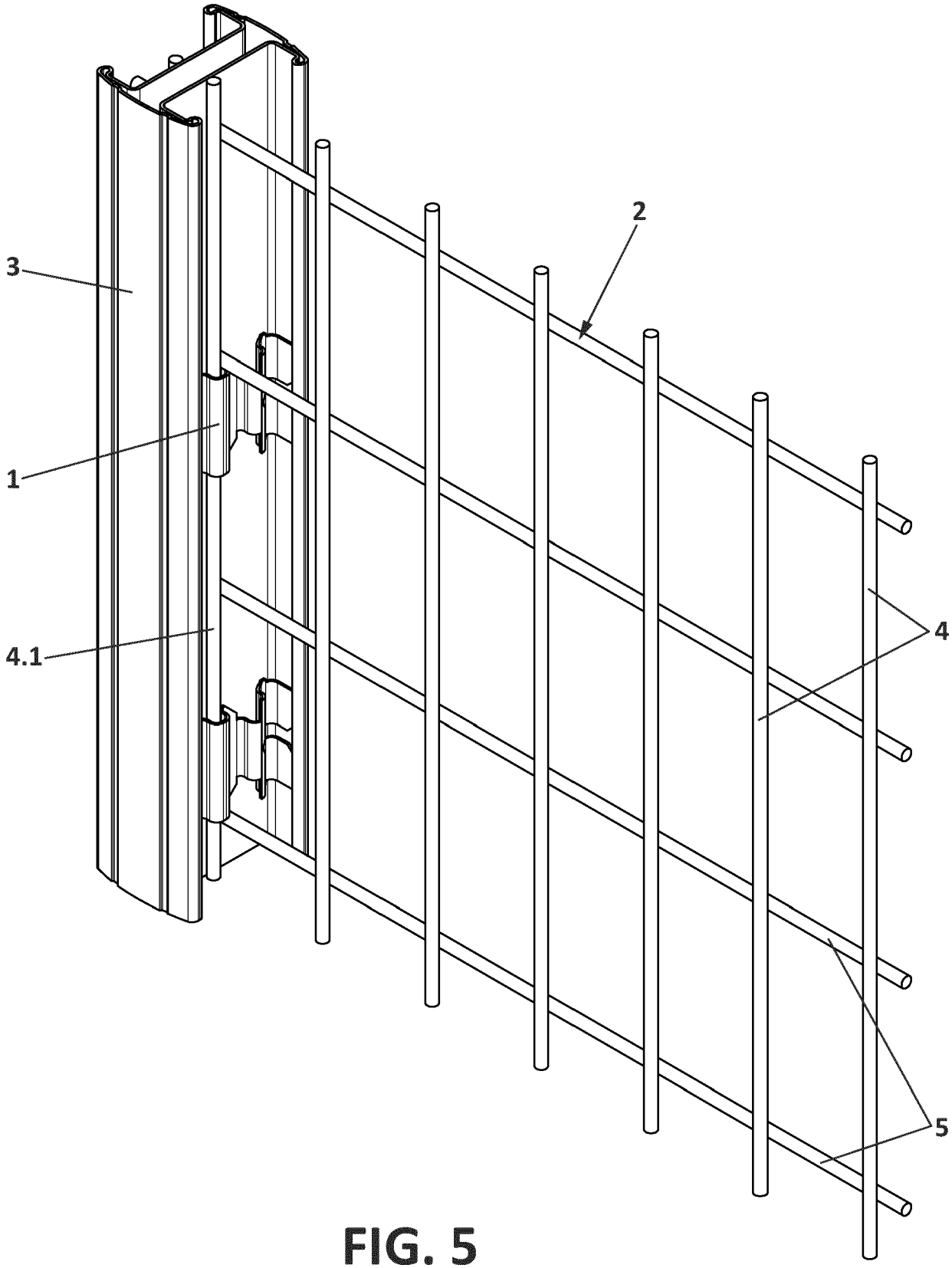

FIG. 5

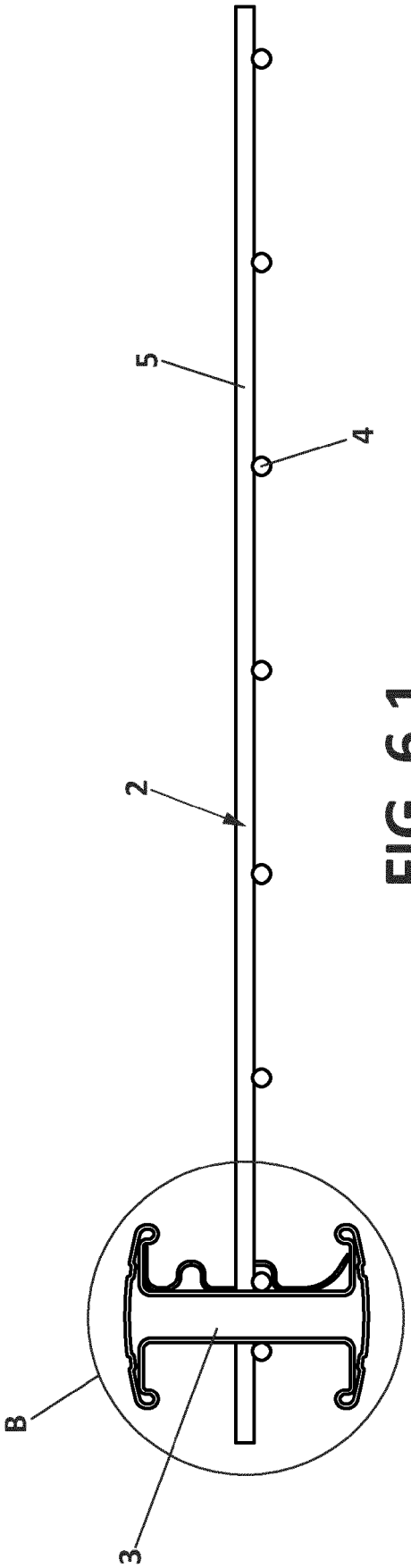

FIG. 6.1

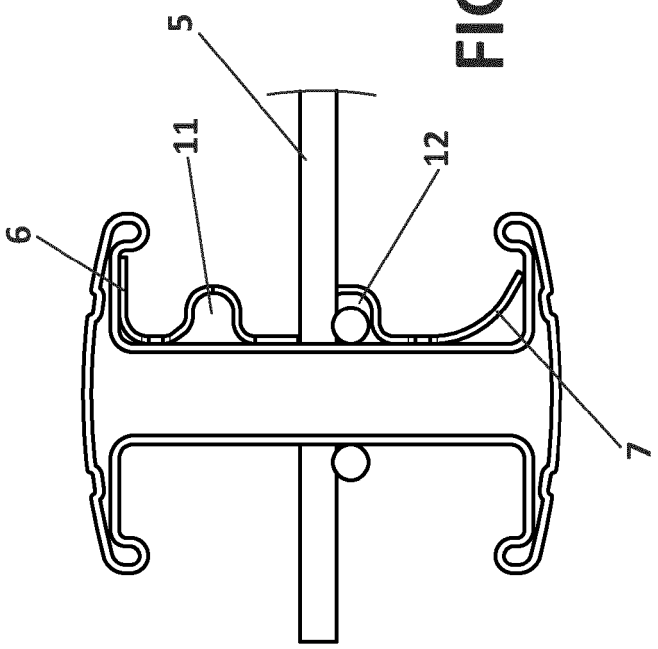

FIG. 6.2

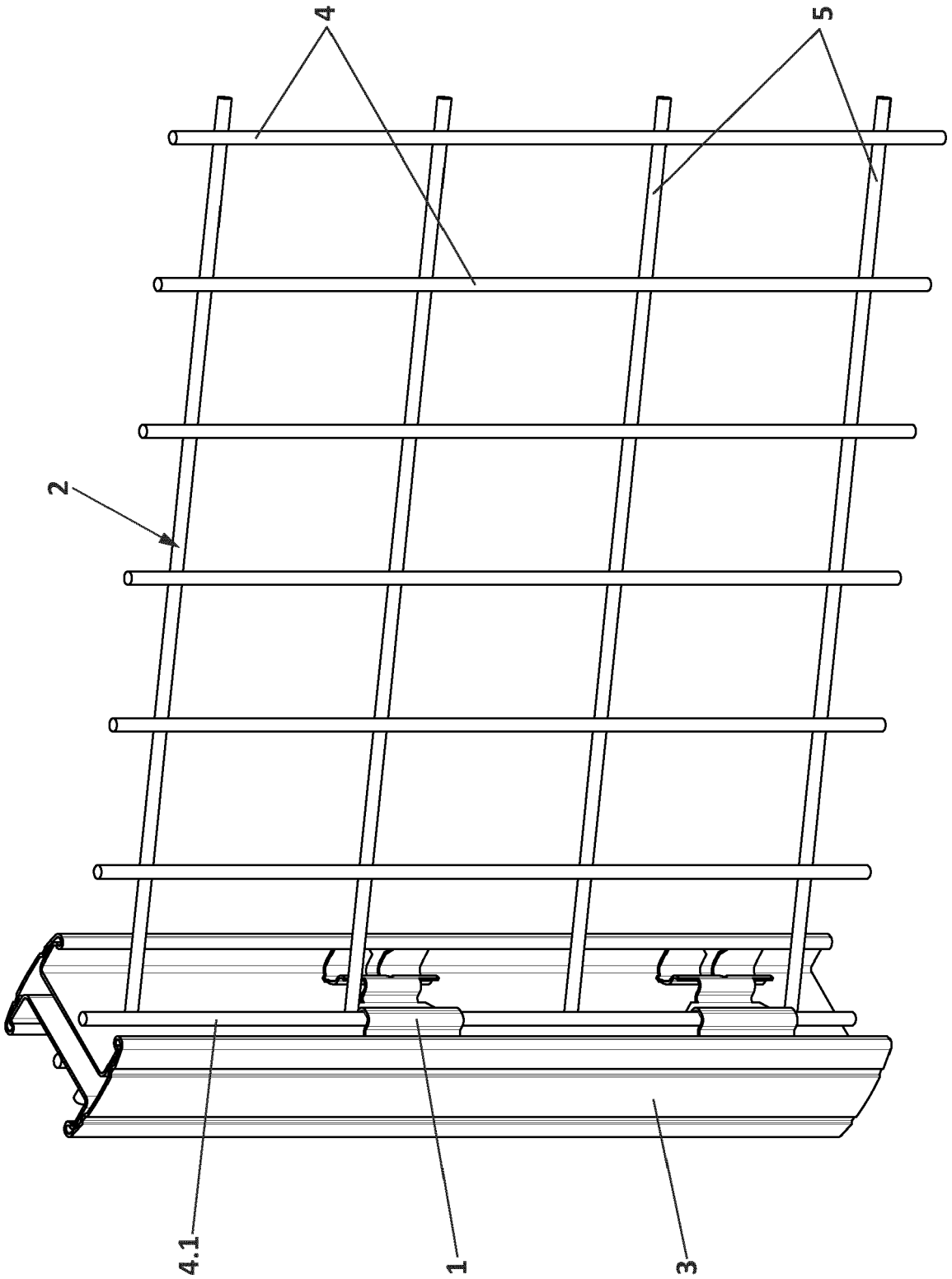

FIG. 7

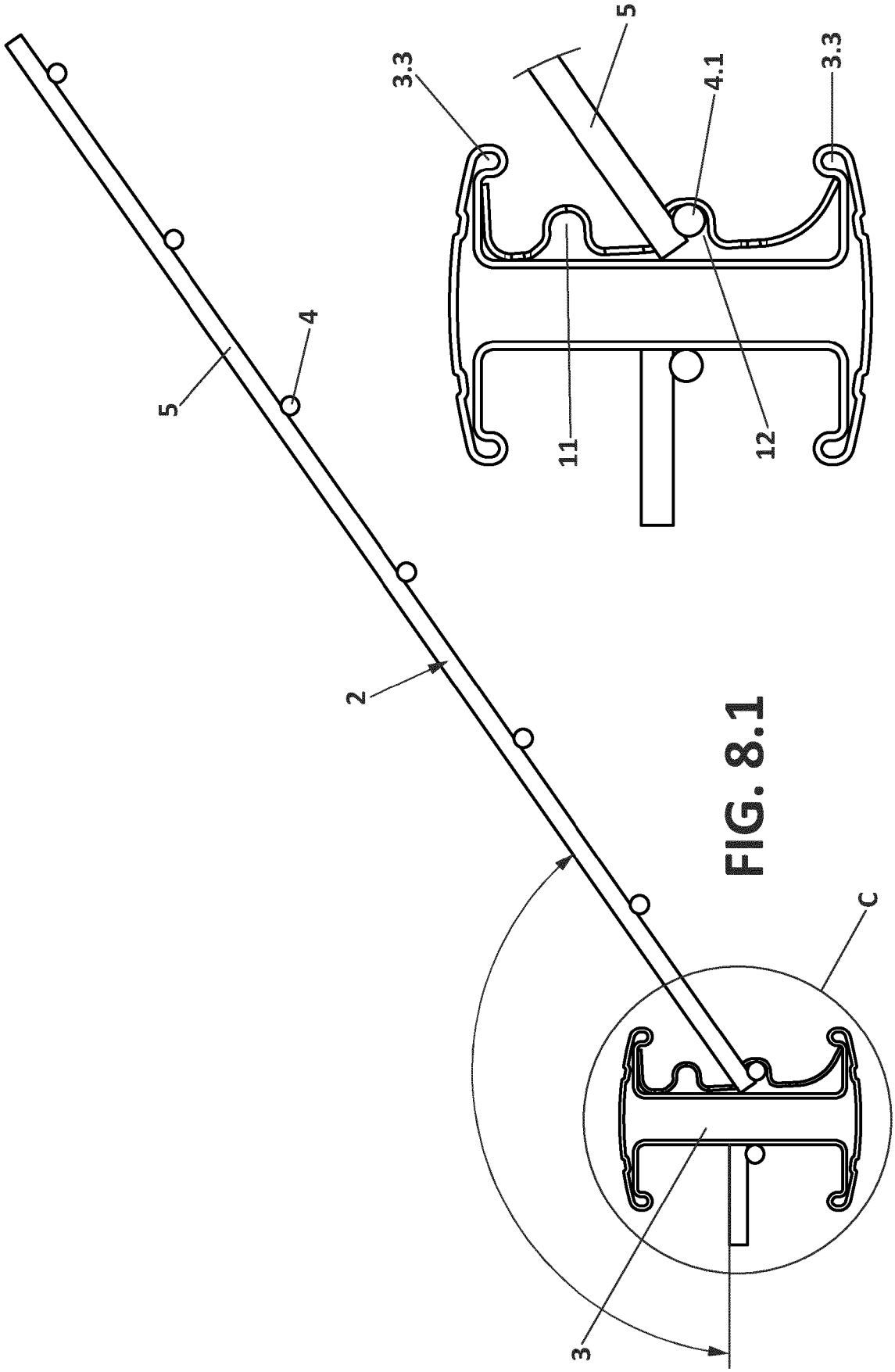

FIG. 8.1

FIG. 8.2

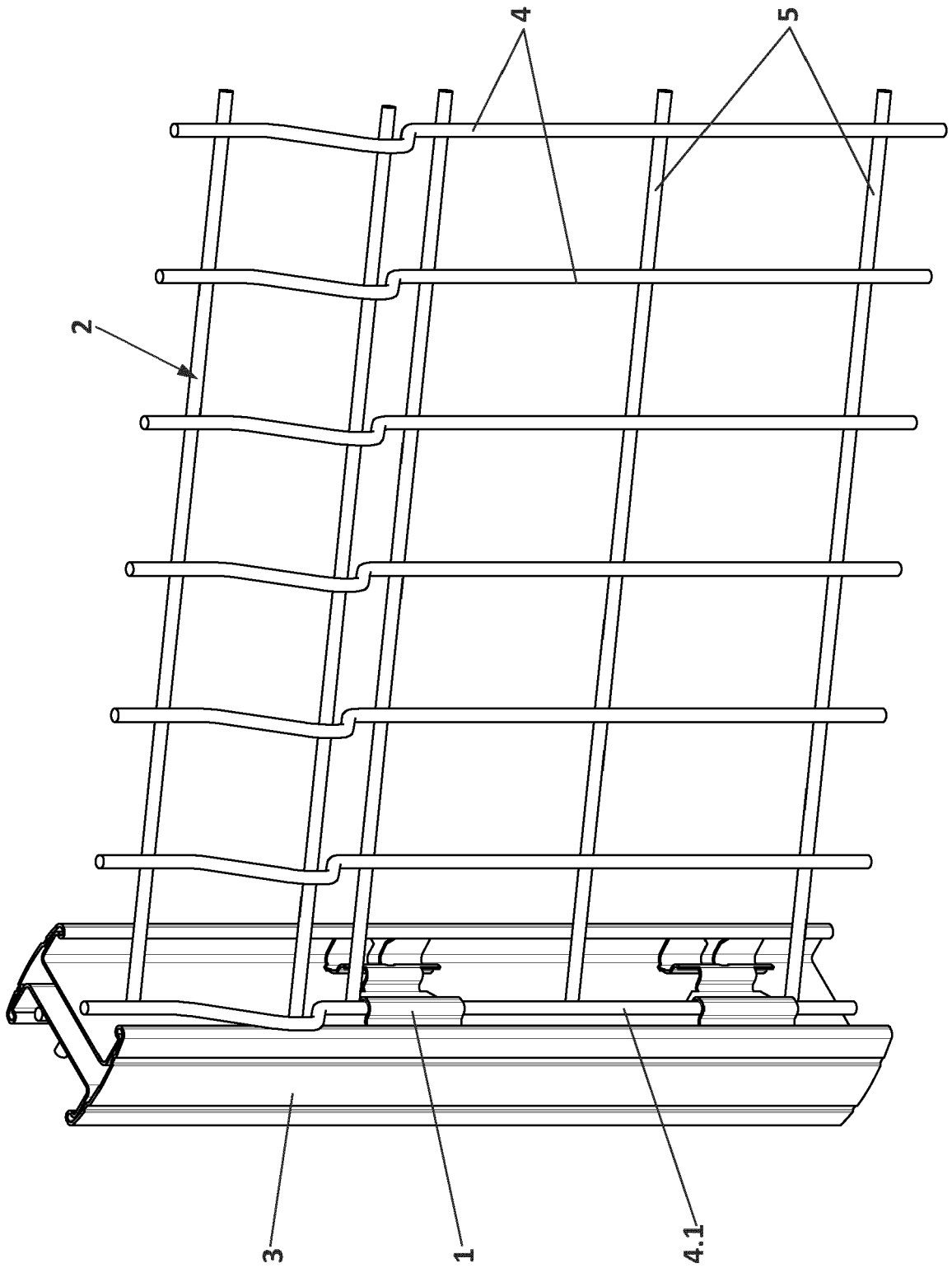

FIG. 9

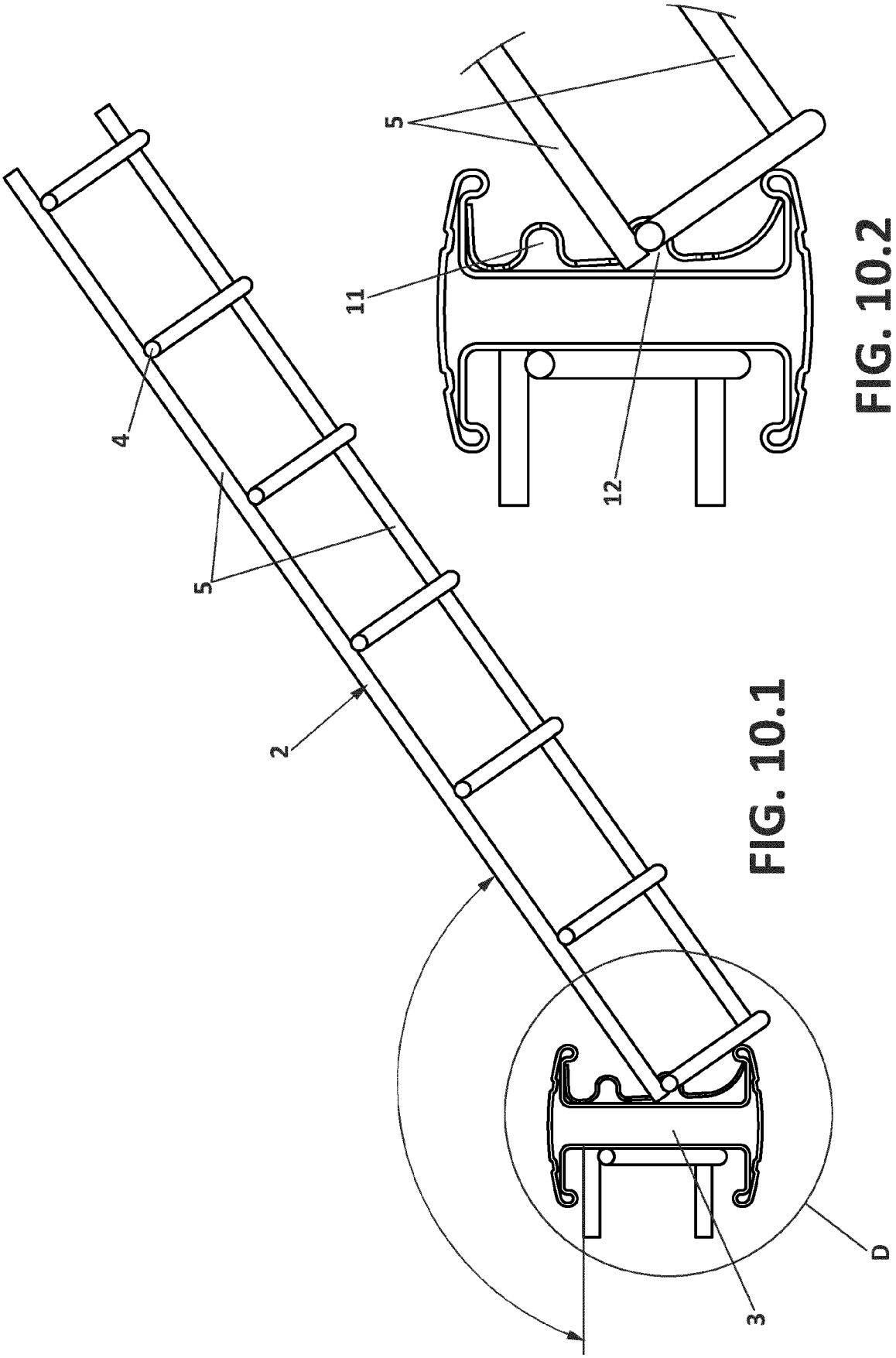

FIG. 10.2

FIG. 10.1

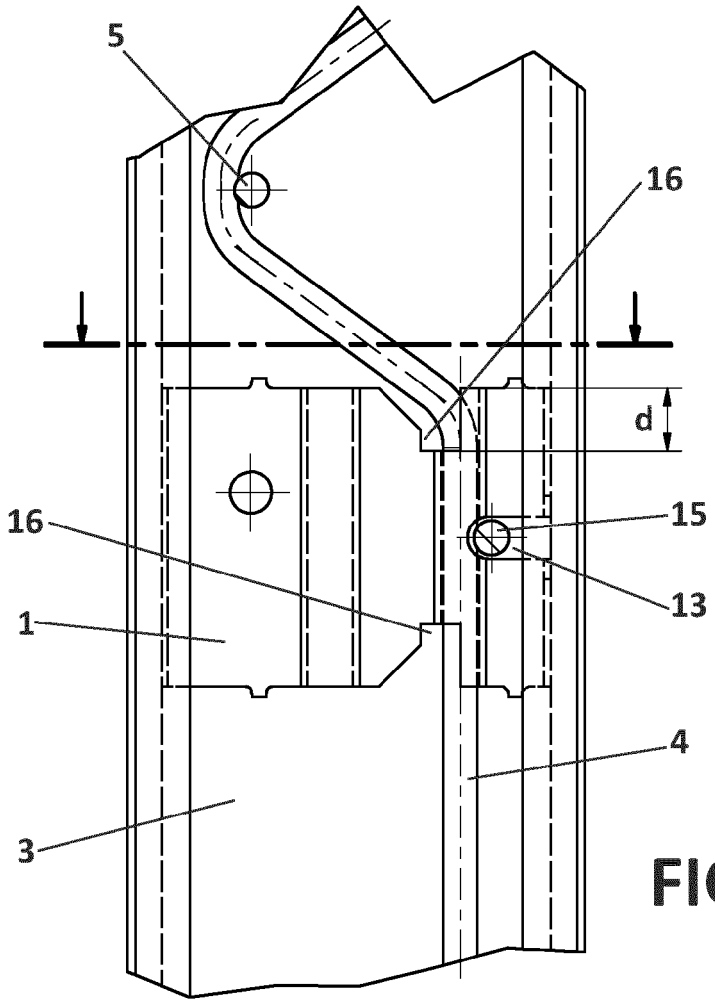

FIG. 11.1

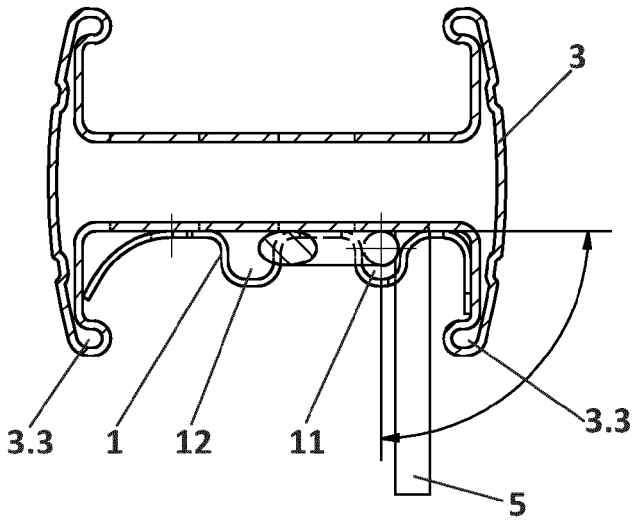

FIG. 11.2

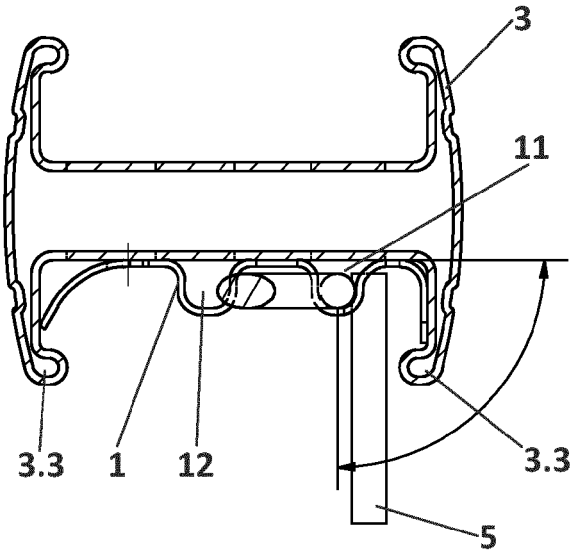

FIG. 11.3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 38 2346

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2020/020638 A1 (BEKAERT SA NV [BE]; BELGO BEKAERT ARAMES LTDA [BR]) 30 January 2020 (2020-01-30)	1,7	INV. E04H17/16
A	* claim 1; figures 1-5 *	2-6	
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