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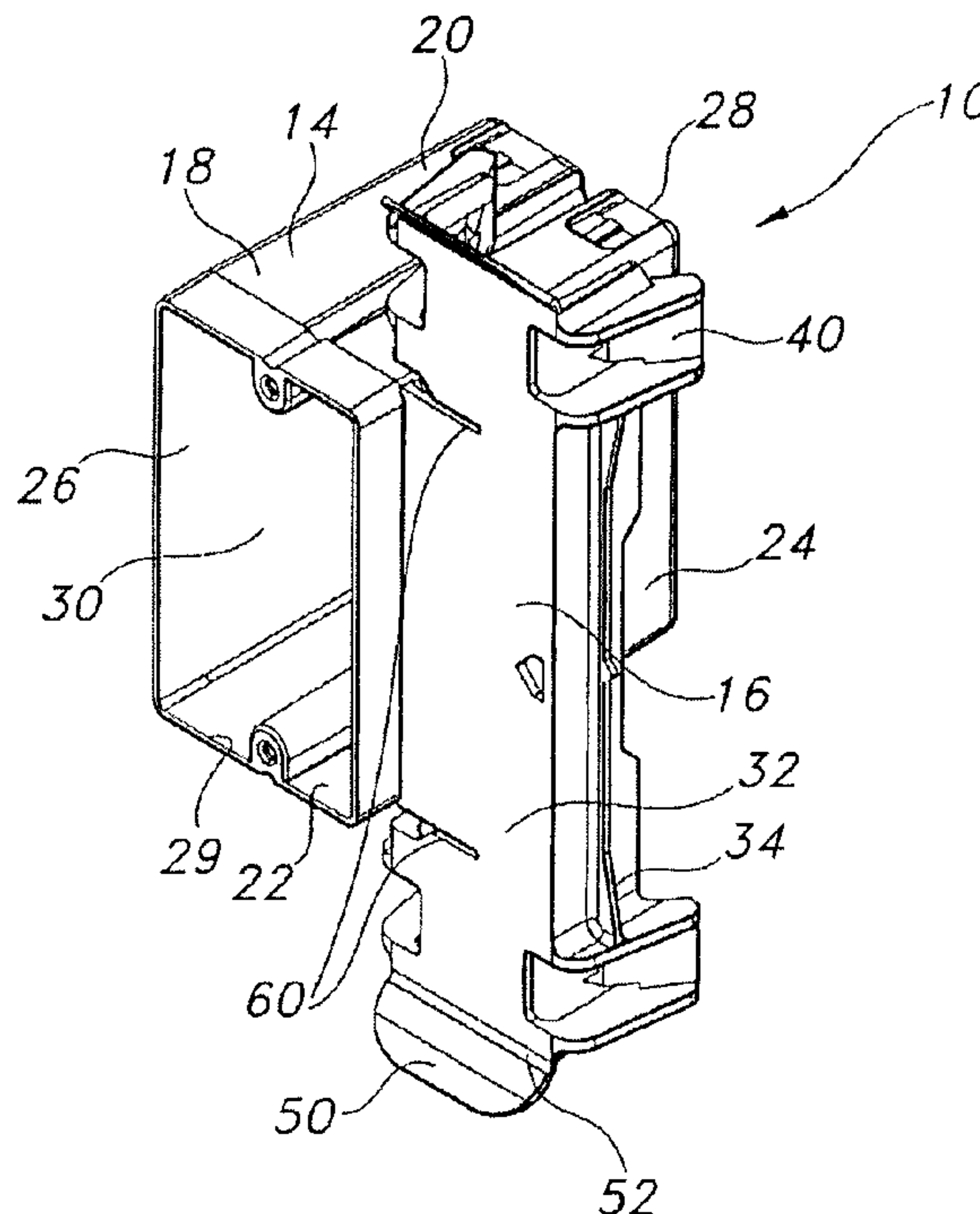
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(54) Titre : BOITE A PRISES ELECTRIQUES AUTOPORTANTE

(54) Title: SELF-SUPPORTING ELECTRICAL OUTLET BOX



(57) Abrégé/Abstract:

An electrical outlet box and/or assembly is attachable to the wall stud. The assembly in one embodiment includes an outlet box having a perimetrical side wall, a back wall and open front face defining a box interior. The assembly may also include a communications frame or a ceiling light box. A mounting bracket is integrally formed with the box and extends from the side wall. The mounting bracket includes, integrally formed therewith, an attachment structure for directly securing the bracket to the stud and positionally fixing the bracket without the use of additional securement hardware. The bracket may be a U-shaped member having a planar face abutting the face of the stud and a pair of spaced apart arms extending therefrom for engagement with opposite sides of the stud.

ABSTRACT

[0048] An electrical outlet box and/or assembly is attachable to the wall stud. The assembly in one embodiment includes an outlet box having a perimetrical side wall, a back wall and open front face defining a box interior. The assembly may also include a communications frame or a ceiling light box. A mounting bracket is integrally formed with the box and extends from the side wall. The mounting bracket includes, integrally formed therewith, an attachment structure for directly securing the bracket to the stud and positionally fixing the bracket without the use of additional securement hardware. The bracket may be a U-shaped member having a planar face abutting the face of the stud and a pair of spaced apart arms extending therefrom for engagement with opposite sides of the stud.

577-702

SELF-SUPPORTING ELECTRICAL FIXTURE SUPPORT**CROSS REFERENCE TO RELATED APPLICATIONS:**

[0001] This application claims priority to co-pending U.S. Patent Application No. 60/638,224, filed December 21, 2004, titled NON-METALLIC ELECTRICAL BOX WITH SNAP-ON ASSEMBLY, co-pending U.S. Patent Application No. 60/665,906, filed March 28, 2005, titled SELF-SUPPORTING ELECTRICAL OUTLET BOX, and co-pending U.S. Patent Application No. 60/670,202, filed April 11, 2005, titled SELF-SUPPORTING ELECTRICAL FIXTURE SUPPORT.

FIELD OF THE INVENTION:

[0002] The present invention relates generally to an electrical fixture support such as an outlet box or frame. More particularly, the present invention relates to a non-metallic outlet box which may be secured directly to the wall stud without use of additional installation hardware.

BACKGROUND OF THE INVENTION:

[0003] Electrical outlet boxes are commonly used for terminating wires to electrical fixtures such as switches and receptacles. Such boxes may also include single and multiple gang configurations and/or frames for supporting communications fixtures. In common use, the outlet boxes are attached to a wood or metal wall stud. The outlet box must be properly positioned on the stud so that an outer covering of wall board can be affixed thereover.

[0004] The art has seen a wide variety of materials used to form electrical outlet boxes. Typically, boxes are either metallic or non-metallic in design. With respect to both types of boxes, fastening hardware is usually used to secure the box to the stud. The fastening hardware may take the form of wood screws or nails for affixing the box to a wood stud or sheet metal screws when affixing the box to a metal stud. In either case, separate hardware and separate steps for securement must be employed.

[0005] The art has also seen the use of various brackets which may be attached to an outlet box to secure the outlet box to the stud. However, even when using such brackets, the bracket itself must be fixed to the stud using securement hardware. While certain of the outlet box and bracket designs allow the bracket to be temporarily affixed to the stud for positioning purposes, permanent securement of the bracket to the stud, in order to comply with applicable codes which dictate the load which the box must withstand, require additional securement hardware.

[0006] One such applicable code requirement is a requirement mandated by Underwriters Laboratories (UL). UL Code 514C (29.1) requires in part that “a bracket or other device for securing a flush device or other box not intended to support a fixture to a structural wall stud shall withstand a pull of 50 pounds (222N)...the bracket may bend; but the results of the test are not applicable if the bracket breaks or if the box is pulled loose from the bracket.”

[0007] As may be appreciated, it is time consuming and costly for the installer to have to employ separate securement hardware in order to secure the outlet box to the stud in a manner in

which the box will perform adequately in its intended environment and meet applicable code requirements.

[0008] It is, therefore, desirable to provide an outlet box which may be directly attachable to a structural stud and which by virtue of such attachment permanently secures the box to the stud in a manner which meets requisite code requirements.

SUMMARY OF THE INVENTION:

[0009] The present invention provides an assembly for supporting an electrical fixture to a structural stud. The assembly includes a fixture support. The assembly further includes a mounting bracket formed integrally with the fixture support. The mounting bracket includes integrally formed therewith a stud attachment structure. The stud attachment structure directly secures the bracket to the stud without use of additional hardware.

[0010] In preferred embodiments of the present invention, the fixture support may include a single or multiple gang outlet box. The fixture support may also include a communications fixture frame or a combination of an outlet box and communications fixture frame.

[0011] In various embodiments, the assembly may be used with a wall or ceiling stud.

BRIEF DESCRIPTION OF THE DRAWINGS:

- [0012] Figure 1 is a perspective showing of the outlet box assembly of the present invention.
- [0013] Figure 2 shows the outlet box assembly of Figure 1 attached to a wall stud.
- [0014] Figure 3 is a top plan view of the outlet box assembly of Figure 1.
- [0015] Figure 4 is front plan view of the outlet box assembly of Figure 1.
- [0016] Figure 5 is a rear plan view of the outlet box assembly of Figure 1.
- [0017] Figure 6 is a side plan view of the outlet box assembly of Figure 1.
- [0018] Figure 7 shows a further embodiment of the present invention including a multiple gang outlet box.
- [0019] Figure 8 shows a still further embodiment of the present invention including a single gang outlet box and a communication fixture frame.
- [0020] Figure 9 is a yet further embodiment of the present invention showing a communication fixture frame.

[0021] Figures 10 and 11 show in front and back perspective views, respectively, a further embodiment of the outlet box assembly of the present invention.

[0022] Figures 12 and 13 show in front and back perspective views, respectively, a still further embodiment of the outlet box assembly of the present invention.

[0023] Figures 14 and 15 show in top and bottom perspective views, respectively, an electrical outlet box assembly of the present invention used to support fixtures to a ceiling stud.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS:

[0024] The present invention provides an outlet box assembly including an outlet box and/or a communications fixture frame and an integrally formed bracket. In a preferred embodiment, the present invention is directed to a non-metallic outlet box formed of a suitably molded plastic. As will be discussed in further detail hereinbelow, boxes of this type are typically mounted adjacent a wood stud. These wood studs are structural studs such as wall or ceiling studs. These non-metallic boxes are secured to the face of the stud by use of wood screws or nails. Such securement of the box directly to the wood stud assures that if a load is placed on the box, it will not detach from the wood stud. For wall boxes mounted on vertical studs, such a load can be a vertically directed load along the direction of the length of the stud or it can be a horizontal load perpendicular thereto. In either case, the securement of the box directly to the stud by use of fastening hardware assures that the box will not detach from its secured position against the stud. The present invention provides an electrical box assembly which secures a non-metallic electrical box to a structural wood stud such as a wall or ceiling

stud directly without need for additional fastening hardware and which still maintains the box in secure engagement with the stud upon application of either a horizontal or vertical load.

[0025] With reference to Figures 1-6 of the present application, an electrical outlet box assembly 10 is shown. Outlet box assembly 10 is preferably a non-metallic integrally formed member, typically molded of suitable plastic. The outlet box assembly 10 is designed to be self secured or “snapped” on to a wall stud 12 shown in Figure 2. As is well known, stud 12 is an elongate wooden member such as a “2x4” having a front face 12a and opposed sides 12b and 12c.

[0026] Outlet box assembly 10 includes two distinct portions, an electrical outlet box 14 and a securement bracket 16. Outlet box 14 is similar to conventional non-metallic outlet boxes well known in the art, including a perimetrical wall 18, defined by top and bottom walls 20 and 22 and opposed lateral walls 24 and 26. Outlet box 14 has a solid back wall 28, an open front face 29, and defines a box interior 30, for accommodating electrical termination devices such as switches and receptacles (not shown) which terminate electrical cables (also not shown) as is well known in the art. While a solid box is shown in the present example, as set forth further hereinbelow, the present invention contemplates use of a fixture frame for supporting data/communication fixtures.

[0027] Bracket 16 is generally a U-shaped member having a planar face 32 and a pair of spaced apart arms 34 and 36 extending perpendicularly therefrom. As may be appreciated from the depiction in Figure 2, planar face 32 is designed for flush support against the face 12a of stud

12, while the arms 34 and 36 are designed to extend along sides 12b and 12c respectively of stud 12. Also, the planar face 32 is recessed from the front face 29 of box 14 for accommodating wall board adjacent face 32.

[0028] As more fully shown in Figures 3-5, the bracket 16 includes a stud attachment structure 40 which extends from each of the spaced apart arms 34 and 36 at opposite longitudinal ends thereof. Each stud attachment structure 40 includes an inwardly directed cantilevered gripping element 42 surrounded by a generally rectangular frame 44 to provide structural stability and prevent flexing of the arms thereat. The distal end of gripping element 42 may include wood piercing teeth 42a for engagement with the sides 12b and 12c of stud 12. The gripping elements 42 are positioned so that the bracket 16 may be attachable to the stud 12 and thereupon bite into the sides of the stud preventing removal therefrom.

[0029] Bracket 16 further includes a deflectable stiffening rib 50 at either distal end thereof. Stiffening rib 50 is attached to face 32 by a living hinge 52 (Figure 6). This allows the stiffening rib to deflect outwardly from the plane of face 32 prior to the installation of a wall covering. As will be described in further detail herein below, stiffening ribs 50 help prevent the bracket from flexing upon application of a load to box 14. The face 32 of bracket 16 may also include an alignment aperture 55, which is used as a viewing opening to view a scribed mark placed on the face 12a of stud 12 by the installer for box alignment purposes.

[0030] The face 32 of bracket 16 also includes a pair of inwardly directed slots 60. Slots 60 extend from one arm 36 of assembly 10, which is common with lateral wall 24 of box 14.

Slots 60 extend at a location adjacent the top and bottom walls 20 and 22, partially across face 32. As will be described in further detail herein below, the slots allow deflection of box 14 in a transverse direction indicated by arrow A in Figure 2, without adversely affecting the grip of bracket 16 on stud 12. In addition, to also support the box on the stud during deflection, bracket 16 also includes inwardly directed fixed tooth 61 adjacent each slot 60.

[0031] Having described the structure of the electrical outlet box assembly in the present invention, use and operation may now be described.

[0032] Referring to Figures 2-4, the outlet box assembly 10 may be securely attached to a stud 12. An installer may optionally beforehand place a scribed mark on a stud indicating the desired vertical position of the box with respect to the stud. Thereafter, the installer snaps the assembly 10 onto the stud 12 by pushing the bracket 16 against the face of the stud and aligning the viewing aperture 55 with the scribed mark. The bracket 16 is pushed onto the stud until the face 32 of bracket 16 is supported flush against the face 12a of stud 12. The gripping elements 42 of stud attachment structure 40 deflect allowing insertable attachment of the bracket 16 onto the stud. Thereafter, the teeth 42a dig into the wooden stud at the sides 12b and 12c preventing withdrawal of the bracket from the stud. Engagement of the gripping elements 42 with the wooden stud sides prevent both horizontal and vertical movement of the outlet box assembly 10, even upon application of a load, either vertical as depicted by arrow B in Figure 2, or horizontal as depicted by arrow A.

[0033] In addition to fixedly positioning the outlet box assembly with respect to the stud, the present invention provides for the secure positioning of the outlet box with respect to the stud regardless of a load placed on the box prior to completion of the project (attachment of the wall board). This is especially the case with respect to horizontal loads which may be placed on the box in a direction of arrow A such as during wire pulling. A load placed on box 14 will not result in the bracket becoming detached from the stud 12.

[0034] This is accomplished in one part by a provision of the stiffening ribs 50. These stiffening ribs 50 extend outwardly from the plane of face 32 and provide transverse stiffness to the planar face. Thus, a load placed on box 14 will not have a tendency to flex or deflect the face 32 of bracket 16 adjacent attachment structure 40. In addition, and as importantly, the slots 60 provide a relief area upon which a force placed on the box in the direction of arrow A will have a tendency to permit the box to flex forwardly. Such flexure will be absorbed by face 32 of bracket 16 as the slots allow the box 14 itself be so flexed or deflected. Moreover, upon such flexure, adjacent fixed teeth 61 will dig into the stud further gripping the bracket 16 to the stud.

[0035] The need to prevent a load placed on the box from causing detachment of the bracket is necessary only during the installation process. Once the wall board is attached to the stud, the ribs 50 are deflected back against the face 12a of stud 12. Obviously, once the wall board is applied, the wall board itself will restrict any excessive deflection of box 14.

[0036] The electrical outlet box shown in Figures 1-4 is a single gang electrical outlet box. It is contemplated that the bracket of the present invention may be used not only with a

single gang electrical outlet box, but also with multiple gang boxes or a communications fixture frame and combinations thereof.

[0037] Referring to Figure 7, a further embodiment of the present invention is shown. Outlet box assembly 110 is substantially similar to outlet box assembly 10 shown above with respect to Figures 1-6. In the present illustrative embodiment, outlet box 114 is a double gang outlet box which accommodates two electrical fixtures such as switches and receptacles. While a double gang box is shown, it is further contemplated that other multiples such as a three gang box may also be employed. In all other respects, outlet box assembly 110 operates in a manner similar to outlet box assembly 10 of the present invention. The bracket 116 of assembly 110 is identical to bracket 16 described above.

[0038] Turning now to Figure 8, a further embodiment of the present invention is shown. Outlet box assembly 210 again is substantially similar to outlet box assembly 10 described above. In the present illustrative embodiment, box 214 includes a single gang box 214a and a communications frame 215 extending therefrom. Communications frame 215 has upper and lower arms 215a and 215b, respectively, and a connecting side wall 215c. Thus, the frame forms a rectangular structure with the side wall of box 214a. As is well known in the art, frame 215 is designed to accommodate a communications fixture which under applicable codes need not be enclosed by a box. The embodiment shown in Figure 8 includes a single gang outlet box in combination with a communications frame. However, it is contemplated that a multiple gang box as well as a multiple gang frame may also be employed in combination. Bracket 216 which is supported on box 214a is identical in structure to bracket 16 described above.

[0039] Referring now to Figure 9, a further embodiment of the present invention is shown. Outlet box assembly 310 includes a frame 314 attached directly to bracket 316. The frame is a communications frame used to support a communications fixture including upper and lower arms 314a and 314b, respectively, and adjoining side wall 314. Again, the frame 314 is shown for accommodation of a single communications fixture. However, a frame supporting multiple communications fixtures may also be employed. As with the embodiments, bracket 316 is identical to bracket 16 described above and operates in identical fashion.

[0040] A further embodiment of the present invention is shown in Figures 10 and 11. In this embodiment the outlet box assembly 150 includes an electrical outlet box 154 and a securement bracket 156. The outlet box 154 is substantially similar to outlet box 14 described above. Furthermore, securement bracket 156 is generally of a U-shaped member having a planar face 160 and a pair of spaced apart arms 164 and 166 extending perpendicularly therefrom. Each of the arms includes inwardly directed cantilevered gripping element 172 which may be substantially as described above with respect to gripping element 42 of Figures 1-9. The planar face 160 of bracket 156 includes a beveled peripheral edge 170. Extending therearound, the beveled edge allows for a smooth transition with respect to a wall board that is later positioned over the box assembly.

[0041] A still further embodiment of the present invention is shown in Figures 12 and 13 where an outlet box assembly 250 is shown. Outlet box assembly 250 includes an outlet box 254 and a securement bracket 256. In this embodiment, the opposite longitudinal ends of the bracket

256 include gripping elements 260. The gripping elements 260 include an angled portion 262 terminating at a point 264. The angled portion 258 angles the gripping elements inwardly. The gripping elements 260 allow the user to place the outlet box assembly over the structural support and hold the assembly securely in place. Since the gripping elements 260 bias inwards toward the stud, removal of the outlet box is prevented when the points 264 pierce the outer surface of the stud.

[0042] While the above-referenced embodiments are all specifically directed to mounting an electrical outlet box to a wall stud, the present invention further contemplates mounting an electrical outlet box to a ceiling stud.

[0043] Referring now to Figures 14 and 15, an electrical outlet box assembly 310 is shown. Outlet box assembly 310 is preferably a non-metallic integral member formed of suitable molded plastic. The outlet box assembly 310 is designed to be self-secured or snapped onto a wood ceiling stud (not shown). Outlet box assembly 310 includes an electrical outlet box 314 and a securement bracket 316. The electrical outlet box 314 is somewhat of the type more fully shown and described in commonly assigned U.S. Patent No. 6,827,229, issued December 7, 2004, which is incorporated by reference herein for all purposes.

[0044] The outlet box assembly of the present embodiment may be used to secure such devices as lighting fixtures to a ceiling stud as is known in the art. The box 314 is generally cylindrical in shape including a body 322 having a planar lower surface 324. A pair of side members 326 and 328 extend upwardly from either side of lower surface 324. The side members

326 and 328 and the lower surface 324 define a generally U-shaped recess 320 for accommodating the ceiling stud therein.

[0045] Bracket 316 is coextensive with U-shaped recess 320 of box 314. The bracket 316 includes longitudinally spaced ends 332 and 334 extending beyond the box 314. Bracket 316 includes stud attachment structure 340 at each of the spaced apart ends 332 and 334. Stud attachment structure 340 is similar to that described with respect to the embodiments shown in Figures 1-9. In the present embodiment, the outlet box assembly 310 may be secured to a ceiling stud and may be used to secure electrical fixtures therein without need for using additional securement hardware to secure the box assembly 310 to the ceiling stud.

[0046] The present invention provides various combinations of boxes and frames which may be integrally supported by a bracket which allows attachment of a box to a stud and which prevents a load placed on the box or frame for causing detachment of the bracket from the stud. Moreover, such attachment is achieved without need for additional securement hardware.

[0047] Various changes to the foregoing described and shown structures would now be evident to those skilled in the art. Accordingly, the particularly disclosed scope of the invention is set forth in the following claims.

WHAT IS CLAIMED IS:

1. An assembly for supporting an electrical fixture to a structural stud comprising:
a support for terminating an electrical fixture; and
a mounting bracket formed integrally with said support;
said mounting bracket having formed thereon an attachment structure for directly
securing and positionally fixing said bracket to the structural stud without use of additional
securement hardware.
2. An assembly of claim 1 wherein said bracket and said support are integrally molded.
3. An assembly of claim 1 wherein said fixture support includes a single gang outlet box.
4. An assembly of claim 1 wherein said fixture support includes a multi-gang outlet box.
5. An assembly of claim 1 wherein said fixture support includes a communications fixture
frame.
6. An assembly of claim 1 wherein said fixture support includes an outlet box and a
communications fixture frame.
7. An outlet box assembly attachable to a structural stud comprising:
an electrical outlet box having a perimetrical side wall; and
a mounting bracket extending from said box;

said mounting bracket having integrally formed therewith a stud attachment structure for directly securing said bracket to said stud and positionally fixing said bracket to said stud without use of additional securement hardware.

8. An outlet box assembly of claim 7 wherein said box includes a back wall and an open front face defining a box interior for supporting an electrical fixture.
9. An outlet box assembly of claim 8 wherein said bracket is integrally formed with said box.
10. An outlet box assembly of claim 9 wherein said bracket extends from said side wall.
11. An outlet box assembly of claim 7 wherein said bracket is generally a U-shaped member having a planar face positioned adjacent a face of the stud and a pair of spaced apart arms extending therefrom for engagement with opposite sides of said stud, each said arm including said stud attachment structure.
12. An outlet box assembly of claim 11 wherein each said stud attachment structure includes an inwardly directed resilient cantilevered gripping element for engagement with said opposite sides of said stud.
13. An outlet box assembly of claim 12 wherein said gripping elements include inwardly directed teeth for biting engagement with said stud.

14. An outlet box assembly of claim 11 wherein said bracket includes at least one stiffening rib extending across said planar surface for preventing deflection of said bracket upon a load placed on said outlet box.
15. An outlet box assembly of claim 14 wherein said bracket includes a pair of said stiffening ribs.
16. An outlet box assembly of claim 14 wherein said stiffening ribs deflectably extend from said planar face.
17. An outlet box assembly of claim 11 wherein said outlet box is deflectably supported by said bracket.
18. An outlet box assembly of claim 17 wherein said perimetrical side wall of said outlet box includes top and bottom walls and opposed lateral walls and wherein one of said lateral walls is common to one of said arms of said bracket.
19. An outlet box assembly of claim 18 wherein said face of said bracket includes a pair of slots extending from said common wall partially across said face and aligned with said top and bottom walls for permitting said resilient deflection of said box with respect to said bracket.
20. An outlet box assembly of claim 7 wherein said structural stud is a wall stud.

21. An outlet box assembly of claim 7 wherein said structural stud is a ceiling stud.
22. A method of securing an electrical fixture to a structural stud, the electrical fixture being mounted to a support having a first side wall and a mounting bracket extending from this side wall, the mounting bracket having stud attachment structure secured thereto, the improvement comprising the step of directly mounting the bracket to the stud for securing the support to the stud and for positionally fixing the support to the stud without use of additional securement hardware.
23. The method as set forth in claim 22 further comprising the step of integrally forming the support and the bracket.
24. The method as set forth in claim 22 further comprising the step of forming said support and said bracket of non-metallic material.
25. The method as set forth in claim 22 further comprising the step of forming an alignment aperture in said bracket.
26. The method as set forth in claim 22 further comprising the step of terminating wires in said support after said support is secured and positionally fixed to the stud without the use of additional securement hardware.

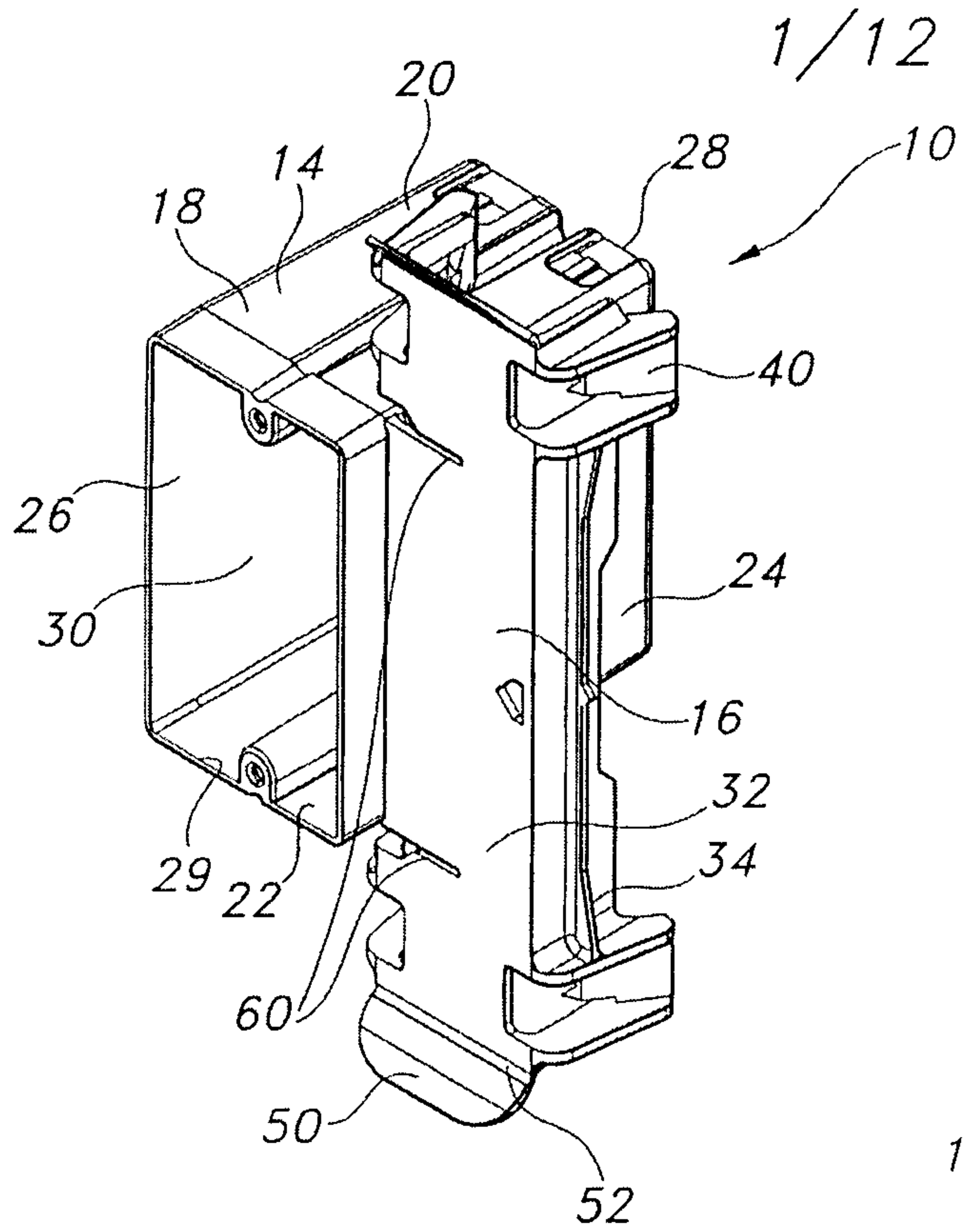


FIG. 1

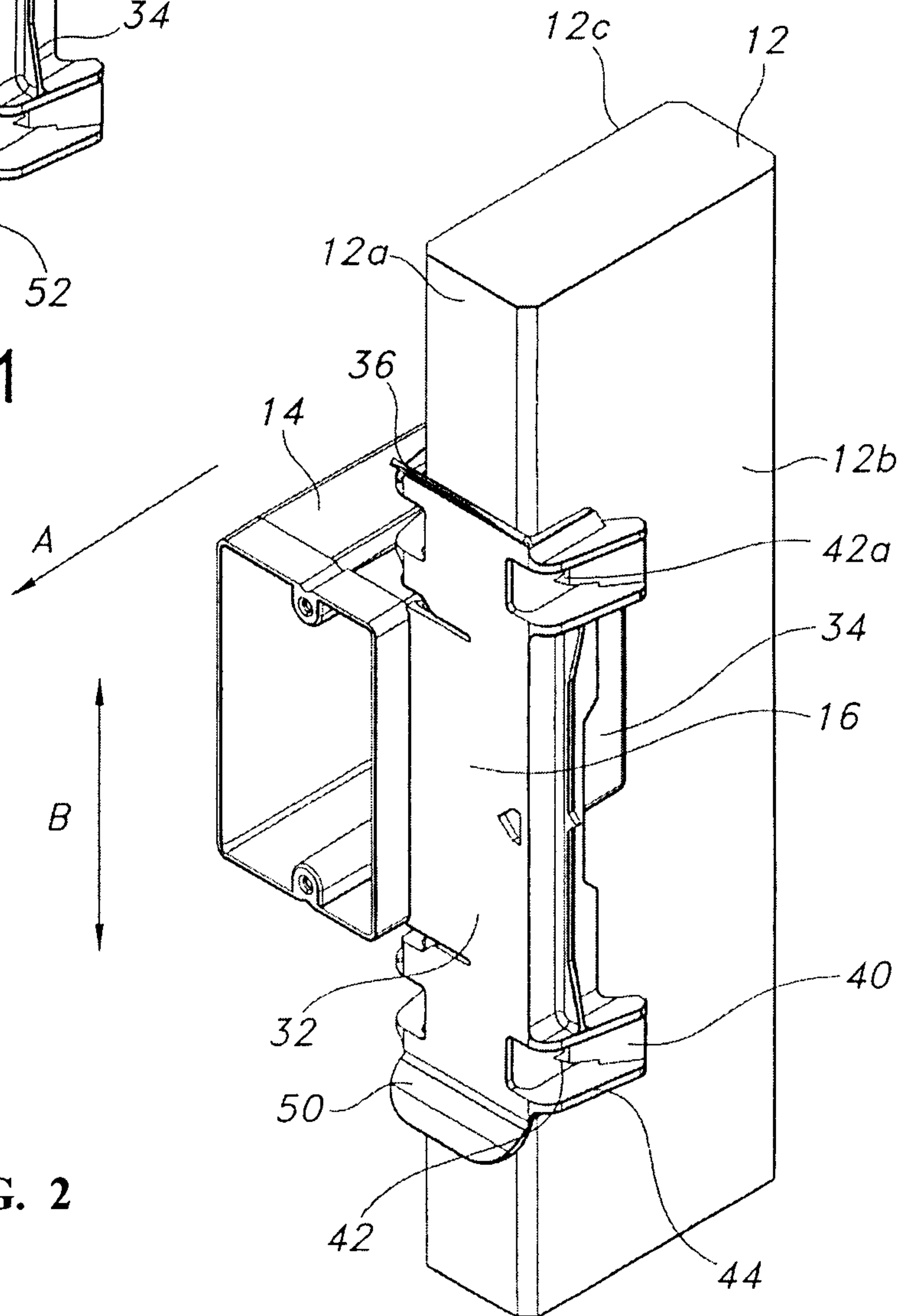


FIG. 2

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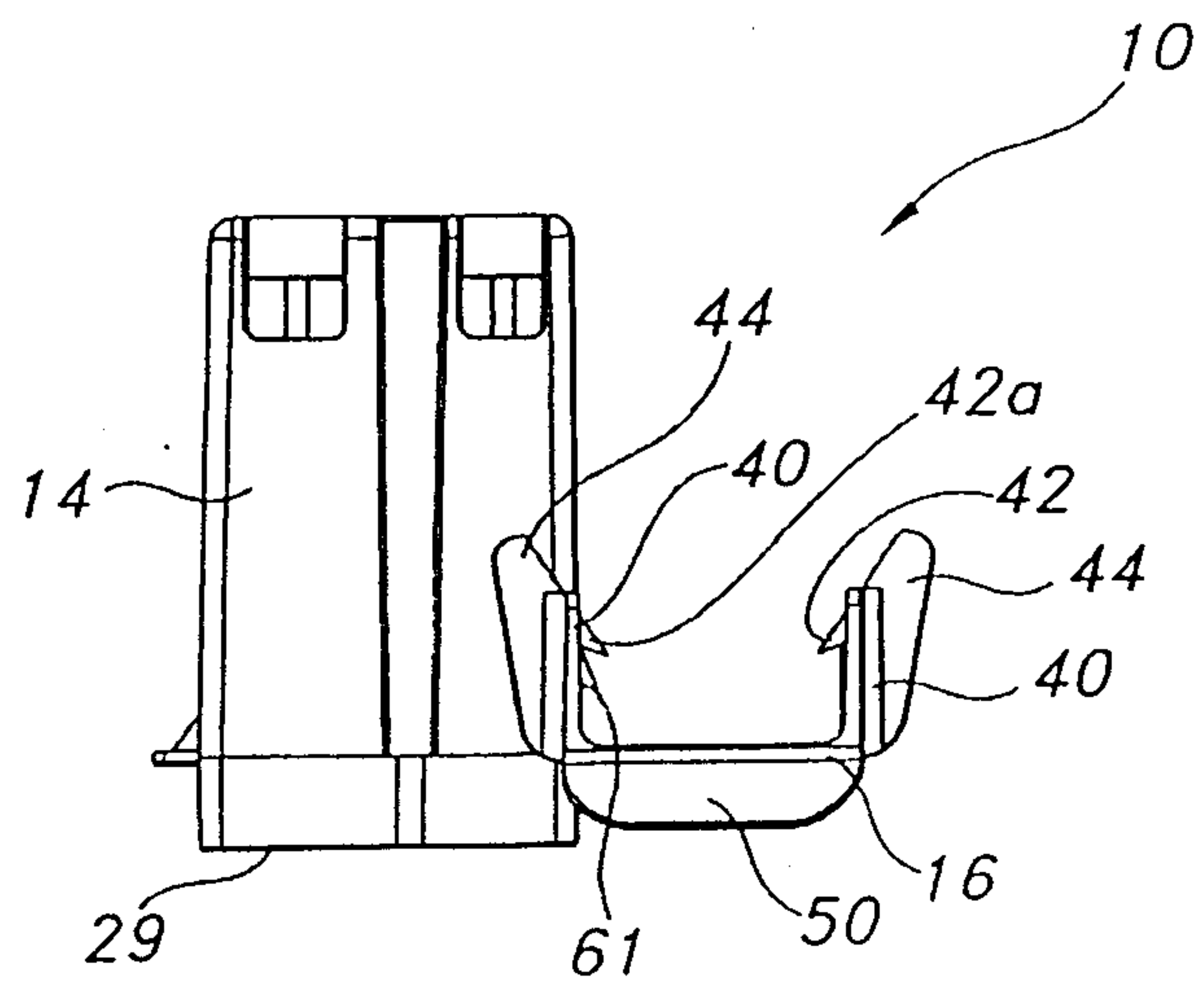


FIG. 3

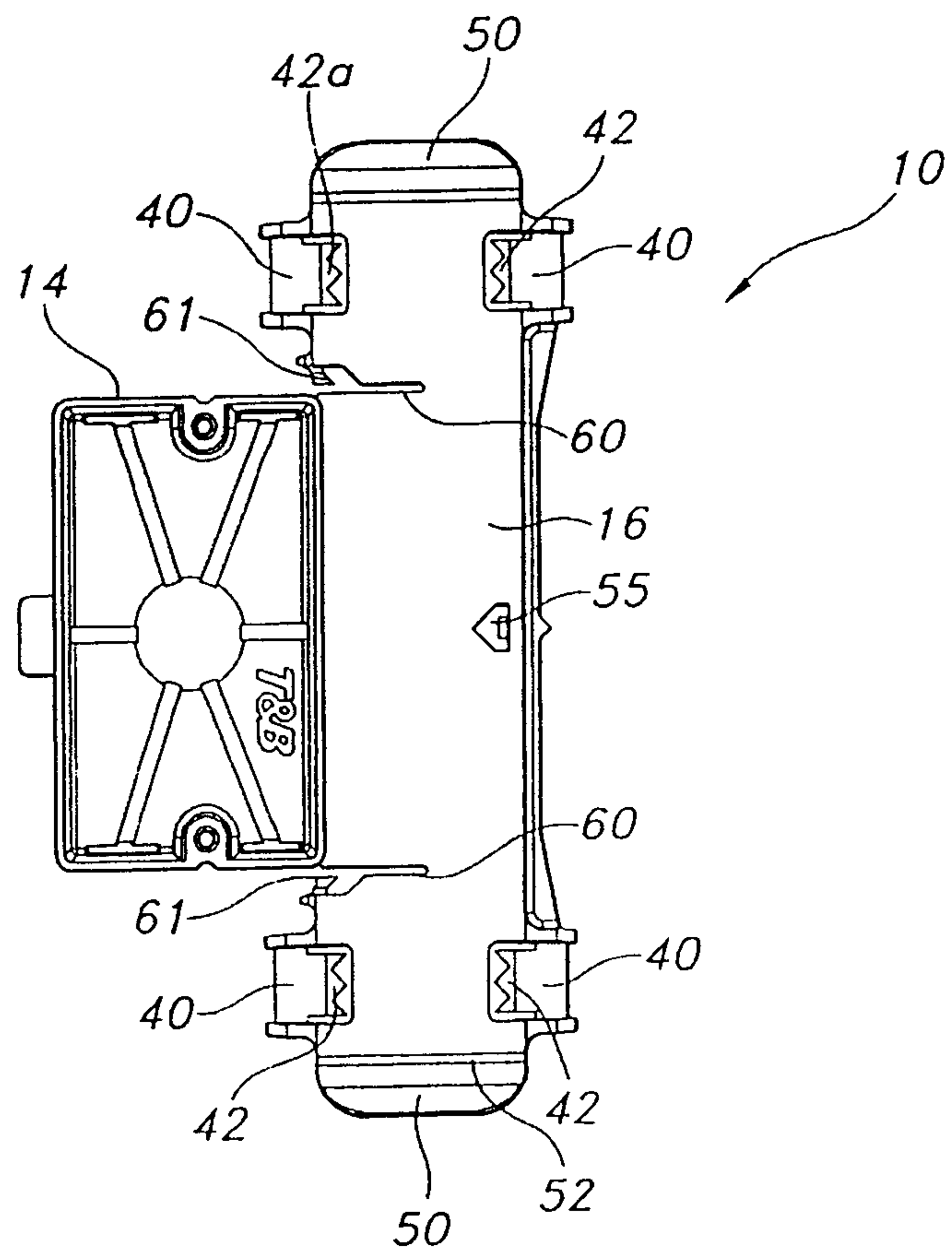


FIG. 4

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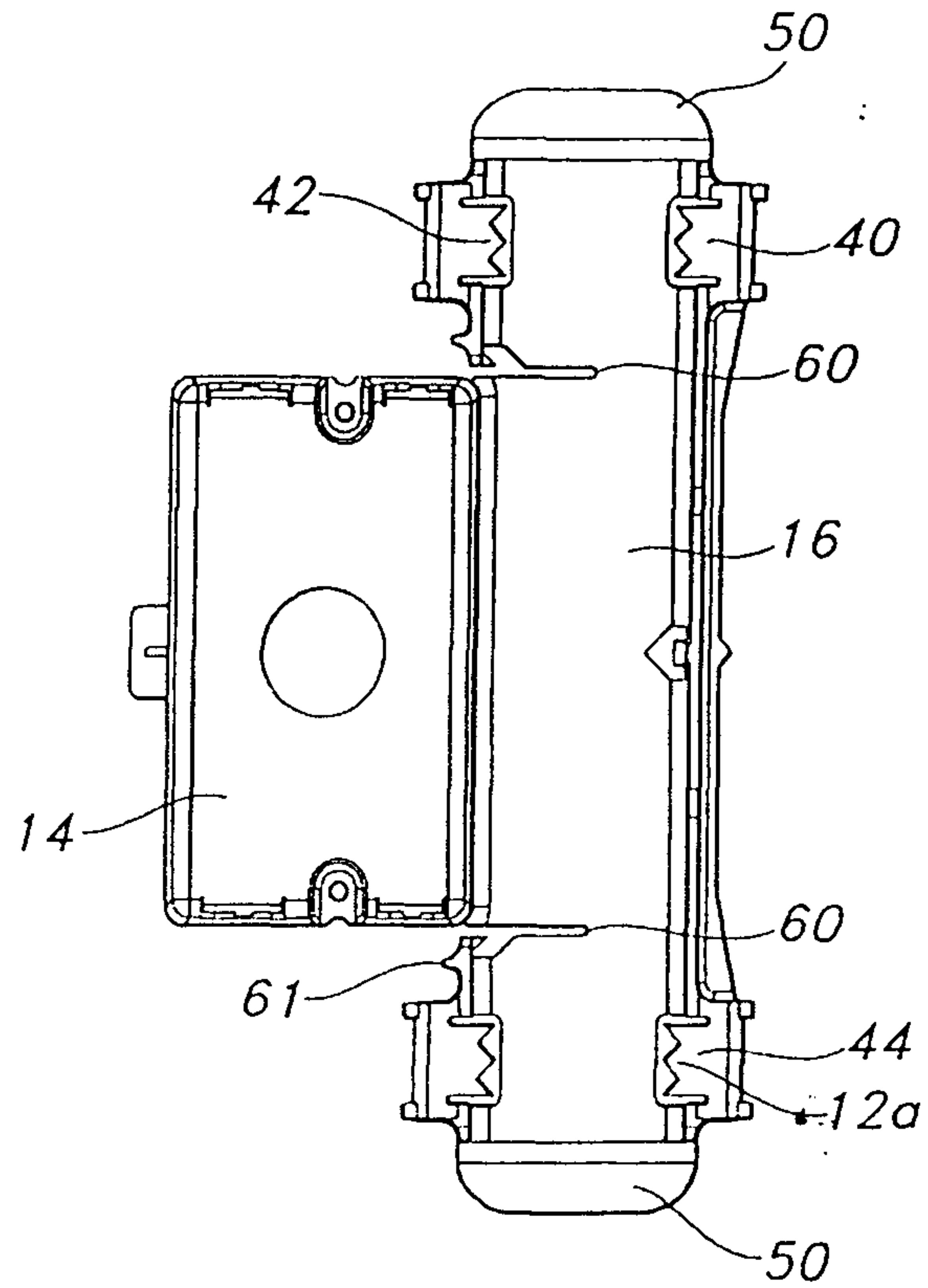


FIG. 5

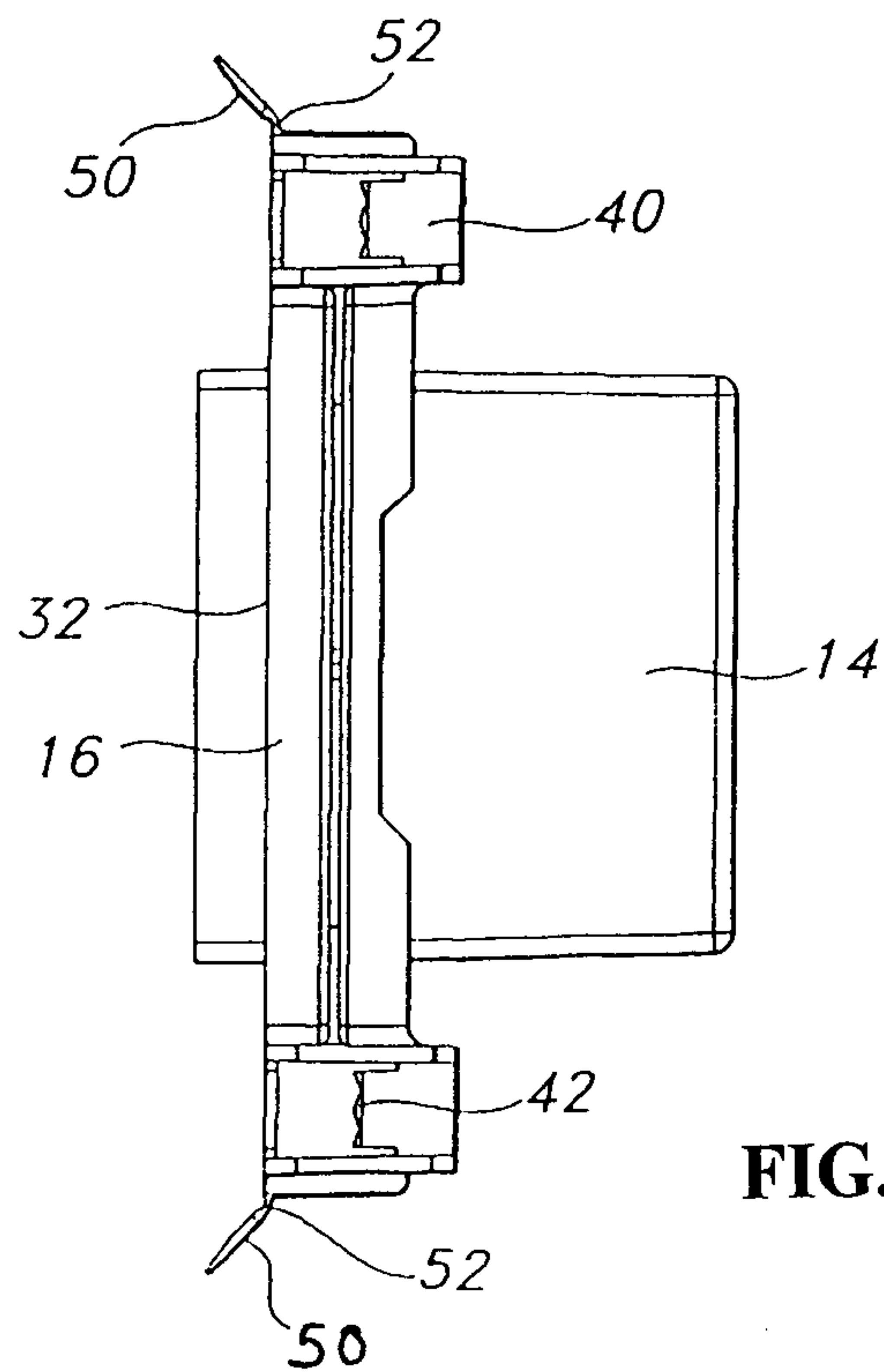


FIG. 6



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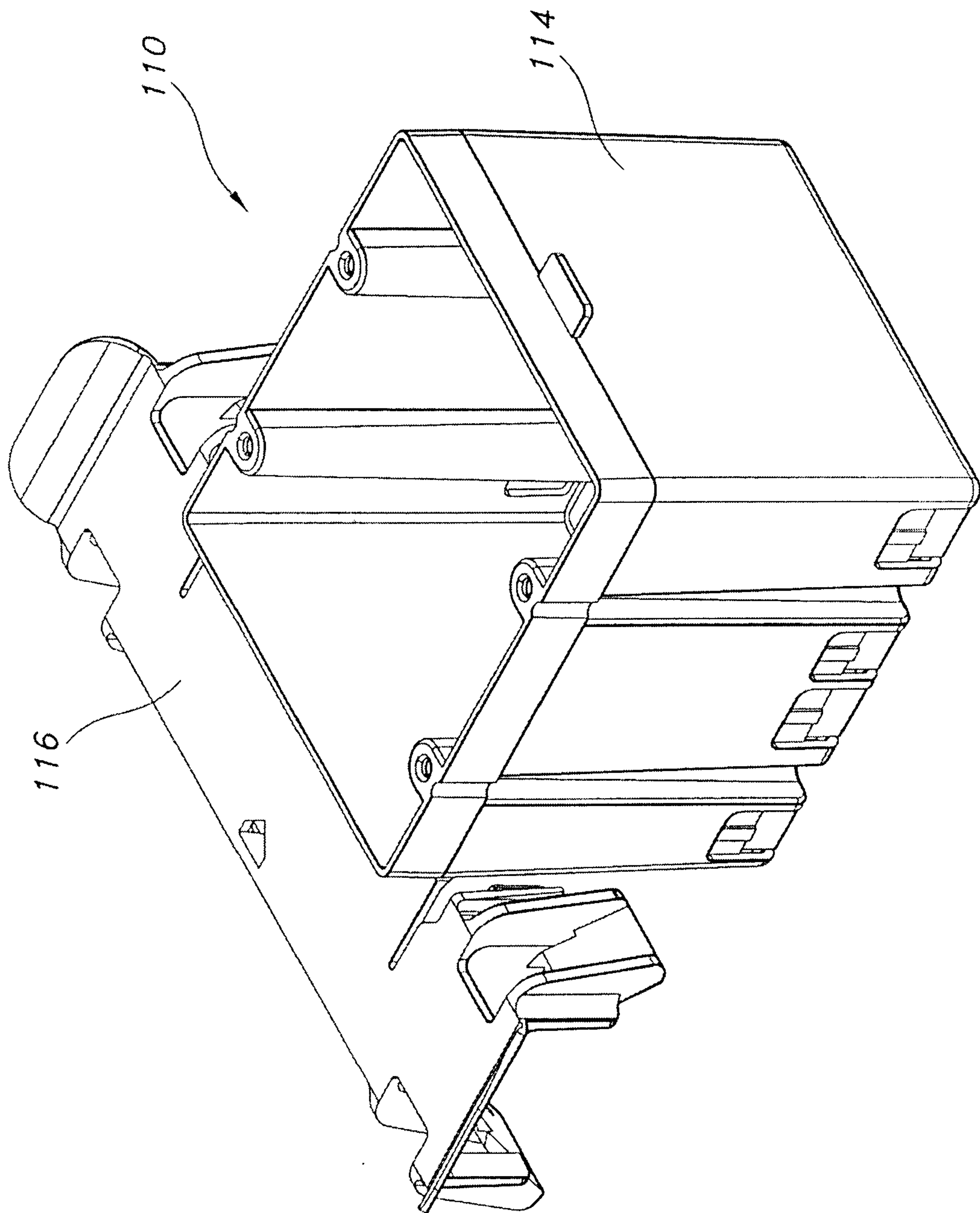


FIG. 7

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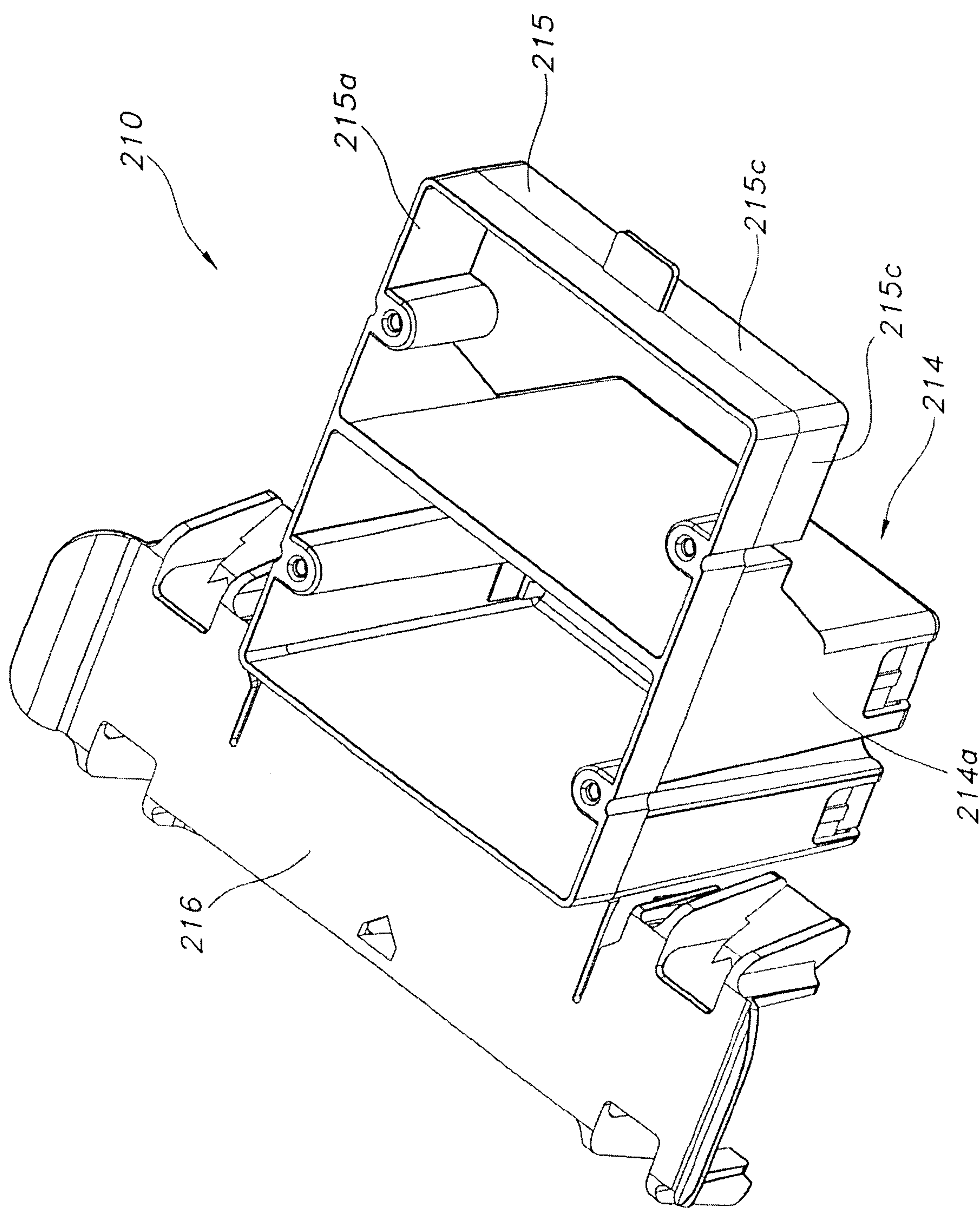


FIG. 8

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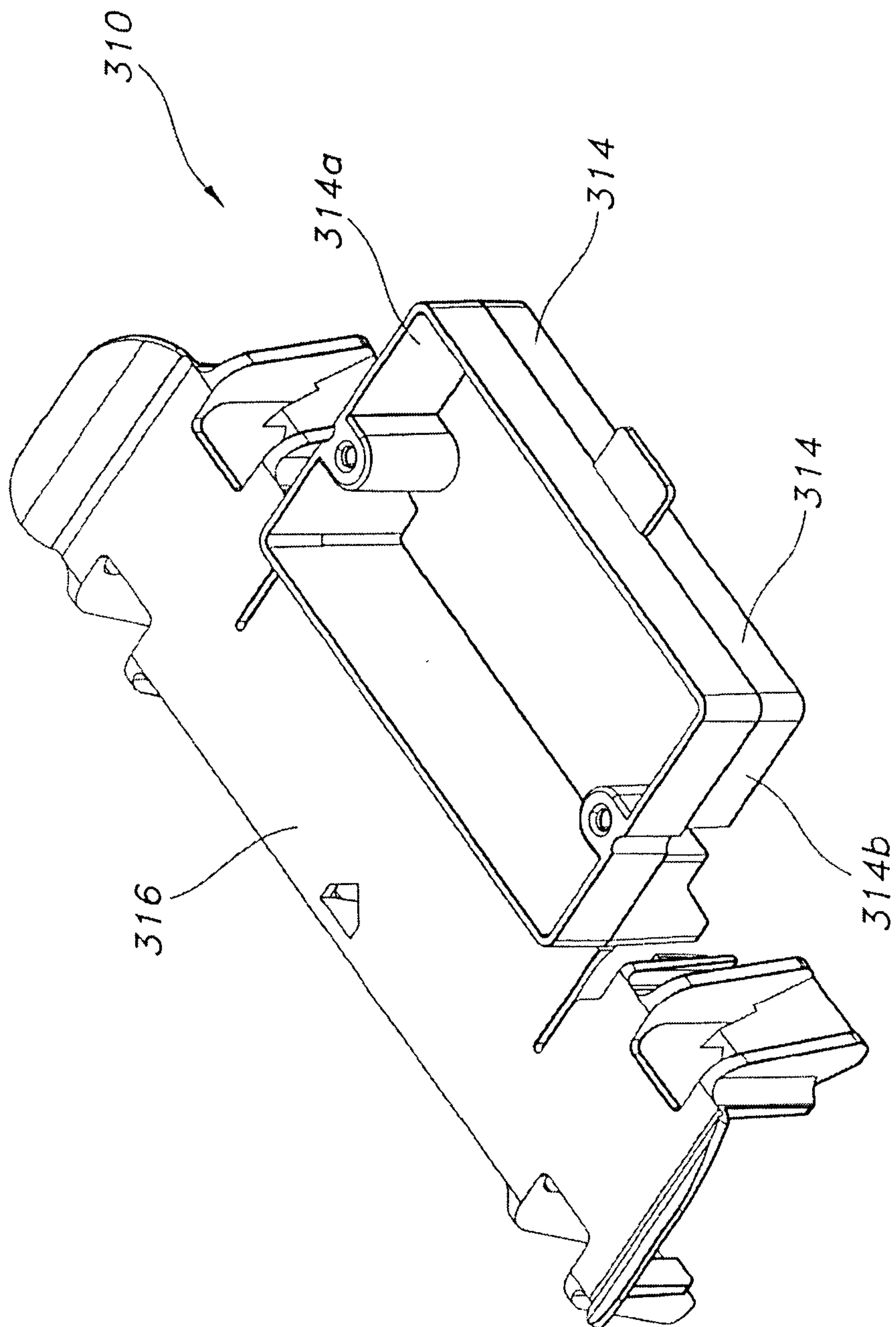


FIG. 9

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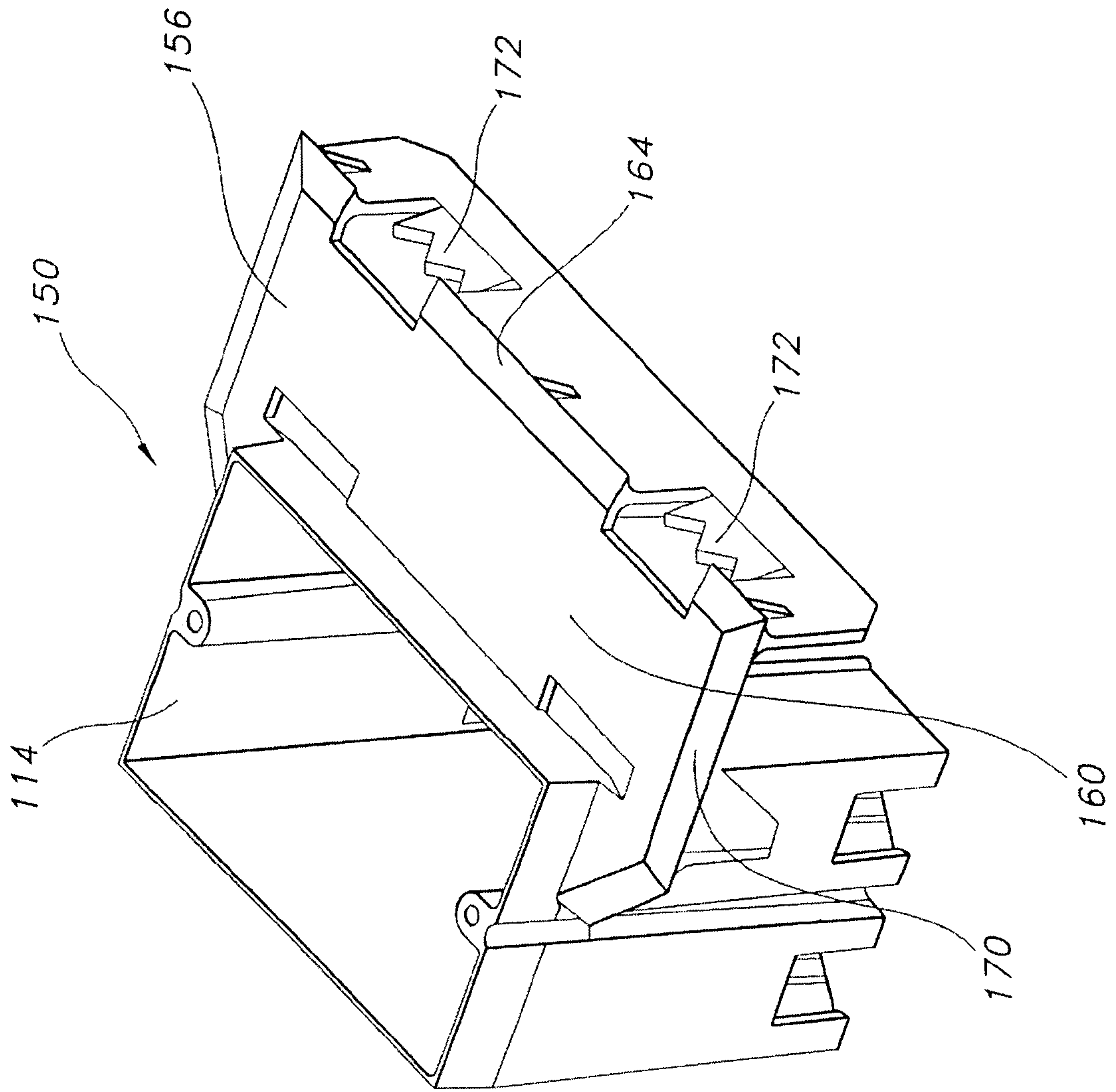


FIG. 10

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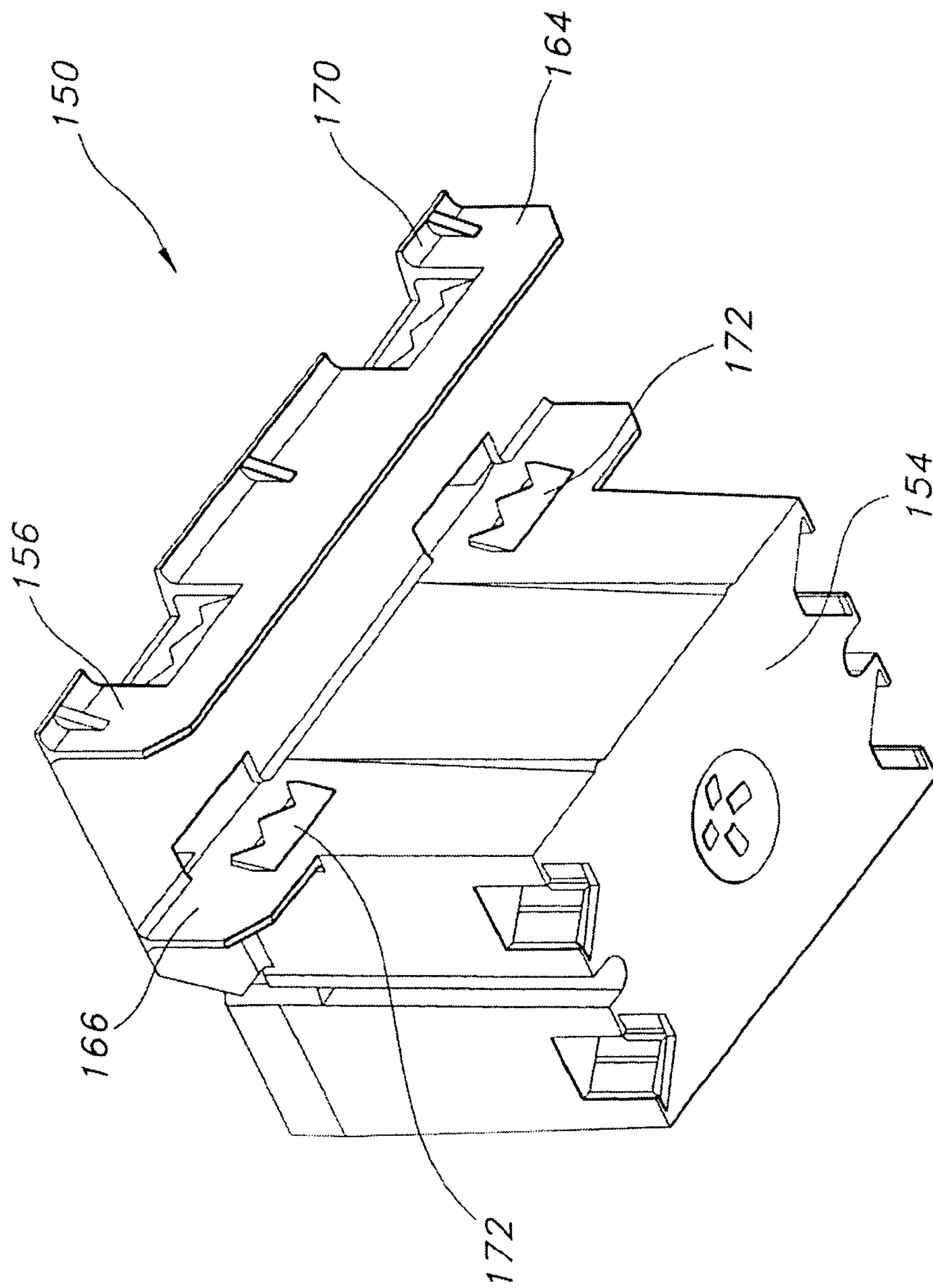
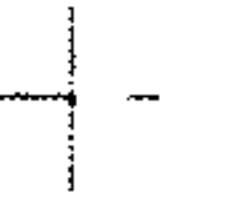


FIG. 11

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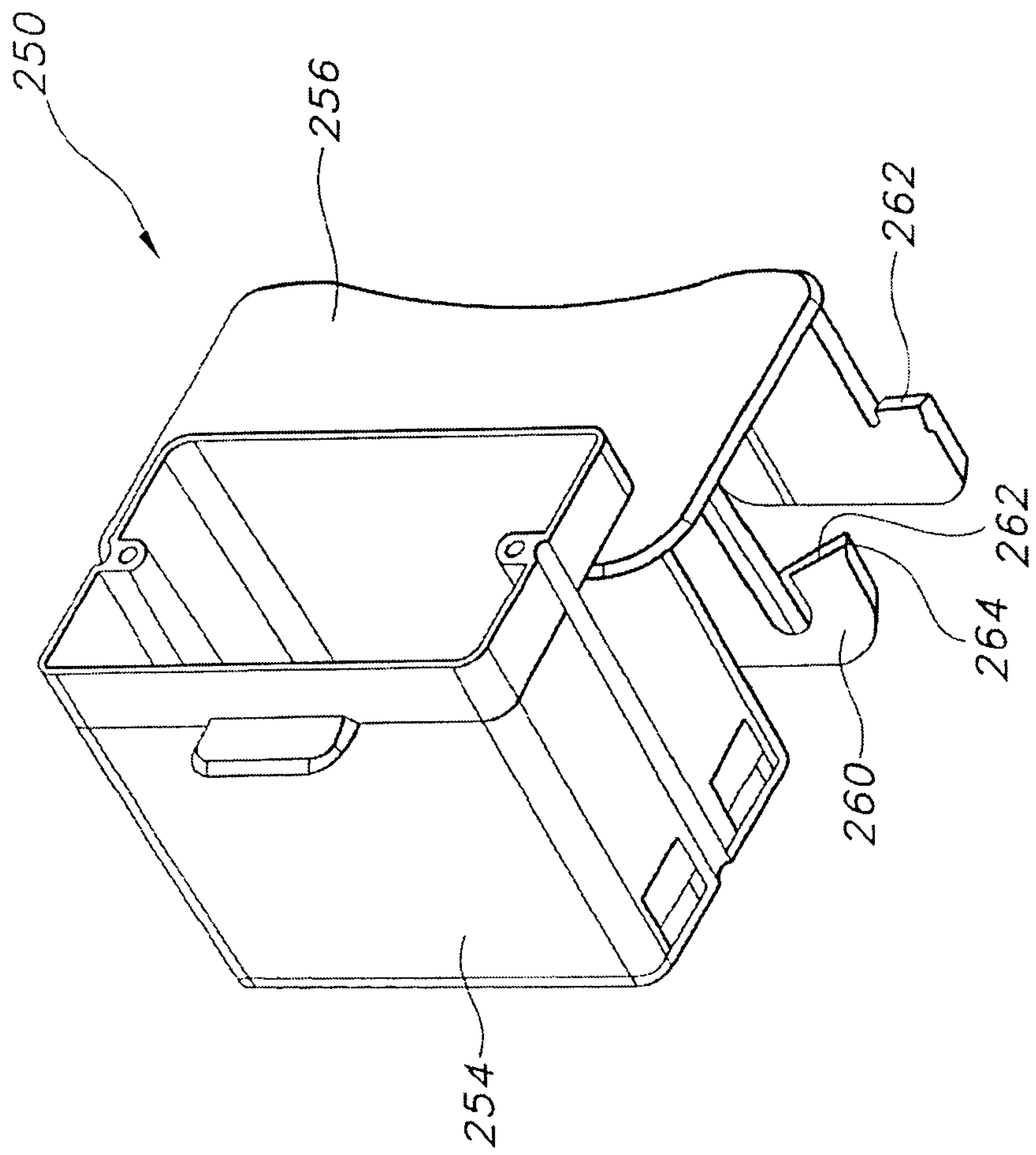


FIG 12



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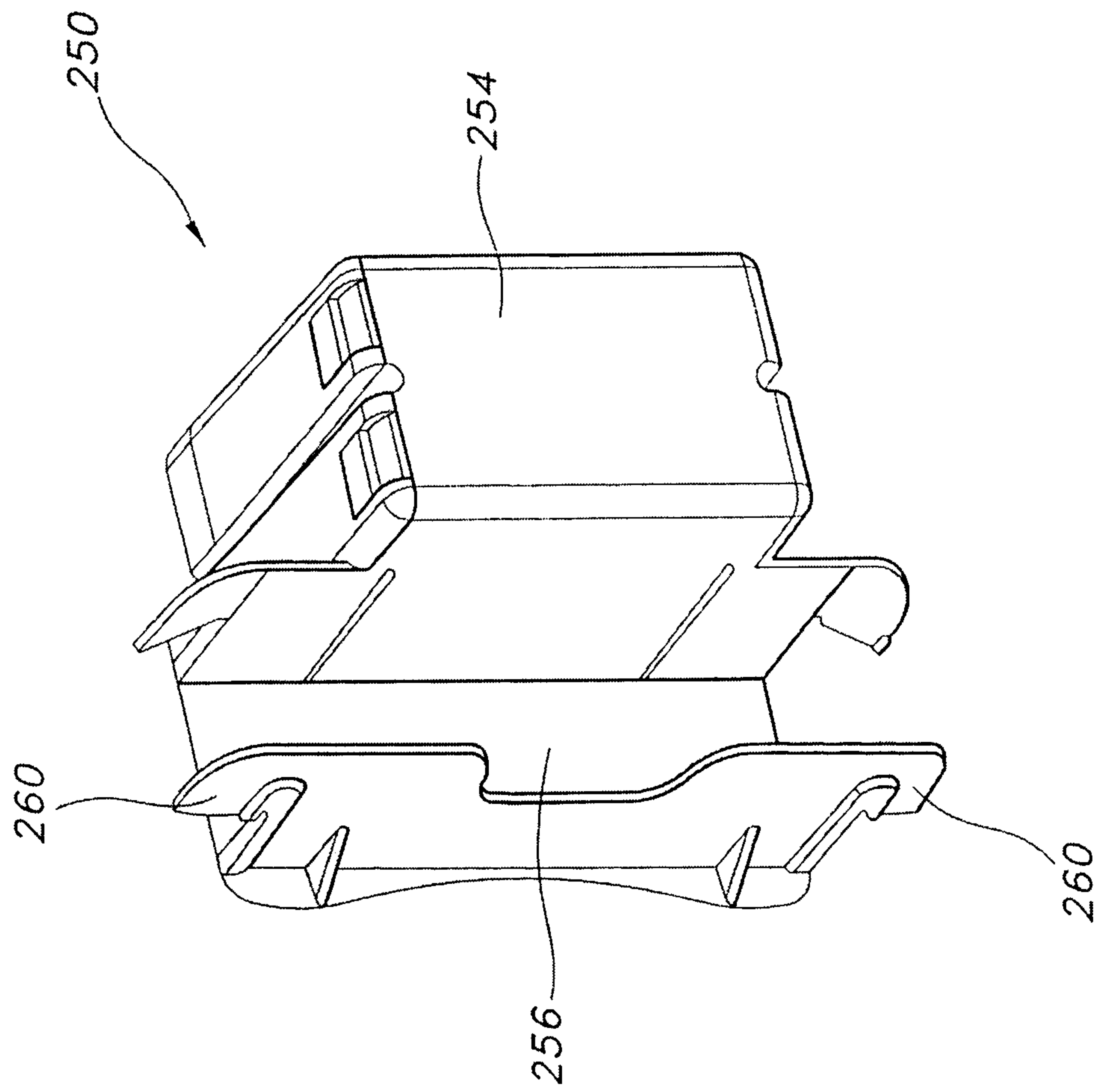


FIG. 13

11/12

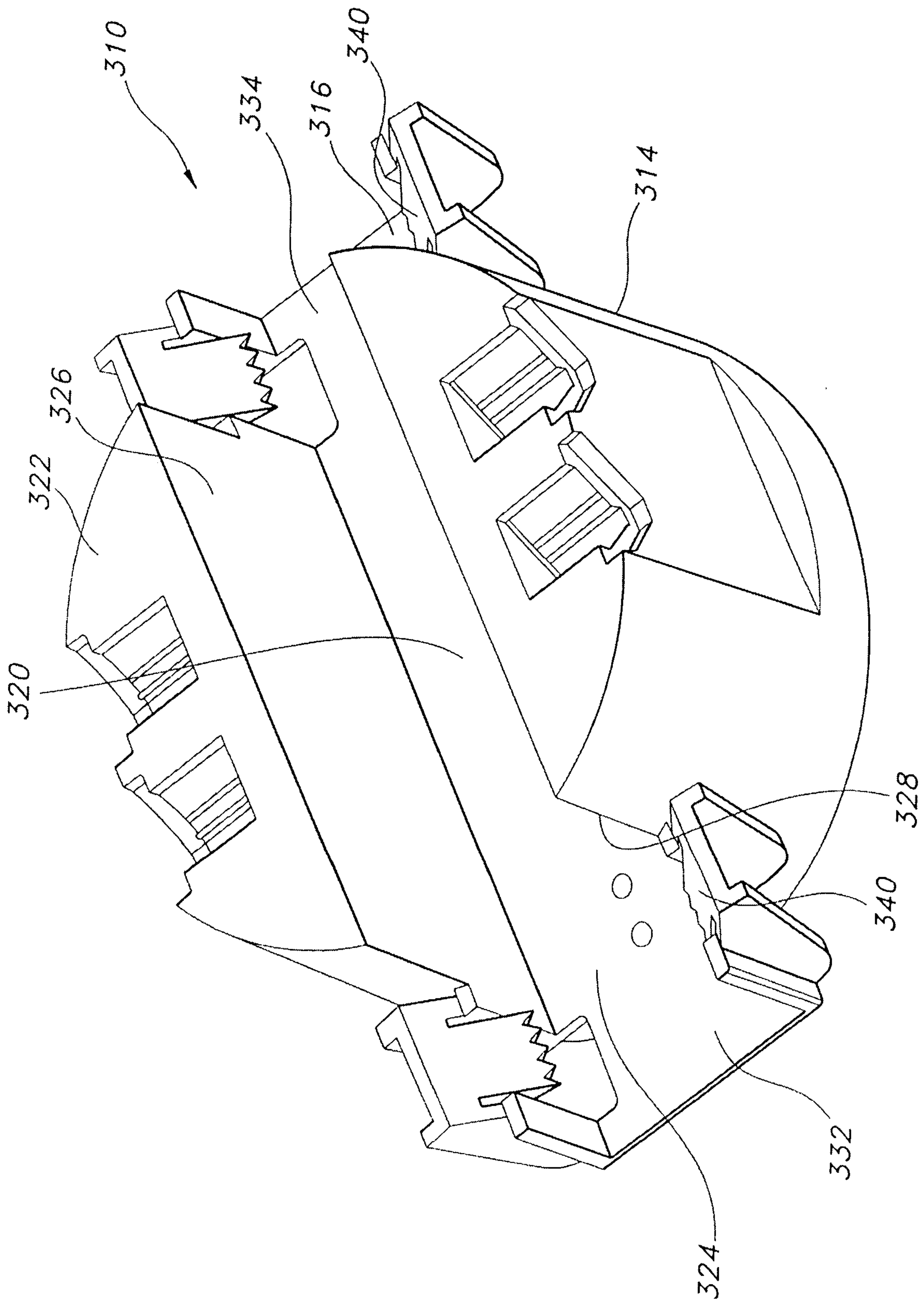
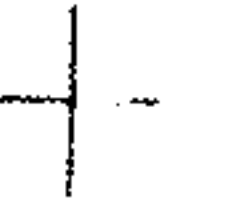


FIG. 14



12/12

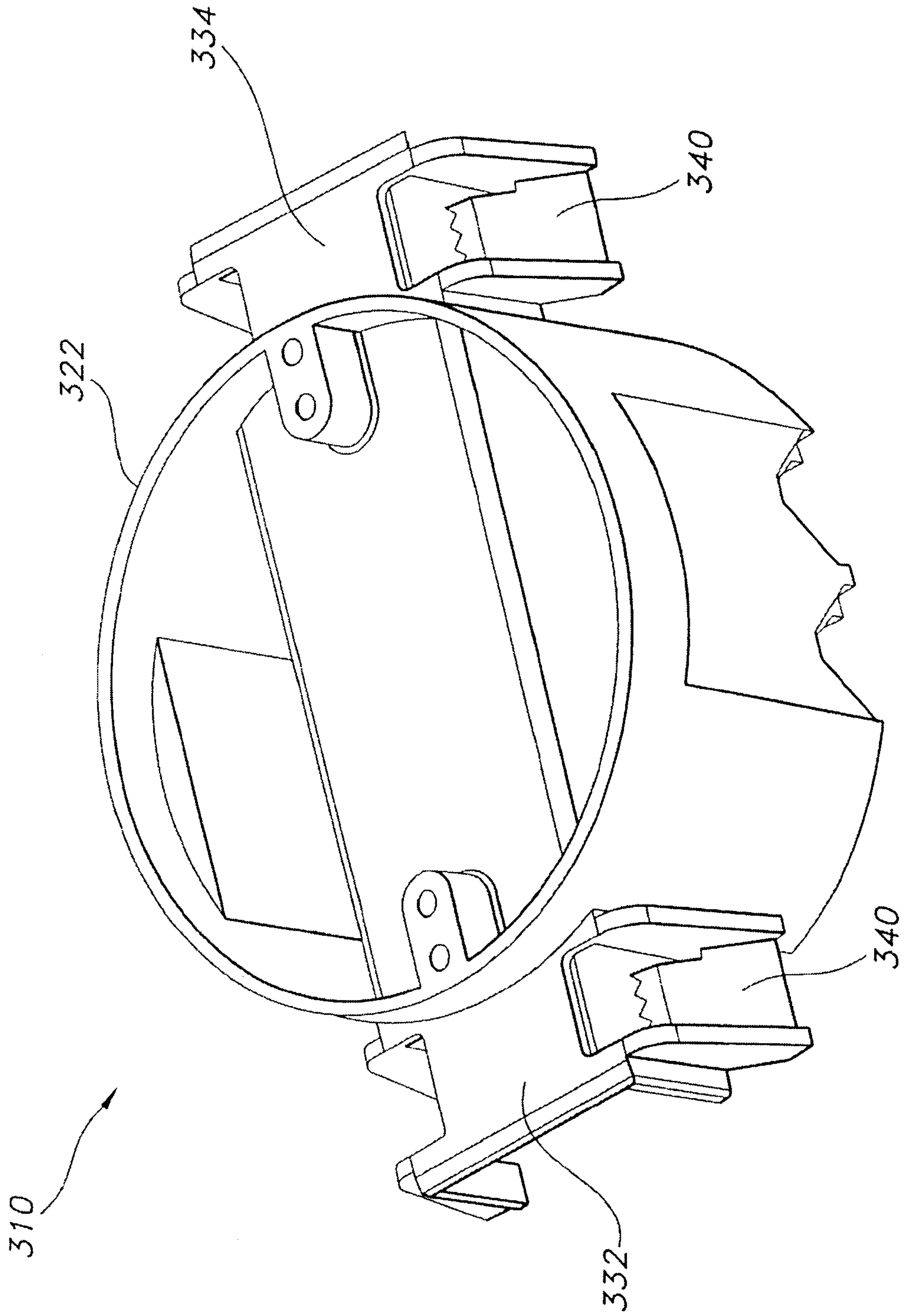


FIG. 15

