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(54) **FRAME WITH CABLE MANAGEMENT**

RAHMEN MIT KABELFÜHRUNG

BÂTI UTILISÉ POUR LA GESTION DE CÂBLES

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Description

Background

[0001] The present disclosure relates generally to telecommunications cable management systems. More specifically, the present disclosure relates to cable management frame assemblies for arranging and organizing cables and for holding telecommunications equipment.

[0002] Cable management systems and assemblies are commonly used in the telecommunications industry to guide, secure and position cables such that the cables do not interfere with each other or with other equipment.

[0003] The telecommunications industry is driven to provide cable management assemblies that provide the most effective cable management solutions as it is typically difficult and time consuming to perform installation and/or maintenance work in an environment containing numerous cables and equipment or environments with confined spaces.

[0004] For these and other reasons cable management assemblies are desired such that cables can be efficiently organized and positioned.

Summary

[0005] Cable management frame assemblies include a frame chassis and a plurality of cable management fixtures that can be affixed to the frame chassis. The cable management frame assembly is arranged wherein the fixtures are placed as desired to optimally guide, secure and position cables such that the cables do not interfere with each other or with other equipment. In a preferred embodiment, the cable management fixtures are mounted to the frame chassis without the use of tools or additional hardware such screws, nuts or bolts. In the preferred embodiment, at least some of the cable management fixtures are positionally configurable to adjust for spacing and volume of cable. It will be appreciated the cables can be a single cable or a bundle of cables and can be of many different types, such as a fiber optic cable, an electrical conductor, or other cable. In a preferred embodiment, the cable management fixtures are mounted to the frame chassis such that the fixtures are removable and/or retractable.

Description of the Drawings

[0006] Aspects of the disclosure may be more completely understood in consideration of the following detailed description of various embodiments of the disclosure in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of an example cable management frame assembly;
Figure 2 is a perspective view of a frame chassis;
Figure 3 is front views of a frame chassis positioned in a collapsed position, an intermediate position, and an erected position.
Figure 4 is a perspective view of a bottom portion of the example cable management frame assembly of Figure 1;
Figure 5 is a perspective view of a cable management tray;
Figure 6 is a front view of the cable management tray of Figure 5;
Figure 7 is a side view of the cable management tray of Figure 5;
Figure 8 is a top view of the cable management tray of Figure 5;
Figure 9 is a perspective view of a horizontal tray support;
Figure 10 is a front view of the horizontal tray support of Figure 9;
Figure 11 is a top view of the horizontal tray support of Figure 9;
Figure 12 is a side view of the horizontal tray support of Figure 9;
Figure 13 is a further perspective view of a bottom portion of the example cable management frame assembly of Figure 1, showing portions in exploded view;
Figure 14 is an enlarged view of a portion of the frame assembly of Figure 13;
Figure 15 is a perspective view of a top portion of the example cable management frame assembly of Figure 1, showing portions in exploded view;
Figure 16 is a perspective view of a patch cable finger unit;
Figure 17 is a further perspective view of the patch cable finger unit of Figure 16;
Figure 18 is a first side view of the patch cable finger unit of Figure 16;
Figure 19 is an opposite side view of the patch cable finger unit of Figure 16;
Figure 20 is a front view of the patch cable finger unit of Figure 16;
Figure 21 is a top view of the patch cable finger unit of Figure 16;
Figure 22 is a perspective view of a cable management plate;
Figure 23 is a front view of the example cable management frame assembly of Figure 1, showing the cable management plates in different mounting positions;
Figure 24 is a side view of a cable guide finger unit;
Figure 25 is a side view of a bottom portion of the example cable management frame assembly of Figure 1;
Figure 26 is a top view of the example cable management frame assembly of Figure 1;
Figure 27 is a further perspective view of a bottom portion of the example cable management frame assembly of Figure 1, showing an example panel mounted to the frame chassis;

Figure 28 is a perspective view of a panel mount unit, showing one retention wedge in the retracted position;

Figure 29 is a further perspective view of the panel mount unit of Figure 28, showing some of the retention wedges in retracted positions and one retention wedge in exploded view;

Figure 30 is an enlarged perspective view of a portion of the panel mount unit of Figure 28;

Figure 31 is a cross-sectional view of the panel mount unit of Figure 28 showing a panel stud in a mounting position;

Figure 32 is a cross-sectional view of the panel mount unit of Figure 28 showing a panel stud in a displaced position;

Figure 33 is a perspective view of a retention wedge;

Figure 34 is a perspective view of a panel:

Figure 35 is a top cross-sectional view of the example cable management frame assembly of Figure 1 showing a mounted panel;

Figure 36 is an enlarged view of a portion of Figure 35;

Figure 37 is enlarged cross-sectional view of a portion of Figure 35 showing a wedge positioned in a first orientation to secure a first panel having a first thickness; and

Figure 38 is an enlarged cross-sectional view of a portion of Figure 35 showing a wedge positioned in a second orientation to secure a second panel having a greater thickness than the first panel of Figure 37.

Detailed Description

[0007] The following embodiments described in this document are provided by way of illustration only and should not be construed as limiting. Various modifications and changes may be made to the example embodiments described below.

[0008] Figure 1 illustrates a preferred embodiment of an example cable management frame assembly 100 having features in accordance with the principles of the present disclosure. The cable management frame assembly 100 includes a frame chassis 105 and a plurality of cable management fixtures for managing cables extending to and from the frame chassis 105. In the preferred embodiment, the cable management frame assembly 100 includes a plurality of positionally configurable cable management fixtures.

[0009] Example cable management fixtures include, in part, a patch cable finger unit 110, a cable management plate 115, a cable constraint bar 120, a cable management tray 125, a cable guide finger unit 130, and a panel mount 1000, as described in further detail below.

[0010] Referring now to Figures 1-3, the frame chassis 105 forms the frame structure of the cable management frame assembly 100. The frame chassis 105 includes a top section 200, a bottom section 205, a first post or side 210, and a second post or side 215, and has a front side 217 and a rear side 219. The top section 200 and the bottom section 205 are formed having the same general physical dimensions. Each respective section 200, 205 is generally rectangular in shape and includes a front plate 220, a rear plate 225, and a pair of side plates 230. The front plate 220 includes an elongated positioning aperture 235. The rear plate 225 has front and rear plate portions 242. 244. The rear plate 225 has a plurality of cable positioning tab apertures 240 positioned on plate portions 242, 244 that can be utilized as cable tie locations to secure or provide strain relief for one or more cables. Side plates 230 join the front plate 220 to the rear plate 225. Preferably, the top section 200 and the bottom section 205 are identically configured components, for manufacturing ease.

[0011] Both plates 220, 225 include a plurality of U-shaped apertures 245. In certain embodiments, U-shaped apertures 245 are utilized to pass a stabilizing element between front side 217 and a rear side 219 to stabilize frame chassis 105 positioned in an upright position. In one embodiment, stabilizing element comprises of a bar passing between front side 217 and a rear side 219 and a base element attached to bar for stabilization.

[0012] The first side 210 and the second side 215 are formed having the same general physical dimensions. Sides 210, 215 include a primary surface 250 having a plurality of spaced apertures. In general, the plurality of apertures are formed having one or more distinguishable shapes such that one or more different types of cable management fixtures can be fastened to the frame chassis 105. In the example embodiment, apertures defined on the primary surface 250 include a square aperture 255, a slit aperture 260, and a slot aperture 265. As described in further detail below, each of the respective apertures 255, 260, and 265 are periodically spaced and shaped such that corresponding cable management fixtures can be optimally positioned to the frame chassis 105. The slot aperture 265 includes curved tabs 261 to restrict movement of a respective cable management fixture, described in further detail below.

[0013] Sides 210, 215 additionally include a secondary surface 275 formed as a lip section running along both of the lengthwise edges of a respective side 210, 215. In this manner, sides 210, 215 form a U-shaped cross-section. In general, each respective secondary surface 275 includes plurality of periodically spaced apertures shaped such that one or more different types of cable management fixtures can be secured to the frame chassis 105. In the example embodiment, apertures defined on the secondary surface 275 include square apertures 255. Preferably, the sides 210, 215 are identically configured components, for manufacturing ease.

[0014] In one example embodiment, the top section 200, bottom section 205, first side 210 and second side 215 are pivotally connected at pivots 222 to form the frame chassis 105. In one aspect, the frame chassis 105 is collapsible. As such, the frame chassis 105 can be

positioned from a collapsed position 300 to an erected position 305. In the collapsed position 300 the frame chassis 105 is folded such that the top section 200, bottom section 205, first side 210 and second side 215 have the respective lengthwise surfaces in parallel planes. In this manner, a storage void space 310 framed by the first side 210 and the second side 215 can be utilized to store one or more different types of cable management fixtures or other items.

[0015] In one aspect, the frame chassis 105 is supplied in the collapsed position 300 and then is positioned into an erected position 305 by pivoting the sections about the various pivot points, in a parallelogram action. Subsequently, the frame chassis 105 can be locked to maintain the erected position 305. For example, the erected frame assembly can be secured in the erected position 305 by a clamping fixture such as one or more rotating clamp handles. In the erected position 305 the frame chassis 105 defines a space 315 where equipment can be mounted. In use, the frame chassis 105 is erected, locked and bolted to the floor.

[0016] As referred to above, the cable management frame assembly 100 includes a plurality of cable management fixtures. In one example embodiment, a cable constraint bar 120 is provided, Figure 4. The cable restraint bar 120 is a ring shaped structure 402 that includes a first opening 400 forming an opening into an interior of the ring shape. The first opening 400 is defined by a first end 405 and a second end 410. The second end 410 has a slight outward curvature. Connected to the cable restraint bar 120 is a pivot block 415. In the example embodiment, a portion of the cable restraint bar 120 is positioned through an internal passage defined in the body of the pivot block 415. The portion of the cable restraint bar positioned in the passage is loosely engaged to a surface of the passage. The cable restraint bar 120 is slidable relative to the pivot block 415 along an axis A. Additionally, the cable restraint bar 120 can be pivoted about the axis A and can be rotated in direction B about axis A. In the example embodiment a plurality of securing posts are integrally formed on a rear side of the pivot block 415. In one aspect, a plurality of L-shaped securing posts can be snapped into slit apertures 260 arranged on the primary surface 250 of the respective sides 210, 215 to fasten a respective cable restraint bar 120 to the frame chassis 105. As such, one or more cable restraint bars 120 can be mounted to the frame chassis 105 without the use of tools or additional hardware such screws, nuts or bolts. Additionally, the cable restraint bars 120 are removable and can be positioned on the frame chassis 105 as desired.

[0017] Cable restraint bars 120 are adjustable regarding how far front 412 extends forward of frame chassis 105 by sliding bar portion 414 relative to pivot block 415 forwardly or rearwardly. Cable restraint bars 120 are allowed to pivot to accommodate more or less cables. In the case of only a few cables, the ring shaped structure 402 pivots down to constrain the few cables. As the number of cables increases, ring shaped structure pivots up to increase the cable handling area. The ring shaped structure can be biased downwardly by a spring in block 415. In one embodiment the spring is a torsion type spring such that a downwardly acting restraining force is developed.

[0018] In one example embodiment, a plurality of cable management trays 125 are provided, as detailed in Figures 5-8. Each cable management tray 125 includes a horizontal positioning surface 500 having a plurality of apertures 505. In one aspect, the apertures 505 are positioned in a row and column configuration. Adjacent to a first edge 510 is a fin structure or front lip 515, having an aperture 517 formed therein, that extends perpendicularly from the horizontal positioning surface 500. Additionally, the cable management tray 125 includes a downwardly extending portion in the form of a curved lip member 520 adjacent to a first side 525 and an identical curved lip member 520 adjacent to a second side 530 of the horizontal positioning surface 500. Each respective curved lip member 520 extends generally in a direction opposite of the front lip 515.

[0019] In the example embodiment, the cable management tray 125 can be positioned into the elongated positioning aperture 235 positioned on the front plate 220 of respective sections 200, 205 of the frame chassis 105. A second edge 535, positioned oppositely from the first edge 510, of the cable management tray 125 is slidable into the elongated positioning aperture 235. The cable management tray 125 is secured into the elongated positioning aperture 235 via friction. Additionally, stop members 600 restrict sliding movement, and retain the cable management tray 125 in selected positions.

[0020] Additionally, the cable management trays 125 can be positioned to the frame chassis 105 by sliding the cable management tray 125 into a tray support structure that is secured to the frame chassis 105. For example, in one embodiment, each respective curved lip member 520 is engaged to a respective horizontal tray support 800 that is secured to the frame chassis 105. The cable management tray 125 is slidable into space 315. In the example embodiment, a pair of horizontal tray supports 800 are mounted to the frame chassis at an equal height such that a cable management tray 125 engaged with the supports 800 is horizontal with respect to a ground surface. The horizontal tray support 800 is a rigid molded structure that includes a U-shaped aperture 805 shaped to complement the shape of the curved lip member 520. The horizontal tray support 800 additionally includes a plurality of L-shaped securing posts 810 formed on a first surface 815 and a second surface 820. In this manner, the horizontal tray support 800 and can be snapped into complementary apertures on the frame chassis 105, such as the square apertures 255 arranged on the secondary surface 275 of the respective sides 210, 215. Upon fastening a pair of horizontal tray supports 800 at a desired level position on the secondary surface 275 of each respective side 210, 215, the curved lip members

520 of the cable management tray 125 are slid into horizontal tray supports 800 to mount the cable management tray 125 to the frame chassis 105. With this mounting arrangement, trays 125 can be mounted at a variety of desired vertical positions. The trays 125 can be fastened to a section of the frame chassis 105 without the use of tools or additional hardware such screws, nuts or bolts. Additionally, the trays 125 are removable and can be positioned on the frame chassis 105 as desired.

[0021] In one embodiment, a plurality of patch cable finger units 110 for cable management are provided, as detailed in Figures 16-21. In general, a patch cable finger unit 110 includes a base section 1400, one or more fingers 1405 extending from the base section 1400 in the same direction, a flange 1410 positioned on an end of each of the fingers 1405 opposite from the base section 1400, and a plurality of L-shaped securing posts 1415 arranged on a first side 1420 of the base section 1400.

[0022] In general, one or more patch cable finger units 110 can be positioned on one or both of the sides 210, 215 of the frame chassis 105 such that the flanges 1410 extend outwards from the front side 217 of the frame chassis 105. In this manner, one or more patch cables or other cables can be positioned between the fingers 1405 to manage and organize the cables as desired.

[0023] In one aspect, the plurality of L-shaped securing posts 1415 can be snapped into the square apertures 255 arranged on the primary surface 250 of the respective sides 210, 215. In this manner, one or more respective patch cable finger units 110 can be fastened to a section of the frame chassis 105 without the use of tools or additional hardware such screws, nuts or bolts. In certain embodiments, a button 1417 is snapped into square apertures 255 arranged on the primary surface 250 to provide additional securing support to affix one or more patch cable finger units 110 to one or both of the sides 210, 215 of the frame chassis 105. In further embodiments, a button 1417 is positioned on pivot block 415, cable guide finger units 130 and panel mounts 1000 to provide additional securing support to affix one or more of fixtures to one or both of the sides 210, 215 of the frame chassis 105 in a similar manner to the patch cable finger units 110. Further, the patch cable finger units 110 are removable and can be positioned on the frame chassis 105 as desired.

[0024] In one embodiment, a cable management plate 115 is provided, as detailed in Figure 22. In general, the cable management plate 115 is rectangular in shape. The cable management plate 115 includes a plurality of tab member apertures 1805 that can be utilized as cable ties to secure or provide strain relief for one or more cables. In one embodiment, the tab member apertures 1805 are arranged in a row and column configuration.

[0025] The cable management plate 115 additionally includes a plurality of positioning slots 1810 periodically spaced between the columns of the flexible tab member apertures 1805. The positioning slots 1810 extend from a first edge 1815 and terminate at a generally internal position 1820 on the cable management plate 1800.

[0026] In the example embodiment, one or more cable management plates 115 can be positioned in complementary features on the frame chassis 105. For example, a respective positioning slot 1810 can be positioned in a slot aperture 265 on the primary surface 250 of sides 210, 215. In this manner, a desired number of tab member apertures 1805 extend perpendicularly outwards from the primary surface 250 such that one or more cables can be managed and organized as desired. Curved tabs 261 restrict pivoting movement of the cable management plates 115. The cable management plates 115 can be positioned where a variable number cable ties and tab member apertures 1805 are utilized. One or more cable management plates 115 can be selectively positioned in a respective slot aperture 265 such that a desired number of tab member apertures 1805 are accessible inside or outside of frame chassis 105. For example, as shown in Figure 23, six, eight or ten tab member apertures 1805 are accessible outside of frame chassis 105; see cable management plates 1900, 1905, 1910, respectively. Additionally, multiple cable management plates can be staggered front to back, see cable management plates 1915, 1920, in a respective slot aperture 265. Further, plates 1930 can be positioned so that tab member apertures 1805 are positioned inside of frame chassis 105. In this manner, one or more respective cable management plates 115 can be positioned to a portion of the frame chassis 105 without the use of tools or additional hardware such screws, nuts or bolts. Additionally, the one or more cable management plates 115 are removable and can be positioned on the frame chassis 105 as desired.

[0027] In one embodiment, a plurality of cable guide finger units 130 are provided, as detailed in Figure 24. In general, a cable guide unit 130 includes a base section 2310, one or more fingers 2315 extending from the base section 2310 in the same direction, a flange 2305 positioned on an end of each of the fingers 2315 opposite from the base section 2310, and a plurality of L-shaped securing posts 2320 arranged on a first side 2325 of the base section 2310.

[0028] In the example embodiment, one or more cable guide finger units 130 can positioned on one or both of the sides 210, 215 on a back side 219 of the frame chassis 105 such that the fingers 2315 are extended outwardly from a back side 219 of the frame chassis 105, Figure 25. In this manner, one or more cables can be positioned between the fingers 2315 to support and organize cables as desired.

[0029] In one aspect, the plurality of L-shaped securing posts 2320 can be snapped into the square apertures 255 arranged on the secondary surface 275 of the respective sides 210, 215, to fasten a respective cable guide finger unit 130 to the frame chassis 105. As such, the one or more cable guide finger units 130 can be mounted to the frame chassis 105 without the use of tools or additional hardware such screws, nuts or bolts. In one

embodiment, the cable guide finger units 130 are removable and can be positioned on the frame chassis 105 as desired.

[0030] Cable guide finger units 130 and patch cable finger units 110 are similar in structure and function. One difference is the cable guide finger units 130 are shorter in finger length than patch cable finger units 110. If desired, the individual fingers 1405, 2315 can be made to be moveably mounted to bases sections 1400, 2310, such as by retracting or extending longitudinally into or away from the respective base sections. The fingers can be retracted/extended as a group or individually.

[0031] The various fixtures, including the patch cable finger units 110, the cable management plates 115, the cable restraint bars 120, the cable management trays 125, the cable guide finger units 130, and the panel mounts 1000, can be delivered as separate elements with frame chassis 105, and mounted to frame chassis 105 after frame chassis 105 is erected from the collapsed state to the erected state. Alternatively, the various fixtures can be pre-mounted, and retracted, then extended into the desired positions after the frame chassis 105 is placed in the erected state.

[0032] In one embodiment, a panel or equipment mounting assembly is provided for mounting equipment in space 315. The mounting assembly includes a panel mount 1000, and a retention wedge 2000 for mounting a panel 3000, Figure 27. Referring now to Figures 28-33, the panel mount 1000 includes a first side 1005, a second side 1010, and a bracket 1015 extending outwardly from the second side 1010. The bracket 1015 includes a plurality of rectangular wedge member receiving apertures 1015, a stop surface 1017, and a clip surface 1019. The first side 1005 includes a plurality of clip posts 1020. The panel mount 1000 is secured to the secondary surface 275 of the frame chassis 105 by the clip posts 1020. The second side 1010 includes a plurality of panel studs 1025. Each respective panel stud 1025 is positioned in a respective stud aperture 1030. The panel stud 1025 is depressible upon a pressure applied to the panel stud 1025 to move the panel stud 1025 into the stud aperture 1030 until a stud first surface 1035 contacts a receiving stud surface 1040. A flexible tail 1045 biases each panel stud 1025 toward an outer position. The panel stud 1025 can be pushed inward if not desired and locked out of the way by pressing inward until the first stud surface 1035 contacts the receiving stud surface 1040. Such might be the case if equipment larger than one rack unit (1RU) is mounted the frame chassis 105.

[0033] The retention wedge 2000 includes a fitting aperture 2005 framed by a first wedge member 2010, a second wedge member 2015, and a stop bar 2020. A flexible retaining clip 2025 is positioned on an inner surface 2030 of the first wedge member 2010 and the second wedge member 2015. Additionally, a panel stud contact section 2035 is formed on an outer surface 2040 of both the first wedge member 2010 and the second wedge member 2015. Further, a retention bump 2022 is positioned at a terminal end of each respective retaining clip 2025 such that retention wedge 2000 does not fall from panel mount 1000 when not fully engaged. In one aspect, retention bump 2022 contacts a clip surface 1019 such that retention wedge 2000 does not fall from panel mount 1000 when not fully engaged.

[0034] Referring now to Figures 34-36, the panel 3000 includes a center section 3005 having a plurality of telecommunications connection locations 3010, such as for receiving copper or fiber connection equipment, including jacks or adapters. Located at each of a first end 3015 and a second end 3020 is a retaining flange 3025. The retaining flange 3025 includes a plurality of securing apertures 3030.

[0035] In use, the panel 3000 is positioned to the panel mount 1000, that is secured to the secondary surface 275 of the frame chassis 105, such that each of the plurality of securing apertures 3030 are coincidently aligned with a panel stud 1025. A retention wedge 2000 is positioned such that the first wedge member 2010 and the second wedge member 2015 are aligned with a respective wedge member receiving aperture 1015. The first wedge member 2010 and the second wedge member 2015 of the retention wedge 2000 are inserted into respective wedge member receiving apertures 1015 until the stop bar 2020 contacts the stop surface 1017. During the insertion process each of the flexible retaining clips 2025 are deformed outwardly, in a direction towards a panel stud contact section 2035 on the respective wedge member 2010, 2015. Upon contact of the stop bar 2020 with the stop surface 1017 each respective flexible retaining clip 2025 expands to its normal state and contacts the clip surface 1019. In this manner, the retention wedge 2000 is secured, thereby restraining the panel 3000 to the frame chassis 105. To disengage the retention wedge 2000 from the quick fit molding 1000 pressure is applied to deform each of the flexible retaining clips 2025. Wedges 2000 are reversible to allow for different panel thicknesses. In one aspect, the retention wedge 2000 is inserted into the bracket 1015 in a first orientation such that a first face is facing outwardly from the frame chassis 105. In a second aspect, the retention wedge 2000 is inserted into the bracket 1015 in a second orientation such that an opposite second face is facing outwardly from the frame chassis 105. For example, Figure 37 illustrates a wedge 2000 inserted to panel mount 1000 in an orientation to allow for a first panel thickness, as illustrated by space 3700. In contrast, Figure 38 illustrates a wedge 2000 reversed to allow for a greater panel thickness, as illustrated by space 3800.

[0036] The preceding embodiments are intended to illustrate without limitation the present disclosure. Those skilled in the art will readily recognize various modifications and changes that may be made to the embodiments described above.

Claims

1. A cable management frame assembly (100) comprising:

   a frame chassis (105) including: a top section (200), a bottom section (205), a first side (210), and a second side (215), and wherein the first side (210) and the second side (215) each include a primary surface (250) and a secondary surface (275) and each of the primary surface (250) and the secondary surface (275) includes a plurality of apertures (255, 260, 265); and
   a plurality of cable restraint bars (120) including:

      a ring shaped body (402) having an opening (400);
      a pivot block (415) mounted to the ring shaped body (402); and
      a plurality of securing posts arranged on a rear side of the pivot block (415), the securing posts mounted to the plurality of apertures (255, 260, 265), wherein the ring shaped body (402) is pivotally moveable relative to the frame chassis (105), **characterised in that** the ring shaped body (402) of each cable restraint bar (120) pivots down to constrain few cables and pivots up to increase a cable handling area.

2. The cable management frame assembly of claim 1, wherein the cable restraint bar (120) is slidable along a longitudinal axis in a direction parallel to the primary surface (250).

3. The cable management frame assembly of claim 2, wherein the cable restraint bar (120) is pivotable with respect to the longitudinal axis.

4. The cable management frame assembly of claim 1, wherein the plurality of apertures (255, 260, 265) includes at least a plurality of square apertures.

5. The cable management frame assembly of claim 4, wherein the plurality of securing posts arranged on the rear side of the pivot block (415) are snapped into the square apertures.

6. The cable management frame assembly of claim 4, wherein the cable restraint bars (120) are removable from the frame chassis (105).

7. The cable management frame assembly of claims 1-6, further comprising:

   a plurality of cable management trays (125) including:

      a main support surface (500);
      a front (515) extending perpendicularly from a first edge of the main support surface (500); and
      two downwardly extending members (520), wherein a first member (520) is positioned on a first side (525) adjacent to the main support surface (500) and a second member (520) is positioned on a second side (530) adjacent to the main support surface (500), and wherein the members (520) extend generally in direction opposite of the front structure (515); and
      a plurality of horizontal tray supports (800) for receiving the downwardly extending members (520), wherein each of the plurality of horizontal tray supports (800) have a first surface (815) and a second surface (820), and wherein a plurality of securing posts (810) are formed on the first surface (815) and the second surface (820) and mounted to the plurality of apertures.

8. The cable management frame assembly of claims 1-7, further comprising:

   a plurality of cable management finger units (110) including:

      a base section (1400);
      a plurality of fingers (1405) extending in a common direction from the base section;
      a flange (1410) positioned on an end of each of the fingers opposite from the base section; and
      a plurality of securing posts (1415) arranged on the base section and mounted to the plurality of apertures.

9. The cable management frame assembly of claims 1-8, further comprising:

   a plurality of management plates (115) including:

      a plate body;
      a plurality of tab members (1805) for cable ties; and
      a plurality of positioning slots (1810) wherein one of the slots is mounted to one of the apertures.

10. The cable management frame assembly of claim 7, wherein a further cable management tray (125) is positioned in an elongated positioning aperture (235) formed in a front plate (220) of at least one of the top section (200) and the bottom section (205) of the frame chassis.

11. The cable management frame assembly of claim 7, wherein the trays (125) are slideably mounted to the tray supports (800).

12. The cable management frame assembly of claim 11, further comprising a plurality of tray stops (600) to selectively locate the trays in discrete positions relative to the tray supports (800).

13. The cable management frame assembly of claim 8, wherein a plurality of finger units (110) are positioned on the primary surface of at least one of the first side (210) and the second side (215), and wherein the fingers (1405) of each of the finger units (110) extend outwards from a front side (217) of the frame chassis (105).

14. The cable management frame assembly of claim 9, wherein the tab members (1805) are arranged in a plural row and column configuration.

15. The cable management frame assembly of claim 9, wherein the positioning slots (1810) are spaced between the columns of the tab members (1805).

Patentansprüche

1. Rahmenanordnung (100) zur Kabelführung, aufweisend:

ein Rahmengehäuse (105), enthaltend: ein oberes Teil (200), ein unteres Teil (205), eine erste Seite (210) und eine zweite Seite (215) und wobei die erste Seite (210) und die zweite Seite (215) jeweils eine Primärfläche (250) und eine Sekundärfläche (275) enthalten und jede der Primärfläche (250) und der Sekundärfläche (275) mehrere Öffnungen (255, 260, 265) enthält; und
mehrere Kabelfixierungsbügel (120), enthaltend:

einen ringförmigen Körper (402) mit einer Öffnung (400);
einen Schwenkblock (415), der am ringförmigen Körper (402) montiert ist; und
mehrere Befestigungsstäbe, die an der Rückseite des Schwenkblocks (415) angeordnet sind, wobei die Befestigungsstäbe an den mehreren Öffnungen (255, 260, 265) montiert sind, wobei der ringförmige Körper (402) in Bezug auf das Rahmengehäuse (105) schwenkbar ist, **dadurch gekennzeichnet, dass** der ringförmige Körper (402) jedes Kabelfixierungsbügels (120) nach unten schwenkt, um einige Kabel zu fixieren, und nach oben schwenkt, um eine Kabelhandhabungsfläche zu vergrößern.

2. Rahmenanordnung zur Kabelführung nach Anspruch 1, wobei der Kabelfixierungsbügel (120) entlang einer Längsachse in einer Richtung parallel zur Primärfläche (250) gleitfähig ist.

3. Rahmenanordnung zur Kabelführung nach Anspruch 2, wobei der Kabelfixierungsbügel (120) in Bezug auf die Längsachse schwenkbar ist.

4. Rahmenanordnung zur Kabelführung nach Anspruch 1, wobei die mehreren Öffnungen (255, 260, 265) zumindest mehrere quadratische Öffnungen enthalten.

5. Rahmenanordnung zur Kabelführung nach Anspruch 4, wobei die mehreren Befestigungsstäbe, die an der Rückseite des Schwenkblocks (415) angeordnet sind, in die quadratischen Öffnungen eingeschnappt sind.

6. Rahmenanordnung zur Kabelführung nach Anspruch 4, wobei die Kabelfixierungsbügel (120) vom Rahmengehäuse (105) entfernbar sind.

7. Rahmenanordnung zur Kabelführung nach den Ansprüchen 1 bis 6, des Weiteren aufweisend:

mehrere Kabelführungswannen (125), enthaltend:

eine Hauptauflagefläche (500);
eine Front (515), die sich senkrecht von einer ersten Kante der Hauptauflagefläche (500) erstreckt; und
zwei sich nach unten erstreckende Elemente (520), wobei ein erstes Element (520) an einer ersten Seite (525) neben der Hauptauflagefläche (500) angeordnet ist und ein zweites Element (520) an einer zweiten Seite (530) neben der Hauptauflagefläche (500) angeordnet ist, und wobei sich die Elemente (520) im Allgemeinen in eine Richtung erstrecken, die der Frontstruktur (515) entgegengesetzt ist; und
mehrere horizontale Wannenträger (800) zum Aufnehmen der sich nach unten erstreckenden Elemente (520), wobei jeder der mehreren horizontalen Wannenträger (800) eine erste Oberfläche (815) und eine zweite Oberfläche (820) hat und wobei mehrere Befestigungsstäbe (810) an der ersten Oberfläche (815) und der zweiten Oberfläche (820) gebildet und an den mehreren Öffnungen montiert sind.

8. Rahmenanordnung zur Kabelführung nach den Ansprüchen 1 bis 7, des Weiteren aufweisend:

mehrere Kabelführungsfingereinheiten (110), enthaltend:

ein Basisteil (1400);
mehrere Finger (1405), die sich vom Basisteil in eine gleiche Richtung erstrecken;
einen Flansch (1410), der an einem Ende jedes der Finger gegenüber vom Basisteil positioniert ist; und
mehrere Befestigungsstäbe (1415), die am Basisteil angeordnet und an den mehreren Öffnungen montiert sind.

9. Rahmenanordnung zur Kabelführung nach den Ansprüchen 1 bis 8, des Weiteren aufweisend:

mehrere Führungsplatten (115), enthaltend:

einen Plattenkörper;
mehrere Riegelelemente (1805) für Kabelbinder; und
mehrere Positionierungsschlitze (1810), wobei einer der Schlitze an einer der Öffnungen montiert ist.

10. Rahmenanordnung zur Kabelführung nach Anspruch 7, wobei eine weitere Kabelführungswanne (125) in einer länglichen Positionierungsöffnung (235) positioniert ist, die in einer Frontplatte (220) von zumindest einem vom oberen Teil (200) und unteren Teil (205) des Rahmengehäuses gebildet ist.

11. Rahmenanordnung zur Kabelführung nach Anspruch 7, wobei die Wannen (125) gleitfähig an den Wannenträgern (800) montiert sind.

12. Rahmenanordnung zur Kabelführung nach Anspruch 11, des Weiteren aufweisend mehrere Wannenanschläge (600), um die Wannen selektiv an einzelnen Positionen relativ zu den Wannenträgern (800) anzuordnen.

13. Rahmenanordnung zur Kabelführung nach Anspruch 8, wobei mehrere Fingereinheiten (110) an der Primärfläche zumindest einer von der ersten Seite (210) und der zweiten Seite (215) positioniert sind und wobei sich die Finger (1405) jeder der Fingereinheiten (110) von einer Vorderseite (217) des Rahmengehäuses (105) nach außen erstrecken.

14. Rahmenanordnung zur Kabelführung nach Anspruch 9, wobei die Riegelelemente (1805) in einer Gruppierung aus mehreren Reihen und Spalten angeordnet sind.

15. Rahmenanordnung zur Kabelführung nach Anspruch 9, wobei die Positionierungsschlitze (1810) in Abständen zwischen den Spalten der Riegelelemente (1805) liegen.

Revendications

1. Ensemble de bâti pour la gestion de câbles (100), comprenant:

un châssis de bâti (105) comprenant une section supérieure (200), une section inférieure (205), un premier côté (210) et un deuxième côté (215), et dans lequel le premier côté (210) et le deuxième côté (215) présentent chacun une surface primaire (250) et une surface secondaire (275), et chacune parmi la surface primaire (250) et la surface secondaire (275) comporte une pluralité d'ouvertures (255, 260, 265); et
une pluralité de barres de serrage de câble (120), comprenant:

un corps de forme annulaire (402) comportant une ouverture (400);
un bloc pivotant (415) monté sur le corps de forme annulaire (402); et

une pluralité de montants de fixation agencés sur un côté arrière du bloc pivotant (415), les montants de fixation étant montés sur la pluralité d'ouvertures (255, 260, 265), dans lequel le corps de forme annulaire (402) peut se déplacer de façon pivotante par rapport au châssis de bâti (105),
caractérisé en ce que le corps de forme annulaire (402) de chaque barre de serrage de câble (120) pivote vers le bas afin de serrer quelques câbles et pivote vers le haut afin d'augmenter une zone de manipulation de câbles.

2. Ensemble de bâti pour la gestion de câbles selon la revendication 1, dans lequel la barre de serrage de câble (120) peut coulisser le long d'un axe longitudinal dans une direction parallèle à la surface primaire (250).

3. Ensemble de bâti pour la gestion de câbles selon la revendication 2, dans lequel la barre de serrage de câble (120) peut pivoter par rapport à l'axe longitudinal.

4. Ensemble de bâti pour la gestion de câbles selon la revendication 1, dans lequel la pluralité d'ouvertures (255, 260, 265) comprend au moins une pluralité d'ouvertures carrées.

5. Ensemble de bâti pour la gestion de câbles selon la

revendication 4, dans lequel la pluralité de montants de fixation agencés sur le côté arrière du bloc pivotant (415) sont emboîtés dans les ouvertures carrées.

6. Ensemble de bâti pour la gestion de câbles selon la revendication 4, dans lequel les barres de serrage de câble (120) peuvent être enlevées du châssis de bâti (105).

7. Ensemble de bâti pour la gestion de câbles selon l'une quelconque des revendications 1 à 6, comprenant en outre:

une pluralité de plateaux de gestion de câbles (125), comprenant:

une surface de support principale (500);
une structure avant (515) s'étendant perpendiculairement à partir d'un premier bord de la surface de support principale (500); et

deux éléments s'étendant vers le bas (520), dans lequel un premier élément (520) est positionné sur un premier côté (525) adjacent à la surface de support principale (500), et un deuxième élément (520) est positionné sur un deuxième côté (530) adjacent à la surface de support principale (500), et dans lequel les éléments (520) s'étendent essentiellement dans une direction opposée de la structure avant (515); et
une pluralité de supports de plateau horizontaux (800) pour recevoir les éléments s'étendant vers le bas (520), dans lequel chacun de la pluralité de supports de plateau horizontaux (800) présente une première surface (815) et une deuxième surface (820), et dans lequel une pluralité de montants de fixation (810) sont formés sur la première surface (815) et la deuxième surface (820) et sont montés sur la pluralité d'ouvertures.

8. Ensemble de bâti pour la gestion de câbles selon l'une quelconque des revendications 1 à 7, comprenant en outre:

une pluralité d'unités de doigts pour la gestion de câbles (110), comprenant:

une section de base (1400);
une pluralité de doigts (1405) qui s'étendent dans une direction commune à partir de la section de base;
une bride (1410) positionnée sur une extrémité de chacun des doigts à l'opposé de la section de base; et

une pluralité de montants de fixation (1415) agencés sur la section de base et montés sur la pluralité d'ouvertures.

9. Ensemble de bâti pour la gestion de câbles selon l'une quelconque des revendications 1 à 8, comprenant en outre:

une pluralité de plaques de gestion (115), comprenant:

un corps de plaque;
une pluralité d'éléments de patte (1805) pour des attaches de câble; et
une pluralité de fentes de positionnement (1810), dans lequel une des fentes est montée sur une des ouvertures.

10. Ensemble de bâti pour la gestion de câbles selon la revendication 7, dans lequel un plateau de gestion de câbles supplémentaire (125) est positionné dans une ouverture de positionnement allongée (235) formée dans une plaque avant (220) d'au moins une parmi la section supérieure (200) et la section inférieure (205) du châssis de bâti.

11. Ensemble de bâti pour la gestion de câbles selon la revendication 7, dans lequel les plateaux (125) sont montés de façon coulissante sur les supports de plateau (800).

12. Ensemble de bâti pour la gestion de câbles selon la revendication 11, comprenant en outre une pluralité d'arrêts de plateau (600) pour localiser de façon sélective les plateaux dans des positions discrètes par rapport aux supports de plateau (800).

13. Ensemble de bâti pour la gestion de câbles selon la revendication 8, dans lequel une pluralité d'unités de doigts (110) sont positionnées sur la surface primaire d'au moins un parmi le premier côté (210) et le deuxième côté (215), et dans lequel les doigts (1405) de chacune des unités de doigts (110) s'étend vers l'extérieur à partir d'un côté avant (217) du châssis de bâti (105).

14. Ensemble de bâti pour la gestion de câbles selon la revendication 9, dans lequel les éléments de patte (1805) sont agencés en une configuration à plusieurs rangées et colonnes.

15. Ensemble de bâti pour la gestion de câbles selon la revendication 9, dans lequel les fentes de positionnement (1810) sont espacées entre les colonnes des éléments de patte (1805).

FIG. 1

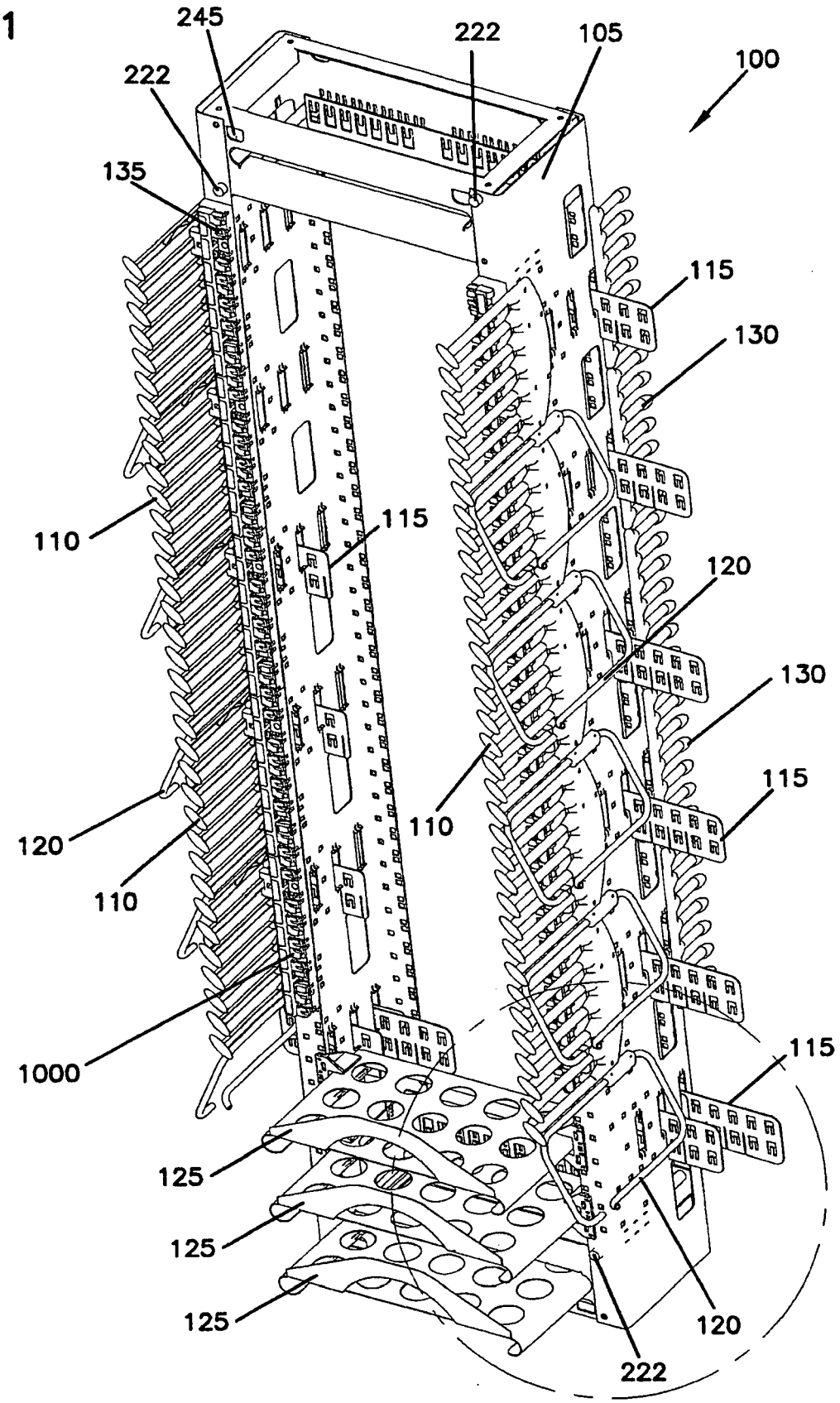
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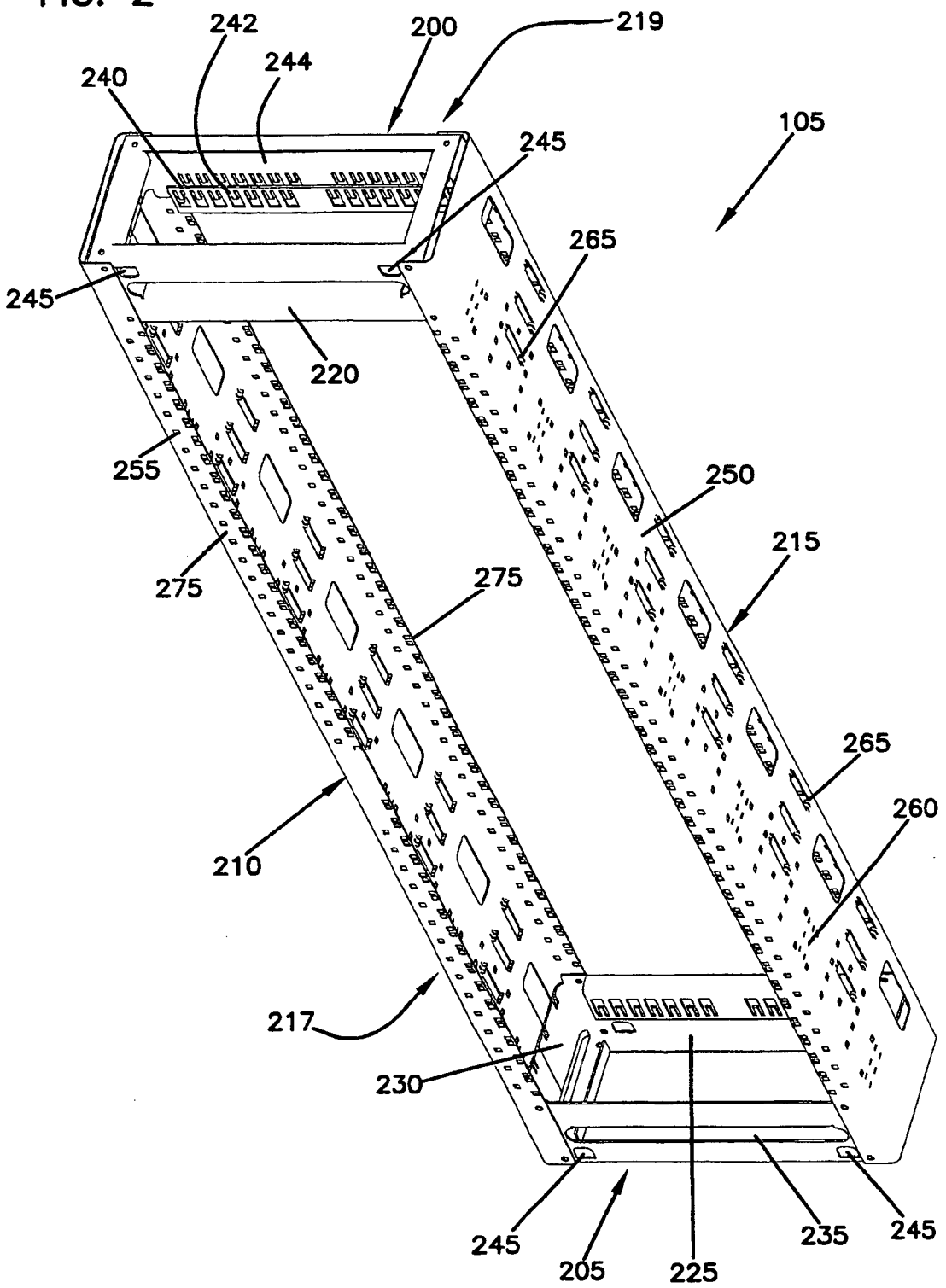
FIG. 2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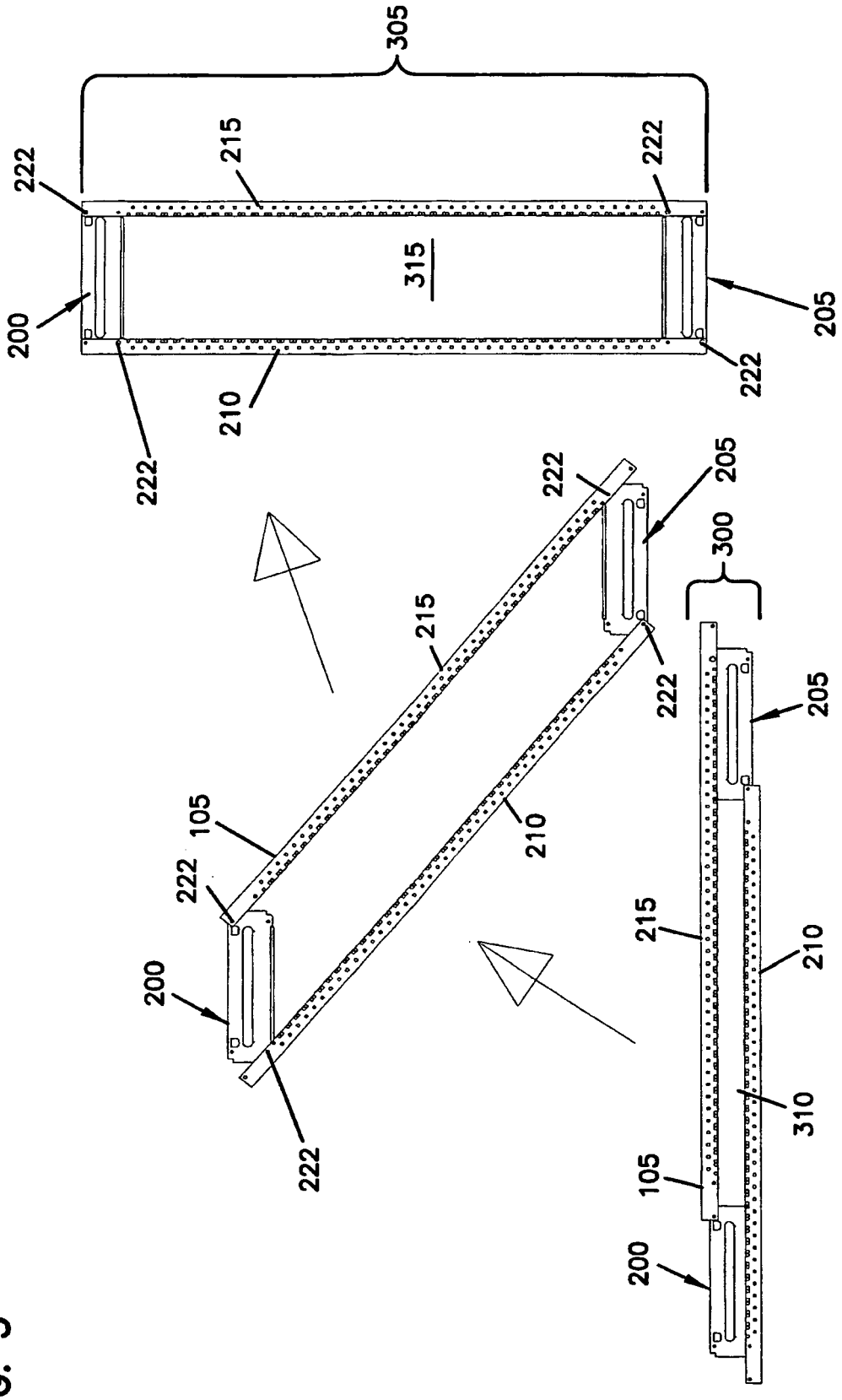
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FIG. 3

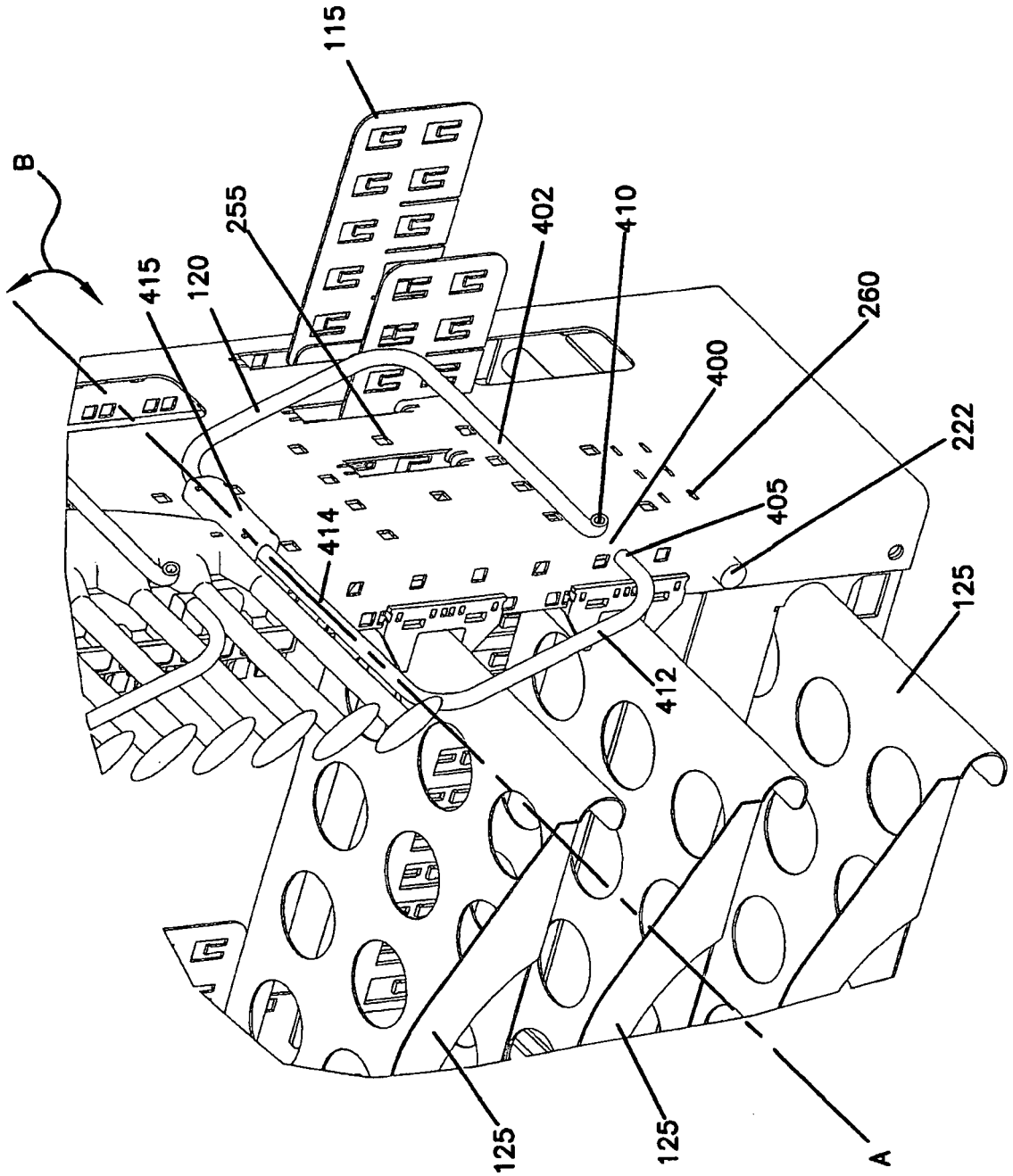


FIG. 4

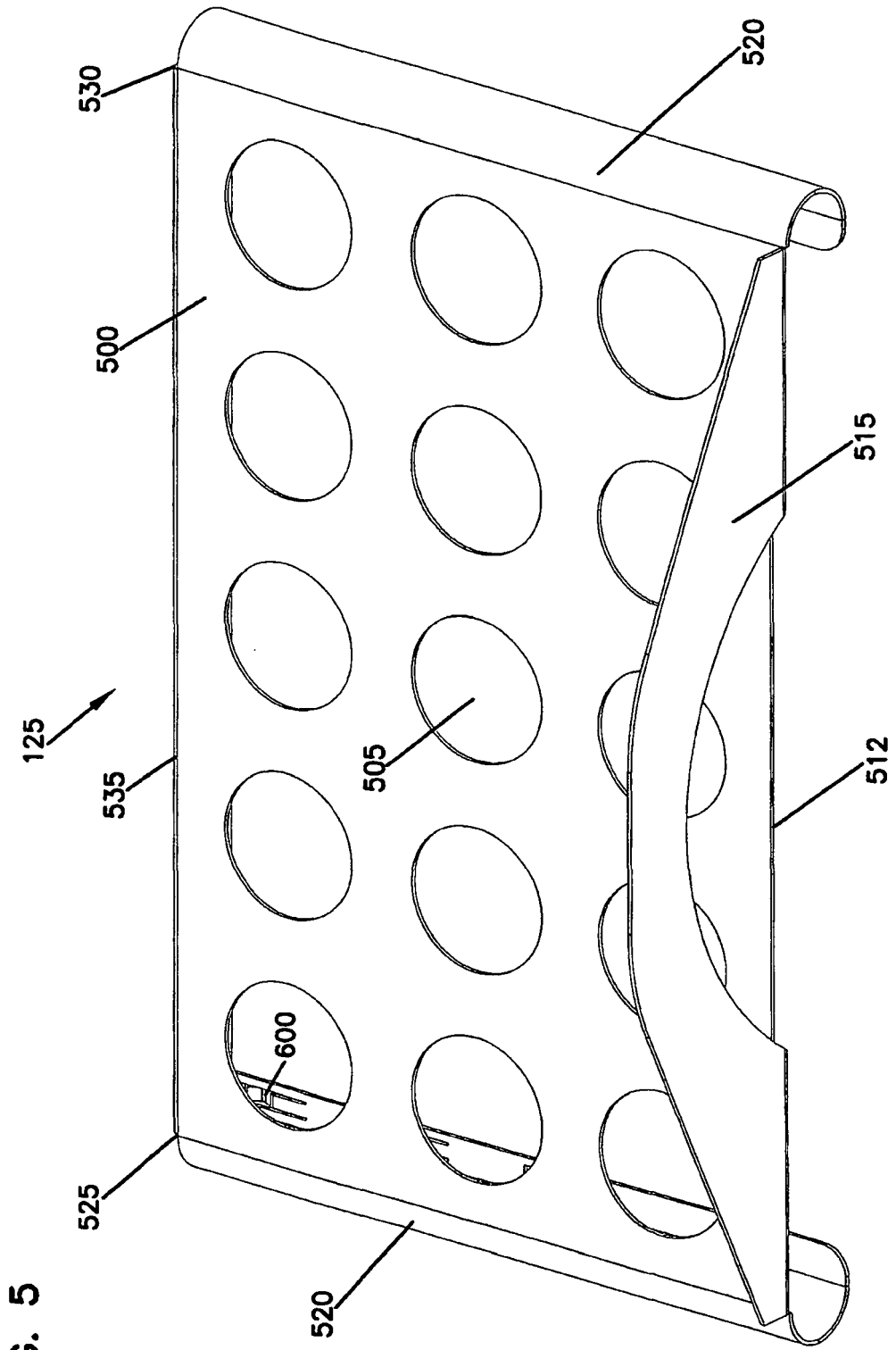


FIG. 5

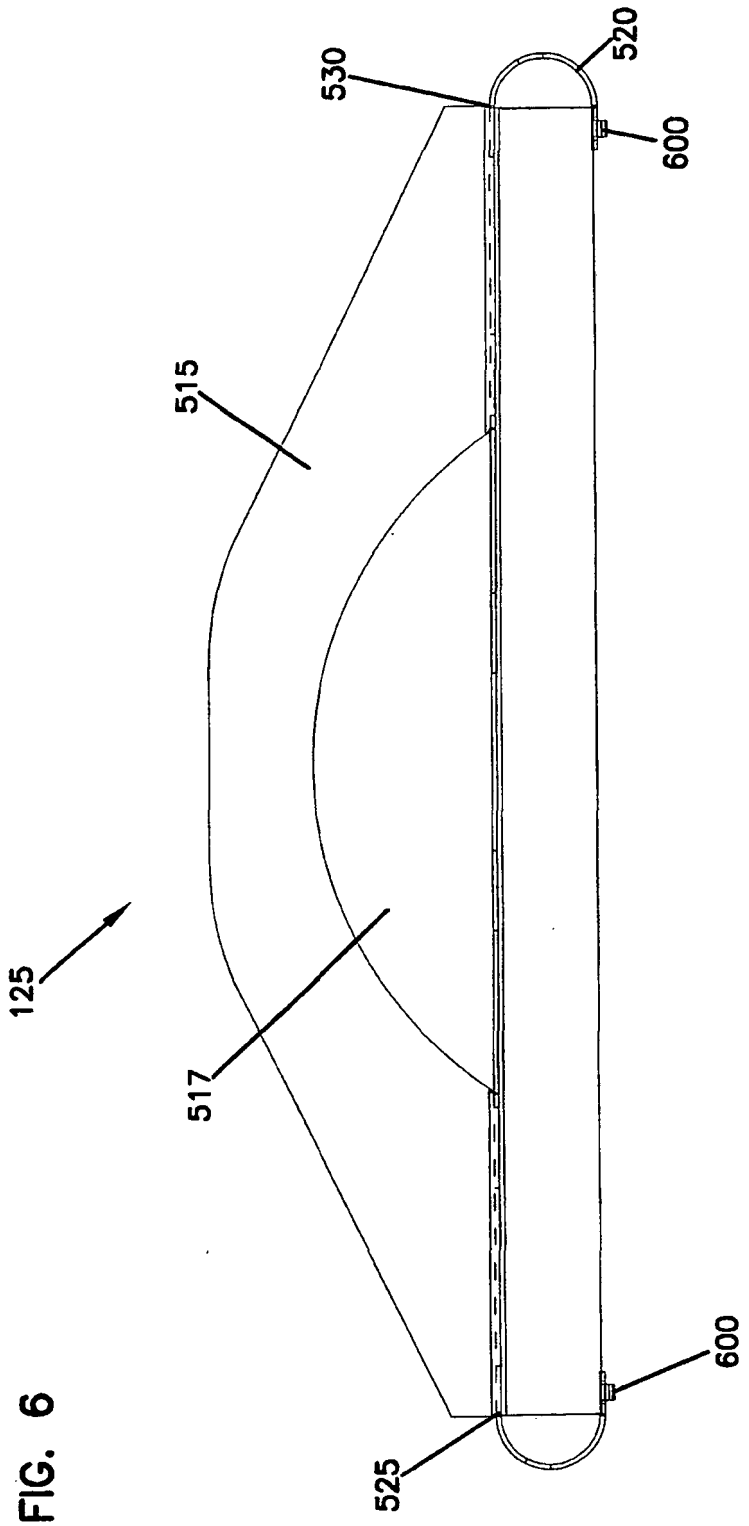


FIG. 6

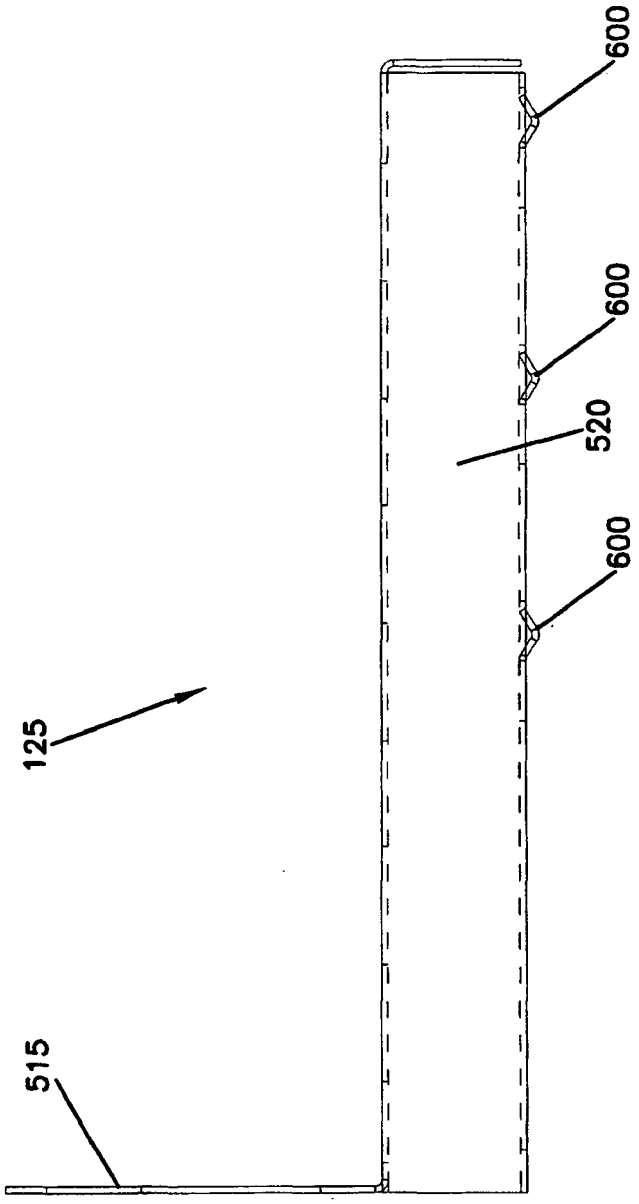


FIG. 7

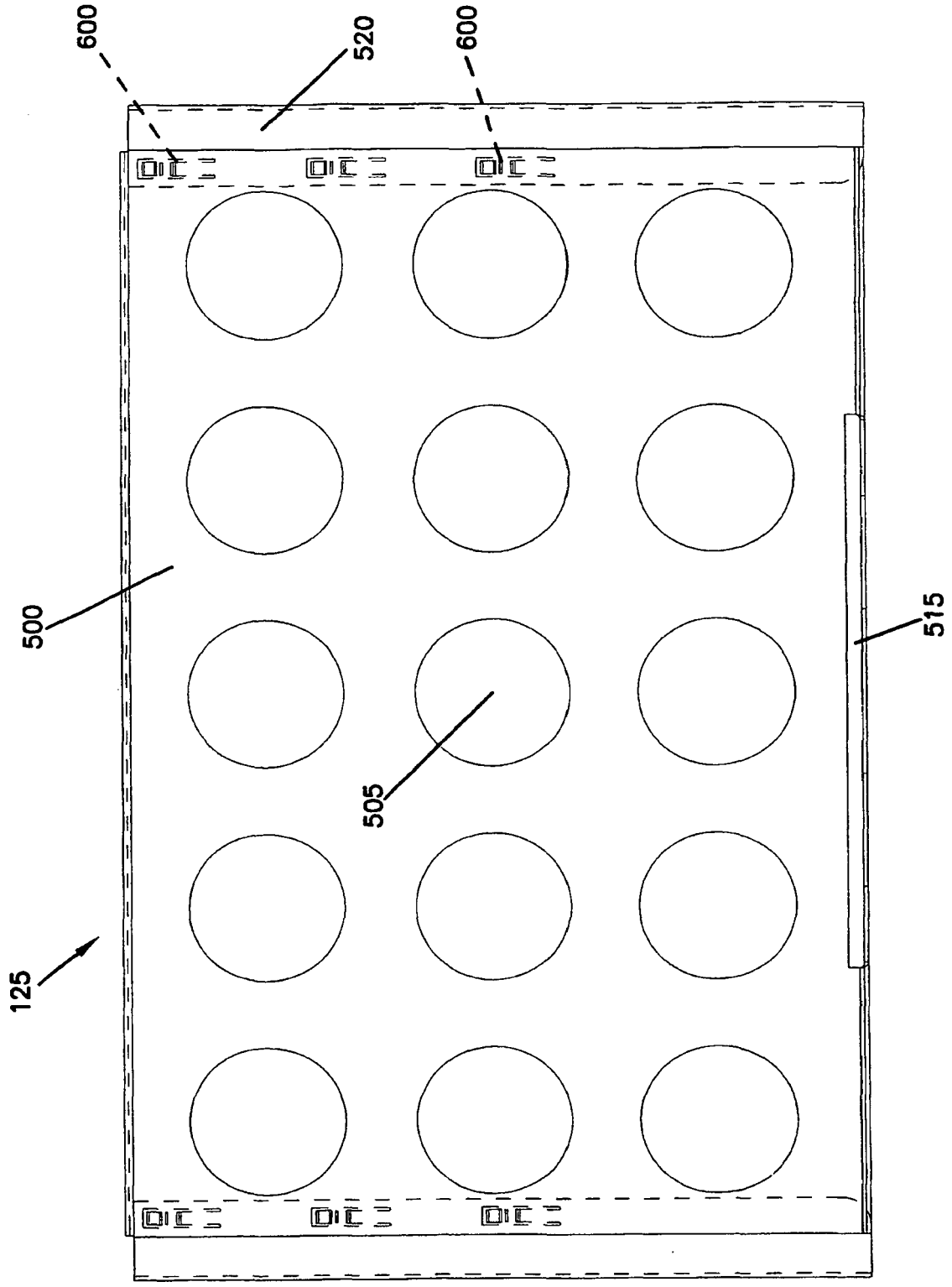


FIG. 8

FIG. 9

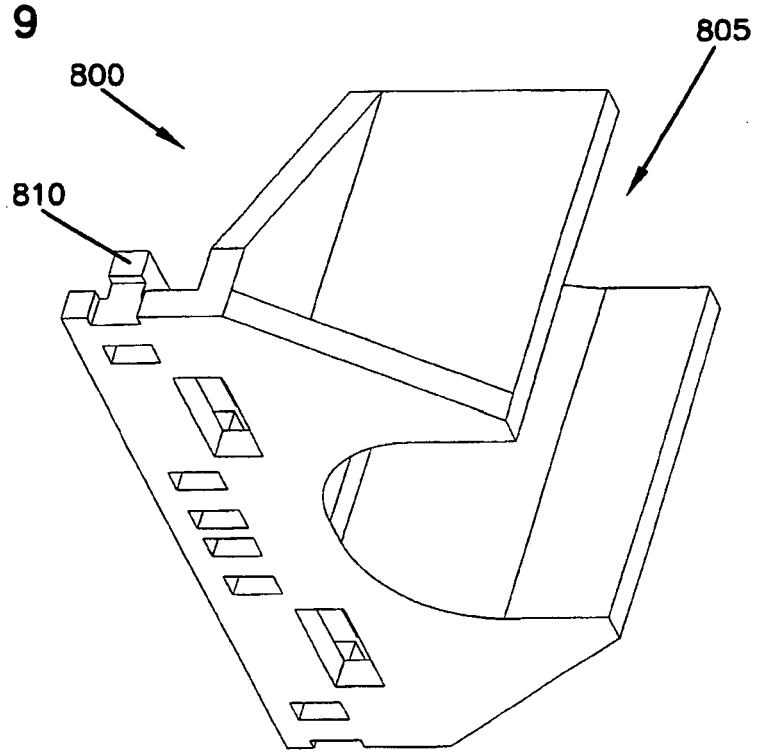


FIG. 10

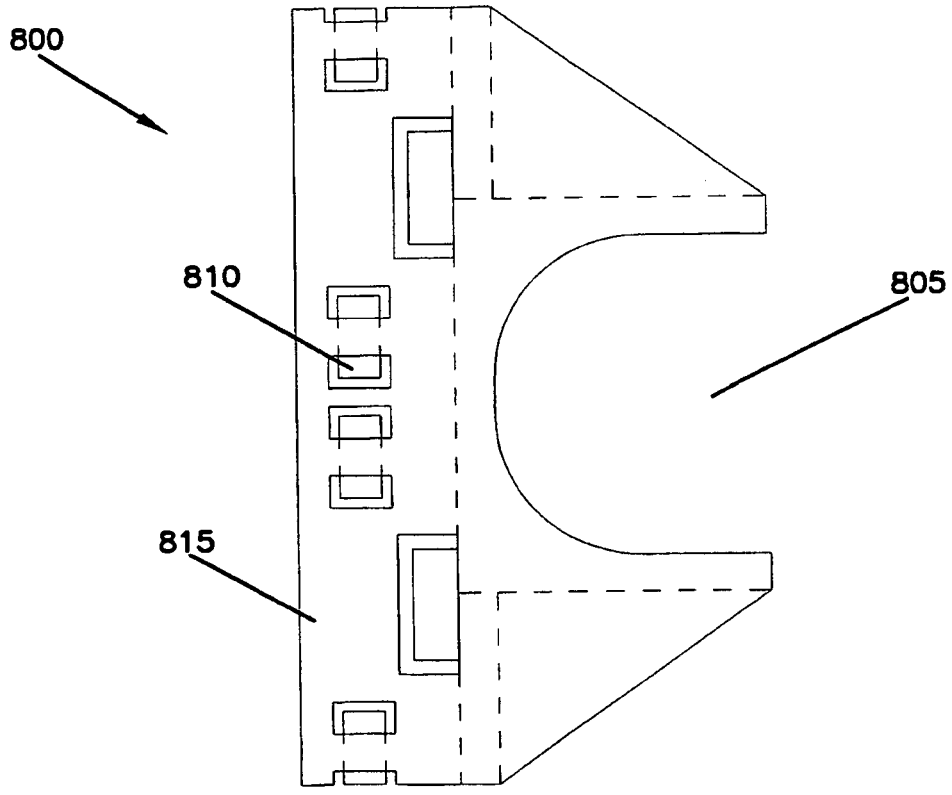


FIG. 11

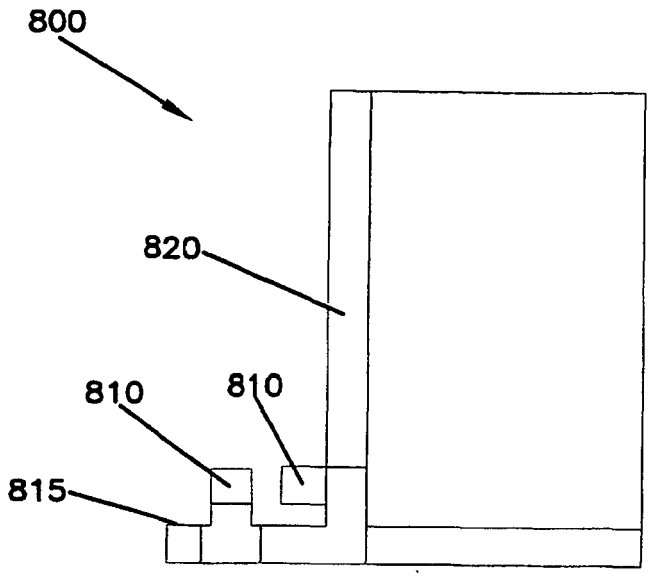
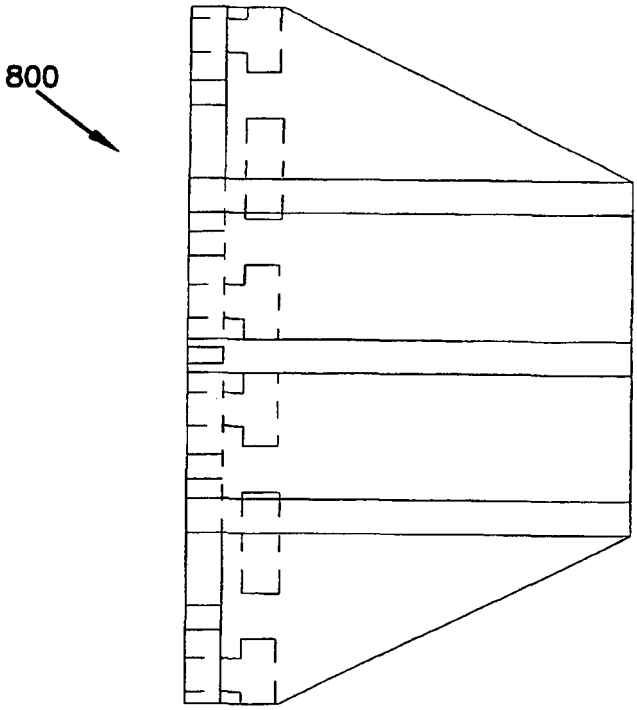


FIG. 12



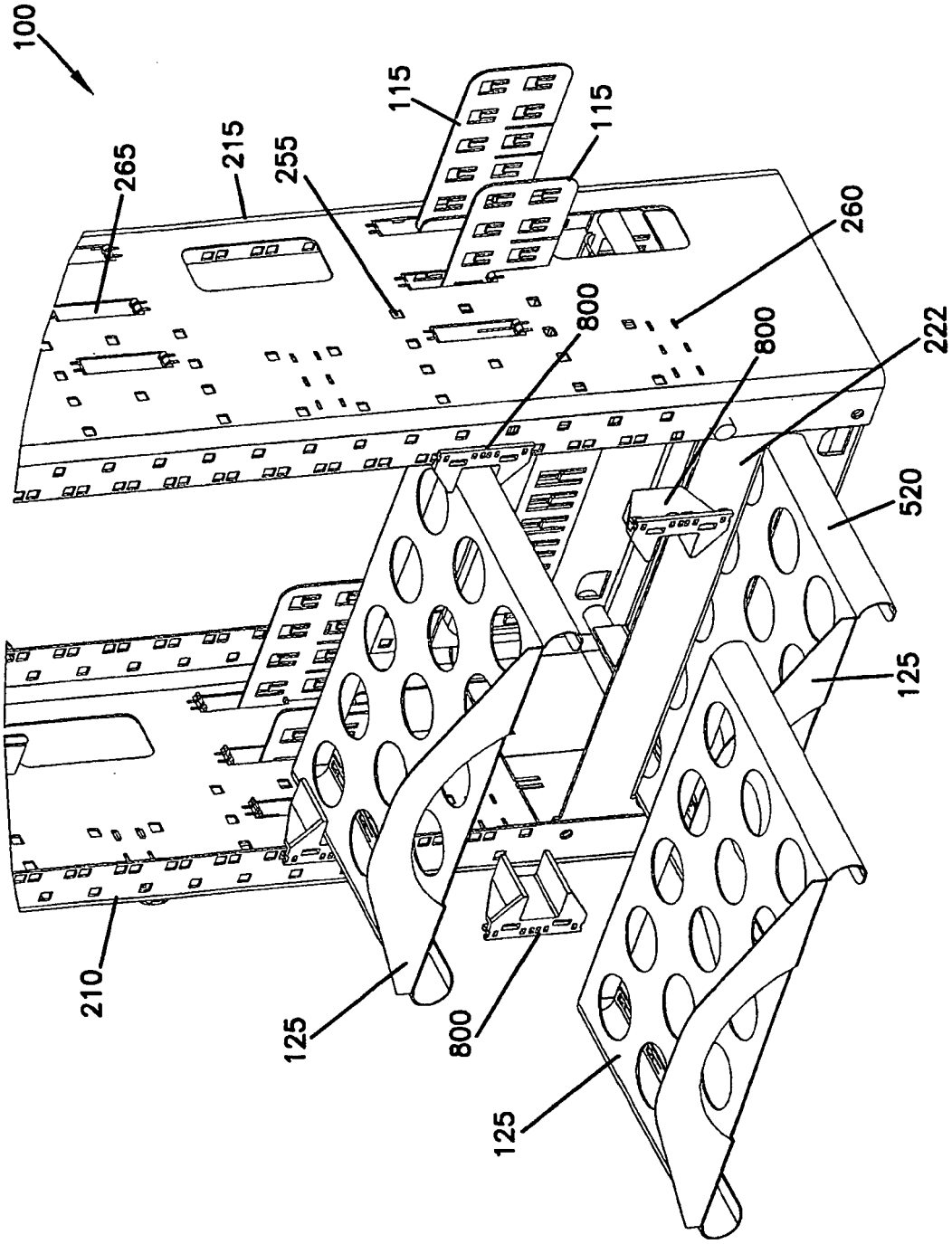


FIG. 13

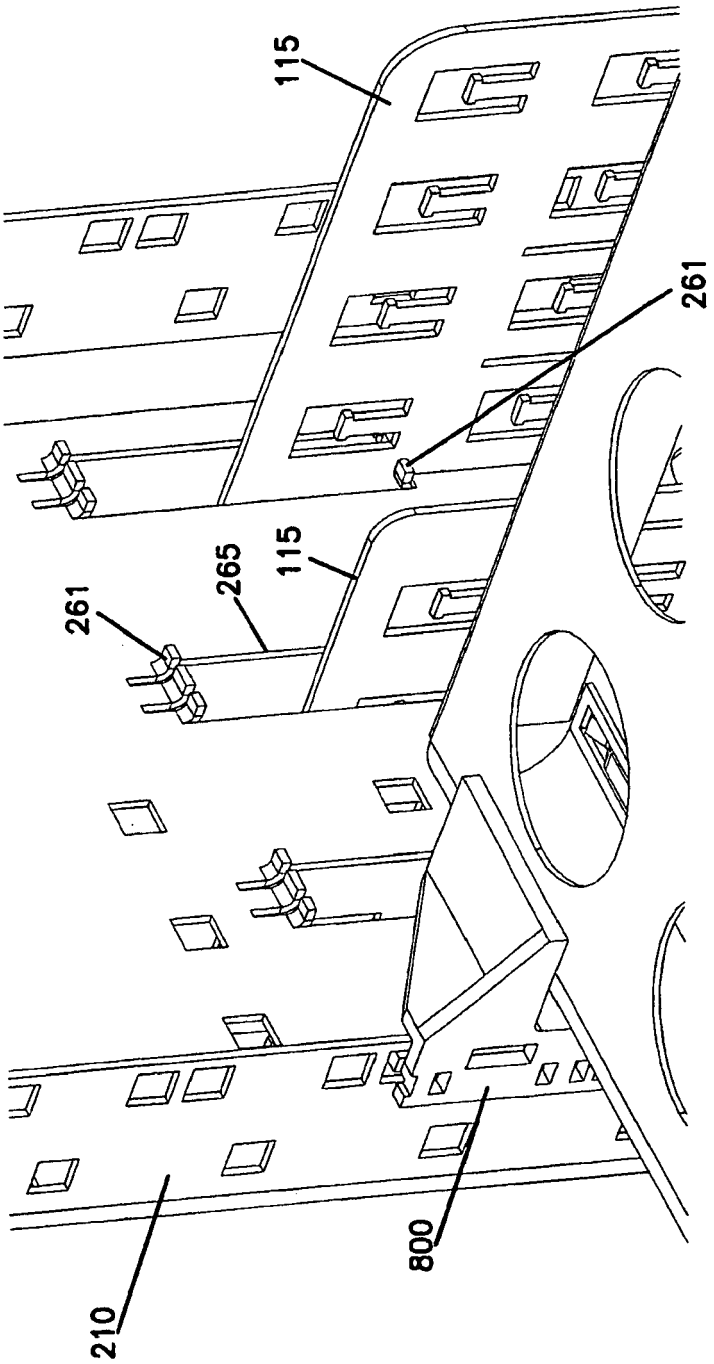


FIG. 14

FIG. 15

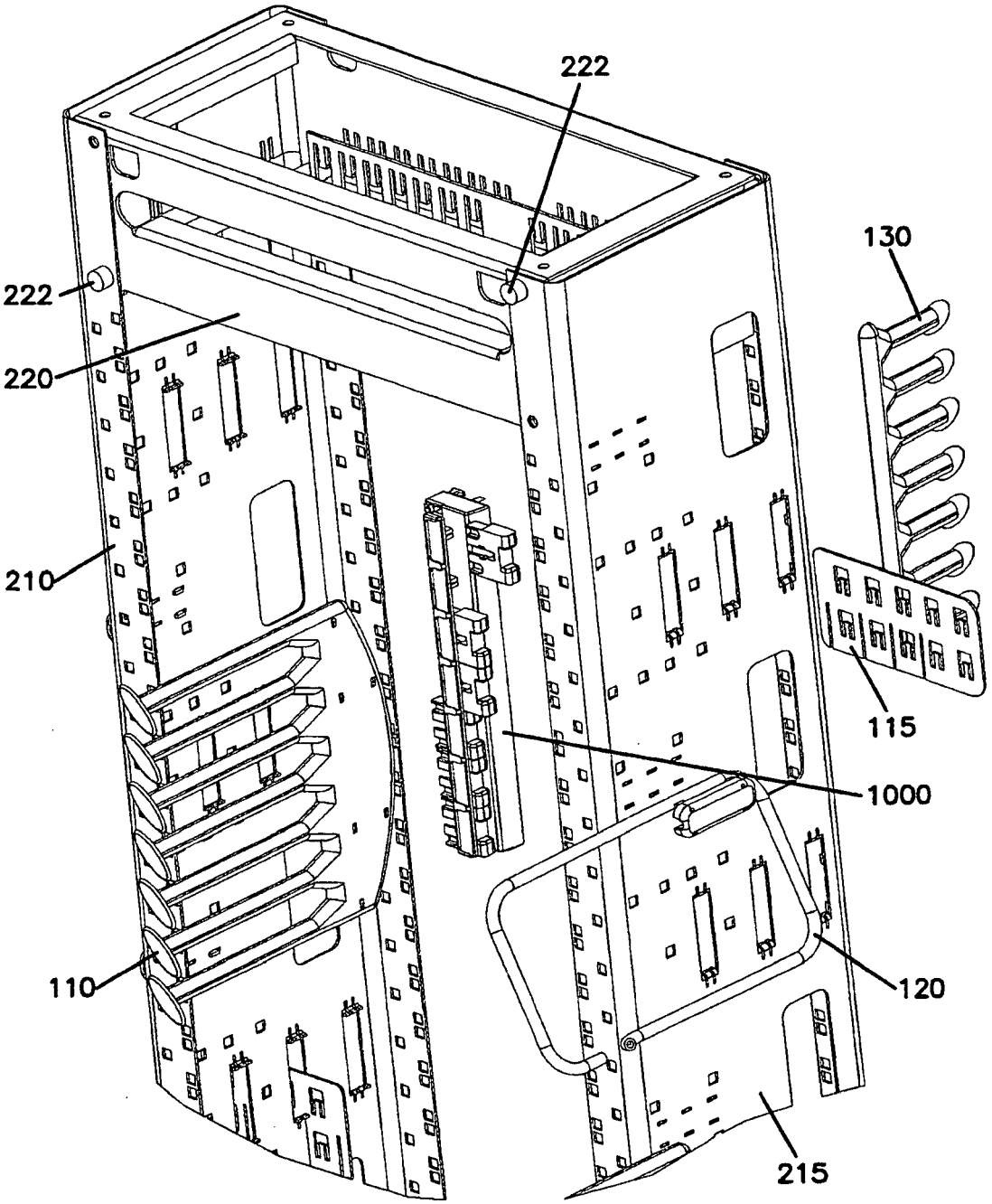


FIG. 16

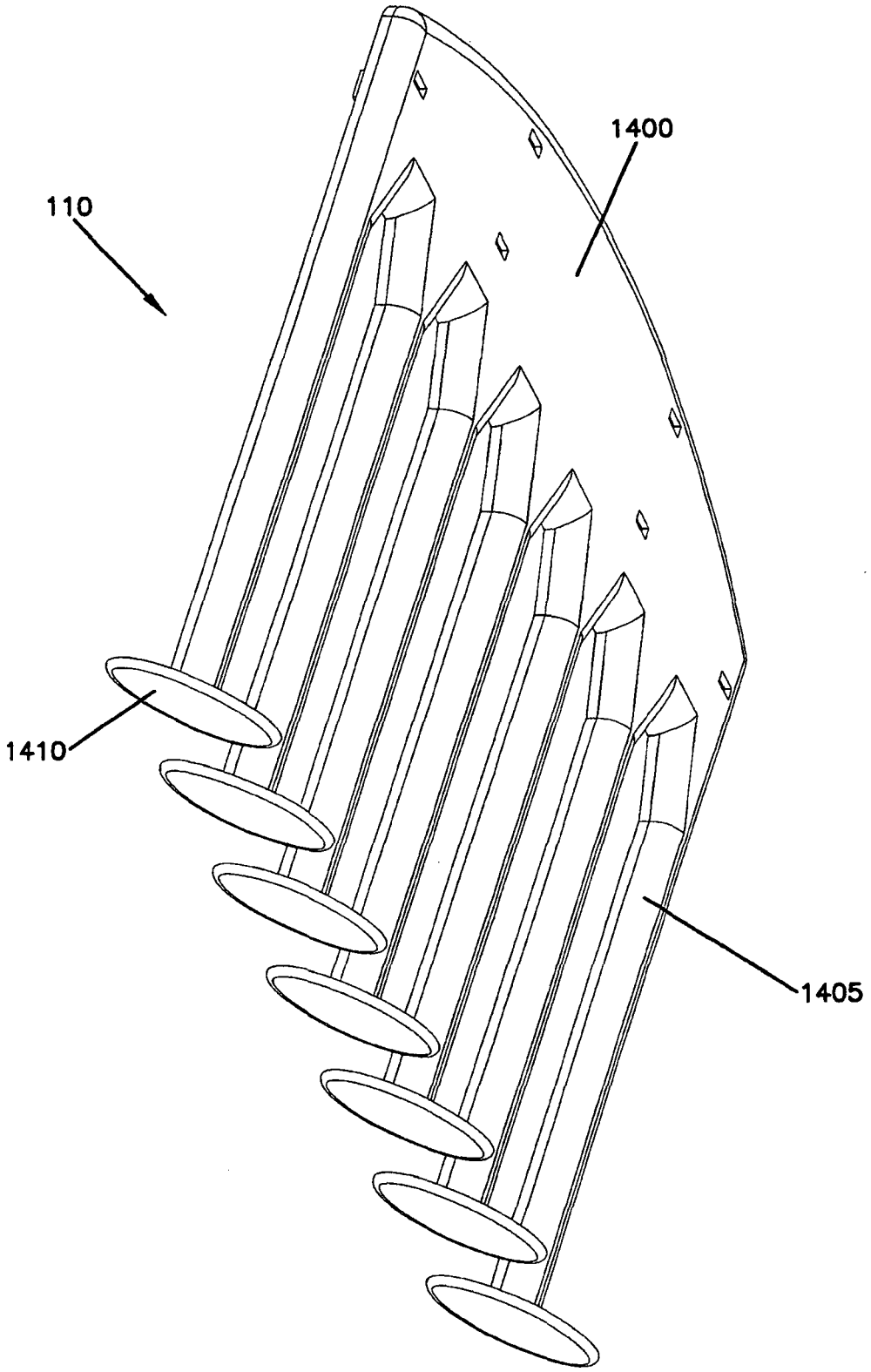


FIG. 17

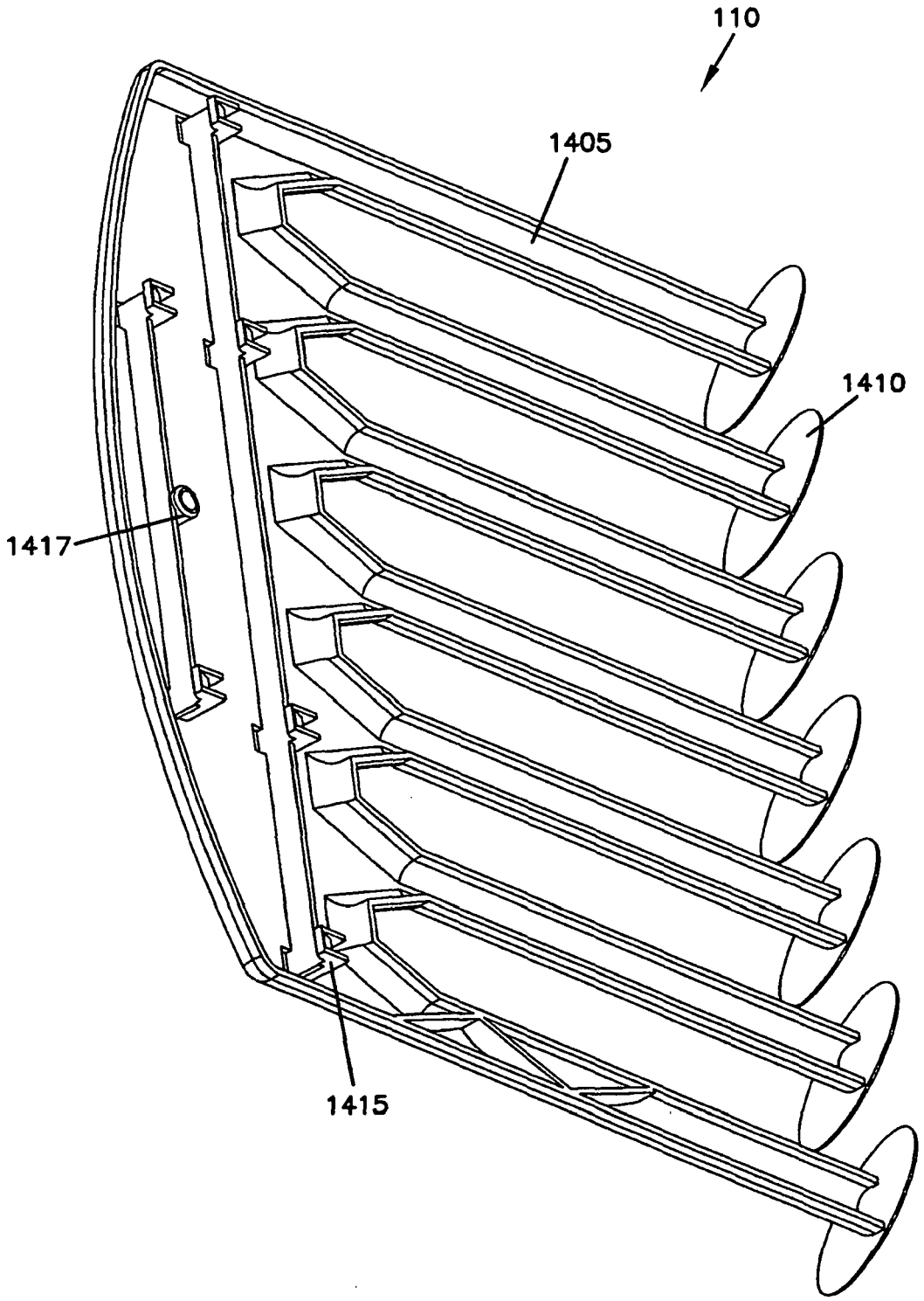


FIG. 18

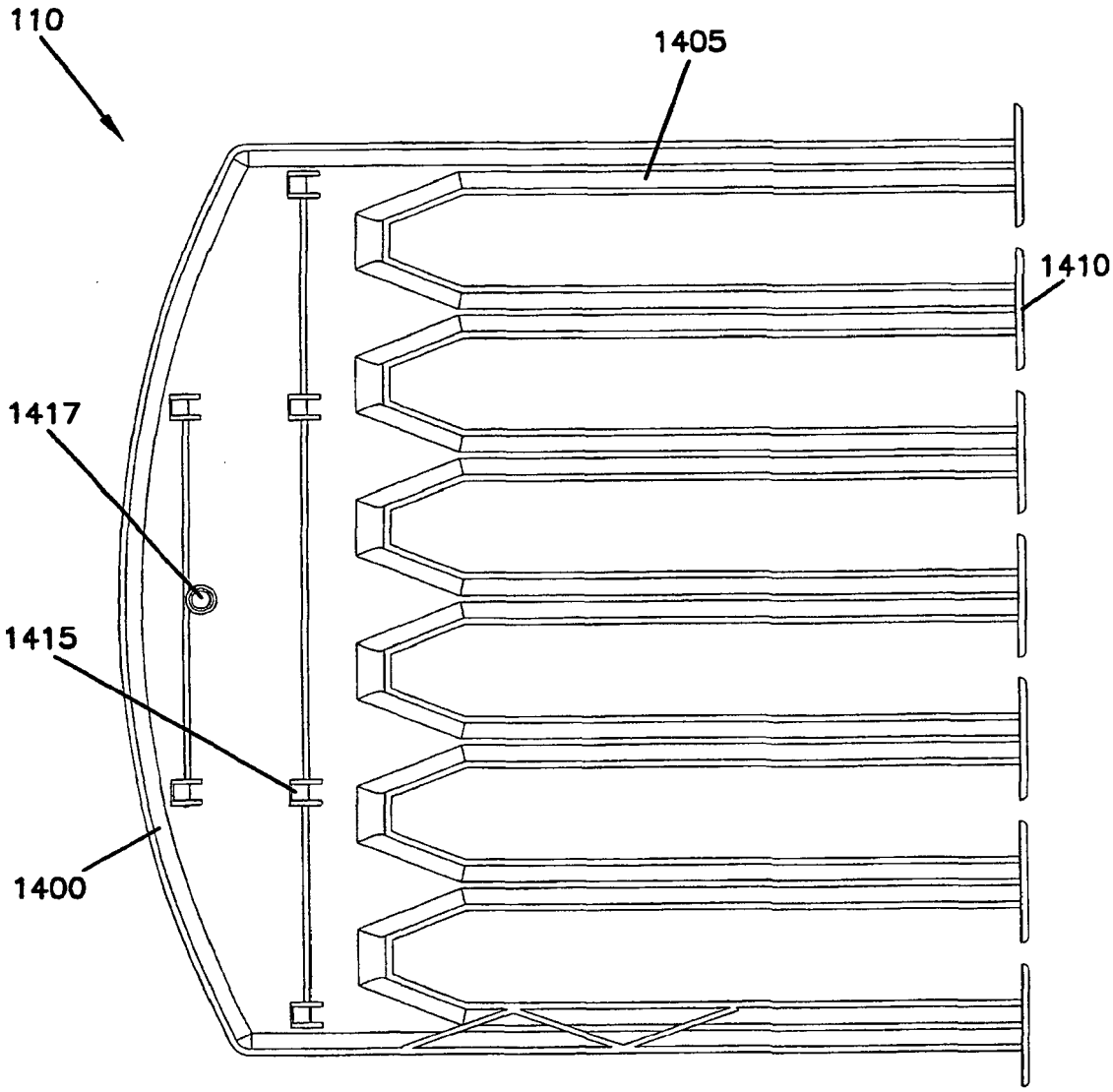


FIG. 19

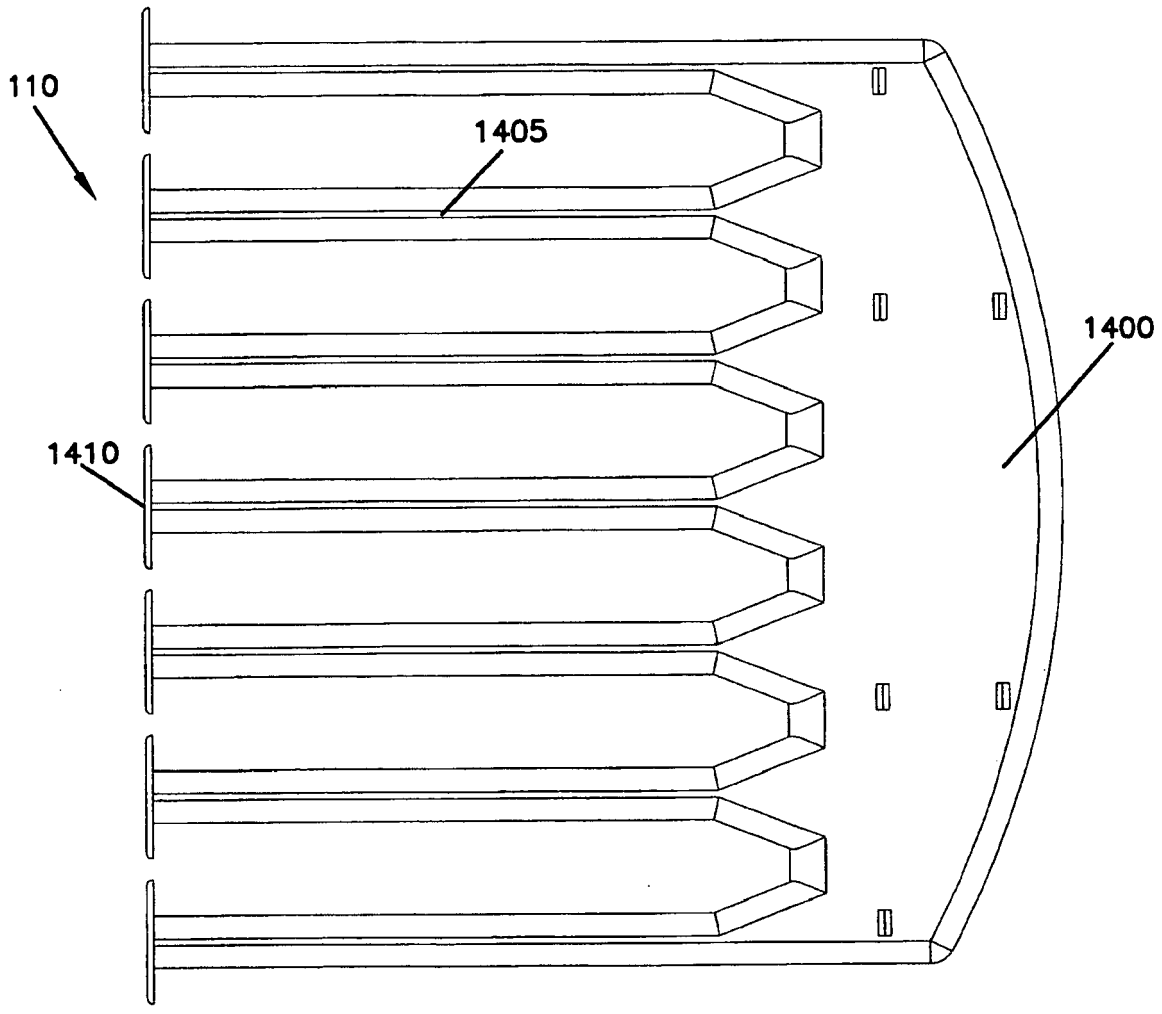
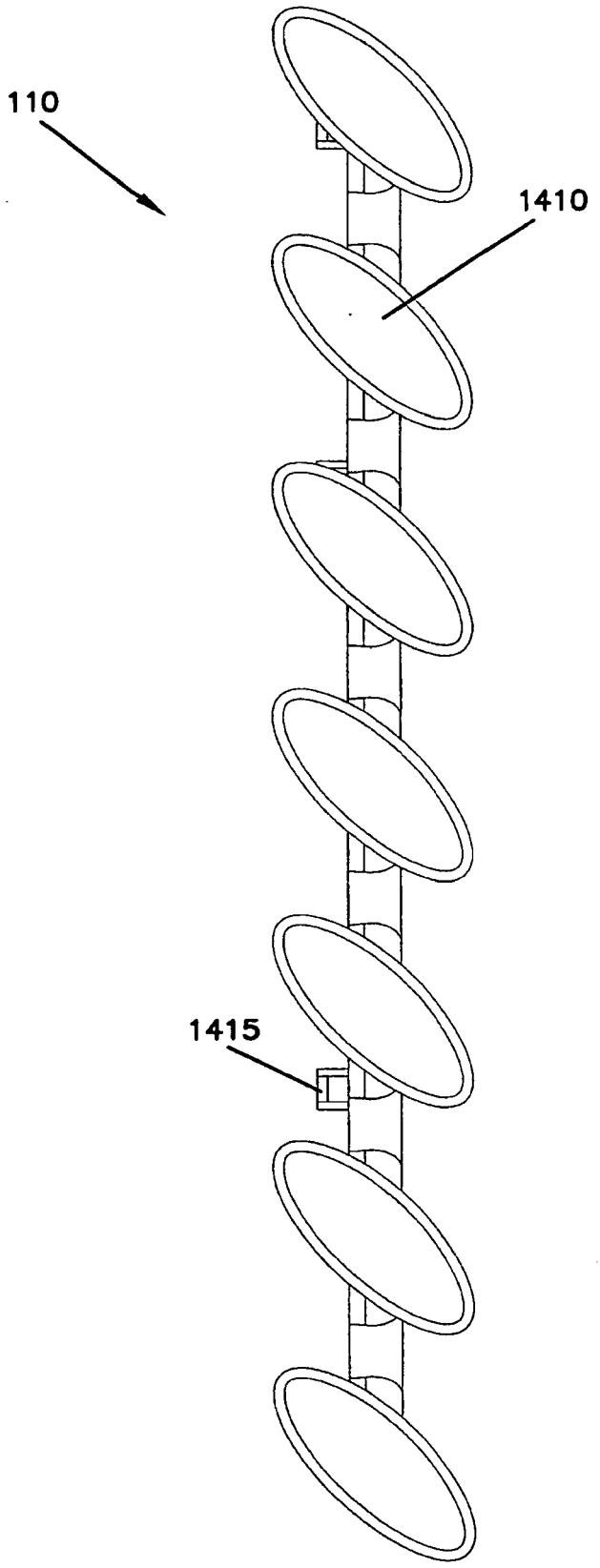


FIG. 20



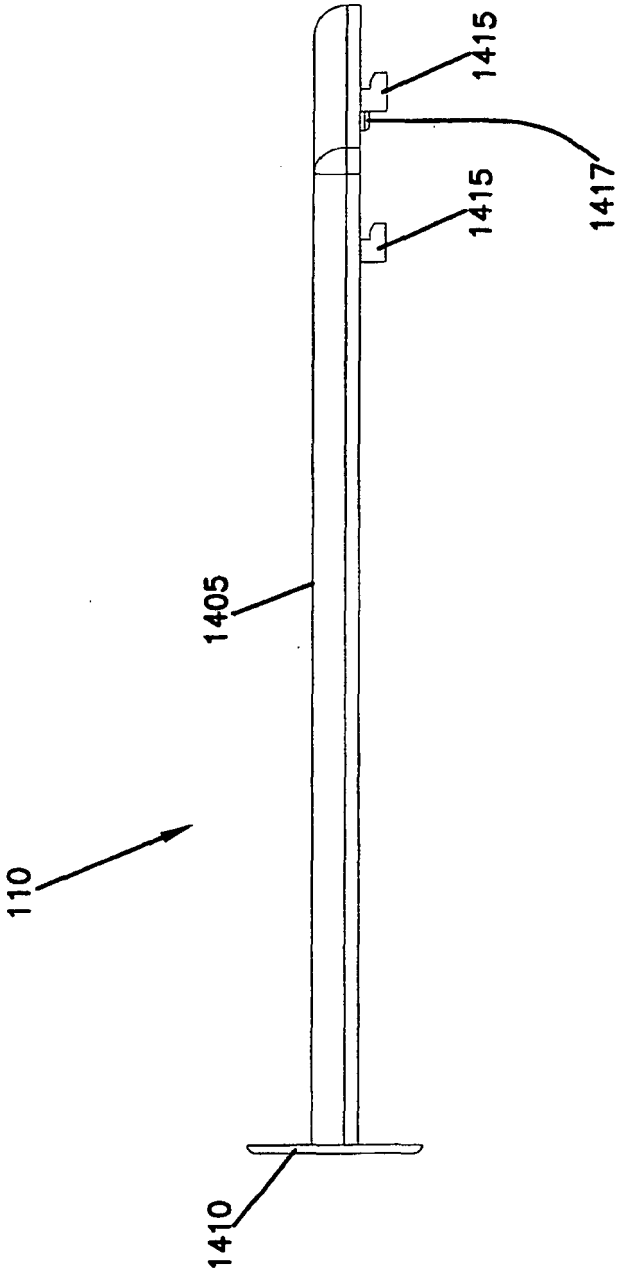


FIG. 21

FIG. 22

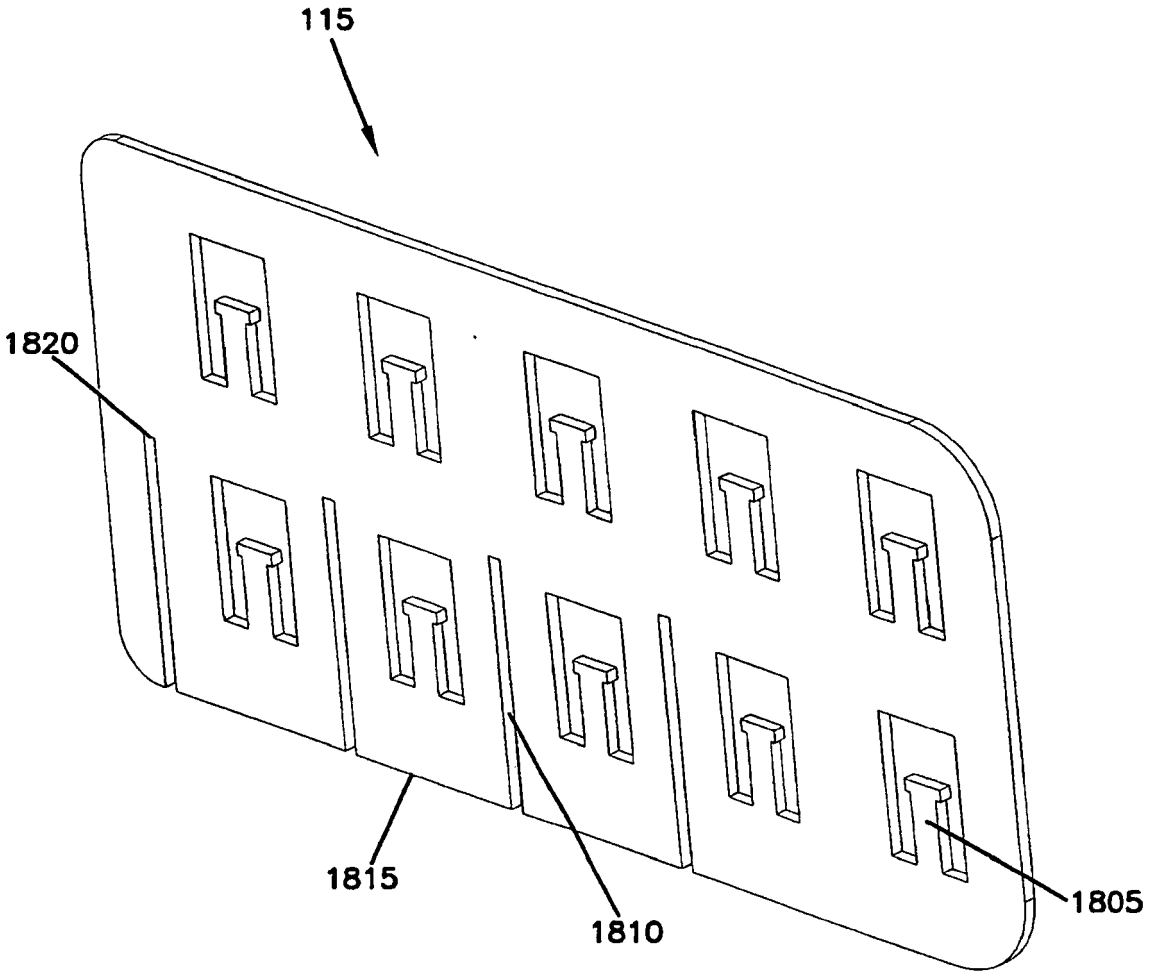


FIG. 23

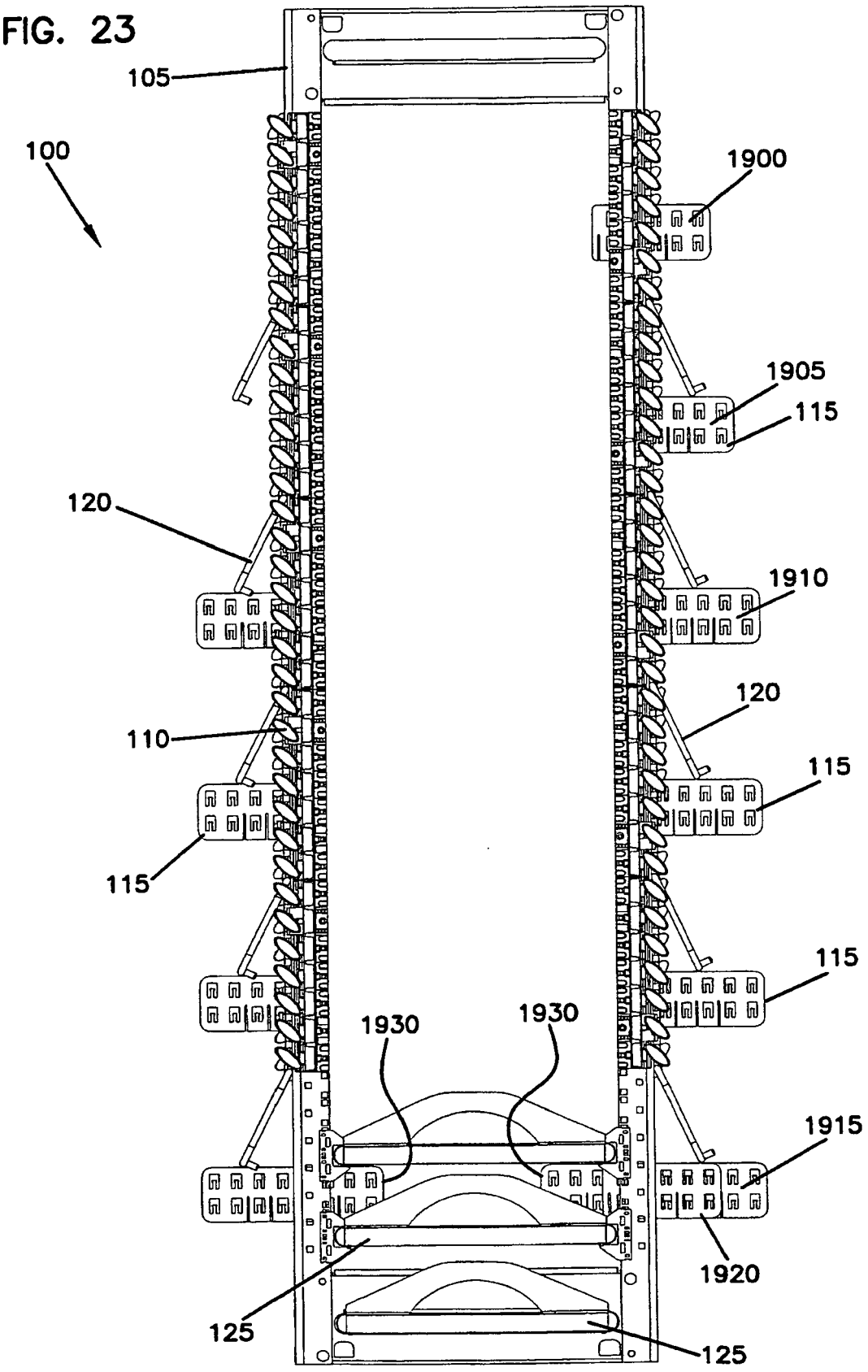

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FIG. 24

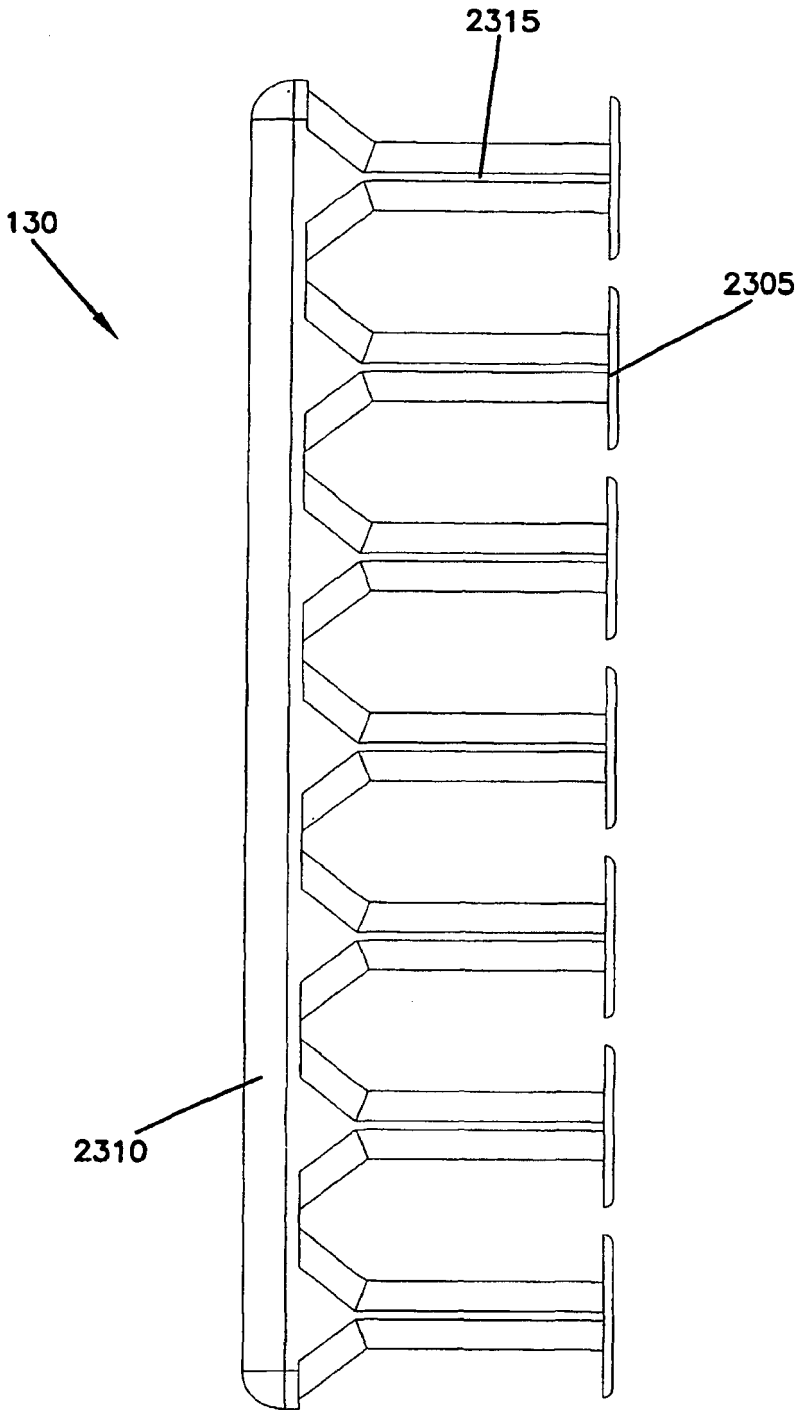
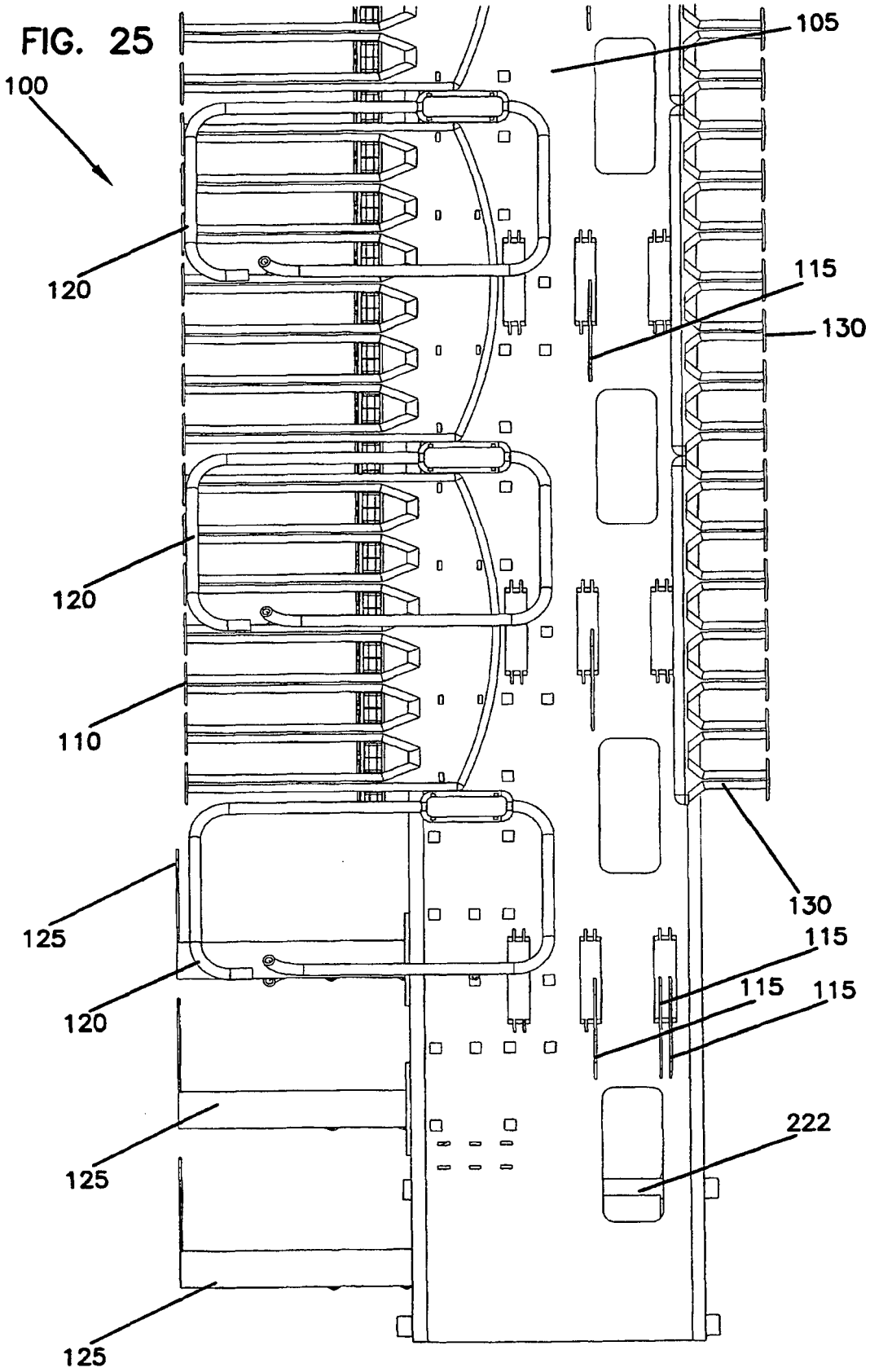


FIG. 25



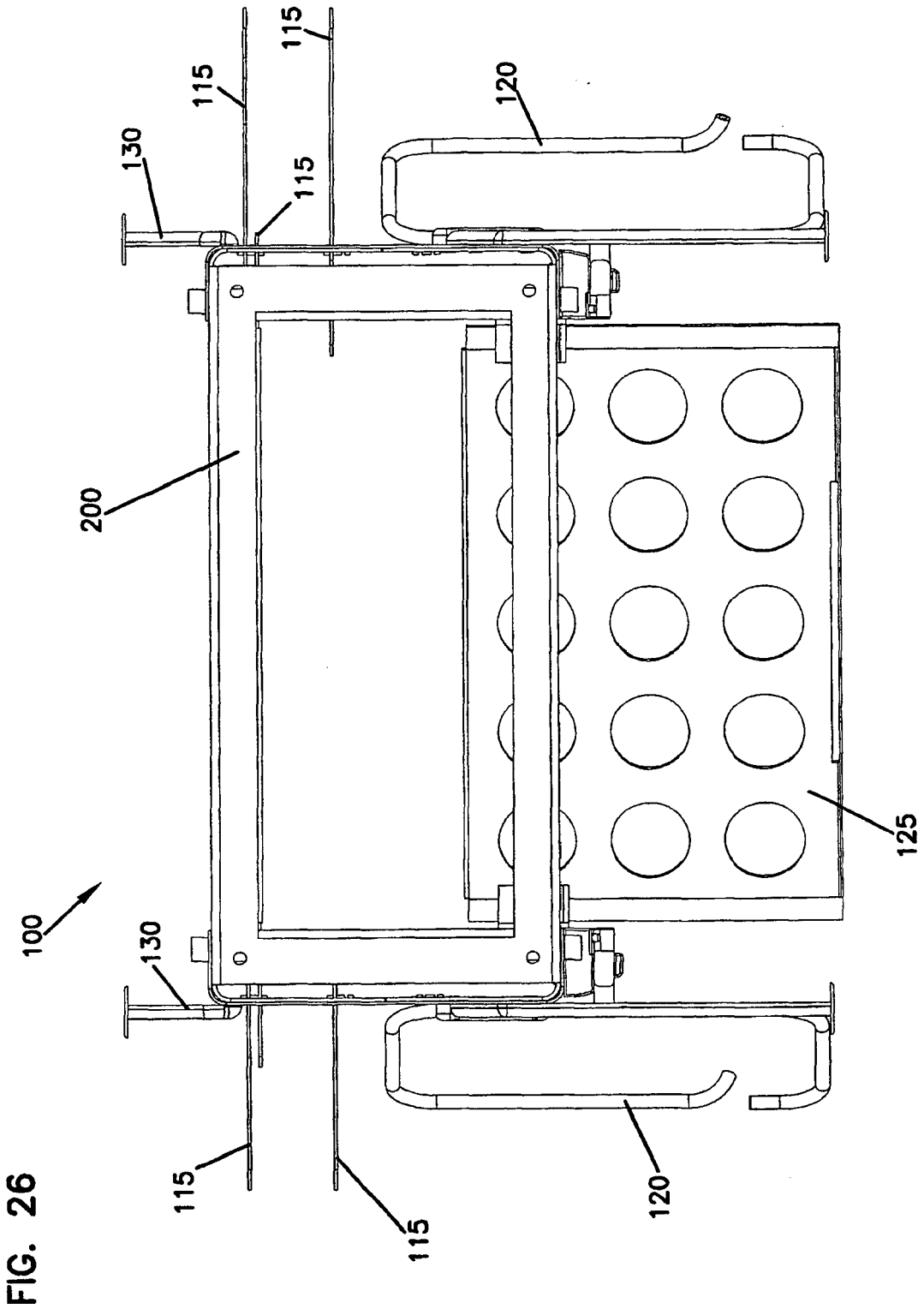


FIG. 26

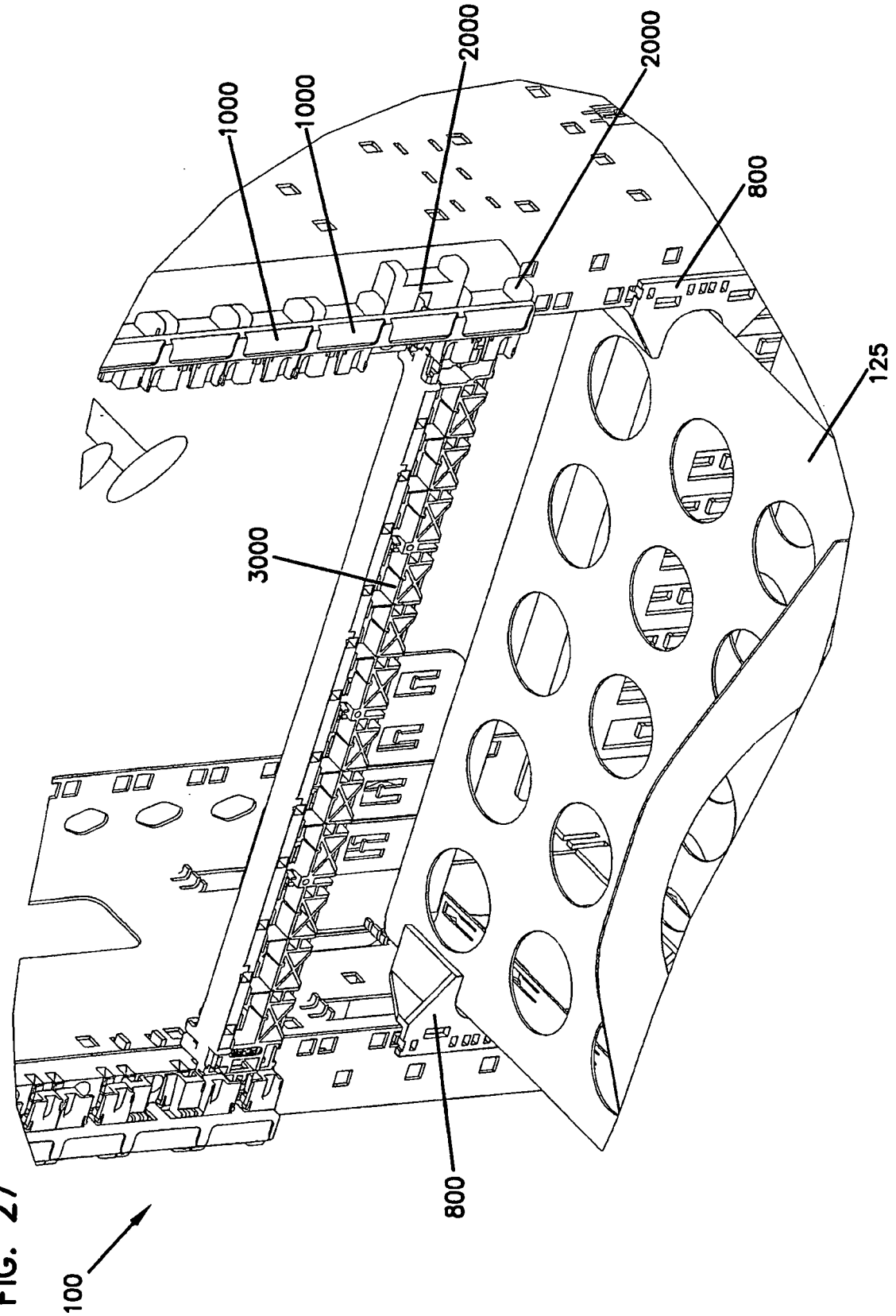


FIG. 27

FIG. 28

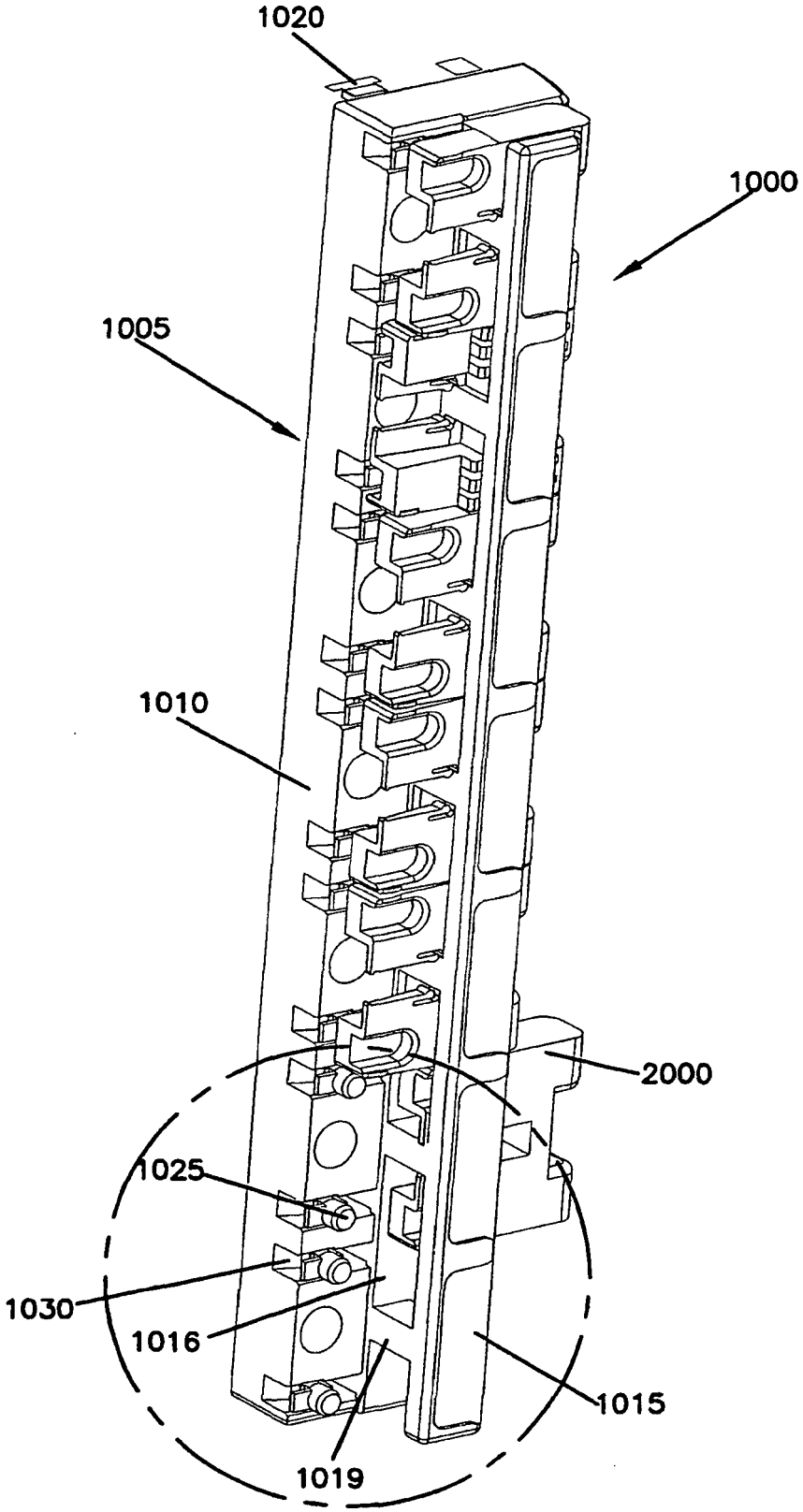


FIG. 29

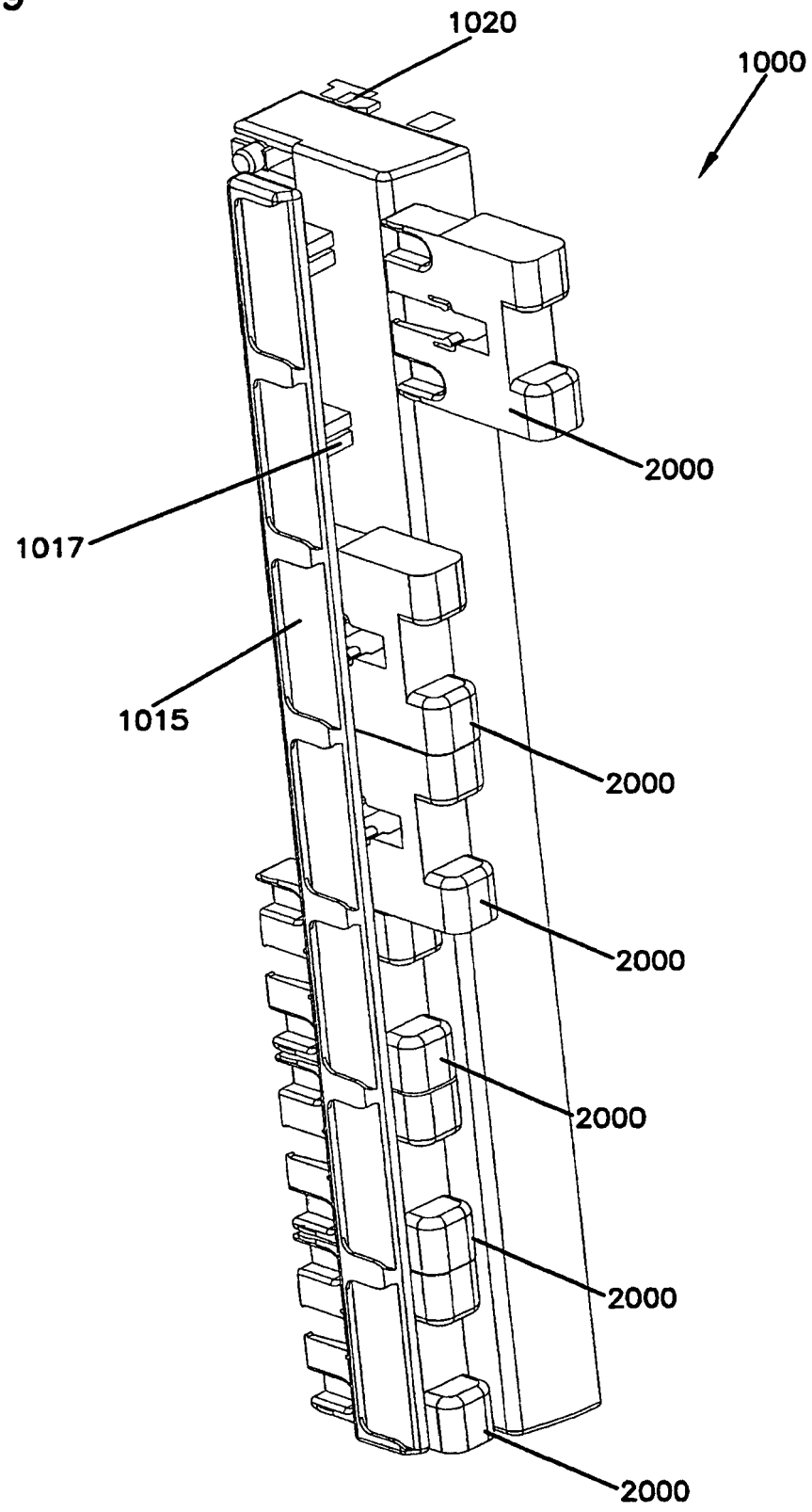


FIG. 30

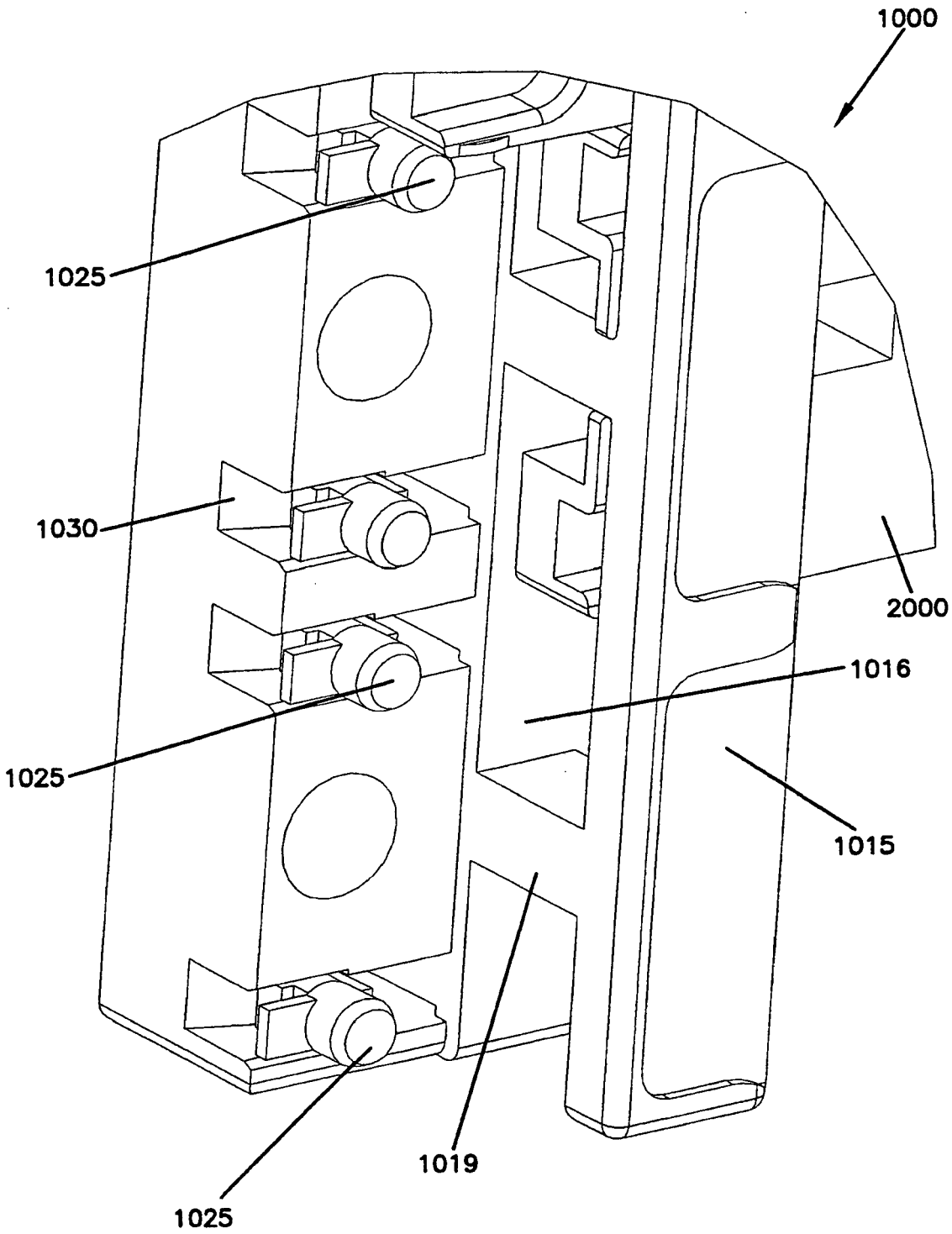


FIG. 31

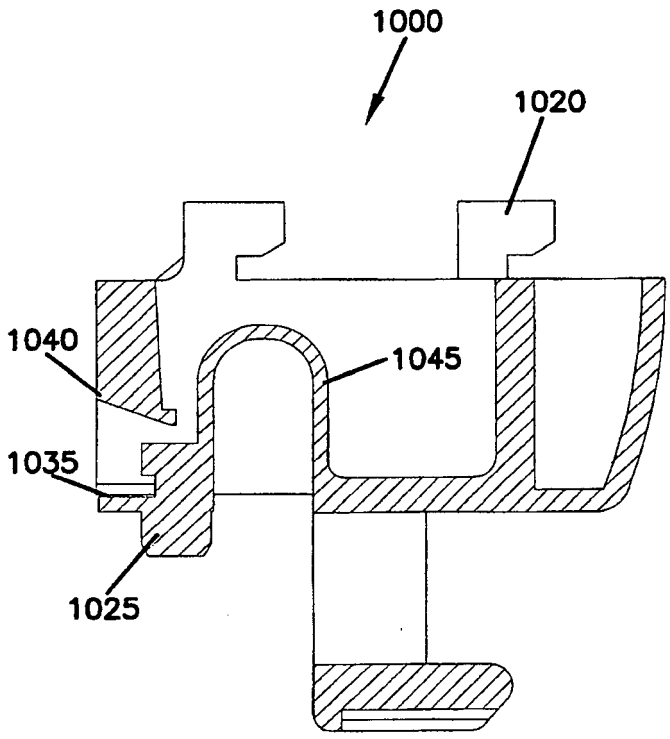
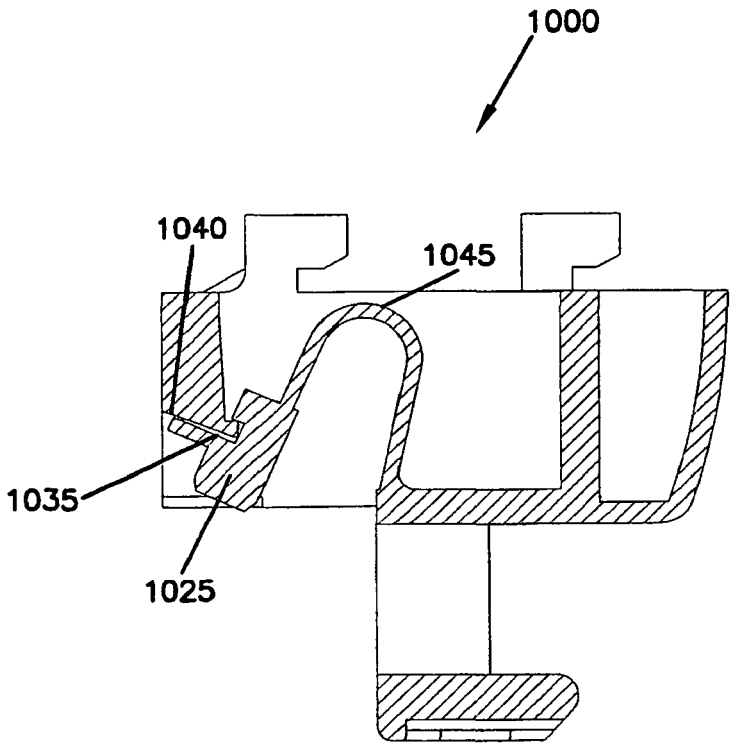


FIG. 32



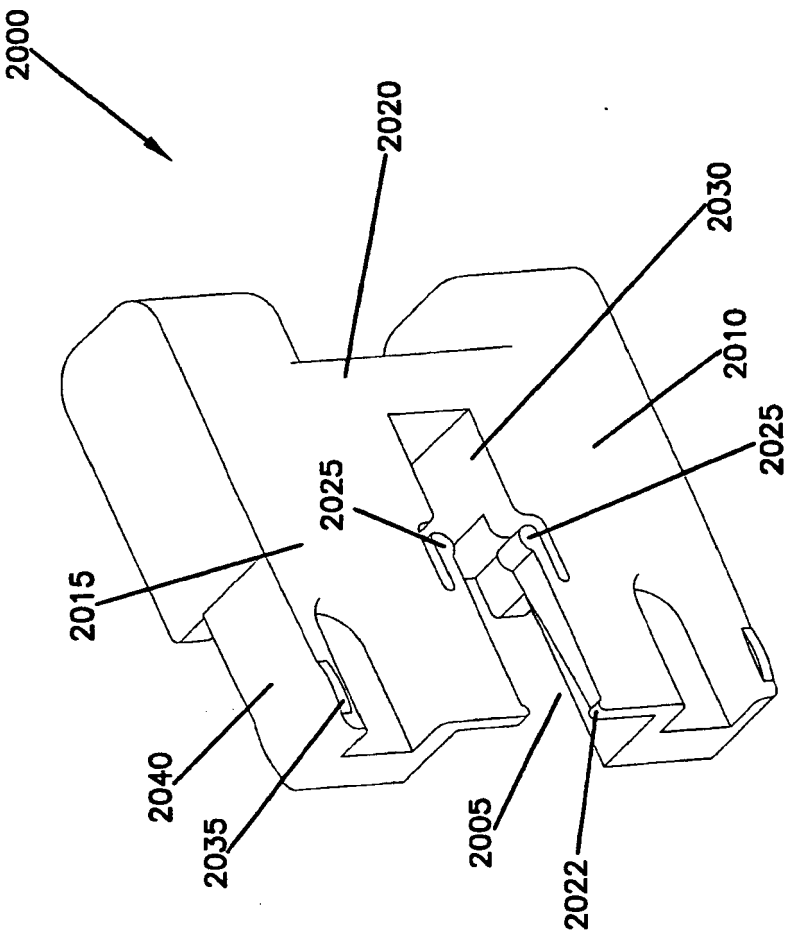


FIG. 33

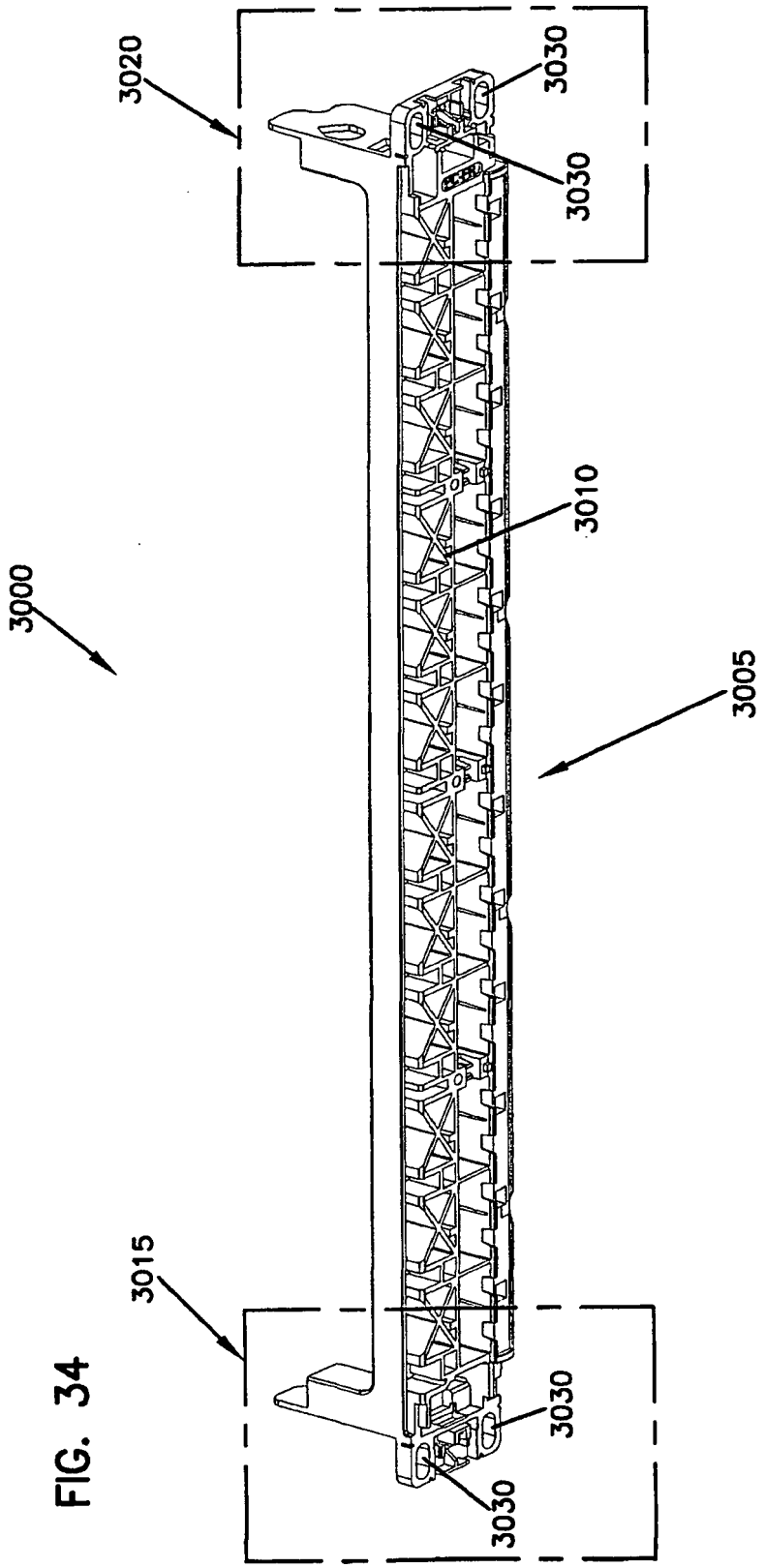


FIG. 34

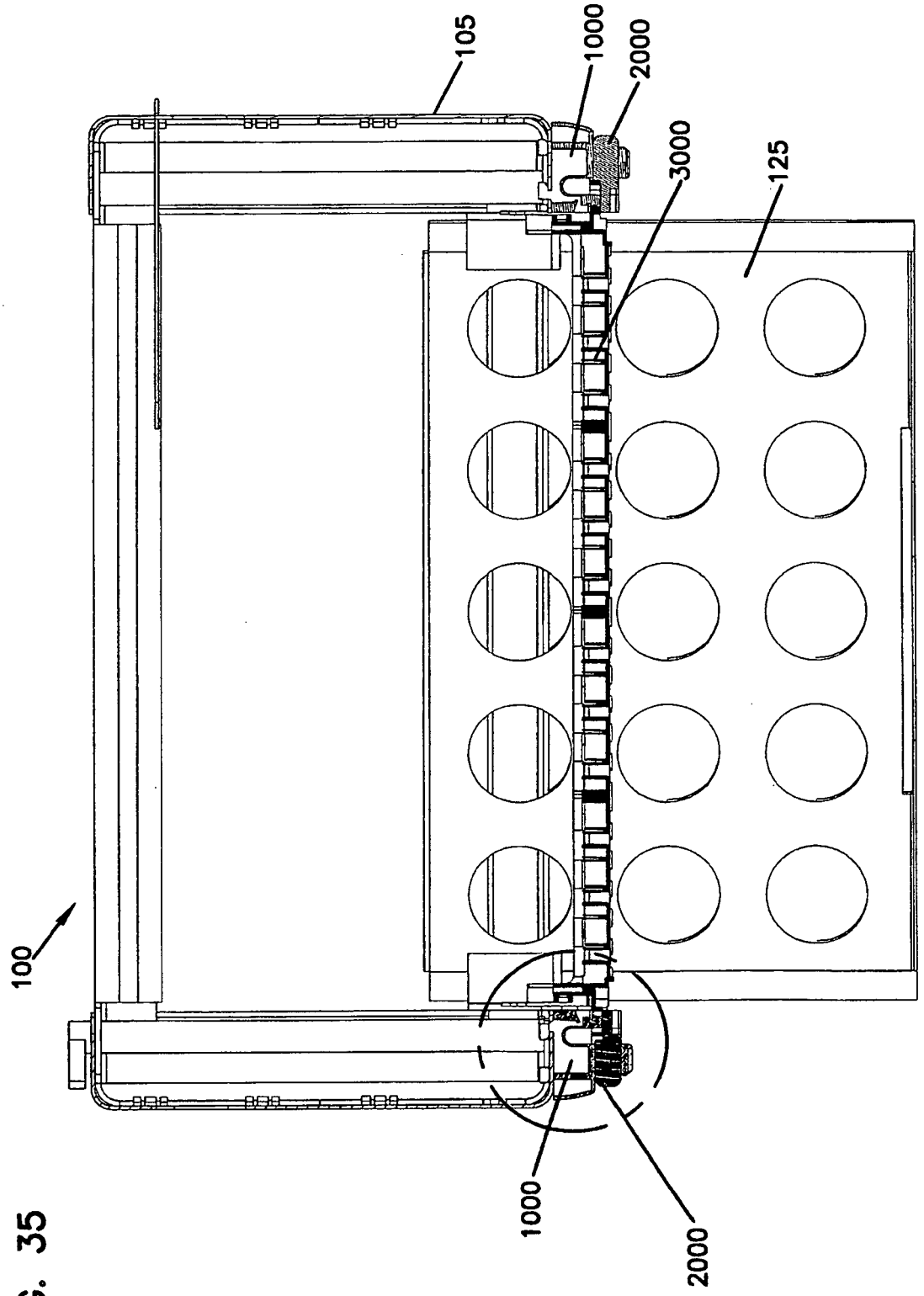


FIG. 35

FIG. 36

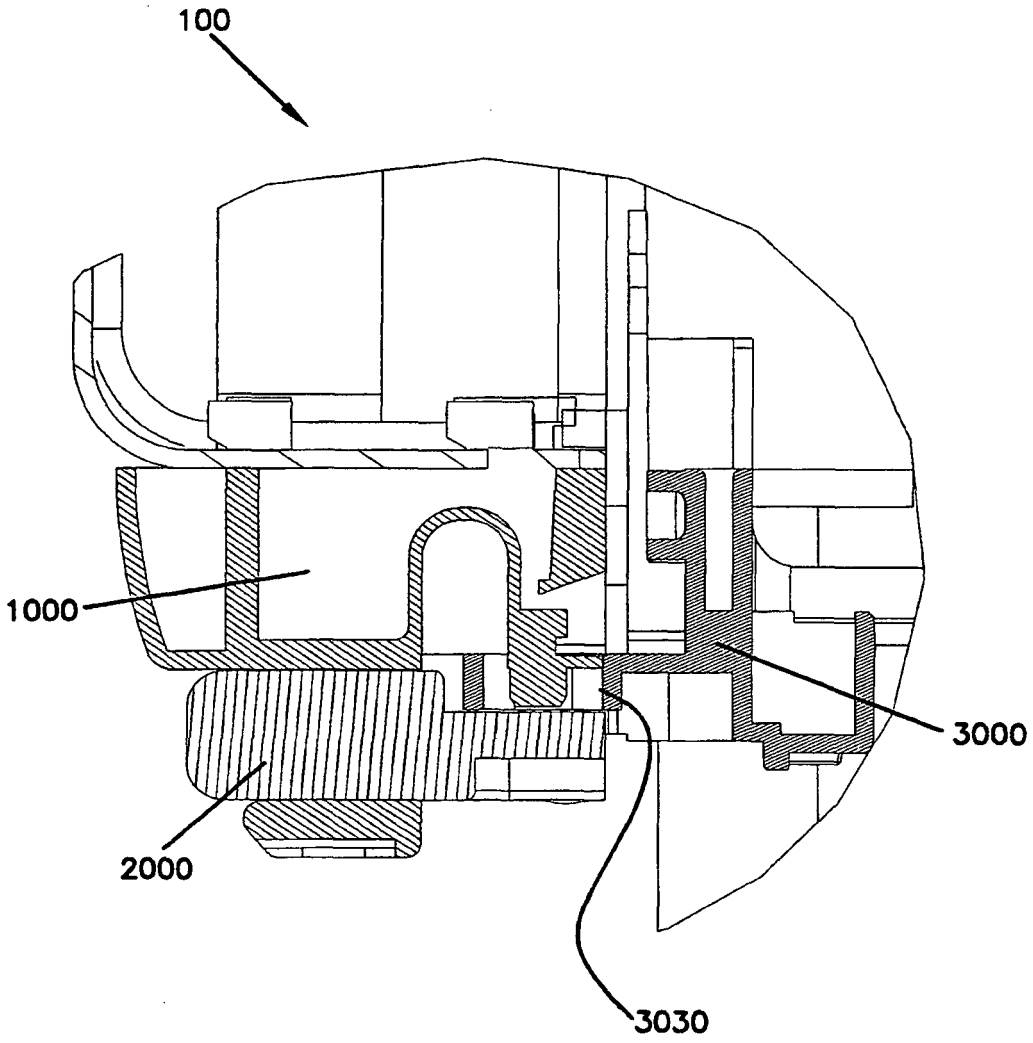


FIG. 37

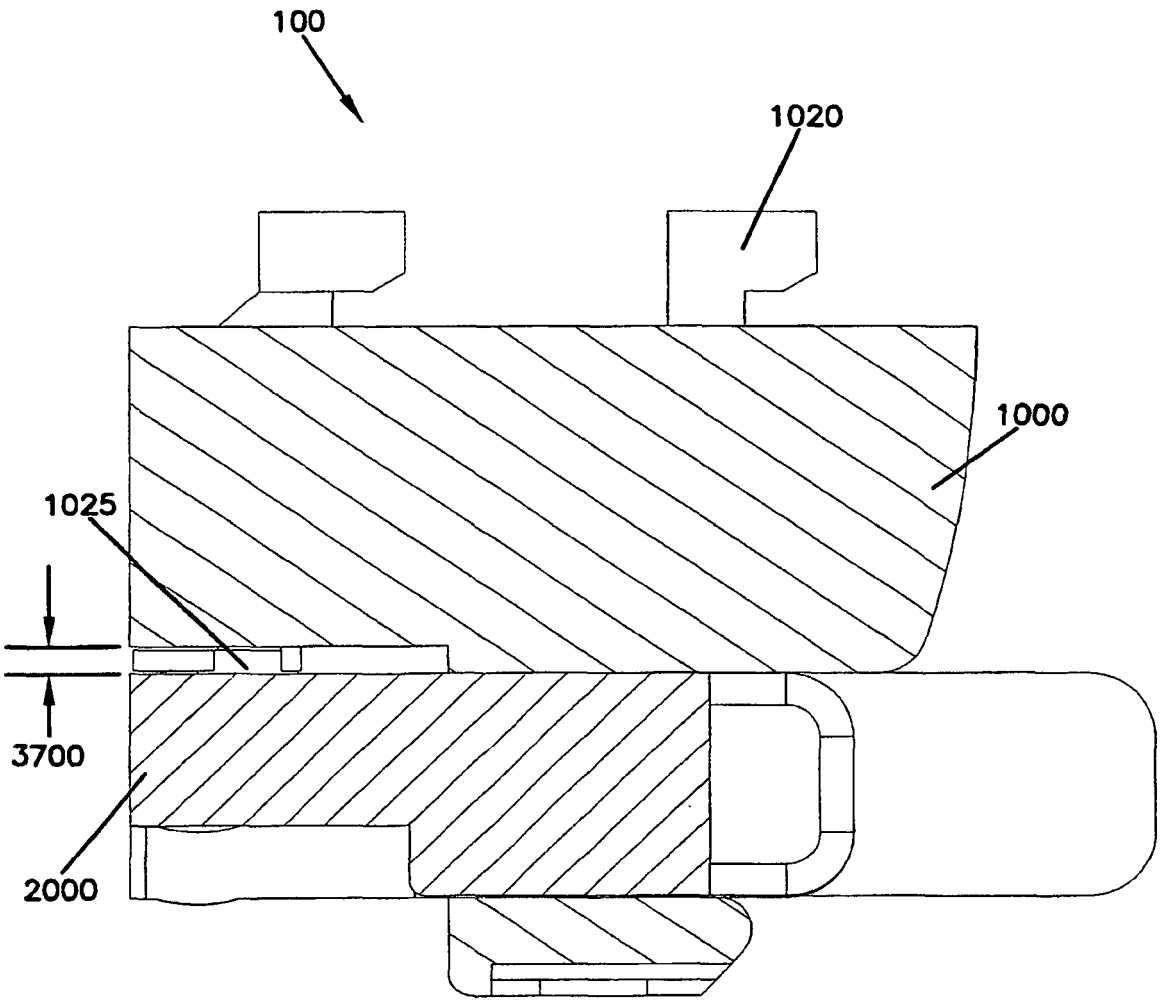


FIG. 38