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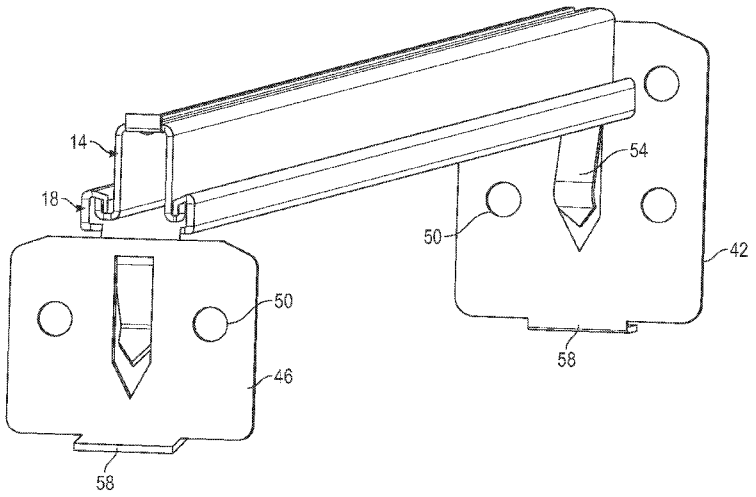


FIG. 3

(57) **Abstract:** A bar hanger assembly includes a first slide that has an inverted U-shaped cross-section that opens in a first direction. The first slide is formed by first opposed side walls that extend away from a top wall. Each one of the first opposed side walls has a first end portion that forms a first U-shaped flange that opens in a second direction opposite the first direction. Each first U-shaped flange defines a first channel. A second slide has a generally central portion that is provided by a bottom wall that extends laterally to spaced apart second end portions that each form a second Cshaped flange. The second C-shaped flanges face toward one another, each providing a second channel. The first U-shaped flange and second C-shaped flange are interleaved with one another to permit the first and second slides to slide along the first and second channels in a longitudinal direction.

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*[Continued on next page]*

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# BAR HANGER ASSEMBLY

## CROSS-REFERENCE TO RELATED APPLICATION

**[0001]** The present disclosure claims priority to United States Provisional Patent Application No. 63/448,043 filed February 24, 2023.

## BACKGROUND

**[0002]** Adjustable bar hanger assemblies are used to support electrical systems between spaced apart ceiling joists. A typical hanger bar assembly includes first and second metallic slides that are interleaved and telescopically arranged with respect to one another. This relationship permits the slides to be moved longitudinally relative to one another to accommodate typical joist spacing. Each slide has a support, such as a mounting plate, provided at one end for securing the slide to its respective joist. An electrical box is supported on one of the slides, and electrical fixtures such as ceiling fans and lights are subsequently mounted to the electrical box.

**[0003]** The bar hanger assembly must support the weight of the electrical fixture. In the case of large lighting fixtures or ceiling fans, the weight can be quite substantial. The bar hanger assembly must support this weight without breaking or excessive bending. As a result, conventional bar hanger assemblies are designed using fully nested (same cross-sectional shape and surfaces tightly fitting with one another), dual U-shaped or round slides constructed of relatively thick sheet metal.

## SUMMARY

**[0004]** In one exemplary embodiment, a bar hanger assembly includes a first slide that has an inverted U-shaped cross-section that opens in a first direction. The first slide formed by first opposed side walls that extend away from a top wall. Each one of the first opposed side walls has a first end portion that forms a first U-shaped flange that opens in a second direction opposite the first direction. The first U-shaped flange defines a first channel. A second slide has a generally central portion that is provided by a bottom wall that extends laterally to spaced apart second end portions that each form a second C-shaped flange. The second C-shaped flanges face

toward one another. Each second C-shaped flange provides a second channel. The first U-shaped flange and second C-shaped flange are interleaved with one another and are configured to permit the first and second slides to slide along the first and second channels in a longitudinal direction.

**[0005]** In a further embodiment of any of the above, each first U-shaped flange includes a first horizontally extending section that extends from its respective first opposed side wall in the second direction to a first vertically extending section. Each second C-shaped flange includes a second opposed side wall that extend away from the bottom wall to a second horizontally extending section joined to a second vertically extending section that extends towards the bottom wall. The second opposed side wall, second horizontally extending section and second vertically extending section of each second channel 142 form an inverted U-shape. The first and second channels respectively receive the second and first vertically extending sections.

**[0006]** In a further embodiment of any of the above, each one of the first opposed side walls provide a first height that extends between the top wall and the first end portion. Each one of the second opposed side walls provide a second height that extends between the bottom wall and the second end portion, and the first height is larger than the second height, wherein a third height extends between the bottom wall and the second horizontally extending section, the second vertically extending section provides a fourth height that is substantially equal to the second height.

**[0007]** In a further embodiment of any of the above, the first opposed side walls are spaced apart by a first distance. Each first vertically extending section is spaced apart a second distance from its respective first opposed side wall, and the second distance is substantially less than the first distance. The second opposed side walls are spaced about by a third distance greater than the sum of the first distance and twice the second distance. Each second opposed side wall and its respective second vertically extending section is spaced apart by a fourth distance, and the fourth distance is approximately equal to the second distance.

**[0008]** In a further embodiment of any of the above, the first opposed side walls are spaced apart to provide a first space and the second opposed side walls are

spaced apart to provide a second space. The bottom wall is substantially flat and does not extend substantially into the first space.

**[0009]** In a further embodiment of any of the above, each one of the first opposed side walls provide a first height that extends between the top wall and the first end portion. The bottom wall is spaced almost or at least the entire first height from the top wall.

**[0010]** In a further embodiment of any of the above, the first U-shaped flange includes a first horizontally extending section that extends from the first end portion in a direction away from the first space and a first vertically extending section that extends from the first horizontally extending section in a direction towards the top wall.

**[0011]** In a further embodiment of any of the above, each second C-shaped flange includes a second horizontally extending section that extends from the second end portion in a direction towards the second space and a second vertically extending section that extends from the second horizontally extending section in a direction towards the bottom wall.

**[0012]** In a further embodiment of any of the above, the first vertically extending section is situated in the second space, and the second vertically extending section is situated in the first space.

**[0013]** In a further embodiment of any of the above, the first and second opposed side walls are parallel, and the top wall and the bottom wall are substantially parallel.

**[0014]** In a further embodiment of any of the above, the top wall includes a support rib that projects below the top wall.

**[0015]** In a further embodiment of any of the above, the first slide extends between a first front end and a first back end, and the second slide extends between a second front end and a second back end. The first back end includes a first support, and the second back end includes a second support. The first and second supports are configured to be secured to a support structure.

**[0016]** In a further embodiment of any of the above, the first slide includes a strengthening rib that extends to the first support .

**[0017]** In a further embodiment of any of the above, the first opposed side walls are non-parallel.

**[0018]** In a further embodiment of any of the above, at least one of the first U-shaped flange and the second C-shaped flange is arcuate in shape.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0019]** The various features and advantages of the present disclosure will become apparent to those skilled in the art from the following detailed description. The drawings that accompany the detailed description can be briefly described as follows.

**[0020]** FIG. 1 illustrates a perspective view of an example bar hanger assembly.

**[0021]** FIG. 2 illustrates a top perspective view of the bar hanger assembly of FIG. 1.

**[0022]** FIG. 3 illustrates an isometric view of telescoping slides of the bar hanger assembly of FIG. 1.

**[0023]** FIG. 4 illustrates a side view of one example telescoping slide.

**[0024]** FIG. 5 illustrates a perspective view of the telescoping slide of FIG. 4.

**[0025]** FIG. 6 illustrates a side view of another example telescoping slide that is configured to be interleaved with the telescoping slide shown in FIG. 4 to provide the bar hanger assembly shown in FIG. 3.

**[0026]** FIG. 7 illustrates a perspective view of the telescoping slide of FIG. 6.

**[0027]** FIG. 8 illustrates a side view of telescoping slides of the bar hanger assembly in FIG. 1.

**[0028]** FIG. 9 illustrates another example bar hanger assembly.

**[0029]** FIG. 10 illustrates yet another example bar hanger assembly.

## DETAILED DESCRIPTION

**[0030]** FIG. 1 illustrates an example bar hanger assembly 10 including a first slide 14 and a second slide 18 that, when installed, extend between a pair of spaced

apart structures 22 such as ceiling joists, for example. The first and second slides 14, 18 are interleaved and telescopically, slideable arranged relative to one another such that a longitudinal length or distance $L_d$ between the structures 22 can be adjusted to fit the dimensions of a particular application during installation. The first and second slides 14, 18 are each formed from a single, unitary piece of formed sheet metal.

**[0031]** With further reference to FIG. 2, a saddle bracket 34 is situated over the first and second slides 14, 18 and secures an electrical box 28 to one of the first and second slides 14, 18 using a weld, a rivet, threaded fasteners and/or other suitable connections. In the example shown in FIG. 2, the saddle bracket 34 includes apertures 38, which are configured to receive fasteners, for securing the saddle bracket 34 to the first slide 14 and the electrical box 28. An aesthetic covering 26, such as drywall, wood, or other finishing material of the ceiling is secured to the structures 22, and a hole in the aesthetic covering 26 provides access to the electrical box. A fixture 30, such as a ceiling fan, light, or chandelier, is mounted to the electrical box 28, as is generally known.

**[0032]** FIG. 3 illustrates an isometric view of the bar hanger assembly 10 with its first and second slides 14, 18 in a fully collapsed position, which corresponds to its narrowest installable width. As shown, the first and second slides 14, 18 respectively includes first and second supports 42, 46 that are configured to attach its respective structures 22 (e.g, the adjacent joist) when the bar hanger assembly 10 is installed.

**[0033]** The first and second supports 42, 46 may include a brace 58 for easily locating the bar hanger assembly 10 once extended to the desired width with respect to the supports 22. When installing the bar hanger assembly 10, the braces 58 abut the bottom of joists, which ensures the desired depth of the electrical box 28 relative to the ceiling material. In one example, the first and second supports 42, 46 can include apertures 50 which are configured to receive a fastener to secure the first and second slides 14, 18 to the structures 22. Additionally or alternatively, the first and second supports 42, 46 can include a nail tab 54 which is configured to penetrate the structures 22.

**[0034]** Referring to FIGS. 3-5, the first slide 14 has a generally inverted U-shaped cross-section that is oriented in a first direction, that is, the opening provided by the "U" faces downward in a typical installation. In the example, the first slide 14 has a central portion formed by first opposed side walls 62 each joined to a top wall 66 to form the inverted U-shape. In one example, the opposed side walls 62 extend away from the top wall 66 at an angle of about 90 degrees. In the example, the first opposed side walls 62 are substantially parallel and extending a height $H_1$ from the top wall 66 to a first end portion 70 at each end of the first opposed side walls 62. The first opposed side walls 62 are spaced apart by a first distance $D_1$ such that a first space 74 (i.e., the opening) is provided by the inverted U-shaped central portion. In the example, the height $H_1$ is greater than the first distance $D_1$, which better enables the bar hanger assembly 10 to support heavy loads.

**[0035]** The first end portions 70 each form a first U-shaped flange 78 that are oriented in a second direction opposite the first direction. Each first U-shaped flange 78 is provided by a lower portion of the inverted U-shaped central portion and a first horizontally extending section 82 that extends from its respective first opposed side wall 62 in a direction away from the first space 74 to a first vertically extending section 86. In this example, the first horizontally extending section 82 and the first vertically extending section 86 are bent by an angle substantially equal to about 90 degrees such that the first horizontally extending section 86 and the top wall 66 are substantially parallel, and the first vertically extending section 82 and the first opposed side walls 62 are substantially parallel. The first channel 90 is configured to receive at least a portion of the second slide 18.

**[0036]** In one example, the first opposed side walls 62 and the first vertically extending sections 86 are spaced apart by a second distance $D_2$, and the second distance $D_2$ is substantially less than the first distance $D_1$ provided between the first opposed side walls 62 (e.g., less than 50%). In one example, the first vertically extending sections 86 provide a second height $H_2$ that is substantially less than the first height $H_1$ (e.g., less than 50%). The second height $H_2$ and the second distance $D_2$ are approximately the same, in the example.

**[0037]** The first slide 14 includes a support rib 94 that extends longitudinally between a first front end 98 and a first back end 102, as best shown in FIG. 5. The support rib 94 forms a protrusion that projects below the top wall 66 and serves to further increase the rigidity of the first slide 14. In this example, the support rib 94 is generally arcuate. The first slide 14 also includes a strengthening rib 106 contiguous with the support rib 94 and extending into first support 46, which strengthens this joint to resist racking.

**[0038]** In one example, the first front end 94 includes an L-shaped tab 110 that the extends from the top wall 66 in a direction away from the first space 74. The tab 110 serves as a stop that prevents the saddle bracket 34 from sliding off the bar hanger assembly 10.

**[0039]** Referring to FIGS. 6, and 7, the second slide 18 has a generally flat bottom wall 118 that substantially does not extend into the first space 74 of the first slide 14 (best shown in FIGS. 3 and 8). Said another way, the bottom wall 118 is not tightly nested by extending into the first space 74. Instead, the top and bottom walls 66, 118 are significantly spaced from one another, which is the opposite of prior art bar hangers. In the example, the bottom wall 118 is spaced almost or at least the entire first height $H_1$ from the top wall 66, using substantially less material.

**[0040]** In one example, the bottom wall 118 generally forms a U-shape with second end portions 122, which are laterally spaced from one another. The second slide 18 extends longitudinally between a second front end 146 and a second back end 150. As shown, the second back end 150 includes the second support 46, which is similar to first support 42. Each second end portion 122 forms a second C-shaped flange 130 that hooks to provide a downwardly opening second channel 142 facing an opposite direction as the first channels 90.

**[0041]** Each second C-shaped flange 130 includes second opposed side walls 114 that extend away from the bottom wall 118 at an angle of about 90 degrees in the example shown in FIG. 6. In this example, the second opposed side walls 114 are substantially parallel and bound a second space 126. Each one of the second opposed side walls 114 provide a third height $H_3$ that extends between the bottom wall 118 and a second horizontal extending section 134 adjoining the second vertical

extending section 138 and extending toward the second space 126. A second vertically extending section 138 extends from the second horizontally extending section 134 in a direction towards the bottom wall 118 to form the second channel 142 having an inverted U-shape. In this example, the second horizontally extending section 134 and the second vertically extending section 138 are at an angle of about 90 degrees such that the second horizontally extending section 134 and the bottom wall 118 are generally parallel, and the second vertically extending section 138 the second opposed side walls 114 are generally parallel.

**[0042]** The bottom wall 118 lies substantially within a plane interconnecting the second opposed side walls 114 at an end opposite the second horizontally extending sections 134. As a result, this central portion of the second slide 18 is relatively weak under vertical bending loads. As can be appreciated from FIG. 8, the first and second channels 90, 142 are adjacent one another and respectively receive the second and first vertically extending sections 138, 86 to provide significant structural support to resist bending under downward, vertical loads. In one example, the third height $H_3$ is less than the first height $H_1$ and greater than the second height $H_2$. In one example, the second opposed side walls 114 are spaced about by a third distance $D_3$ greater than the sum of the first distance $D_1$ and twice the second distance $D_2$ (i.e., $D_3 > D_1 + 2*D_2$) . In one example, the second opposed side walls 114 and the second vertically extending sections 138 are spaced apart by a fourth distance $D_4$, and the fourth distance $D_4$ is approximately equal to the second distance $D_2$ but greater than the second distance $D_2$.

**[0043]** In one example, the second vertically extending sections 138 provide a fourth height $H_4$ that is substantially equal to the second height $H_2$ provided by the first vertically extending section 86.

**[0044]** FIG. 9 illustrates another example bar hanger assembly 1010. In this disclosure, like reference numerals generally designate like elements. The first and second flanges 1078, 1130 are curved to form an arc shape, rather than the straight box-like configuration shown in FIG. 8. Other cross-sectional flange shapes may be used, if desired.

**[0045]** FIG. 10 illustrates another example bar hanger assembly 2010. The first slide is an inverted U-shaped with non-parallel side walls 2062 that extend away from the top wall 2066 by an angle of about 60 degrees. For example, the first opposed side walls 2062 extend laterally outward in opposite directions such that the first space 2074 provided therebetween gradually widens as the first opposed sides walls 2062 extend toward the bottom wall 2118. The first and second flanges 2078, 2130 in this example are curved like those shown in FIG. 9, although they could also be configured in another cross-sectional shape.

**[0046]** The disclosed bar hanger assemblies use less material than prior art bar hanger flanges, yet are at least as strong. This greatly reduces cost.

**[0047]** The terminology "first" and "second" as used throughout this description is to differentiate that there are two distinct components or features. It is to be further understood that the terms "first" and "second" are interchangeable in the embodiments herein in that a first component or feature could alternatively be termed as the second component or feature, and vice versa. Use of the terms "horizontally" and "vertically" relate to the typical installed orientation of the bar hanger and are not intended to be limiting. Similarly, the terms "top," "bottom," "front" and "back" are used as relative terms for convenience to distinguish one element from another and are not intended to be limiting.

**[0048]** Although the different non-limiting examples are illustrated as having specific components, the examples of this disclosure are not limited to those particular combinations. It is possible to use some of the components or features from any of the non-limiting examples in combination with features or components from any of the other non-limiting examples.

**[0049]** It should be understood that like reference numerals identify corresponding or similar elements throughout the several drawings. It should also be understood that although a particular component arrangement is disclosed and illustrated in these exemplary embodiments, other arrangements could also benefit from the teachings of this disclosure.

**[0050]** The foregoing description shall be interpreted as illustrative and not in any limiting sense. A worker of ordinary skill in the art would understand that certain

modifications could come within the scope of this disclosure. For these reasons, the following claim should be studied to determine the true scope and content of this disclosure.

## CLAIMS

What is claimed is:

1. A bar hanger assembly (10) comprising:

a first slide (14) having an inverted U-shaped cross-section opening in a first direction, the first slide formed by first opposed side walls (62) that extend away from a top wall (66), each one of the first opposed side walls (62) having a first end portion (70) that forms a first U-shaped flange (78) opening in a second direction opposite the first direction, the first U-shaped flange (78) defining a first channel (90);

a second slide (18) having a generally central portion provided by a bottom wall (118) that extends laterally to spaced apart second end portions (122) that each form a second C-shaped flange (130), the second C-shaped flanges (130) face toward one another, each second C-shaped flange (130) providing a second channel (142); and

wherein the first U-shaped flange (78) and second C-shaped flange (130) are interleaved with one another and are configured to permit the first and second slides (14, 18) to slide along the first and second channels (90, 142) in a longitudinal direction.

2. The bar hanger assembly (10) of claim 1, wherein each first U-shaped flange (78) includes a first horizontally extending section (82) that extends from its respective first opposed side wall (62) in the second direction to a first vertically extending section (86), and each second C-shaped flange (130) includes a second opposed side wall (114) that extend away from the bottom wall (118) to a second horizontally extending section (134) joined to a second vertically extending section (138) extending towards the bottom wall (118), wherein the second opposed side wall (114), second horizontally extending section (134) and second vertically extending section (138) of each second channel 142 forming an inverted U-shape, and wherein the first and second channels (90, 142) respectively receive the second and first vertically extending sections (138, 86).

3. The bar hanger assembly (10) of claim 2, wherein each one of the first opposed side walls (62) provide a first height ($H_1$)that extends between the top wall (66) and the first end portion (70), and each one of the second opposed side walls (114) provide a second height ($H_2$) that extends between the bottom wall (118) and the second end portion (122), and the first height ($H_1$) is larger than the second height ($H_2$), wherein a third height ($H_3$) extends between the bottom wall (118) and the second horizontally extending section (134), the second vertically extending section (138) provides a fourth height ($H_4$) that is substantially equal to the second height ($H_2$).

4. The bar hanger assembly (10) of claim 2, wherein the first opposed side walls (62) are spaced apart by a first distance ($D_1$), each first vertically extending section (86) is spaced apart a second distance ($D_2$) from its respective first opposed side wall (62), and the second distance ($D_2$) is substantially less than the first distance ($D_1$), the second opposed side walls (114) are spaced about by a third distance ($D_3$) greater than the sum of the first distance ($D_1$) and twice the second distance ($D_2$), each second opposed side wall (114) and its respective second vertically extending section (138) is spaced apart by a fourth distance ($D_4$), and the fourth distance ($D_4$) is approximately equal to the second distance ($D_2$).

5. The bar hanger assembly (10) of claim 1, wherein the first opposed side walls (62) are spaced apart to provide a first space (74) and the second opposed side walls (114) are spaced apart to provide a second space (126), wherein the bottom wall (118) is substantially flat and does not extend substantially into the first space (74).

6. The bar hanger assembly (10) of claim 4, wherein each one of the first opposed side walls (62) provide a first height ($H_1$) that extends between the top wall (66) and the first end portion (70), the bottom wall (118) is spaced almost or at least the entire first height ($H_1$) from the top wall (66).

7. The bar hanger assembly (10) of claim 5, wherein the first U-shaped flange (78) includes a first horizontally extending section (82) that extends from the

first end portion (70) in a direction away from the first space (74) and a first vertically extending section (86) that extends from the first horizontally extending section (82) in a direction towards the top wall (66).

8. The bar hanger assembly (10) of claim 7, wherein each second C-shaped flange (130) includes a second horizontally extending section (134) that extends from the second end portion (122) in a direction towards the second space (126) and a second vertically extending section (138) that extends from the second horizontally extending section (134) in a direction towards the bottom wall (118).

9. The bar hanger assembly (10) of claim 8, wherein the first vertically extending section (86) is situated in the second space (126), and the second vertically extending section (138) is situated in the first space (74).

10. The bar hanger assembly (10) of claim 1, wherein the first and second opposed side walls (62, 114) are parallel, and the top wall (66) and the bottom wall (118) are substantially parallel.

11. The bar hanger assembly (10) of claim 9, wherein the top wall (66) includes a support rib (94) that projects below the top wall (66).

12. The bar hanger assembly (10) of claim 1, wherein the first slide (14) extends between a first front end (98) and a first back end (102), and the second slide (18) extends between a second front end (146) and a second back end (150), wherein the first back end (102) includes a first support (42), and the second back end (150) includes a second support (46), the first and second supports (42, 46) configured to be secured to a support structure (22).

13. The bar hanger assembly (10) of claim 12, wherein the first slide (14) includes a strengthening rib (106) extending to the first support (42).

14. The bar hanger assembly (10) of claim 1, wherein the first opposed side walls (62) are non-parallel.

15. The bar hanger assembly (10) of claim 1, wherein at least one of the first U-shaped flange (78) and the second C-shaped flange (130) is arcuate in shape.

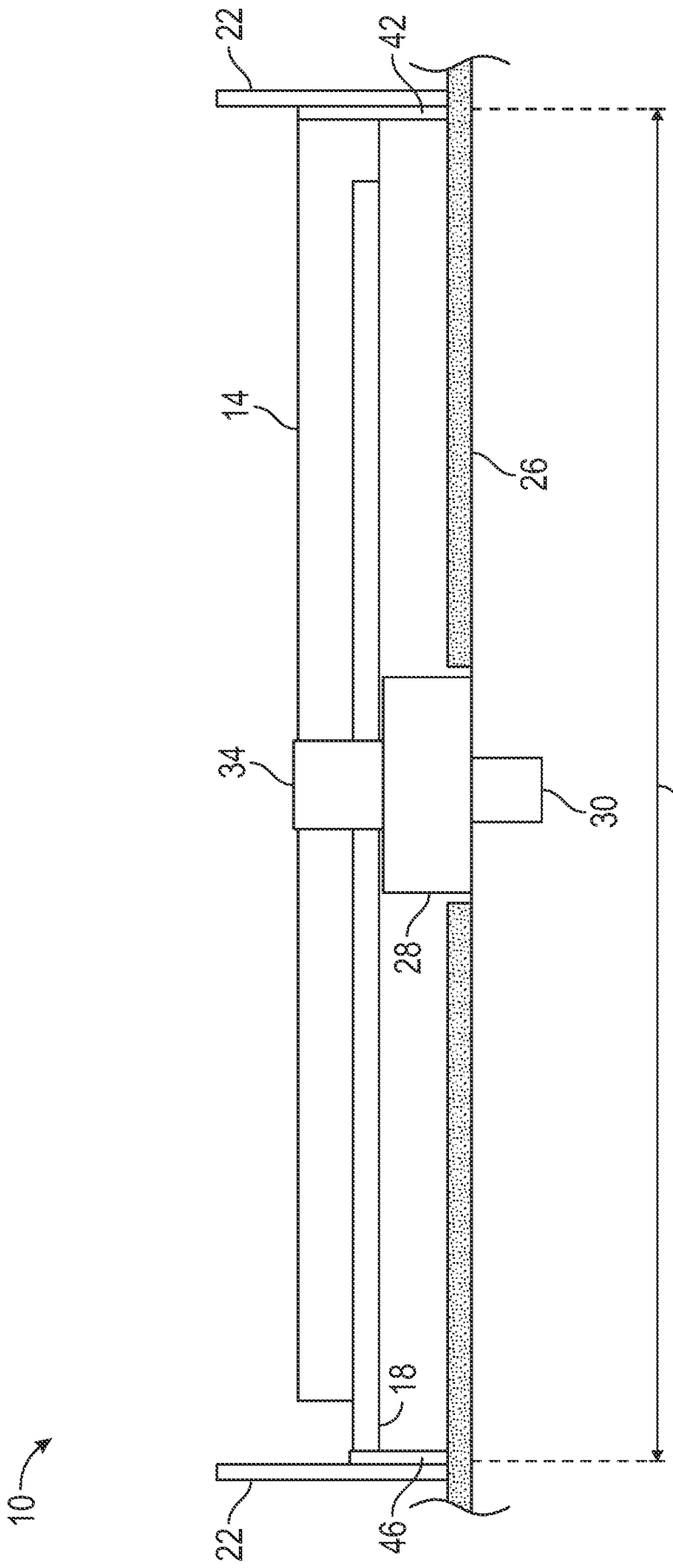


FIG. 1

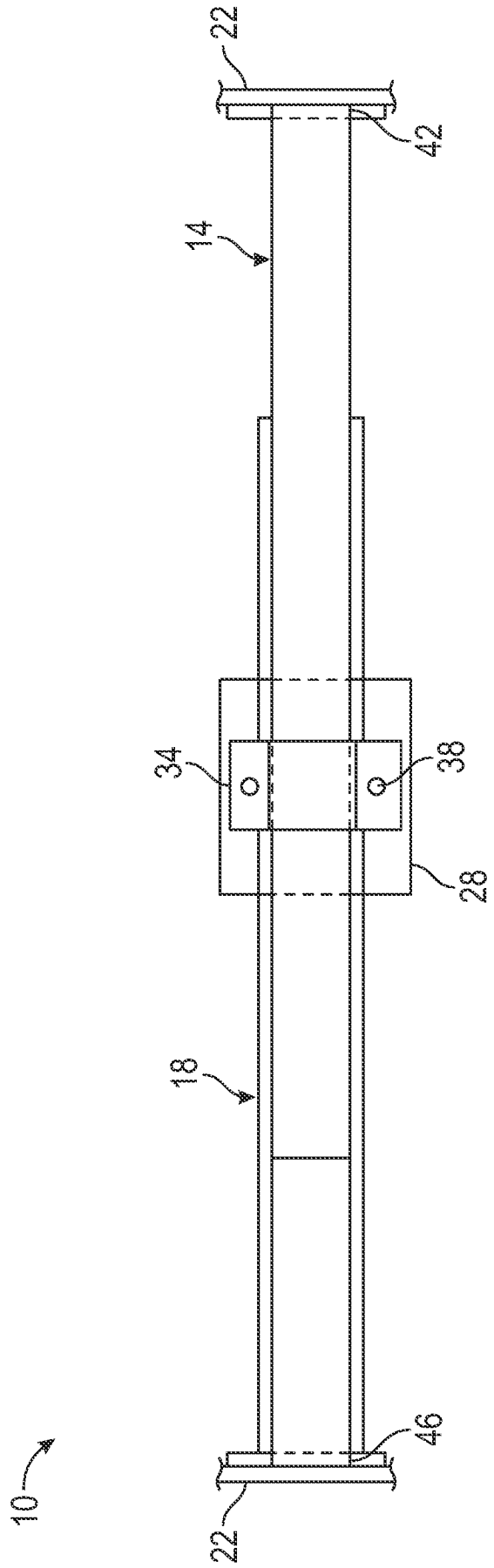


FIG. 2

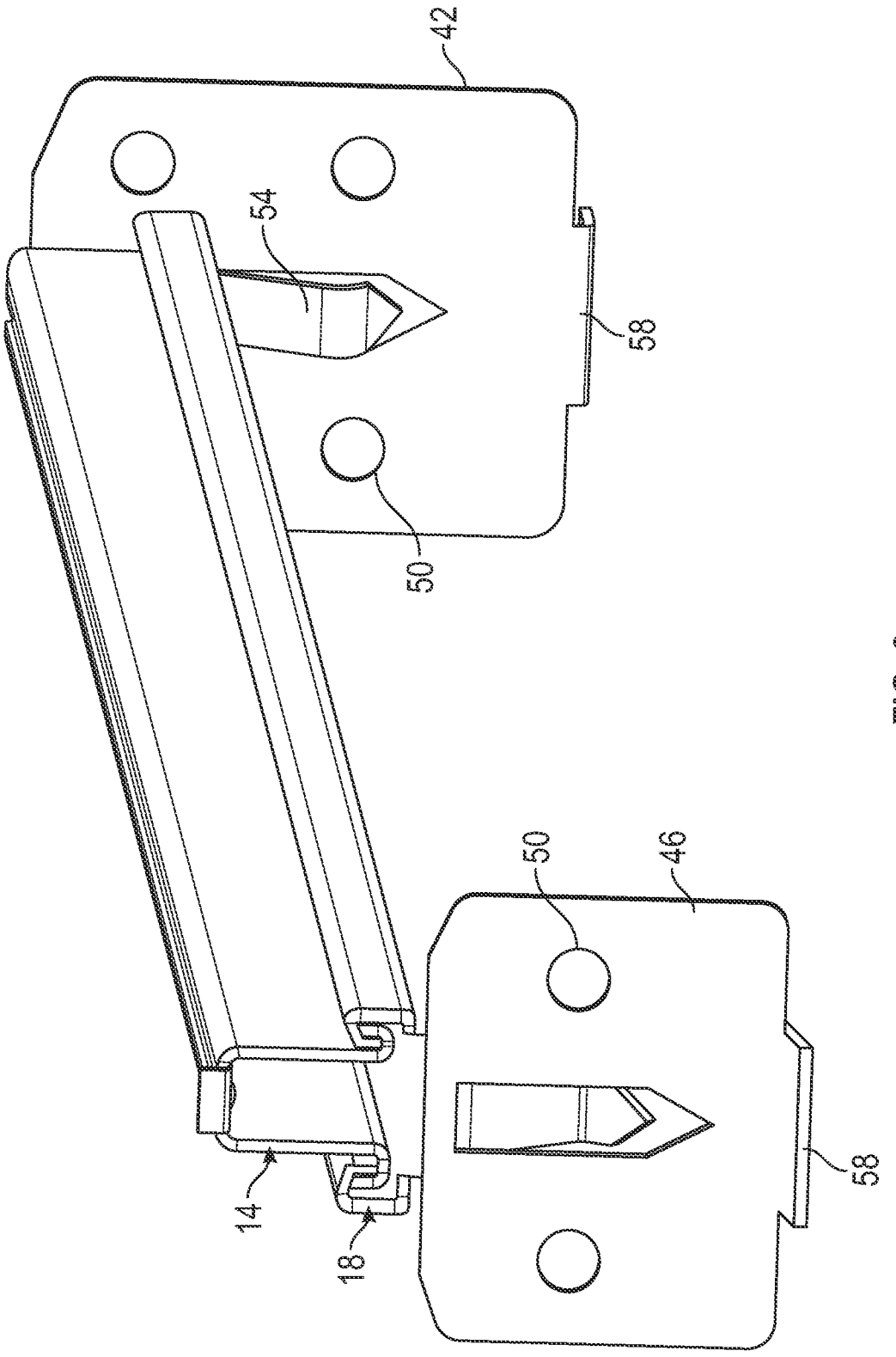


FIG. 3

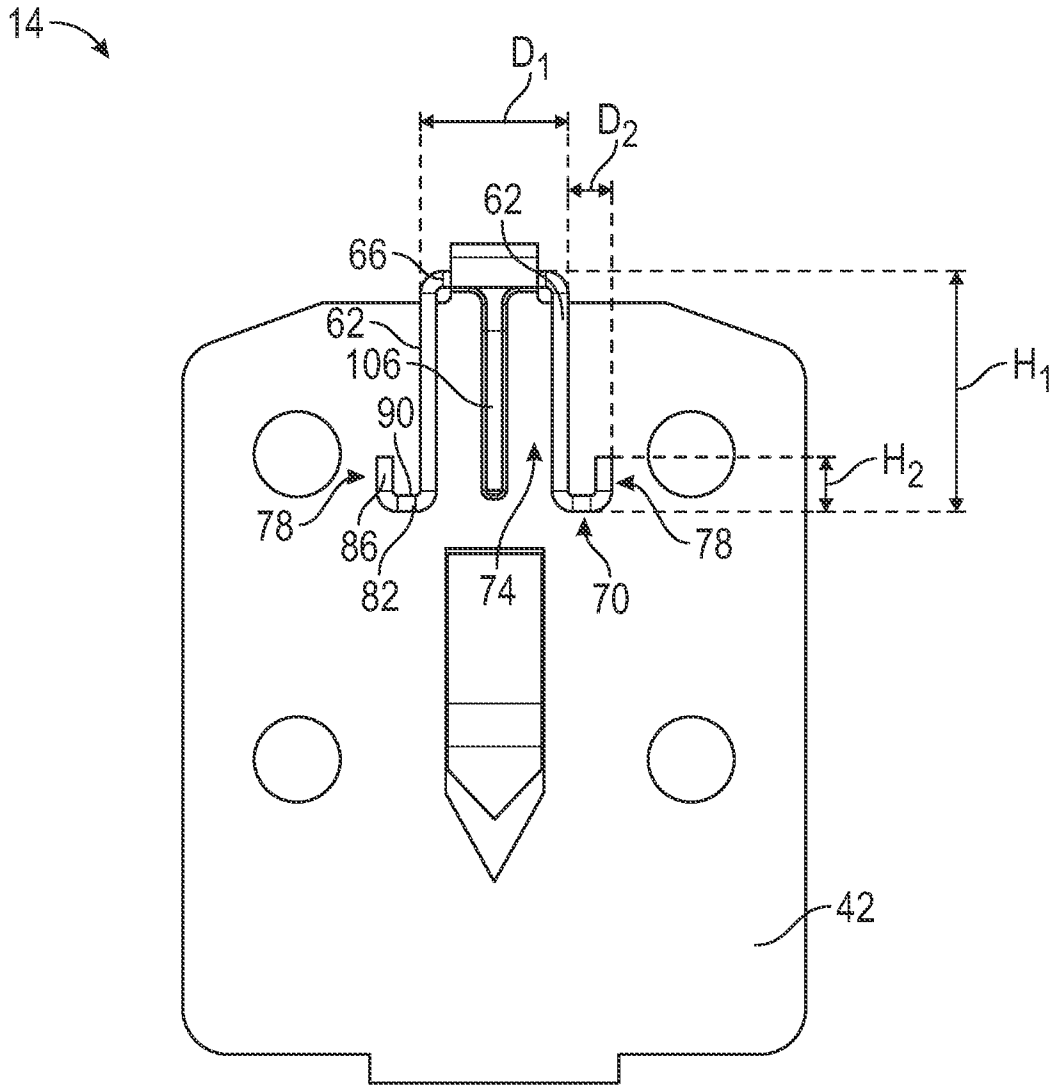


FIG. 4

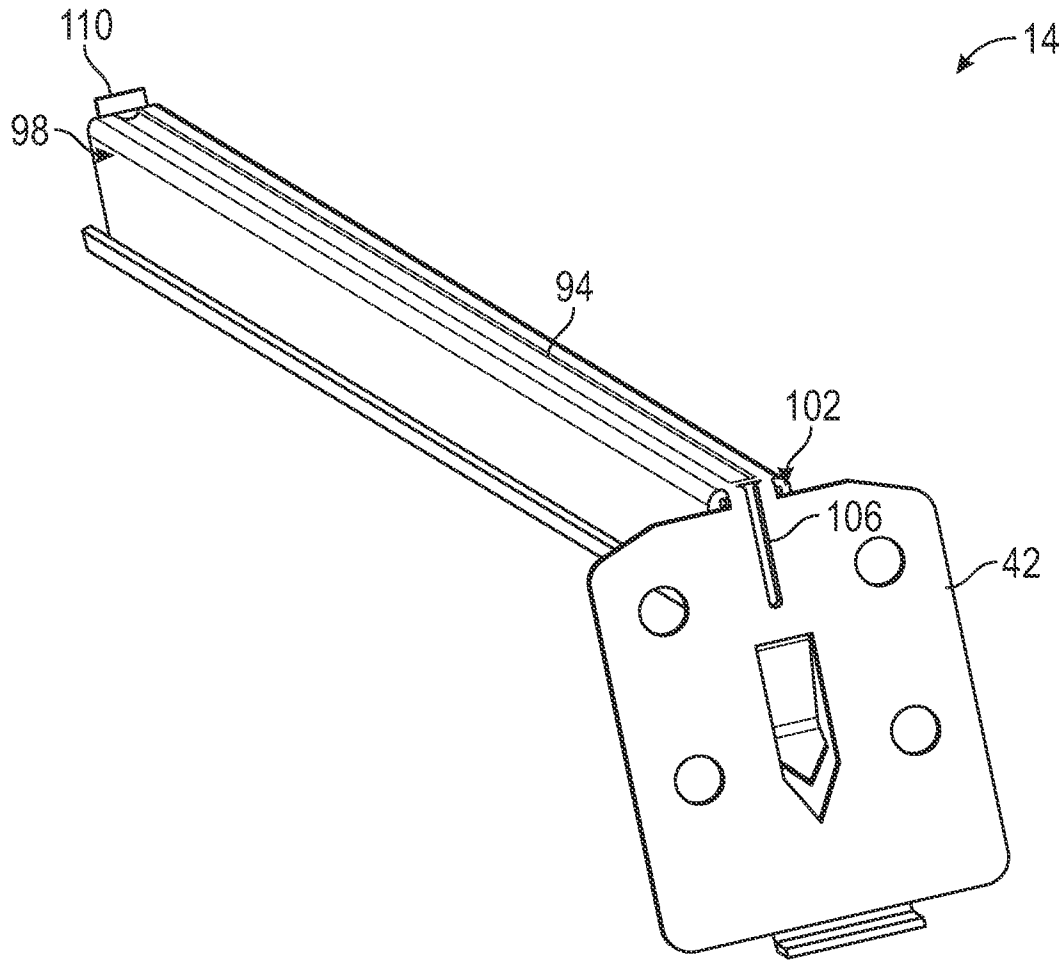


FIG. 5

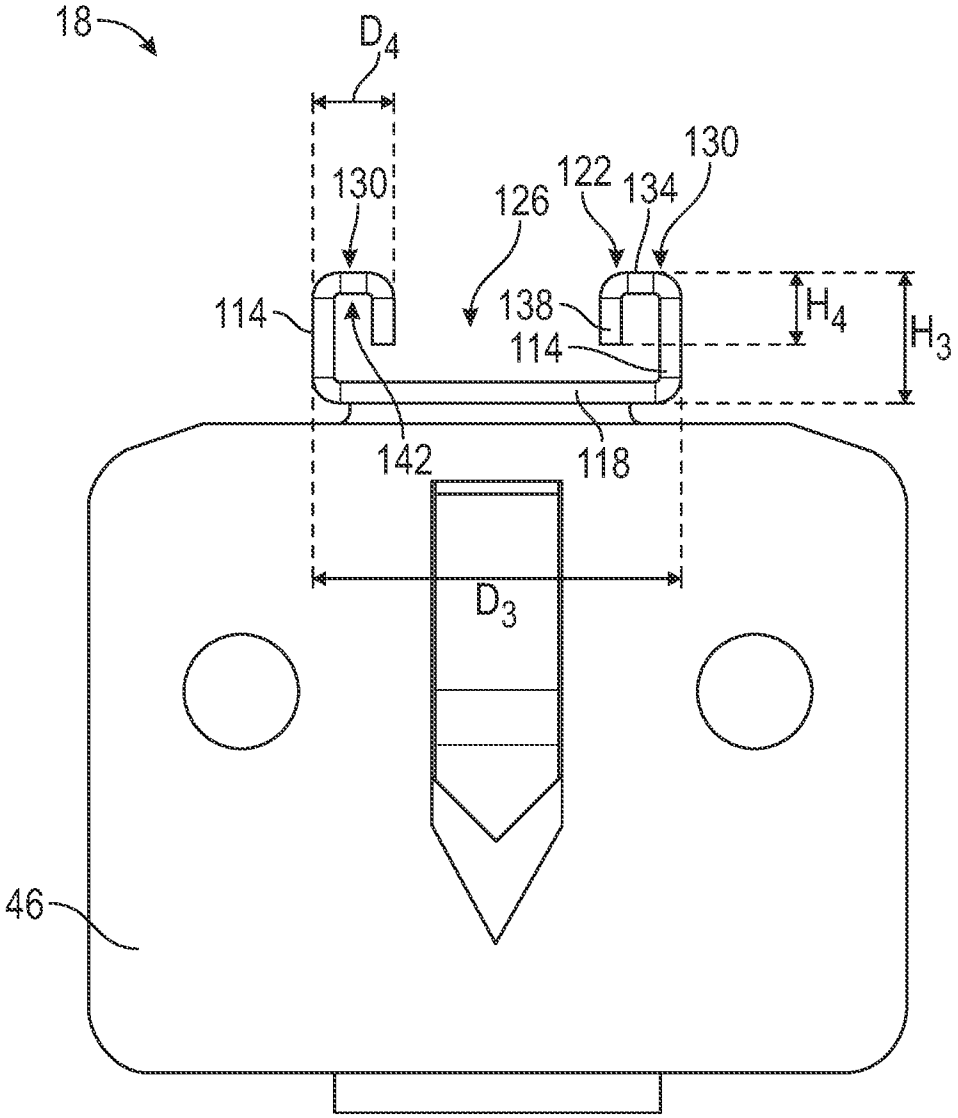


FIG. 6

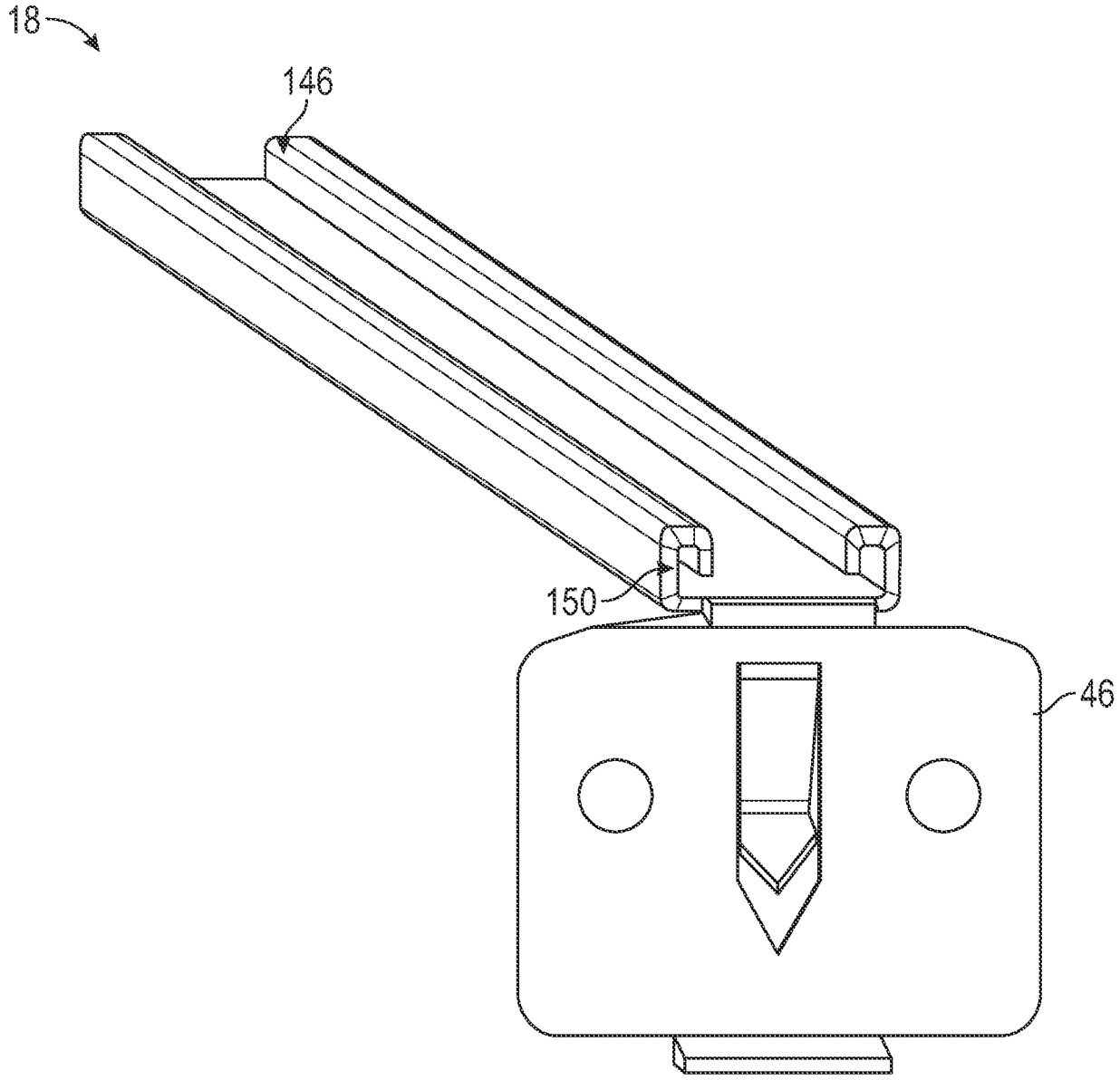


FIG. 7

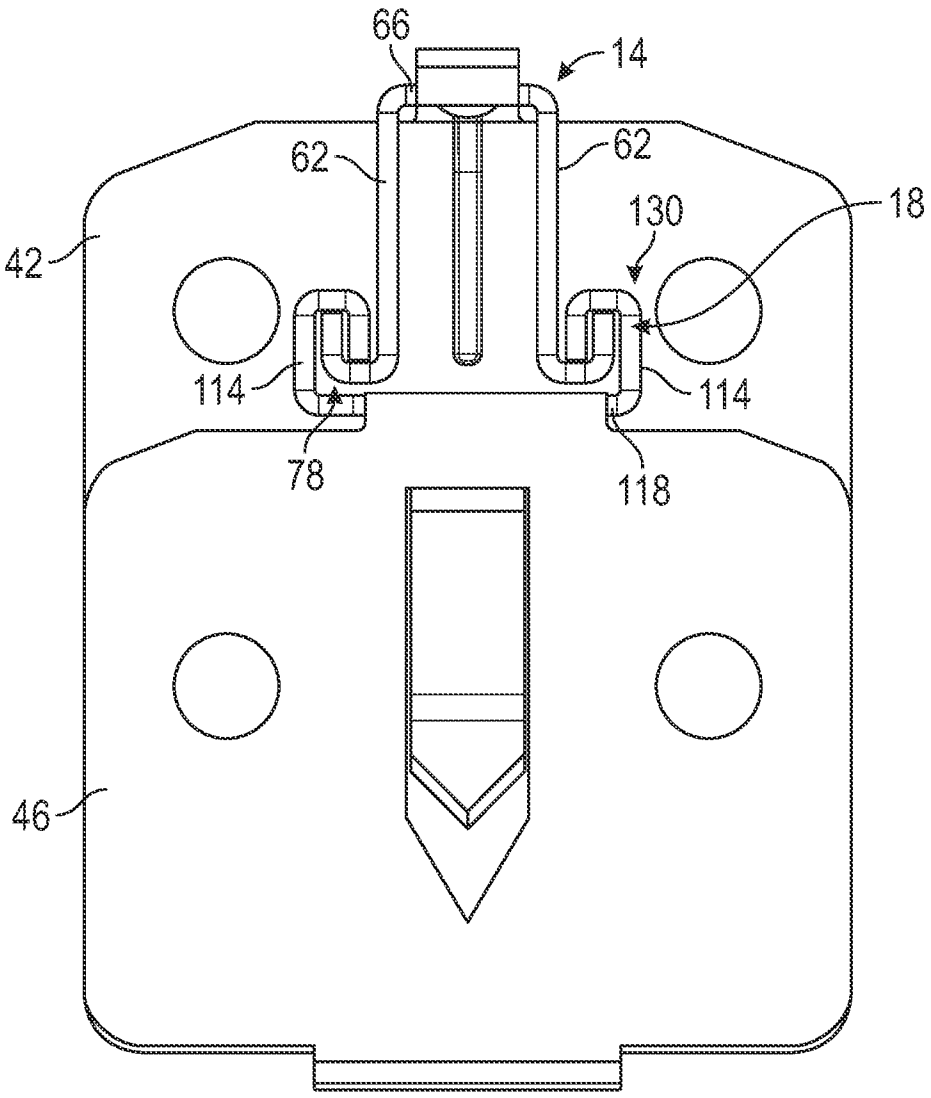


FIG. 8

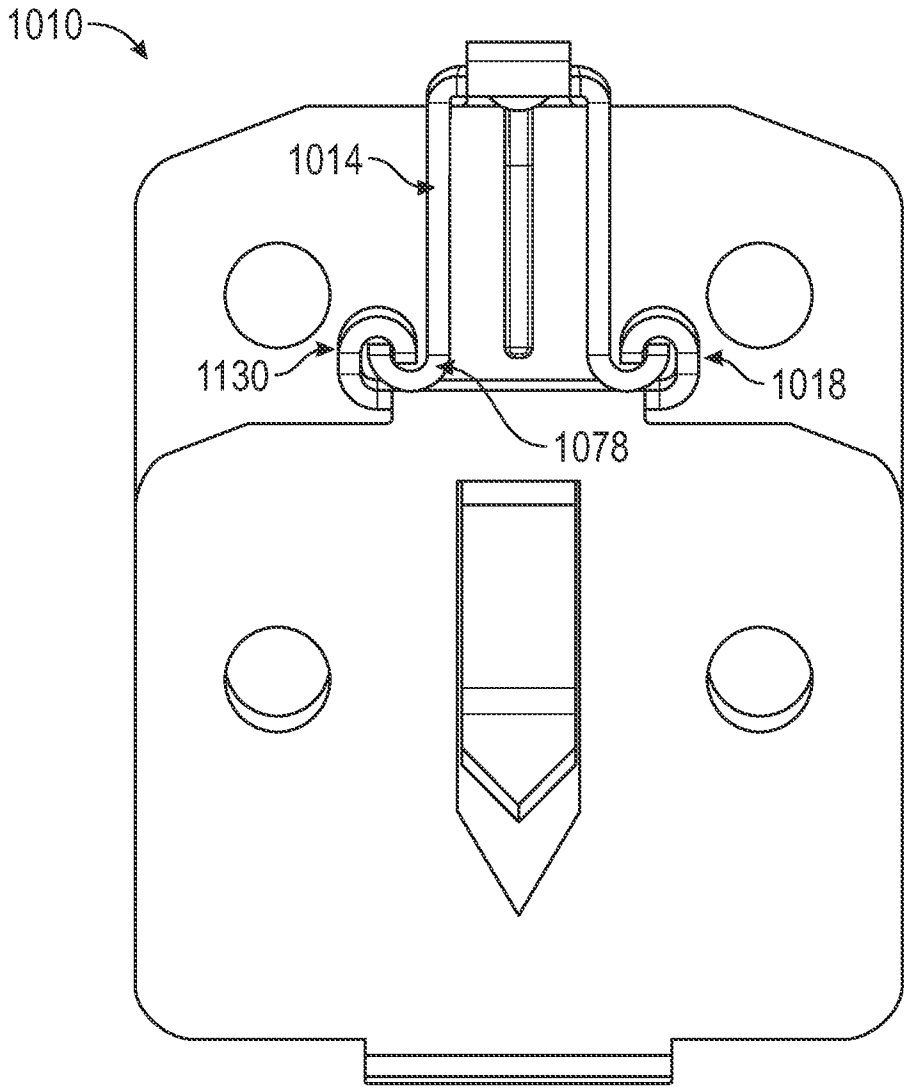


FIG. 9

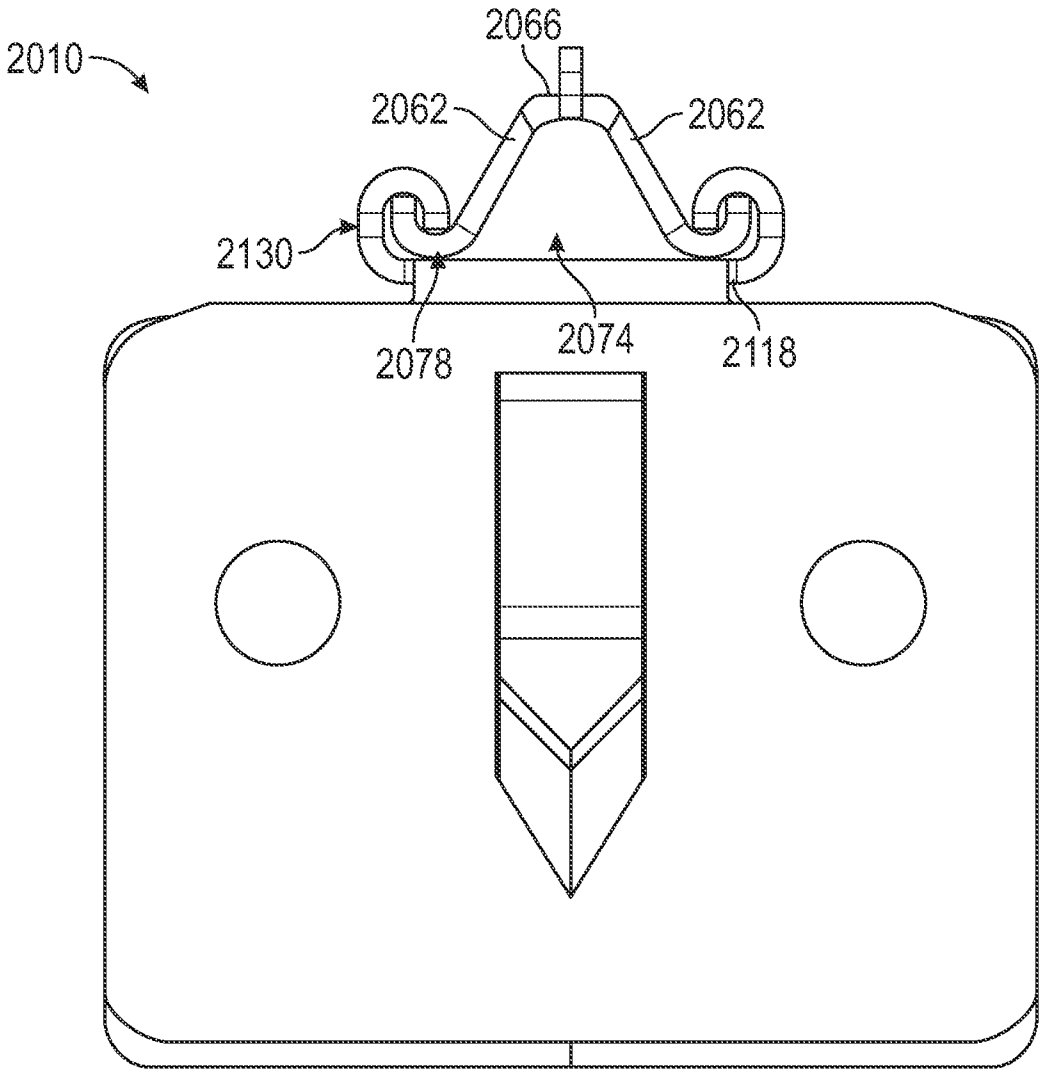


FIG. 10

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 24/17208

A. CLASSIFICATION OF SUBJECT MATTER

IPC - INV. H02G 3/12, H02G 3/20, H02G 3/36, F21V 21/02 (2024.01)
ADD.

CPC - INV. H02G 3/125, H02G 3/20, H02G 3/36, F21V 21/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | US 2,963,253 A (MAIER et al.) 06 December 1960 (06.12.1960), entire document, especially Title, Abstract, Figs 1-3 | 1-15 |
| A | US 6,889,943 B2 (DINH et al.) 10 May 2005 (10.05.2005), entire document, especially Abstract and Figs. 1-4 | 1-15 |
| A | US 2021/0222845 A1 (VER LIGHTING LLC) 22 July 2021 (22.07.2021), entire document, especially Abstract and Figs. 2A-4D | 1-15 |
| A | US 11,349,290 B2 (ORBIT INDUSTRIES INC.) 31 May 2022 (31.05.2022), entire document, especially Abstract and Figs. 1 and 3-5 | 1-15 |
| A | US 2012/0018600 A1 (KERR, JR.) 26 January 2012 (26.01.2012), entire document, especially Abstract and Figs. 1-10 | 1-15 |

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 07 May 2024 | JUN 14 2024 |
| Name and mailing address of the ISA/US<br>Mail Stop PCT, Attn: ISA/US, Commissioner for Patents<br>P.O. Box 1450, Alexandria, Virginia 22313-1450<br>Facsimile No. 571-273-8300 | Authorized officer<br>Kari Rodriquez<br>Telephone No. PCT Helpdesk: 571-272-4300 |