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(54) Title: DUAL PULL TAB

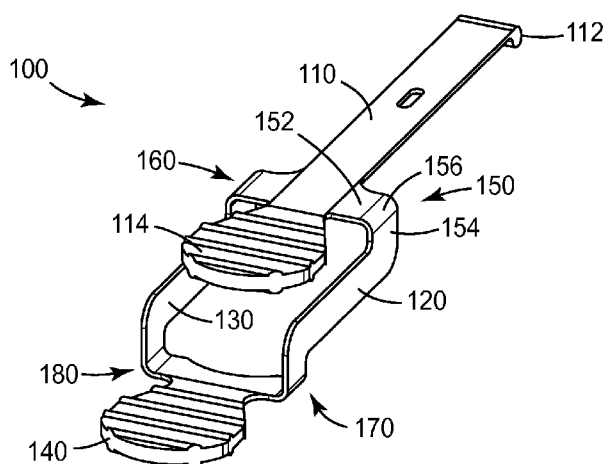


FIG. 1

(57) Abstract: Dual pull tabs that allow for disconnection of connectors are described. The dual pull tabs include a tongue segment including a connector end and a first pull tab end, two lateral segments, two L-shaped elbow segments, and a second pull tab end. The manipulation of the dual pull tabs may provide for the unmating of the connector from a complementary connector.



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DUAL PULL TAB

Background

5 Various devices are useful in designing connectors that attach cables to cage mounts of other connection surfaces or ports, including those attached to printed circuit boards, such as computer motherboards. Some devices have mechanisms which allow the cable to be secured in place. In some situations, for example where cables are very closely arranged or may be hard to reach, some assemblies include pull tabs for ease of disconnection. The pull tab may be used to release the cable assembly from
10 its mounting surface or to disengage the mechanism securing it in place. Unfortunately, many pull tabs, including designs with two pull tabs on opposite sides to provide greater access, are not appropriate for use with rectangular or flat cables, at least not without creating a significant amount of wasted or inefficiently utilized space.

Summary

15 In one aspect, the present disclosure describes a dual pull tab. In some embodiments, the dual pull tab includes a tongue segment in a first plane including a connector end, a first pull tab end, and a middle portion connecting the connector end to the first pull tab end having opposing first and second sides, the connector end and the first pull tab end disposed on opposite ends of the tongue segment. The dual pull
20 tab assembly includes a first lateral segment extending along at least a portion of a length of the tongue segment, the first lateral segment disposed below and on a first side of the tongue segment and in a second plane orthogonal to the first plane and a second lateral segment extending along at least a portion of the length of the tongue segment, the second lateral segment disposed below and on an opposite second side of the tongue segment and in a third plane orthogonal to the first plane and parallel to the second
25 plane. In some embodiments, the dual pull tab assembly also includes a first L-shaped elbow segment having a first portion in the first plane extending from the first side of the middle portion of the tongue segment, a second portion in the second plane extending from the first lateral segment, and a joining portion connecting the first portion to the second portion and a second L-shaped elbow segment having a first portion in the first plane extending from the second side of the middle portion of the tongue segment,
30 a second portion in the third plane extending from the second lateral segment, and a joining portion connecting the first portion to the second portion.

In another aspect, the present disclosure describes a dual pull tab including a tongue segment in a first plane with a connector end, a first pull tab end, and a middle portion connecting the connector end and the first pull tab end having first and second sides, where the connector end and the first pull tab end
35 are disposed on opposite ends of the tongue segment. In some embodiments, the dual pull tab includes a first arm segment extending along at least a portion of a length of the tongue segment, the first arm

segment disposed below and on a first side of the tongue segment and in a second plane parallel to the first plane, the first arm segment having a first end and an opposing second end. The dual pull tab also includes a second arm segment extending along at least a portion of the length of the tongue segment, the second arm segment disposed below and on an opposing second side of the tongue segment and in the second plane, the second arm segment having a first end and an opposing second end. In some embodiments, the dual pull tab includes a second pull tab end, extending between and attached to the first ends of the first and second arm segments, disposed below the tongue segment in the second plane. The dual pull tab also includes a first elbow segment having a first portion in the first plane extending from the first side of the middle portion of the tongue segment, a second portion in a third plane orthogonal to the first plane, a first joining portion connecting the first portion to the second portion, and a second joining portion connecting the second portion to the second end of the first arm segment. In some embodiments, the dual pull tab includes a second elbow segment having a first portion in the first plane extending from the second side of the middle portion of the tongue segment, a second portion in a fourth plane orthogonal to the first plane, a first joining portion connecting the first portion to the second portion, and a second joining portion connecting the second portion to the second end of the second arm segment.

Brief Description of the Drawings

FIG. 1 is a top perspective view of a dual pull tab.

FIG. 2 is a bottom perspective view of the dual pull tab of FIG. 1.

FIG. 3 is a side elevation view of the dual pull tab of FIG. 1.

FIG. 4 is a top plan view of the dual pull tab of FIG. 1.

FIG. 5 is a top perspective view of a connector and cable configured with the dual pull tab of FIG. 1.

FIG. 6 is a bottom perspective view of a connector and cable configured with the dual pull tab of FIG. 1.

FIG. 7 is a top perspective view of another dual pull tab.

FIG. 8 is a side elevation view of the dual pull tab of FIG. 7.

FIG. 9 is a top plan view of the dual pull tab of FIG. 7.

FIG. 10 is a top perspective view of a connector and cable configured with the dual pull tab of FIG. 7.

FIG. 11 is a bottom perspective view of a connector and cable configured with the dual pull tab of FIG. 7.

Detailed Description

Embodiments of the present disclosure include a tongue segment in a first plane, a first lateral segment in a second plane, a second lateral segment in a third plane, and a second pull tab end in a fourth plane. Dual pull tab described within may also include first and second L-shaped elbow segments, including portions in the first and second plane and first and third plane, respectively.

Other embodiments of the present disclosure include a tongue segment in a first plane, a first arm segment in a second plane, a second arm segment also in a second plane, and a second pull tab end disposed below the tongue segment in the second plane. These dual pull tabs may include first and second elbow segments, with portions in the first and third plane and first and fourth plane, respectively.

Some embodiments of the present disclosure may have a rectangular cross-section. This may be particularly suitable for fitting to cables with rectangular shapes, as the dual pull tab may fit around the rectangular cable while minimizing wasted space. Nonetheless, embodiments with a rectangular cross-section may also be desirable for round cables, giving the overall assembly/cable combination a rectangular shape ideal for fitting many assemblies together in close quarters, as in, for example, on a mount cage.

FIG. 1 is a top perspective view of a dual pull tab. Dual pull tab 100 includes tongue segment 110 with connector end 112 and first pull tab end 114, first lateral segment 120, second lateral segment 130, second pull tab end 140, first L-shaped elbow segment 150 including first portion 152, second portion 154, and joining portion 156, second L-shaped elbow segment 160, third L-shaped elbow segment 170, and fourth L-shaped elbow segment 180.

Tongue segment 110 has two opposing sides and two opposing ends. Connector end 112 and first pull tab end 114 are disposed at each end of tongue segment 110. Tongue segment 110 may lie in a first plane. For purposes of this disclosure, a component or part may be said to lie within a plane despite having a physical thickness, or despite having minor deviations from a fully flat and planar two-dimensional surface. For example, while, in some embodiments connector end 112 has at least a portion that deviates from the plane of the rest of tongue segment 110, tongue segment 110 as a whole may still be said to lie within a first plane.

Connector end 112 may have any suitable shape to facilitate the integration of dual pull tab 100 with a connector. In other words, connector end 112 may be, for example, a latch or hook that joins with and may provide functionality to a connector. Connector end 112 may fit into a notch or slot in a connector. Suitable connectors are described in, for example, in U.S. Patent Application Serial No. 61/514261, entitled "Electrical Connector Assembly," and filed August 2, 2011, described in further detail below in conjunction with FIG. 5. Connector end 112 may be a separate, joined piece with tongue segment 110 or it may be port of the same continuous body; for example, connector end 112 may be formed from the same mold as tongue segment 110.

First pull tab end 114 may be any suitable shape or any suitable size. In some embodiments, first pull tab end 114 may be substantially elliptical or circular, or it may be ring-shaped (annular or toroidal). Considerations for the shape of first pull tab end 114 may include ease of manipulation and grip; that is, it may be desirable to shape first pull tab end 114 in order to make it easy for a human hand (or, more specifically, two or more fingers) to grasp. Similarly, shapes which surround holes, e.g., annuli and the like, may allow for manipulation with a tool or hook, possibly providing for even more precise and safe operation. In some embodiments, first pull tab end 114 may be substantially linear, as in a bar or handle. First pull tab end 114 may be a separate piece joined or connected to tongue segment 110 or it may be part of the same continuous body. In some embodiments, first pull tab end 114 may be attached with a joint or hinge allowing for easier manipulation of dual pull tab 100.

For ease of explanation, the first plane (containing tongue segment 110) will be referred to as the “top” of dual pull tab 100; that is, nothing shown in FIG. 1 is “above” the first plane. Below and extending along at least a portion of a length of tongue segment 110 is first lateral segment 120, which lies in a second plane orthogonal to the first plane. In a third plane, also orthogonal to the first plane and parallel to the second plane, is second lateral segment 130.

First lateral segment 120 and second lateral segment 130 may be any suitable shape and be of suitable dimensions. In some embodiments where dual pull tab 100 is designed for use with a flat or rectangular cable, first lateral segment 120 or second lateral segment 130 may be sized for that cable’s thickness. First lateral segment 120 or second lateral segment 130 may be substantially rectangular and planar, “S” or “L” shaped, shapes with holes or “windows,” or even elliptical with curved surfaces. Regardless of the shape, the lateral segments may be designed or selected to provide a close fitting surface to the cable it may be attached to, whether it be substantially flat, rectangular, or round.

Second pull tab end 140 may be the same as or different than first pull tab end 114, including in either shape or size. Second pull tab end 140 is in a fourth plane, parallel to the first plane. In some applications where first pull tab end 114 and second pull tab end 140 are on opposite sides of a rectangular cable, it may be desirable that one of the pull tab ends is quickly identifiable as either the top or bottom side of the entire assembly, for example to quickly verify several cables have been attached in the same direction.

First L-shaped elbow segment 150 extends from the first side of tongue segment 110 (from the perspective in FIG. 1, the right side) and includes first portion 152 in the first plane, second portion 154 in the second plane, and joining portion 156. In some embodiments, joining portion 156 includes a 90° angle or a quarter arc. As depicted in FIG. 1, in some embodiments first L-shaped elbow segment 150 may also extend from first lateral segment 120, that is, second portion 154 and first lateral segment 120 may be attached, joined, or otherwise connected.

Second L-shaped elbow segment 160 extends from the second side of tongue segment 110, opposite the first side from which first L-shaped elbow segment 150 extends. Second L-shaped elbow

segment 160 may include a first portion in the first plane, a second portion in the third plane, and a joining portion, but these are obstructed from view in FIG. 1; therefore, the constituent parts of second L-shaped elbow segment 160 are not identified. In some embodiments, second L-shaped elbow segment 160 is a mirror image of first L-shaped elbow segment 150. Second L-shaped elbow segment 160 may have any or all of the same attributes as first L-shaped elbow segment 150.

Third L-shaped elbow segment 170 and fourth L-shaped elbow segment 180 are not shown in detail in FIG. 1 (that is, a first portion, a second portion, and a joining portion), and they may have any or all of the same attributes as the other L-shaped elbow segments described above. In some embodiments, the third and fourth L-shaped elbow segments may include first portions in the second and third planes, respectively, second portions in the fourth plane, and joining portions connecting their first portions to their second portions. Third L-shaped elbow segment 170 may extend from first lateral segment 120, and fourth L-shaped elbow segment 180 may extend from second lateral segment 130. In some embodiments, second pull tab end 140 may be connected or otherwise attached directly to first lateral segment 120 and second lateral segment 130, eliminating any necessity for third L-shaped elbow segment 170 and fourth L-shaped elbow segment 180.

Any or all of dual pull tab 100 may be formed from any suitable material, including plastic, metal, polymeric, any organic or nonorganic material or some combination of the preceding. In some embodiments, the materials may be selected to be lightweight, physically durable, flexible or pliable, warp- or melt- resistant, or otherwise optimized for the desired use's ambient conditions. For some applications, it may be desirable for dual pull tab 100 to be electrically non-conducting for safety reasons or to prevent static discharge. In some embodiments, dual pull tab 100 may be a single continuous body; in other embodiments, it may be desirable for some parts of dual pull tab 100 to be disconnectable, for example, to facilitate fitting dual pull tab 100 around a cable or cord.

FIG. 2 is a bottom perspective view of FIG. 1, with dual pull tab 200 corresponding to dual pull tab 100. Dual pull tab 200 shows tongue segment 210 including textured surface 216, first lateral segment 220, second lateral segment 230, second pull tab end 240, and wishbone segment 290. FIG. 2 largely illustrates the same features as shown and described in FIG. 1, but also depicts features obscured or not visible from a top perspective view. For example, tongue segment 210 may include a textured surface 216. Textured surface 216 may include grooves, dots, crosshatches, or other tactile or haptic features. In some embodiments, textured surface 216 may make it easier for a person to grip, grab, or otherwise manipulate one or more of the pull tabs. Textured surface 216 may also provide a tactile indication of the location of one or more of the pull tabs, for example, for use under dim light or in applications where visibility of the dual pull tab is limited. Second pull tab end 240 is also depicted as having grooves; in some embodiments, one, both, or neither of the pull tabs may have such a textured surface.

Wishbone segment 290 is shown in FIG. 2 to connect first lateral segment 220 and second lateral segment 230 to second pull tab end 240. Wishbone segment 290 may have any suitable shape, including a

Y- or V- shape. Wishbone segment 290 may provide the proper offset between first pull tab end (not shown in FIG. 2; 114 in FIG. 1) and second pull tab end 240 with keeping the two tabs the same size and shape. Wishbone segment 290 may provide better access or allow the dual pull tab to, as a whole, conform or fit better to the cable it is attached to. In some embodiments, dual pull tab 200 may not require or include a wishbone segment, and instead, second pull tab end 240 may be directly attached to the third and fourth elbow segments, or directly to the first and second lateral segment. The shape and size of wishbone segment 290, if used, may be selected for strength, durability, or to provide a more even distribution of force across other parts of the dual pull tab.

FIG. 3 is a side elevation view of the dual pull tab of FIG. 1, with dual pull tab 300 corresponding with dual pull tab 100 and 200. Dual pull tab 300 shows tongue segment 310 and first lateral segment 330. Tongue segment 310 may be any suitable length, including lengths chosen to provide either flexibility or rigidity. Tongue segment 310 may be a certain length in order to fit properly with a connector, such as those described, for example, in U.S. Patent Application Serial No. 61/514261, entitled "Electrical Connector Assembly," and filed August 2, 2011. Lateral segment 330 may also be any suitable shape or dimensions, particularly in order to accommodate suitable shapes or cross-sections of an attached cable.

FIG. 4 is a top plan view of the dual pull tab of FIG. 1, with dual pull tab 400 corresponding with dual pull tab 100, 200, and 300. Dual pull tab 400 shows tongue segment 410, including first pull tab end 414 and hole 418, second pull tab end 440, first L-shaped elbow segment 450, and second L-shaped elbow segment 460.

The top plan view of dual pull tab 400 illustrates that in some embodiments, first pull tab end 414 and second pull tab end 440 are staggered. In other words, they are set apart from each other; in some embodiments no part of first pull tab end 414 and second pull tab end 440 overlap from the perspective of a plan view. Staggering the pull tab ends may have advantages in certain applications, such as facilitating substantial width of one or more of the lateral segments, which may provide a better or more stable fit to an attached cable.

In some embodiments, first L-shaped elbow segment 450 and second L-shaped elbow segment 460 may also have its dimensions selected to accommodate one or more types of cables or cords. More specifically, the width of first L-shaped elbow segment's first portion 452 and second L-shaped elbow segment's first portion 462 may be sufficient to accommodate the width of a particular type of cable or cord.

In some embodiments, hole 418 may be useful to prevent dual pull tab 400 from being completely decoupled from an attached connector. Hole 418 may accommodate or interface with a latch or hook within a connector that, while allowing dual pull tab assembly 400 to be manipulated to unlocked or disconnect a connector from a mount cage, may also resist physically (and possibly irreversibly) separating dual pull tab 400 from a connector.

FIG. 5 and FIG. 6 are, respectively, a top perspective view and a bottom perspective view of a dual pull tab 510, corresponding to the dual pull tab shown in FIG. 1 and with dual pull tab 100, 200, 300, and 400 connected with cable 520 and connector 530. As shown in FIG. 5 and FIG. 6, dual pull tab 510 may be designed to closely conform to the general shape or cross-section of cable 520. In some
5 embodiments, it may be desirable to ensure dual pull tab 510 adds little extra volume to cable 520, particularly in applications where space or accessibility may be at a premium. In other words, dual pull tab 510 may preserve the thin profile of a cable. In other embodiments, cable 520 may be round (i.e., have a circular or elliptical cross-section), but dual pull tab 510 may nonetheless have a rectangular cross-section to facilitate, for example, the efficient arrangement (as a grid) of many dual pull tabs, connectors,
10 and cables on a single mount cage, motherboard, or other surface.

Connector 530 may attach or integrate with dual pull tab 510 and cable 520. Connector 530 may be any suitable shape or size, adapted to fit into one or more specific ports depending on the desired application. Suitable connectors are described in, for example, in U.S. Patent Application Serial No. 61/514261, entitled "Electrical Connector Assembly," and filed August 2, 2011. In some embodiments,
15 connector 530, cable 520, and dual pull tab 510 are not separable, or at least not easily separable.

Cable 520 may be any suitable cable or cord, in any suitable shape. In some embodiments, cable 520 may be a coaxial cable, multicore cable, ribbon cable, shielded cable, or any combination of the preceding, and may be soldered, glued, or otherwise permanently attached to connector 530. Depending on the desired application, cable 520 may be an electrical cable or it may be an optical cable. In other
20 embodiments, cable 520 may be easily disconnectable from connector 530. Multiple cords or cables, possibly of different types, may be attached to a single connector.

Dual pull tab 510 may be connected with connector 530 in such a way that manipulating dual pull tab 510 moves a latch, hook, or other component, either internal or external, of connector 530. Likewise, connector 530 may have suitable hooks, latches, or flanges to keep connector attached to a port or suitable
25 surface so long as dual pull tab 510 is not manipulated. In some embodiments, the attachment or detachment of connector 530 may produce an audible click to confirm connection or disengagement in low light or limited visibility applications. Connector 530 may also contain suitable electronics and contacts to transfer data carried by cable 520 to an external surface of connector 530. By extension, connector 530 may contain suitable electronics to permit the transfer of data by a male connector end of
30 connector 530 to or from a port, motherboard, socket, or other female connector end (i.e., a complimentary connector).

FIG. 7 is a top perspective view of another dual pull tab. Dual pull tab 700 includes tongue segment 710 with connector end 712 and first pull tab end 714, first arm segment 720, second arm segment 730, second pull tab end 740, first elbow segment 750 including first portion 752, second portion
35 754, first joining portion 756, and second joining portion 758, and second elbow segment 760.

Tongue segment 710 with connector end 712 and first pull tab end 714 are shown largely as described for corresponding tongue segment 110, connector end 112, and first pull tab end 114 in conjunction with FIG. 1. As in FIG. 1, tongue segment 710 lies chiefly in a first plane. Another possible shape for a pull tab end is shown in FIG. 7, however, where first pull tab end 714 is of the same width as the rest of tongue segment 710. In these embodiments, first pull tab end 714 may be distinguished from the rest of tongue segment 710 by its textured surface or other haptic features.

First arm segment 720 is disposed below and to a first side of the tongue segment 710 and lies chiefly in a second plane. Similarly, second arm segment 730 is disposed below and to a second side of the tongue segment 710 and also lies chiefly in a second plane. In some embodiments, first and second arm segments may be parallel to one another. As is the case for first and second lateral segments 120 and 130 discussed elsewhere in conjunction with FIG. 1, first and second arm segments may be any suitable shape or size and be formed from any suitable material. In some embodiments, first arm segment 720 and second arm segment 730 may be shaped to accommodate a rectangular, flat, or round cable or to provide a close fitting enclosure for the same. First and second arm segments each have two opposing ends, with the first ends attached to second pull tab end 740.

Second pull tab end extends between and is attached to the first ends of the first and second arm segments. Second pull tab end may be any shape or size, including toroidal or annular is in a loop or a ring, or substantially linear, as in a handle or a bar. In some embodiments, second pull tab end 740 may be the same as first pull tab end 714; in other embodiments they may be different. In some applications it may be desirable to have the first pull tab end 714 and second pull tab end 740 readily distinguishable, visually or through touch, in order to, for example, facilitate proper alignment in low or limited visibility conditions.

First elbow segment 750 extends from the first side of tongue segment 710 (from the perspective in FIG. 7, the right side) and includes first portion 752 in the first plane, second portion 754 in a third plane orthogonal to the first plane, first joining portion 756, and second joining portion 758. In some embodiments, first joining portion 756 or second joining portion 758 includes a 90° angle or a quarter arc. In embodiments where second joining portion 758 is curved, the arc of second joining portion 758 may be curved along with second portion 754, forming a smooth curve. In some embodiments, first elbow segment 750 may also extend from first arm segment 720, that is, more specifically, second joining portion 758 and first arm segment 720 may be attached, joined, or otherwise connected. Any of the shapes, sizes, or configurations of first elbow segment 750 or its constituent portions may be selected to provide any desired characteristic to pull tab 700, including increased strength, durability, flexibility, or cross-sectional area.

Second elbow segment 760, though not shown in detail in FIG. 7, may include any or all of the features or characteristics described first elbow segment 750. In some embodiments first elbow segment

750 and second elbow segment 760 may be mirror images of each other. First and second elbow segments in some embodiments may be L-shaped elbow segments as described in conjunction with FIG. 1.

FIG. 8 is a side elevation view of the dual pull tab of FIG. 7. Dual pull tab 800 includes tongue segment 810, arm segment 830, and elbow segment 850. The shape and size of tongue segment 810, arm segment 830, and elbow segment 850 may be selected to accommodate a certain size, shape, or cross-section of cable, or to provide rigidity or flexibility to the dual pull tab coupled with a cable or connector or to dual pull tab 800 itself.

FIG. 9 is a top plan view of the dual pull tab of FIG. 7. Dual pull tab 900 includes tongue segment 910 with first pull tab end 914 and hole 918, second pull tab end 940, first portion 952 of the first elbow segment, and first portion 962 of the second elbow portion. The view of FIG. 9 illustrates a possible embodiment where first pull tab end 914 and second pull tab end 940 do not overlap. This may not only provide ready access to either one of the first or second pull tab ends, but also may simplify the molding and manufacturing process. First portions 952 and 962 of first and second elbow segments, respectively, may also be any suitable shape or size, and may be particularly designed or selected to accommodate or secure appropriate widths of attached cable.

FIG. 10 and FIG. 11 are, respectively, a top perspective view and a bottom perspective view of a dual pull tab 1010 corresponding to FIG. 7 with a cable 1020 and connector 1030. As in FIG. 5 and FIG. 6, the dual pull tab may be designed to closely conform to the general shape or cross-section of cable. In some embodiments, the width of the dual pull tab is not greater than the width of the connector, ensuring that multiple assemblies as shown in FIG. 10 and FIG. 11 may be efficiently stacked or arranged in close quarters. In other embodiments, the thickness of the dual pull tab is not greater than the thickness of the connector, or a cross-sectional area of the dual pull tab may also not be greater than a cross-sectional area of the connector, for the same reasons.

The following are a list of items of the present disclosure:

Item 1 is a dual pull tab, comprising:

a tongue segment in a first plane comprising a connector end, a first pull tab end, and a middle portion connecting the connector end to the first pull tab end comprising opposing first and second sides, the connector end and the first pull tab end disposed on opposite ends of the tongue segment;

a first lateral segment extending along at least a portion of a length of the tongue segment, the first lateral segment disposed below and on a first side of the tongue segment and in a second plane orthogonal to the first plane;

a second lateral segment extending along at least a portion of the length of the tongue segment, the second lateral segment disposed below and on an opposite second side of the tongue segment and in a third plane orthogonal to the first plane and parallel to the second plane;

a second pull tab end disposed below the tongue segment in a fourth plane and parallel to the first plane;

a first L-shaped elbow segment having a first portion in the first plane extending from the first side of the middle portion of the tongue segment, a second portion in the second plane extending from the first lateral segment, and a joining portion connecting the first portion to the second portion; and

a second L-shaped elbow segment having a first portion in the first plane extending from the second side of the middle portion of the tongue segment, a second portion in the third plane extending from the second lateral segment, and a joining portion connecting the first portion to the second portion.

Item 2 is the dual pull tab of item 1 having a rectangular cross-section.

Item 3 is the dual pull tab of item 1, wherein, from a top plan view, no part of the first pull tab end and the second pull tab end overlap.

Item 4 is the dual pull tab of item 1, wherein the first portion of the second L-shaped elbow segment is parallel to the first portion of the first L-shaped elbow segment.

Item 5 is the dual pull tab of item 1 further comprising a third L-shaped elbow segment, wherein the third L-shaped elbow segment has a first portion in the second plane extending from the first lateral segment, a second portion in the fourth plane extending from the second pull tab end, and a joining portion connecting the first portion to the second portion.

Item 6 is the dual pull tab of item 5, further comprising a fourth L-shaped elbow segment, wherein the fourth L-shaped elbow segment has a first portion in the third plane, a second portion in the fourth plane extending from the second pull tab end, and a joining portion connecting the first portion to the second portion.

Item 7 is the dual pull tab of item 6, wherein the second portion of the third L-shaped segment is parallel to the second portion of the fourth L-shaped elbow segment.

Item 8 is a device, comprising:

a connector and the dual pull tab of item 1;

wherein the tongue segment of the dual pull tab is attached to the connector.

Item 9 is the device of item 8, further comprising a cable attached to the connector, wherein at least part of the cable is surrounded by the dual pull tab.

Item 10 is the device of item 8, wherein a width of the dual pull tab is not greater than a width of the connector.

Item 11 is the device of item 8, wherein a cross-sectional area of the dual pull tab is not greater than a cross-sectional area of the connector.

Item 12 is the device of item 8, wherein a thickness of the dual pull tab is not greater than a width of the connector.

Item 13 is a dual pull tab, comprising:

a tongue segment in a first plane comprising a connector end, a first pull tab end,

and a middle portion connecting the connector end to the first pull tab end comprising opposing first and second sides, the connector end and the first pull tab end disposed on opposite ends of the tongue segment;

5 a first arm segment extending along at least a portion of a length of the tongue segment, the first arm segment disposed below and on a first side of the tongue segment and in a second plane parallel to the first plane, the first arm segment having a first end and an opposing second end;

a second arm segment extending along at least a portion of the length of the tongue segment, the second arm segment disposed below and on an opposing second side of the tongue segment and in the second plane, the second arm segment having a first end and an opposing second end;

10 a second pull tab end, extending between and attached to the first ends of the first and second arm segments, disposed below the tongue segment in the second plane;

a first elbow segment having a first portion in the first plane extending from the first side of the middle portion of the tongue segment, a second portion in a third plane orthogonal to the first plane, a first joining portion connecting the first portion to the second portion, and a second joining portion connecting the second portion to the second end of the first arm segment;

15 a second elbow segment having a first portion in the first plane extending from the second side of the middle portion of the tongue segment, a second portion in a fourth plane orthogonal to the first plane, a first joining portion connecting the first portion to the second portion, and a second joining portion connecting the second portion to the second end of the second arm segment.

20 Item 14 is the dual pull tab of item 13, wherein, from a top plan view, no part of the first pull tab end and the second pull tab end overlap.

Item 15 is the dual pull tab of item 13, wherein the first portion of the second L-shaped elbow segment is parallel to the first portion of the first L-shaped elbow segment.

Item 16 is a device, comprising:

25 a connector and the dual pull tab of item 13;
wherein the tongue segment of the dual pull tab is attached to the connector.

Item 17 is the device of item 16, further comprising a cable attached to the connector, wherein at least part of the cable is surrounded by the dual pull tab.

30 Item 18 is the device of item 16, wherein a width of the dual pull tab is not greater than a width of the connector.

Item 19 is the device of item 16, wherein a cross-sectional area of the dual pull tab is not greater than a cross-sectional area of the connector.

Item 20 is the device of item 16, wherein a thickness of the dual pull tab is not greater than a width of the connector.

35 All U.S. patent applications cited in the present application are incorporated herein by reference as if fully set forth. Advantages and features described for the embodiments illustrated in the figures

should be considered fully interchangeable or modifiable and any or all of them may be appropriate to include in embodiments of the present disclosure. The present invention should not be considered limited to the particular examples and embodiments described above, as such embodiments are described in detail in order to facilitate explanation of various aspects of the invention. Rather, the present invention should

5 be understood to cover all aspects of the invention, including various modifications, equivalent processes, and alternative devices falling within the scope of the invention as defined by the appended claims and their equivalents.

What is claimed is:

1. A dual pull tab, comprising:

5 a tongue segment in a first plane comprising a connector end, a first pull tab end, and a middle portion connecting the connector end to the first pull tab end comprising opposing first and second sides, the connector end and the first pull tab end disposed on opposite ends of the tongue segment;

10 a first lateral segment extending along at least a portion of a length of the tongue segment, the first lateral segment disposed below and on a first side of the tongue segment and in a second plane orthogonal to the first plane;

a second lateral segment extending along at least a portion of the length of the tongue segment, the second lateral segment disposed below and on an opposite second side of the tongue segment and in a third plane orthogonal to the first plane and parallel to the second plane;

15 a second pull tab end disposed below the tongue segment in a fourth plane and parallel to the first plane;

a first L-shaped elbow segment having a first portion in the first plane extending from the first side of the middle portion of the tongue segment, a second portion in the second plane extending from the first lateral segment, and a joining portion connecting the first portion to the second portion; and

20 a second L-shaped elbow segment having a first portion in the first plane extending from the second side of the middle portion of the tongue segment, a second portion in the third plane extending from the second lateral segment, and a joining portion connecting the first portion to the second portion.

25 2. The dual pull tab of claim 1, wherein, from a top plan view, no part of the first pull tab end and the second pull tab end overlap.

3. The dual pull tab of claim 1, wherein the first portion of the second L-shaped elbow segment is parallel to the first portion of the first L-shaped elbow segment.

30 4. The dual pull tab of claim 1 further comprising a third L-shaped elbow segment, wherein the third L-shaped elbow segment has a first portion in the second plane extending from the first lateral segment, a second portion in the fourth plane extending from the second pull tab end, and a joining portion connecting the first portion to the second portion.

5. The dual pull tab of claim 4, further comprising a fourth L-shaped elbow

segment, wherein the fourth L-shaped elbow segment has a first portion in the third plane, a second portion in the fourth plane extending from the second pull tab end, and a joining portion connecting the first portion to the second portion.

5 6. A device, comprising:

 a connector and the dual pull tab of claim 1;

 wherein the tongue segment of the dual pull tab is attached to the connector.

 7. A dual pull tab, comprising:

10 a tongue segment in a first plane comprising a connector end, a first pull tab end, and a middle portion connecting the connector end to the first pull tab end comprising opposing first and second sides, the connector end and the first pull tab end disposed on opposite ends of the tongue segment;

 a first arm segment extending along at least a portion of a length of the tongue segment, the first arm segment disposed below and on a first side of the tongue segment and in a second plane parallel to the first plane, the first arm segment having a first end and an opposing second end;

 a second arm segment extending along at least a portion of the length of the tongue segment, the second arm segment disposed below and on an opposing second side of the tongue segment and in the second plane, the second arm segment having a first end and an opposing second end;

20 a second pull tab end, extending between and attached to the first ends of the first and second arm segments, disposed below the tongue segment in the second plane;

 a first elbow segment having a first portion in the first plane extending from the first side of the middle portion of the tongue segment, a second portion in a third plane orthogonal to the first plane, a first joining portion connecting the first portion to the second portion, and a second joining portion connecting the second portion to the second end of the first arm segment;

25 a second elbow segment having a first portion in the first plane extending from the second side of the middle portion of the tongue segment, a second portion in a fourth plane orthogonal to the first plane, a first joining portion connecting the first portion to the second portion, and a second joining portion connecting the second portion to the second end of the second arm segment.

30 8. The dual pull tab of claim 7, wherein, from a top plan view, no part of the first pull tab end and the second pull tab end overlap.

 9. The dual pull tab of claim 7, wherein the first portion of the second L-shaped elbow segment is parallel to the first portion of the first L-shaped elbow segment.

10. A device, comprising:
a connector and the dual pull tab of claim 7;
wherein the tongue segment of the dual pull tab is attached to the connector.

1/5

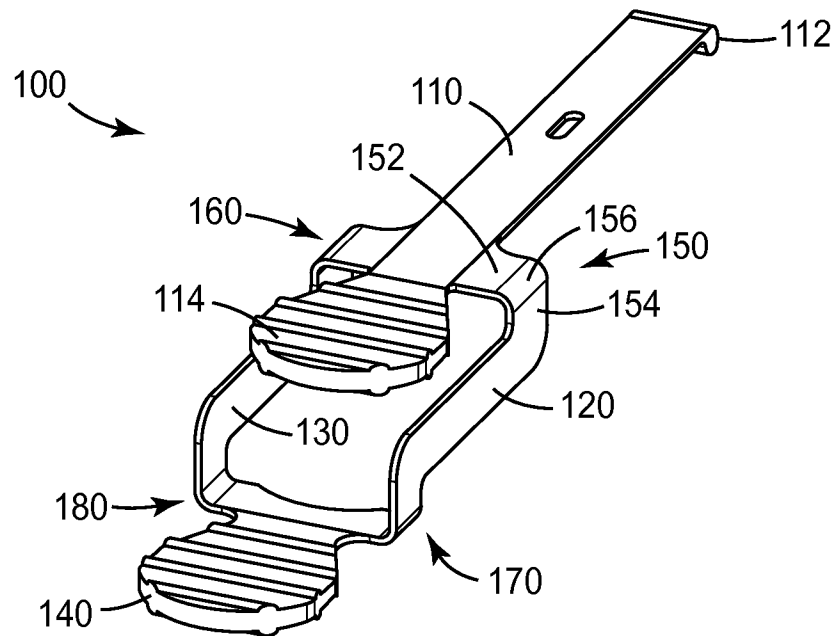


FIG. 1

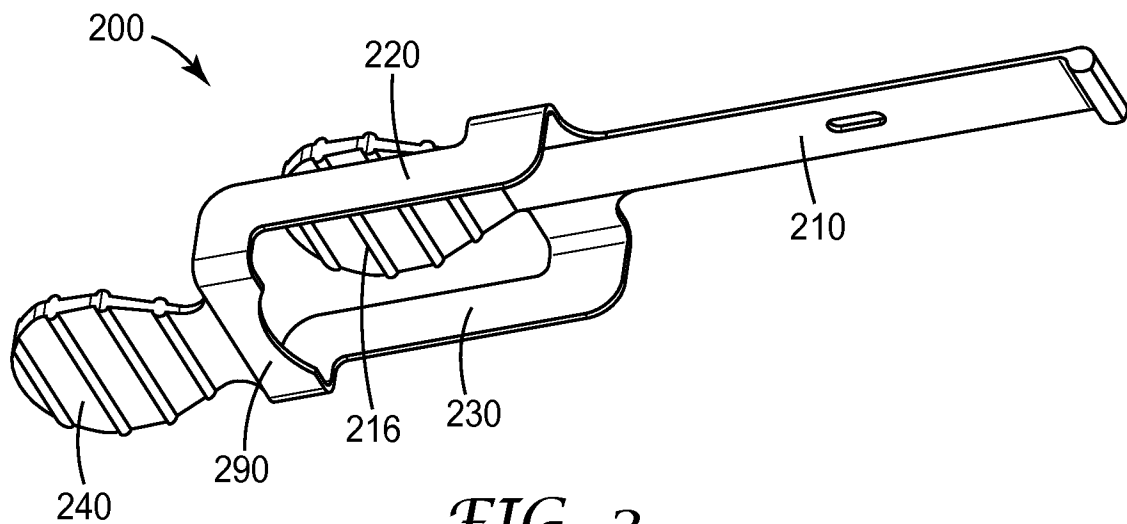


FIG. 2

2/5

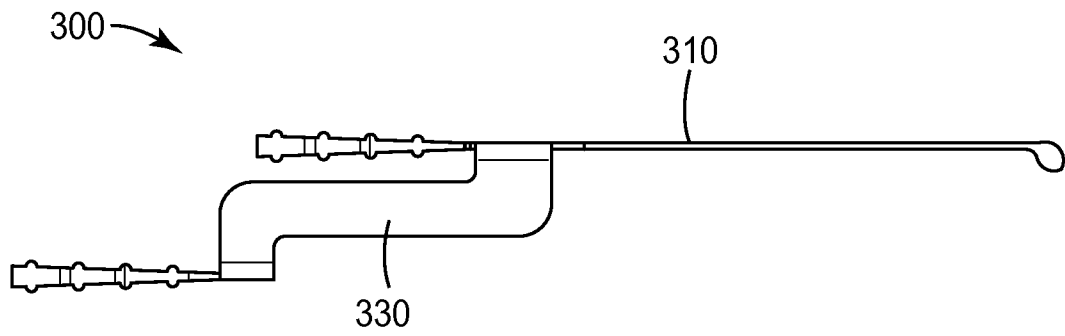


FIG. 3

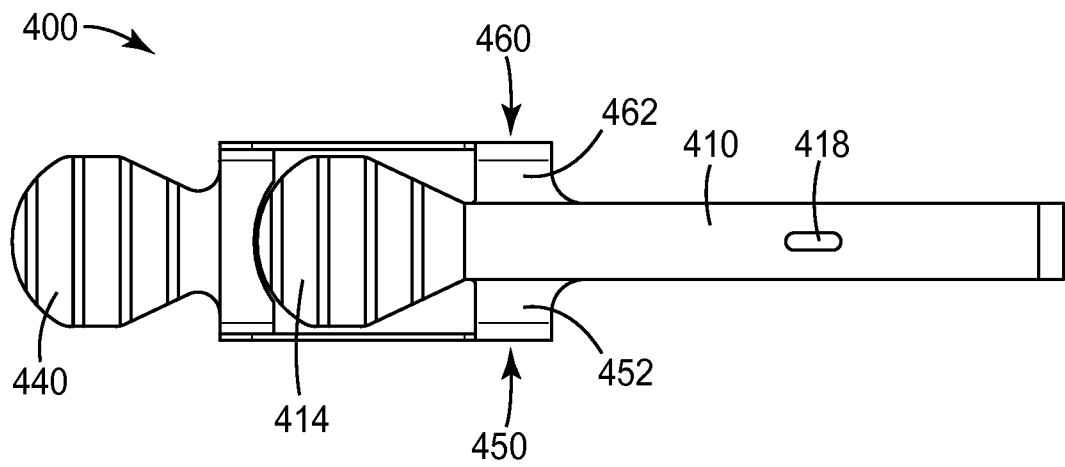


FIG. 4

3/5

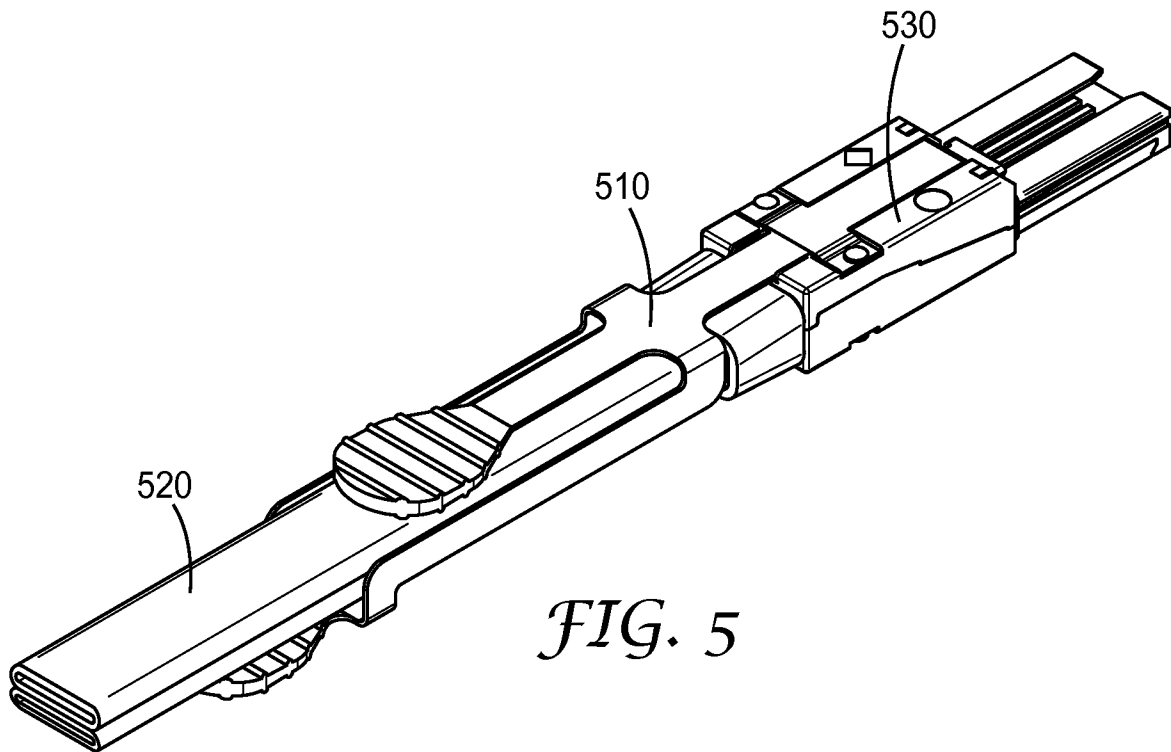


FIG. 5

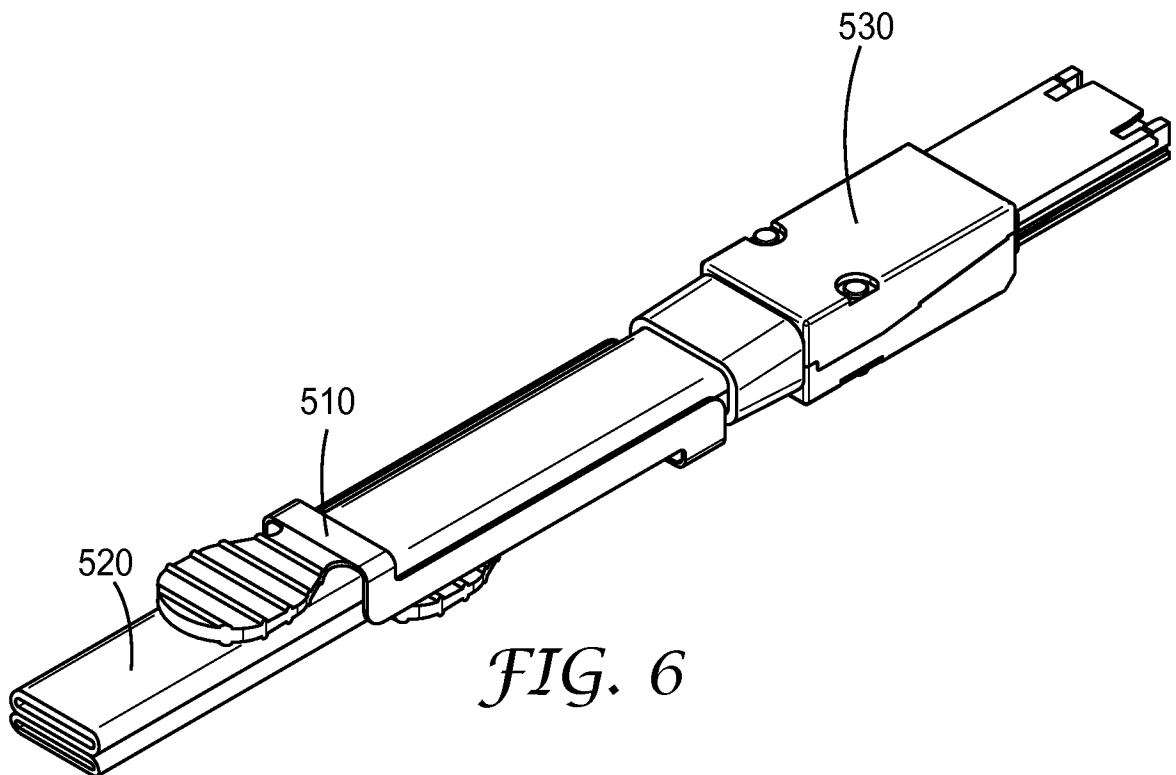
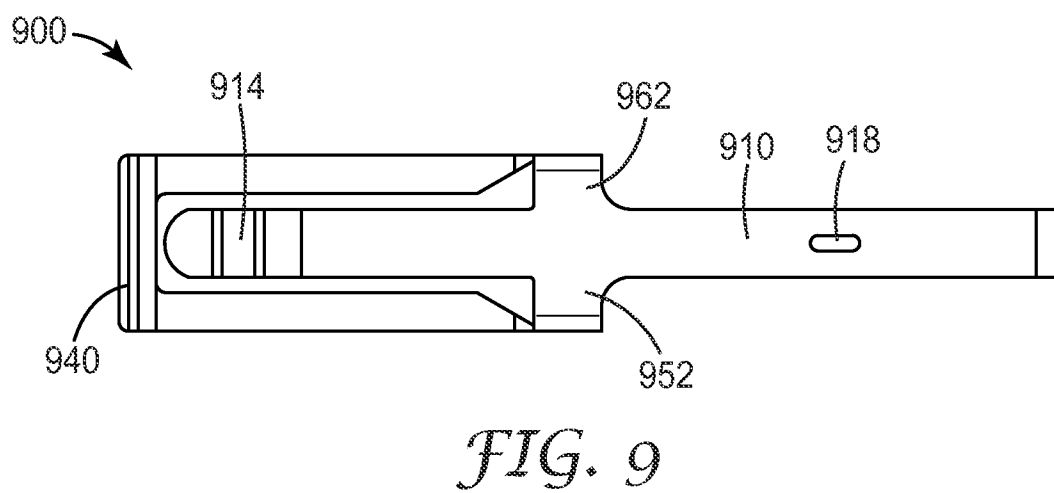
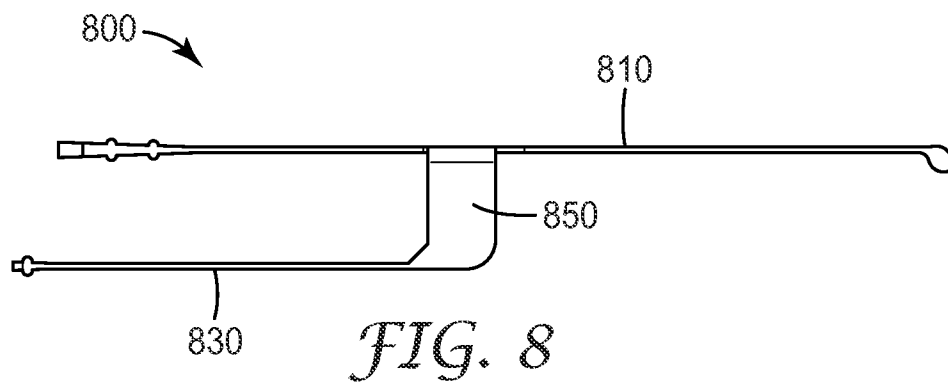
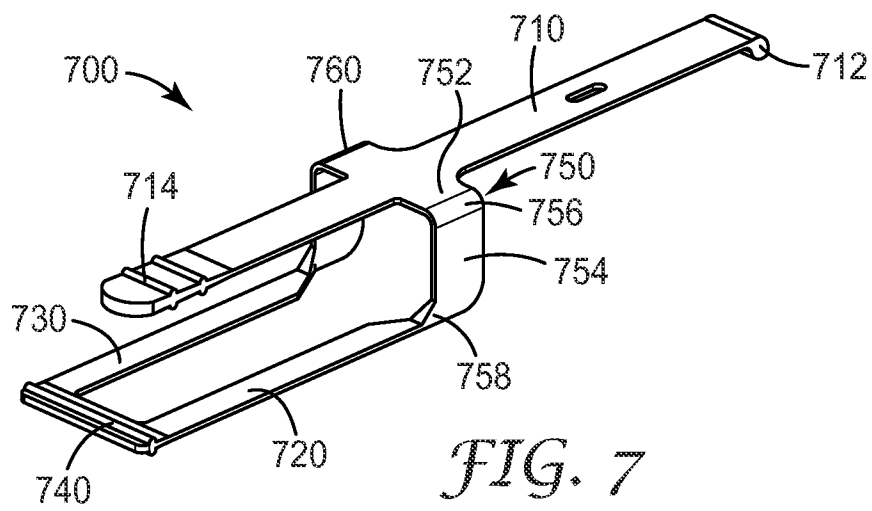
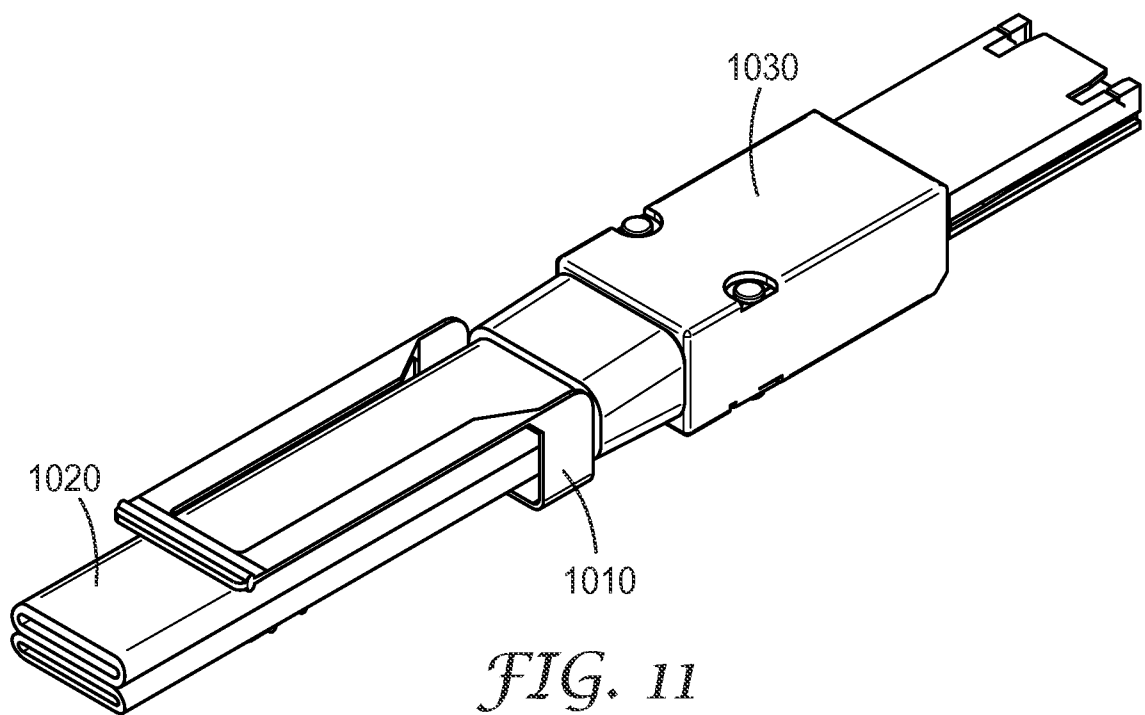
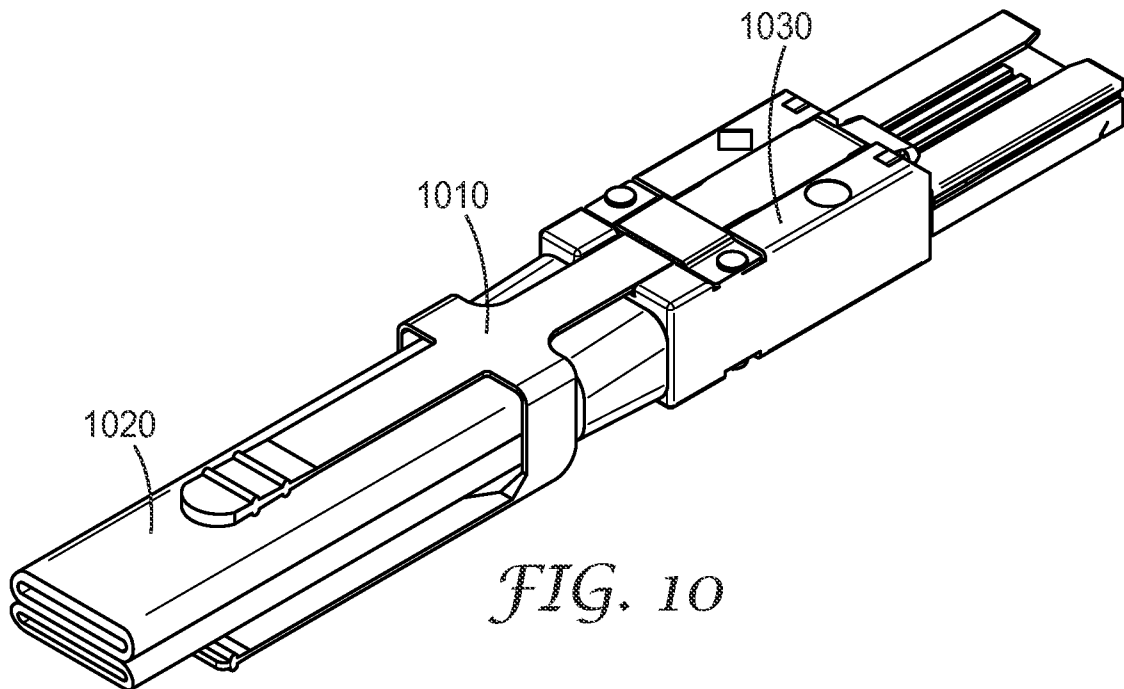


FIG. 6

4/5



5/5



INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/059578

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01R13/627 H01R13/633
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)
H01R

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2012/015871 A2 (FRAMATOME CONNECTORS INT [FR]; FCI AMERICAS TECHNOLOGY LLC [US]; ZEREB) 2 February 2012 (2012-02-02)	1,3-6
A	paragraph [0066] - paragraph [0079] figures 13a-13e -----	7,9,10

☐

Further documents are listed in the continuation of Box C.

☒

See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

14 November 2013

Date of mailing of the international search report

22/11/2013

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/059578

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012015871 A2	02-02-2012	CN 202423713 U	05-09-2012
		TW 201244287 A	01-11-2012
		US 2012058665 A1	08-03-2012
		WO 2012015871 A2	02-02-2012
