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(54) A releasing mechanism for disengagement of patch cord and individual port member

(57) The present invention relates to a releasing mechanism for disengagement of a patch cord (40) and an individual port member (100) from a modular panel assembly. One aspect of the releasing mechanism comprises an individual port member (100) having a plurality of connectors (20), assembled to the front end of a panel assembly by means of its locking member (34) for holding at least one connector (20) which receives the patch cord (40), through a connector housing (30). A release lever member (50) is formed of a main body portion and a plurality of attachment portions (54) that are connected to the main body portion at its both ends. The release lever member (50) is attached to the connector housing (30) through its attachment portions (54) in such a way that the release lever member (50) is moved from a first end position to an opposite second end position with respect to the connector housing (30). When the release lever member (50) is moved at the first end position, the release lever member (50) is further moved to disengage the patch cord (40) from the connector (20), whereas when the release lever member (50) is moved at the opposite second end position, the release lever member (50) forms a gripping space in tandem with the locking member (34) to pull and disengage the individual port member (100) from the panel assembly. Such releasing mechanism improves the accessibility and reduces the user effort/force requirement for removal of patch cord (40), and also facilitates ergonomically good hold and better gripping to the user for removal of individual port member (100).

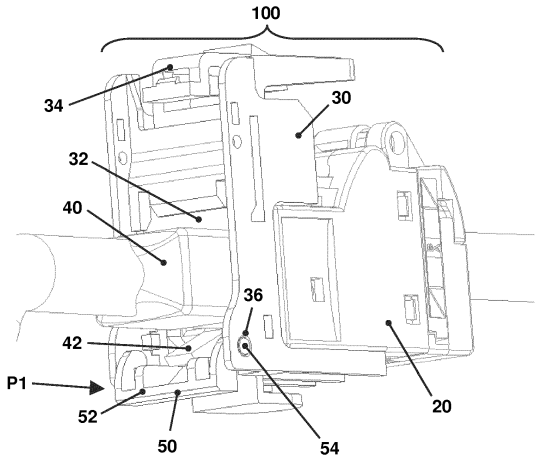

FIG. 2

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Description

FIELD OF THE INVENTION

[0001] The present invention generally relates to the field of removal/detachment of a patch chord and an individual port member from a modular panel assembly. More particularly, the present invention relates to a releasing mechanism for disengagement of the patch chord and the individual port member from the modular panel assembly. In addition, the present invention also prevents the unauthorized connection and disconnection of the patch chord from the modular panel assembly. The authority to use connector port and RJ 45 from the connector is attributed by a mechanical tool.

BACKGROUND OF THE INVENTION

[0002] In a modular panel assembly, many types of patch chords, in particular RJ-45 patch chords or plugs, are designed to be plugged into connectors and each arranged with a resilient extended locking clip for locking and removal of the patch chords into and from the connectors assembled in the modular panels (Data panels). Further, multiple individual port members are assembled from the front end of the modular panel and formed with a snap lever which locks the individual port to the modular panel. Each individual port member is composed and referred for assembly of a connector and a connector housing. Each connector housing is designed to hold the connector (female), which receives the RJ45 patch chord (male), in the modular panel.

[0003] While inserting the patch chord into the connector, the locking clip of the patch chord is snapped into a locking slot of the connector, which makes engagement of electrical contacts from the patch chord and the connector to establish an electrical connection between a cable terminating at the patch chord and a cable terminating at the connector. The patch chord can be released from the locked position by manually compressing the locking clip, where this manual release requires access to the patch chord to compress the locking clip. In particular, the patch chord can be removed from the connector by applying a force, i.e. when the locking clip is pressed with a user force, the patch chord delatches itself from the connector and slides outside the connector. Similarly, individual port member can be removed from the panel by unsnapping and holding the Individual port member at any of the surface below the connector seating surface.

[0004] In this modular panel, multiple numbers of patch chords are spaced very closely together, and arranged and positioned in crowded manner either side-by-side or modular panels stacked one above the other. This crowded installation of the patch chords at the panel can provide little gap or space to access the locking clip of each patch chord. After the assembly of individual port member in the panel, the gap available for the user to access is very less considering that there are panels assembled above and below the individual port member. In particular, the gap available is less due to the presence of label holder or identification plate/panel and the position of the connector in the individual port member. In addition, the panel mounted under the port also adds to the hindrance, and thus, the gap available is less and it acts as a hindrance for the user to remove both the patch chord and the individual port member from the panel. Therefore, it is highly difficult for the user to access the patch chord locking clip for manual removal of the patch chords as well as for the user to unsnap the snap lever for removal of the individual port member from the panel.

[0005] In one of the conventional approach, the user uses a tool such as a flat blade screw driver, to access and compress the patch chord locking clip for removal of the patch chords as well as to press and unsnap the snap lever for removal of the individual port member from the panel. However, this approach of using additional tool is not very effective and also damages the locking clip of the patch chord and the snap lever of the individual port member. Further, the user has to carry the additional tool for removal of the patch chord and the individual port member from the panel.

[0006] With respect to these conventional approaches and designs, the problem of having less gap for the removal of the patch chord from the port and the issue of accessibility to the patch chord is very common across this product line in the network connectivity domain. Thus, the user has high difficulty in accessing the chord locking clip to compress it or in seeing the locking clip in the clutter around an installation of panels. As a result, the removal of these patch chords becomes tedious and burden to the user since the conventional locking clip of the patch chord has to be depressed in the crowded location to pull the patch chord from the corresponding connector. Moreover, the locking clip of the patch chord is normally too deep inside the slot of the connector, which may accidentally damage the finger nail of the user while detaching the patch chord. Alternative, the user has to carry an additional tool for removal of the patch chord, which is cumbersome. Hence, it is necessary to provide an easy and reliable solution to overcome the above-mentioned disadvantages.

[0007] The current scenario with the networking industry is that the connector port is open and can accept modular jack by any unauthorized user. In a generic case, the connector port can be misused or have an accidental patch of a different communication jack. Thus, it is required to prevent the unauthorized person to remove/disconnect the patch chord to the connector port. In lieu of the above mention issues, a special tool accommodated with an additional part may be integrated to assist in the locking/unlocking of the patch chord and the individual port member.

[0008] Therefore, it is desirable to provide a simple and reliable releasing mechanism for disengagement of the patch chord and the individual port member from the

modular panel assembly, which is capable of overcoming the aforementioned drawbacks. This mechanism improves the access for removal of patch chord and facilitates better gripping for removal of individual port member. Further, it eases and reduces the effort of the installer to remove the patch chord from the connector and also provides a good ergonomics to remove the individual port member from the modular panel assembly. In addition, this releasing mechanism should be capable of preventing the accidental or unauthorized access and disengagement of the patch chord and the individual port member, and also avoiding unauthorized insertion of the patch chord for security reasons.

SUMMARY OF THE INVENTION

[0009] An object of the present invention is to provide a releasing mechanism for disengagement of a patch chord and an individual port member from a modular panel assembly, which improves the accessibility for removal of patch chord and facilitates better gripping for removal of individual port member.

[0010] Another object of the present invention is to provide a releasing mechanism for disengagement of a patch chord and an individual port member from a modular panel assembly, which prevents accidental or unauthorized access and disengagement of the patch chord and the individual port member, and also avoids unauthorized insertion of the patch chord for security reasons.

[0011] A further object of the present invention is to provide a releasing mechanism for disengagement of a patch chord and an individual port member from a modular panel assembly, which reduces the effort/force requirement for the user to remove of the patch chord from the connector port.

[0012] A further object of the present invention is to provide a releasing mechanism for disengagement of a patch chord and an individual port member from a modular panel assembly, which provides ergonomically good hold for the user to pull and remove the individual port member from the modular panel assembly.

[0013] A further object of the present invention is to provide a releasing mechanism for disengagement of a patch chord and an individual port member from a modular panel assembly, which is simple in construction, and easily adaptable, disassembled and reassembled without or with the simplest tools.

[0014] According to one aspect, the present invention, which achieves this objective, relates to a releasing mechanism for disengagement of a patch chord and an individual port member from a modular panel assembly, comprising an individual port member having a plurality of connectors, assembled to the front end of a panel assembly by means of its locking member for holding at least one connector which receives the patch chord through a connector housing. A release lever member is formed of a main body portion and a plurality of attachment portions that are connected to the main body portion at its both ends. The lever member is attached to the connector housing through its attachment portions in such a way that the lever member is moved from a first end position to an opposite second end position with respect to the connector housing. When the lever member is moved at the first end position, the release lever member is further moved to disengage the patch chord from the connector, whereas when the lever member is moved at the opposite second end position, the release lever member forms a gripping space in tandem with the locking member to pull and disengage the individual port member from the panel assembly. Such releasing mechanism improves the accessibility and reduces the user effort/force requirement for removal of patch chord, and also facilitates ergonomically good hold and better gripping to the user for removal of individual port member. Further, it is simple in construction, and easily adaptable, disassembled and reassembled without or with the simplest tools.

[0015] Furthermore, the main body portion of the release lever member is formed of a touch region and an arm region extended from the touch region. The attachment portions of the release lever member are located outside of the touch region at its both sides, where the attachment portions include a hinge pin. The release lever member is positioned adjacent to a port region of the connector housing in such a way that a leading edge of the arm region is located under a locking lever of the patch chord when the patch chord is connected to the connector through the individual port member.

[0016] In the first end position, the release lever member is moved in downward direction with respect to the connector housing by pressing the touch region of the release lever member away from the patch chord, such that the leading edge of the arm region of the release lever member depresses the locking lever of the patch chord to disengage the patch chord from the connector. In the opposite second end position, the release lever member is moved in upward direction with respect to the connector housing to bring the arm region in tandem with the locking member in the connector housing, such that the arm region of the release lever member acts as the gripping space to pull and disengage the individual port member from the panel assembly.

[0017] The releasing mechanism further comprises a pin assembly having at least two pins that are loaded and engaged with a spring member at its one end. The pin assembly is assembled within the main body portion of the release lever member in such a way that while assembling the release lever member into the individual port member, the pins of the pin assembly are compressed and locked with the connector housing in relation to the first and second end positions of the release lever member to restrict the movement of release lever member from the first end position to the second end position and vice versa. The spring member is compressed to disengage the pins from the connector housing for the movement of release lever member from the first end

position to the second end position and vice versa.

[0018] According to another aspect, the present invention, which achieves this objective, relates to a releasing mechanism for disengagement of a patch chord and an individual port member from a modular panel assembly, comprising an individual port member having a plurality of connectors, assembled to the front end of a panel assembly by means of its locking member for holding at least one connector which receives the patch chord through a connector housing. A release lever member is formed of a main body portion and a plurality of attachment portions that are connected to the main body portion at its both ends. The lever member is attached to the connector housing through its attachment portions in such a way that the lever member is moved from a first end position to an opposite second end position with respect to the connector housing. A port lock member is attached to the individual port member or the release lever member to restrict the movement of release lever member from its first end position. When the lever member is at the first end position, the port lock member is detached from the individual port member or the release lever member to disengage the patch chord from the connector by further moving the release lever member, whereas when the lever member is moved at the opposite second end position, the release lever member forms a gripping space in tandem with the locking member to pull and disengage the individual port member from the panel assembly. Another object of the present invention is to provide a releasing mechanism for disengagement of a patch chord and an individual port member from a modular panel assembly, which prevents accidental or unauthorized access and disengagement of the patch chord and the individual port member, and also avoids unauthorized insertion of the patch chord for security reasons. This releasing mechanism, apart from eases the release of patch chord and port member, additionally prevents accidental or unauthorized access and disengagement of the patch chord and the individual port member, and also avoids unauthorized insertion of the patch chord for security reasons.

[0019] The release lever member is positioned adjacent to a port region of the connector housing to depress a locking lever of the patch chord when the patch chord is connected to the connector through the connector housing. In the first end position, the release lever member is moved in downward direction with respect to the connector housing by pressing the release lever member away from the patch chord, such that at least part of the release lever member depresses the locking lever of the patch chord to disengage the patch chord from the connector. In the opposite second end position, the release lever member is moved in upward direction with respect to the connector housing to bring at least part of the release lever member in tandem with the locking member in the connector housing, such that the release lever member acts as the gripping space to pull and disengage the individual port member from the panel assembly.

[0020] In accordance with one design concept of the port lock member associated with the second aspect or embodiment of the releasing mechanism of the present invention, the main body portion of the release lever member is formed of a locking arm with a protuberant region at its free end, an arm region extended from the locking arm, and a plurality of guiding members located behind the attachment portions. The port lock member is formed of a U-shaped body region and at least two extensible regions that are extended from the body region at both edges of its center and inclined towards each other. The body region of the port lock member is formed with a slot at its center and a plurality of guiding slits at its free end. At least one of the extensible regions of the port lock member is formed with a locking slot. The port lock member is attached to the release lever member in such a way that in such a way that the guiding members of the release lever member are guided into the respective guiding slits of the port lock member and the protuberant region of the locking arm is locked into the locking slot of the port lock member in order to restrict the movement of release lever member from its first end position. The protuberant region of the locking arm of the release lever member is disengaged from the locking slot of the port lock member by operating a tool through the slot in the body region, so that the port lock member is detached from the release lever member for the movement of release lever member from the first end position to the second end position and vice versa.

[0021] In accordance with another design concept of the port lock member associated with the second aspect or embodiment of the releasing mechanism of the present invention, the port lock member is composed of a U-shaped body region terminated with deflecting pins, and a base flange extended from the U-shaped body region at one of its center edges. The port lock member is deflected and locked to the individual port member through its depleting pins in such a way that the locking lever of the patch chord is locked between at least part of the release lever member and the base flange of the port lock member to restrict the movement of release lever member from its first end position. The depleting pins of the port lock member is deflected and unlocked from the individual port member to detach the port lock member from the release lever member for the movement of release lever member from the first end position to the second end position and vice versa. The port lock member is assembled to the individual port member through its depleting pins in the reverse orientation to block the port region of the individual port member.

[0022] In accordance with yet another design concept of the port lock member associated with the second aspect or embodiment of the releasing mechanism of the present invention, the main body portion of the release lever member is formed of a touch region and an arm region extended from the locking arm, where the arm region is formed with a guiding arm to define a guiding space in the touch region. The port lock member is com-

posed of a body region terminated with deflecting flanges, an extensible flange extended from the upper edge of the body region, and a locking flange extended from the lower edge of the body region, where wherein the body region of the port lock member is formed with a slot at its center. Once a dummy patch chord is plugged into the connector, the port lock member is held inside the mechanical tool and attached to the release lever member in such a way that the locking flange of the port lock member is guided into the guiding space defined by the guiding arm of the release lever member and the deflecting flanges of the port lock member are locked into the connector housing in order to restrict the movement of release lever member and also to keep the port lock member in position. At this condition, the port lock with the dummy patch chord and the connector port remains inaccessible to unauthorized person for connecting the patch chord.

[0023] To access and use the connector ports, the deflecting flanges of the port lock member are deflected by the two flanges of the tool, and unlocked and pulled from the connector housing by operating a tool through the slot in the body region of the port lock member, so that the port lock member is detached from the release lever member for the movement of release lever member and to remove the dummy patch chord from the connector port. The given condition provides access to the authorized users to assemble the patch chord into the connector port. Unauthorized removal of the patch chord is prevented by assembly of the port lock member into the release lever member as described above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The invention will be discussed in greater detail with reference to the accompanying figures.

FIG. 1 shows an exploded view depicting a releasing mechanism with a release lever member, in accordance with an exemplary first embodiment of the present invention;

FIG. 2 illustrates an assembled view depicting the release lever member fitted into a connector housing with a patch chord inserted into it, in accordance with an exemplary first embodiment of the present invention;

FIG. 3 illustrates an isometric top view of the release lever member, in accordance with an exemplary first embodiment of the present invention;

FIG. 4 illustrates an isometric bottom view of the release lever member, in accordance with an exemplary first embodiment of the present invention;

FIG. 5 illustrates a cross-sectional view depicting the patch chord and the release lever member positioned at the first end position, in accordance with an exemplary first embodiment of the present invention;

FIG. 6 illustrates a cross-sectional view depicting the patch chord and further movement of the release lever member when it is at the first end position, in accordance with an exemplary first embodiment of the present invention;

FIG. 7 illustrates a schematic view depicting the release lever member positioned at the opposite second end position, in accordance with an exemplary first embodiment of the present invention;

FIG. 8 illustrates an exploded view of a release lever member assembled with a spring-loaded pin assembly, in accordance with an exemplary second embodiment of the present invention;

FIG. 9 illustrates an assembled view depicting the release lever member and the pin assembly locked at the first end position in an individual port member, in accordance with an exemplary second embodiment of the present invention;

FIG. 10 illustrates an assembled view depicting the release lever member and the pin assembly locked at the first end position, with the patch chord, in accordance with an exemplary second embodiment of the present invention;

FIG. 11 illustrates a schematic view depicting a spring member of the pin assembly compressed using a tool to release the release lever member from the first end position, in accordance with an exemplary second embodiment of the present invention;

FIG. 12 illustrates a schematic view depicting upward movement of the release lever member from the first end position once the spring member is compressed using the tool, in accordance with an exemplary second embodiment of the present invention;

FIG. 13 illustrates a schematic view depicting the release lever member and the pin assembly locked at the second end position, in accordance with an exemplary second embodiment of the present invention;

FIG. 14 illustrates a schematic view depicting the spring member of the pin assembly compressed using the tool to release the release lever member from the second end position, in accordance with an exemplary second embodiment of the present invention;

FIG. 15 illustrates an exploded view depicting a re-

leasing mechanism with a release lever member and a port lock member, in accordance with an exemplary third embodiment of the present invention;

FIG. 16 illustrates an assembled view depicting the release lever member fitted into a connector housing with a patch chord before assembling the port lock member, in accordance with an exemplary third embodiment of the present invention;

FIG. 17 illustrates an isometric top view of the release lever member, in accordance with an exemplary third embodiment of the present invention;

FIG. 18 illustrates an isometric outside view of the port lock member, in accordance with an exemplary third embodiment of the present invention;

FIG. 19 illustrates an isometric inside view of the port lock member, in accordance with an exemplary third embodiment of the present invention;

FIG. 20 illustrates an isometric view depicting the port lock member assembled with the release lever member, in accordance with an exemplary third embodiment of the present invention;

FIG. 21 illustrates a detailed view depicting release of the port lock member assembled with the release lever member using a tool, in accordance with an exemplary third embodiment of the present invention;

FIG. 22 illustrates an isometric view of a port lock member, in accordance with an exemplary fourth embodiment of the present invention;

FIG. 23 illustrates an isometric view depicting the port lock member locking a patch chord and a release lever member at its first end position, in accordance with an exemplary fourth embodiment of the present invention;

FIG. 24 illustrates a detailed view depicting the release lever member locked at its first end position using the port lock member, in accordance with an exemplary fourth embodiment of the present invention;

FIG. 25 illustrates a detailed view depicting the port lock member positioned in the reverse orientation, in accordance with an exemplary fourth embodiment of the present invention;

FIG. 26 illustrates an assembled view depicting a release lever member fitted into a connector housing with a dummy patch chord before assembling a port lock member, in accordance with an exemplary fourth embodiment of the present invention;

FIG. 27 illustrates an isometric top view of the release lever member, in accordance with an exemplary fourth embodiment of the present invention;

FIG. 28 illustrates an isometric outside view of the port lock member, in accordance with an exemplary fourth embodiment of the present invention;

FIG. 29 illustrates an isometric inside view of the port lock member, in accordance with an exemplary fourth embodiment of the present invention;

FIG. 30 illustrates a detailed view depicting assembling of the port lock member into the release lever member and the individual port member using a tool, in accordance with an exemplary fourth embodiment of the present invention; and

FIG. 31 illustrates a detailed view depicting release of the port lock member assembled with the release lever member using the tool, in accordance with an exemplary fourth embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0025] The present invention generally describes about a modular panel assembly which are organized and arranged with multiple connectors (20), connector housings (30) and patch chords (40), where the modular panel assembly can be a data panel assembly. Multiple individual port members (100) are assembled to the modular panel assembly in a stacked manner to securely hold multiple connectors (20) in the modular panel assembly so that multiple connectors (female) (20) respectively receives multiple patch chords (male) (40) through the connector housings (30).

[0026] FIG. 1 shows an exploded view depicting a releasing mechanism with a release lever member (50), in accordance with an exemplary first embodiment of the present invention. The present invention describes about a releasing mechanism for disengagement of the patch chord (40) and the individual port member (100) from the modular panel assembly. The releasing mechanism is composed of the connector housing (30) and the release lever member (50). The individual port member (100) composed of the connector (20) and the connector housing (30) is assembled to the front end of the panel assembly by means of its locking member (34) for holding the connector (20) which receives the patch chord (40), through the connector housing (30). The locking member (34) of the connector housing (30) is formed as a snap lever which snaps and locks the individual port member (100) onto the panel assembly.

[0027] FIG. 2 illustrates an assembled view depicting the release lever member (50) fitted into the connector

housing (30) with the patch chord (40) inserted into it, in accordance with an exemplary first embodiment of the present invention. After assembling the individual port member (100) and the connector (20) in the panel assembly, the patch chord (40) can be plugged into the connector (20) to make engagement of electrical contacts from the patch chord (40) and the connector (20) to establish an electrical connection between a cable (10) terminating at the patch chord (40) and a cable (10) terminating at the connector (20). The patch chord (40) includes, but is not limited to RJ-45 patch chords or plugs. The patch chord (40) is arranged with a resilient locking lever (42) for locking and removal of the patch chord (40) into and from the connector (20) assembled in the connector part. In particular, while inserting the patch chord (40) into the connector (20) through a port region (32) of the connector housing (30), the locking lever (42) of the patch chord (40) is snapped into a locking slot (22) of the connector (20).

[0028] FIG. 3 illustrates an isometric top view of the release lever member (50), in accordance with an exemplary first embodiment of the present invention. The release lever member (50) is formed of a main body portion (52) and a set of attachment portions (54) that are connected to the main body portion (52) at its both ends. The lever member (50) is assembled and attached to the connector housing (30) through its attachment portions (especially hinge portions) (54) so that the lever member (50) is swivelable or pivotable with respect to the connector housing (30), about a longitudinal axis of the hinge portions (54). In particular, the attachment portions (54) of the lever member (50) are hinged with an aperture (36) which is formed in the connector housing (30) at its both front bottom sides, where the profile of the apertures (36) of the connector housing (30) can be formed to be matched with the profile of the attachment portions (54) for receiving the lever member (50).

[0029] The main body portion (52) of the release lever member (50) is formed of a touch region (56) and an arm region (58) extended from the touch region (56), as shown in FIG. 4, which illustrates an isometric bottom view of the release lever member (50), in accordance with an exemplary first embodiment of the present invention. The attachment portions (54) of the release lever member (50) are located outside of the touch region (56) at its both side flanges (562), where the attachment portions (54) are designed as cylindrical hinge pins. The main flange (581) of the arm region (58) of the lever member (50) is extended and raised from at least partial portion of one of main flanges (561) of the touch region (56) in such a way that side flanges (582) of the arm region (58) is extended in the main flanges (561) of the touch region (56), which partitions and defines a touch area (563) in the touch region (56) of the lever member (50).

[0030] FIG. 5 illustrates a cross-sectional view depicting the patch chord (40) and the release lever member (50) positioned at the first end position (P1), in accordance with an exemplary first embodiment of the present invention. The release lever member (50) is positioned adjacent to the port region (32) of the connector housing (30) in such a way that a leading edge of the arm region (58) is located under the locking lever (42) of the patch chord (40) when the patch chord (40) is plugged into the connector (20) through the port region (32) of the connector housing (30). As the release lever member (50) is pivotably attached the connector housing (30), the lever member (50) is moved from a first end position (P1) to an opposite second end position (P2) with respect to the connector housing (30). Especially, in first or free end position (P1), the lever member (50) and the connector housing (30) are positioned in such a way that the leading edge of the arm region (58) is in contact with the lower surface of the locking lever (42) of the patch chord (40), once the patch chord (40) is connected to the connector (20) through the connector housing (30).

[0031] FIG. 6 illustrates a cross-sectional view depicting the patch chord (40) and further movement of the release lever member (50) when it is at the first end position (P1), in accordance with an exemplary first embodiment of the present invention. When the lever member (50) is moved to the first end position (P1), the release lever member (50) is further pressed to disengage the patch chord (40). In particular, at the first end position (P1), the release lever member (50) is further moved in downward direction with respect to the connector housing (30) by manually pressing (little user force on) the touch region (56) of the release lever member (50) away from the patch chord (40), such that the leading edge of the arm region (58) of the release lever member (50) depresses the locking lever (42) of the patch chord (40), which assist the user to push the locking lever (42) of from its locked position for disengagement of the patch chord (40) from the connector (20) and pull the patch chord (40) outside the connector (20). In this first or free position/function (P1), the user pushes the release lever member (50) to rotate it about the hinge portions (54) and transmit force on the locking lever (42) of the patch chord (40). Then, the user can easily pull out the patch chord (40) from the connector (20). Thus, this releasing mechanism reduces the effort/force requirement for the user/installer to remove of the patch chord (40) from the connector (20). It also helps to overcome the complexity to disconnect the patch chord (40) in the less installation space of the panel assembly.

[0032] Similarly, when the lever member (50) is moved at the opposite second end position (P2), the release lever member (50) forms a gripping space in tandem with the locking member (34) to pull and disengage the individual port member (100), as shown in FIG. 7, which illustrates a schematic view depicting the release lever member (50) positioned at the opposite second end position (P2), in accordance with an exemplary first embodiment of the present invention. In particular, in the opposite second end position (P2), the release lever member (50) is turned in upward direction towards the connector housing (30) to make the arm region (58) coming to front

side position with respect to the connector housing (30), which forms and acts as a gripping space, for the user, in tandem with the locking member (34) in the connector housing (30), such that the arm region (58) of the release lever member (50) is pulled by the user to unsnap the locking member (34) of the connector housing (30) for disengagement/removal of the individual port member (100) from the panel assembly. In this second position/function (P2), the release lever member (50) is rotated about the hinge portions (54) to make the arm region (58) to come in front, which assist the user in providing a grip at bottom in relative to the locking member (34) of the connector housing (30) while releasing the snap/locking member (34) on top to pull and disconnect the individual port member (100) from the panel assembly. Thus, this releasing mechanism provides ergonomically good hold for the user/installer to remove the individual port member (100) from the modular panel assembly. Hence, the releasing mechanism of the present invention is referred as a dual purpose releasing mechanism, which improves the access for removal of patch chord (40) as well as facilitates better gripping for removal of individual port member (100) to make easy disengagement of the patch chord (40) and the individual port member (100) from the modular panel. Also, it is simple in construction and easily disassembled and reassembled without or with the simplest tools. The mechanism operates with in Standard 1 rack unit size of the data panel.

[0033] FIG. 8 illustrates an exploded view of a release lever member (50') assembled with a spring-loaded pin assembly (60), in accordance with an exemplary second embodiment of the present invention. According to another aspect of the present invention without departing core concept of the releasing mechanism as disclosed above, the releasing mechanism is further composed of a spring-loaded pin assembly (60) assembled within the release lever member (50') disclosed above for blocking the disengagement of patch chord (40') and connector port (32') for security reasons, which is capable of avoiding and preventing accidental and unauthorized access and disengagement of the patch chord (40') from the connector (20') and the individual port member (100') from the modular panel assembly, as shown in FIG. 9, which illustrates an assembled view depicting the release lever member (50') and the pin assembly (60) locked at the first end position (P1) in the individual port member (100'), in accordance with an exemplary second embodiment of the present invention. The pin assembly (60) is composed of at least two pins (62) that are loaded with a spring member (66) at its one end for connecting the pins (62) together in a back-to-back manner. Each pin (62) is shaped in a cylindrical form and arranged with a stopper (64) which is formed on the outer circumference of the pins (62) in adjacent to the end loaded with the spring member (66). The stoppers (64) of each pin (62) are configured to arrest the spring member (66) within the two pins (62), when the pin assembly (60) is fitted into the touch region (56') of the release lever member (50').

[0034] The pin assembly (60) are fixed into the touch region (56') of the release lever member (50') in such a way that the stoppers (64) of the two pins (62) are rested on and arrested at stop points (564') extended from the side flanges (582') of the lever member arm region (58') of the main body portion (52') in the main flanges (561') of the lever member touch region (56'), and free end of both the pins (62) are inserted and extended outside of apertures (565') formed in both the side flanges (562') of the touch region (56') of the release lever member (50'). The profile of the apertures (565') of the release lever member (50') can be formed to be matched with the profile of the pins (62) of the pin assembly (60). In particular, the apertures (565') in both the side flanges (562') of the touch region (56') are located adjacent to the attachment portions (54') of the release lever member (50'), so that the pins (62) extended outside of these apertures (565') are also in adjacent to the attachment portions (54') of the release lever member (50').

[0035] Further, upper and lower pin apertures (38') can be formed in adjacent to top and bottom sides of each attachment portion aperture (36') in the connector housing (30'). While assembling the release lever member (50') along with the pin assembly (60) into the connector housing (30') by attaching the attachment portions (54') of the lever member (50') into the apertures (36') of the connector housing (30'), the spring-loaded extended pins (62) of the pin assembly (60) are compressed through the spring member (66) and engaged into the respective upper and lower pin apertures (38') in the connector housing (30'). The upper and lower pin apertures (38') at the top and bottom sides of each attachment portion aperture (36') are respectively located in the connector housing (30') with reference to the second and first end positions (two locking positions) (P2, P1) of the release lever member (50').

[0036] FIG. 10 illustrates an assembled view depicting the release lever member (50') and the pin assembly (60) locked at the first end position (P1), with the patch chord (40'), in accordance with an exemplary second embodiment of the present invention. In the first or initial end position (P1) of the release lever member (50'), the spring-loaded extended pins (62) of the pin assembly (60) are compressed with the help of mechanical tool (150) and engaged/locked into the respective lower pin apertures (38') at the bottom side with respect to the attachment portion apertures (36') into which the attachment portions (54') of the release lever member (50') are engaged. In this first end position (P1), the patch chord (40') can be inserted into the port region (32') of the connector housing (30') for connecting and plugging into the connector (20'). Since the pins (62) are arrested at the lower pin apertures (38') in the connector housing (30'), it blocks the accidental or unauthorized access and disengagement of the patch chord (40') and the individual port member (100') from the panel assembly.

[0037] FIG. 11 illustrates a schematic view depicting the spring member (66) of the pin assembly (60) com-

pressed using a tool (150) to release the release lever member (50') from the first end position (P1), in accordance with an exemplary second embodiment of the present invention. The mechanical tool (150) can be used by the authorized user to compress the spring member (66) with the help of stoppers (64) to move the pins (62) inside together for disengaging the pins (62) from the lower pin apertures (38') of the connector housing (30'), which assist the rotation of the release lever member (50') through its attachment portions (54'). Then, the release lever member (50') is further moved in downward direction with respect to the connector housing (30') by manually pressing touch point (563') at the touch region (56') of the release lever member (50') away from the patch chord (40'), such that the leading edge of the main flange (581') of the arm region (58') of the release lever member (50') depresses the locking lever (42') of the patch chord (40'), which assist the user to push the locking lever (42') of from its locked position for disengagement of the patch chord (40') from the connector (20') and pull the patch chord (40') outside the connector (20').

[0038] FIG. 12 illustrates a schematic view depicting upward movement of the release lever member (50') from the first end position (P1) once the spring member (66) is compressed using the tool (150), in accordance with an exemplary second embodiment of the present invention. In order to remove the individual port member (100') from the panel assembly, the release lever member (50') is turned in upward direction towards the connector housing (30') to make the arm region (58') coming to front side position with respect to the connector housing (30'), which makes the release lever member (50') to reach the second end position (P2), as shown in FIG. 13, which illustrates a schematic view depicting the release lever member (50') and the pin assembly (60) locked at the second end position (P2), in accordance with an exemplary second embodiment of the present invention. Then, the spring-loaded extended pins (62) of the pin assembly (60) are compressed by means of tool (150) and engaged/locked into the respective upper pin apertures (38') at the top side with respect to the attachment portion apertures (36') into which the attachment portions (54') of the release lever member (50') are engaged. In the second end position (P2), the arm region (58') of the release lever member (50') acts as a gripping space, for the user, in tandem with the locking member (34') in the connector housing (30'), such that the arm region (58') of the release lever member (50') is pulled in upward direction by the user to unsnap the locking member (34') to disengage the individual port member (100') from the panel assembly. Also, in the second locking position (P2), the releasing mechanism prevents accidental or unauthorized insertion of the patch chord (40') in to the connector port. Again using the tool (150), the user can move the release lever member (50') from the second end position (P2) to the first end position (P1), vice versa, as shown in FIG. 14, which illustrates a schematic view depicting the spring member (66) of the pin assembly (60) compressed using the tool (150) to release the release lever member (50') from the second end position (P2), in accordance with an exemplary second embodiment of the present invention.

[0039] FIG. 15 illustrates an exploded view depicting a releasing mechanism with a release lever member (50") and a port lock member (70), in accordance with an exemplary third embodiment of the present invention. A further aspect of the present invention describes about a releasing mechanism with locking features, which can be referred as a releasing and locking mechanism, without departing core concept of the releasing mechanism. The releasing mechanism is composed of a connector housing (30"), a release lever member (50") and a port lock member (70). The individual port member (100") composed of the connector (20") and the connector housing (30") is assembled to the panel assembly by means of its locking member (34") for holding the connector (20") which receives the patch chord (40") through the connector housing (30"). The locking member (34") of the connector housing (30") is formed as a snap lever which snaps and locks the individual port member (100") onto the panel assembly. After assembling the connector housing (30") with the connector (20"), the release lever member (50") is attached to the connector housing (30") through its attachment portions (especially hinge portions) (54") so that the lever member (50") is swivelable with respect to the connector housing (30"). In particular, the attachment portions (54") of the lever member (50") are hinged with apertures (36") which are formed in the connector housing (30") at its both front bottom sides, where the profile of the apertures (36") of the connector housing (30") can be formed to be matched with the profile of the attachment portions (54") for receiving the lever member (50").

[0040] Thereafter, once the connector housing (30") is assembled with the release lever member (50"), the patch chord (40") can be inserted and plugged into the connector (20") through the port region (32") of the connector housing (30") such that the locking lever (42") of the patch chord (40") is snapped into the connector (20"). Then, the port lock member (70) is inserted and locked with the release lever member (50") assembled in the connector housing (30"), which arrest the movement of the release lever member (50") to prevent the accidental or unauthorized access and disengagement of the patch chord (40") and the individual port member (100") from the panel assembly, as shown in FIG. 16, which illustrates an assembled view depicting the release lever member (50") fitted into the connector housing (30") with the patch chord (40") before assembling the port lock member (70), in accordance with an exemplary third embodiment of the present invention. The profile of the release lever member (50") and the profile of the port lock member (70) are made in such a way that the release lever member (50") can be locked with the port lock member (70) to prevent the disengagement of patch chord (40") from the connector (20"). A mechanical tool (150') can be used

by the authorized user to release the port lock member (70) in order to disengage the patch chord (40") and the individual port member (100") from the panel assembly.

[0041] FIG. 17 illustrates an isometric top view of the release lever member (50"), in accordance with an exemplary third embodiment of the present invention. The release lever member (50") is formed of a main body portion (52") and a set of attachment portions (54") that are connected to the main body portion (52") at its both ends. The main body portion (52") of the release lever member (50") is formed of a touch region (56") and an arm region (58") extended from the touch region (56"). The attachment portions (54") of the release lever member (50") are located outside of the touch region (56") at its both side flanges (562"). A main flange (581") of the arm region (58") of the lever member (50") is extended and raised from a locking arm (564") in the touch region (56") in such a way that side flanges (582") of the arm region (58") is extended in main flanges (561 ") of the touch region (56"), where the locking arm (564") in the touch region (56") acts as a touch point (563") for the user to further press the release lever member (50") to remove the patch chord (40"). The locking arm (564") extended from the arm region (58") is formed with a protuberant region (565") in closer to the free end of the locking arm (564"). In addition, each extended side flange (582") of the arm region (58") is formed and arranged with a set of guiding members (583") in its outer surface, where the guiding members (583") are shaped as cylindrical pins.

[0042] FIG. 18 illustrates an isometric outside view of the port lock member (70), in accordance with an exemplary third embodiment of the present invention. The port lock member (70) is formed of a body region (71) and at least two extensible regions (72a, 72b), where the body region (71) is defined as a U-shaped body region having a center flange (73) shaped with two side flanges (74). The two extensible regions (upper and lower extensible regions) (72a, 72b) are extended from both edges of the center flange (73) of the body region (71) and are inclined towards each other, where the inclination of these extensible regions (72a, 72b) is formed in such a way that the port lock member (70) can easily assembled into the release lever member (50"). The center flange (73) of the body region (71) is formed with a slot (75) at its center for receiving a tip of the tool (150'), whereas each side flanges (74) of the body region (71) is formed with a guiding slit (76) at its free end for receiving the guiding members (583") of the release lever member (50"). Similarly, at least one of the extensible regions (72a, 72b), in particular the lower extensible region (72b) contacting the locking arm (564") while locking with the release lever member (50"), is formed with a locking slot (77) for receiving the protuberant region (565") of the locking arm (564") of the release lever member (50"), as shown in FIG. 19, which illustrates an isometric inside view of the port lock member (70), in accordance with an exemplary third embodiment of the present invention.

[0043] In this embodiment of the releasing mechanism of the present invention, after assembling the release lever member (50") into the connector housing (30") and plugging the patch chord (40") into the connector (20") through the connector housing (30"), the port lock member (70) is attached to the release lever member (50") by means of guiding members (583") and locked with the release lever member (50") in the first end position (P1) by means of locking arm (564"), as shown in FIG. 20", which illustrates an isometric view depicting the port lock member (70) assembled with the release lever member (50"), in accordance with an exemplary third embodiment of the present invention. In particular, the port lock member (70) is inserted and locked with the release lever member (50") in such a way that the guiding members (583") of the release lever member (50") are guided and sliding into the guiding slits (76) of the port lock member (70) and the protuberant region (565") of the locking arm (564") of the release lever member (50") is engaged into the locking slot (77) in the lower extensible region (72b) of the port lock member (70). This locks the tip of the locking lever (42") of the patch chord (40") in between the arm region (58") of the release lever member (50") and the upper extensible region (72a) of the port lock member (70). Thus, this releasing mechanism is capable of arresting the further movement of the release lever member (50"), which prevents the accidental or unauthorized access and disengagement of the patch chord (40") and the individual port member (100") from the panel assembly, and also blocks the port region (32") of the connector housing (30") to avoid unauthorized insertion of the patch chord (40") for security reasons.

[0044] FIG. 21 illustrates a detailed view depicting release of the port lock member (70) assembled with the release lever member (50") using the tool (150'), in accordance with an exemplary third embodiment of the present invention. In order to release the port lock member (70) from the release lever member (50"), the tool (150') can be used by the authorized user and inserted into the slot (75) at the center flange (73) of the body region (71) of the port lock member (70) so that the tool (150') can be rotated or twisted to press and disengage the protuberant region (565") of the locking arm (564") of the release lever member (50") from the locking slot (77) of the port lock member (70), which assists the authorized user to pull and separate the port lock member (70) from the release lever member (50"). Then, the release lever member (50") is pushed or further moved in downward direction with respect to the connector housing (30") by manually pressing the touch region (56") of the release lever member (50") away from the patch chord (40"), such that the leading edge of the arm region (58") of the release lever member (50") depresses the locking lever (42") of the patch chord (40"), which assist the user to push the locking lever (42") from its locked position for disengagement of the patch chord (40") from the connector (20") and pull the patch chord (40") outside the connector (20").

[0045] Further, in order to remove the individual port member (100") from the panel assembly, after releasing the port lock member (70) from the release lever member (50"), the release lever member (50") is turned in upward direction towards the connector housing (30") to make the arm region (58") coming to front side position with respect to the connector housing (30"), which makes the release lever member (50") to reach the second end position (P2). In the second end position (P2), the arm region (58") of the release lever member (50") acts as a gripping space, for the user, in tandem with the locking member (34") in the connector housing (30"), such that the arm region (58") of the release lever member (50") is pulled in upward direction by the user to unsnap the locking member (34") to disengage the individual port member (100") from the panel assembly.

[0046] FIG. 22 illustrates an isometric view of a port lock member (80), in accordance with an exemplary fourth embodiment of the present invention. As an additional aspect of the port lock member (80) as discussed above, the port lock member (80) can also be designed and shaped in a different form to prevent accidental disengagement of the patch chord (40). This aspect of the port lock member (80) is composed of a U-shaped body region (82) whose both ends are extended and terminated with deflecting pins (86), and a base flange (84) extended and inclined from the U-shaped body region (82) at one of its center edges. The port lock member (80) can also be referred as a blocking tap (80) which is made of sheet metal of 1.2mm thickness.

[0047] FIG. 23 illustrates an isometric view depicting the port lock member (80) locking the patch chord (40) and the release lever member (50) at its first end position (P1), in accordance with an exemplary fourth embodiment of the present invention. After assembling the release lever member (50) into the connector housing (30) and plugging the patch chord (40) into the connector (20) through the connector housing (30), the port lock member (80) is assembled to the individual port member (100) through its depleting pins (86). In particular, the port lock member (80) is pushed and inserted into the space defined by the locking lever (42) with respect to the lower surface of the patch chord (40) in such a way that the free end of base flange (84) of the port lock member (80) is in contact with the tip of the locking lever (42) of the patch chord (40) and the deflecting pins (86) of the port lock member (80) is deflected and locked into apertures (39) in the side surfaces of the connector housing (30), where the apertures (39) in the connector housing (30) is positioned adjacent to the apertures (36) receiving the attachment portions (54) of the release lever member (50), as shown in FIG. 24, which illustrates a detailed view depicting the release lever member (50) locked at its first end position (P1) using the port lock member (80), in accordance with an exemplary fourth embodiment of the present invention. The profile of the apertures (39) of the connector housing (30) can be formed to be matched with the profile of the deflecting pins (86) of the port lock member (80) for receiving the deflecting pins (86). This releasing mechanism locks the tip of the locking lever (42) of the patch chord (40) in between the arm region (58) of the release lever member (50) and the base flange (84) of the port lock member (80). When the user presses the release lever member (50) to remove the patch chord (40), the movement of release lever member (50) is restricted by the port lock member (80). Thus, this releasing mechanism is capable of prevents the accidental or unauthorized access and disengagement of the patch chord (40) from the connector (20).

[0048] In order to release the port lock member (80) from the release lever member (50), the tool (150) can be used by the authorized user and inserted into gaps formed on both the sides of the depleting pins (86) to deflect the depleting pins (86) to release the port lock member (80) from the individual port member (100), which assists the authorized user to pull and separate the port lock member (80) from the release lever member (50). Then, the release lever member (50) is pushed or further moved in downward direction with respect to the connector housing (30) by manually pressing the touch region (56) of the release lever member (50) away from the patch chord (40), such that the leading edge of the arm region (58) of the release lever member (50) depresses the locking lever (42) of the patch chord (40), which assist the user to push the locking lever (42) from its locked position for disengagement of the patch chord (40) from the connector (20) and pull the patch chord (40) outside the connector (20). Further, the port lock member (80) is assembled to the individual port member (100) through its depleting pins (86) in the reverse orientation in such a way that a space is defined between the release lever member (50) and the port lock member (80), which blocks the port region (32) of the individual port member (100) to avoid unauthorized insertion of the patch chord (40) for security reasons, as shown in FIG. 25, which illustrates a detailed view depicting the port lock member (80) positioned in the reverse orientation, in accordance with an exemplary fourth embodiment of the present invention. Further, in order to remove the individual port member (100) from the panel assembly, after releasing the port lock member (80) from the release lever member (50), the release lever member (50) is turned in upward direction towards the connector housing (30) to make the arm region (58) coming to front side position, which acts as a gripping space, for the user, in tandem with the locking member (34) in the connector housing (30), such that the arm region (58) of the release lever member (50) is pulled in upward direction by the user to unsnap the locking member (34) to disengage the individual port member (100) from the panel assembly.

[0049] FIG. 26 illustrates an assembled view depicting a release lever member (50"') fitted into a connector housing (30"') with a dummy patch chord (40"') before assembling a port lock member (90), in accordance with an exemplary fourth embodiment of the present invention. A further aspect of the present invention describes

about a releasing mechanism with locking features (port lock member) without departing core concept of the releasing mechanism. The releasing mechanism of this particular aspect of the invention is designed to hold and lock a dummy patch chord (40"') within a port region (32"') of an individual port member (100"') with the help of a release lever member (50"') and a port lock member (90), which prevents and blocks the unauthorized user to access and insert any patch chords into the port region (32"') of the individual port member (100"') when the individual port member (100"') is not in use or kept in the panel assembly without any connections into it. The releasing mechanism is mainly composed of the individual port member (100"') composed of a connector (20"') and a connector housing (30"'), the release lever member (50"') and the port lock member (90). The individual port member (100"') is assembled to the panel assembly by means of its locking member (snap lever) (34"') for holding the connector (20"') through the connector housing (30"'). In this releasing mechanism, the dummy patch chord (40"') is used and locked into the port region (32"') of the individual port member (100"') to prevent the unauthorized use when the individual port member (100"') is not in use of any connections. The dummy patch chord (40"') is specifically designed and terminated with a holding member (44"') (instead of a cable connection), where the holding member (44"') assists the user to pull the dummy patch chord (40"') outside the connector (20"') while disengaging the dummy patch chord (40"').

[0050] FIG. 27 illustrates an isometric top view of the release lever member (50"'), in accordance with an exemplary fourth embodiment of the present invention. The release lever member (50"') is formed of a main body portion (52"') and a set of attachment portions (54"') that are connected to the main body portion (52"') at its both ends. The lever member (50"') is assembled and attached to the connector housing (30"') through its attachment portions (especially hinge portions) (54"') so that the lever member (50"') is swivelable or pivotable with respect to the connector housing (30"'), about a longitudinal axis of the hinge portions (54"'). In particular, after assembling the individual port member (100"') in the panel assembly, the attachment portions (54"') of the lever member (50"') are hinged with an aperture (36"') which is formed in the connector housing (30"') at its both front bottom sides, where the profile of the apertures (36"') of the connector housing (30"') can be formed to be matched with the profile of the attachment portions (54"') for receiving the lever member (50"').

[0051] The main body portion (52"') of the release lever member (50"') is formed of a touch region (56"') and an arm region (58"') extended from the touch region (56"'). The attachment portions (54"') of the release lever member (50"') are located outside of the touch region (56"') at its both side flanges (562"'), where the attachment portions (54"') are designed as cylindrical hinge pins. The main flange (581"') of the arm region (58"') of the lever member (50"') is extended and raised from at least partial portion of one of main flanges (561"') of the touch region (56"') in such a way that side flanges (582"') of the arm region (58"') is extended in the main flanges (561"') of the touch region (56"'), which partitions and defines a touch area (563"') in the touch region (56"') of the lever member (50"'). Each side flange (582"') of the arm region (58"') is formed with a guiding arm (583"') to define a guiding space within the touch area (563"') in the touch region (56"') of the lever member (50"').

[0052] FIG. 28 illustrates an isometric outside view of the port lock member (90), in accordance with an exemplary fourth embodiment of the present invention. This aspect of the port lock member (90) is composed of a body region (91) whose both side edges are extended and terminated with deflecting flanges (92), a locking flange (93) extended from the body region (91) at its lower center edge, and an extensible flange (94) extended from the body region (91) at its upper center edge. The deflecting flanges (92) are designed to be a flexible material in such a way that the deflecting flanges (92) can easily be compressible towards each other with respect to the body region (91) of the port lock member (90). Further, the body region (91) is formed with a slot (95) at its center for receiving a mechanical tool (150"), as shown in FIG. 29, which illustrates an isometric inside view of the port lock member (90), in accordance with an exemplary fourth embodiment of the present invention.

[0053] FIG. 30 illustrates a detailed view depicting assembling of the port lock member (90) into the release lever member (50"') and the individual port member (100"') using the tool (150"), in accordance with an exemplary fourth embodiment of the present invention. In this embodiment of the releasing mechanism of the present invention, after assembling the release lever member (50"') into the individual port member (100"'), the dummy patch chord (40"') can be inserted and plugged into the connector (20"') through the port region (32"') of the connector housing (30"') such that a locking lever (42"') of the dummy patch chord (40"') is snapped into the connector (20"'). Once the dummy patch chord (40"') is plugged into the connector (20"'), the port lock member (90) is inserted and fitted into the mechanical tool (150"), which deflects the deflecting flanges (92) of the port lock member (90) using C-shaped member (151") of the tool (150"), and keeps the port lock member (90) in position. The port lock member (90) fitted with the mechanical tool (150") is locked with the release lever member (50"') with the help of guiding arm (583"') in the release lever member (50"') and the locking flange (93) of the port lock member (90). In particular, the port lock member (90) fitted with the mechanical tool (150") is inserted and locked with the release lever member (50"') in such a way that the locking flange (93) of the port lock member (90) is guided and engaged into the guiding space defined by the guiding arm (583"') of the release lever member (50"'), and the tip of deflecting flanges (92) of the port lock member (90) are snapped or locked and engaged into apertures (39"') in the side surfaces of the

connector housing (30"'), where the apertures (39"') in the connector housing (30"') is positioned adjacent to the apertures (36"') receiving the attachment portions (54"') of the release lever member (50"'). The profile of the apertures (39"') of the connector housing (30"') can be formed to be matched with the profile of the deflecting flanges (92) of the port lock member (90) for receiving the tip of deflecting flanges (92). This locks the tip of the locking lever (42"') of the dummy patch chord (40"') in between the arm region (58"') of the release lever member (50"') and the upper extensible flange (94) of the port lock member (90). Thereafter, the tool (150") is rotated in clockwise and pulled outside the port lock member (90). When the user presses the release lever member (50"') to remove the dummy patch chord (40"'), the movement of release lever member (50"') is restricted by the port lock member (90). Thus, this releasing mechanism is capable of arresting the movement of the release lever member (50"') to avoid disengagement of the dummy patch chord (40"') from the connector (20"'), which prevents and blocks the unauthorized user to access and insert any live patch chords connected into the connector (20"') through the port region (32"') of the individual port member (100"').

[0054] FIG. 31 illustrates a detailed view depicting release of the port lock member (90) assembled with the release lever member (50") using the tool (150"), in accordance with an exemplary fourth embodiment of the present invention. The mechanical tool (150") can be used by the authorized user to release the port lock member (90) from the release lever member (50"') in order to disengage the dummy patch chord (40"') from the connector (20"') for plugging any live patch chord into the connector (20"'). In particular, in order to release the port lock member (90) from the release lever member (50"'), the tool (150") used by the authorized user can be inserted into the slot (95) at the body region (91) of the port lock member (90) so that the C-shaped member (151 ") of the tool (150") deflects the deflecting flanges (92) of the port lock member (90) to detach the tip of the deflecting flanges (90) from the connector housing (30"') and the tool (150") can be rotated or twisted in a clockwise manner until the C-shaped member (151 ") buts with the outer surface of the body region (91) of the port lock member (90) to engage and lock at least part of the tool (150") with the inner surface of the body region (91) of the port lock member (90). Then, the tool (150") can be pulled by the authorized user to detach the port lock member (90) from the release lever member (50"') and the individual port member (100"').

[0055] The foregoing description is a specific embodiment of the present invention. It should be appreciated that this embodiment is described for purpose of illustration only. It is evident to those skilled in the art that although the invention herein is described in terms of specific embodiments thereof, there exist numerous alternatives, modifications and variations of the invention. It is intended that all such modifications and alterations be included insofar as they come within the spirit and scope of the invention as claimed or the equivalents thereof. Hence all variations, modifications and alternatives that falls within the broad scope of the appended claims comes under the gamut of the invention.

Claims

1. A releasing mechanism for disengagement of a patch chord and an individual port member, comprising:

   an individual port member having a plurality of connectors, assembled to the front end of a panel assembly by means of its locking member for holding at least one connector which receives the patch chord, through a connector housing; and

   a release lever member formed of a main body portion and a plurality of attachment portions that are connected to the main body portion at its both ends,

   wherein the lever member is attached to the connector housing through its attachment portions in such a way that the lever member is moved from a first end position to an opposite second end position with respect to the connector housing,

   when the lever member is moved at the first end position, the release lever member is further moved to disengage the patch chord from the connector, whereas when the lever member is moved at the opposite second end position, the release lever member forms a gripping space in tandem with the locking member to pull and disengage the individual port member from the panel assembly.

2. The releasing mechanism as claimed in claim 1, wherein the main body portion of the release lever member is formed of a touch region and an arm region extended from the touch region.

3. The releasing mechanism as claimed in claims 1 and 2, wherein the attachment portions of the release lever member are located outside of the touch region at its both sides, where the attachment portions include a hinge pin.

4. The releasing mechanism as claimed in claims 1 and 2, wherein the release lever member is positioned adjacent to a port region of the connector housing in such a way that a leading edge of the arm region is located under a locking lever of the patch chord when the patch chord is connected to the connector through the connector housing.

5. The releasing mechanism as claimed in claims 1 and 2, wherein in the first end position, the release lever member is moved in downward direction with respect to the connector housing by pressing the touch region of the release lever member away from the patch chord, such that the leading edge of the arm region of the release lever member depresses the locking lever of the patch chord to disengage the patch chord from the connector.

6. The releasing mechanism as claimed in claims 1 and 2, wherein in the opposite second end position, the release lever member is moved in upward direction with respect to the connector housing to bring the arm region in tandem with the locking member in the connector housing, such that the arm region of the release lever member acts as the gripping space to pull and disengage the individual port member from the panel assembly.

7. The releasing mechanism as claimed in claim 1, further comprising: a pin assembly having at least two pins that are loaded and engaged with a spring member at its one end, where the pin assembly is assembled within the main body portion of the release lever member in such a way that while assembling the release lever member into the connector housing, the pins of the pin assembly are compressed and locked with the connector housing in relation to the first and second end positions of the release lever member to restrict the movement of release lever member from the first end position to the second end position and vice versa.

8. The releasing mechanism as claimed in claim 7, wherein the spring member is compressed to disengage the pins from the connector housing for the movement of release lever member from the first end position to the second end position and vice versa.

9. A releasing mechanism for disengagement of a patch chord and an individual port member, comprising:

an individual port member having a plurality of connectors, assembled to the front end of a panel assembly by means of its locking member for holding at least one connector which receives the patch chord, through a connector housing;
a release lever member formed of a main body portion and a plurality of attachment portions that are connected to the main body portion at its both ends, where the lever member is attached to the connector housing through its attachment portions in such a way that the lever member is moved from a first end position to an opposite second end position with respect to the connector housing; and
a port lock member attached to the individual port member or the release lever member to restrict the movement of release lever member from its first end position,
wherein when the lever member is at the first end position, the port lock member is detached from the individual port member or the release lever member to disengage the patch chord from the connector by further moving the release lever member, whereas when the lever member is moved at the opposite second end position, the release lever member forms a gripping space in tandem with the locking member to pull and disengage the individual port member from the panel assembly.

10. The releasing mechanism as claimed in claim 9, wherein the release lever member is positioned adjacent to a port region of the connector housing to depress a locking lever of the patch chord when the patch chord is connected to the connector through the connector housing.

11. The releasing mechanism as claimed in claim 9, wherein in the first end position, the release lever member is moved in downward direction with respect to the connector housing by pressing the release lever member away from the patch chord, such that at least part of the release lever member depresses the locking lever of the patch chord to disengage the patch chord from the connector.

12. The releasing mechanism as claimed in claim 9, wherein in the opposite second end position, the release lever member is moved in upward direction with respect to the connector housing to bring at least part of the release lever member in tandem with the locking member in the connector housing, such that the release lever member acts as the gripping space to pull and disengage the individual port member from the panel assembly.

13. The releasing mechanism as claimed in claim 9, wherein the main body portion of the release lever member is formed of a locking arm with a protuberant region at its free end, an arm region extended from the locking arm, and a plurality of guiding members located behind the attachment portions.

14. The releasing mechanism as claimed in claim 9, wherein the port lock member is formed of a U-shaped body region and at least two extensible regions that are extended from the body region at both edges of its center and inclined towards each other.

15. The releasing mechanism as claimed in claim 14, wherein the body region of the port lock member is formed with a slot at its center and a plurality of guid-

ing slits at its free end.

16. The releasing mechanism as claimed in claim 14, wherein at least one of the extensible regions of the port lock member is formed with a locking slot.

17. The releasing mechanism as claimed in claims 9 and 13-16, wherein the port lock member is attached to the release lever member in such a way that in such a way that the guiding members of the release lever member are guided into the respective guiding slits of the port lock member and the protuberant region of the locking arm is locked into the locking slot of the port lock member in order to restrict the movement of release lever member from its first end position.

18. The releasing mechanism as claimed in claims 9 and 13-17, wherein the protuberant region of the locking arm of the release lever member is disengaged from the locking slot of the port lock member by operating a tool through the slot in the body region, so that the port lock member is detached from the release lever member for the movement of release lever member from the first end position to the second end position and vice versa.

19. The releasing mechanism as claimed in claim 9, wherein the port lock member is composed of a U-shaped body region terminated with deflecting pins, and a base flange extended from the U-shaped body region at one of its center edges.

20. The releasing mechanism as claimed in claims 9 and 19, wherein the port lock member is deflected and locked to the individual port member through its depleting pins in such a way that the locking lever of the patch chord is locked between at least part of the release lever member and the base flange of the port lock member to restrict the movement of release lever member from its first end position.

21. The releasing mechanism as claimed in claims 9 and 20, wherein the depleting pins of the port lock member is deflected and unlocked from the individual port member to detach the port lock member from the release lever member for the movement of release lever member from the first end position to the second end position and vice versa.

22. The releasing mechanism as claimed in claims 9 and 19, wherein the port lock member is assembled to the individual port member through its depleting pins in the reverse orientation to block the port region of the individual port member.

23. The releasing mechanism as claimed in claim 9, wherein the main body portion of the release lever member is formed of a touch region and an arm region extended from the locking arm, where the arm region is formed with a guiding arm to define a guiding space in the touch region.

24. The releasing mechanism as claimed in claim 9, wherein the port lock member is composed of a body region terminated with deflecting flanges, an extensible flange extended from the upper edge of the body region, and a locking flange extended from the lower edge of the body region, where wherein the body region of the port lock member is formed with a slot at its center.

25. The releasing mechanism as claimed in claims 23-24, wherein once a dummy patch chord is plugged into the connector, the port lock member is attached to the release lever member in such a way that the locking flange of the port lock member is guided into the guiding space defined by the guiding arm of the release lever member and the deflecting flanges of the port lock member are locked into the connector housing in order to restrict the movement of release lever member.

26. The releasing mechanism as claimed in claims 23-25, wherein the deflecting flanges of the port lock member are deflected and unlocked from the connector housing by operating a tool through the slot in the body region of the port lock member, so that the port lock member is detached from the release lever member for the movement of release lever member.

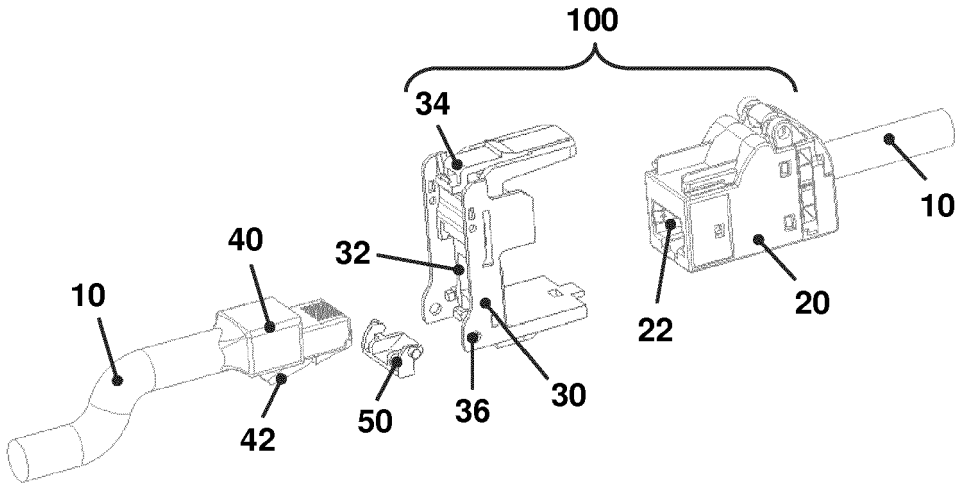
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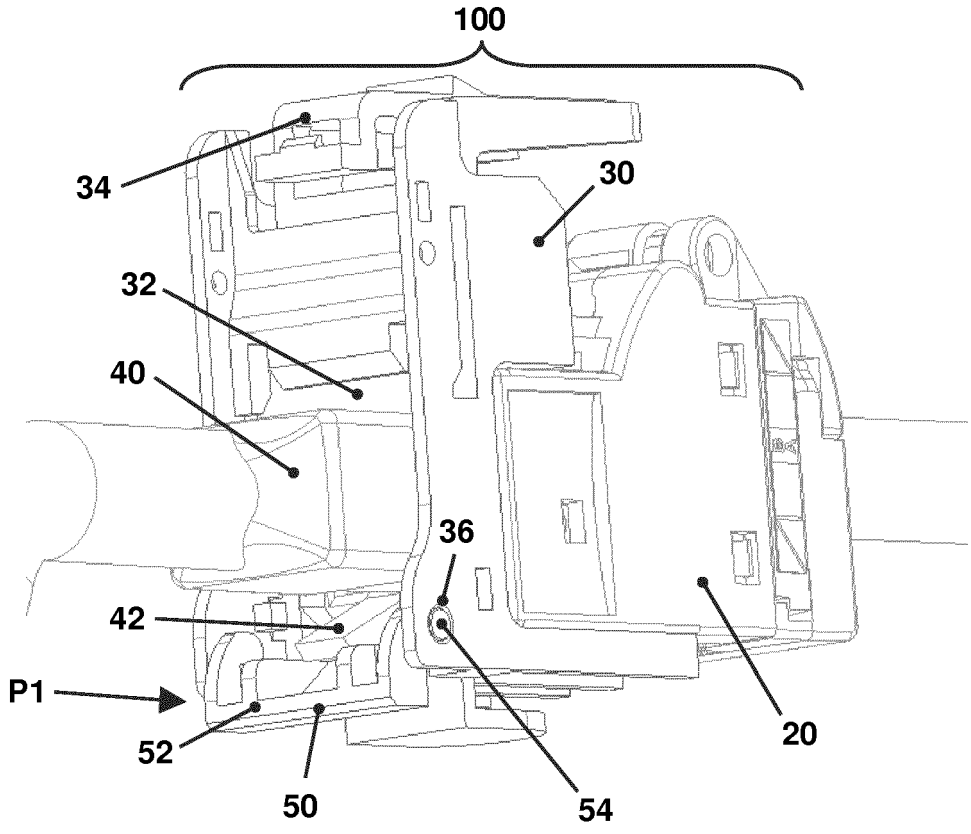
FIG. 1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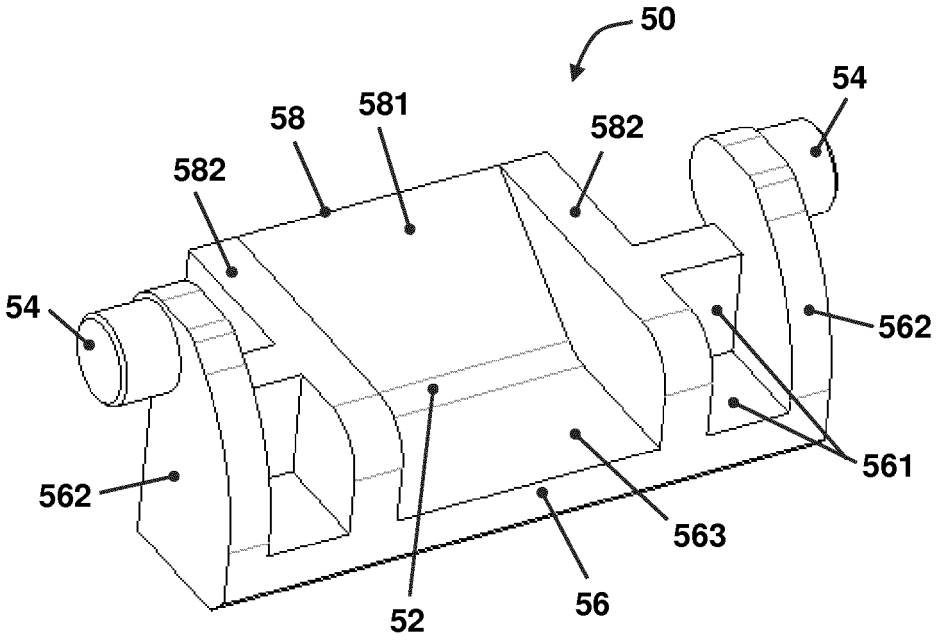
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FIG. 3

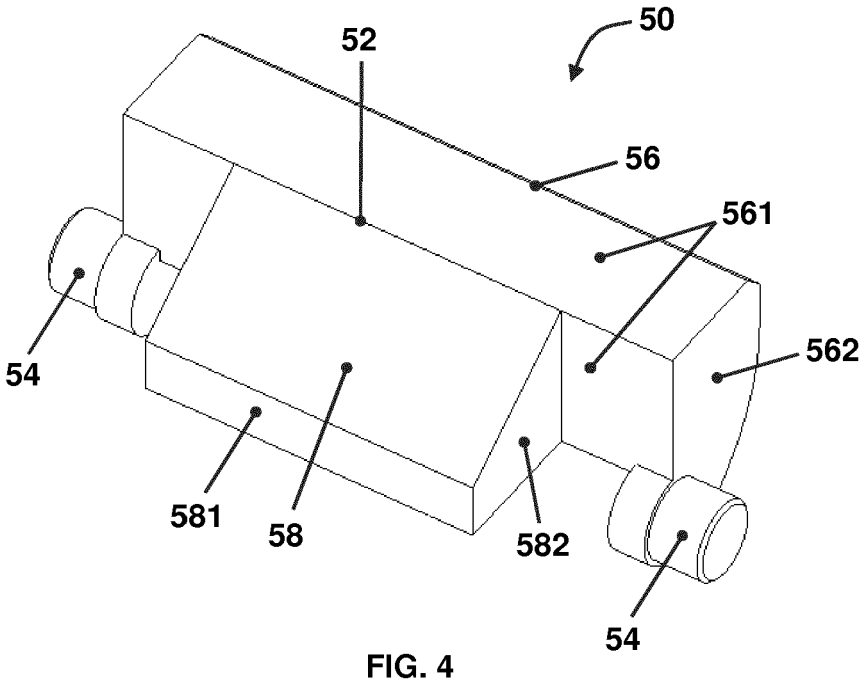
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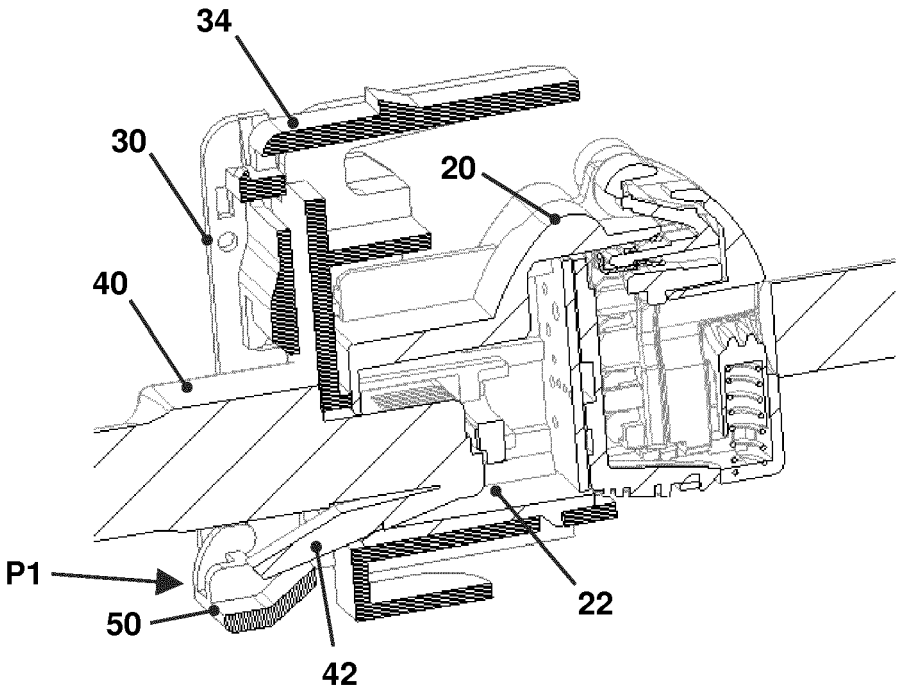
FIG. 4



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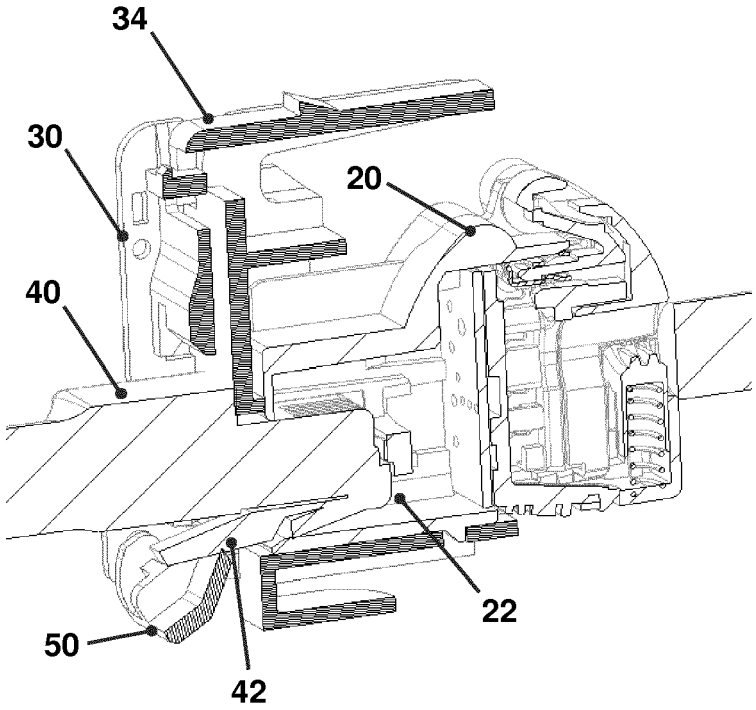

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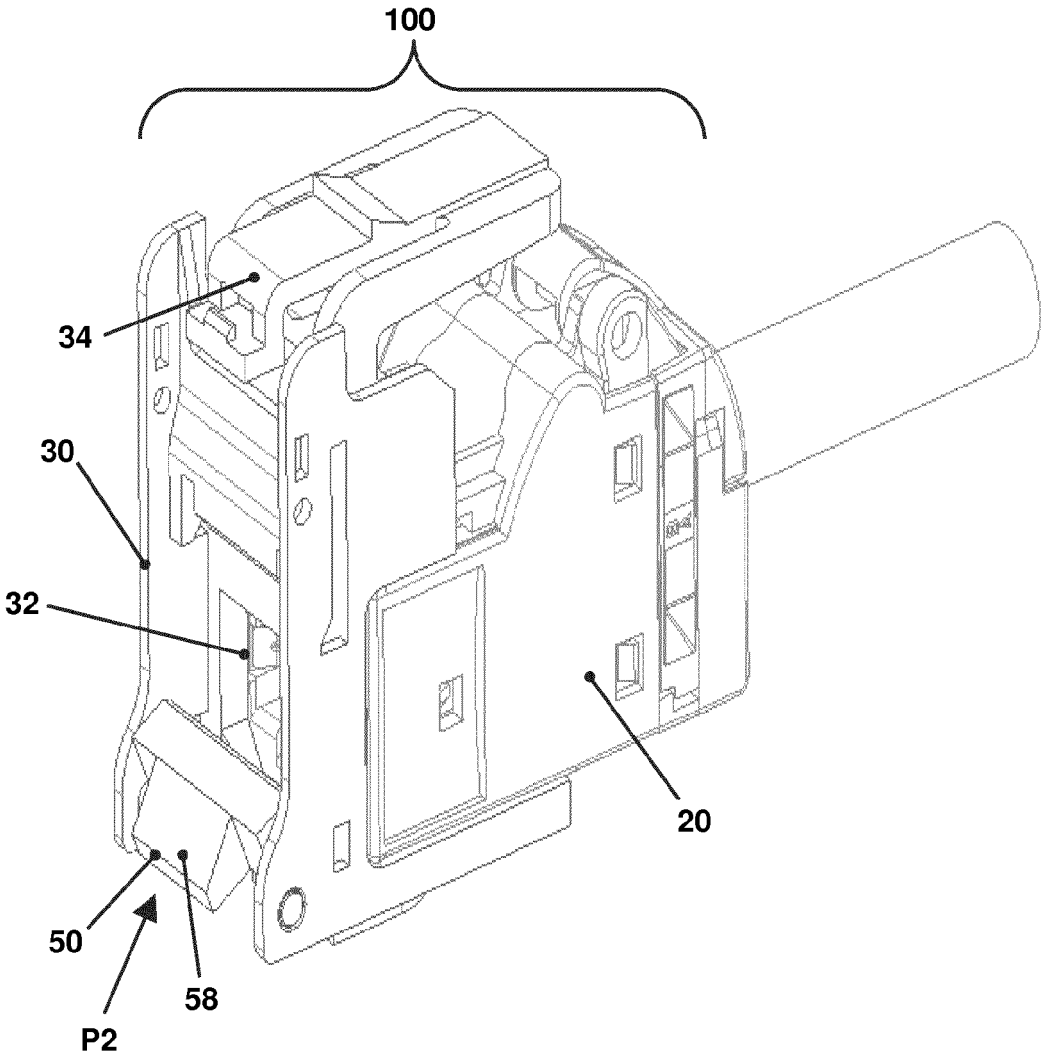
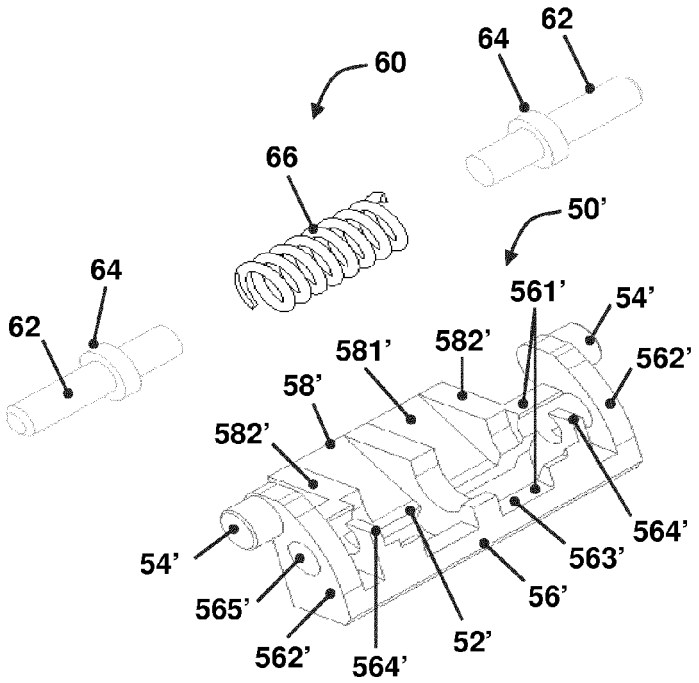


FIG. 7



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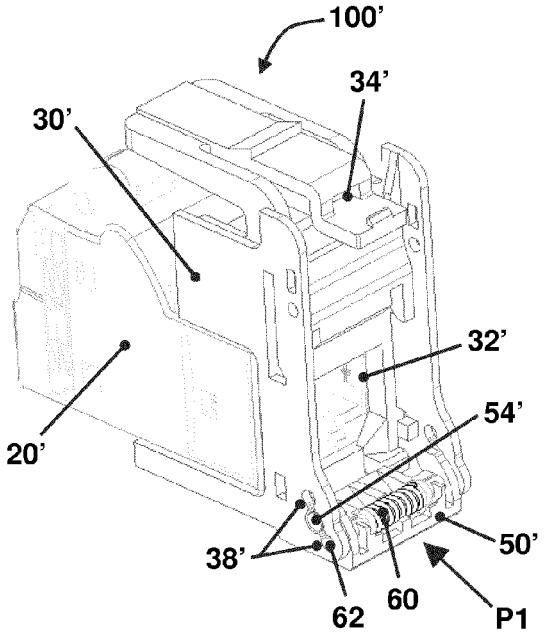

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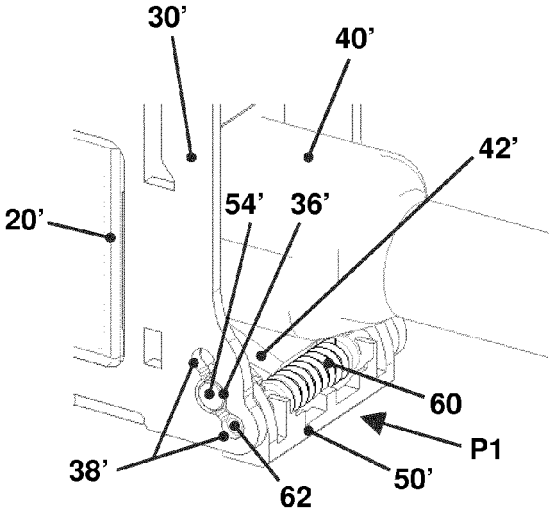

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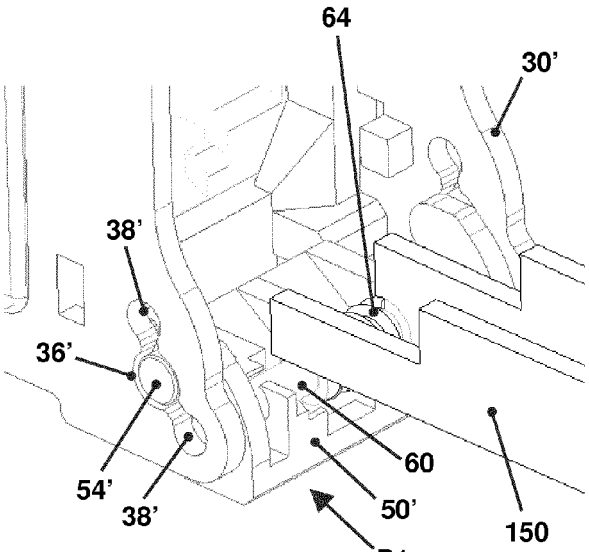

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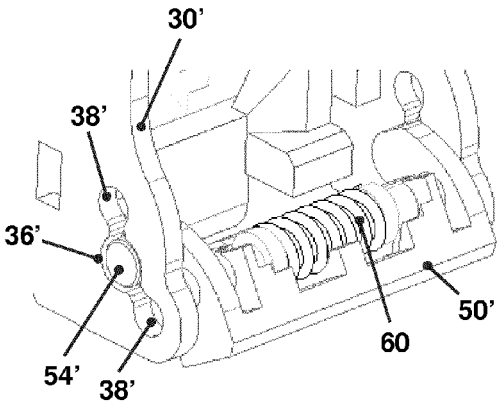
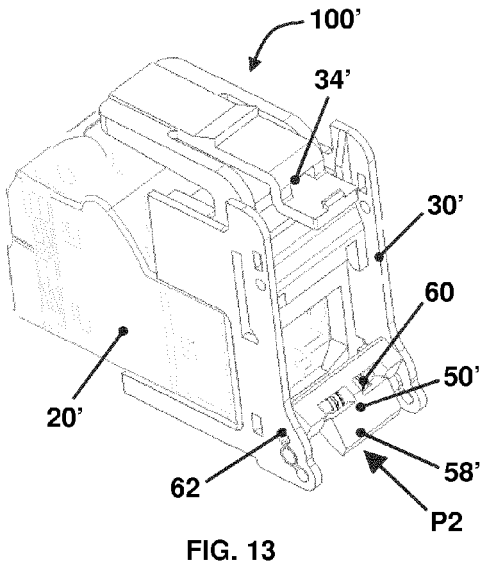


FIG. 12



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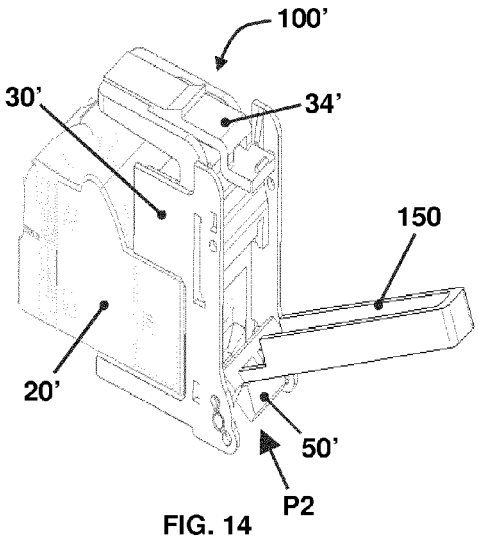

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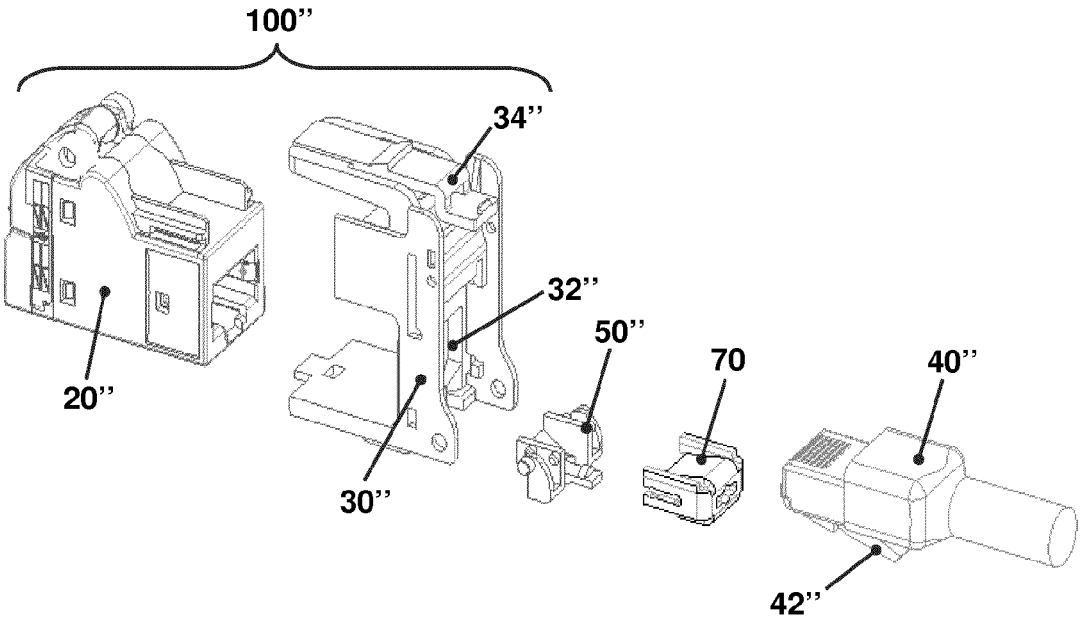

FIG. 15

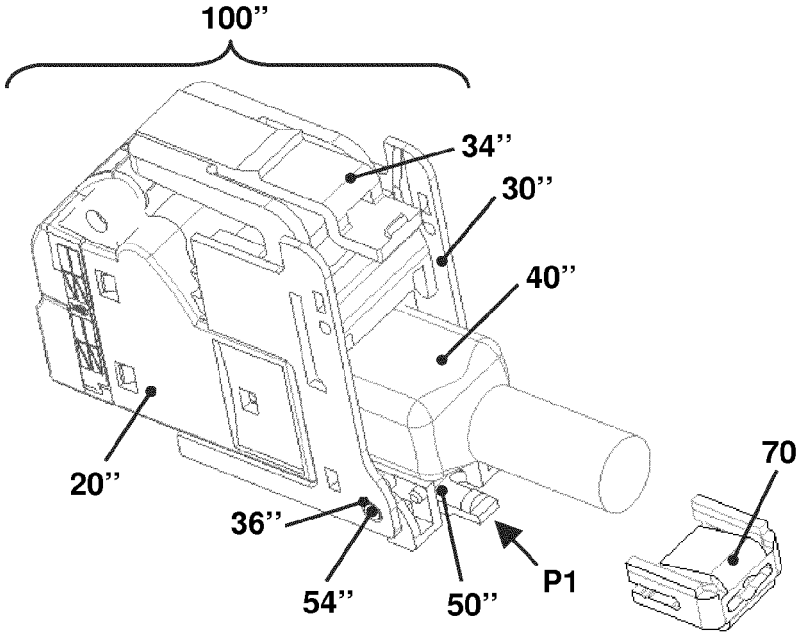

FIG. 16

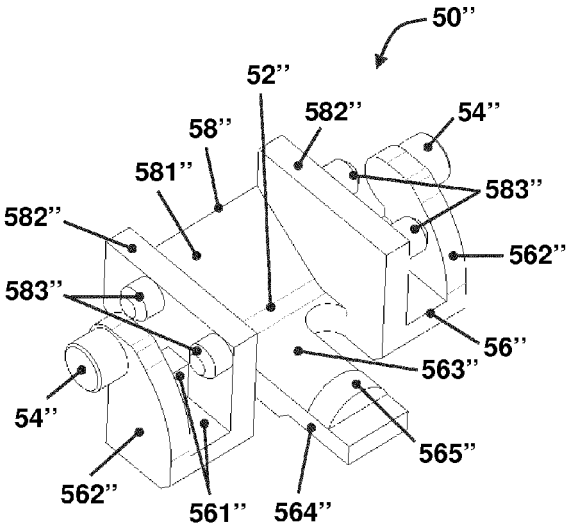

FIG. 17

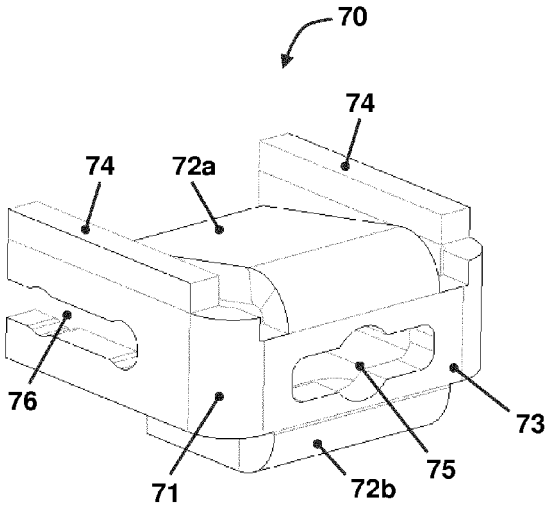

FIG. 18

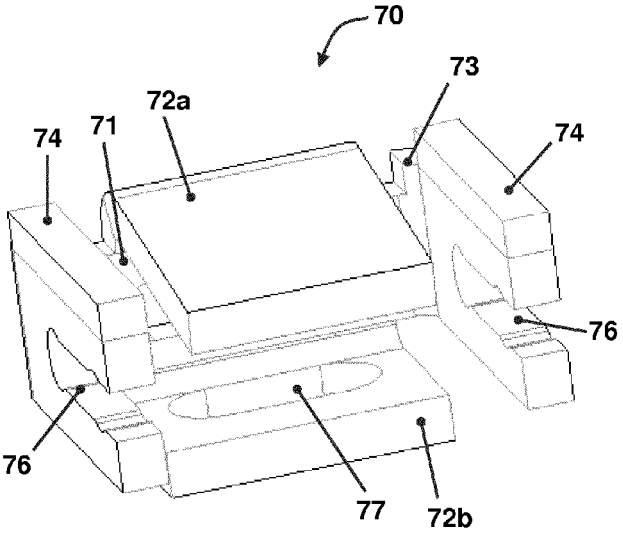

FIG. 19

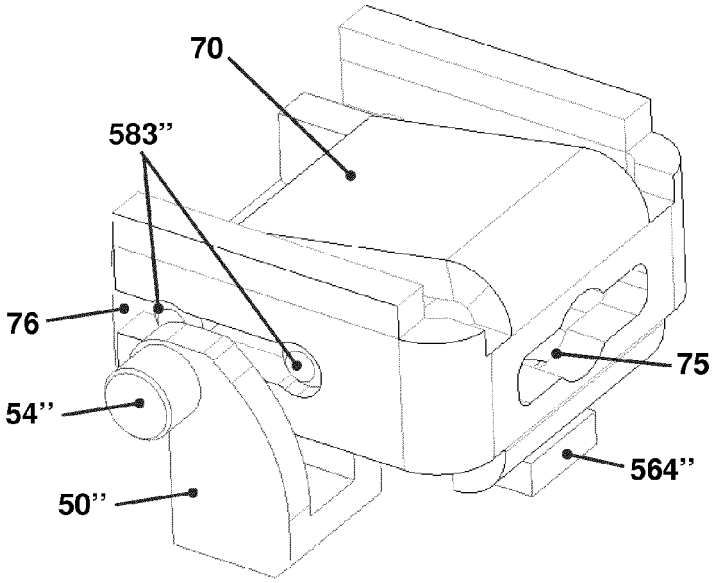

FIG. 20

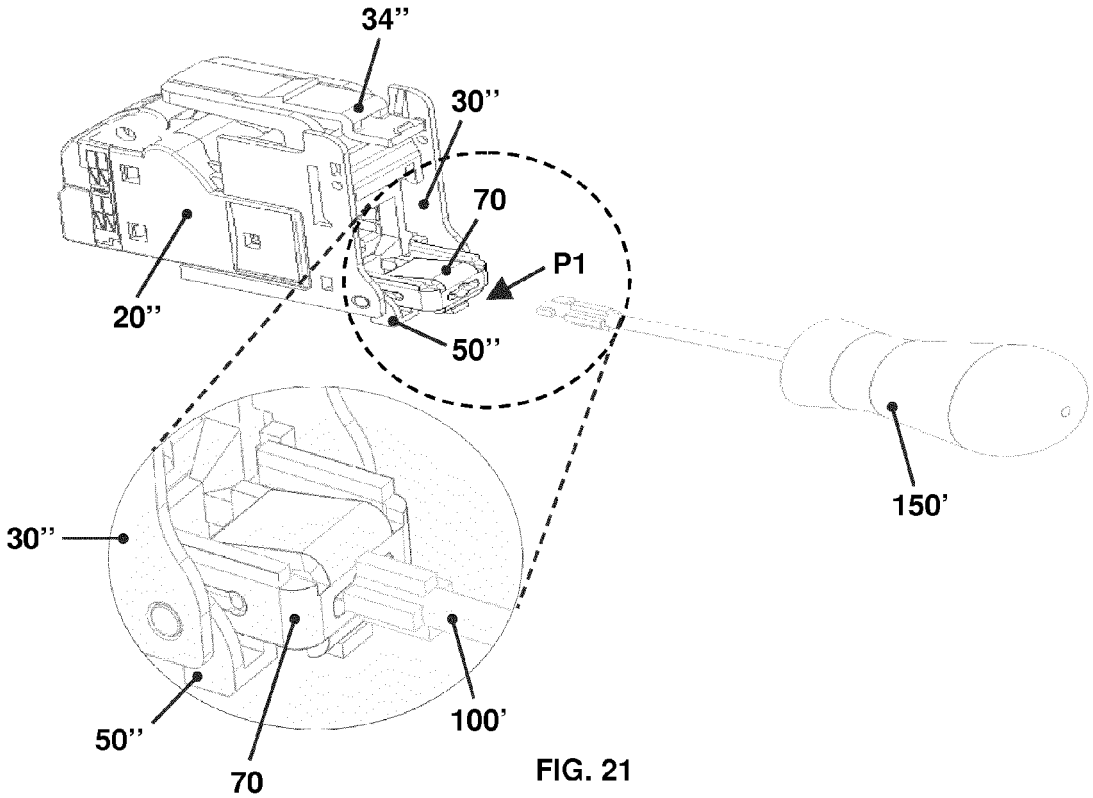

FIG. 21

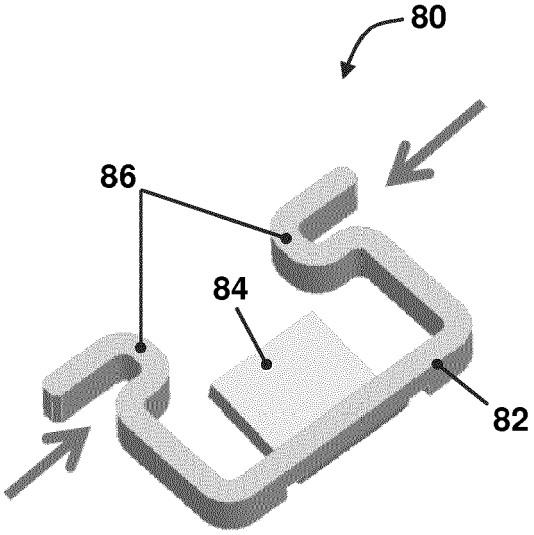

FIG. 22

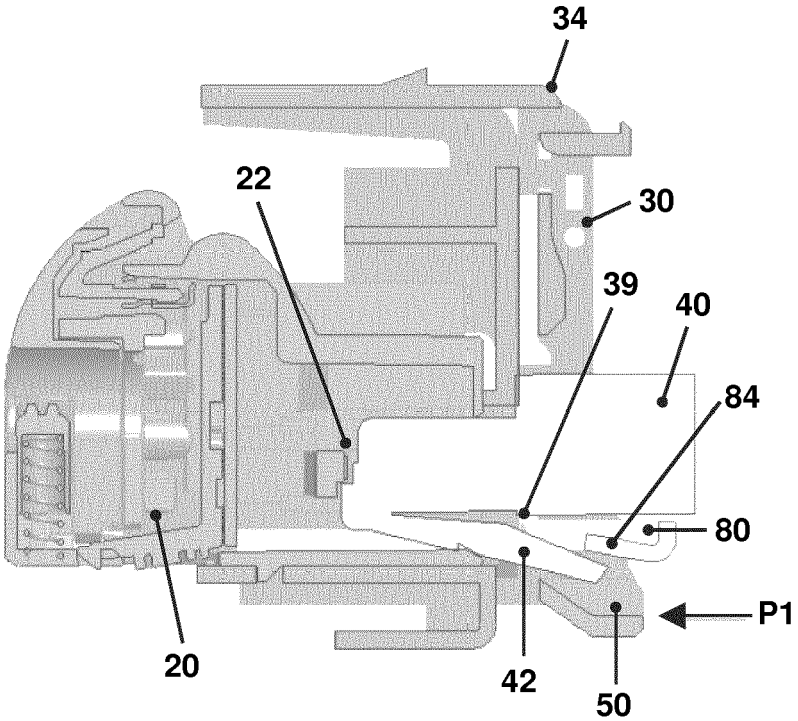

FIG. 23

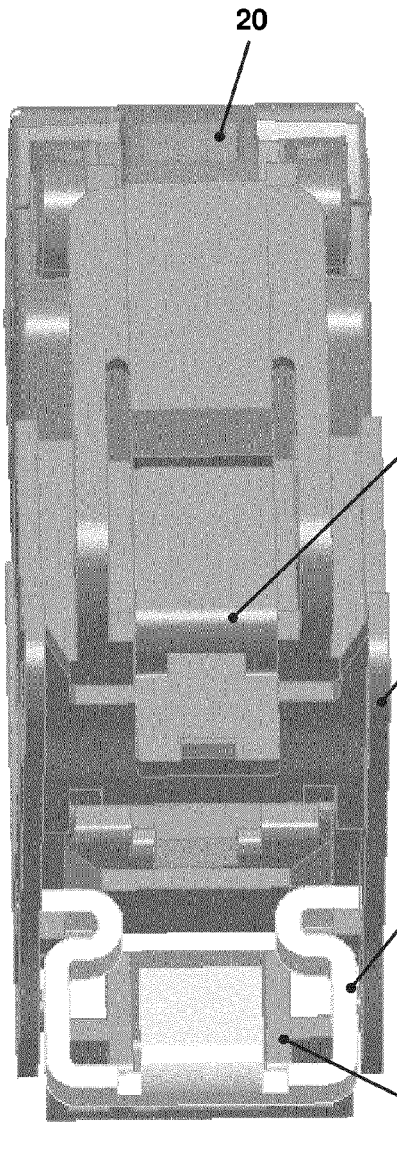

FIG. 24

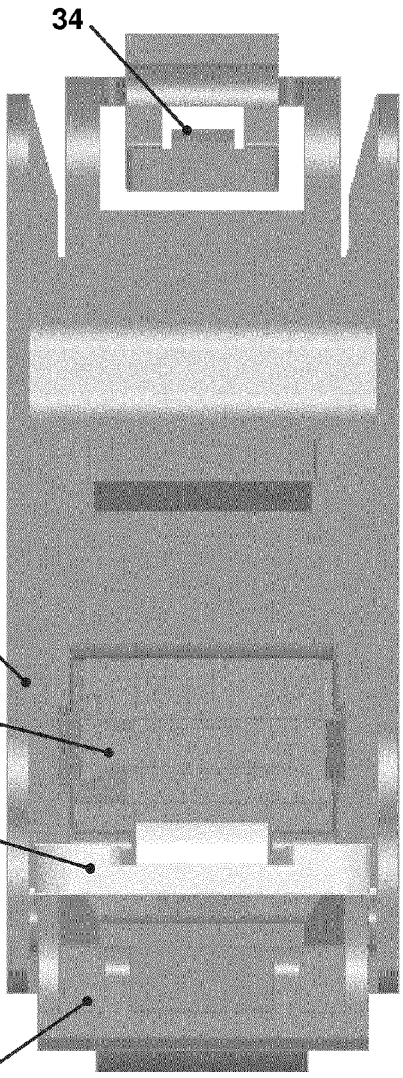

FIG. 25

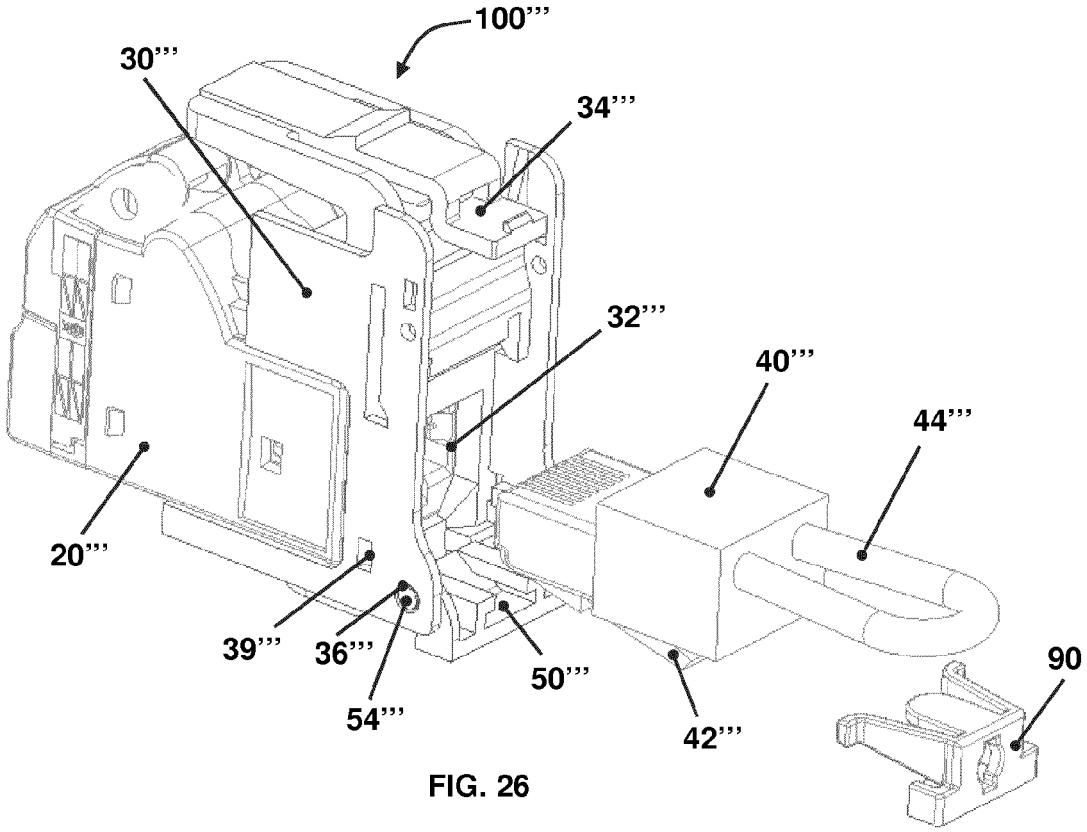
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FIG. 26

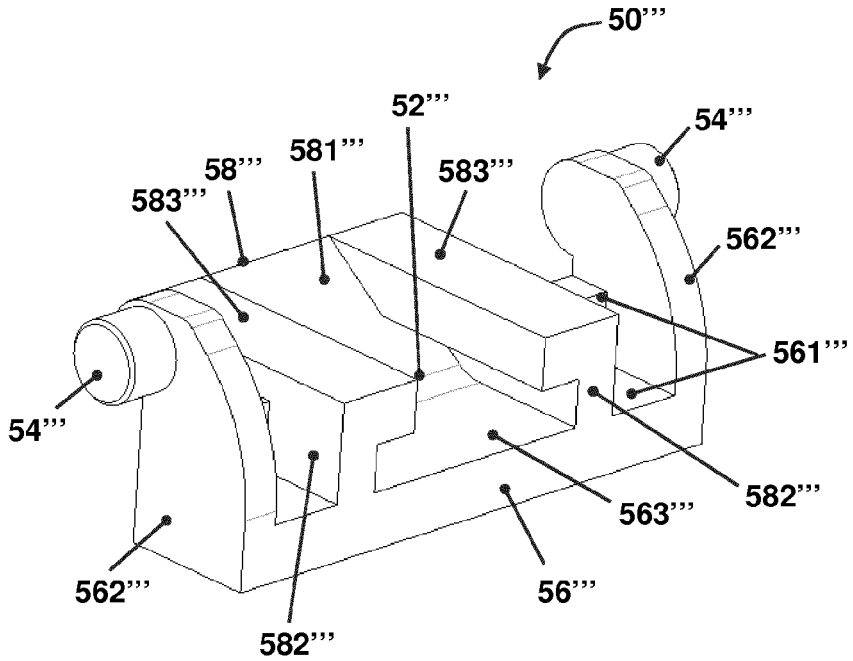
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FIG. 27

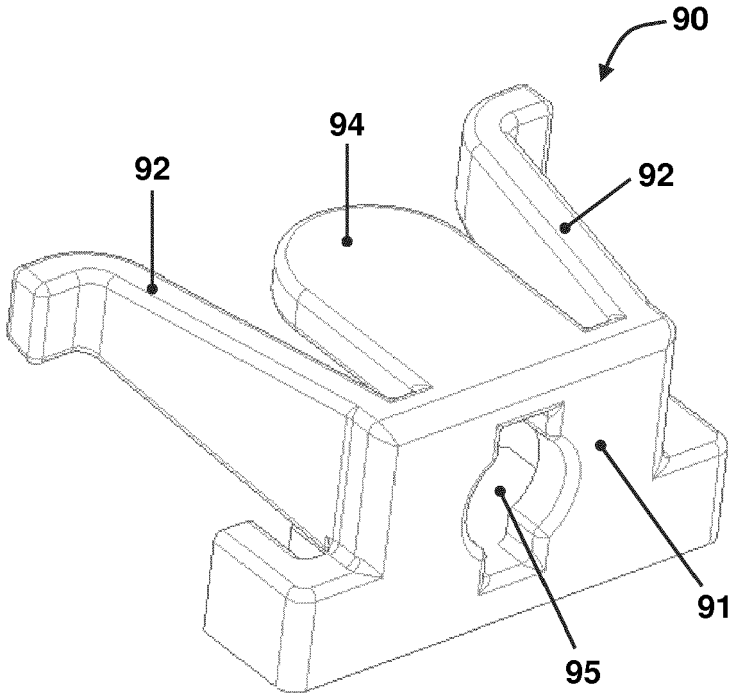

FIG. 28

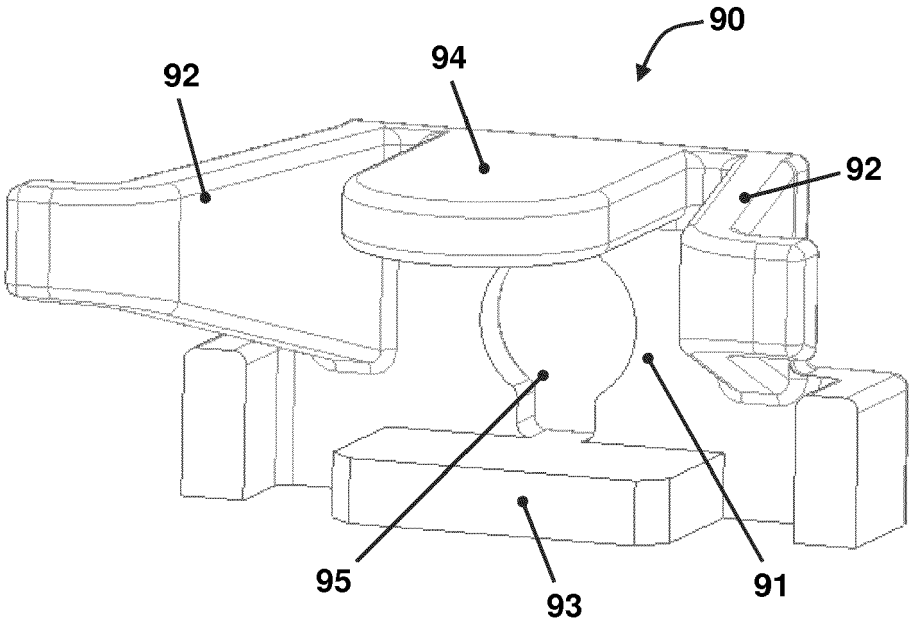

FIG. 29

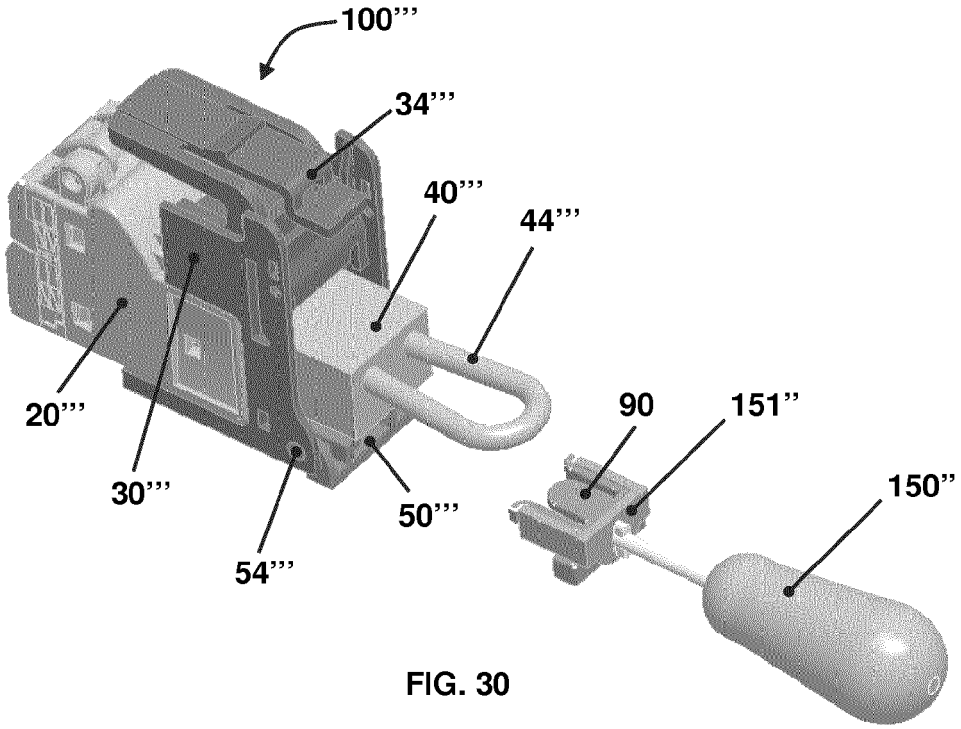
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FIG. 30

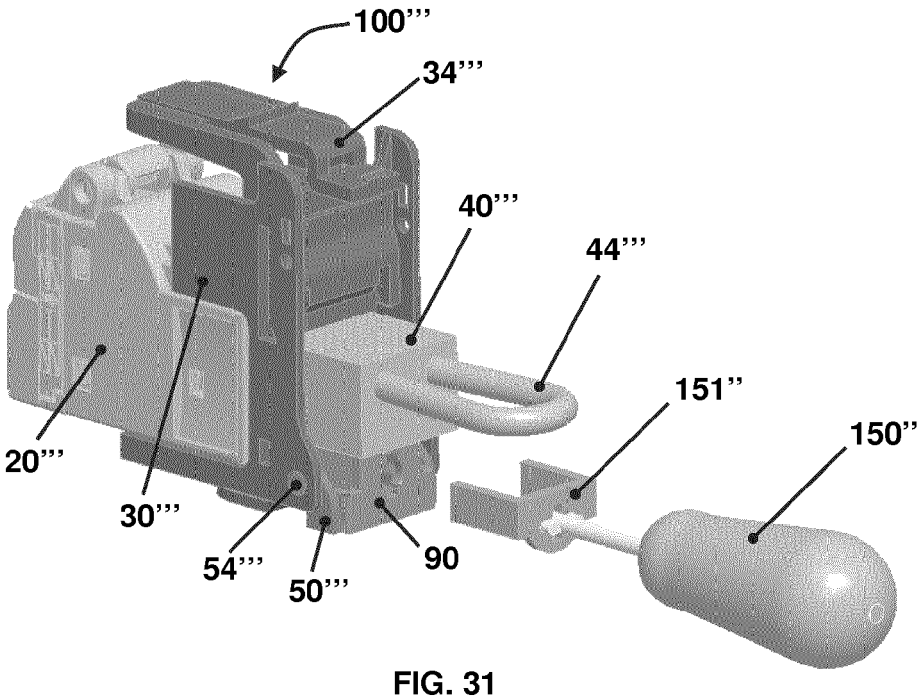
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FIG. 31

Europäisches Patentamt
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EUROPEAN SEARCH REPORT

Application Number
EP 13 30 6777

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 5 238 426 A (ARNETT JAIME R [US]) 24 August 1993 (1993-08-24) * the whole document *	1-26	INV. H01R13/633 H01R43/26 H01R13/74
Y	US 2008/132101 A1 (GUNDLACH JOHN G [US] ET AL) 5 June 2008 (2008-06-05) * abstract * * paragraph [0021] - paragraph [0026] * * figure 1 *	1-26	H01R13/627 H01R13/516 H01R24/64
Y	US 2007/207667 A1 (CAVENEY JACK E [US] ET AL) 6 September 2007 (2007-09-06)	9-26	
A	* abstract * * figures 1-36 *	1-8	
A	US 2006/040564 A1 (MORRISON DAVID S [US] ET AL) 23 February 2006 (2006-02-23) * abstract * * figures 1-32 *	1-26	

TECHNICAL FIELDS SEARCHED (IPC)
H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	25 February 2014	Pugliese, Sandro

CATEGORY OF CITED DOCUMENTS

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25-02-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5238426 A	24-08-1993	AU 4011293 A	13-01-1994
		CA 2097636 A1	12-12-1993
		DE 69313935 D1	23-10-1997
		DE 69313935 T2	29-01-1998
		EP 0575072 A1	22-12-1993
		JP 2948442 B2	13-09-1999
		JP H0636831 A	10-02-1994
		NZ 247845 A	27-02-1996
		US 5238426 A	24-08-1993
US 2008132101 A1	05-06-2008	NONE	
US 2007207667 A1	06-09-2007	AT 451737 T	15-12-2009
		EP 1994608 A2	26-11-2008
		TW 200805821 A	16-01-2008
		US 2007207667 A1	06-09-2007
		US 2008146056 A1	19-06-2008
		US 2009004904 A1	01-01-2009
		WO 2007103689 A2	13-09-2007
US 2006040564 A1	23-02-2006	AT 377272 T	15-11-2007
		DE 602005003141 T2	14-08-2008
		EP 1782506 A1	09-05-2007
		JP 4541410 B2	08-09-2010
		JP 2008511106 A	10-04-2008
		US 2006040564 A1	23-02-2006
		US 2009088027 A1	02-04-2009
		US 2010184313 A1	22-07-2010
		US 2010229363 A1	16-09-2010
		US 2011065296 A1	17-03-2011
		US 2012108090 A1	03-05-2012
		US 2012270427 A1	25-10-2012
		WO 2006023788 A1	02-03-2006

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82