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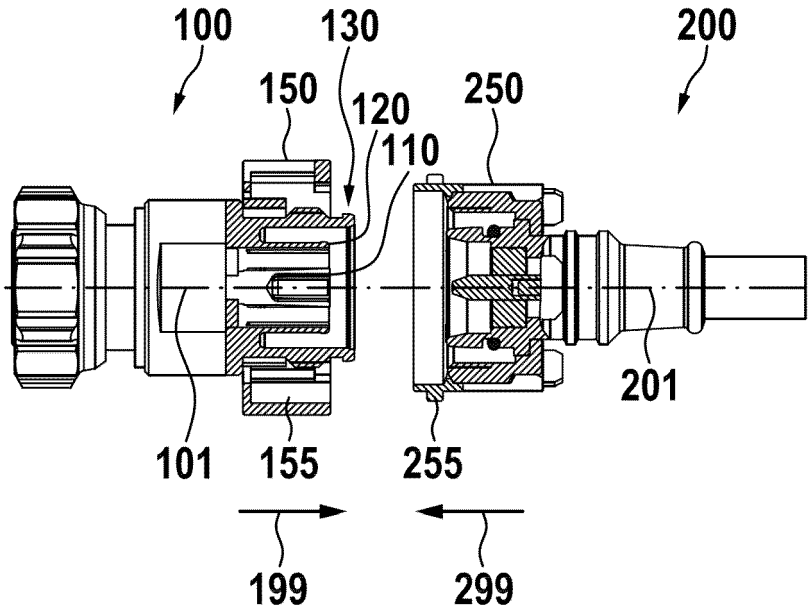
(54) **COAXIAL RF CONNECTOR KEYING SYSTEM AND RF CONNECTOR**

(57) A first coaxial RF connector (100) includes a first coding adapter (150) which may be of plastic material and snapped on the first connector. The first coding adapter includes at least one coding notch (155). A second coaxial RF connector (200) may include a coding ring (250), which may include at least one coding protrusion (255). If the coding adapter matches to the coding ring, then the connectors may be mated and locked. Otherwise they cannot be mated.

Fig. 9



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Description

Field of the invention

[0001] The invention relates to a keying system for coaxial RF connectors and coaxial RF connectors with keying to prevent false connections.

Description of the related art

[0002] Coaxial RF connectors are known from EP 3 300 535. If there are multiple connectors of the same type at a device which may be an antenna, an amplifier or a measuring device, then these connectors may be mixed up. This may lead to malfunctioning or even damaging of the device.

[0003] A coaxial cable connector interface for preventing mating with incorrect connector is disclosed in US 2020/0091658 A1. Here a barrier plug is provided in the space between a center conductor and an outer conductor of a connector. A disadvantage of this keying is that the electrical properties of the connector are modified by the added material, such that the basic connector design must be changed and retrofitting of existing connectors is not possible.

Summary of the invention

[0004] The problem to be solved by the invention is to provide an encoding (keying) for coaxial RF connectors to avoid unwanted connections. This encoding should be a simple retrofit to existing connectors.

[0005] Solutions of the problem are described in the independent claims. The dependent claims relate to further improvements of the invention.

[0006] In an embodiment, a coaxial RF connector keying system includes a matching pair of a first coding adapter and a second coding adapter. The coding adapters are configured to be held by a matching pair of coaxial RF connectors, e.g. a male connector and a female connector or a pair of hermaphroditic connectors. Therefore, the first coding adapter may be attached to a first connector and the second coding adaptor may be attached to a matching second connector. For example, the first connector may be a male connector and the second connector may be a female connector. This is only an example, as the coding adaptors work independent of the gender of the connectors, and therefore, they may be combined with any kind of gender of connectors.

[0007] The first coding adapter may have a ring-shaped body with an inner diameter. The second coding adapter may have a ring-shaped body with an outer diameter. The term ring-shaped may also include a hollow circular cylinder.

[0008] The outer diameter may at least partially be smaller than the inner diameter such that the second coding adapter may fit at least partially into the first coding adapter. The diameters of the first and the second coding adaptor may be matched such that the second coding adaptor fits into the first coding adaptor. The diameter of the second coding adaptor may be between 0.1 and 1 mm less than the diameter of the first coding adaptor.

[0009] The first coding adapter includes at least one first keying means, the first keying means further may include at least one of a protrusion and a recess. In an embodiment, the at least one first keying means may be oriented inwards in radial direction. The second coding adapter includes at least one second keying means, the second keying means further may include at least one of a protrusion and a recess. The at least one second keying means may be oriented outwards in radial direction. The at least one second keying means matches to the at least one first keying means. The keying means may have any combination, number and size of recesses and protrusions with and without limited length.

[0010] In another embodiment, at least one of the keying means is oriented in axial direction. Such, axial oriented keying means on each coding adapter may match to each other. Also a radial oriented keying means on one coding adapter and an axial oriented keying means on another coding adapter may match.

[0011] In an embodiment, a protrusion with a certain width of the first keying means would match with a recess having a slightly larger width of the second keying means at the second coding adaptor. The width may be about 0.1 to 1 mm larger. Further, a recess at the first keying means may match to a protrusion at the second keying means, whereas the recess at the first keying means is larger than the protrusion at the second keying means. Keying may be done by selecting different widths of protrusions and matching recesses and further by selecting different distances between such protrusions and recesses.

[0012] In an embodiment, a plurality of identical keying means may be arranged in the same distance to each other (equidistant). There may be 3, 4 or 5 identical keying means, such that there are angular distances of 120°, 90° or 72° between neighbored keying means. In the case of 3 keying means, these may be arranged at angles of 0°, 120° and 240°. This allows the coding adapters to be merged in three angular positions, which is more convenient than rotating the connectors and/or coding adapters for large angles before merging.

[0013] A pair of matching coding adapters include a first coding adapter and a second coding adapter with matching keying features.

[0014] In an embodiment, at least one of the coding adaptors may include a plastic material or a metal. In an embodiment, the first coding adaptor and/or the second coding adaptor are manufactured by an additive manufacturing process. This may allow to easily manufacture a large variety of keying systems including different sizes of the protrusions and recesses.

[0015] A coding adapter may include attachment means like at least one holding means to be held at a RF coaxial connector. Such a holding means may be a snap

tab which may be one piece with the coding adapter. It may also be a clamp or any other means which is configured to hold a coding adapter to a connector.

[0016] The coding adapters may include an attachment section which may further include holding means for the body of a coaxial connector.

[0017] A coding adapter may be held rotatable at a connector. This may allow to rotate a nut for locking connectors, even, when the coding adapters are not rotatable against each other. It may be sufficient, if only one coding adapter of a pair of matching coding adapters is rotatable. If, in contrast thereto both matching coding adapters may be held at the connectors or a nut of the connectors such that a nut cannot be rotated relative to the connectors, unless the there is a backspace behind the keying elements, such that the connectors witch attached coding adapters can be rotated against each other. Not every connector, like push-pull connector requires such a rotation between the coding adapters.

[0018] In an embodiment, a coding adapter may have holding means for the outside of a connector locking nut. It may be fixed to such a locking nut of a connector. The coding adapter may have a hex-nut like outside, such that the locking nut of a connector may be locked by a wrench at the coding adapter. A coding adapter may also be held within a groove under a connector locking nut.

[0019] In an embodiment, a coding adapter may have holding means for a groove or an outer thread of a connector. The coding adapter may be fixed to a groove or an outer thread of a connector.

[0020] Any coding adapter may be combined with any type of connector, like male, female or hermaproditic.

[0021] In an embodiment, the first keying means of the first coding adapter may have a first length, the second keying means of the second coding adapter may have a second length. Further, the first coding adapter may have a first keying means backspace which is free of keying means and which is located behind the first keying means and which is larger than the second length. The second coding adapter may have a second keying means backspace which is free of keying means and which is located behind the second keying means which is larger than the first length. This will result in a pass-trough feature which allows a rotation of the coding adapters relative to each other after the second coding adapter has been inserted into the first coding adapter so far that the keying means have passed each other. The term behind is related to a view from the connector interface. The length of the keying means is measured in axial direction of the ring.

[0022] A first RF connector may include such a coding adapter. A second RF connector may include a second matching coding adapter. A RF connector system may include a pair of matching RF connectors each connector having a coding adapter of a matching pair of coding adapters.

Description of Drawings

[0023] In the following the invention will be described by way of example, without limitation of the general inventive concept, on examples of embodiment with reference to the drawings.

[0024] Basically, three sets of embodiments are disclosed. A first set relates to a set of ring-shaped coding adapters including a first coding adapter of type A matching to a second coding adapter of type B. The coding adapters may be added or retrofitted to existing connectors at the outside of the connectors.

[0025] A second set relates to a set of ring-shaped coding adapters including a first coding adapter of type C matching to a second coding adapter of type D. Here, the coding or keying devices are contained within the connector system, when mated and locked. Therefore, they are invisible and protected from the environment.

[0026] A third set relates to a set of ring-shaped coding adapters including a first coding adapter of type F matching to a second coding adapter of type E. Here, coding adapters may be added or retrofitted at least to existing type F connectors. Type E connectors may require modification.

[0027] Although the coding adapters are shown attached to certain male or female connectors, they may be attached to any gender of connectors, e.g. male, female, hermaphroditic, as the coding adapters work independent of the connector interface.

[0028] Figures 1 to 4 show a first embodiment referred as type A which may be mated with a second embodiment of type B as will be shown later. Here, coding adapters may be added or retrofitted to existing connectors. This may even be done without modifying the connectors. The coding adapters are located at the outside of the connectors.

[0029] In figure 1, a basic female coaxial RF connector 100 of type A is shown. It may include an A center conductor 110, an A outer conductor 120 and it may include an A locking thread 132 at an A outer sleeve 130. The embodiment may also work without A locking thread 132 if a different type of locking mechanism e.g. a snap lock or bayonet lock may be provided.

[0030] In figure 2, the connector of figure 1 is shown with a first A coding adapter 150 attached. The A coding adapter 150, which may have a ring-shaped body may be snapped on the first connector, e.g. by at least one A holding means 152 which may be held by an A mounting neck 134 at the connector, and which may be behind an A locking thread 132. Such an A holding means 152 may be a snap tab.

[0031] The first coding adapter may include a keying means, which may be at least one A coding protrusion 154, a first coding recess 156, a second coding recess 157 or any combination of keying means like a protrusion or a recess. The connector 100 may be a standard connector which may be retrofitted by attaching the coding adapter 150. The connector may have a rear connector

140 to connect a further counter connector or a cable (not shown), such that the connector 100 may be an adapter.

[0032] Figure 3 shows a front view to the connector interface of the coaxial RF connector 100. This shows further a first keying means 160, which may include a plurality of protrusions 154. Here, 2 protrusions are shown. The protrusions are radially oriented inwards. The A coding adapter 150 shown here has three identical keying means 160 including protrusions 154. Between and on the sides of the protrusions may be recesses.

[0033] Figure 4 shows a sectional view of the A coaxial RF connector 100. Here, the inner diameter 161 of the coding adapter 150 is shown. Further, the first length 163 of the first keying means 160, which may be the same as the length of the protrusions 154, is indicated together with the length of the first keying means backspace 165. This length of the first keying means backspace 165 should be larger than the second length 263 of the second keying means 260, which is shown in the next figures.

[0034] Figures 5 to 8 show a second embodiment referred as type B. This is a counter connector mating to a connector of type A. The genders may also be exchanged. Further hermaphroditic or any other kind of connectors may be used.

[0035] In figure 5, a male coaxial RF connector 200 of type B is shown. It may include a B center conductor 210, a B outer conductor 220 and it may include a B locking nut 230. The embodiment may also work without B locking nut 230 if a different type of locking mechanism e.g. a snap lock or bayonet lock is provided. The B locking nut 230 or other locking means may match to the B locking thread 132 or any other locking means at the counter connector of type A. Here, the outer diameter 261 of the coding adapter 250 is shown. Further, the second length 263 of the second keying means 260, which may be the same as the length of the recesses 254 or the protrusions 255, 256, is indicated together with the length of the second keying means backspace 265. This length of the second keying means backspace 265 should be larger than the first length 163 of the first keying means 160.

[0036] In figure 6, the connector of figure 5 is shown with a second coding adapter 250 of type B attached. The B coding adapter 250 may be on the first connector. It may be held by the B locking nut 230, e.g. snapped on the B locking nut 230, e.g. by at least one snap tab, e.g. 6 snap tabs for a hex nut. The coding adapter may include a keying means 260, which may be a B coding recess 254, a B first coding protrusion 255, a B second coding protrusion 256 or any other keying means like a protrusion or recess or any combination thereof. The keying means may be at the outside of the connector. They may have similar and/or matching properties to the keying means of the A type coding adapter, as will later be described in figure 12. The second connector may be a special connector matching to the first connector with attached coding adapter. The coding adapter 250 of embodiment B may match the coding adapter 150 of embodiment A. For example, the combination of coding protrusions and recesses of the type A coding adapter 150 may match to the type B coding adapter 250. Therefore, the A coding protrusion 154 may match to the B coding recess 254, the A first coding recess 155 may match to the B first coding protrusion 255, the A second coding recess 156 may match to the B second coding protrusion 256 and so on. For matching the width of a protrusion may fit to the width of a recess. Further the depths may be matching, also the distances between recesses and protrusions may match. The coding protrusions may have a limited length. This length may be in the range from 1 mm to 10 mm. This may allow to pass the protrusions of a type B coding adapter 250.

[0037] After passing these, the type A coding adapter 150 may be rotated freely against the type B coding adapter 250, which may allow to lock a type B locking nut 230.

[0038] Figure 7 shows a side view of the coaxial RF connector 200.

[0039] Figure 8 shows a front view to the connector interface of the coaxial RF connector 200.

[0040] Figures 9, 10 and 11 show different phases of mating (connecting) a connector of type A and a connector of type B in a sectional side view of the connectors.

[0041] Figure 9 shows a connector of type A and a connector of type B distant from each other. The connectors are moved together as indicated by the arrows for direction of mating of connector type A 199 and direction of mating of connector type B 299.

[0042] In figure 10, the connectors are closer together than in the previous figure, such that the type A coding adapter 150 is in contact with the type B coding adapter 250. There may be a contact between the Type A outer conductor 120 and the Type B outer conductor 220, but the inner conductors do not contact each other. If the type A coding adapter 150 matches to the type B coding adapter 150 a further movement to completely mate the connectors is possible. If the coding adapters do not match, a movement is blocked and a full connection of the connectors including the center conductors is not possible.

[0043] In figure 11, the connectors are completely mated and connected. The type B locking nut has been screwed on type A locking thread 132. Rotation of the nut is possible, because the A coding adapter 150 and the type B coding adapter 250 both have a pass-through feature. This allows to push the type B coding adapter 250 into the type A coding adapter 150 if the adapters match together. After the adapters have been pushed together, they may be freely rotated against each other.

[0044] Figures 12 to 15 show details of the type A coding adapter 150. Basically, a type A coding adapter may also be connected to a male connector like the type B connector and a type B coding adapter may also be connected to a female connector like the type A connector.

[0045] In figure 12, type A coding adapter 150 is shown in a front view, as seen onto the connector interface like

figure 3. There may be at least on type A holding means 152. There may also be a higher number, like 3 or 5 type A holding meanss 152. The A holding meanss 152 may hold the A coding adapter 150 at the A connector. There may be an A mounting neck 134 at a type A connector, which matches to the type A holding meanss 152. For encoding or keying at least one type A coding protrusion 154 may be provided.

[0046] Further at least one keying means, which may include a type A first coding recess 155 and/or type A second coding recess 156 may be provided. These may be arranged at a ring-shaped body of the A coding adapter 150. They may be at an inner side of the ring-shaped body. There may also be any number of coding protrusions and coding recesses. A plurality of coding protrusions and coding recesses may be grouped together to form a key. There may be a plurality of such groups or keys, which may be arranged in the same distance to each other. This allows to match the coding adapters in a plurality of positions. For example, if there are three groups or keys as shown in positions having angular distances of 120°, the coding adapters may be matched in three positions 120° distant. The type A coding protrusions and coding recesses may match to type B coding protrusions and coding recesses 254, 255, 256 as shown in figures 6, 7 and 8 at the outside of the type B coding adapter.

[0047] Figure 13 shows a type A coding adapter 150 in a side view.

[0048] Figure 14 shows a type A coding adapter 150 in a rear view. There may be A openings 153 in the ring-shaped body behind the A coding protrusions 154 Figure 15 shows a type A coding adapter 150 in a perspective view. The A coding protrusions 154 have a limited length. This length may be in the range from 1 mm to 10 mm. For blocking a not matching type B coding adapter 250, the A coding protrusions 154 may only be at the A front edge 158 of the type A coding adapter 150. If the type B coding adapter 250 has matching protrusions and recesses at its outside, which also have a limited length, this may allow to pass the protrusions of a type B coding adapter 250. After passing these, the type A coding adapter 150 may be rotated freely against the type B coding adapter 250, which may allow to lock a type B locking nut 230.

[0049] Figure 16 shows a modified A coding adapter 151. Here, modifies A coding recesses 157 are provided. They have a larger length, such that they block rotation of a matching type A coding adapter 150 against a type B coding adapter 250.

[0050] Figure 17 shows a further embodiment including an embodiment of a type C connector 500 mated with an embodiment of a type D connector 600. Here, the coding or keying devices are contained within the connector system, when mated and locked. Therefore, they are invisible and protected from the environment. To implement this embodiment, the connectors and specifically the type D connector 600 must provide provisions for attaching a D coding adapter 650.

[0051] Figure 18 shows a type C connector 500, including a C outer sleeve 530 with a C locking thread 532. The figure further shows a C outer conductor 520 and a C rear connector 540.

[0052] Figure 19 shows a type D connector 600, having a D locking nut 630. The figure further shows a D outer conductor 620.

[0053] Figure 20 shows a type C connector 500 including a ring-shaped first C coding adapter 550. The C coding adapter 550 may include a plurality of C holding meanss 552 to hold the C coding adapter 550 at the C outer sleeve 530. The enlarged detail shows a type C coding recess 554 and a C coding protrusion 555. At least one of a plurality of C coding recesses 554 and C coding protrusions 555 may be at the inner side of the ring-shaped C coding adapter 550.

[0054] Figure 21 shows a type D connector 600 including a ring-shaped second D coding adapter 650, but without D locking nut 630 to improve view of the D coding adapter 650. The ring-shaped D coding adapter 650 may further include at least one of a D coding protrusion 654 and or a D coding recess. Basically, the arrangement of protrusions and recesses may be as described in the embodiments above. The protrusions and recesses may have full available length, as rotation of the mated connectors normally is not required. The second coding adapter 650 may be matching to the first coding adapter 650 described before.

[0055] Figures 22, 23 and 24 show different phases of mating (connecting) a connector of type C and a connector of type D in a sectional side view of the connectors.

[0056] Figure 22 shows a connector of type C and a connector of type D distant from each other. The connectors are moved together as indicated by the arrows for direction of mating of connector type A 599 and direction of mating of connector type B 699. Here, the sectional views also show C center conductor 510, C outer conductor 520, D center conductor 610 and D outer conductor 620.

[0057] In figure 23, the connectors are closer together than in the previous figure, such that the type C coding adapter 550 is in contact with the type D coding adapter 650. There may be a contact between the Type C outer conductor 520 and the Type D outer conductor 620, but the inner conductors do not contact each other. If the type C coding adapter 650 matches to the type D coding adapter 550 a further movement to completely mate the connectors is possible. If the coding adapters do not match, a movement is blocked and a full connection of the connectors including the center conductors is not possible.

[0058] In figure 24, the connectors are completely mated and connected. The type D locking nut has been screwed on type C locking thread 532. Rotation of the nut is possible, because the C coding adapter 550 and the type D coding adapter 650 both have a pass-through feature. This allows to push the type D coding adapter

650 into the type C coding adapter 550 if the adapters match together. After the adapters have been pushed together, they may be freely rotated against each other.

[0059] Figure 25 shows the cooperation of the coding adapters in the case of a C coding adapter 550 matching to a D coding adapter 650. For a better viewability, the D locking nut 630 is not shown. The detailed view in this figure shows D coding protrusions 654 and 656 matching to C coding recesses 554 and 556, such that the D coding protrusions 654 and 656 may slide into the C coding recesses 554 and 556 when the C connector and the D connector are pushed together.

[0060] Figure 26 shows a similar configuration as in the previous figure, but with not matching coding adapters. Here, the D coding protrusion 654 matches with C coding recess 554, but D coding protrusion 656 does not match with C coding recess 556, such that the coding adapters and therefore the connectors are blocked.

[0061] Figures 27 to 29 show a further embodiment referred as type E which may be mated with another embodiment of type F as will be shown later. Here, coding adapters may be added or retrofitted at least to existing type F connectors. Type E connectors may simply be modified by providing a groove for E encoding adapter 750.

[0062] In figure 27, a basic female coaxial RF connector 700 of type E is shown in a front view on the connector interface. It may include a center conductor 710, an outer conductor 720.

[0063] Figure 28 shows the connector of the previous figure in a sectional view. A second type E coding adapter 750 is in an E groove 739 of type E connector 700. This E groove 739 may be behind E locking thread 732 of E outer sleeve 730. Here, an E rear connector 740 is marked.

[0064] Figure 29 shows more details of the E coding adapter 750. It includes any combination of E coding protrusions 754, 756 and E coding recesses 755.

[0065] Figure 30 shows an F type connector 800 with a first type F coding adapter 850 held by F holding meanss 852 on an F locking nut 830. The F coding adapter 850 may have a ring shape with F coding recesses 854, 856 and F coding protrusions 855. Further an F cable connector 840 may be provided. The first coding adapter 850 may be matching to the second coding adapter 750 described before.

[0066] Fig. 31 shows a Type E connector 700 aligned with a type F connector 800.

[0067] Figures 32, 33 and 34 show different phases of mating (connecting) a connector of type E and a connector of type F in a sectional side view of the connectors.

[0068] Figure 32 shows a connector of type E and a connector of type F distant from each other. The connectors are moved together as indicated by the arrows for direction of mating of connector type E 799 and direction of mating of connector type F 899.

[0069] In figure 33, the connectors are closer together than in the previous figure, such that the type E coding adapter 750 is in contact with the type F coding adapter 850.

[0070] In figure 34, the connectors are completely mated and connected. The type F locking nut 830 has been screwed on type E locking thread 732. Rotation of the nut is possible, because the E coding adapter 750 and the type F coding adapter 850 both have a pass-through feature as described before.

[0071] Figure 35 shows the cooperation of the coding adapters in the case of an E coding adapter 750 matching to a F coding adapter 850. The detailed view in this figure shows E coding protrusions 754 and 756 matching to F coding recesses 854 and 856, such that the E coding protrusions 754 and 756 may slide into the F coding recesses 854 and 856 when the E connector and the F connector are pushed together.

[0072] Figure 36 shows a similar configuration as in the previous figure, but with not matching coding adapters. Here, the E coding protrusion 754 matches with F coding recess 854, but E coding protrusion 757 does not match with F coding recess 856, such that the coding adapters and therefore the connectors are blocked.

[0073] Figure 37 shows a type E connector 700 a type F connector 800 connected.

List of reference numerals

[0074]

100	A connector
110	A center conductor
120	A outer conductor
130	A outer sleeve
132	A locking thread
134	A mounting neck
140	A rear connector
150	A coding adapter
151	A modified coding adapter
152	A holding means
153	A openings
154	A coding protrusion
155	A first coding recess
156	A second coding recess
157	A modified coding recess
158	A front edge
160	A first keying means
161	A coding adapter inner diameter
163	A keying means length
165	A keying means backspace
199	A direction of mating
200	B connector
210	B center conductor
220	B outer conductor
230	B locking nut
240	B cable connector
250	B coding adapter
254	B coding recess
255	B first coding protrusion

256 B second coding protrusion
258 B coding adapter holding tab
260 B second keying means
261 B coding adapter outer diameter
263 B keying means length
265 B keying means backspace
199 B direction of mating
500 C connector
510 C center conductor
520 C outer conductor
530 C outer sleeve
532 C locking thread
540 C rear connector
550 C coding adapter
552 C holding means
554 C coding recess
555 C coding protrusion
556 C second coding recess
599 C direction of mating
600 D connector
610 D center conductor
620 D outer conductor
630 D locking nut
640 D cable connector
650 D coding adapter
654 D coding protrusion
655 D coding recess
656 D second coding protrusion
699 D direction of mating
700 E connector
710 E center conductor
720 E outer conductor
730 E outer sleeve
732 E locking thread
739 E groove
740 E rear connector
750 E coding adapter
752 E holding means
754 E first coding protrusion
755 E coding recess
756 E second coding protrusion
757 E modified second coding protrusion
799 E direction of mating
800 F connector
810 F center conductor
820 F outer conductor
830 F locking nut
840 F cable connector
850 F coding adapter
852 F holding means
854 F first coding recess
855 F coding protrusion
856 F second coding recess
899 F direction of mating
901 center axis

Claims

1. A Coaxial RF Connector keying system including a matching pair of a first coding adapter (150, 550, 850) and a second coding adapter (250, 650, 750), wherein
the first coding adapter (150, 550, 850) has a ring shaped body with an inner diameter (161),
the first coding adapter (150, 550, 850) comprises at least one first keying means (160), the first keying means (160) including at least one of a protrusion (154) and a recess (155),
and
the second coding adapter (250, 650, 750) has a ring shaped body with an outer diameter (261),
wherein the outer diameter (261) is smaller than the inner diameter (161) such that the second coding adapter (250, 650, 750) fits into the first coding adapter (150, 550, 850), and
the second coding adapter (250, 650, 750) comprises at least one second keying means (260), the second keying means (260) including at least one of a protrusion (255) and a recess (254),
and wherein
the at least one second keying means (260) matches to the at least one first keying means (160).

2. A Coaxial RF Connector keying system according to claim 1,
characterized in, that
the at least one first keying means (160) is oriented inwards in radial direction,
the at least one second keying means (260) is oriented outwards in radial direction,
the at least one first keying means (160) of the first coding adapter (150) has a first length (163), the al least one second keying means (260) of the second coding adapter (250) has a second length (263), wherein
the first coding adapter (150) has a first keying means backspace (165) behind the at least one first keying means (160) which is larger than the second length (263), and
the second coding adapter (250) has a second keying means backspace (265) behind the at least one second keying means (260) which is larger than the first length (163).

3. A Coaxial RF Connector keying system according to claim 1,
characterized in, that
the at least one first keying means (160) is oriented inwards in radial direction, and/or
the at least one second keying means (260) is oriented outwards in radial direction.

4. A Coaxial RF Connector keying system according to claim 1,

characterized in, that
the at least one first keying means (160) is oriented in axial direction, and/or
the at least one second keying means (260) is oriented in axial direction.

5. A Coaxial RF Connector keying system according to any of the previous claims,
characterized in, that
the first coding adapter (150) has holding means for a groove or an outer thread of a connector.

6. A Coaxial RF Connector keying system according to any of the previous claims,
characterized in, that
the second coding adapter (250) has holding means for the outside of a connector locking nut (230) or within a groove under the connector locking nut (230).

7. A Coaxial RF Connector keying system according to any of the previous claims,
characterized in, that
the second coding adapter (250) has at least one snap tab for the outside of a connector locking nut (230).

8. A Coaxial RF Connector keying system according to any of the previous claims,
characterized in, that
a plurality of identical keying means (160, 260) is arranged in the same distance to each other.

9. A Coaxial RF Connector keying system according to the previous claim,
characterized in, that
3, 4, or 5 of identical keying means (160, 260) are arranged under angular distances of 120°, 90° or 72°.

10. A Coaxial RF Connector keying system according to any of the previous claims,
characterized in, that
the first coding adapter (150, 550, 850) and/or the second coding adapter (250, 650, 750) include a plastic material and/or metal.

11. A Coaxial RF Connector keying system according to any of the previous claims,
characterized in, that
the ring-shaped body of the first coding adapter (150, 550, 850) has an attachment section including holding means for the body of a first coaxial connector and/or
the ring-shaped body of the second coding adapter (250, 650, 750) has an attachment section including holding means for the body of a second coaxial connector.

12. A RF coaxial connector including a coding adapter according to any of the previous claims.

13. A pair of RF coaxial connectors including a first connector (100), and a second connector (200) matching to the first connector (100), further including a first coding adapter (150) and a second coding adapter (250) according to any of the previous claims,
wherein
the first connector (100) includes a first coding adapter (150) and
the second connector (200) includes a second coding adapter (250), wherein the first coding adapter (150) matches to the second coding adapter (250).

Fig. 1

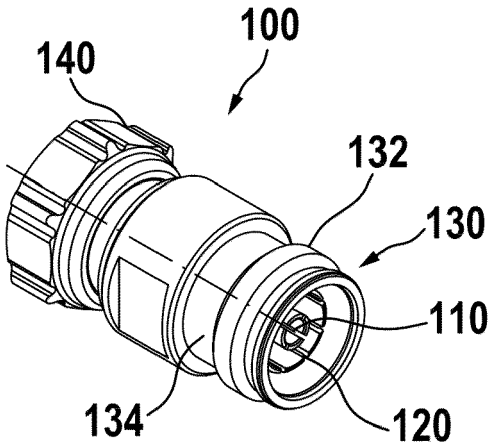
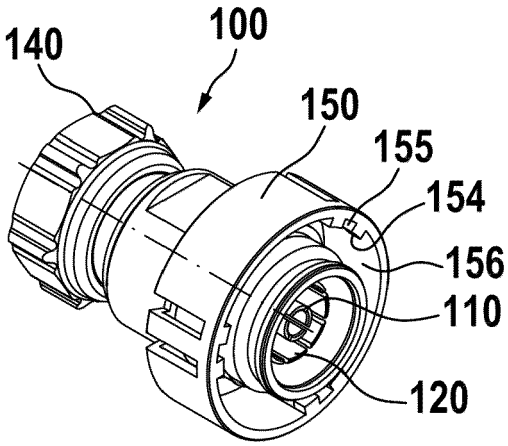


Fig. 2



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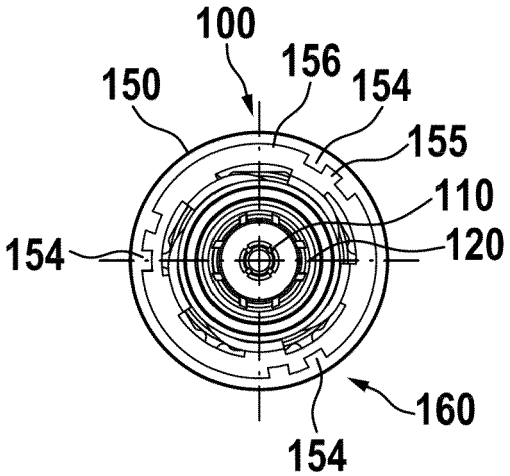

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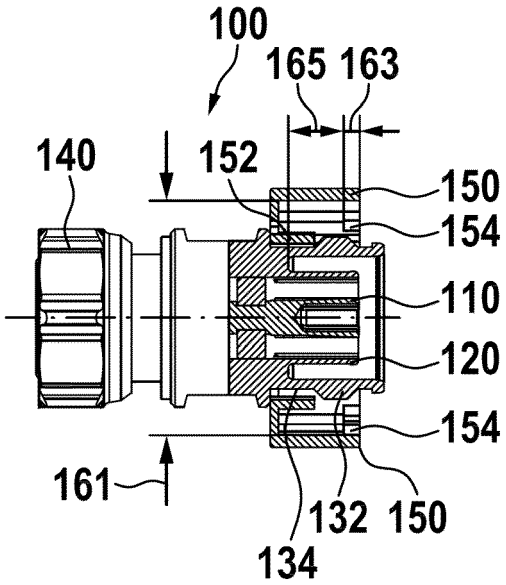

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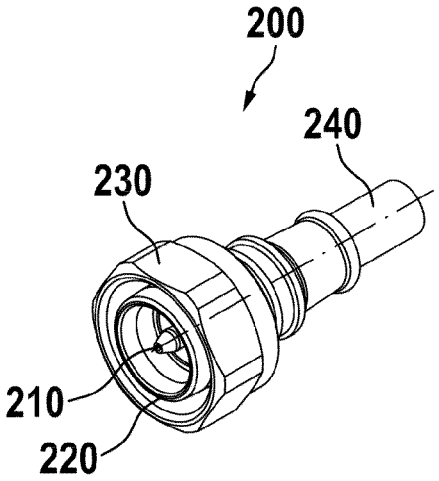

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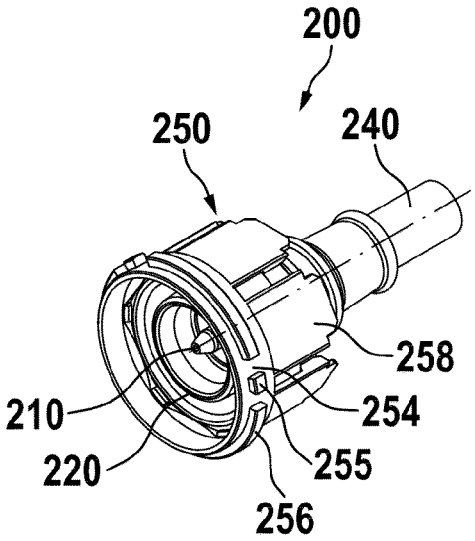

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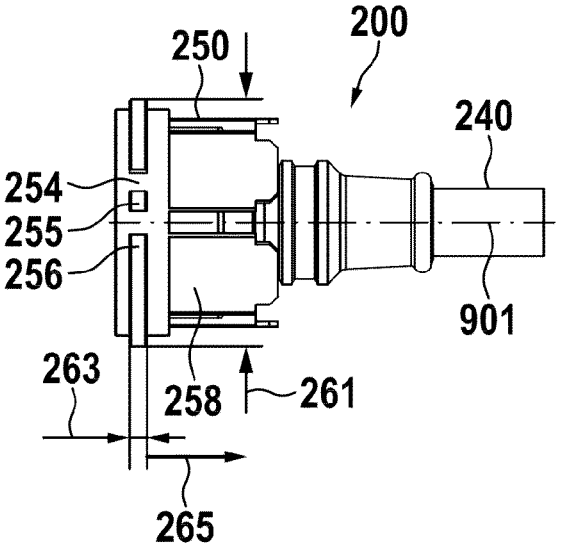

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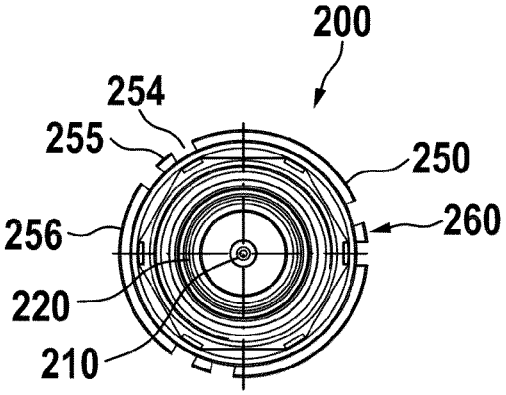

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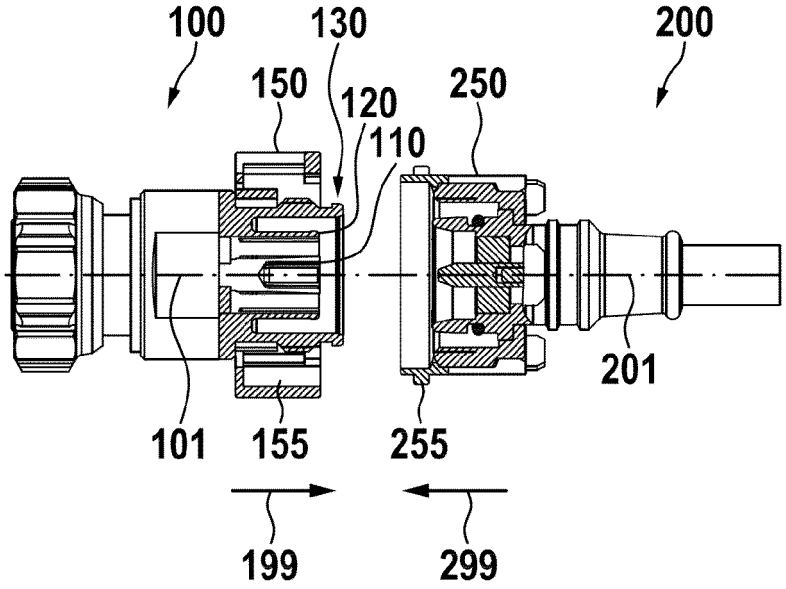

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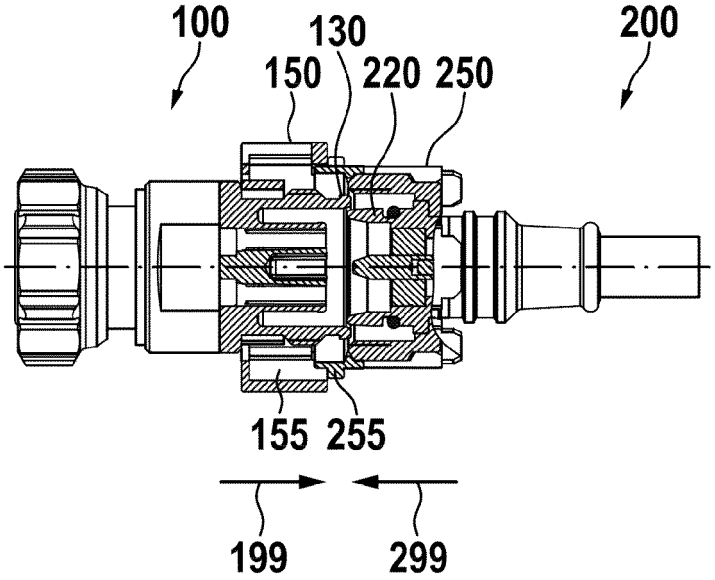

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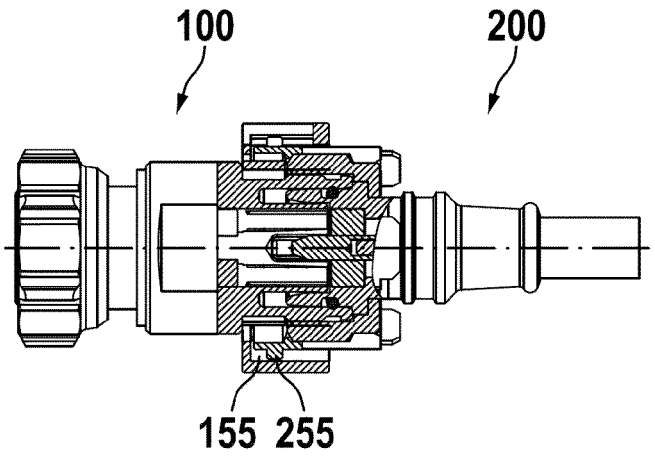
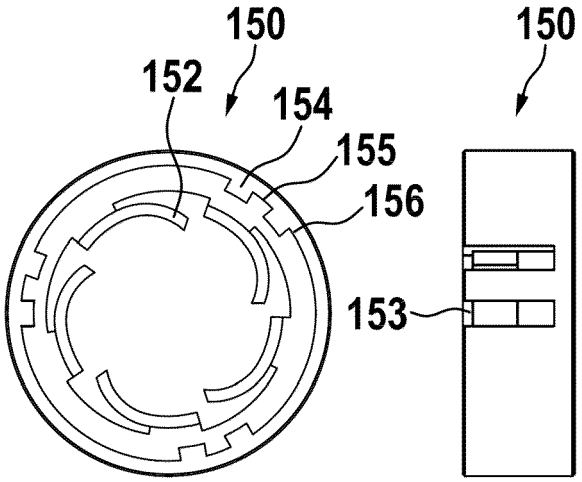


Fig. 12

Fig. 13

Fig. 14



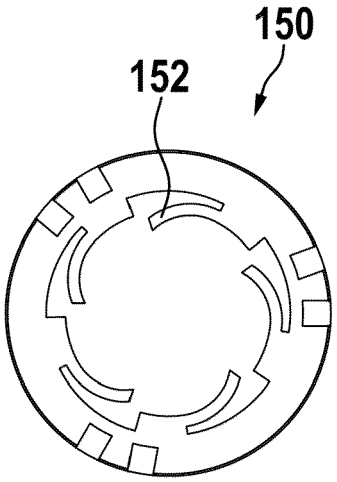
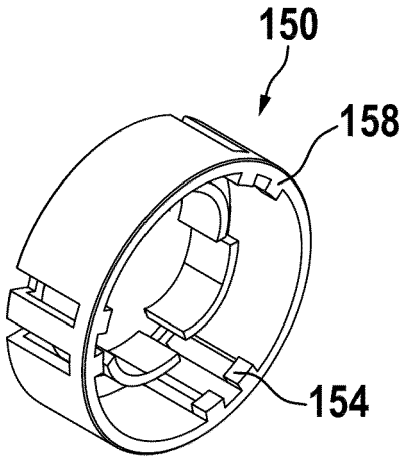


Fig. 15

Fig. 16



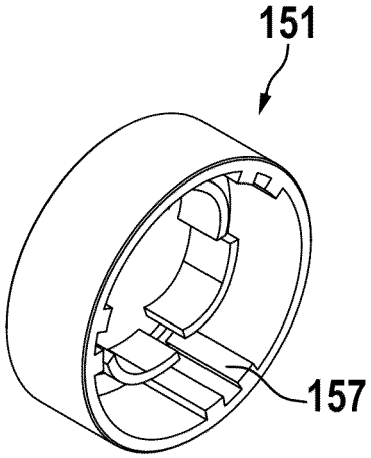
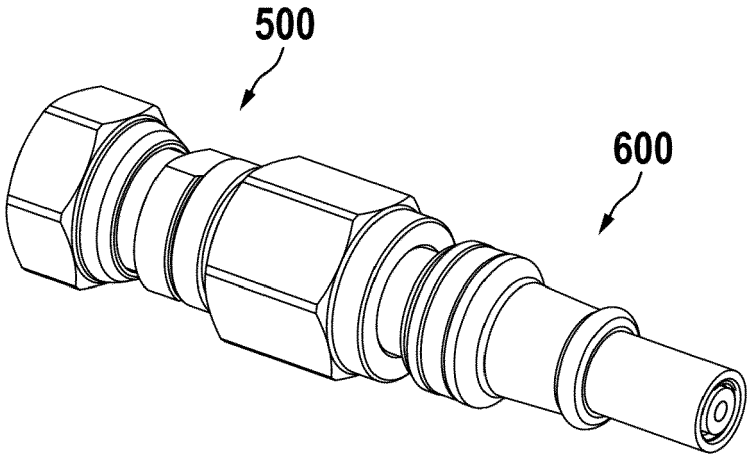


Fig. 17



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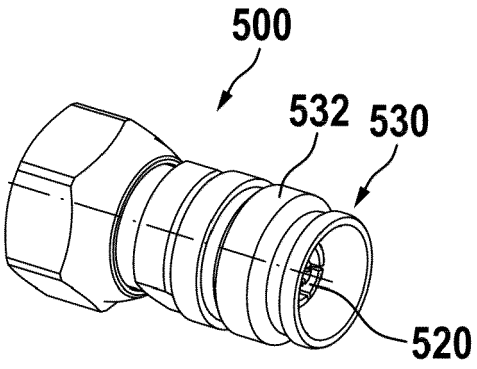

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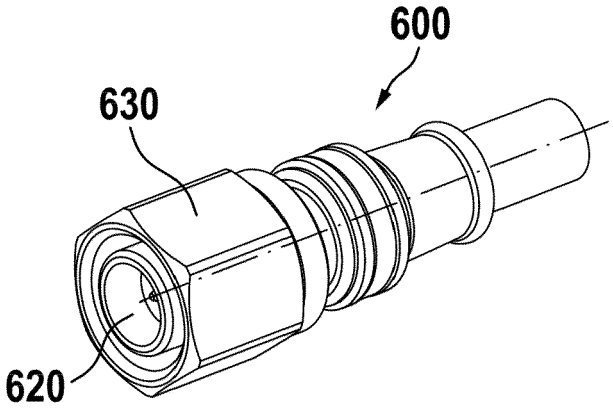

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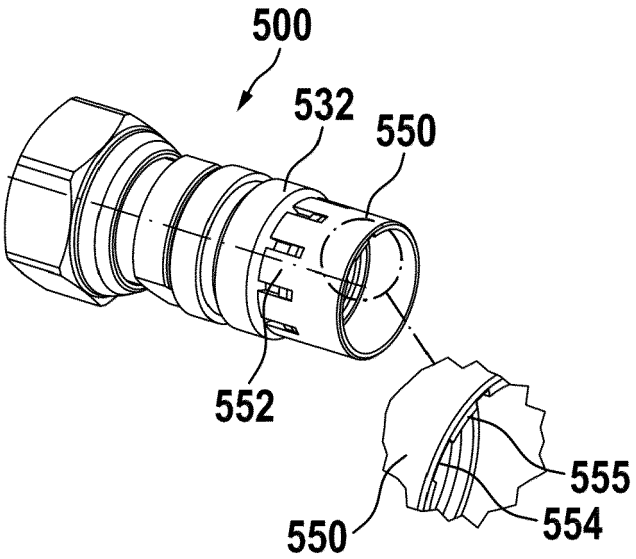

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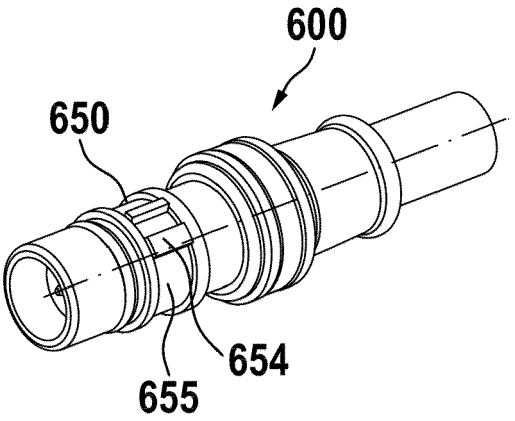


Fig. 22

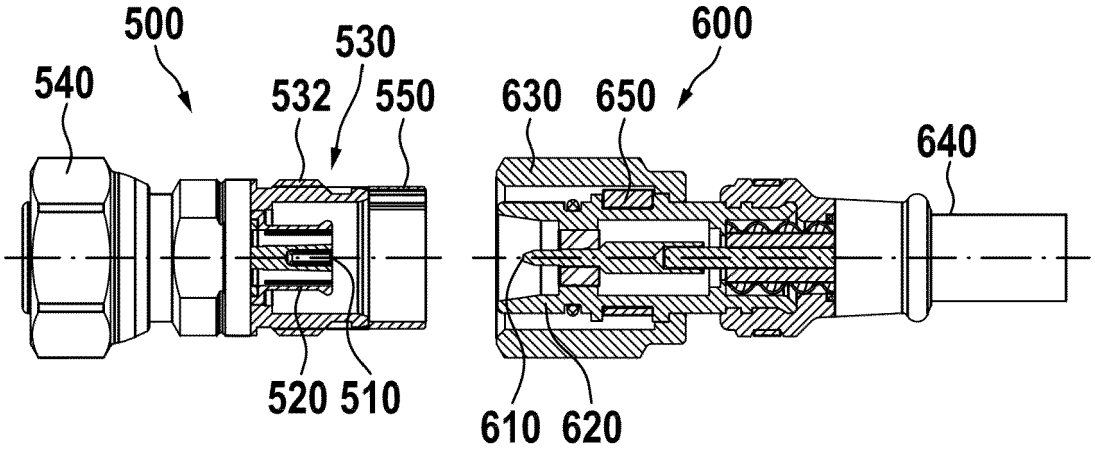
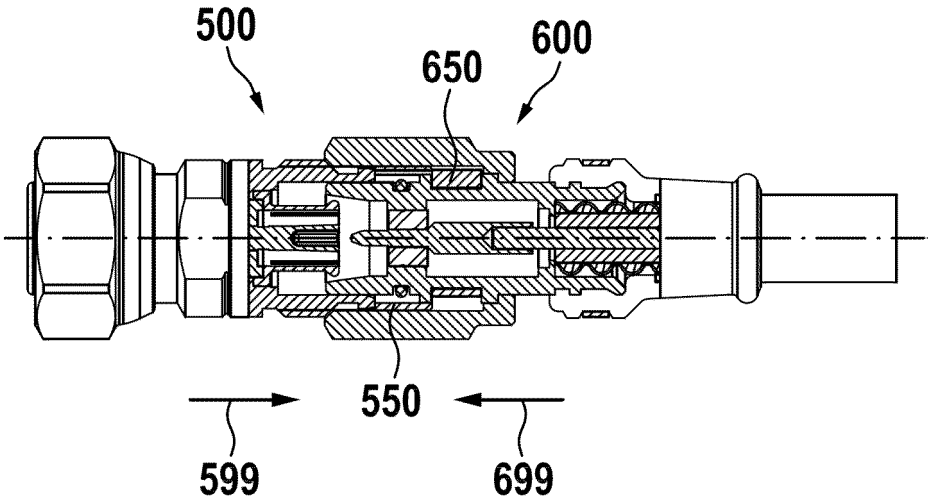


Fig. 23



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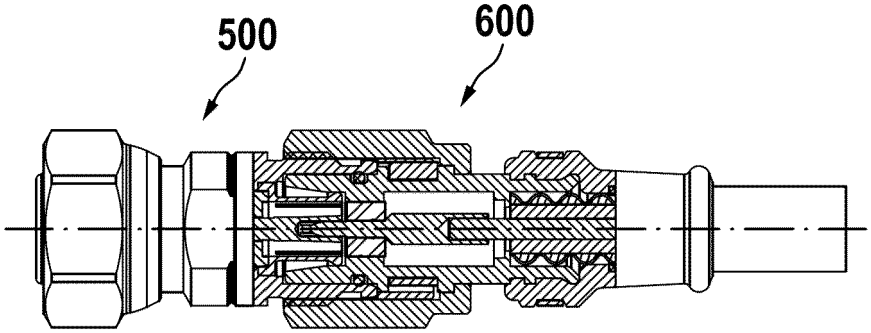

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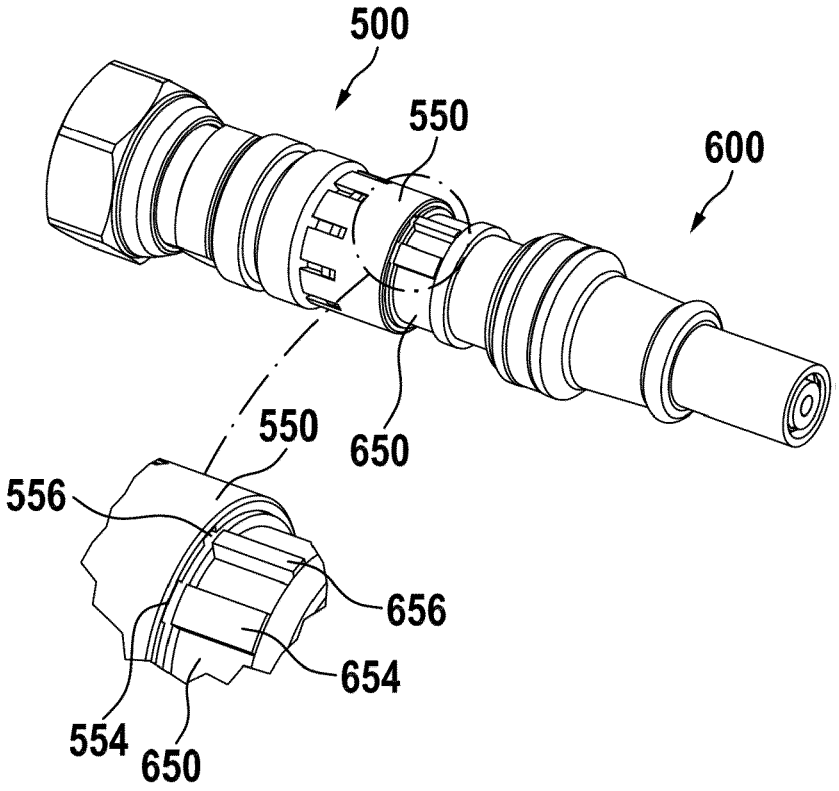
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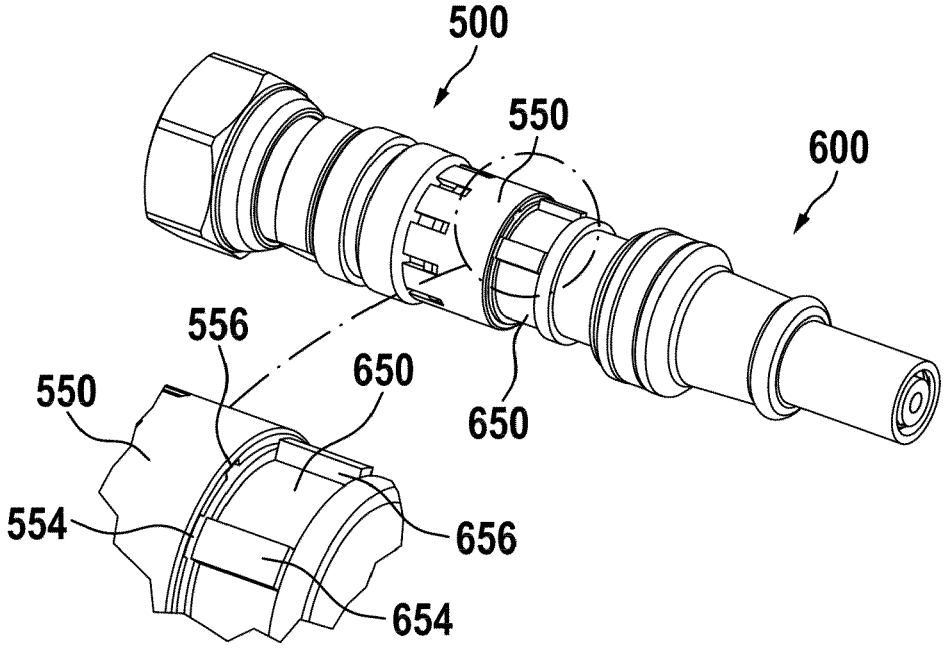
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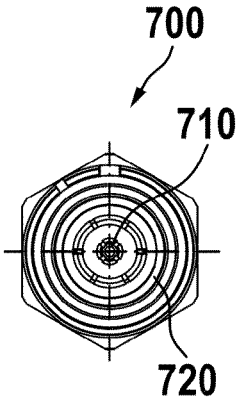
Fig. 27



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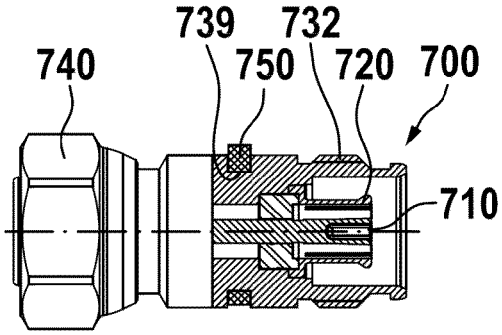

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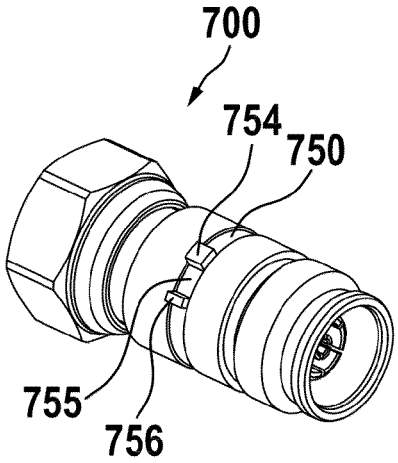

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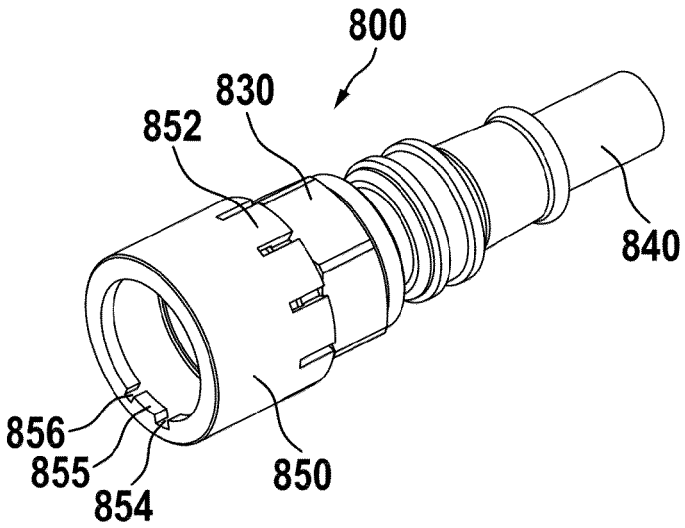

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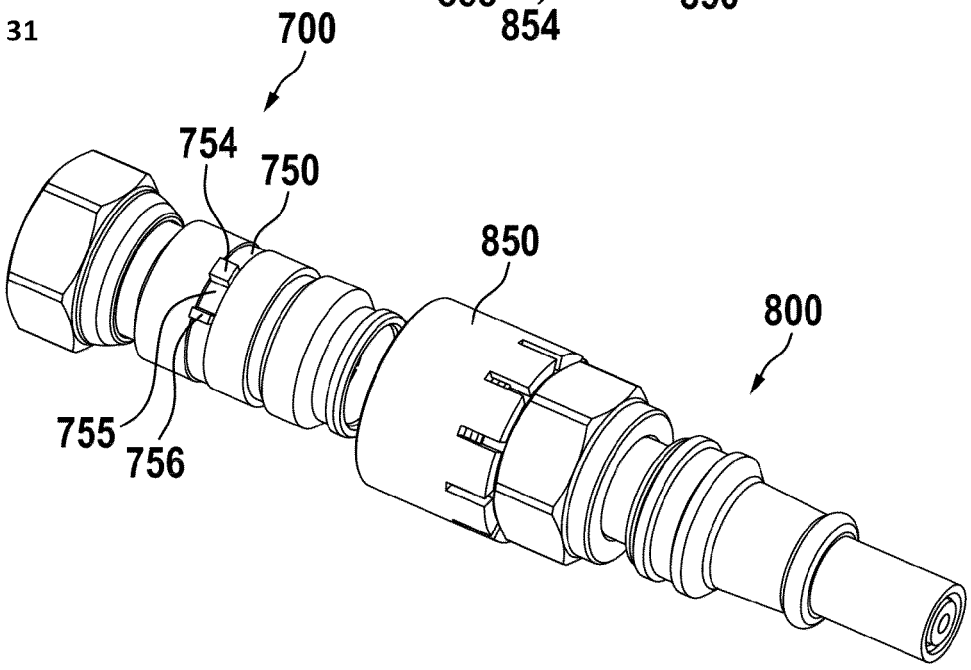

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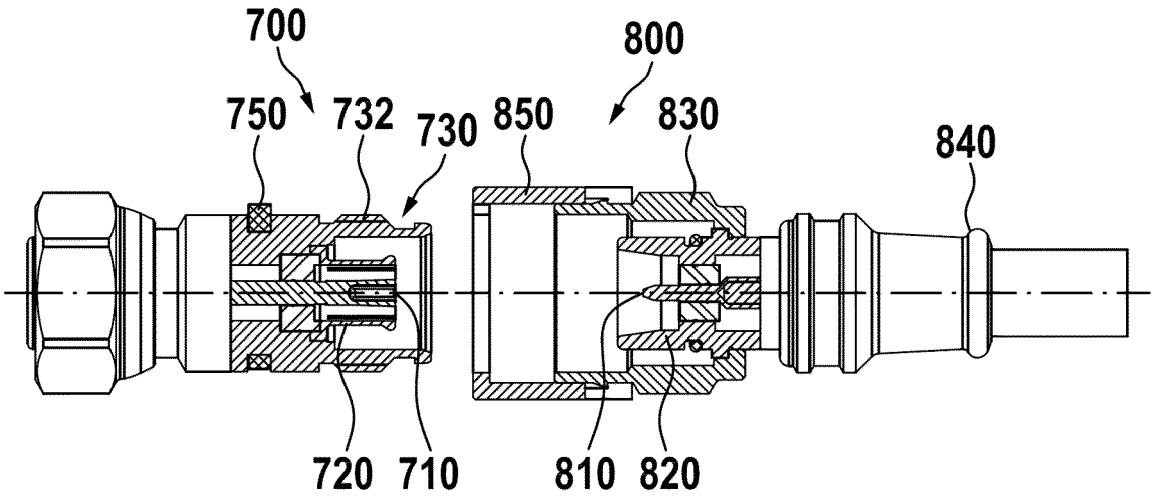


Fig. 33

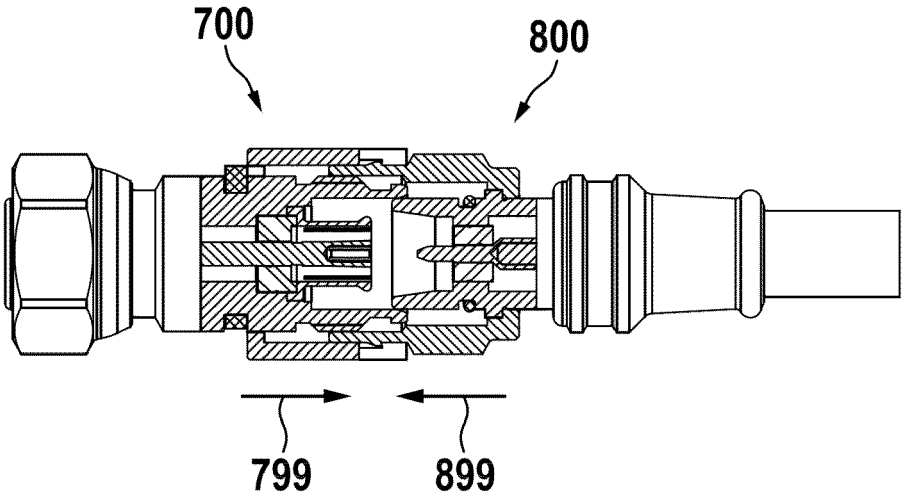
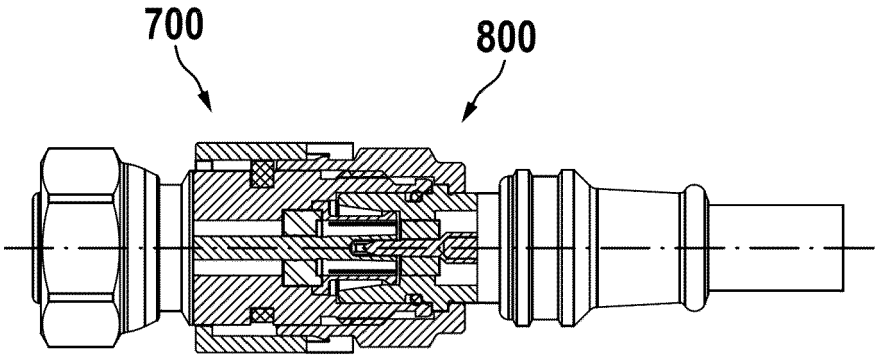


Fig. 34



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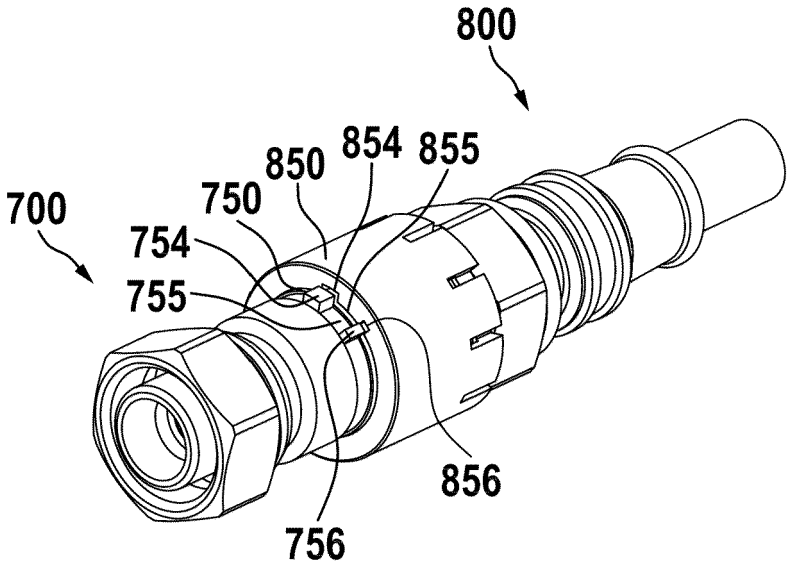

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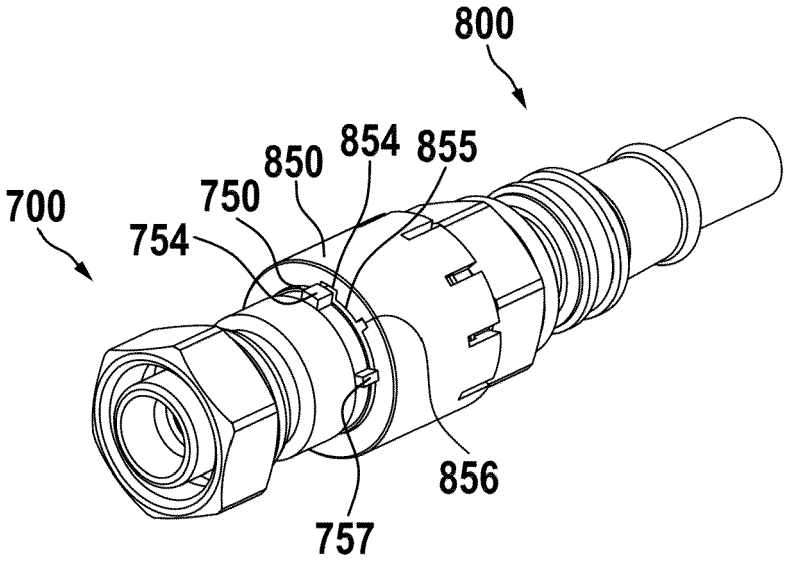
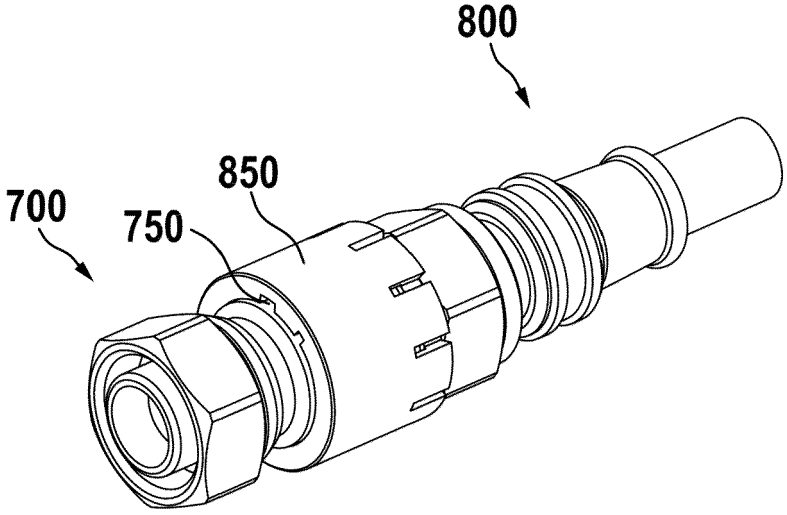


Fig. 37



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EUROPEAN SEARCH REPORT

Application Number
EP 20 18 8573

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2003/060088 A1 (KOCH RICHARD [US]) 27 March 2003 (2003-03-27) * paragraphs [0003], [0004], [0022] - [0038]; figures *	1-6,8-13 7	INV. H01R13/645 H01R9/05
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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	17 December 2020	Gélébart, Yves

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- US 20200091658 A1 **[0003]**