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(54) **CONNECTOR WITH A CONNECTOR HOUSING AND TERMINALS AND METHOD FOR FIXING A TERMINAL IN A CONNECTOR HOUSING**

(57) A connector (1) with a connector housing (4) and at least one terminal (2, 3, 33, 34), said connector housing (4) comprising:

a terminal accommodation chamber (5, 6, 7, 8) in which one of said at least one terminal (2, 3, 33, 34) is inserted in an insertion direction (I) parallel to a longitudinal axis (L) of the connector housing (4),

a locking recess (35, 36) in said terminal accommodation chamber (5, 6, 7, 8) extending radially therefrom, and a first access opening (20) reaching in a first radial direction traverse said longitudinal axis (L) into said terminal accommodation chamber (5, 6, 7, 8) for inserting a first pressing element (22, 26) of a forming tool, wherein said first access opening (20) is axially aligned with said locking recess (35, 36),

said at least one terminal (2, 3, 33, 34) comprising: a locking portion (14) axially aligned with said first access opening (20) and having a radially outward deformed area (24, 25) engaging into said locking recess (35, 36) for locking said terminal (2, 3, 33, 34) against removal out of said terminal accommodation chamber (5, 6, 7, 8) against said insertion direction (I),

wherein said connector housing (4) further comprises a second access opening (21) reaching in a second radial direction divergent from the first radial direction into the terminal accommodation chamber (5, 6, 7, 8) for inserting second pressing element (23, 27) of the forming tool, wherein said second access opening (21) is axially aligned with the locking recess (35, 36) of the connector housing (4).

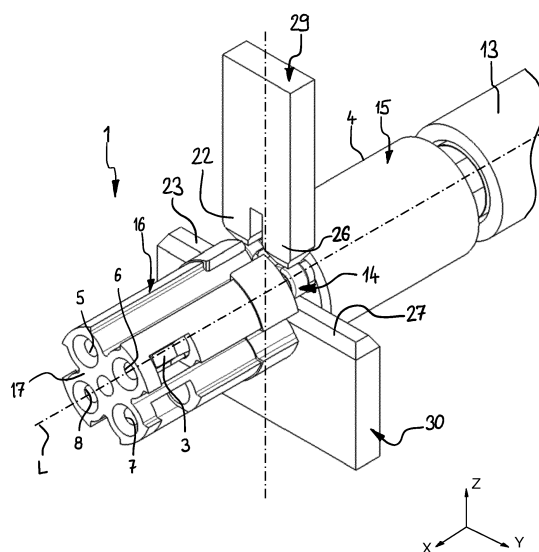


FIG. 2

Description

[0001] The present invention refers to a connector with a connector housing and at least one terminal, wherein the connector housing comprises a terminal accommodation chamber in which one of said at least one terminal is inserted in an insertion direction parallel to a longitudinal axis of the connector housing. The connector housing further has a locking recess in the terminal accommodation chamber extending radially therefrom. A first access opening of the connector housing reaches in a first radial direction traverse the longitudinal axis into the terminal accommodation chamber for inserting a first pressing element of a forming tool, wherein the first access opening is axially aligned with the locking recess. The at least one terminal comprises a locking portion axially aligned with the first access opening and has a radially outward deformed area engaging into the locking recess for locking the terminal against removal out of the terminal accommodation chamber against the insertion direction.

[0002] A connector of such a kind is described in EP 0 622 867 A2 disclosing a connector which comprises a connector housing and at least one metal terminal. The connector housing comprises, at least one terminal accommodating hole for receiving the metal terminals, primary locking means for elastically engaging with the metal terminals, at least one fallout preventing protrusion formed on the wall of the terminal accommodating holes, and at least one window for inserting a jig. The metal terminal comprises secondary locking means extended from the metal terminal, confronting with the window when the metal terminal is locked by the primary locking means while being avoided interference with the fallout preventing protrusion, and deformed by a jig inserting into the window to engage with the fallout preventing protrusion. During the deformation of the secondary locking means, the terminal is supported against a bottom of the connector housing.

[0003] It is the object of the invention to provide an electrical connector with locking means to avoid removal of the terminal out of the accommodation chamber of the connector housing wherein the connector is design to avoid too much stress to the connector housing during the locking of the terminal.

[0004] The object is met by a connector with a connector housing and at least one terminal, wherein the connector housing comprises a terminal accommodation chamber in which one of said at least one terminal is inserted in an insertion direction parallel to a longitudinal axis of the connector housing. The connector housing further has a locking recess in the terminal accommodation chamber extending radially therefrom. A first access opening of the connector housing reaches in a first radial direction traverse the longitudinal axis into the terminal accommodation chamber for inserting a first pressing element of a forming tool, wherein the first access opening is axially aligned with the locking recess. The at least one

terminal comprises a locking portion axially aligned with the first access opening and has a radially outward deformed area engaging into the locking recess for locking the terminal against removal out of the terminal accommodation chamber against the insertion direction. The connector housing further comprises a second access opening reaching in a second radial direction divergent from the first radial direction into the terminal accommodation chamber for inserting a second pressing element of the forming tool, wherein the second access opening is axially aligned with the locking recess of the connector housing.

[0005] Hence, the connector is provided with two access openings per accommodation chamber so that two elements of the forming tool, i.e. the first and the second pressing element, can be inserted into the connector housing. It is possible to deform the locking portion of the terminal by pressing it between the two pressing elements of the forming tool. Thereby, for instance, one pressing element can be used as a moving puncher and the other pressing element can be used as not moving anvil.

[0006] This pressing operation forms a radially outward deformed area of the locking portion, which engages into said locking recess for locking said terminal against removal out of the terminal accommodation chamber. The pressing operation does not stress or affect the connector housing as all forces for deforming the locking portion of the terminal are only supported against the elements of the forming tool.

[0007] The terminal is made of an electrically conductive material, such as a metal material. The terminal is designed to be electrically connected to a conductor of an electric cable. The connector housing is made of an electrically insulative material, such as syntactic resin.

[0008] In an embodiment, the first access opening and the second access opening are part of a common access opening in the connector housing. The first pressing element and the second pressing element of the forming tool can be inserted into the terminal accommodation chamber through the same common access opening, wherein the common access opening is big enough to insert the first and the second pressing elements in different radial directions/angles.

[0009] The at least one terminal can be a round terminal with a round cross-section. The locking portion may have a larger diameter than the rest of the terminal. The locking portion can be arranged between a contact section and a connection section of the terminal.

[0010] The contact section is the front part of the terminal with respect to the insertion direction. In other words, the contact section is the foremost section of the terminal, which is inserted into the terminal accommodation chamber. The contact section servers to be mated to a counter-terminal of a counter-connector, which is designed to be mated to the connector.

[0011] The connection section is the rearmost section of the terminal, which is design to be electrically connect-

ed to a conductor of an electric cable, for instance, by crimping, welding or soldering.

[0012] The round terminal is accommodated in an accordingly designed accommodation chamber with a round cross-section. In one example, the maximum diameter of the locking portion in the region of the deformed area is larger than the diameter of a rear part of the terminal accommodation chamber. The rear part is located, in mating direction, in front of the locking portion of the respective terminal. Hence, the rear part accommodates the connection section of the terminal. The locking recess extends radially from the terminal accommodation chamber. It has, therefore, the larger cross-section than the rear part of the terminal accommodation chamber. The locking recess and the rear part of the terminal accommodation chamber establish a shoulder in the transition from the locking recess to the rear part of the terminal accommodation chamber. The deformed area of the locking portion is supported against said shoulder when the terminal is pulled out of the terminal accommodation chamber against the insertion direction.

[0013] In the un-deformed state of the locking portion, the maximum diameter of the locking portion is smaller than the diameter of the rear part of the terminal accommodation chamber. Hence, the locking portion can be pushed through the rear part of the terminal accommodation chamber when inserting the terminal.

[0014] In an exemplary embodiment, the rear part of the terminal accommodation chamber has a circular cross-section wherein the deformed locking portion of the terminal has an outer cross-section deviating from a circle.

[0015] In an embodiment of the connector, the connector housing has four terminal accommodation chambers each accommodating one of said at least one terminal and each terminal accommodation chambers is provided with a first access opening and a second access opening. The connector may be used as Ethernet connector.

[0016] The connector housing may have two radial slots each of which forms the first access openings and the second access openings of two of said four terminal accommodation chambers. For instance, the slots can be separated by a wall of the connector housing.

[0017] The at least one terminal can be assembled to the connector housing with a method comprising the steps of:

- inserting one of said at least one terminal into a terminal accommodation chamber of the connector housing in an insertion direction parallel to a longitudinal axis of the connector housing,
- inserting a first pressing element of a forming tool into a first access opening reaching in a first radial direction traverse said longitudinal axis into said terminal accommodation chamber, wherein said first access opening is axially aligned with a locking recess in said terminal accommodation chamber and

extending radially therefrom,

- inserting a second pressing element of the forming tool into a second access opening reaching in a second radial direction divergent from the first radial direction into the terminal accommodation chamber, wherein said second access opening is axially aligned with the locking recess of the connector housing, and
- pressing and deforming a locking portion of said terminal, which is inserted into said terminal accommodation chamber, between the first and second pressing element and forming a radially outward deformed area of the locking portion, which engages into said locking recess for locking said terminal against removal out of said terminal accommodation chamber against the insertion direction.

[0018] Hence, the locking portion of the terminal is deformed by pressing it between the two elements of the forming tool, e.g. a puncher and an anvil. This pressing operation forms a radially outward deformed area of the locking portion, which engages into said locking recess for locking said terminal against removal out of the terminal accommodation chamber. The pressing operation does not stress or affect the connector housing as all forces for deforming the locking portion of the terminal are only supported against the forming tool.

[0019] In one embodiment of the method, the insertion direction of the first pressing element may be opposite to the insertion direction of the second pressing element.

[0020] In an alternative embodiment of the method, the insertion direction of the first pressing element is oriented traverse the insertion direction of the second pressing element.

[0021] Further details of the present invention will be described hereinafter with reference to the figures.

Figure 1 is a schematic perspective explosion view of a connector,

Figure 2 is a perspective view of a connector with a first embodiment of a forming tool,

Figure 3 is a cross-sectional view of the connector and the forming tool according to Figure 2 before deformation,

Figure 4 is a cross-sectional view of the connector according to Figure 3 after deformation,

Figure 5 is a perspective view of a connector with a second embodiment of a forming tool,

Figure 6 is a cross-sectional view of the connector and the punch tool according to Figure 5 before deformation,

- Figure 7 is a perspective view of a connector with a third embodiment of a forming tool,
- Figure 8 is a cross-sectional view of the connector and the punch tool according to Figure 7 before deformation,
- Figure 9 is a perspective view of a connector with a fourth embodiment of a forming tool, and
- Figure 10 is a cross-sectional view of the connector and the punch tool according to Figure 9 before deformation.

[0022] Figures 1 to 4 depict an electric connector 1 having a first terminal 2 and a second terminal 3. The electric connector 1 further comprises third terminal and the fourth terminal, which are not shown for the sake of clarity. The electric connector further comprises a connector housing 4, wherein the connector housing 4 in Figure 1 is shown schematically and differs in its outer shape from the connector housing 4 of Figures 2 to 4 but has the same function. The connector housing 4 is provided with four terminal accommodation chambers, namely a first terminal accommodation chamber 5, a second terminal accommodation chamber 6, a third terminal accommodation chamber 7 and a fourth terminal accommodation chamber 8.

[0023] The terminal accommodation chambers 5, 6, 7, 8 have, in general, the shape of bores, which are arranged parallel to each other distributed around and parallel a longitudinal axis L of the electric connector 1. Each of the terminal accommodation chambers 5, 6, 7, 8 accommodates one of the terminals 2, 3 wherein in Figures 1 to 4 only two terminals 2, 3 are shown, i.e. the first terminal 2 accommodated in the first terminal accommodation chamber 5 and the second terminal 3 accommodated in the second terminal accommodation chamber 6.

[0024] It should be noted that the terms "axial" and "radial" refer to axes of a Cartesian coordinate system with an X-direction, a Y-direction and a Z-direction being perpendicular to each other. The X-direction is parallel to the longitudinal axis L wherein the Y-direction and the Z-direction are arranged radially to the X-direction and the longitudinal axis L, respectively.

[0025] The terminals 2, 3 are round terminals 2, 3 with a round cross-section. Each of the terminals 2, 3 has a contact section 9 and a connection section 10. The contact section 9 is the front part of the terminal 2, 3 with respect to an insertion direction I parallel to the longitudinal axis L. In other words, the contact section 9 is the foremost section of the terminal 2, 3, which is inserted into the respective terminal accommodation chamber 5, 6, 7, 8. The contact section 10 serves to be mated to a counter-terminal (not shown) of a counter-connector (not shown), which is designed to be mated to the connector 1.

[0026] The connection section 10 is the rearmost section of the terminal 2, 3, which is electrically connected

to a conductor of an electric wire 11 of an electric cable 13 by crimping. The electric cable 13 has as many electrical wires 11 as terminals 2, 3 are provided. In the Figures only two of the electric wires 11, 12 are shown.

[0027] Between the contact section 9 and the connection section 10 each of the terminal 2, 3 has a locking portion 14 that has a larger diameter than the contact section 9 and the connection section 10.

[0028] The connector housing 4 is divided into the rear portion 15 and a front portion 16. The terminal accommodation chambers 5, 6, 7, 8 each extend through the rear portion 15 and the front portion 16 and open into a front face 17 of the connector housing 4. That part of each terminal accommodation chamber 5, 6, 7, 8 that is arranged within the rear portion 15 of the connector housing 4 be also referred to as the rear part of the terminal accommodation chamber. That part of each terminal accommodation chamber 5, 6, 7, 8 that is arranged within the front portion 16 of the connector housing 4 be also referred to as the front part of the terminal accommodation chamber.

[0029] The terminals 2, 3 are each inserted into the respective terminal accommodation chambers 5, 6, 7, 8 from the rear part thereof in the insertion direction I until the contact section 9 is accommodated in the front part of the respective terminal accommodation chamber 5, 6, 7, 8 and the connection section 10 is accommodated in the rear part of the respective terminal accommodation chamber 5, 6, 7, 8.

[0030] In an un-deformed state, the diameter of the locking portion 14, which has a circular cross-section, is smaller than the diameter of the rear part of the terminal accommodation chamber 5, 6, 7, 8. Hence, the locking portion 14 can be pushed through the rear part of the terminal accommodation chamber 5, 6, 7, 8 during the insertion process of the terminal 2, 3. In a fully inserted state the locking portions 14 of the terminals 2, 3 are located between the rear portion 15 and the front portion 16 of the connector housing 4.

[0031] The connector housing 4 has two radial slots, namely a first slot 18 and a second slot 19, between the rear portion 15 and the front portion 16. Each of the slots 18, 19 extends from an outer circumference of the connector housing 4 into two of the terminal accommodation chambers 5, 6, 7, 8. Each of the slots 18, 19 reaches almost over half of the cross-section of the connector housing 4 in a plane perpendicular to the longitudinal axis L. The two slots 18, 19 are separated by the wall 28, which integrally connects the rear portion 15 and the front portion 16 of the connector housing 4, as can best be seen in Figure 4.

[0032] The first slot 18 intersects the first and the fourth terminal accommodation chambers 5, 8. The second slot 19 intersects the second and the third terminal accommodation chambers 6, 7.

[0033] The first slot 18 provides or forms a first access opening 20 and a second access opening 21. The first access opening 20 allows a first pressing element 22 of

a forming tool to be inserted into the first access opening 20 for reaching the locking portion 14 of the first terminal 2 accommodated in the first terminal accommodation chamber 5. The second access opening 21 allows a second pressing element 23 of the forming tool to be inserted into the second access opening 21 for reaching the locking portion 14 of the first terminal 2.

[0034] In the disclosed embodiment, the second pressing element 23 is used as an anvil and is inserted into the second access opening 21 until it abuts the locking portion 14 of the first terminal 2 and supports the first terminal 2 in a direction against the Z-direction. The first pressing element 22 is used as a puncher and is inserted into the first access opening 20 in a direction against the Z-direction, i.e. opposite to the insertion direction of the second pressing element 23. The first pressing element 22 is used to press and deform the locking portion 14 of the first terminal 2 while the first terminal 2 is supported against the second pressing element 23. The locking portion 14 of the first terminal 2 is formed into a shape as depicted in Figure 4, that is into a shape deviating from a round cross-section.

[0035] In the Z-direction, the locking portion 14 is compressed. In the Y-direction, the locking portion 14 is enlarged forming two radially outward deformed areas 24, 25 reaching into locking recesses 35, 36 of the first terminal accommodation chamber 5. The locking recesses 35, 36 are part of the first slot 18 and are arranged in a first radial direction traverse the longitudinal axis L. Alternatively the locking recesses 35, 36 can be separate recesses or cavities in the first terminal accommodation chamber 5. Further, the first and second access openings 20, 21 can be separate from each other and can be separate from the locking recesses 35, 36. In the present embodiment of the invention the first and second access openings 20, 21 as well as the locking recesses 35, 36 are commonly formed by the first slot 18 in order to simplify the manufacture of the connector 1.

[0036] The two deformed areas 24, 25 are arranged diametrically opposed to each other. In this width direction (Y-direction) the locking portion 14 and respectively the first terminal has a larger extension/diameter than the rear part of the first terminal accommodation chamber 5. Therefore, after the deformation process of the locking portion 14 the first terminal 2 is locked within the first terminal accommodation chamber 5 against pullout forces.

[0037] The connector housing 4 is designed symmetrically to the wall 28. Therefore, the locking portion 14 of the second terminal 3 can be deformed in the same manner within the second slot 19 as the locking portion 14 of the first terminal 2. In order to facilitate this deformation of the locking portion 14 of the second terminal 3 the forming tool is also designed symmetrically with respect to the wall 28 and is provided with a further first pressing element 26 and a further second pressing element 27, which are driven in the same direction as the first pressing element 22 and the second pressing element 23 for de-

forming the locking portion 14 of the first terminal 2.

[0038] The first pressing elements 22, 26 are part of a common first pressing member 29. The second pressing elements 23, 27 are part of a common second pressing member 30. During the deformation process, the second pressing member 30 is held still and does not move while the first pressing member 29 is moved towards the second pressing member 30. Thereby, the locking portions 14 of both the first and the second terminal 2, 3 are being deformed simultaneously. After the deformation of the locking portions 14 of the first and second terminals 2, 3 the third and the fourth terminals are inserted in the respective terminal accommodation chamber 7, 8 and deformed likewise.

[0039] In order to lock the first and second terminals 2, 3 within the connector housing 4, the first and second terminals 2, 3 are inserted into the first and second terminal accommodation chambers 5, 6 respectively in an insertion direction I parallel to the longitudinal axis L of the connector housing 4.

[0040] The first pressing elements 22, 26 are inserted into the first access openings 20 of the first and second terminal accommodation chambers 5, 6, respectively. The first access openings 20 reach in a radial direction traverse said longitudinal axis L into the first and second terminal accommodation chamber 5, 6, wherein the first access openings 20 are axially aligned with the locking recesses 35, 36, which extend radially from the first and second terminal accommodation chambers 5, 6, respectively.

[0041] The second pressing elements 23, 27 are inserted into the second access openings 21 of the first and second terminal accommodation chambers 5, 6, respectively. The second access openings 21 reach in a radial direction divergent from the radial direction of the first access openings 20 into the terminal accommodation chambers 5, 6, wherein said second access openings are axially aligned with the locking recesses 35, 36.

[0042] Then, the locking portions 14 of the first and second terminals 2, 3, which have been inserted into the first and second terminal accommodation 5, 6 previously, are pressed and deformed between the first pressing elements 22, 26 and the second pressing elements 23, 27 forming radially outward deformed areas 24, 25 of the locking portions 14. Said radially outward deformed areas 24, 25 engage into the locking recesses 35, 36 in order to lock the first and second terminal 2, 3 against removal out of the first and second terminal accommodation chambers 5, 6 against the insertion direction I.

[0043] Figures 5 and 6 show the connector 1 according to Figures 1 to 4 with a second embodiment of a forming tool.

[0044] The forming tool according to the second embodiment is basically identical to the forming tool according to the first embodiment of Figures 1 to 4. The second embodiment of the forming tool distinguishes from the first embodiment with respect to the fact that during the forming process both pressing members 29, 30 are being

moved towards each other. The second pressing member 30 moves in Z-direction during the deformation of the locking portions 14. In all further aspects, the second embodiment of the forming tool is identical to the first embodiment.

[0045] Figures 7 and 8 show the connector 1 according to Figures 1 to 4 with a third embodiment of a forming tool.

[0046] The forming tool according to the third embodiment is basically identical to the forming tool according to the second embodiment of Figures 5 and 6. The third embodiment of the forming tool distinguishes from the second embodiment with respect to the fact that it has third pressing elements 31, 32. One of the third pressing elements 31 is moved in Y-direction. Another one of the third pressing elements 32 is arranged opposite to the first mentioned third pressing elements 31 and moves against the Y-direction. In order to deform the locking portions 14 of the first and second terminals 2, 3, the third pressing elements 31, 32 can be used as terminal holders or anvils, which are not moved during the deformation of the locking portions. In this case the first third pressing elements 22, 26 and the second pressing elements 23, 27 are used for the deformation. Alternatively, the first pressing elements 22, 26 can be moved and the second pressing elements 23, 27 can be used as anvils without being moved. It is also possible that the third pressing elements 31, 32 are moved during the deformation of the locking portions 14 and the first and second pressing elements 22, 23, 26, 27 are not moved.

[0047] Figures 9 and 10 show the connector 1 according to Figures 1 to 4 with a fourth embodiment of a forming tool.

[0048] The forming tool according to the fourth embodiment is basically identical to the forming tool according to the third embodiment of Figures 7 and 9.

[0049] The third pressing elements 31, 32 are used as anvils and are inserted in radial direction in and against the Y-direction. The third pressing elements 31, 32 are inserted between the first and the fourth terminal 2, 34 and between the second and the third terminals 3, 33, respectively. The first pressing member 29 is moved against the Z-direction and against the first and the second terminals 2, 3. During that movement and for deforming the locking portions 14, the first and the second terminals 2, 3 are supported against the third pressing elements 31, 32 against the Z-direction. The second pressing element 30 is moved in the Z-direction and against the third and the fourth terminals 33, 34. During that movement and for deforming the locking portions 14 the third and fourth terminals 32, 34 are supported against the third pressing elements 31, 32 in Z-direction.

List of Reference Numerals

[0050]

- 1 electric connector
- 2 first electric terminal

- 3 second electric terminal
- 4 connector housing
- 5 first terminal accommodation chamber
- 6 second terminal accommodation chamber
- 7 third terminal accommodation chamber
- 8 fourth terminal accommodation chamber
- 9 contact section
- 10 connection section
- 11 electric wire
- 12 electric wire
- 13 electric cable
- 14 locking portion
- 15 rear portion of connector housing
- 16 front portion of connector housing
- 17 front face
- 18 first slot
- 19 second slot
- 20 first access opening
- 21 second access opening
- 22 first pressing element
- 23 first pressing element
- 24 deformed area
- 25 deformed area
- 26 second pressing element
- 27 second pressing element
- 28 wall
- 29 third pressing element
- 30 third pressing element
- 31 first side puncher
- 32 second side puncher
- 33 third electric terminal
- 34 fourth electric terminal
- 35 first locking recess
- 36 second locking recess
- I insertion direction
- L longitudinal axis
- X X-direction
- Y Y-direction
- Z Z-direction

Claims

1. A connector (1) with a connector housing (4) and at least one terminal (2, 3, 33, 34), said connector housing (4) comprising:
 - a terminal accommodation chamber (5, 6, 7, 8) in which one of said at least one terminal (2, 3, 33, 34) is inserted in an insertion direction (I) parallel to a longitudinal axis (L) of the connector housing (4),
 - a locking recess (35, 36) in said terminal accommodation chamber (5, 6, 7, 8) extending radially therefrom, and
 - a first access opening (20) reaching in a first radial direction traverse said longitudinal axis (L)

into said terminal accommodation chamber (5, 6, 7, 8) for inserting a first pressing element (22, 26) of a forming tool, wherein said first access opening (20) is axially aligned with said locking recess (35, 36),

said at least one terminal (2, 3, 33, 34) comprising: a locking portion (14) axially aligned with said first access opening (20) and having a radially outward deformed area (24, 25) engaging into said locking recess (35, 36) for locking said terminal (2, 3, 33, 34) against removal out of said terminal accommodation chamber (5, 6, 7, 8) against said insertion direction (I),

characterized in

that said connector housing (4) further comprises a second access opening (21) reaching in a second radial direction divergent from the first radial direction into the terminal accommodation chamber (5, 6, 7, 8) for inserting second pressing element (23, 27) of the forming tool, wherein said second access opening (21) is axially aligned with the locking recess (35, 36) of the connector housing (4).

2. The connector according to claim 1,
characterized in
that the first access opening (20) and the second access opening (21) are part of a common access opening in the connector housing (4).
3. The connector according to claim 1 or 2,
characterized in
that the at least one terminal (2, 3, 33, 34) has a round cross-section.
4. The connector according to claim 1,
characterized in
that the maximum diameter of the locking portion (14) in the region of the deformed area (24, 25) is larger than the diameter of a rear part of the terminal accommodation chamber (5, 6, 7, 8) which rear part is located, in insertion direction (I), in front of the locking portion (14) of the respective terminal (2, 3, 33, 34).
5. The connector according to claim 4,
characterized in
that the maximum diameter of the locking portion (14) in an un-deformed state is smaller than the diameter of the rear part of the terminal accommodation chamber (5, 6, 7, 8).
6. The connector according to claim 4 or 5,
characterized in
that the rear part of the terminal accommodation chamber (5, 6, 7, 8) has a circular cross-section and
that the deformed locking portion (14) of the terminal (2, 3, 33, 34) has an outer cross-section deviating

from a circle.

7. The connector according to one of claims 1 to 6,
characterized in
that the connector housing (4) has four terminal accommodation chambers (5, 6, 7, 8) each accommodating one of said at least one terminal (2, 3, 33, 34) and each terminal accommodation chambers (5, 6, 7, 8) is provided with a first access opening (20) and a second access opening (21).
8. The connector according to claim 7,
characterized in
that the connector housing (4) has two radial slots (18, 19) each of which forms the first access openings (20) and the second access openings (21) of two of said four terminal accommodation chambers (5, 6, 7, 8).
9. The connector according to claim 8,
characterized in
that the slots (18, 19) are separated by a wall (28) of the connector housing (4).
10. A Method for fixing at least one terminal (2, 3, 33, 34) in a connector housing (4) of a connector (1), the method comprising the steps of:

inserting one of said at least one terminal (2, 3, 33, 34) into a terminal accommodation chamber (5, 6, 7, 8) of the connector housing (4) in an insertion direction (I) parallel to a longitudinal axis (L) of the connector housing (4),
inserting a first pressing element (22, 26) of a forming tool into a first access opening (20) reaching in a first radial direction traverse said longitudinal axis (L) into said terminal accommodation chamber (5, 6, 7, 8), wherein said first access opening (20) is axially aligned with a locking recess (35, 36) in said terminal accommodation chamber (5, 6, 7, 8) and extending radially therefrom,
inserting a second pressing element (23, 27) of said forming tool into a second access opening (21) reaching in a second radial direction divergent from the first radial direction into the terminal accommodation chamber (5, 6, 7, 8), wherein said second access opening (21) is axially aligned with the locking recess (35, 36) of the connector housing (4), and
pressing and deforming a locking portion (14) of said terminal (2, 3, 33, 34), which is inserted into said terminal accommodation chamber (5, 6, 7, 8), between said first pressing element (22, 26) and said second pressing element (23, 27) and forming a radially outward deformed area 24, 25) of the locking portion (14) which engages into said locking recess (35, 36) for locking said

terminal (2, 3, 33, 34) against removal out of said terminal accommodation chamber (5, 6, 7, 8) against the insertion direction (I).

11. The method according to claim 10,
characterized in
that the insertion direction of the first pressing element (22, 26) is opposite to the insertion direction of the second pressing element (23, 27). 5 10
12. The method according to claim 10,
characterized in
that the insertion direction of the first pressing element (22, 26) is traverse to the insertion direction of the second pressing element (23, 27). 15

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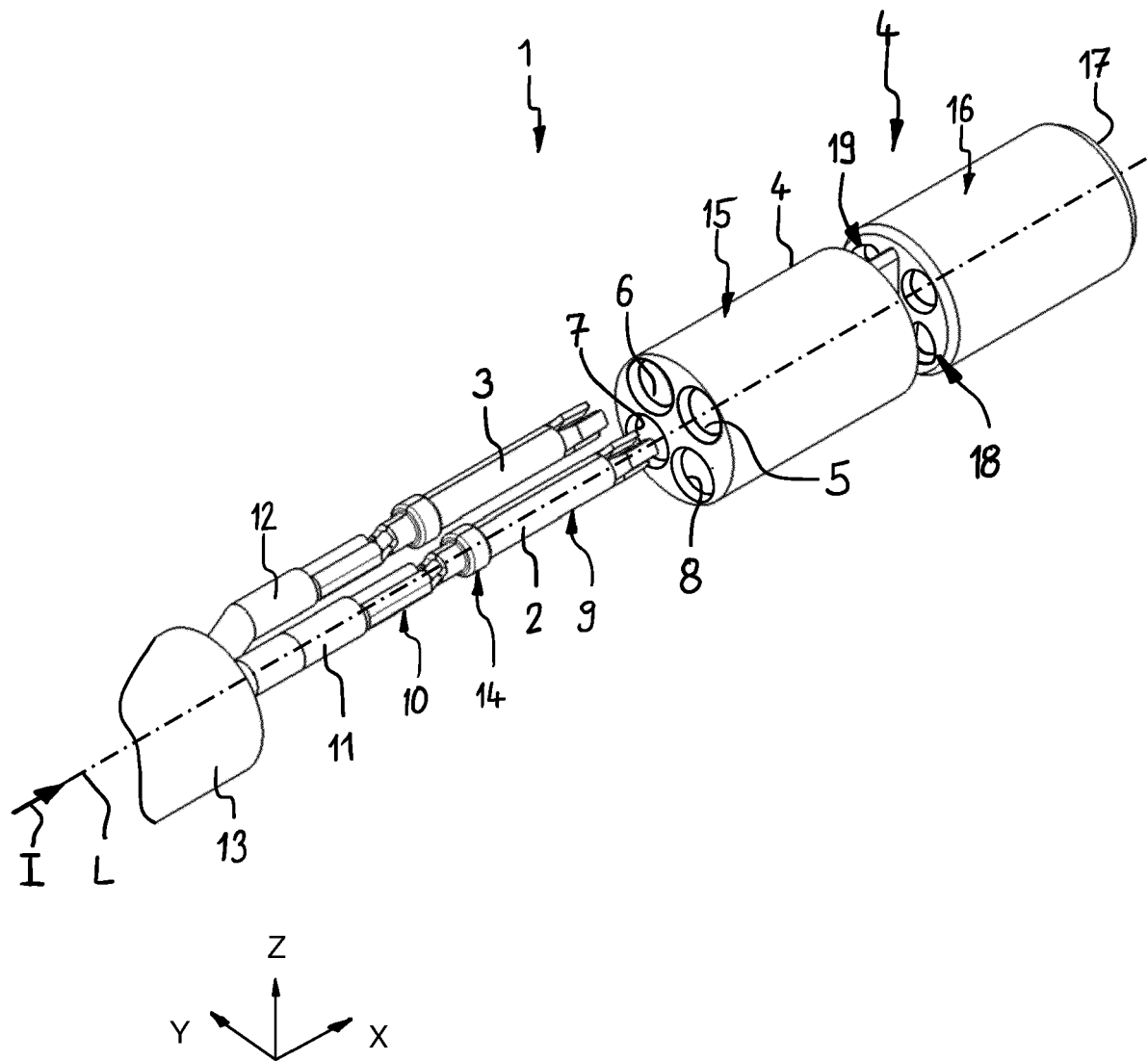


FIG. 1

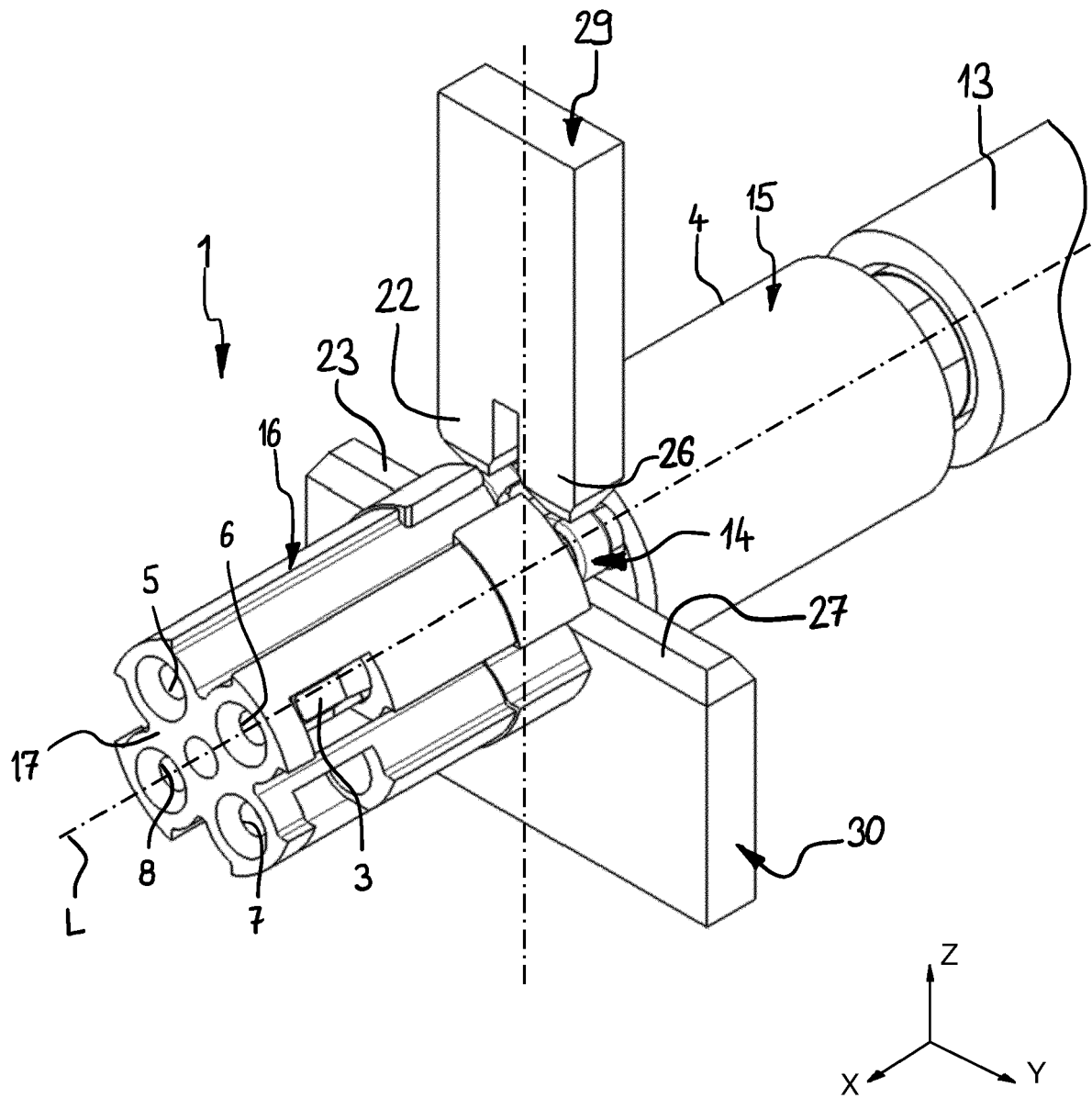


FIG. 2

FIG. 3

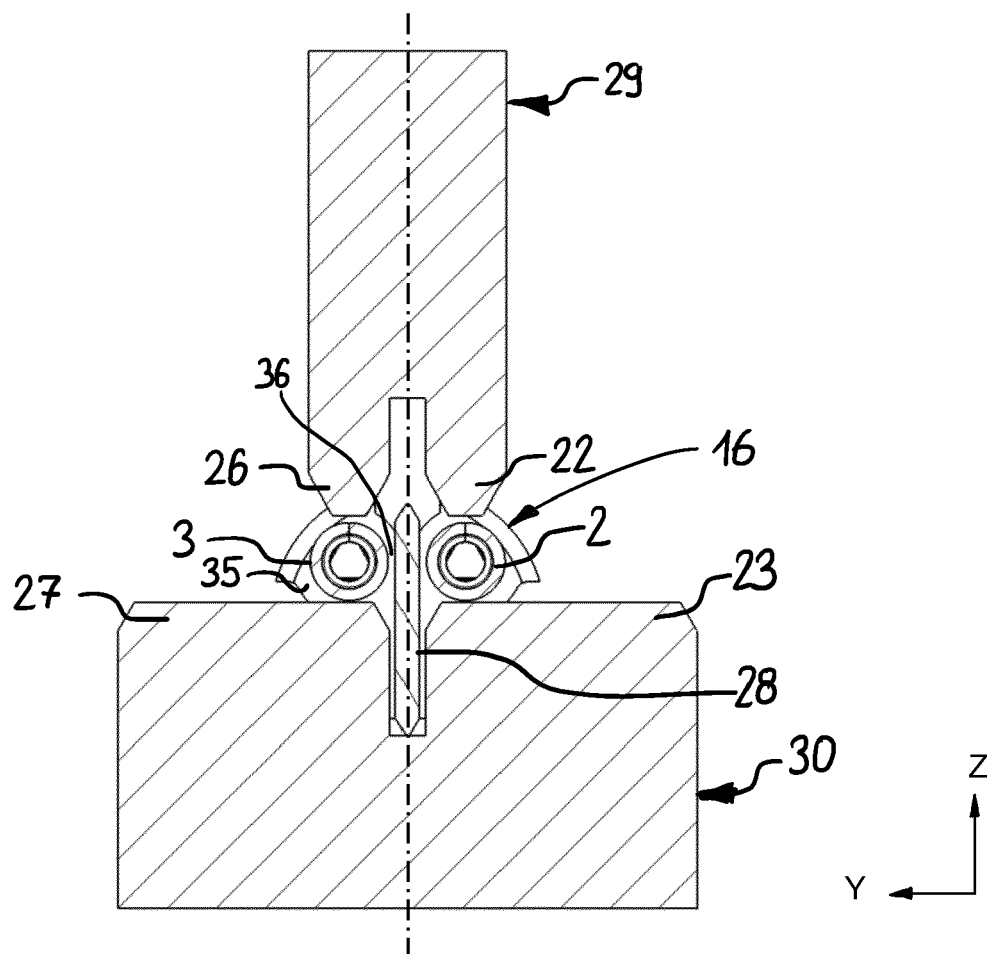
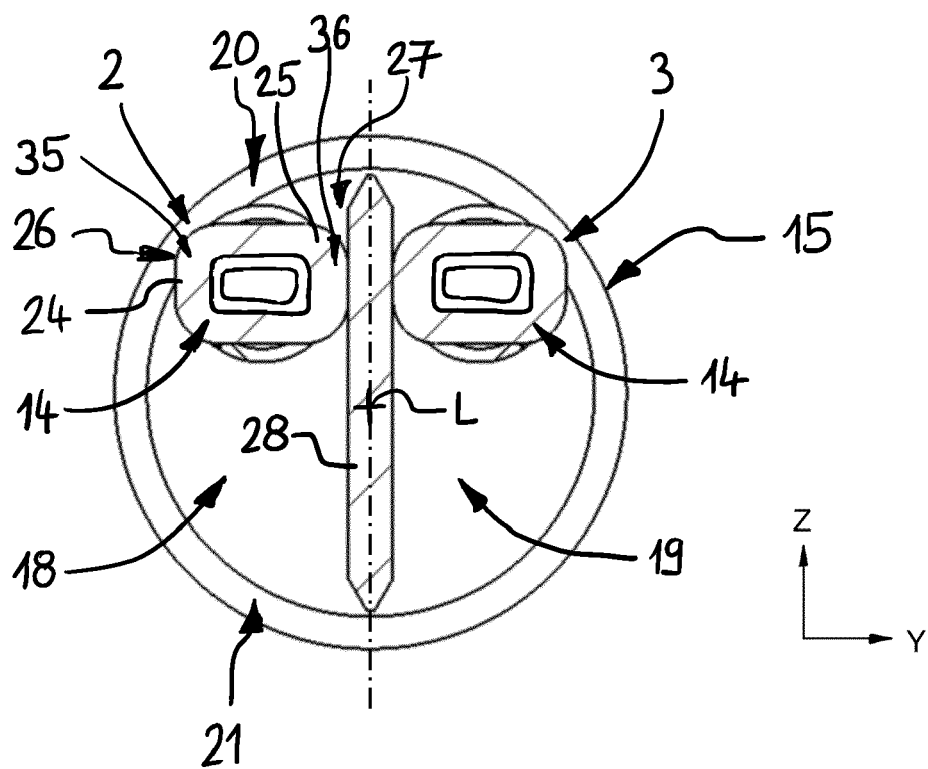


FIG. 4



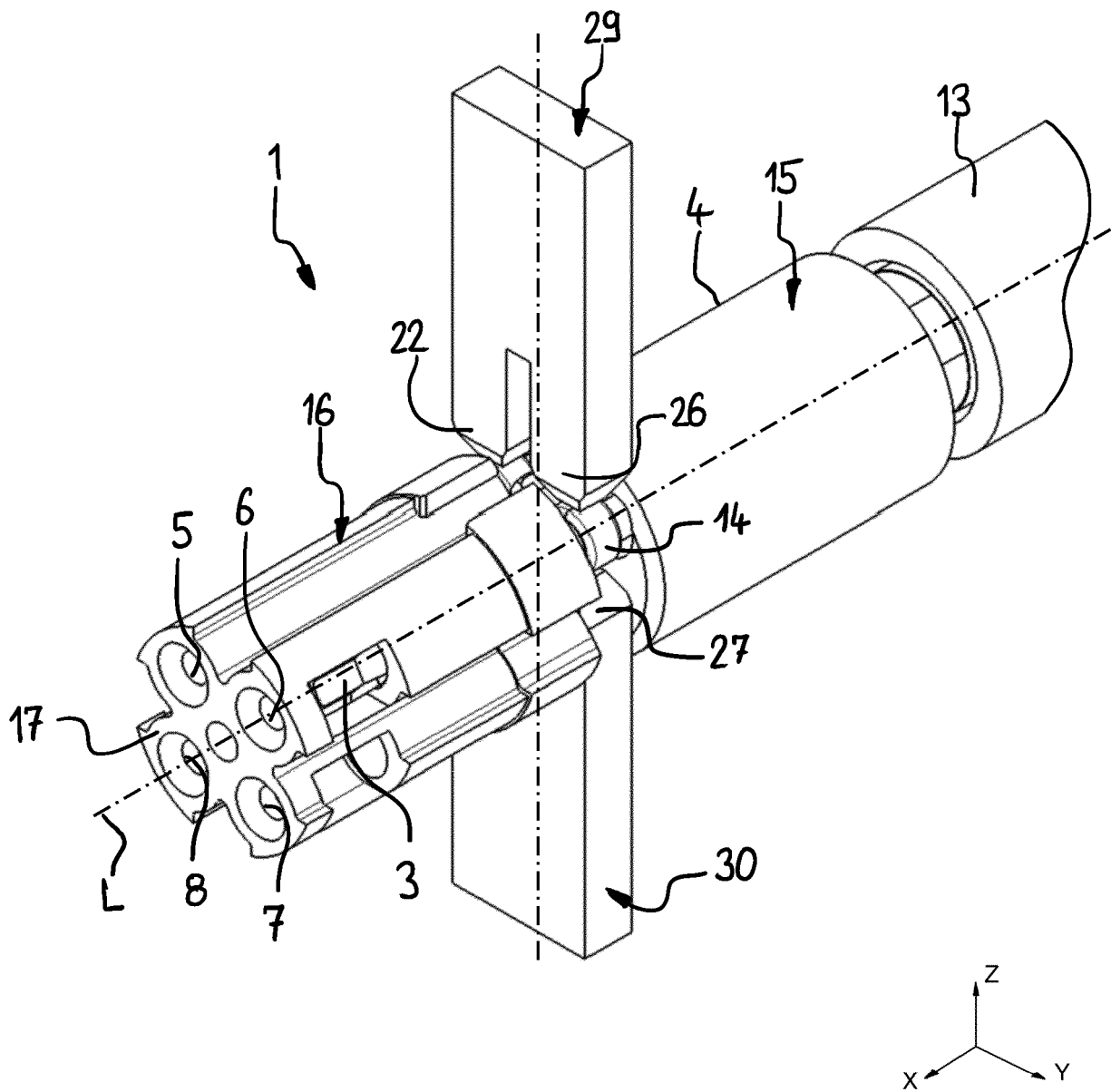


FIG. 5

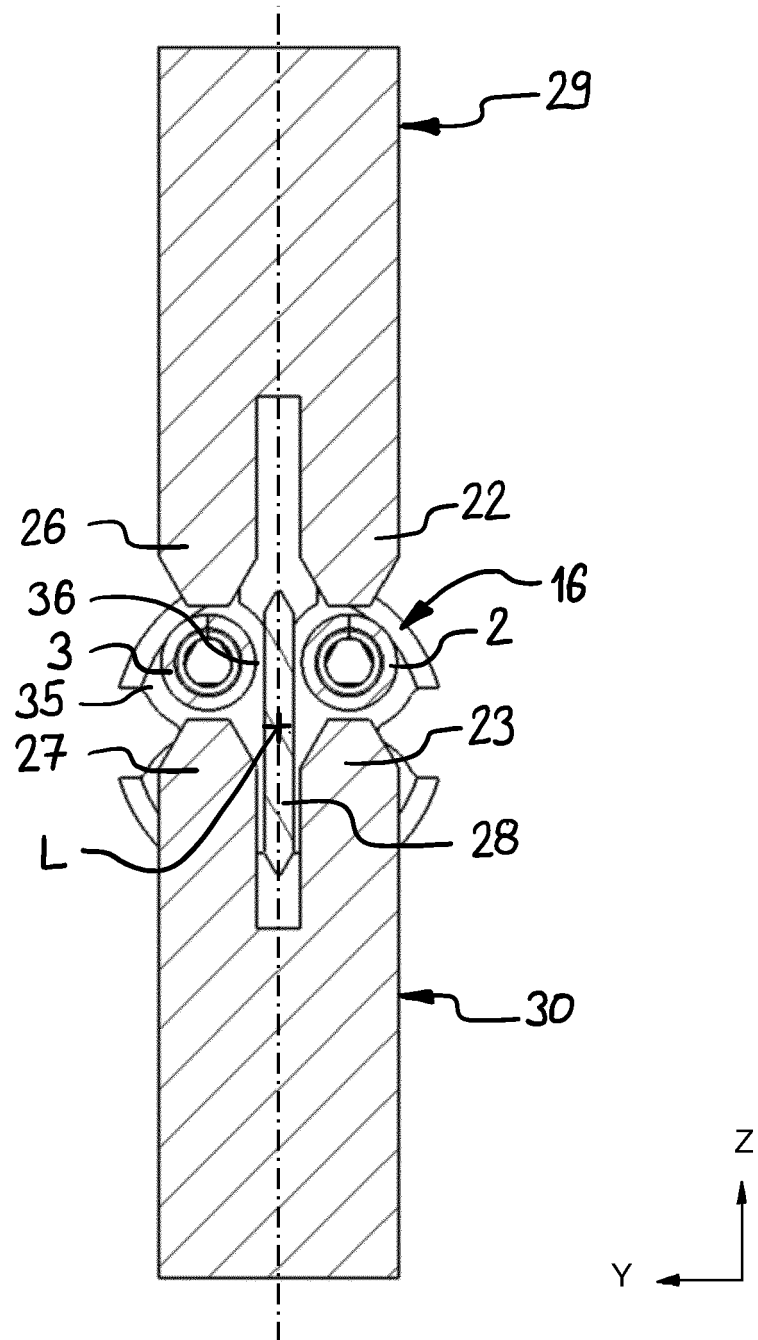


FIG. 6

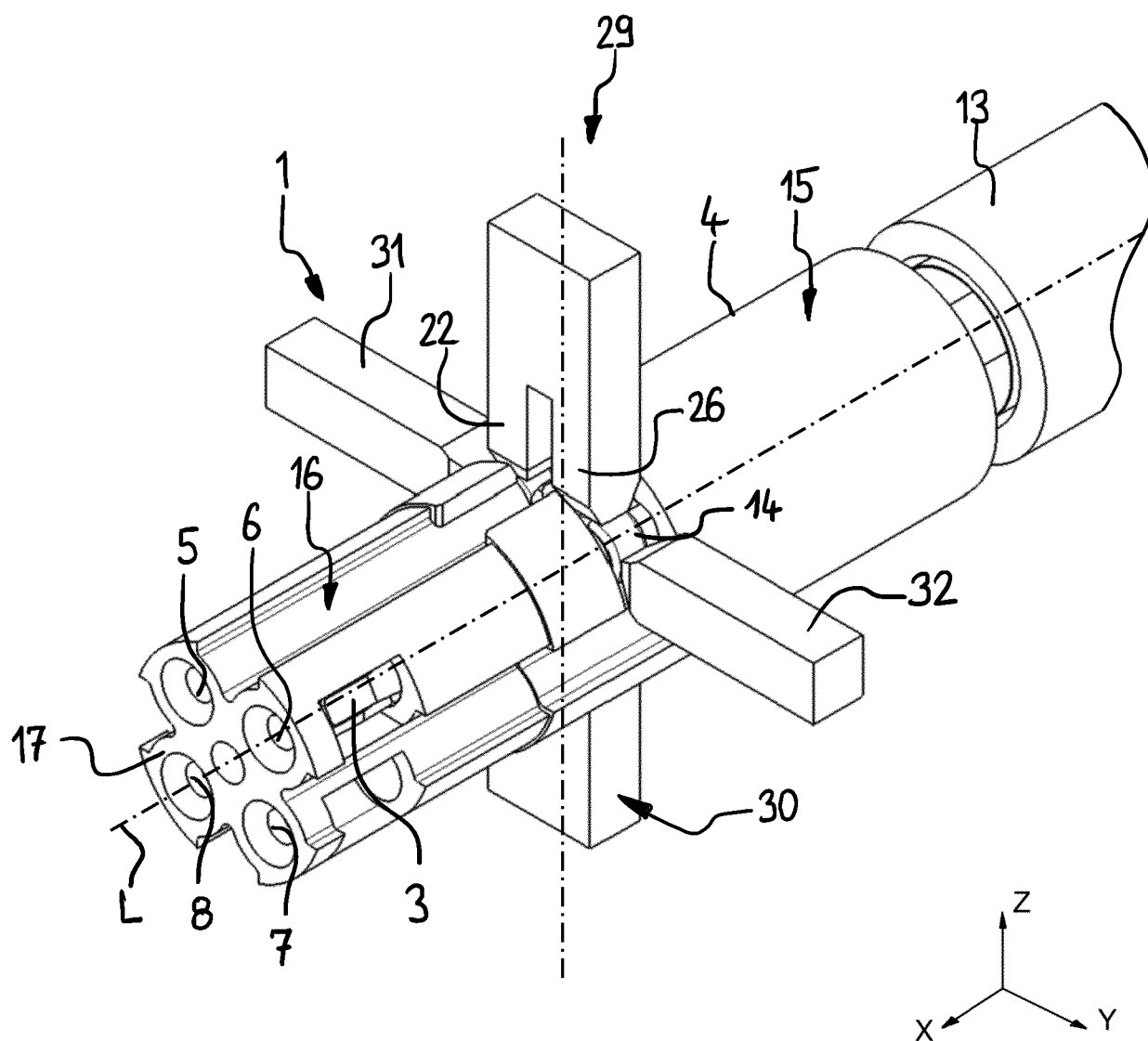


FIG. 7

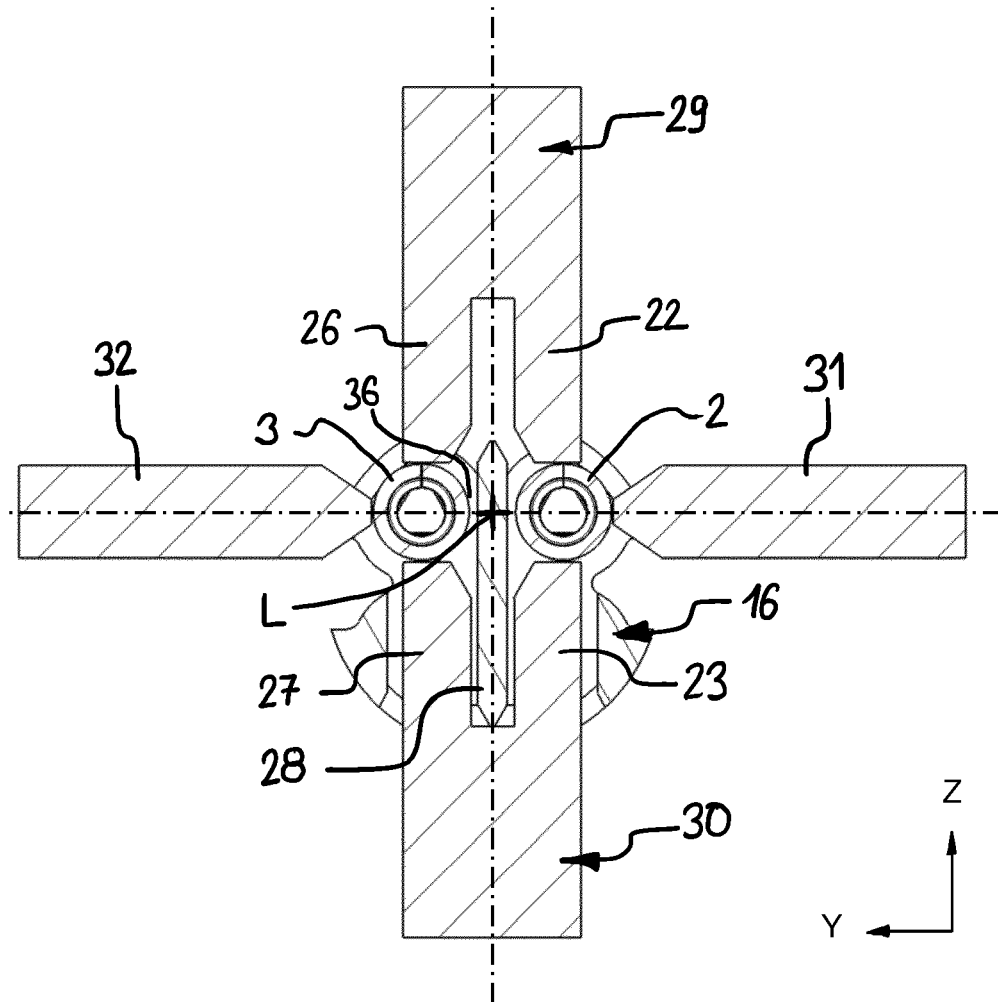


FIG. 8

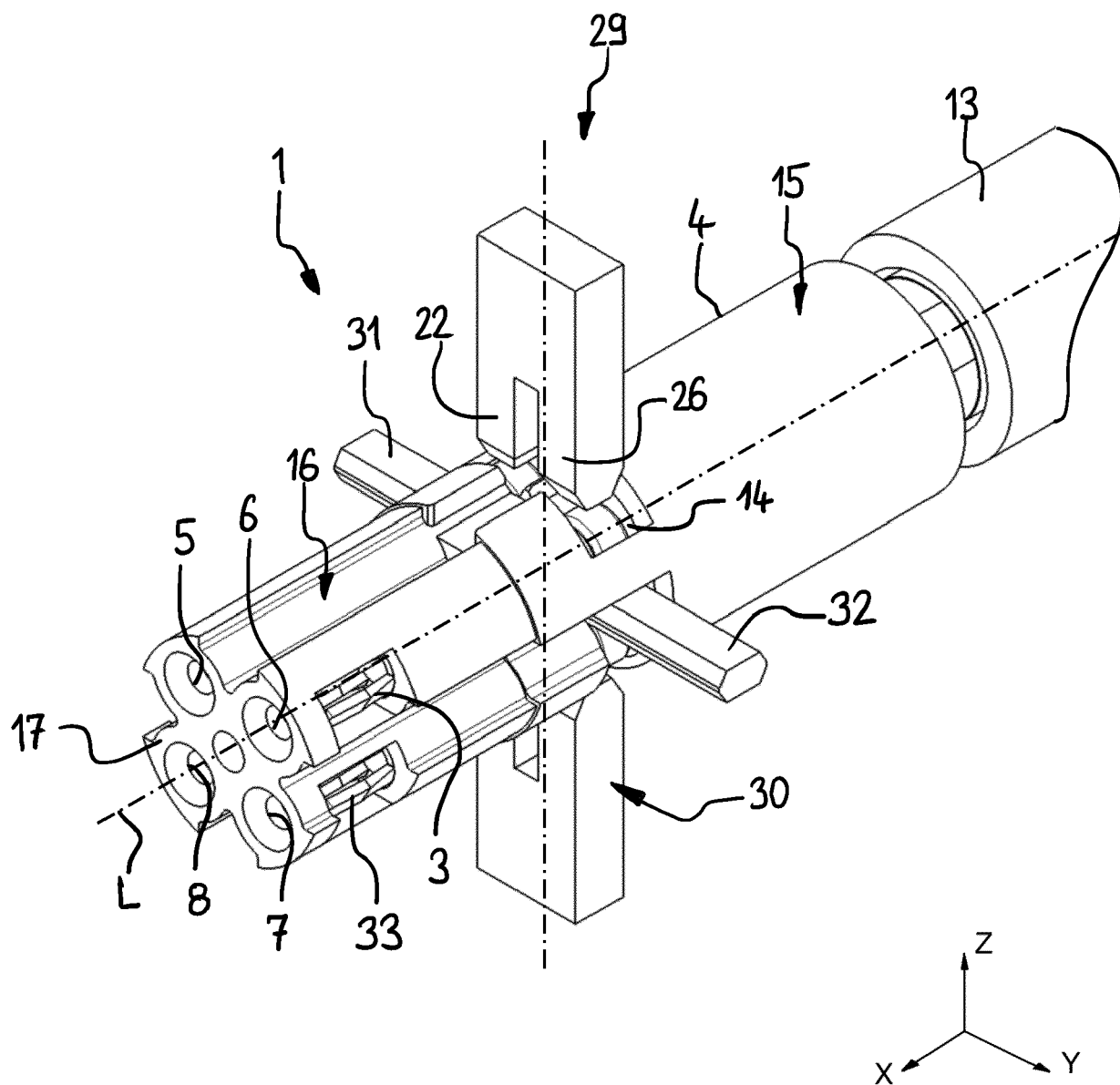


FIG. 9

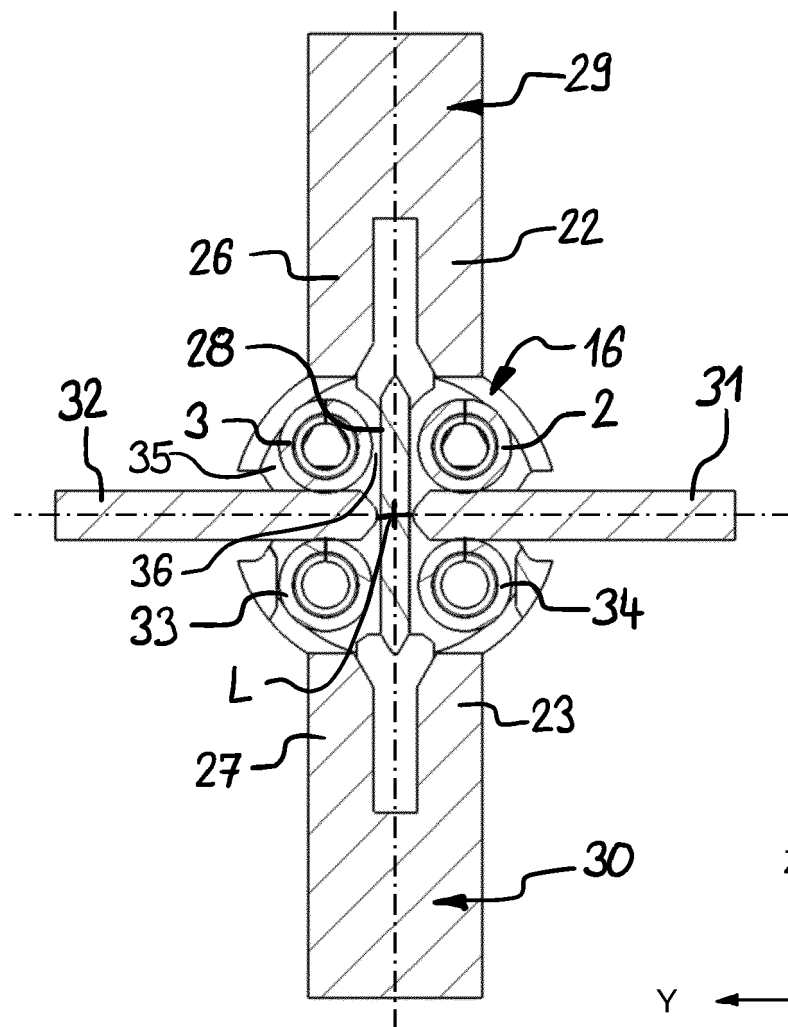


FIG. 10



EUROPEAN SEARCH REPORT

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			TECHNICAL FIELDS SEARCHED (IPC)
			H01R
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 April 2020	Examiner Esmiol, Marc-Olivier
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