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(71) Applicant: **Stäubli Electrical Connectors AG**
4123 Allschwil (CH)

(72) Inventors:
- **NURDIN Yannick**
  68130 Walheim (FR)
- **SCHULL Frédéric**
  68210 Hagenbach (FR)

(74) Representative: **Frischknecht, Harry Ralph**
Isler & Pedrazzini AG
Giesshübelstrasse 45
Postfach 1772
8027 Zürich (CH)

(54) ELECTRICAL CONNECTOR

(57) A connector (1) comprising
at least one housing (2) in each of which at least one electrical connector element (3) is arranged, wherein said housing (2) having a front section (20) extending along a front axis (M1) and a rear section (21) extending along a rear axis (M2), and
a shielding arrangement (7) to provide an electromagnetic shielding, said shielding arrangement (7) comprising at least two outer shielding elements (100) which are located on opposite sides of the at least one housing (2), wherein a cable (150) with a shielding braid (151) is guidable through the rear section (21) into the housing (2) and wherein an electrical contact can be established between the electrical connector element (3) and the cable (150);
wherein the connector further comprising in the region of the rear section (21) at least one of the elements chosen from the group of:
- a shielding bridge (180) to be directly connected to the outer shielding elements (100), wherein the shielding braid (151) is connectable to the shielding bridge (180); and/or
- a clamping bridge (200) to be directly connected to the outer shielding elements (100), or to be indirectly connected to the outer shielding elements (100) via the shielding bridge (180) if the shielding bridge (180) is present.

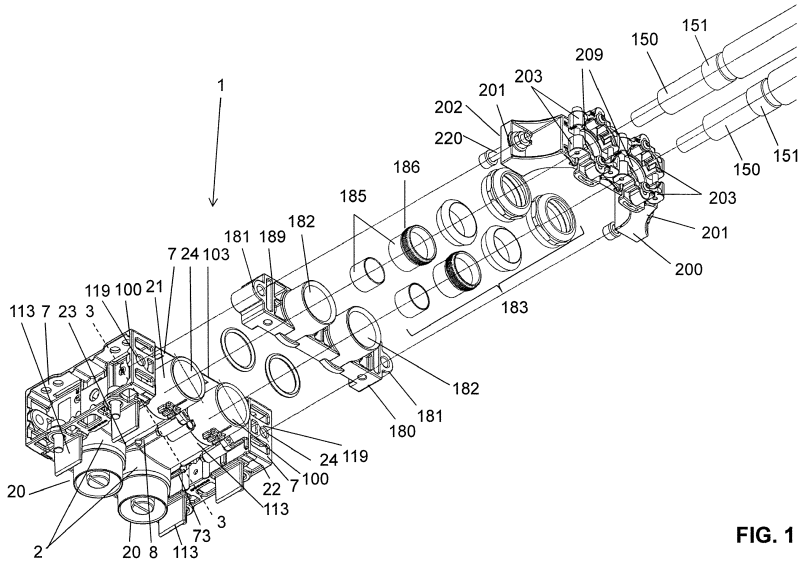

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a connector according to the preamble of claim 1.

PRIOR ART

[0002] There are a plethora of connectors known from prior art. Such connectors usually comprise a pin-side to be connected to a plug-side and may serve for various purposes such as providing an electrical contact or establishing a fluid-tight connection in a pneumatic or hydraulic pipe system.

[0003] There are for example electrical connectors which are used to link railway carriages together such that there is an electrical contact provided in order to supply electrical appliances such as light etc. with electrical energy.

[0004] Furthermore it is known from prior art that connectors may be arranged parallel to each other so that several connections are established with one single insertion operation. Such a connector assembly is for example known from US 2006/0110978.

[0005] However, connector systems known from prior art usually have the disadvantage that their structure is limited to specific functions.

SUMMARY OF THE INVENTION

[0006] It is an object to provide a connector which can be arranged in a modular manner, whereby the robustness of the connector shall be improved. In particular the robustness in terms of strain relief of cable connected to the connector and/or the robustness in terms of electromagnetic shielding, under the provision that the connector can be used in a modular manner.

[0007] Such an object is achieved by a connector assembly according to claim 1. Such a connector comprises at least one, preferably at least two, housings in each of which at least one electrical connector element is arranged, wherein said housing having a front section extending along a front axis and a rear section extending along a rear axis, and a shielding arrangement to provide an electromagnetic shielding, said shielding arrangement comprising at least two outer shielding elements which are located on opposite sides of the at least one housing. In case more than one housing is present the at least two outer shielding elements which are located on opposite sides of the housings. A cable with a shielding braid is guidable through the rear section into the housing and wherein an electrical contact can be established between the electrical connector element and the cable. The connector further comprising in the region of the rear section at least one of the elements chosen from the group of:

- a shielding bridge to be directly connected to the outer shielding elements, wherein the shielding braid is connectable to the shielding bridge; and
- a clamping bridge to be directly connected to the outer shielding elements, or to be indirectly connected to the outer shielding elements via the shielding bridge if the shielding bridge is present.

[0008] With the shielding bridge, the shielding braid of the cable can be connected in a very simple manner to the shielding bridge, which is in an electrical connection with the shielding element. Furthermore with the clamping bridge it is possible to mechanically clamp a cable to the connector.

[0009] In principle there are the following combinations or configurations of the modular connector possible:

- Connector with shielding bridge and clamping bridge; or
- Connector with clamping bridge only; or
- Connector with shielding bridge only.

[0010] The first configuration has the advantage the both functions, namely shielding and clamping can be provided.

[0011] The second configuration has the advantage that an enhanced shielding structure can be provided by means of the shielding bridge. This configuration can be used in case electromagnetic shielding is of importance and in case strain relief of the cable is of no importance.

[0012] The third configuration has the advantage that an enhanced mechanical robustness can be provided by means of the clamping bridge. This configuration can be used in case electromagnetic shielding is of no importance and in case strain relief of the cable is of importance.

[0013] Said housing comprises preferably an outer surface on which latching elements are arranged. Said outer shielding elements comprise latching elements which are adapted to be received by said latching elements of said

housing in order to establish a mechanical connection between the shielding element and the respective housing.

[0014] Preferably the shielding bridge and/or the clamping bridge extend as seen in direction of the second middle axis over the whole width of the connector and over said opposite sides. This has the advantage that the bridges serve also as mechanical stabilizer and enhance the rigidity of the connector structure.

[0015] Preferably the outer shielding elements have a threaded opening and wherein the shielding bridge and/or the clamping bridge have a through opening, whereby a screw can be feed through the through opening and engages into the threaded opening in order to mount the shielding bridge and/or the clamping bridge to the shielding arrangement or the outer shielding elements, respectively. The threaded opening and the through openings are oriented parallel to the rear axis.

[0016] Preferably on each side of the connector one screw is arranged such that the bridges or the bridge can be tightened in a symmetrical manner to the connector.

[0017] The shielding bridge and/or the clamping bridge are made out of an electrically conductive material.

[0018] Preferably said shielding bridge comprises at least one opening through which said cable can be guided towards the connector element, whereby via the opening a shielding braid of the cable is conductively connected to the shielding bridge.

[0019] Under the term "opening" various forms and shapes of openings are to be understood. The "opening" can also be a recess or a cut-out or any other form opening. The opening shall allow guiding the cable through the shielding bridge.

[0020] Preferably a shielding adapter is arranged between the shielding braid of the cable and the opening which shielding adapter establishes an electrically conductive connection between the shielding braid of the cable and the shielding bridge. The shielding adapter can be an element that is separated from the shielding bridge, wherein the shielding adapter is then mechanically fitted or pressed into the opening. Alternatively the shielding adapter is provided by the opening as an integral part thereof.

[0021] Preferably the shielding bridge comprises a bearing surface and the clamping bridge comprises a bearing surface, which bearing surfaces are in contact with each other. Preferably the bearing surface are oriented parallel with each other.

[0022] Preferably the clamping bridge comprises at least one pair of clamping elements, in particular one pair of clamping elements per cable, which clamping elements can be moved transversely to the middle axis of the cable in order to clamp the cable mechanically to the clamping bridge. A first clamping element of said pair and a second clamping element of said pair are moveable with respect to each other towards the cable such that the cable can be clamped between the first clamping element and the second clamping element.

[0023] Preferably the clamping bridge and the clamping elements are in connection via a linear guide, whereby the clamping elements can be moved relatively to the clamping bridge along the linear guide, which linear guide extends transversely to the middle axis of the cable or to the middle axis of the opening. Parts of the linear guide are located at the clamping bridge and other parts are located that the clamping elements.

[0024] Preferably the two clamping elements are connected together with screws.

[0025] Preferably each of the clamping elements comprises a slot through which a securing screw is guided which securing screw engages into a threaded opening in the clamping bridge, whereby the securing screw can be tightened in order to fasten the clamping element to the clamping bridge.

[0026] Preferably the clamping bridge comprises at least one opening through which said cable can be guided towards the electrical connector element and wherein each of the openings comprises a pair of said clamping elements which can be moved transversely to the middle axis of the opening. The term "opening" is to be understood according to the explanation given above with regard to the opening in the shielding element.

[0027] Preferably the shielding arrangement comprises further at least one transversal shielding element that is arranged such that it extends over at least one of said housings or such that it extends over all housings.

[0028] Preferably the outer shielding element comprises a locking structure to receive a side portion of said transversal shielding element.

[0029] In the following further preferred features will be outlined.

[0030] Preferably the connector as mentioned can be a pin-side or a plug-side connector, whereby the housing and the electrical contact element are designed accordingly. A connector assembly comprises the a pin-side with at least two pin-side housings in each of which at least one pin-side electrical connector element is arranged, wherein said pin-side housing having a front section extending along a front axis and a rear section extending along a rear axis, a plug-side with at least two plug-side housings in each of which at least one plug-side electrical connector element is arranged, wherein said pin-side housing having a front section extending along a front axis and a rear section extending along a rear axis, and wherein the front section of the pin-side is adapted to be connected with the front section of the plug-side in direction of said front axis, and a shielding arrangement comprising at least one outer shielding element to provide an electromagnetic shielding. The assembly thereby comprises a pin-side, a plug-side and a shielding arrangement.

[0031] Said latching elements of the housings are additionally adapted to be received by latching elements of a neighbouring housing in order to establish a mechanical connection between two neighbouring housings.

[0032] This structure allows building a contact assembly in a modular manner, wherein the shielding can be adapted to the structure of the housing and/or to the structure of the pin-side arrangement or the plug-side arrangement.

[0033] Preferably said outer shielding element is connected to the outer surface of the housing, which outer surface is opposite to the intermediate shielding element of the outermost housing.

[0034] In a preferred embodiment the shielding arrangement comprises between each pair of housing an intermediate shielding element, two outer shielding elements and two transversal shielding elements. The outer shielding element and the transversal shielding element encompass the connector assembly apart from the parts of the front section and the rear section on its outer side. Preferably the shielding elements of the shielding arrangement are in an electrical contact with each other.

[0035] Preferably the outer shielding element comprises a locking structure to receive a side portion of said transversal shielding element. Thereby via the locking structure a mechanical and an electrical contact can be established.

[0036] Preferably said outer shielding element and/or said transversal shielding element has substantially the same dimension as the housing as viewed in a direction perpendicular to said front axis and/or rear axis.

[0037] Preferably one of said shielding arrangement is in connection with the pin-side housing and one of said shielding arrangements is in connection with the plug-side housing. At least one of said shielding elements of said shielding arrangements that is arranged on the pin-side comprises a contact section and at least one of said shielding elements of said shielding arrangements that is arranged on the plug-side comprises a contact section. Said contact sections are arranged such that an electrical and/or mechanical contact between the shielding element that is arranged on the pin-side and the shielding element that is arranged on the plug-side can be established.

[0038] Preferred embodiments are characterized in that said contact section is arranged on the outer shielding element and/or in that said contact section is arranged on the transversal shielding element.

[0039] Preferably said contact section is a substantially flat contact surface. Alternatively said contact section is provided by means of a plug-side and a pin-side. In a preferred embodiment the intermediate shielding element is provided with the contact surface and the outer shielding element is provided with the plug-side and a pin-side.

[0040] Preferably said latching elements, in particular of the housing and/or the outer shielding element, are oriented in direction of said front axis and/or said rear axis such that the housings are connectable with a movement in direction of said front axis and/or said rear axis with each other or with said shielding element. It is an advantage that the latching elements can be used to connect the housings with each other as well as said housing with the shielding element.

[0041] Preferably said housing as well some of said shielding elements of said shielding arrangement comprise a locking structure in order to secure neighbouring housing against a relative movement to each other and/or in order to secure the respective of said shielding elements against a relative movement to the respective housing. The locking structure comprises preferably a recess in the housing and/or recess in the shielding element which recesses provide a complete recess, if the respective elements are in connection with each other, and a pin which can be introduced in said complete recess.

[0042] Preferably said latching elements are arranged in the front section and in the rear section so that each of the housings comprises two latching elements which are separated from each other. With two separate latching elements a very firm connection can be provided.

[0043] The housings have substantially the shape of a hollow cylinder with a preferably circular cross section, wherein said hollow cylinder defines an interior space in which said electrical connector elements are arranged. The latching elements are preferably arranged on embossments which circumvent said hollow cylinder in manner that a prismatic cross-section result, wherein the surface of said prismatic cross-section provide said outer surface.

[0044] Preferably at least two groups of latching elements are arranged, whereby said two groups are arranged separately from each other at a distance and wherein between said groups said locking structure is arranged.

[0045] Preferably the front axis is arranged collinear with the rear axis.

[0046] Alternatively the front axis is arranged angular with the rear axis, wherein the angle between the front axis and the rear axis is preferably between 90° or 150°, in particular 90°: Thereby an angular connector may be provided.

[0047] Preferably the electrical connector element is provided as a more piece element which comprises a connector element extending along the front axis and a bridging element extending along the rear axis, wherein either the connector element or the bridging element comprise an opening in which the bridging element or the connector element, respectively extends such that an electrical contact is established between the connector element and the bridging element. With this structure a very compact angular connector can be provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0048] Preferred embodiments of the invention are described in the following with reference to the drawings, which are for the purpose of illustrating the present preferred embodiments of the invention and not for the purpose of limiting the same. In the drawings,

Fig. 1 shows a perspective exploded view of assembly connector;
Fig. 2 shows a cross-sectional view of the connector according to figure 1;
Fig. 3 shows a further cross-sectional view of the connector according to figure 1 and 2;
Fig. 4 shows a perspective view of the connector according to the previous figures in a first configuration;
Fig. 5 shows a perspective view of the connector according to the previous figures in a second configuration; and
Fig. 6 shows a perspective view of the connector according to the previous figures in a third configuration.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0049] Figures 1 to 6 show a first embodiment of connector. Such a connector is provided to establish an electrical contact between two energy carriers, such as electrical cables. Thereby the connector assembly serves preferably as a multi-polar connector. This connector assembly therefore has several electrical cables to transmit electrical energy and/or control signals. Optionally the connector assembly may also include other energy carriers such as hydraulic or pneumatic fluids.

[0050] The connector comprises at least one housing 2 in which at least one electrical connector element 3 is arranged and a shielding arrangement 7 to provide an electromagnetic shielding. In the embodiments as shown in the figures two housings are shown and in the following the structure of the connector assembly is explained with regard to the two housing whereby it is clear that the description is also applicable to one housing. Preferably several housings 2 are arranged parallel to each other so that the connector comprises a multi-polar structure. In a connector assembly a pin-side and a plug-side is arranged. The pin-side 1 and the plug-side 2 can be connected with each other in order to establish a contact between the electrical connector element that is on the pin-side pin-side connector and the electrical connector element that is on the plug-side a plug-side connector.

[0051] As mentioned the connector assembly further comprises a shielding arrangement 7. The shielding arrangement 7 comprises as it can be seen from figure 1 at least one, here two, outer shielding elements 100. Furthermore the shielding arrangement 7 as shown in this embodiment comprises also one transversal shielding element 103. The shielding arrangement 7 will be explained in more detail below.

[0052] With regard to figure 1 the structure of the connector 1 will be explained in greater detail. The housing 2 comprises a front section 20 extending along a front axis M1 and a rear section 21 extending along a rear axis M2. The housing 2 has the shape of a hollow housing having an interior space 24 extending along the front axis M1 and the rear axis M2. The interior space 24 is preferably has a circular cross-section. Furthermore the housing has an outer surface 22. The electrical connector element 3 is arranged within the interior space 24. On the outer surface 22 latching elements 23 are arranged in order to connect two neighbouring housings together.

[0053] The latching elements 23 have preferably the shape of a dovetail joint. However, other shapes are also possible. With this regard it has to be mentioned that it is preferable that two neighbouring pin-side housings are contactable via movement in direction of one of the axis M1 or M2.

[0054] In case the electrical connector element 3 is an electrical connector, a cable 150 is electrically connected to the electrical connector element 3 in the interior space 24. The cable 150 is guided via the rear section 21 into the housing 2 whereby the cable 150 is in an electrical connection with the electrical connector element 3. The cable further comprises a shielding braid 151.

[0055] The front section 20 of the housing 2 is adapted to engage with the front section of a further housing such that an electrical connector assembly can be provided.

[0056] The connector further comprises in the region of the rear section 21 at least one of the elements chosen from the group of:

- a shielding bridge 180 to be directly connected to the outer shielding elements 100, wherein the shielding braid 151 is connectable to the shielding bridge 180; and
- a clamping bridge 200 to be directly connected to the outer shielding elements 100) or to be indirectly connected to the outer shielding elements 100 via the shielding bridge 180 if the shielding bridge 180 is present.

[0057] In principle there are the following combinations or configurations of the modular connector possible:

- Connector with shielding bridge 180 and clamping bridge 200; or
- Connector with clamping bridge 200 only; or
- Connector with shielding bridge 180 only.

[0058] In figure 4 the first configuration of the connector with the shielding bridge 180 and the clamping bridge 200 is shown. Thereby the shielding bridge 180 is in connection with the outer shielding element 100 and the clamping bridge 200 is in connection with the shielding bridge 180.

[0059] In figure 5 the second configuration of the connector is shown, whereby the clamping bridge 200 is in connection with the outer shielding element 100.

[0060] In figure 6 the third configuration of the connector is shown, whereby the shielding bridge 180 is in connection with the outer shielding element 100.

[0061] The shielding bridge 180 and/or the clamping bridge 200 extend as seen in direction of the rear axis M2 over the whole width of the connector 1 and over said opposite sides.

[0062] The outer shielding elements 100 have a bore or a threaded opening 119 and wherein the shielding bridge 180 and/or the clamping bridge 200 have a through opening 181, 201. A screw 220 can be feed through the through opening 181, 201 and engages into the bore or the threaded opening 119 in order to mount the shielding bridge 180 and/or the clamping bridge 200 to the shielding arrangement 7 or the outer shielding elements 100, respectively. In the present case the embodiment of the bore 119 is shown.

[0063] The shielding bridge 180 and/or the clamping bridge 200 are made out of an electrically conductive material. Preferably the bridges are made out of aluminium.

[0064] The shielding bridge 180 comprises at least one opening 182 through which said cable 150 can be guided towards the connector element 3. Via the opening 182 the shielding braid 151 of the cable 150 is conductively connected to the shielding bridge 180.

[0065] Preferably a shielding adapter 183 is arranged between the shielding braid 151 of the cable 150 and the opening 182. With the shielding adapter 183 an electrically conductive connection between the shielding braid 151 of the cable 151 and the shielding bridge 180 can be established. The shielding adapter 183 comprises a clamping structure 185 in which the shielding braid is clamped and a connection structure 186 with which an electrical contact can be established to the shielding bridge 180. In the shown embodiment the shielding adapter 183 is fitted in the opening 182 in a mechanical loose manner. Hence the shielding adapter 183 is mechanically fitted into the opening 182.

[0066] The clamping bridge 200 comprises at least one pair of clamping elements 203, in particular one pair of clamping elements 203 per cable 180, which clamping elements 203 can be moved transversely to the middle axis M of the cable 150 in order to mechanically clamp the cable 150 to the clamping bridge 200.

[0067] The clamping bridge 200 and the clamping elements 203 are in connection via a linear guide 204, whereby the clamping elements 203 can be moved relatively to the clamping bridge 200 along the linear guide 204, which linear guide 204 extends transversely to the middle axis M of the cable 150 or to the middle axis of the opening 182. The linear guide 204 comprises a guide comb 210 and a guide slot 211 into which the guide comb 210 extends into.

[0068] Each of the clamping elements comprises a slot 206 through which a securing screw 207 is guided which securing screw 207 engages into a threaded opening 208 in the clamping bridge 200, whereby the securing screw 207 can be tightened in order to fasten the clamping element 203 to the clamping bridge 200.

[0069] Furthermore the clamping bridge 200 comprises at least one opening 209 through which said cable can be guided towards the electrical connector element 3 and wherein each of the openings 209 comprises a pair of said clamping elements 203 which can be moved transversely to the middle axis of the opening 209.

[0070] The contact assembly is as mentioned above encompassed by the shielding arrangement 7 which comprises here two outer shielding elements 100 and two transversal shielding elements 103. The two outer shielding elements 100 are arranged to the left and the right of the contact assembly, whereas the two transversal shielding elements 103 are arranged on the top and on the bottom of the contact assembly. All of the shielding elements 100, 103 are in an electrical contact with each other. Preferably the shielding elements 100,103 are provided such that they cover substantially the respective surface of the respective housing 2, 5.

[0071] The outer shielding elements 100 comprise latching elements 73 with which the respective shielding element 100, can be connected to the respective housing 2.

[0072] In the present embodiment the outer shielding elements 100 comprises also latching elements which are also arranged on a lateral surface 111. The shielding elements 100 which are arranged to the left and to the right are provided with latching elements 73 to be connected to the housing 2, 5.

[0073] In order to provide an electrical contact between the outer shielding elements 100 of the pin-side and the outer shielding elements 100 of the plug-side, some of the outer shielding elements 100 comprise a contact section 113. This connection is established, when the pin-side comes into contact with the plug side.

[0074] The shielding arrangement 7 does not only provide an electrical shielding but also a protection against mechanical impacts on the respective housing. This is particularly advantageous, if the contact assembly is used in the field of railway technique in order to prevent that the housings will be damaged due to stone chipping etc..

[0075] In the embodiment as shown in the figures the front axes M1 and the rear axes M2 are arranged angular to each other, so that an angular plug results. The angle between the axes is here 90°, but other angles such as 135° are also possible. It is also possible that the axes M1, M2 are collinear to each other.

[0076] With regard to all of the embodiments it has to be mentioned here that the housings 2 are made out of plastic material, preferably chosen from the group of polyethylene. The shielding elements are preferably made out of metal.

LIST OF REFERENCE SIGNS

1	connector	183	adapter
2	housing	184	bearing surface
3	connector element	185	clamping structure
7	shielding arrangement	186	connection structure
8	locking structure	200	clamping bridge
20	front section	201	through opening
21	rear section	202	bearing surface
22	outer surface	203	clamping element
23	latching elements	204	linear guide
24	interior space	205	screw
73	latching elements	206	slot
80	recess	207	securing screw
81	recess	208	threaded opening
83	pin	209	opening for cable
100	outer shielding elements	210	guide comb
103	transversal shielding element	211	guide slot
119	opening		
120	side portion	220	screw
150	cable		
151	shielding braid	M1	front axis
		M2	rear axis
180	shielding bridge		
181	through opening		
182	opening		

Claims

1. Connector (1) comprising
at least one housing (2) in each of which at least one electrical connector element (3) is arranged, wherein said housing (2) having a front section (20) extending along a front axis (M1) and a rear section (21) extending along a rear axis (M2), and
a shielding arrangement (7) to provide an electromagnetic shielding, said shielding arrangement (7) comprising at least two outer shielding elements (100) which are located on opposite sides of the at least one housing (2),
wherein a cable (150) with a shielding braid (151) is guidable through the rear section (21) into the housing (2) and wherein an electrical contact can be established between the electrical connector element (3) and the cable (150);
characterized in that the connector further comprises in the region of the rear section (21) at least one of the elements chosen from the group of:

- a shielding bridge (180) to be directly connected to the outer shielding elements (100), wherein the shielding braid (151) is connectable to the shielding bridge (180); and/or
- a clamping bridge (200) to be directly connected to the outer shielding elements (100), or to be indirectly connected to the outer shielding elements (100) via the shielding bridge (180) if the shielding bridge (180) is present.

2. Connector (1) according to claim 1, wherein the shielding bridge (180) and/or the clamping bridge (200) extend as seen in direction of the rear axis (M2) over the whole width of the connector (1) and over said opposite sides of said housing (2).

3. Connector (1) according to claim 1 or 2, wherein the outer shielding elements (100) have a bore or a threaded opening (119) and wherein the shielding bridge (180) and/or the clamping bridge (200) have a through opening (181, 201), whereby a screw (220) can be feed through the through opening (181, 201) and engages into the bore or the threaded opening (119) in order to mount the shielding bridge (180) and/or the clamping bridge (200) to the

shielding arrangement (7) or the outer shielding elements (100), respectively.

4. Connector (1) according to any of the preceding claims, wherein the shielding bridge (180) and/or the clamping bridge (200) are made out of an electrically conductive material.

5. Connector (1) according to any of the preceding claims, wherein said shielding bridge (180) comprises at least one opening (182) through which said cable (150) can be guided towards the connector element (3), whereby via the opening (182) the shielding braid (151) of the cable (150) is conductively connected to the shielding bridge (180).

6. Connector (1) according to claim 5, wherein a shielding adapter (183) is arranged between the shielding braid (151) of the cable (150) and the opening (182) which shielding adapter (183) establishes an electrically conductive connection between the shielding braid (151) of the cable (150) and the shielding bridge (180); wherein the shielding adapter (183) is mechanically fitted or pressed into the opening (182) or is provided by the opening (182) as an integral part thereof.

7. Connector (1) according to one of the preceding claims, wherein the shielding bridge (180) comprises a bearing surface (184) and wherein the clamping bridge (200) comprises a bearing surface (202), which bearing surfaces (184, 202) are in contact with each other.

8. Connector (1) according to one of the preceding claims, wherein the clamping bridge (200) comprises at least one pair of clamping elements (203), in particular one pair of clamping elements (203) per cable (180), which clamping elements (203) can be moved transversely to the middle axis (M) of the cable (150) in order to clamp the cable (150) mechanically to the clamping bridge (200).

9. Connector (1) according to claim 8, wherein the clamping bridge (200) and the clamping elements (203) are in connection via a linear guide (204), whereby the clamping elements (203) can be moved relatively to the clamping bridge (200) along the linear guide (204), which linear guide (204) extends transversely to the middle axis (M) of the cable (150) or to the middle axis of the opening (201, 209).

10. Connector (1) according to claim 8 or 9, wherein the two clamping elements (203) are connected together with screws (205); and/or
wherein each of the clamping elements comprises a slot (206) through which a securing screw (207) is guided which securing screw (207) engages into a threaded opening (208) in the clamping bridge (200), whereby the securing screw (207) can be tightened in order to fasten the clamping element (203) to the clamping bridge (200); and/or
wherein the clamping bridge (200) comprises at least one opening (209) through which said cable can be guided towards the electrical connector element (3) and wherein each of the openings (209) comprises a pair of said clamping elements (203) which can be moved transversely to the middle axis of the opening (209).

11. Connector assembly according to one of the preceding claims, **characterized in that** said shielding arrangement (7) comprises further at least one transversal shielding element (103) that is arranged such that it extends over at least one of said housings (2) or such that it extends over all housings (2).

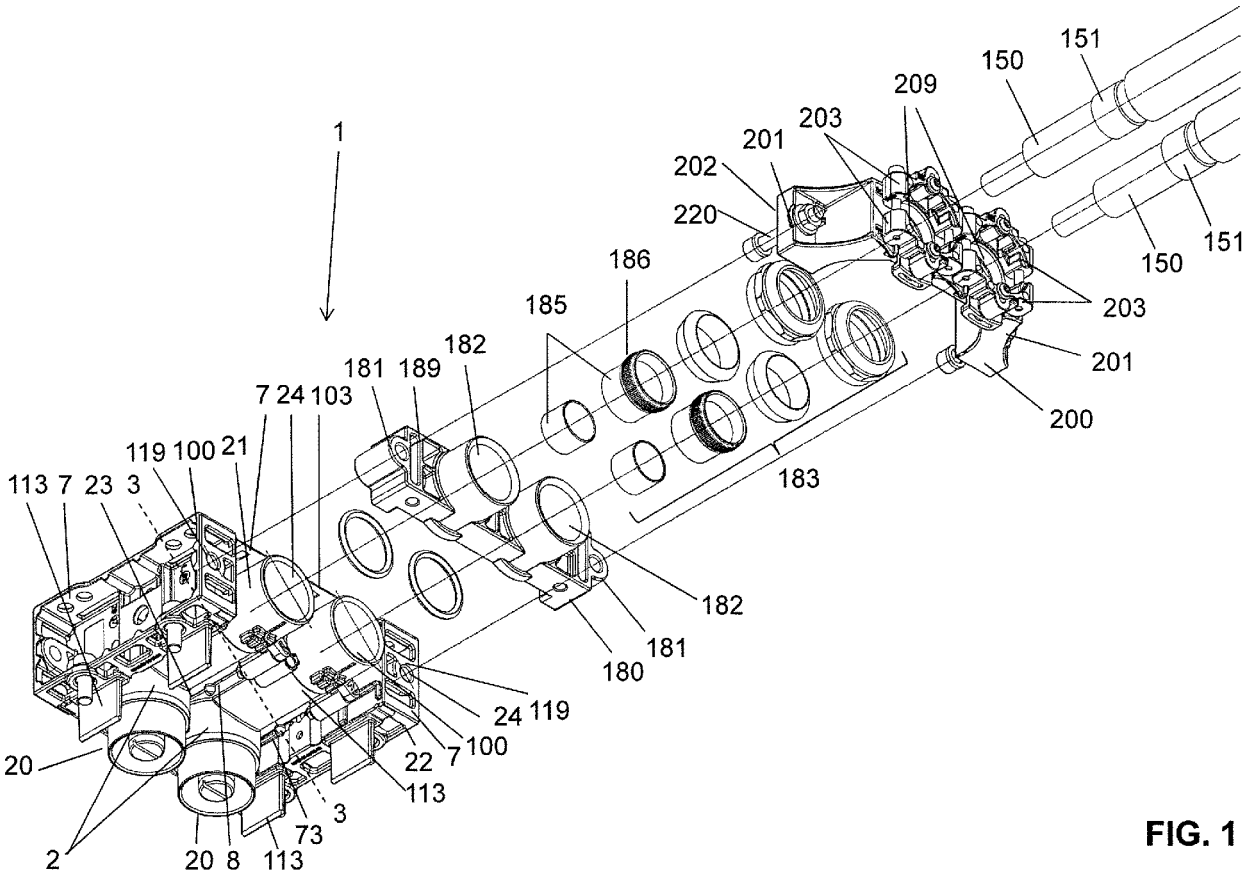
12. Connector according to one of the previous claims, **characterized in that** the outer shielding element (100) comprises a locking structure to receive a side portion (120) of said transversal shielding element (103).

13. Connector according to one of the preceding claims, **characterized in that** said outer shielding element (100) and/or said intermediate shielding element (101) has substantially the same dimension as the housing as viewed in a direction perpendicular to said front axis and/or rear axis.

14. Connector according to one of the preceding claims, wherein at least one of said shielding elements of said shielding arrangements (7) comprises a contact section (113) that is arranged such that an electrical and/or mechanical contact between a shielding element of another connector can be established.

15. Connector according to any of the preceding claims, **characterized in that** said housing (2, 5) as well as some of said shielding elements of said shielding arrangement (7) comprise a locking structure (8) in order to secure neighbouring housings (2, 5) against a relative movement to each other and/or in order to secure said shielding elements of said shielding arrangement (7) against a relative movement to the respective housing (2, 5), wherein the locking structure (8) comprises preferably a recess (80) in the housing (2, 5) and/or recess (81) in the shielding element

which recesses (80, 81) provide a complete recess (82), if the respective elements (2, 5, 7) are in connection with each other, and a pin (83) which can be introduced in said complete recess (82).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73

FIG. 1

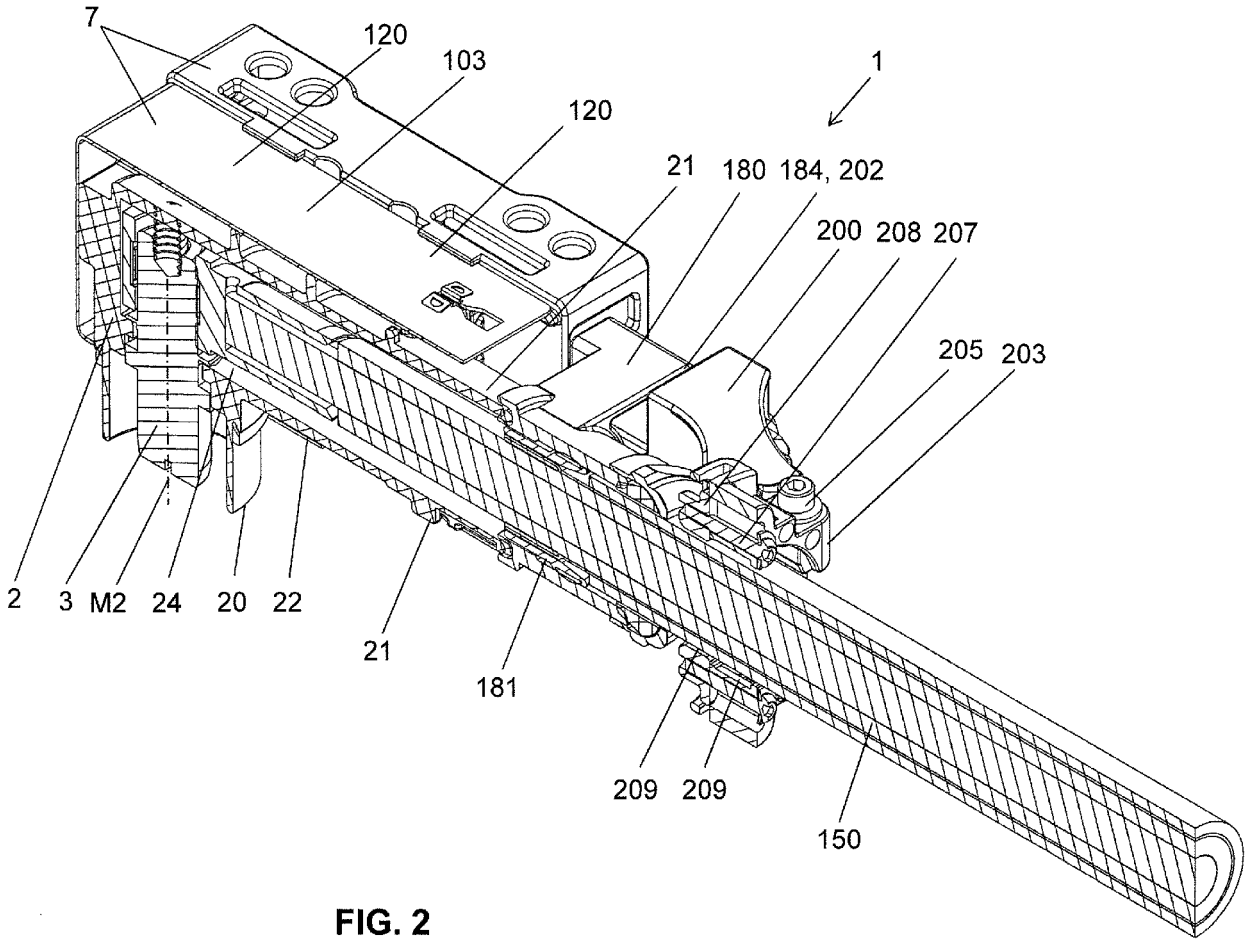
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FIG. 2

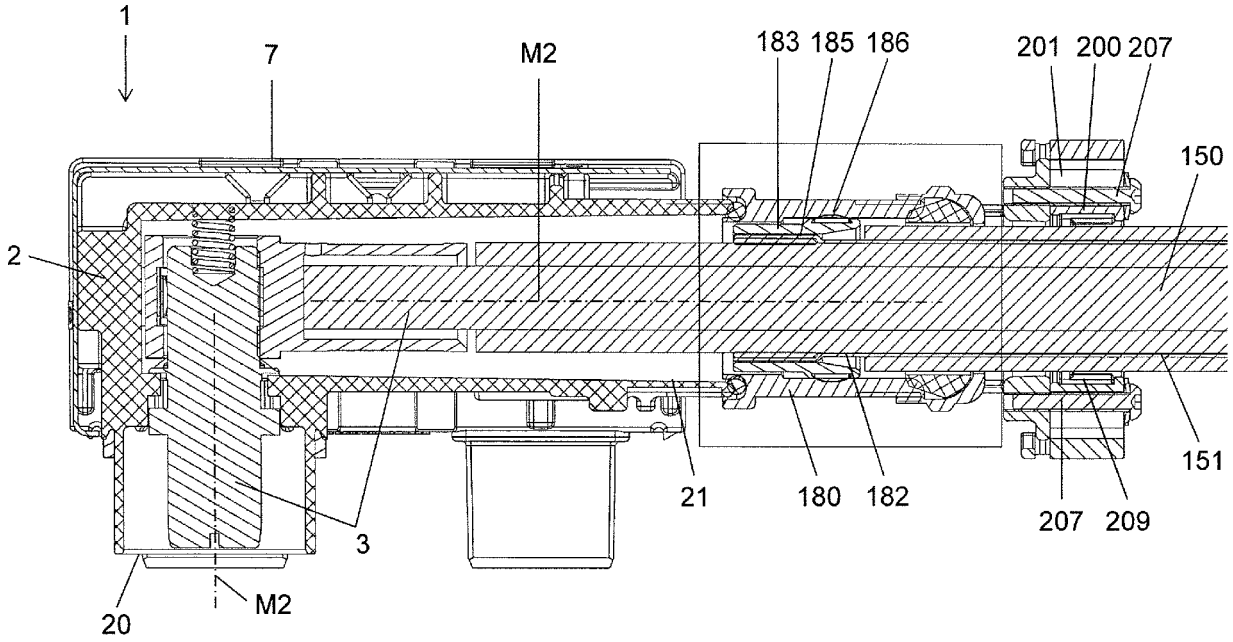

FIG. 3

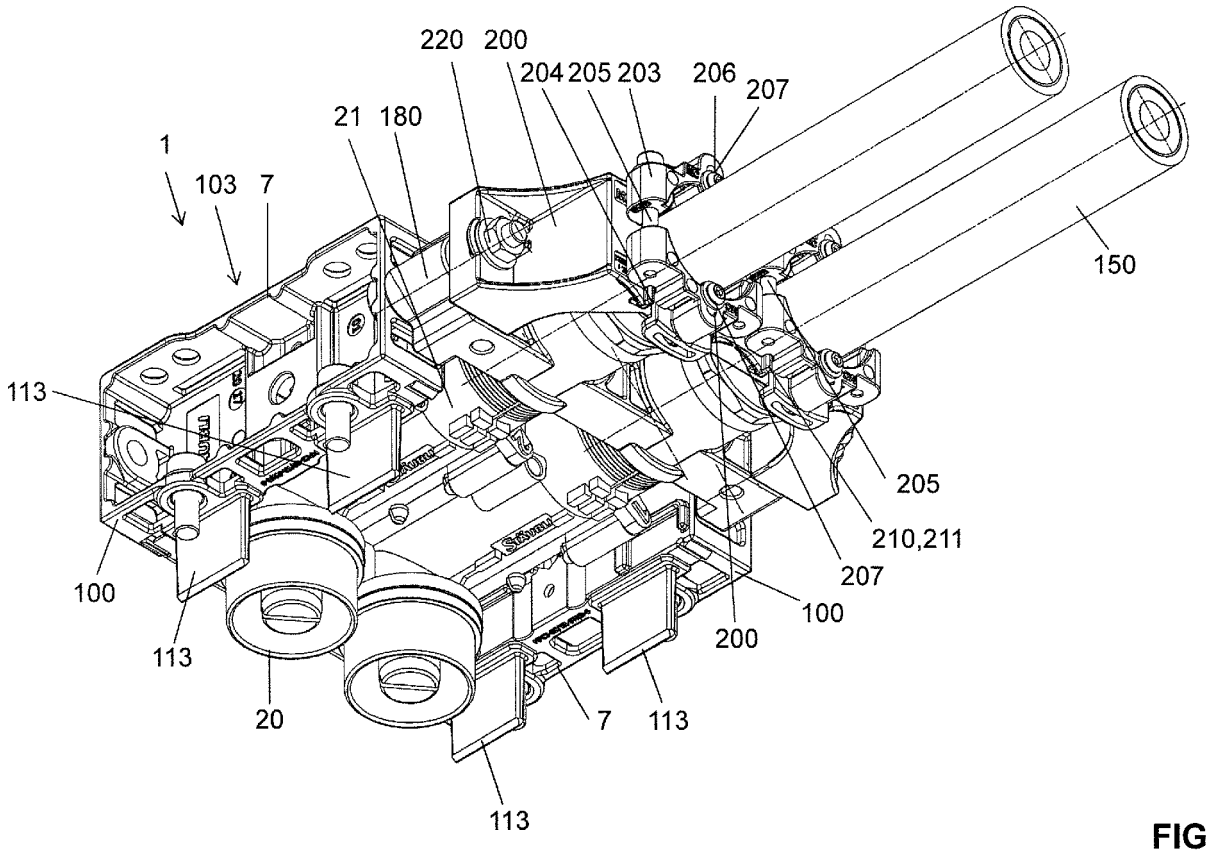
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FIG. 4

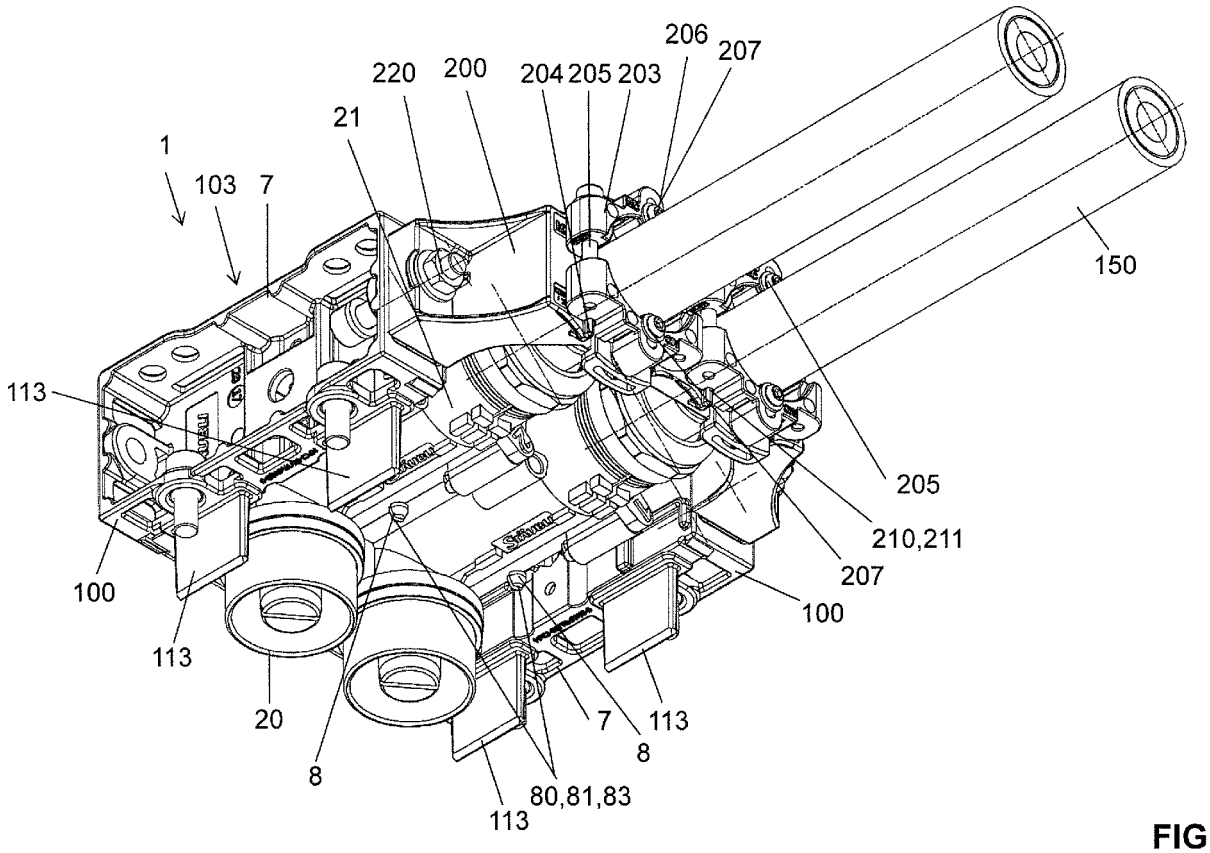
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FIG. 5

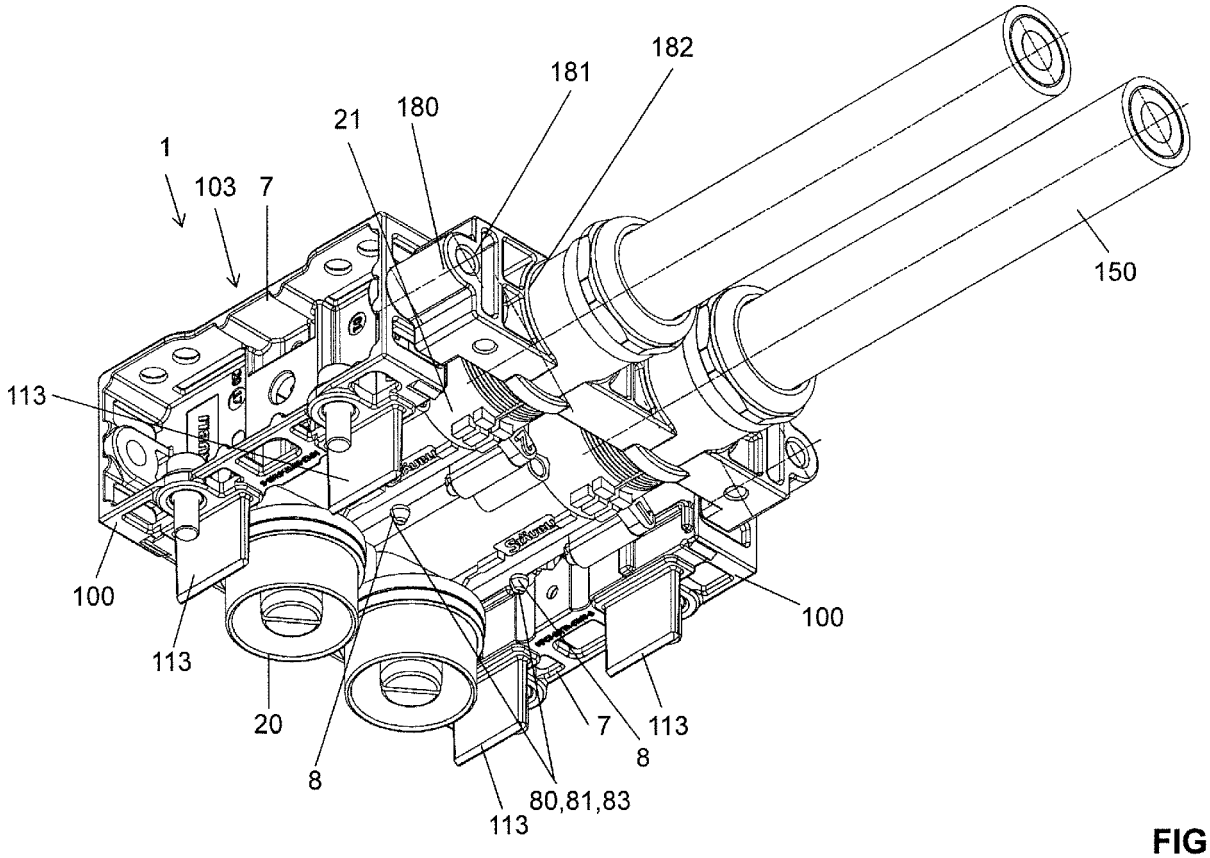

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 18 15 9751

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H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 August 2018	Pugliese, Sandro

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