



(11) **EP 3 323 173 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
19.08.2020 Bulletin 2020/34

(51) Int Cl.:
H01R 9/26 (2006.01) H01R 13/10 (2006.01)
H01R 4/36 (2006.01) H01R 43/16 (2006.01)

(21) Application number: **15897993.0**

(86) International application number:
PCT/CN2015/084083

(22) Date of filing: **15.07.2015**

(87) International publication number:
WO 2017/008265 (19.01.2017 Gazette 2017/03)

(54) **CONDUCTIVE BAR WITH ANNULAR PORTION TO ACCOMMODATE TEST PLUG**

LEITFÄHIGE SCHIENE MIT RINGFÖRMIGEM ABSCHNITT ZUR AUFNAHME EINES
PRÜFSTECKERS

BARRE CONDUCTRICE AVEC PARTIE ANNULAIRE POUR LOGER UN ÉLÉMENT DE CONNEXON
DE TEST

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

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(43) Date of publication of application:
23.05.2018 Bulletin 2018/21

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Description

[0001] The present invention relates to a part of an electrically conducting bar for an electrical apparatus, such as for example and in particular a terminal block.

[0002] It also relates to an electrically conducting bar as such and a terminal block equipped with at least such one electrically conducting bar.

[0003] In a known manner, a terminal block is an electrical apparatus comprising two connection terminals allowing connecting each one with a corresponding electrically conducting wire. A terminal block also comprises at least one electrically conducting bar for establishing the electrical connection between the two wires connected to the two connection terminals.

[0004] In this context, it is known to produce electrically conducting bars comprising at least a part originating from a cutout then folded base sheet metal. Different ways of folding along the general extension direction of the electrically conducting bar may allow increasing the section in order to allow good electrical conductivity. It is also known to form areas, for example in the form of plugs, by folding a part of the electrically conducting bar, such plugs being intended to be put in contact with one of the connection terminals and/or with the conducting wire connected to the connection terminal set up at this plug.

[0005] Other functions may be required from a terminal block. Particularly, it may be designed in such a manner as to allow the setting up, at each of the connection terminals, of a test plug external to the terminal block and capable of electrical measurement of the part of the electrically conducting bar at which the connection terminal is set up, in particular a measurement of the electric potential. In particular, the use of such a test plug allows controlling whether the electric contact between the conducting wire and the electrically conducting bar is correctly established.

[0006] It is also known to provide that the terminal block may allow setting up a shunt jumper allowing establishing an electric contact between two electrically conducting bars implanted respectively in two different terminal blocks. Particularly, these two terminal blocks may be mounted in an adjacent manner on a same supporting rail.

[0007] In a first example, the document DE1971109U describes a part of an electrically conducting bar for an electric apparatus, said part comprising a connection junction constituted by a square box, a panel and a screw. The low wall of the box forms a planar first portion. A second portion parallel with the first portion is composed of a folded plate in which a hole is formed to accommodate a test plug. This folded plate is a cutout along a contour arranged outside the planar first portion.

[0008] In a second example, each of the documents CN201656008U and CN104143737A describes a part of an electrically conducting bar for an electric apparatus, wherein said part comprises a planar first portion includ-

ing an area allowing the setting up of a first connection junction, and a second portion composed of two side plates where each side plate is a cutout along a contour arranged outside the first portion. Receiving elements are formed in the second portion in such a way to accommodate a test plug

[0009] Currently, such functions are obtained at the price of a high number of components and/or great complexity of design and manufacturing of the terminal block, also putting a strain on the price, the weight and the general size of the known terminal blocks. The present invention aims to resolve all or part of the above-listed drawbacks. To this end, the present invention relates to a part of an electrically conducting bar for an electrical apparatus, such as a terminal block, said part of electrically conducting bar comprising:

a planar first portion extending along a first extension direction and including a first area arranged for allowing the setting up of a connection terminal of the electrical apparatus intended to ensure an electrical contact between the first portion and an electrically conducting element external to the apparatus,

a second portion of the part of electrically conducting bar extending protruding from the first portion along a second extension direction forming an angle with the first extension direction,

receiving elements formed in the second portion by a second cutout along a second contour arranged at the second portion, the folding of the second cutout being carried out along at least one folding axis parallel with the second extension direction, the receiving elements being configured in such a manner as to separately accommodate a test plug external to the electrical apparatus and capable of an electric measurement of the second portion,

wherein said second portion is formed by a first cutout along a first contour arranged in the first portion, the folding of the first cutout achieved transversally to the first extension direction along a folding axis perpendicular to the first extension direction and the first contour being configured in such a manner that the first cutout forms said second portion.

[0010] The advantage of this disposition is to be able to impart a temporary accommodating function of a test plug while ensuring that the dimensions of the electrically conducting bar, particularly the width thereof, are low. This promotes a reasonable price and a gain of material in which the part of the electrically conducting bar is formed. The terminal block which could be manufactured on the base of such a part of an electrically conducting bar may include a number of components which is less high and/or which will have a simplified design and manufacture in comparison with the current terminal blocks, also improving the price, the weight and the general size of the terminal block while imparting it with the accommodating function of test plugs.

[0011] The implementation of the cutout at the first contour then the folding of the first cutout thus delimited and the implementation of the cutout at the second contour then the folding of the second cutout thus delimited allow, by simple and economical operations (cutting out, folding) in terms of material and size, of constituting the first and second portions suitable for accommodating a test plug.

[0012] The material of the second portion at least partially originates from the first portion prior to implementing the first cutout. Likewise, the material of the receiving elements may at least partially originates from the second portion prior to implementing the second cutout. It thus results a gain in material.

[0013] The fact that the folding of the second cutout is carried out along at least one folding axis parallel with the second extension direction promotes the possibility of setting up of the test plug in the receiving elements along a direction substantially oriented along the second extension direction.

[0014] The receiving elements may be arranged at a first end of the second opposite portion, along the second extension direction, with respect to a second end of the second portion where the coupling of the second portion with the first portion is carried out.

[0015] This promotes an easy set up of the test plug in the receiving elements, particularly from one of the peripheral edges of the insulating body of the electrical apparatus without requiring a large insertion travel of the test plug.

[0016] According to an aspect of the invention, the second cutout comprises first and second parts extending from the rest of the second portion transversally to the second extension direction and delimiting the receiving elements.

[0017] Preferentially, the first and second parts form receiving elements having an annular contour over at least a half periphery.

[0018] According to an advantageous embodiment, the first and second parts are provided at their distal ends respectively with first and second coupling members having complementary forms for a fitting of one in the other, in order to constitute receiving elements having an annular contour with closed contour.

[0019] This allows constituting in a very simple manner such receiving elements further having a good efficiency for mechanically maintaining the test plug and ensuring good electrical contact between the test plug and the receiving elements.

[0020] Preferentially, the first portion comprises a second area, shifted with respect to the first area along the first extension direction, configured for ensuring an electrical connection of the part of the electrically conducting bar directly or indirectly with another electrically conducting bar or with another connection terminal than the connection terminal which is set up at the first area.

[0021] According to a particular embodiment, the first contour of the first cutout is carried out at the second area

and the second portion is located, along the first extension direction, between the first and second areas of the first portion.

[0022] It thus results in an optimization of the place and of the material constituting the part of the electrically conducting bar.

[0023] The part of electrically conducting bar may comprise a securing member, in particular in the form of a threaded element such as a tapping formed in a hole of the first portion, arranged in the first portion in the verticality of the receiving elements along a direction perpendicular to the first extension direction, said securing member being configured in such a manner as to allow a dismountable securing of the test plug with the part of electrically conducting bar.

[0024] This disposition allows making reliable, if necessary, the securing of the test plug accommodated by the receiving elements, and thus in a very simple, economical manner and requiring small size and not much material.

[0025] The receiving elements are preferably configured in such a manner as to allow accommodating a shunt jumper external to the electrical apparatus and to ensure an electrical contact between the receiving elements and the shunt jumper positioned in the receiving elements, said shunt jumper being capable of ensuring an electrical connection between the receiving elements formed in the second portions of two parts of two electrically conducting bars respectively belonging to two distinct electrical apparatuses.

[0026] The advantage of this disposition is to be able to impart a temporary set up function of such a shunt jumper while ensuring that the dimensions of the electrically conducting bar, particularly the width thereof, are low. This promotes a reasonable price and a gain of material in which the part of electrically conducting bar is formed. The terminal block which may be manufactured on the base of such a part of electrically conducting bar may include a number of components which is less high and/or which will have a simplified design and manufacture in comparison to current terminal blocks, also improving the price, weight and general size of the terminal block while imparting it with the set up function of a shunt jumper in addition to the accommodating function of a test plug.

[0027] According to a particular embodiment, the securing member is configured in such a manner as to allow a dismountable securing of a maintaining screw with the part of electrically conducting bar in a configuration in which this maintaining screw ensures a positive locking of the shunt jumper in the receiving elements.

[0028] This disposition once again allows making reliable, if necessary, the securing of the shunt jumper set up in the receiving elements, and thus in a very simple, economical manner and requiring a small size and not much material.

[0029] The present invention also relates to an electrically conducting bar including at least such one part of

electrically conducting bar, as well as a terminal block comprising at least such one electrically conducting bar ensuring all or part of electrical connection between two connection terminals each capable of connecting a respective electrically conducting element such as an electric wire.

[0030] Anyway, the invention will be better understood by means of the following description of particular embodiments of the invention given by way of non limiting examples and represented on the accompanying drawings, on which:

Figure 1 is a perspective view of an example of a part of an electrically conducting bar according to an aspect of the invention,

Figure 2 is a top view of the base piece from which the part of electrically conducting bar of figure 1 originates,

Figure 3 illustrates in perspective and in longitudinal section an example of a terminal block according to another aspect of the invention and comprising at least one part of electrically conducting bar of figure 1,

Figure 4 represents a view corresponding to that of figure 3 but after the set up of a first type of test plug, Figure 5 represents a view corresponding to that of figure 3 but after the set up of a second type of test plug,

Figure 6 illustrates a mounting with two adjacent terminal blocks electrically connected by means of a shunt jumper,

And figure 7 represents in detail the established electrical contact, in the mounting of figure 6, between the shunt jumper and one of the parts of electrically conducting bars of one of the two terminal blocks of the mounting of figure 6.

[0031] In reference to the accompanying figures 1 to 7, the invention essentially relates to a part 10 of an electrically conducting bar for an electrical apparatus, this part 10 of electrically conducting bar comprising:

- a planar first portion 11 extending along a first extension direction D1 and including a first area 12 arranged for allowing the set up of a connection terminal 13 (visible for example on figures 3 and 4) of the electrical apparatus intended for ensuring an electrical contact between the first portion 11 and an electrically conducting element (not represented) external to the apparatus,
- a first cutout 14 along a first contour 15 arranged in the first portion 11, the folding of the first cutout 14 and the first contour 15 being configured (by a suitable choice of orientation, forms, dimensions, folding angle etc.) in such a manner that the first cutout 14 forms a second portion 16 of the part 10 of electrically conducting bar extending protruding from the first portion 11 along a second extension direction D2

forming an angle with the first extension direction D1, receiving elements 17 formed in the second portion 16 and configured in such a manner as to be able to separately accommodate a test plug (identified 18, 19 in the rest of the description), external to the electrical apparatus and capable of an electrical measurement of the second portion 16.

[0032] The electrical apparatus may in particular be constituted by a terminal block 20, as is the case on the figures. The terminal block 20 is an electrical apparatus comprising two connection terminals 13 as mentioned above. Each connection terminal 13 allows connecting for example to a corresponding electrically conducting wire (not represented). A terminal block 20 thus comprises at least one electrically conducting bar ensuring or at least participating in the electrical connection between the two wires connected to the two connection terminals 13, this bar being entirely or partly formed by the part 10 of electrically conducting bar.

[0033] According to the invention, the receiving elements 17 allow accommodating a test plug 18, 19 configured in such a manner as to be suitable for measuring or evaluating the electric potential of the second portion 16.

[0034] The terminal block 20 also comprises an electrically insulating housing 21, also called insulating casing, in which are mounted the two connection terminals 13 and the electrically conducting bar(s). The connection terminals 13 may be of any nature, for example using a securing by screw or spring.

[0035] The present invention also relates to an electrically conducting bar including at least such one part 10 of electrically conducting bar, as well as a terminal block 20 comprising at least such one electrically conducting bar ensuring all or part of electrical connection between two connection terminals 13 each capable of connecting a respective electrically conducting element, such as an electric wire.

[0036] Figures 4 and 5 represent the situation after the set up of respectively a first type of test plug 18 and a second type of test plug 19. The test plug 18 according to the first type is a standard test plug with a diameter of 4 mm. In reference to figure 4, there is definitely a contact area between the test plug 18 and the receiving elements 17 which accommodate the test plug 18, thus allowing finally carrying out an electric measurement of the second portion 16 at the receiving elements 17, in particular a measurement of the electric potential at the receiving elements 17. The test plug 19 according to the second type is a standard test plug with a IP20 class hollow screw, which operates in the same manner as the test plug 18 but which in addition is meshed in the part 10 of electrically conducting bar, as will be explained in detail further down.

[0037] The above-mentioned dispositions in their general principals have as important advantage to be able to impart a temporary accommodating function of a test

plug 18, 19 while ensuring that the dimensions of the electrically conducting bar, particularly the width thereof, are low. This promotes a reasonable price and a material gain in which the part 10 of electrically conducting bar is formed. The terminal block 20 which may be produced on the base of such a part 10 of electrically conducting bar may include a number of components which is less high and/or which will have a simplified design and manufacture with respect to current terminal blocks, also improving the price, the weight and the general size of the terminal block 20 while imparting it with the accommodating function of test plugs 18, 19.

[0038] According to the invention, the folding of the first cutout 14 is carried out transversally to the first extension direction D1 along a folding axis 22 perpendicular to the first extension direction D1.

[0039] The part 10 of electrically conducting bar comprises a second cutout 23 along a second contour 24 arranged at the second portion 16, the folding of the second cutout 23 forming the aforementioned receiving elements 17.

[0040] Thus, the implementation of the cutout at the first contour 15, then the folding of the first cutout 14 thus delimited, and the implementation of the cutout at the second contour 24, then the folding of the second cutout 23 thus delimited, allow the first and second portions 11, 16 suitable for accommodating the test plugs 18, 19 to be constituted by simple and economical operations in terms of material and size.

[0041] As it can be deduced from figure 2 for example, the material of the second portion 16 at least partially originates from the first portion 11 prior to implementing the first cutout 14. Similarly, the material of the receiving elements 17 may at least partially originate from the second portion 16 prior to implementing the second cutout 23. It thus results a substantial gain in material despite the numerous functions imparted to it.

[0042] According to the invention, the folding of the second cutout 23 is carried out along at least a folding axis 25 parallel with the second extension direction D2.

[0043] This disposition promotes the possibility of setting up the test plug 18, 19 in the receiving elements 17 along a direction substantially oriented along the second extension direction D2.

[0044] Hence, it is understood from the aforementioned dispositions that the first portion 11 and the second portion 16, which are distinct, form an integral assembly formed into one single piece, constituting all or part of the part 10 of electrically conducting bar described in this document.

[0045] Particularly, these first and second portions 11, 16 originate from a same planar base, represented on figure 2. The base is for example a planar plate formed in an electrically conducting material having properties allowing it to permit folding operations. It consists for example of a cutout sheet metal plate. The part 10 of electrically conducting bar visible on figure 1 has been obtained by folding the first cutout 14 with respect to the

first portion 11 in order to form the second portion 16 and by folding the second cutout 23 with respect to the rest of the second portion 16 in order to constitute the receiving elements 17.

[0046] As is represented on figure 1, the receiving elements 17 are arranged at a first end of the second portion 16. The first end is opposite, along the second extension direction D2, with respect to a second end of the second portion 16 which corresponds to the coupling area of the second portion 16 with the first portion 11. In practice, this coupling also corresponds to the folding area at the folding axis 22.

[0047] This promotes an easy set up of the test plug 18, 19 in the receiving elements 17, particularly from one of the peripheral edges of the insulating housing 21 of the terminal block 20 without requiring a large insertion travel of the test plug 18, 19 which is inserted in at least one orifice 26 arranged to this end in the electrically insulating housing 21. The housing 21 may besides have two orifices 26 in order to allow the set up of a test plug 18, 19 at each connection terminal 13 for verifying, at this terminal 13, the right electrical contacting between the electrically conducting bar and the electrically conducting element maintained by the connection terminal 13.

[0048] The second portion 16 has for example a general organization in the form of a blade, a wing, a post or a pin.

[0049] The angle formed between the first and second portions 11, 16 is for example substantially equal to 90°, that is to say, included in a range going from 70° to 90°. It results that the second portion 16 is, in this variant, substantially at a right angle with respect to the first portion 11. Thus, it also facilitates the setting up of the test plug 18, 19 in the receiving elements 17.

[0050] According to an aspect of the invention, the second cutout 23 comprises first and second parts 27, 28 extending from the rest of the second portion 16 transversally to the second extension direction D2, these two parts 27, 28 being spatially configured in a manner constituting the receiving elements 17.

[0051] According to a particular embodiment, it may be provided that the first and second parts 27, 28 form receiving elements 17 having an annular contour over at least a half-periphery.

[0052] In the variant represented but which remains non limiting, the first part 27 and the second part 28 are provided at their distal ends respectively with first and second coupling members 271, 281 having complementary forms, for example of male type and female type of complementary forms, in order to allow a fitting of one in the other, in order to constitute receiving elements 17 having an annular contour with closed contour after fitting.

[0053] This allows constituting in a very simple manner such receiving elements 17 further having a good efficiency for mechanically maintaining the accommodated test plug 18, 19 and ensuring a good electrical contact between the test plug 18 19 and the receiving elements

17. The dimensions of the annular form may be suited according to those of the test plug to be accommodated.

[0054] Alternatively or in combination, the first and second parts 27, 28 may possibly have a certain elasticity in order to be suited to different test plugs having in particular different dimensions (for example different diameters).

[0055] It is also to be considered to design the first and second parts 27, 28 in such a manner as to constitute receiving elements 17 having an annular contour with open contour in a part of the periphery thereof. Particularly, the annular profile of the receiving elements 17 may not be completely closed, for example by adopting a general form of split ring, thus which incidentally offers a possibility of elastic deformation of the contour of the receiving elements 17 in order to be suited to the dimensions of the accommodated test plug.

[0056] As is shown on the figures, the first and second parts 27, 28 are in particular folded with respect to the rest of the second portion 16 at two different and parallel folding axes 25.

[0057] Preferentially, the first portion 11 comprises a second area 29, shifted with respect to the first area 12 along the first extension direction D1, configured to ensure an electrical connection of the part 10 of electrically conducting bar directly or indirectly with another electrically conducting bar or with another connection terminal 13 than the connection terminal 13 which is set up at the first area 12.

[0058] It should be noted that the part 10 of electrically conducting bar may possibly be used for ensuring itself the direct electrical connection between the two electrically conducting elements maintained by the two connection terminals 13 of the terminal block 20. Alternatively and in the represented manner, the terminal block 20 may comprise two parts 10 of electrically conducting bars, each being such as represented on figure 1. Each one is intended to receive one of the two connection terminals 13 in the first area 12 thereof, which is hence intended to be in electrical contact with the electrically conducting element when it is maintained in this connection terminal 13. The second areas 29 of the two parts 10 are then either in direct contact with each other or in indirect contact with interposition of an electrically conducting component 30 maintained in mechanical contact against the second areas 29 by the tightening system 31.

[0059] The second area 29 may comprise two hanging parts 32, 33 obtained by folding along a respective folding axis 34 oriented along the first extension direction D1. This allows the part 10 of electrically conducting bar to have a good electrical conductivity by increasing the dimensions of cross sections.

[0060] According to a particular embodiment, the first contour 15 of the first cutout 14 is carried out at the second area 29 of the first portion 11 and the second portion 16 is located, along the first extension direction D1, between the first and second areas 12, 29 of the first portion 11.

[0061] There results an additional optimization of the

place and material constituting the part 10 of electrically conducting bar. The material of the second portion 16 at least partially originates from the second area 29 of the first portion 11 prior to the implementation of the first cutout 14.

[0062] The part 10 of electrically conducting bar may comprise a securing member 35, in particular in the form of a threaded element such as a tapping formed in a hole of the first portion 11, arranged in the first portion 11 in the perpendicularity of the receiving elements 17 along an identified direction D3 perpendicular to the first extension direction D1. The securing member 35 is configured in such a manner as to allow a dismountable securing of the test plug 19 of the second type with the part 10 of electrically conducting bar, by screwing of its screw 191 visible on figure 5.

[0063] This disposition allows making reliable, if necessary, the securing of the test plug 19 accommodated by the receiving elements 17, and thus in a very simple, economical manner and requiring low bulk and hardly any material.

[0064] The receiving elements 17 are preferably configured in such a manner as to also allow the accommodation of a shunt jumper 36 external to the electrical apparatus and to ensure an electrical contact between the receiving elements 17 and the shunt jumper 36 positioned in the receiving elements 17. The shunt jumper 36 is suitable for ensuring an electrical connection between the receiving elements 17 formed in the second portions 16 of the parts 10 of two electrically conducting bars respectively belonging to two distinct electrical apparatuses. This organization is represented on figure 6 in the specific case of two terminal blocks 20 disposed in an adjacent manner.

[0065] The additional advantage of this disposition is to be able to impart a temporary set up function of such a shunt jumper 36 while ensuring that the dimensions of the electrically conducting bar, particularly its width, are low. This once again promotes a reasonable price and a gain in material in which the part 10 of electrically conducting bar is formed. The terminal block 20 which may be produced on the base of such a part 10 of electrically conducting bar may include a number of components which is less high and/or which will have a simplified design and manufacture with respect to current terminal blocks, also improving the price, the weight and the general size of the terminal block while imparting it with the setting up function of a shunt jumper 36 in addition to the accommodating function of a test plug 18, 19.

[0066] According to a particular embodiment, the securing member 35 is configured in such a manner as to allow a dismountable securing of a maintaining screw 37 (visible on figures 6 and 7) with the part 10 of electrically conducting bar in a configuration in which this maintaining screw 37 ensures a positive locking of the shunt jumper 36 in the receiving elements 17.

[0067] This disposition once again allows making reliable, if necessary, the securing of the shunt jumper 36

set up in the receiving elements 17, and thus in a very simple, economical manner and requiring low bulk and hardly any material.

Claims

1. A part (10) of an electrically conducting bar for an electrical apparatus, such as a terminal block (20), said part (10) of electrically conducting bar comprising:

- a planar first portion (11) extending along a first extension direction (D1) and including a first area (12) arranged for allowing the setting up of a connection terminal (13) of the electrical apparatus intended to ensure an electrical contact between the first portion (11) and an electrically conducting element external to the apparatus,
- a second portion (16) of the part (10) of electrically conducting bar extending protruding from the first portion (11) along a second extension direction (D2) forming an angle with the first extension direction (D1),

- receiving elements (17) formed in the second portion (16) by a second cutout (23) along a second contour (24) arranged at the second portion (16), the folding of the second cutout (23) being carried out along at least one folding axis (25) parallel with the second extension direction (D2), the receiving elements (17) being configured in such a manner as to separately accommodate a test plug (18, 19) external to the electrical apparatus and capable of an electric measurement of the second portion (16),

characterized in that said second portion (16) is formed by a first cutout (14) along a first contour (15) arranged in the first portion (11), the folding of the first cutout (14) achieved transversally to the first extension direction (D2) along a folding axis (22) perpendicular to the first extension direction (D1) and the first contour (15) being configured in such a manner that the first cutout (14) forms said second portion (16).

2. The part (10) of electrically conducting bar according to claim 1, **characterized in that** the receiving elements (17) are arranged at a first end of the second opposite portion (16), along the second extension direction (D2), with respect to a second end of the second portion (16) where the coupling of the second portion (16) with the first portion (11) is carried out.
3. The part (10) of electrically conducting bar according to any one of claims 1 to 2, **characterized in that** the second cutout (23) comprises first and second parts (27, 28) extending from the rest of the second portion (16) transversally to the second extension

direction (D2) and delimiting the receiving elements (17).

4. The part (10) of electrically conducting bar according to claim 3, **characterized in that** the first and second parts (27, 28) form receiving elements (17) having an annular contour over at least a half periphery.
5. The part (10) of electrically conducting bar according to claim 4, **characterized in that** the first and second parts (27, 28) are provided at their distal ends respectively with first and second coupling members (271, 281) having complementary forms for a fitting of one in the other, in order to constitute receiving elements (17) having an annular contour with closed contour.
6. The part (10) of electrically conducting bar according to any one of claims 1 to 5, **characterized in that** the first portion (11) comprises a second area (29), shifted with respect to the first area (12) along the first extension direction (D1), configured for ensuring an electrical connection of the part (10) of electrically conducting bar directly or indirectly with another electrically conducting bar or with another connection terminal (13) than the connection terminal (13) which is set up at the first area (12).
7. The part (10) of electrically conducting bar according to claim 6, **characterized in that** the first contour (15) of the first cutout (14) is carried out at the second area (29) of the first portion (11) and the second portion (16) is located, along the first extension direction (D1), between the first and second areas (12, 29) of the first portion (11).
8. The part (10) of electrically conducting bar according to any one of claims 1 to 7, **characterized in that** it comprises a securing member (35), in particular in the form of a threaded element such as a tapping formed in a hole of the first portion, arranged in the first portion (11) in the verticality of the receiving elements (17) along a direction (D3) perpendicular to the first extension direction (D1), said securing member (35) being configured in such a manner as to allow a dismountable securing of the test plug (18, 19) with the part (10) of electrically conducting bar.
9. The part (10) of electrically conducting bar according to any one of claims 1 to 8, **characterized in that** the receiving elements (17) are configured in such a manner as to allow accommodating a shunt jumper (36) external to the electrical apparatus and to ensure an electrical contact between the receiving elements (17) and the shunt jumper (36) positioned in the receiving elements (17), said shunt jumper (36) being capable of ensuring an electrical connection between the receiving elements (17) formed in the

second portions (16) of two electrically conducting bars respectively belonging to two distinct electrical apparatuses.

10. The part (10) of electrically conducting bar according to claims 8 and 9, **characterized in that** the securing member (35) is configured in such a manner as to allow a dismountable securing of a maintaining screw (37) with the part (10) of electrically conducting bar in a configuration in which said maintaining screw (37) ensures a positive locking of the shunt jumper (36) in the receiving elements (17).
11. An electrically conducting bar including at least one part (10) of an electrically conducting bar according to any one of the preceding claims.
12. A terminal block (20) comprising at least one electrically conducting bar according to the preceding claim ensuring all or part of the electrical connection between two connection terminals (13) each capable of connecting a respective electrically conducting element.

Patentansprüche

1. Teil (10) einer elektrisch leitfähigen Schiene für eine elektrische Einrichtung, wie eine Klemmleiste (20), wobei das Teil (10) der elektrisch leitfähigen Schiene umfasst:
 - einen ebenen ersten Abschnitt (11), der sich entlang einer ersten Erstreckungsrichtung (D1) erstreckt und einen ersten Bereich (12) beinhaltet, der angeordnet ist, um die Zusammenstellung einer Anschlussklemme (13) der elektrischen Einrichtung zu erlauben, die dazu bestimmt ist, für einen elektrischen Kontakt zwischen dem ersten Abschnitt (11) und einem elektrisch leitfähigen Element außerhalb der Einrichtung zu sorgen,
 - einen zweiten Abschnitt (16) des Teils (10) der elektrisch leitfähigen Schiene, der sich aus dem ersten Abschnitt (11) überstehend entlang einer zweiten Erstreckungsrichtung (D2), die einen Winkel mit der ersten Erstreckungsrichtung (D1) bildet, erstreckt,
 - Empfangselemente (17), die in dem zweiten Abschnitt (16) durch einen zweiten Ausschnitt (23) entlang einer zweiten Kontur (24) gebildet werden, die an dem zweiten Abschnitt (16) angeordnet ist, wobei das Falten des zweiten Ausschnitts (23) entlang mindestens einer Faltachse (25) parallel zu der zweiten Erstreckungsrichtung (D2) durchgeführt wird, wobei die Empfangselemente (17) in einer solchen Weise konfiguriert sind, um getrennt einen Prüfstecker (18,

19) außerhalb der elektrischen Einrichtung aufzunehmen, und zu einer elektrischen Messung des zweiten Abschnitts (16) imstande sind, **dadurch gekennzeichnet, dass** der zweite Abschnitt (16) durch einen ersten Ausschnitt (14) entlang einer ersten Kontur (15) gebildet ist, die in dem ersten Abschnitt (11) angeordnet ist, wobei das Falten des ersten Ausschnitts (14) quer zur ersten Erstreckungsrichtung (D2) entlang einer Faltachse (22) senkrecht zu der ersten Erstreckungsrichtung (D1) erzielt wird, und die erste Kontur (15) in einer solchen Weise konfiguriert ist, dass der erste Ausschnitt (14) den zweiten Abschnitt (16) bildet.

2. Teil (10) einer elektrisch leitfähigen Schiene nach Anspruch 1, **dadurch gekennzeichnet, dass** die Empfangselemente (17) an einem ersten Ende des zweiten entgegengesetzten Abschnitts (16) entlang der zweiten Erstreckungsrichtung (D2) in Bezug auf ein zweites Ende des zweiten Abschnitts (16) angeordnet sind, wo die Kopplung des zweiten Abschnitts (16) mit dem ersten Abschnitt (11) ausgeführt wird.
3. Teil (10) einer elektrisch leitfähigen Schiene nach einem der Ansprüche 1 bis 2, **dadurch gekennzeichnet, dass** der zweite Ausschnitt (23) erste und zweite Teile (27, 28) umfasst, die sich aus dem Rest des zweiten Abschnitts (16) quer zur zweiten Erstreckungsrichtung (D2) erstrecken und die Empfangselemente (17) begrenzen.
4. Teil (10) einer elektrisch leitfähigen Schiene nach Anspruch 3, **dadurch gekennzeichnet, dass** der erste und zweite Teil (27, 28) Empfangselemente (17) bilden, die eine ringförmige Kontur über mindestens einen halben Umfang aufweisen.
5. Teil (10) einer elektrisch leitfähigen Schiene nach Anspruch 4, **dadurch gekennzeichnet, dass** der erste und zweite Teil (27, 28) jeweils an ihren distalen Enden mit ersten und zweiten Kopplungsorganen (271, 281) bereitgestellt sind, die ergänzende Formen aufweisen, um ineinander zu passen, um Empfangselemente (17) zu erzeugen, die eine ringförmige Kontur mit geschlossener Kontur aufweisen.
6. Teil (10) einer elektrisch leitfähigen Schiene nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** der erste Abschnitt (11) einen zweiten Bereich (29) umfasst, der in Bezug auf den ersten Bereich (12) entlang der ersten Erstreckungsrichtung (D1) versetzt ist, der konfiguriert ist, um für eine elektrische Verbindung des Teils (10) einer elektrisch leitfähigen Schiene direkt oder indirekt mit einer anderen elektrisch leitfähigen Schiene oder mit einer anderen Anschlussklemme (13) als der Anschlussklemme (13) zu sorgen, die in dem ersten

Bereich (12) zusammengestellt ist.

7. Teil (10) einer elektrisch leitfähigen Schiene nach Anspruch 6, **dadurch gekennzeichnet, dass** die erste Kontur (15) des ersten Ausschnitts (14) in dem zweiten Bereich (29) des ersten Abschnitts (11) ausgeführt ist, und sich der zweite Abschnitt (16) entlang der ersten Erstreckungsrichtung (D1) zwischen dem ersten und zweiten Bereich (12, 29) des ersten Abschnitts (11) befindet. 5
8. Teil (10) einer elektrisch leitfähigen Schiene nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** es ein Befestigungsorgan (35), insbesondere in der Form eines gewindebehafteten Elements, wie ein Innengewinde, das in einem Loch des ersten Abschnitts (11) in der Vertikalität der Empfangselemente (17) entlang einer Richtung (D3) senkrecht zu der ersten Erstreckungsrichtung (D1) angeordnet ist, wobei das Befestigungsorgan (35) in einer solchen Weise konfiguriert ist, um eine lösbare Befestigung des Prüfsteckers (18, 19) mit dem Teil (10) einer elektrisch leitfähigen Schiene zu erlauben. 15 20 25
9. Teil (10) einer elektrisch leitfähigen Schiene nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** die Empfangselemente (17) in einer solchen Weise konfiguriert sind, um eine Aufnahme einer Steckbrücke (36) außerhalb der elektrischen Einrichtung zu erlauben, und für einen elektrischen Kontakt zwischen den Empfangselementen (17) und der Steckbrücke (36) zu sorgen, die in den Empfangselementen (17) positioniert ist, wobei die Steckbrücke (36) imstande ist, für eine elektrische Verbindung zwischen den Empfangselementen (17), die in den zweiten Abschnitten (16) zweier elektrisch leitfähiger Schienen gebildet werden, die jeweils zwei unterschiedlichen elektrischen Einrichtungen angehören, zu sorgen. 30 35 40
10. Teil (10) einer elektrisch leitfähigen Schiene nach Anspruch 8 und 9, **dadurch gekennzeichnet, dass** das Befestigungsorgan (35) in einer solchen Weise konfiguriert ist, um eine lösbare Befestigung einer Halteschraube (37) mit dem Teil (10) einer elektrisch leitfähigen Schiene in einer Konfiguration zu erlauben, in der die Halteschraube (37) für eine positive Arretierung der Steckbrücke (36) in den Empfangselementen (17) sorgt. 45 50
11. Elektrisch leitfähigen Schiene, die mindestens ein Teil (10) einer elektrisch leitfähigen Schiene nach einem der vorstehenden Ansprüche beinhaltet. 55
12. Klemmleiste (20), mindestens eine elektrisch leitfähige Schiene nach dem vorstehenden Anspruch um-

fassend, die für die gesamte oder einen Teil der elektrischen Verbindung zwischen zwei Anschlussklemmen (13) sorgt, die jeweils imstande sind, ein jeweiliges elektrisch leitfähiges Element zu verbinden.

Revendications

1. Partie (10) d'une barre électriquement conductrice pour un appareil électrique, tel qu'un contacteur (20), ladite partie (10) de la barre électriquement conductrice comprenant :
 - une première partie plane (11) s'étendant le long d'une première direction d'extension (D1) et comportant une première zone (12) agencée pour permettre la mise en place d'une borne de connexion (13) de l'appareil électrique destinée à assurer un contact électrique entre la première partie (11) et un élément électriquement conducteur externe à l'appareil,
 - une deuxième partie (16) de la partie (10) de la barre électriquement conductrice s'étendant en saillie à partir de la première partie (11) le long d'une deuxième direction d'extension (D2) formant un angle avec la première direction d'extension (D1),
 - des éléments de réception (17) formés dans la deuxième partie (16) par une deuxième découpe (23) le long d'un deuxième contour (24) agencé au niveau de la deuxième partie (16), le pliage de la deuxième découpe (23) étant réalisé le long d'au moins un axe de pliage (25) parallèle à la deuxième direction d'extension (D2), les éléments de réception (17) étant configurés de manière à recevoir séparément un connecteur de test (18, 19) externe à l'appareil électrique et pouvant effectuer une mesure électrique de la deuxième partie (16),**caractérisée en ce que** ladite deuxième partie (16) est formée par une première découpe (14) le long d'un premier contour (15) agencé dans la première partie (11), le pliage de la première découpe (14) réalisé transversalement à la première direction d'extension (D2) le long d'un axe de pliage (22) perpendiculaire à la première direction d'extension (D1) et le premier contour (15) étant configurés de manière à ce que la première découpe (14) forme ladite deuxième partie (16).
2. Partie (10) de barre électriquement conductrice selon la revendication 1, **caractérisée en ce que** les éléments de réception (17) sont agencés au niveau d'une première extrémité de la deuxième partie (16) opposée, le long de la deuxième direction d'extension (D2), par rapport à une deuxième extrémité de la deuxième partie (16) où le couplage de la deuxiè-

me partie (16) avec la première partie (11) est réalisé.

3. Partie (10) de barre électriquement conductrice selon l'une quelconque des revendications 1 et 2, **caractérisée en ce que** la deuxième découpe (23) comprend des première et deuxième parties (27, 28) s'étendant à partir du reste de la deuxième partie (16) transversalement à la deuxième direction d'extension (D2) et délimitant les éléments de réception (17). 5 10
4. Partie (10) de barre électriquement conductrice selon la revendication 3, **caractérisée en ce que** les première et deuxième parties (27, 28) forment des éléments de réception (17) ayant un contour annulaire sur au moins une demi-périphérie. 15
5. Partie (10) de barre électriquement conductrice selon la revendication 4, **caractérisée en ce que** les première et deuxième parties (27, 28) sont munies au niveau de leurs extrémités distales, respectivement, de premier et deuxième éléments de couplage (271, 281) ayant des formes complémentaires pour un emboîtement l'un dans l'autre, afin de constituer des éléments de réception (17) ayant un contour annulaire avec un contour fermé. 20 25
6. Partie (10) de barre électriquement conductrice selon l'une quelconque des revendications 1 à 5, **caractérisée en ce que** la première partie (11) comprend une deuxième zone (29), décalée par rapport à la première zone (12) le long de la première direction d'extension (D1), configurée pour assurer une connexion électrique de la partie (10) de la barre électriquement conductrice directement ou indirectement avec une autre barre électriquement conductrice ou avec une autre borne de connexion (13) que la borne de connexion (13) qui est mise en place au niveau de la première zone (12). 30 35 40
7. Partie (10) de barre électriquement conductrice selon la revendication 6, **caractérisée en ce que** le premier contour (15) de la première découpe (14) est réalisé au niveau de la deuxième zone (29) de la première partie (11) et la deuxième partie (16) est située, le long de la première direction d'extension (D1), entre les première et deuxième zones (12, 29) de la première partie (11). 45 50
8. Partie (10) de barre électriquement conductrice selon l'une quelconque des revendications 1 à 7, **caractérisée en ce qu'elle** comprend un élément de fixation (35), en particulier sous la forme d'un élément fileté tel qu'un taraudage formé dans un trou de la première partie, agencé dans la première partie (11) dans le sens de la verticalité des éléments de réception (17) le long d'une direction (D3) perpendi- 55

culaire à la première direction d'extension (D1), ledit élément de fixation (35) étant configuré de manière à permettre une fixation démontable du connecteur de test (18, 19) avec la partie (10) de barre électriquement conductrice.

9. Partie (10) de barre électriquement conductrice selon l'une quelconque des revendications 1 à 8, **caractérisée en ce que** les éléments de réception (17) sont configurés de manière à permettre la réception d'un cavalier shunt (36) externe à l'appareil électrique et à assurer un contact électrique entre les éléments de réception (17) et le cavalier shunt (36) positionné dans les éléments de réception (17), ledit cavalier shunt (36) étant capable d'assurer une connexion électrique entre les éléments de réception (17) formés dans les deuxième parties (16) de deux barres électriquement conductrices respectivement appartenant à deux appareils électriques distincts.
10. Partie (10) de barre électriquement conductrice selon les revendications 8 et 9, **caractérisée en ce que** l'élément de fixation (35) est configuré de manière à permettre une fixation démontable d'une vis de maintien (37) avec la partie (10) de barre électriquement conductrice dans une configuration dans laquelle ladite vis de maintien (37) assure un verrouillage positif du cavalier shunt (36) dans les éléments de réception (17).
11. Barre électriquement conductrice comportant au moins une partie (10) d'une barre électriquement conductrice selon l'une quelconque des revendications précédentes.
12. Contacteur (20) comprenant au moins une barre électriquement conductrice selon la revendication précédente assurant la totalité ou une partie de la connexion électrique entre deux bornes de connexion (13), chacune capable de connecter un élément électriquement conducteur respectif.

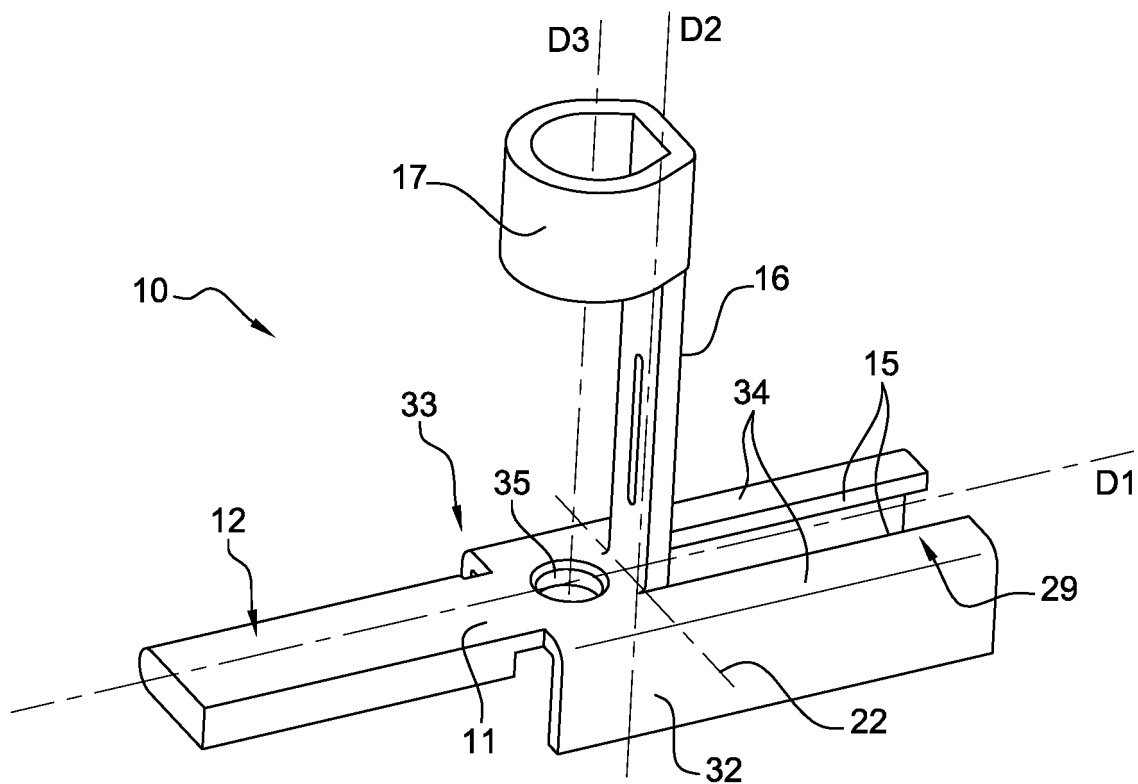


Fig. 1

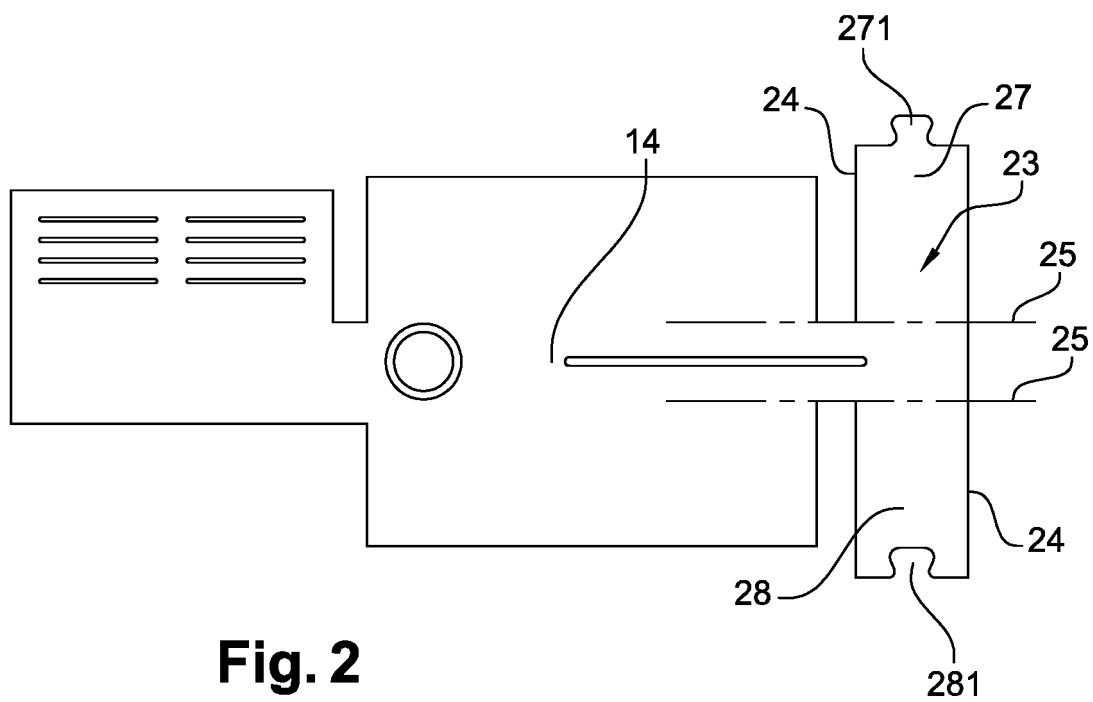
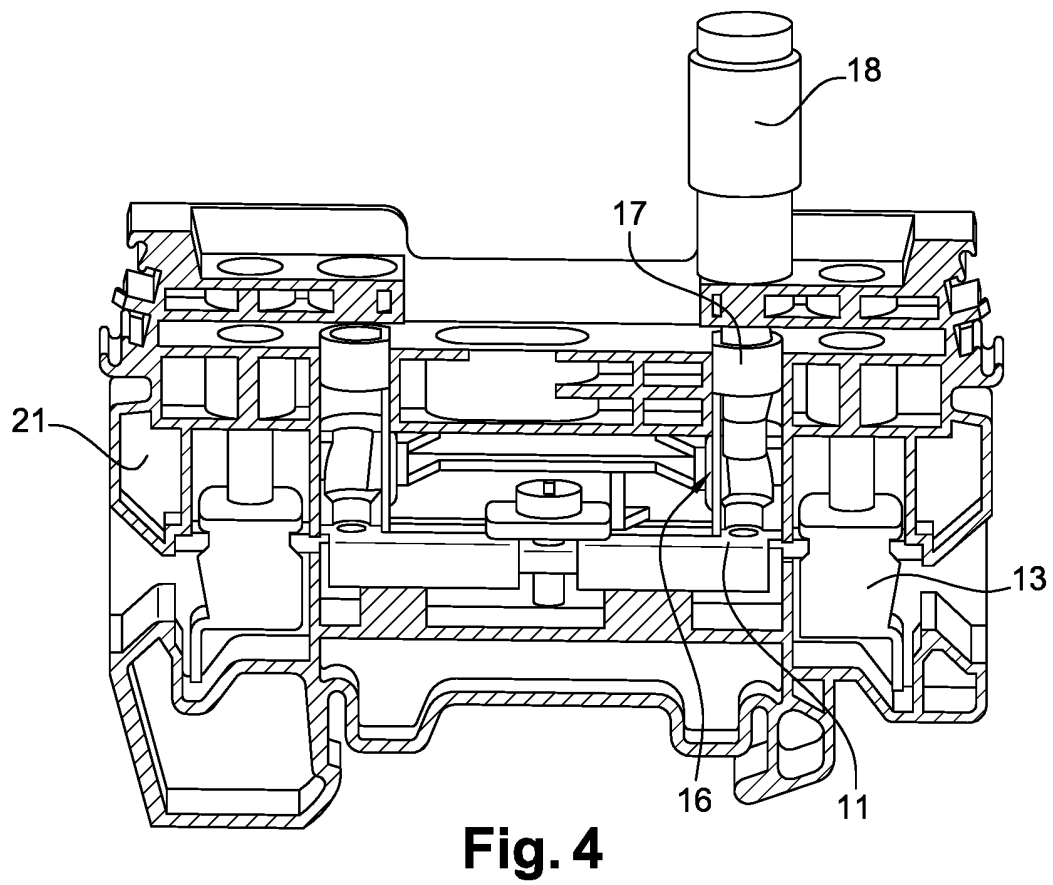
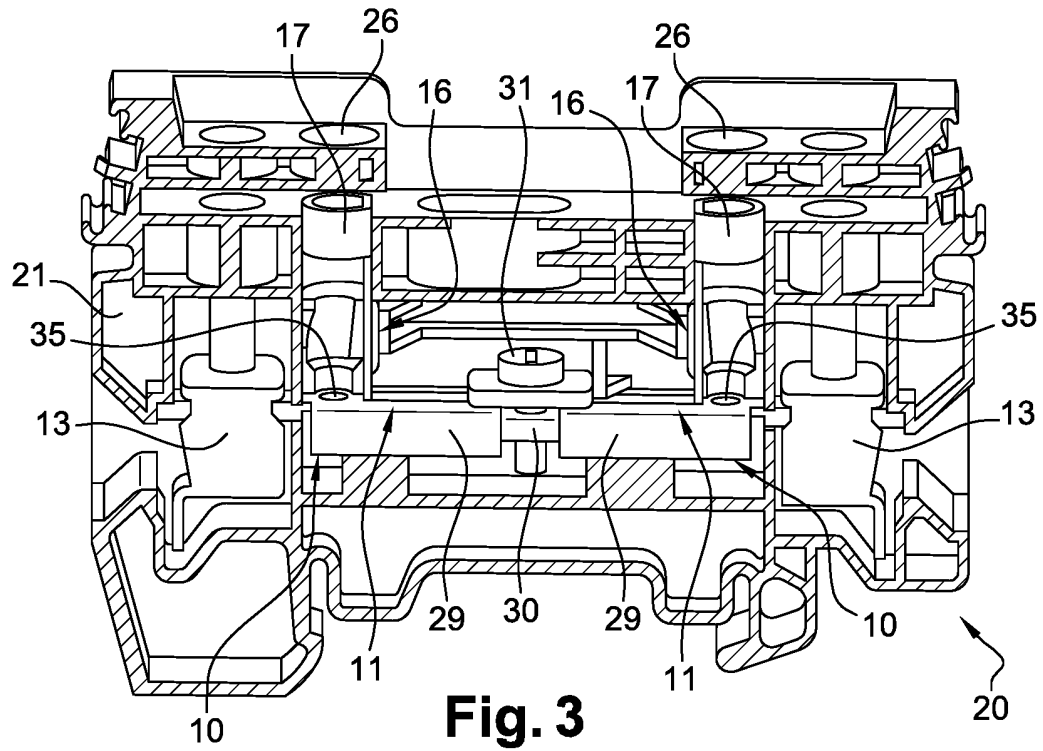


Fig. 2



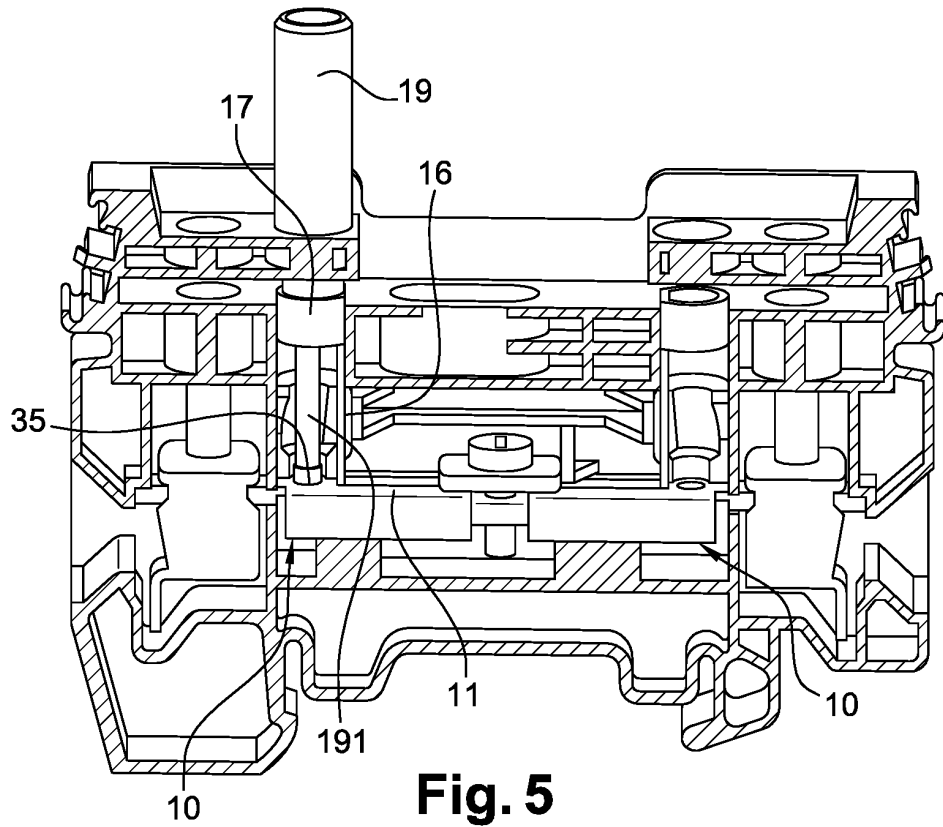


Fig. 5

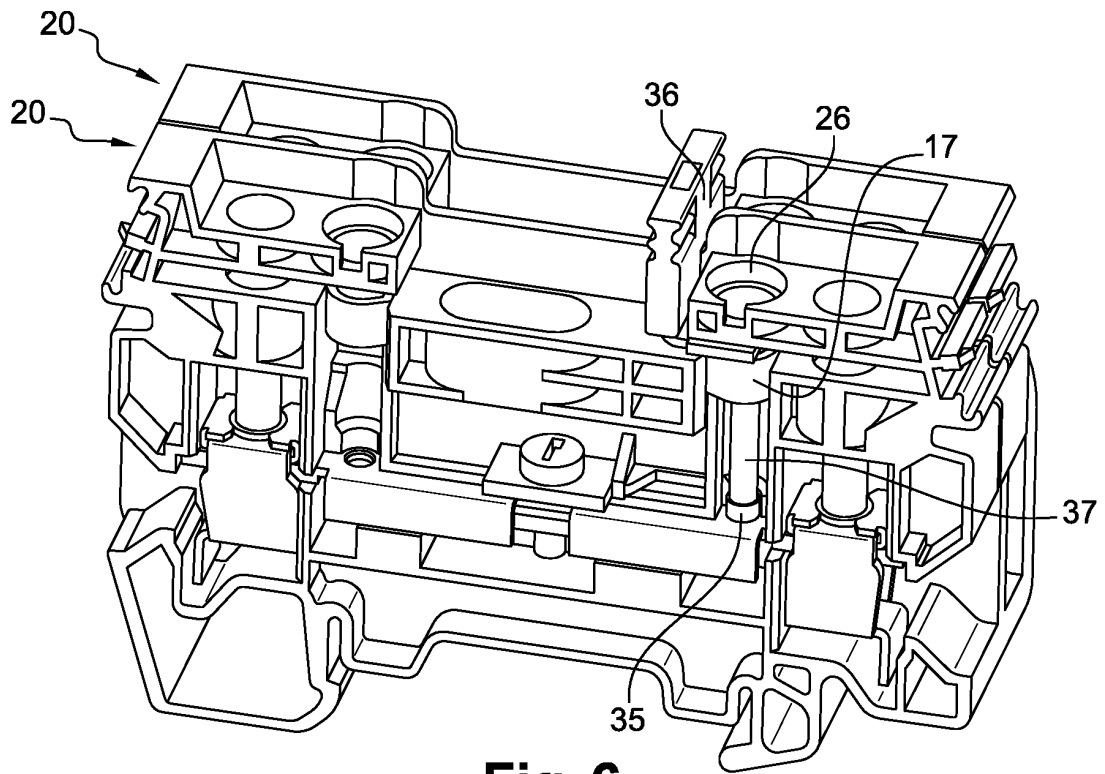


Fig. 6

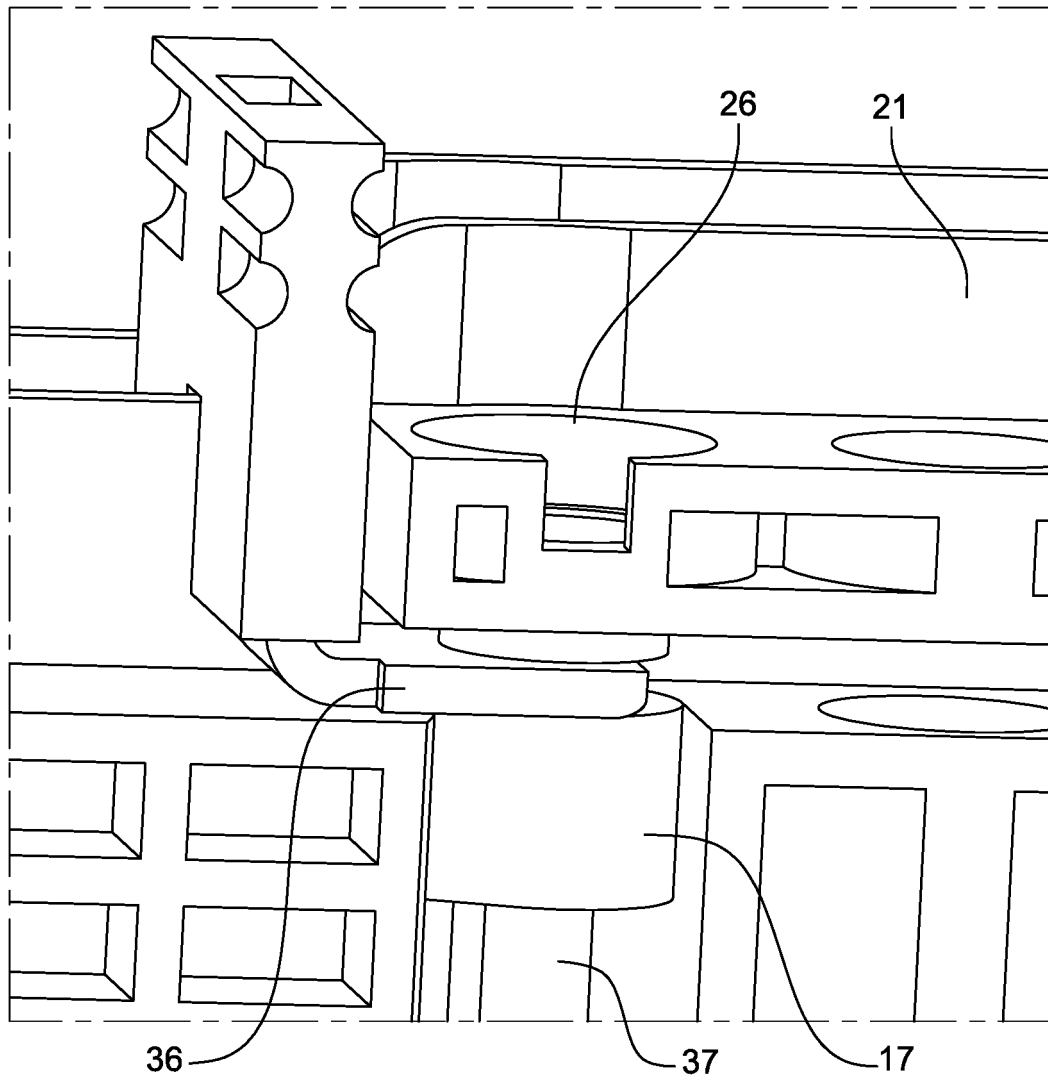


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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