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Dugaszoló csatlakozó

Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

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Plug Connector

Description

The invention relates to a plug connector, comprising an insulating body, a contact support, a shielding device, and a plurality of contacts which are intended to be arranged in the contact support, the shielding device being pivotably held at the insulating body.

Such a plug connector is used, for example, in the industrial sector as well as in telecommunications.

Prior art

Document WO2010046293A1 describes a plug connection in which contacts can be pre-mounted in a contact support, the contact support being movable at a contact holder into a final mounting position. It is further disclosed that the contact support can be adapted to be latched on the contact holder in at least two positions which are axially offset in relation to each other in the plug-in direction, and that two pivotable shielding plates are arranged at the plug housing and/or at the socket housing, the shielding plates being adapted to be pivoted at the plug housing from a position swiveled open at an angle to a position in which they are closed by a swiveling motion.

A drawback of such a plug connector consists in that it is made from a plurality of parts, as a result of which the handling during assembly is relatively complex.

Problem definition

The present invention is therefore based on the problem of indicating a plug connector having a comparatively low mounting complexity.

This problem is solved in that the shielding device includes first guide means which are operatively connected to second guide means of the contact support, so that the contact support can be inserted into the insulating body or joined to the insulating body by a pivoting movement of the shielding device.

Advantageous configurations of the invention are indicated in the sub-claims.

The invention involved is a plug connector which, while having a multi-part design, can be delivered to a user in one piece, i.e. in the form of assembled individual parts. After manual insertion of contacts, e.g. socket or pin contacts, into the contact support, the shielding device can be pivoted over the insulating body by one single movement, as a result of which the contact support can be inserted into the insulating body or can be joined to the insulating body; thereby the contacts can be fixed in their final positions in the plug connector, the shielding device can be latched on the insulating body or on the contact support and, as a result, the contact support can be fixed in or at the insulating body.

This is especially advantageous because the assembly complexity is reduced thereby. The associated individual parts are presented to the user already in a pre-mounted form and thereby in a pre-sorted manner in which they belong together, and they need not at first be laboriously composed and assembled by the user.

In particular, for the assembly the user only needs to insert the contacts connected with cables, for example crimped, into the contact support and to press the shielding device down, i.e. pivot it over the insulating body, in

order to mount the plug connector on the cable connection side, which, compared to the prior art, constitutes a considerable reduction of the assembly complexity.

Further, disassembly is also simplified. By pivoting the shielding device back, it is unlatched again, the fixing of the contact support at the insulating body is reversed, and the contact support is automatically pulled out of the insulating body again due to said operative connection. Thereby, the fixing of the contacts is also released again, as a result of which they can be removed again.

Further, it is especially advantageous if the insulating body includes at least two, preferably circular, holes or recesses, and the shielding device includes at least two pivot pins which engage into the holes or recesses of the insulating body, because this causes the shielding device to be pivotable about the pivot pins.

In a further advantageous configuration, the insulating body includes at least two pivot pins, and the shielding device has at least two circular holes or depressions which engage around the pivot pins of the insulating body, so that the shielding device is pivotable about the pivot pins. This additionally allows such an arrangement to be manufactured with little effort.

It is further advantageous if the insulating body includes at least two hinge windows and the shielding device includes at least two hinge tabs which engage into the hinge windows of the insulating body, so that the shielding device is pivotably held at the insulating body.

It is especially advantageous if the first guide means of the shielding device consist in at least one guide slot or at least one guide groove, and the second guide means of the contact support consist in at least one guide pin which engages into the guide slot or into the guide groove of the shielding device, wherein during the pivoting movement of the shielding device, the guide pin is guided along the guide slot or the guide groove, wherein due to the shape thereof, the guide pin is moved towards the insulating body and the contact support is inserted into the insulating body or is joined to the insulating body, because such an arrangement can be manufactured with just little effort and functions in a stable manner.

In an advantageous embodiment, the shielding device, which in particular consists of a zinc die-cast part, has a plurality of, preferably two, retention noses which advantageously prevent the contact support from being pushed out of the insulating body. The retention noses may advantageously be designed to be spring-loaded, in order to press the contact support and/or the insulating body into a force-fit position through corresponding latching contours, for example through pockets that are interlocking relative thereto, and to fix it/them there.

In a preferred embodiment, the shielding device is adapted to be latched on the insulating body and/or on the contact support. In particular, the insulating body and/or the contact support may include a latch nose on which the shielding device latches, preferably by a first end of its guide slot or its guide groove or by an opening specially provided therefor. It has the advantage that the contact support inserted in the insulating body or joined to the insulating body is fixed in or at the insulating body.

It is especially advantageous if the contacts can be fixed in their final positions in the plug connector by inserting, in particular by pushing in, the contact support into the insulating body or by joining the contact support to the insulating body. Such a configuration will be described below. Here, the insulating body has first through holes. The contact support has second through holes for receiving the contacts, e.g. the pin or socket

contacts. At one end of the second through holes, the contact support has lamellae which encompass the contacts received. The first through holes of the insulating body each have a funnel-shaped portion, preferably adjacent to the contact support. During insertion of or joining the contact support equipped with contacts into or to the insulating body, the contacts are at least partially inserted into the first through holes thereof, and the lamellae of the contact support are pressed together by the funnel-shaped portions in the process. This causes the contacts to be fixed in their final positions in the plug connector.

Preferably, the insulating body may have special recesses in the funnel-shaped portion of its first through holes, and the lamellae may have matching wing-like integrally molded portions, which engage in the special recesses and are pressed together caused by the insertion of the contact support into the insulating body and in this way effect or at least assist in the pressing together of the lamellae and thus the final fixing of the contacts in the plug connector.

Exemplary embodiment

Two exemplary embodiments of the invention are illustrated in the drawings and will be discussed in greater detail below. In the drawings:

Fig. 1a shows an exploded view of a plug connector with socket contacts;

Fig. 1b shows the exploded view of the plug connector from a different perspective;

Fig. 2a shows a perspective view of the assembled plug connector with a contact support that has not yet been inserted;

Fig. 2b shows a sectional view of the assembled plug connector with the contact support not yet pushed in and a socket contact that has not yet been fully inserted;

Fig. 3a shows a perspective view of the plug connector in the locked condition;

Fig. 3b shows a sectional view of the insulating body with the pushed-in contact support with two contacts;

Fig. 3c shows an enlarged cutout from the above-mentioned sectional view;

Fig. 4 shows a three-dimensional view of the sectioned plug connector with the contact support to be inserted;

Fig. 5a shows a three-dimensional view of the sectioned plug connector with the contact support inserted and a socket contact fixed in an exemplary fashion;

Fig. 5b shows an enlarged cut-out from the above-mentioned view;

Fig. 6 shows an exploded view of a further plug connector with pin contacts;

Fig. 7a shows a perspective view of this assembled plug connector with pin contacts to be inserted;

Fig. 7b shows a sectional view of the assembled plug connector with pin contacts yet to be inserted;

Fig. 7c shows a sectional view of the assembled plug connector with pin contacts inserted;

Fig. 7d shows a sectional view of the plug connector in the locked condition.

First exemplary embodiment:

Fig. 1a and Fig. 1b illustrate a plug connector 1 from different perspectives in a respective exploded view. The plug connector 1 comprises an insulating body 2, a contact support 3 and a shielding device 4 as well as a plurality of contacts which are configured as socket contacts 5.

The insulating body 2 has two pivot pins 21 and two latch pins 22, of which only one of each is shown in the drawings because the other one is integrally molded with an opposite side of the insulating body 2 symmetrically thereto and, in the perspective shown, is thus concealed by the insulating body 2. Further, the insulating body 2 has a plurality of first through holes 23.

The contact support 3 includes two guide pins 31, of which likewise only one is visible in the drawing because the other one is integrally molded with an opposite side of the contact support 3 symmetrically thereto and, in the perspective shown, is thus concealed by the contact support 3. In Fig. 1b, second through holes 34 passing through the contact support 3 can be seen, which are provided for receiving the socket contacts 5. On that side of the contact support 3 that is intended for being inserted into the insulating body 2, lamellae 32, which can be seen particularly well in Fig. 1a, are integrally molded with these second through holes 34.

The shielding device 4 is a punched and bent part, preferably made from sheet metal. The shielding device 4 has two circular holes 41 and two guide slots 42.

Fig. 2a shows a plug connector 1 assembled from a plurality of individual parts, namely the insulating body 2, the contact support 3 and the shielding device 4; here, the contact support 3 has not yet been pushed into the insulating body 2. The guide pin 31 is located at a first end of the guide slot 42. It can be seen from this illustration that a pivoting movement of the shielding device 4 about an axis of rotation extending through the pivot pins 21 will automatically push the contact support 3 into the insulating body 2 and hold it there, while the guide pin 31 is guided in the guide slot 42, with a subsequent latching of the first end of the guide slot 42 on the latch pin 22.

Fig. 2b shows a sectional view of this arrangement together with two socket contacts 5, namely one socket contact 5 that has already been inserted as well as one that has yet to be inserted, the section being made through a sectional axis S which is shown in Fig. 3a on the insulating body 2 of the locked plug connector 1.

In Fig. 3a, the shielding device 4 is latched onto the first end of the guide slot 42 on the latch pin 22 of the insulating body 2, and the guide pin 31 is located on a second end of the guide slot 42. For this purpose, prior to this, the shielding device 42 is pivoted in a pivoting movement about the pivot pin 21 over the insulating body 2. During this pivoting movement, the guide pin 31 is guided from the first end of the guide slot 42 along the guide slot 42 to the second end of the guide slot 42, whereby the contact support 3 is inserted into the insulating body 2.

It can further be seen from this view that a pivoting back of the shielding device 4 in the opposite direction, that is, from the position shown in Fig. 3a to the position shown in Fig. 2a and Fig. 2b, results in the contact support 3 being pulled out from the insulating body 2, the guide pin 31 being guided from the second end of the guide slot 42 along the guide slot 42 to the first end of the guide slot 42.

Fig. 3b shows a section taken through the insulating body 2 with the contact support 3 pushed in. Here, the contact support 3 is equipped with the socket contacts 5. It is further shown that the first through hole 23 has -

adjacent to the contact support 3 - a funnel-shaped portion 231 into which the corresponding lamellae 32 of the contact support 3 engage.

This funnel-shaped portion 231 is shown on an enlarged scale in Fig. 3c. It can be seen particularly well there that the lamellae 32 are pressed together by the funnel-shaped portion 231 during the insertion of the contact support 3 into the insulating body 2 and thereby fix the contact sockets 5 in their final positions in the contact support 3 and in the insulating body 2 and thus also in the entire plug connector 1.

Fig. 4 shows a cut-out of the sectioned insulating body 2 with the contact support 3 to be inserted, without the socket contacts 5. The funnel-shaped portion 231 of the first through hole 23 can be seen particularly well in this view. It can further be seen that the lamellae 32 have lateral wing-like integrally molded portions 321 and that the insulating body 2 has special recesses 25 at its funnel-shaped portions 231. The wing-like integrally molded portions 321 of the lamellae 32 engage in these special recesses 25. In particular, the lamellae 32 are pressed together by the special recesses 25 of the funnel-shaped portion 231 due to the wing-like integrally molded portions 321 when the contact support 3 is assembled with the insulating body 2.

Fig. 5a shows the insulating body 2 with the contact support 3 attached thereto and a socket contact 5 inserted by way of example. Fig. 5b shows a corresponding enlarged view. The cooperation of the wing-like integrally molded portions 321 with the special recesses 25 can be seen particularly well with respect to those lamellae 32 into which, for reasons of greater clarity, no socket contacts 5 have been inserted. By pushing the contact support 3 into the insulating body 2, the illustrated part of the contact support 3 is joined to the illustrated part of the insulating body 2, and the lamellae 32 are pressed together due to their wing-like integrally molded portions 321 by the funnel-shaped portion 231 of the first through hole 23 and by the special recesses 25 of the insulating body 2 and thereby fix the socket contacts 5, which may be located therein, in their final positions in the plug connector 1.

Thus, an insertion of the contact support 3 into the insulating body 2, a final fixing of the contacts, in particular of the socket contacts 5, in the plug connector 1, a latching of the shielding device 4 and a retention of the contact support 3 in the plug connector 1, are ultimately achieved by just one single movement, namely the pivoting of the shielding device 4.

Second exemplary embodiment:

Fig. 6 shows a further plug connector 1'.

This plug connector 1' comprises an insulating body 2', a contact support 3', a shielding device 4', a plurality of contacts which are configured as pin contacts 5', and a shielding hood 6', preferably made from sheet metal.

The shielding device 4' is preferably produced in a zinc die-casting process. As an alternative, the shielding device 4' could also consist of a plastic material with a shielding coating or of a plastic material without a shielding coating. In the latter case, however, the shielding device 4' would not have any electrically shielding properties.

On one end, the shielding device 4' includes two bent hinge tabs 43' and two guide slots 42'. The contact support 3' has two guide pins 31' and two latch pins 33', of which only one each can be seen in the drawing because the respective other one is concealed by the contact support 3'.

The insulating body 2' has two hinge windows 24' on one end as well as one respective shielding window 27' on two sides located opposite each other. The shielding hood 6' has two contact springs 61' on each side. Further, the shielding hood 6' has a plurality of latch windows 62'. The shielding device 4' has latch noses 47' matching them. This makes the shielding hood 6' suitable to improve the shielding by being pushed over the otherwise fully assembled plug connector 1' and being fixed there. Owing to the contact springs 61', which in the assembled condition engage through the shielding window 27' of the insulating body 2', a mating plug, for example the plug connector 1 described in the first exemplary embodiment, can be contacted in the plugged-in condition by its shielding device 4, in order to establish a ground contact in this way between the two shielding devices 4, 4' of the two plug connectors 1, 1'.

The shielding device 4' of this plug connector 1' further has two retention noses 45', 46'.

In Fig. 7a, this plug connector 1' is illustrated as being largely assembled, but the contact support 3' has not yet been pushed into its final position and the pin contacts 5' have not yet been inserted into the contact support 3'. In this view and in the following, the shielding hood 6' is not shown for reasons of clarity.

The guide pin 31' is located within the guide slot 42', more specifically at a first end of this guide slot 42'.

It can easily be seen that by pivoting the shielding device 4', the contact support 3' can be inserted into the insulating body 2' by guiding the guide pin 31' from the first end of the guide slot 42' along the guide slot 42 to a second end of the guide slot 42 during the pivoting of the shielding device 4. After the pivoting process, the first end of the guide slot 42' can be latched onto the latch pin 33' of the contact support 3' and can in this way hold the contact support in the insulating body.

Fig. 7b shows the same arrangement in a sectional view. The hinge tabs 43' engage into the hinge windows 24', so that the shielding device 4' is pivotable about an axis extending through the hinge windows 24'. In this view, the first retention nose 46' and the second retention nose 45' of the shielding device 4' can be seen particularly well. The first retention nose 46' is intended to engage into a correspondingly shaped first pocket 26' of the insulating body 2'. The second retention nose 45' is intended to engage through a corresponding retention opening 28' of the insulating body 2' and into a second pocket 35' of the contact support 3', after the contact support 3' has been pushed into its final position in the insulating body 2'. Furthermore, in this view the shape of the first through holes 23' can be seen, which in fact have a funnel-shaped portion 231' at an end facing the contact support 3'. It is apparent from this view that the lamellae 32' are pressed together by the funnel-shaped portion 231' of the first through hole 23' as a result of the contact support 3' being pushed into the insulating body 2'.

Fig. 7c shows the same arrangement in a sectional view; however, the pin contacts 5' have already been pushed into the contact support 3' here. In this view, too, the contact support 3' has not yet been pushed into its final position in the insulating body 2'. But it can be seen that in the final position, the second pocket 35' of the contact support 3' comes to rest over a retention opening 28' of the insulating body 2'. It can further be seen that by the pressing together of the lamellae 32' when the contact support 3' is pushed into the insulating body 2', the pin contacts 5' are fixed in the contact support 3', which is fixed in the process, and thus also in their final positions in the plug connector 1'.

Fig. 7d shows the same arrangement, with the shielding device 4' having been pivoted over the insulating body 2'. Accordingly, the contact support 3' has been inserted to its final position in the insulating body 2'; in the process, the lamellae 32' were pressed together by the funnel-shaped portion 231' and fix the pin contacts 5' in the final positions thereof in the plug connector 1'. The retention noses 46' and 45' engage into the pockets 26' and 35' of the insulating body 2' and the contact support 3', respectively, the second retention nose 45' engaging through the retention opening 28' of the insulating body 2'.

List of reference numerals

Plug Connector

1, 1'	plug connector
2, 2'	insulating body
21	pivot pin
22	latch pin of the insulating body
23, 23'	first through holes
231, 231'	funnel-shaped portion of the first through holes
24'	hinge window
25	special recesses
26'	first pocket of the insulating body
27'	shielding window
28'	retention opening
3, 3'	contact support
31, 31'	guide pin
32, 32'	lamellae
321	wing-like integrally molded portions of the lamellae
33'	latch pin of the contact support
34, 34'	second through holes
35'	second pocket of the contact support
4, 4'	shielding device
41	circular holes
42, 42'	guide slot
43'	hinge tabs
45', 46'	retention noses
47'	latch noses
5, 5'	contacts (socket contacts, pin contacts)
6'	shielding hood
61'	contact springs
62'	latch window

Dugaszó csatlakozó

Szabadalmi igénypontok

1. Dugaszó csatlakozó (1, 1'), amely magában foglal szigetelőtestet (2, 2'), érintkezőhordozót (3, 3'), árnyékolószerkezetet (4, 4') és több hüvely vagy csap érintkezőt (5, 5'), amelyek arra szolgálnak, hogy az érintkezőhordozóban (3, 3') rendezzék el őket, *azzal jellemezve*, hogy az árnyékolószerkezet (4, 4') elfordíthatóan van a szigetelőtesten (2, 2') felerősítve, ahol az árnyékolószerkezetnek (4, 4') az érintkezőhordozó (3, 3') második vezetődőszközével hatáskapcsolatban álló első vezetődőszközei vannak, úgy, hogy az érintkezőhordozó (3, 3') az árnyékolószerkezet (4, 4') egy elfordítása révén a szigetelőtestbe (2, 2') bevezethető vagy a szigetelőtestre (2, 2') illeszthető.
2. Az 1. igénypont szerinti dugaszoló csatlakozó (1), *azzal jellemezve*, hogy a szigetelőtestnek (2) legalább két forgáscsapja (21) van, és hogy az árnyékolószerkezetnek (4) legalább két, a szigetelőtest forgáscsapjait (21) körülvevő furata (41) vagy mélyedése van, úgy, hogy az árnyékolószerkezet a forgáscsapok (21) körül elfordítható.
3. Az 1. igénypont szerinti dugaszoló csatlakozó (1'), *azzal jellemezve*, hogy a szigetelőtestnek (2') legalább két csuklópánt ablaka (24') van, és hogy az árnyékolószerkezet (4') legalább két csuklópánt nyelvet (43') tartalmaz, amelyek a szigetelőtest (2') csuklópánt ablakába nyúlnak, úgy, hogy az árnyékolószerkezet (4') elforgathatóan van a szigetelőtesten (2') felerősítve.
4. Az előző igénypontok bármelyike szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy az árnyékolószerkezet (4, 4') első vezetődőszközeit legalább egy vezetődőhasíték (42, 42') vagy legalább egy vezetődőhorony alkotja, és hogy az érintkezőhordozó (3, 3') második vezetődőszközeit legalább egy, az árnyékolószerkezet (4, 4') vezetődőhasítékába (42, 42') vagy vezetődőhornyába nyúló vezetődőcsap (31, 31') alkotja.
5. Az előző igénypontok bármelyike szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy a hüvely vagy csap érintkezők (5, 5') dugaszoló csatlakozóban (1, 1') elfoglalt végleges helyzetükben az érintkezőhordozónak (3, 3') a szigetelőtestbe (2, 2') történő bevezetése, vagy az érintkezőhordozónak (3, 3') a szigetelőtestre (2, 2') történő illesztése révén rögzíthetők.
6. Az előző igénypontok bármelyike szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy a szigetelőtestnek (2, 2') első átmenőfuratai (23, 23') vannak, és hogy az érintkezőhordozónak (3, 3') a hüvely vagy csap érintkezők (5, 5') felvételére második átmenőfuratai (34, 34') vannak, és hogy az érintkezőhordozó (3, 3') a második átmenőfuratok (34, 34') egyik végén lamellákat (32, 32') tartalmaz, amelyek arra szolgálnak, hogy a befogadott hüvely vagy csap érintkezőket (5, 5') körülvegyék.
7. Az előző igénypontok bármelyike szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy a szigetelőtest (2, 2') első átmenőfuratai (23, 23') egy-egy tölcser alakú tartománnyal (321, 321') rendelkeznek.
8. A 7. igénypont szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy az érintkezőhordozó (3, 3') lamellái (32, 32') és az első átmenő furatok (23, 23') tölcser alakú tartományai (231, 231') arra alkalmasak, hogy együttműködjenek, hogy a hüvely vagy csap érintkezőket (5, 5') végleges helyzetükben rögzítsék a dugaszoló csatlakozóban (1, 1').

9. Az előző igénypontok bármelyike szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy az árnyékolószerkezet (4, 4') a szigetelőtesten (2) vagy az érintkezőhordozón (3') reteszelve.
10. A 9. igénypont szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy a szigetelőtest (2) vagy az érintkezőhordozó (3') legalább egy, előnyösen két reteszcsappal (22, 33') rendelkezik, amelyeken az árnyékolószerkezet (4, 4') előnyösen vezetőhasítéka (42, 42') vagy vezetőhornya egyik végével reteszelve.
11. A 9-10. igénypontok bármelyike szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy az árnyékolószerkezetnek (4, 4') a szigetelőtesten (2, 2') történő reteszelve révén az érintkezőhordozó (3, 3') a szigetelőtestben (2, 2') vagy a szigetelőtesten (2, 2') rögzíthető.
12. Az előző igénypontok bármelyike szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy az árnyékolószerkezet (4, 4') lemezből van készítve.
13. Az előző igénypontok bármelyike szerinti dugaszoló csatlakozó (1, 1'), *azzal jellemezve*, hogy az árnyékolószerkezet (4, 4') egy présöntött cinkdarab.

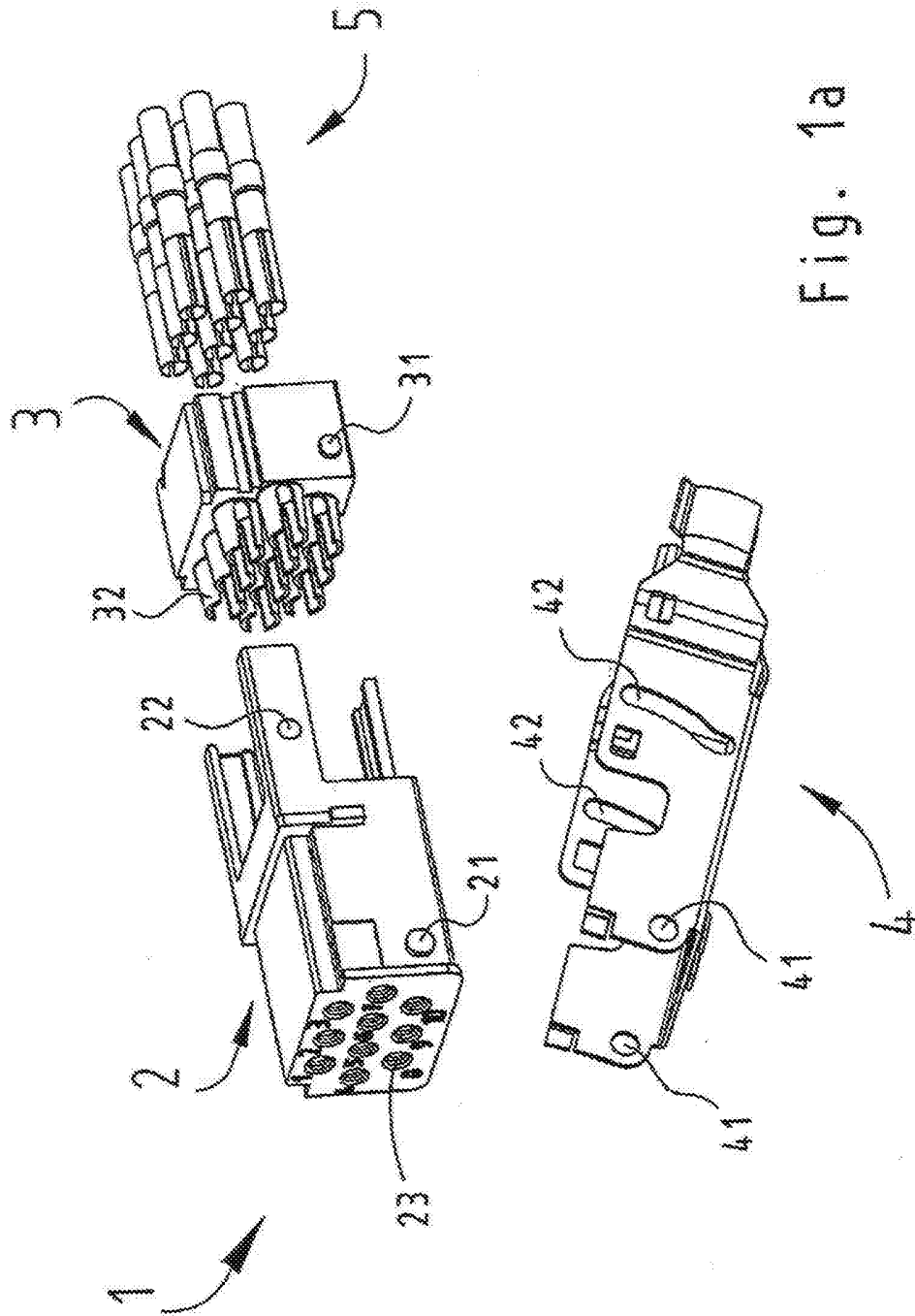


Fig. 1a

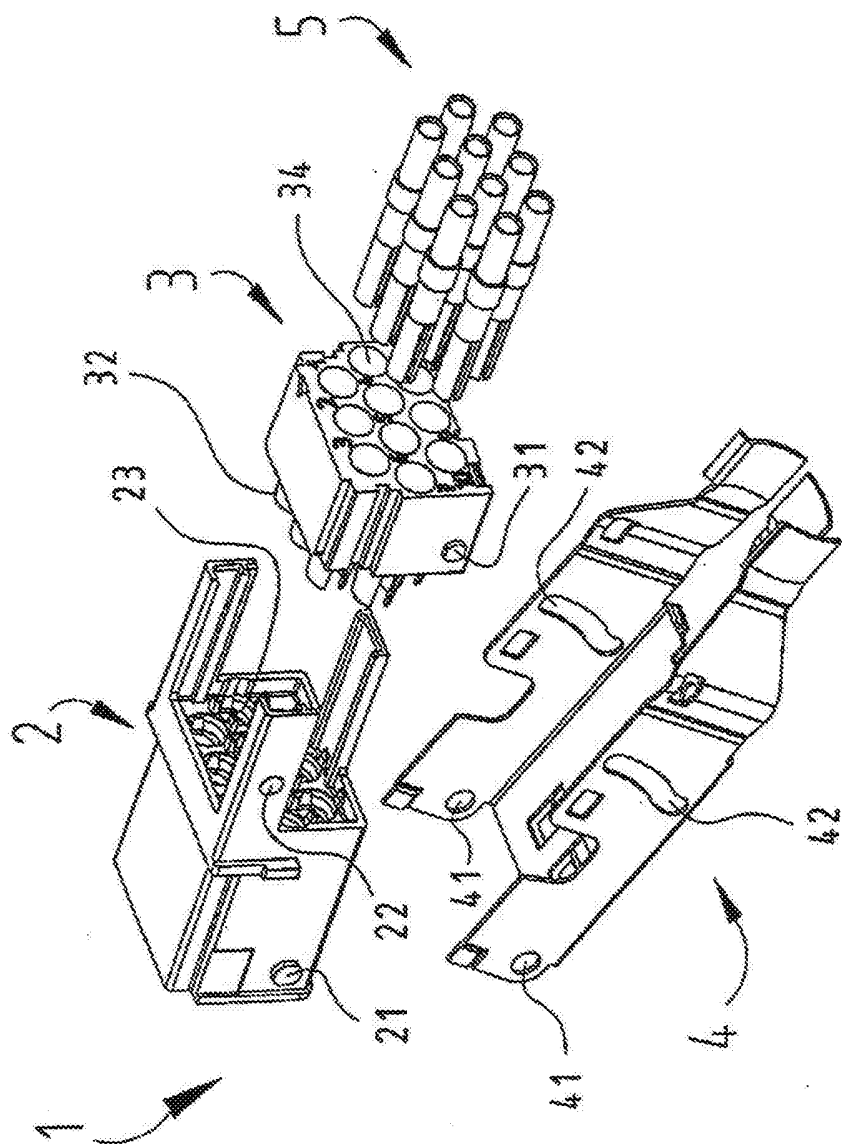


Fig. 1b

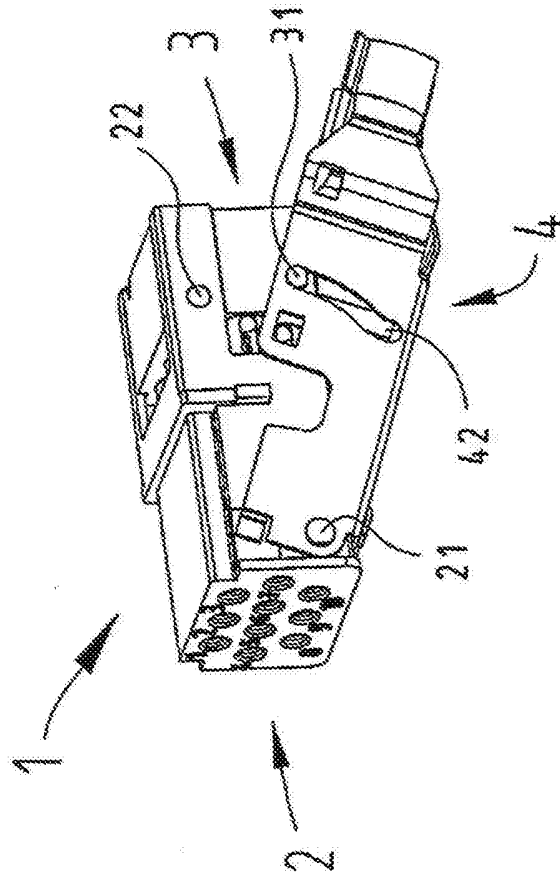


Fig. 2a

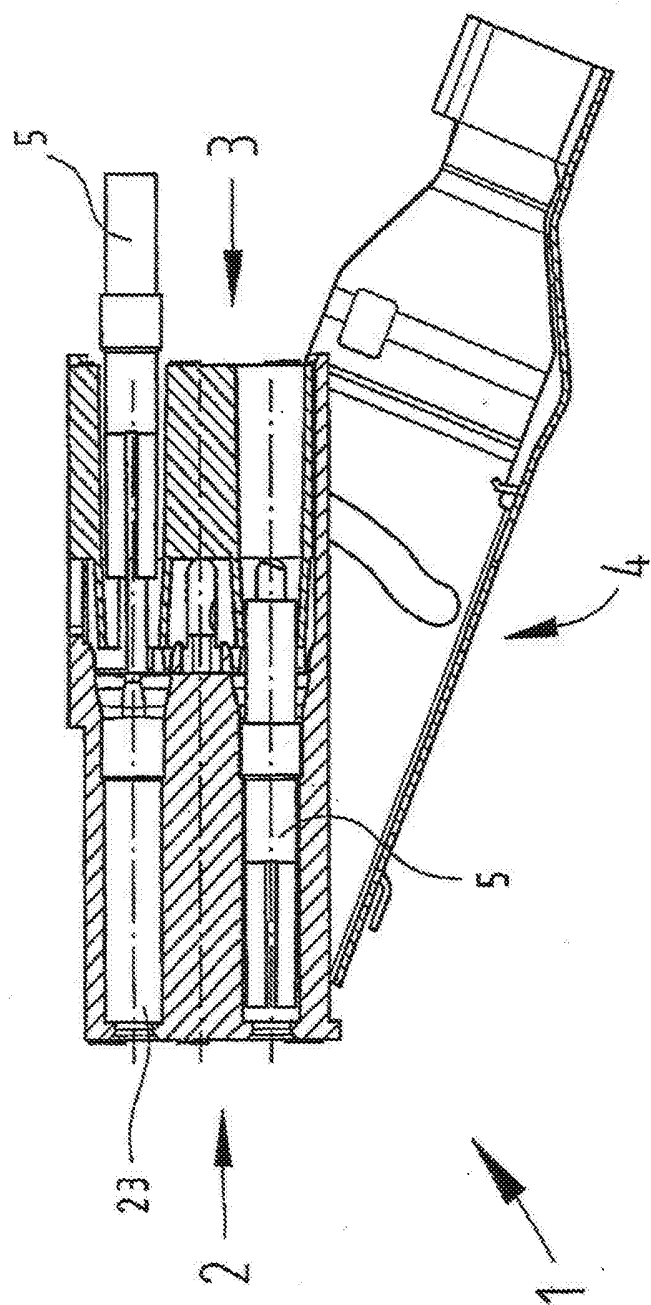


Fig. 2b

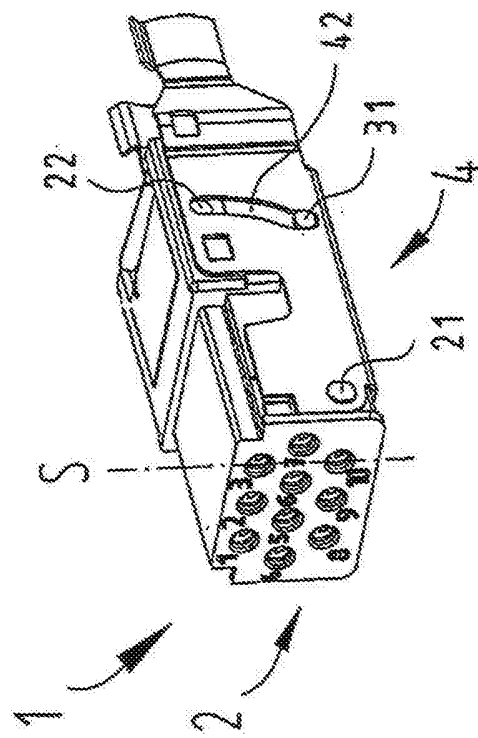
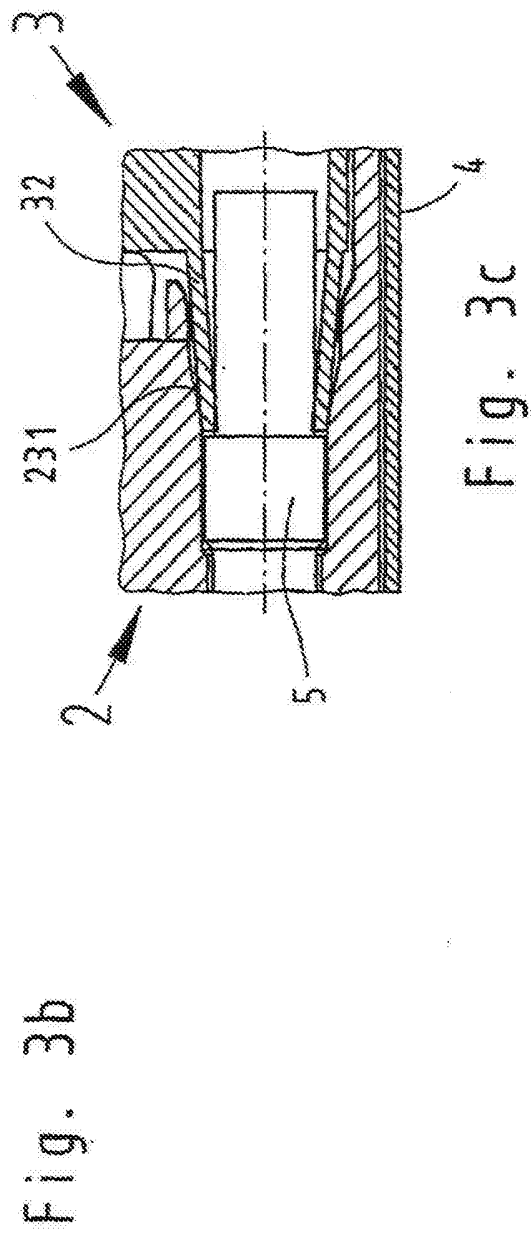
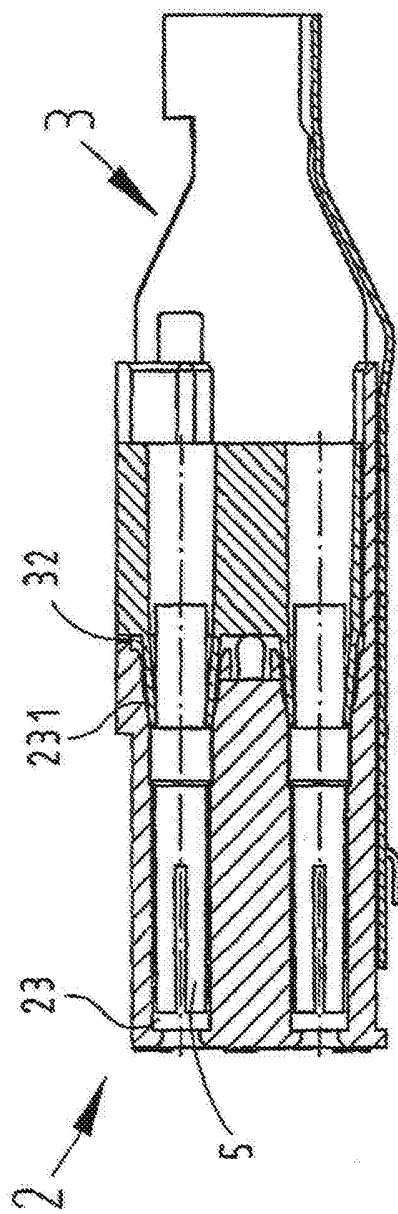


Fig. 3a



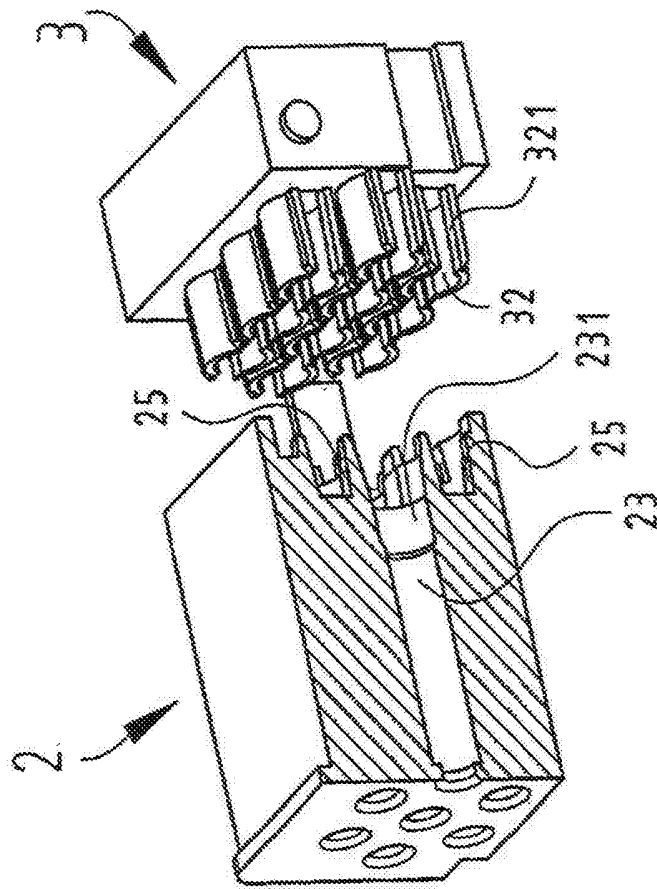


Fig. 4

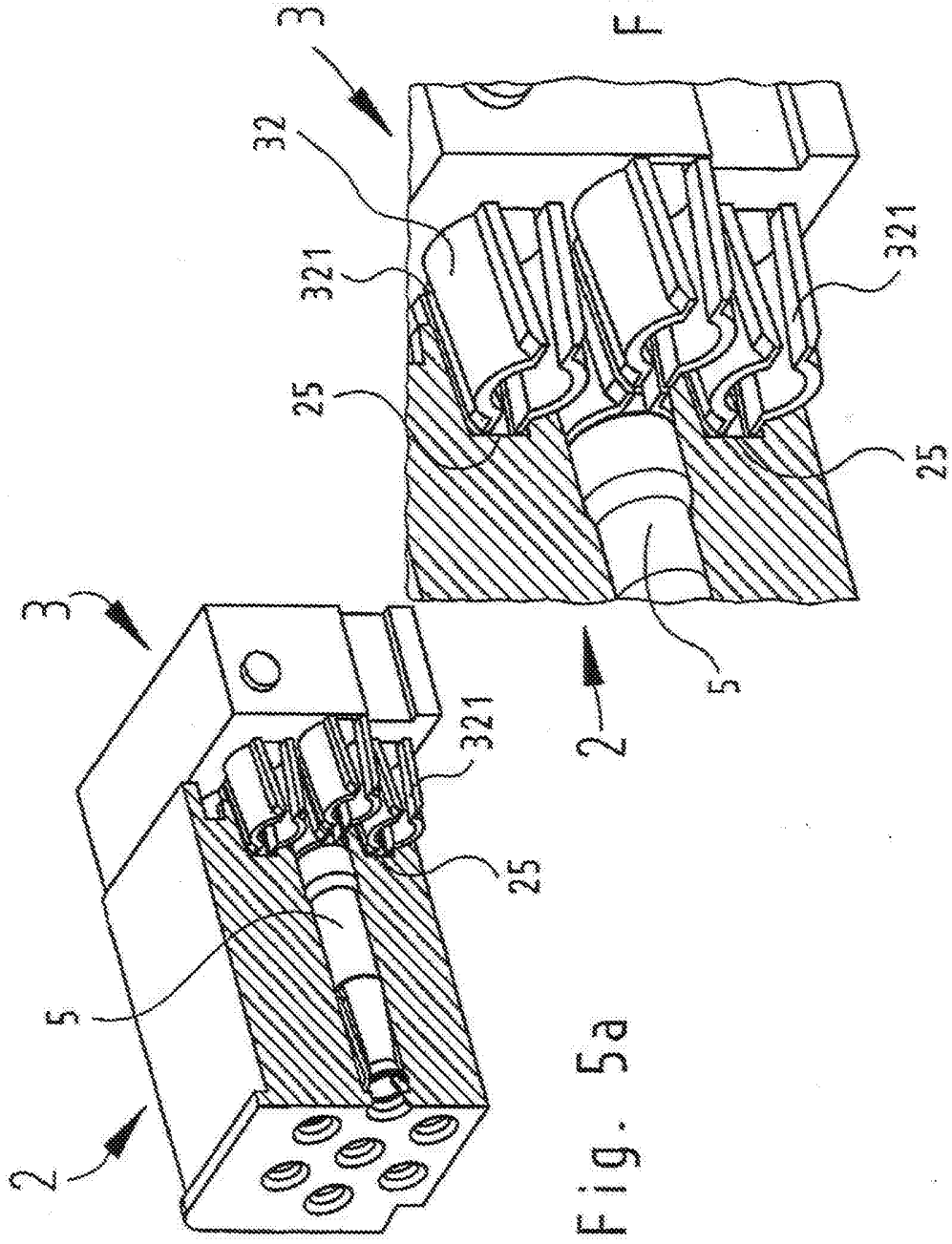


Fig. 5a

Fig. 5b

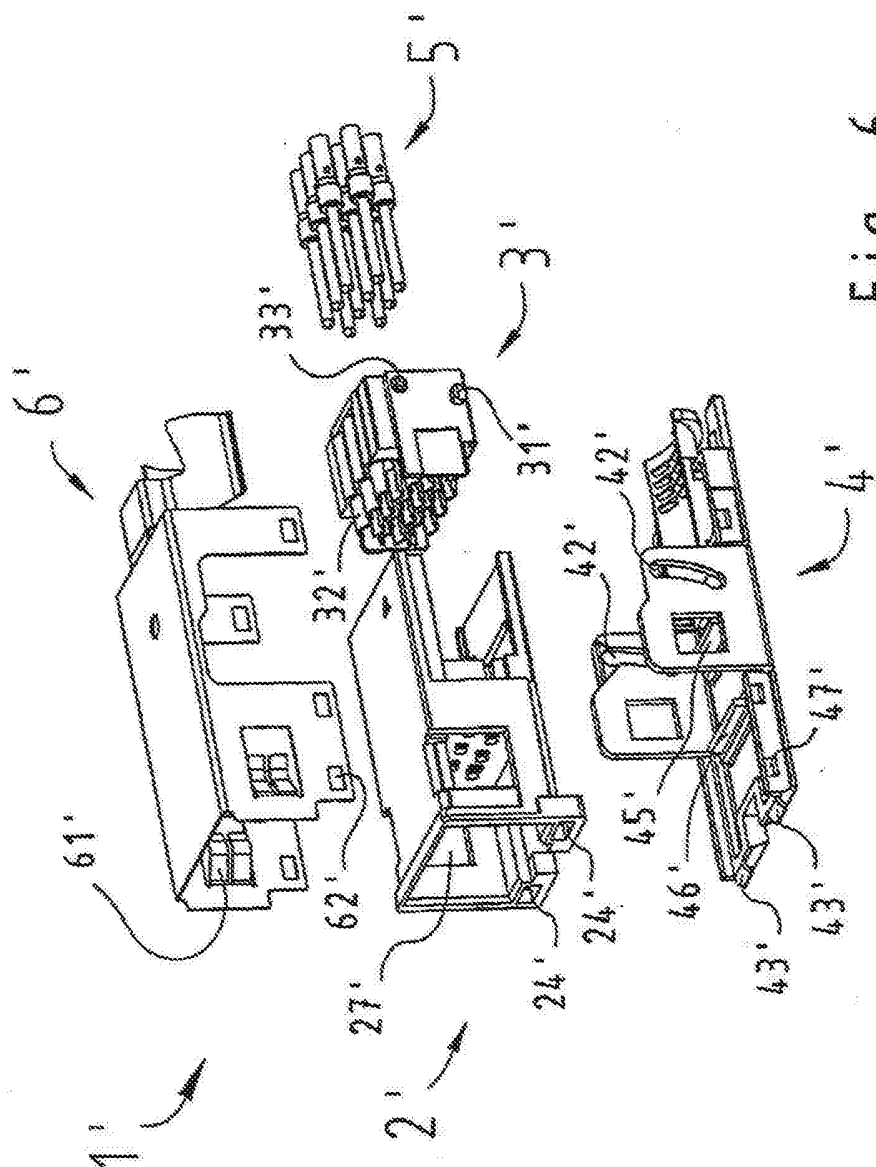


Fig. 6

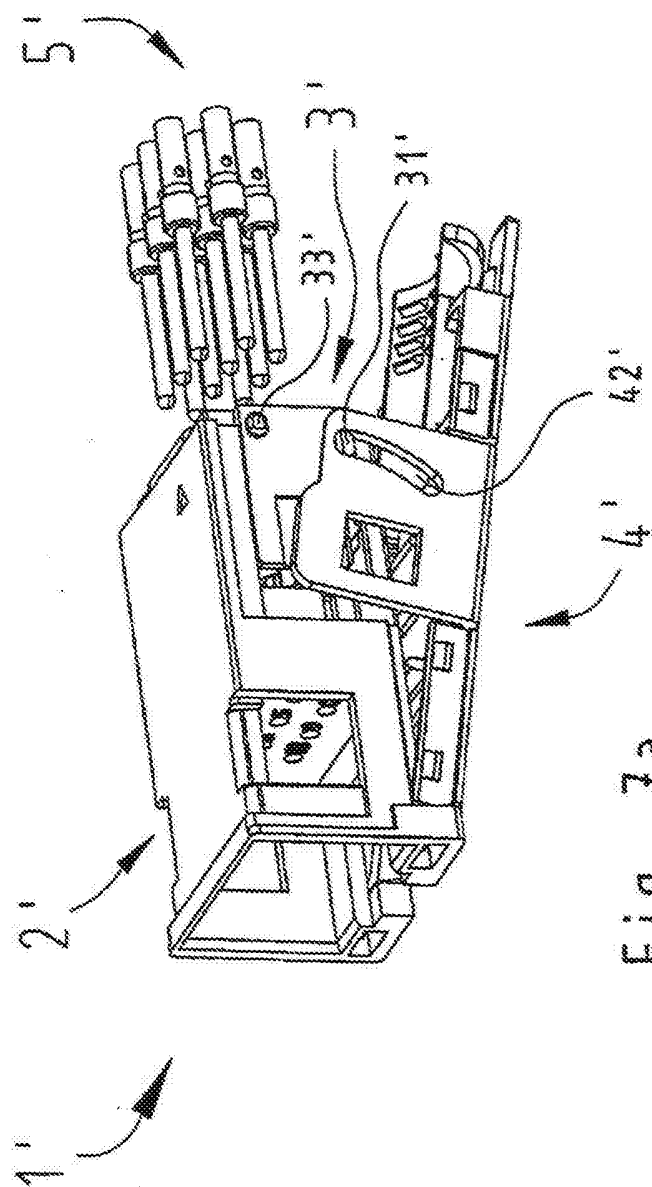


Fig. 7a

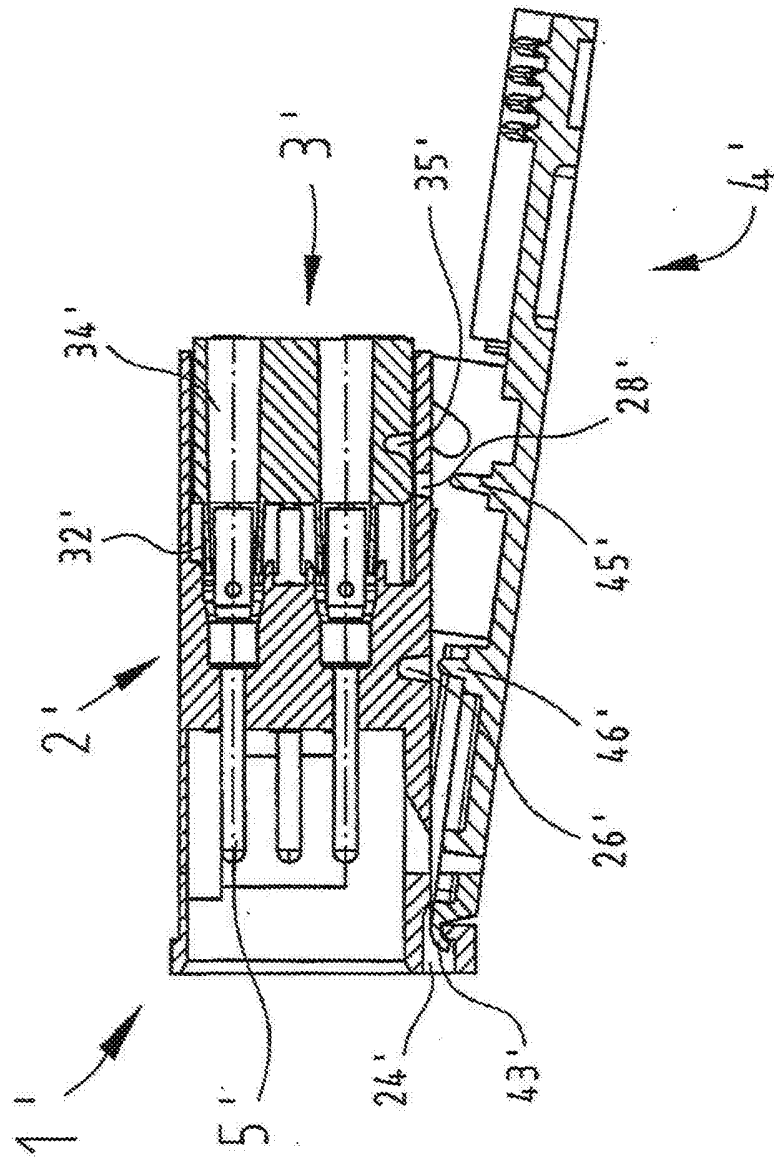


Fig. 7c

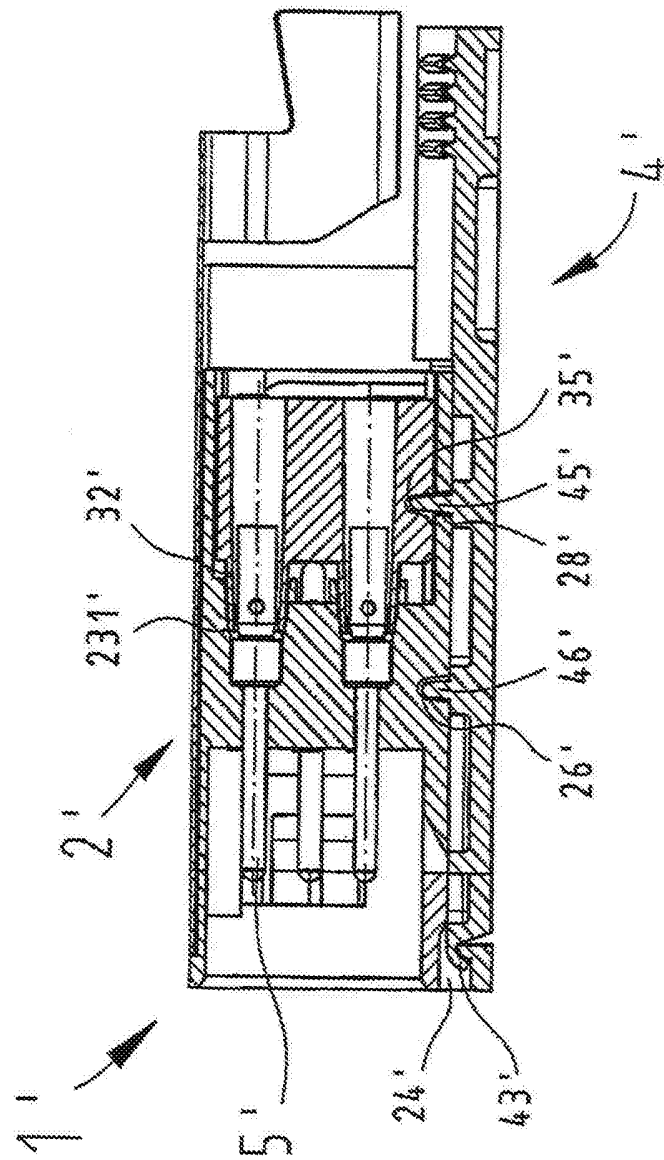


Fig. 7d