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(54) **DEVICE FOR AUTOMATIC HEADING CABLE ENDS AND PROCEDURE THEREFOR**

VORRICHTUNG ZUM AUTOMATISCHEN ANSCHLIEßEN KABELENDEN UND VERFAHREN
DAFÜR

DISPOSITIF DE CONNEXION AUTOMATIQUE POUR BOUTS DE CÂBLE ET PROCÉDÉ ASSOCIÉ

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Description

[0001] The present invention relates to a device for automatic heading of a free lead of a recovered wire and to a procedure therefor. Such a device can be used with a device that produces electrical wiring with insulation displacement (IDC) by loading wires on a wire comb loader to complete a wiring where a crimped terminal is required on the ends of some wires, in the place of a connector IDC.

[0002] The existence of a device for loading wires on a wire comb loader is known from patent PD2005A297.

[0003] The above mentioned devices show how the loading of wires on a wire comb loader can automate particularly to produce electrical wiring with insulation displacement (IDC).

[0004] Now the above mentioned devices are the best the market has to offer for producing crimped wiring.

[0005] An example of said devices is shown in documents US2005/050722, US2006/230597, EP0994538, US5168611, WO2013/105262 and EP1775804. Said documents at best disclose examples of a device for automatic heading of a free lead, but the technical problem of automatic heading of recovered wires in an electrical wiring with insulation displacement connectors, IDC, is not covered by the known prior art.

[0006] However, the wiring requests also include other possibilities that the above mentioned device has only a limited ability to satisfy.

[0007] In fact it is necessary sometimes that some wires should have a free lead that is not loaded into the comb loader (recovered wires) for a heading other than insulation displacement.

[0008] This provision of a free wire could in any event be managed by the above mentioned device.

[0009] However, this free lead of this free wire had to be recovered manually for the specific and desired heading.

[0010] Since the heading could be very different for a series of free wires, it is evident that the complexity of such operations could lead to a higher risk of errors.

[0011] Nor was a preliminary treatment of the free lead with the desired heading.

[0012] In fact the loading of the wires into a wire comb loader and their transfer into a corresponding connector is possible only for wires without terminals, and therefore not headed.

[0013] Finally, the provision of a heading could be so various for the free lead of a different free wires.

[0014] Due to all the above-mentioned drawbacks the heading of the lead of free wires, is recovered manually after the crimping of the connectors.

[0015] All the drawbacks of such a procedure are those of a mixture automatic and manual: increase in the time employed, increase in costs, low quality of final product, low global productivity, poor adaptability and poor configurability

Presentation of the invention

[0016] The aim of the present invention consist in solving one or more drawbacks of the prior art.

5 **[0017]** Another aim of the invention is that the device of the invention can be connected to devices of loading wires into connectors in original manner or also successive.

10 **[0018]** Another aim of the present invention is to provide a device for the heading of free leads of free wires and not crimped on both, but only on one of these.

[0019] A different aim of the present invention is to provide a device that can provides complete discretionality on terminals to be headed on free leads of free wires.

15 **[0020]** Another aim of the present invention is to provide a device that provides the possibility of putting one or more elements (for instance: faston and sleeve, seal, tinning) on the free end.

[0021] An important aim of the present invention is provide a device that allows you to treat the free end even before the relative connection to the terminal.

20 **[0022]** An equally important aim of the present invention is to provide a device that can run in an independent way but also in a coordinated manner with known devices.

25 **[0023]** A different aim of the present invention is to provide a device that can proceed in a coordinate way, but whose operations can precede or be subsequent to those of the devices that it is connected with, without interfering with the production.

30 **[0024]** An important aim of the present invention is to provide a device that can head the wires, also those whose length would be impossible to head manually, after their insertion into connectors.

35 **[0025]** A different aim is to provide a process for heading free leads of recovered wires that can use the device, that is the object of the present invention.

Description of the invention

40 **[0026]** These and other objects are achieved by a device according to claim 1 and a procedure according to claim 7.

45 Advantageous characteristics of the invention

[0027] Advantageously the second or a different rotation position corresponds to that of a heading at a suitable heading device.

50 **[0028]** Advantageously, the heading station can be more than one, arranged in a circular manner or on a arc of a circle to be properly engaged by the wire lead to be headed, after a suitable rotation of the rotating unit.

55 **[0029]** Advantageously the retention of the recovered wire fed by a feeder of electrical wire, for the feeding of at least one wire to head, is done by a pressurised retention device near the end of the rotating head.

[0030] Said pressurised retention device consist of ec-

centric elements capable of locking the wire in a sliding seat specially crafted with its own perimetral profile and to automatically adapting to the different wire sections with which the feeder can be provided.

[0031] This adaption can be advantageously done by elastic elements that act on the periphery of the profile of such eccentric elements. Later in the description of the present invention reference will be made to a specific and preferred realisation having as its object a device to complete the wiring with insulation displacement connectors on both leads, where a serie of wires is required on the same cabling that on one side, in place of the insulation displacement connector, there is a crimped terminal with the further possibility to satisfy the request for insulation devices (sleeve, seal, tinning) according the advantageous characteristics mentioned above, without having any limiting effect on the protection scope that in general can be included in the definition of the invention in its essential characteristics.

Brief description of the drawings

[0032] The Technical characteristics of the invention, according to the above-mentioned aims, are clearly found in the content of claims listed below and the advantages of the invention will become more readily apparent from the detailed description that follows, made with reference to the attached drawings, which represent a preferred but not exclusive embodiment thereof, wherein:

Figure 1 and figure 2 are different perspective view of a whole of a device of the invention in association with a known device operatively connected by a transfer slide of the wire comb loader.

Figure 3 and figure 4 are different perspectives views of the device of the invention and the transfer slide of the wire comb loader for the possible association with a known device (not shown) for the wiring of a processing.

Figure 5 is a perspective view of just a part of the device of the invention, without the heading device and the wire feeding unit, for the purpose of clarity.

Figure 6 shows the transfer slide with a series of recovered wires for the wiring IDC-IDC fixed on the wire comb loader performed by a known device which is bringing to the device of the invention to receive the headed wires and complete the desired wiring in seats of the wire comb loader, after which the slide can come back to the known device and insert the IDC connectors.

Figure 7 shows a top plan view of the device of the invention with rotating arm of the feeding unit rotated in line with a heading unit.

Figure 8 shows a perspective view of an enlargement of the feed unit and the device for inserting the wire in the wire comb loader to complete the wiring.

Figure 9 and figure 11 show what is set out in fig. 8

from a different perspective completed with the wires already inserted by the known device according to a head-head wiring and a series of headed wires inside the provided seats on the wire comb loader.

Figure 10 shows what is set out in fig. 8 from a different perspective complete with recovered wires for starting so-called hybrid wiring, namely on one side IDC connector and on the other side headed wires according to the desired requirements.

Figure 12 and 13 show an enlargement of a different perspective view of the feeding unit and the device for inserting the wire into the wire comb loader.

Figure 14 shows a second front view of the device of the invention equipped with centering of the wire with the cutting and stripping blades according to the colour or the section of the wire exiting the rotating feeding unit.

Figure 15 shows a detail of the previous figure with centring device highlighted.

Figure 16 up to 20 show in an isolated way the insertion device with the guiding clamp highlighted, with relative movement of the guiding plates and the movement of the punch in the various phases of the locking of the wire and its insertion into the comb.

Figure 21 and figure 22 show the insertion device with plates raised to highlight the positioning and shifting of the insertion punch.

Figure 23 and figure 24 show respectively a flat section and a perspective view of the end of the rotating head of the wire feeder.

Figure 25 is an enlargement of figure 24 to highlight the locking device of the wires with eccentric closure that allows you to obtain a lock of the wire independent from another one.

Figure 26 show a partial view of said device for locking the wires, without the upper handling arm, for raising and lowering, at the end of which the various eccentric stops are splined, countered in their rotating movement by elastic elements. This device easily and precisely provides the locking of the wires, also of varying diameters, performed by eccentric elements countered by elastic elements near the end of the head.

[0033] The locking of the wire near the feeding head allows to have extremely high precision regarding the length of the wire exposed by the head, avoiding inaccuracies due to rebounds of a remote and distant feeding-locking system, considering that the seat where said wire slides must be slightly loose per the sliding.

Detailed description

[0034] Referring to the drawings, the device of the invention 1 is shown in association with a known device 2, joined to it by a transfer slide 3 of the comb loader 10. Said transfer can occur both after the operations of the known device 2 have finished and also during these op-

erations, because any recovered headed wires 17 and joined to the comb holder 10 don't interfere with the normal running of one or other device.

[0035] Previously the known device 2 could only connect to the comb loader 10 of the connector 10 a recovered wire without any heading this operation must be performed manually by an operator.

[0036] The device 1 is fed by a wire feeder 9 that can be single or multiple so to have a proper colour and section of the wire.

[0037] The generic wire fed by the feeder 9 is pushed in a guided manner inside the feeding head, supported by a rotating arm 18, where the feeding head 5 can have several paths taking to the exit hole 13 the wire to be processed.

[0038] Possibly said feeding head 5 can be equipped with various devices to check the wire, its speed, and its locking.

[0039] Said rotating feeding head 5 can rotate, in a remote-controlled manner, to present the free leads of the recovered wires 17 at the proper heading station 6,7,8, with which the device 1 is equipped.

[0040] A first unit, said transfer unit 4, is near the arrival and delivery point by the transfer rod 3 of the comb loader 10.

[0041] This transfer unit 4 is the array of elements that having received the headed recovered wire 17, cuts the wire coming out of the exit hole 13 of the feeding head 5 and joins this wire to the comb loader 10 pushing it with a transfer punch 16 into the predetermined position of the comb.

[0042] Preferably before, but also at the same time or even after, the cutting of the wire occurs by means of a shear, consisting of a pair of "V" opposing blade 19. Since it is very important that the cut wire is correctly and precisely inserted into the free position of the comb loader 10, the transfer unit 4 is equipped with a guiding clamp composed of a pair of mobile plates 11, 12.

[0043] Said mobile plates 11, 12 are hinged at the top and can be placed in a vertical position, facing one another and spaced apart, for a space equal to the thickness of the wire to be processed or they can be placed in an horizontal position, allowing the recovered wire 17 to be shifted, without interfering by the feeding head 5.

[0044] In fact during the transfer of the recovered wire 17 by a rotation of a part of the feeding head 5 to position it correctly under the transfer punch 16 for the insertion in the predetermined free seat of the comb loader 10, said plates 11, 12 must be lifted up so as not to interfere with said rotating movement. Moreover, The recovered wire 17 has a terminal or connector 20 or other heading device at its free lead and said plates 11, 12 close to lock the recovered wire 17 in the space between the exit hole 13 of the feeding head 5 and the headed terminal of the same recovered wire 17.

[0045] This locking of the piece of recovered wire 17 by the guiding clamp, which closes with plates 11, 12 in the shape of tabs with a movement of 90° is sufficiently

solid for the secure retention, but without exercising an excessive grip opposing the sliding into the space created by them, pushed by the transfer punch 16, inside the predetermined free seat in the comb loader 10.

[0046] In fact the movement of the transfer punch 16 to transfer said recovered wire 17 held by the clamp realised by close plates 11,12 occurs by sliding inside the space created by said paired and facing plates 11, 12. Since very advantageously said feeding head 5 has many exit holes 13 paired and spaced, so that it can feed the recovered wire 17 of predetermined colour and/or section, the device of the invention 1 is equipped with transfer devices both of the comb loader 10 that moves it to the predetermined free seat to engaged by the properly headed recovered wire 17 as well as transfer devices of the transfer unit 4. Moreover, since the terminals 20 of the recovered wire 17 before being joined to the lead of the recovered wire 17 require that said wire is stripped at its end, the insertion device has a stripping unit. Said stripping unit consists of a couple of "V" blades 14 and 15 mirrored by cutting blades 19 at a predetermined distance that can perform a maximum determined measure; being shorter than the cutting blades, so that first the cutting is performed and then the retraction of the feeding head 5 occurs just as much as is necessary to perform the required stripping, at the same time the stripping blades 14 and 15 close to incise the insulation. After that the feeding head 5 draws back to perform the extraction of the sheath, that can be partial.

[0047] This stripping operation is usually the first operation performed by device 1, before from station 4 the feeding head 5 moves the free lead of the wire under one or more following heading station 6,7,8.

[0048] Afterwards, the recovered wire 17, stripped according to requirements, is moved by a partial rotation of the feeding head 5, near one of the heading station 6,7,8.

[0049] Possibly, with a partial rotation there can be the transfer of the recovered wire 17 processed by a first heading station to a second heading station for a second heading. For instance there might be need of a heading with an electrical terminal and an insulation cap (faston and faston cover).

[0050] Or said heading stations 6,7,8 can be set up for the heading of wires of different diameters so the same heading can be performed on wires of different dimensions.

[0051] Said operations, which in the past were performed manually, are all performed directly in an automated manner with all certainty that they will be precisely and quickly carried out and without any errors.

[0052] Once the heading phase has finished, at the suitably equipped stations 6,7,8, the feeding head 5, by means of an additional rotation places the recovered wire 17 headed with a terminal 20 near the transfer unit.

[0053] After pushing said wire with the feeding device 9 from the exit hole 13 of the feeding head 5 at the predetermined length, the locking plates 11,12 lower so that the wire is cut and into the comb loader 10. At the end

of the feeding head 5, near the exit holes 13 of the recovered wires 17, said head is equipped with a device for locking said wire.

[0054] Said locking device consists of a lever 21, whose first arm 22 is raised and lowered by an actuator. On the second arm 23, contrasted to the first arm 22, is supported by a pin 25 on which is spliced a serie of stops with eccentric profile, preferably crescent shaped.

[0055] Said eccentric profile in a rest position pushes the wire inside its seat of the feeding head 5, preventing it from moving.

[0056] The eccentric profile of the locks 24 allows to the locking device to adapt to the variations in diameter of the wire. In fact said locks can be slightly rotated with respect the support pin 25, opposed by elastic devices 26, adapting to the diameter of the wire which is in the underlying seat.

[0057] As soon as the actuator moves the first arm 22 of the lever 21 of the locking device, the wire feeding 9 feeds one of the recovered wire 17 following the predetermined programme and said wire, sliding free into the seat of the feeding head 5, comes out of the exit hole 13 in the end of the feeding head 5 by the predetermined quantity. With this kind of locking device, placed near exit hole 13, you obtain high precision in the quantity of the recovered wire 17, not having rebounds and windings that could happen in a wide seat of the feeding head 5.

Claims

1. Device (1) for automatic heading of a free lead of a recovered wire (17), a recovered wire (17) being an electrical wire of an electrical wiring with insulation displacement connectors and having a free lead for a different heading from the insulation displacement connector, the device (1) comprising:

- a feeder (9) of one or more electrical wires, the feeder (9) being configured to feed at least one recovered wire (17) to be headed for a predetermined length and to submit a predetermined quantity of the recovered wire (17) from a feeding head (5);

- a transfer unit (4) comprising a stripping unit configured for stripping the free lead of the recovered wire (17), wherein a first position of submitting of the recovered wire (17) corresponds to the stripping unit;

- at least one heading station (6, 7, 8) configured for heading the free lead of the recovered wire (17);

- wherein said feeding head (5) is configured to rotate in a programmed manner to place an end part of the recovered wire (17) under at least one heading station (6, 7, 8) and take a headed recovered wire (17) back, after the heading operations, on a second position that can be near

the transfer unit (4) and expected starting position;

- the device (1) further comprising a cutting unit configured for cutting the recovered wire (17) at a desired measure after that the feeding head (5) has taken back the headed recovered wire (17) near to the transfer unit (4) and a comb loader (10) having a free seat in a predetermined position;

wherein said transfer unit (4) comprises:

- a guiding clamp configured to hold a headed recovered wire (17) cut, wherein the guiding clamp is constituted by a couple of locking plates (11,12), wherein those locking plates (11, 12) are configured to be in proximity of a headed end of the headed recovered wire (17) and to rotate; and

- a transfer punch, which is configured to slide in a space between the pair of mobile locking plates (11, 12) of the guiding clamp, and to push the headed recovered wire (17) cut into the free seat of the comb loader (10).

2. Device according to claim 1, **characterised by** the fact that the second or a different position of the rotation of the feeding head (5) corresponds to that of a following heading at a suitable heading device (6,7,8).

3. Device according to one or more of the previous claims, **characterised by** the fact that said heading stations (6, 7, 8) are arranged in circular way or on a circular arc with respect to the feeding head (5).

4. Device according to one or more of the previous claims, **characterised by** the fact that said rotation of the plates (11,12) is roughly of 90° with respect their upper connection.

5. Device according to one or more previous claims, **characterised by** the fact that a locking device near an end of the feeding head (5) is composed of locks (24) with eccentric profile capable of adapting to the diameter of the recovered wire and opposed in their rotation of squashing the wire inside its seat, by elastic means (26).

6. Device according to one or more of the previous claims, **characterised by** the fact that said feeding head (5) is equipped with many exit holes (13) paired and spaced apart, to feed several recovered wires (17) and by the fact that are present some transfer means of both of the comb loader (10) and the transfer unit (4).

7. Procedure for automatic heading of a free lead of a

recovered wire (17) that employs the device according to claims 1 up to 6 **characterized by** the following steps:

- feeding of the recovered wire (17) by the feeder (9) to the feeding head (5) 5
- stripping of the free lead of the recovered wire (17) by the stripping unit;
- pre-programmed rotation of said feeding head (5) from transfer unit (4) submitting the free lead of the recovered wire (17) to a first heading station; 10
- possible additional pre-programmed rotation of the feeding head (5) to submit the free lead of the recovered wire (17) to a following heading at a different heading station: 15
- possible repetition of the previous step at other heading stations;
- rotation of the feeding head (5) to submit the recovered wire with its lead headed at a transfer unit (4) 20
- feeding of the recovered wire (17) to achieve the desired length;
- rotation of the mobile locking plates (11,12) of the guiding clamp in approach to the recovered wire (17) to retain it; 25
- cutting of the recovered wire (17) by the cutting unit;
- lowering of the transfer punch (16) inside the space between the pair of mobile plates (11,12) with the insertion of the recovered wire (17) into the free seat of the comb loader (10). 30

Patentansprüche

1. Vorrichtung (1) zum automatischen Anschließen einer freien Zuleitung eines rückgewonnenen Drahts (17), wobei ein rückgewonnener Draht ein elektrischer Draht einer elektrischen Verdrahtung mit selbsttätig abisolierenden Steckverbindern ist, der eine freie Zuleitung für einen anderen Anschluss als von dem selbsttätig abisolierenden Steckverbinder hat, wobei die Vorrichtung (1) Folgendes umfasst:

- eine Speiseleitung (9) eines oder mehrerer elektrischer Drähte, wobei die Speiseleitung (9) ausgebildet ist, um mindestens einen rückgewonnenen Draht (17), der angeschlossen werden soll, über eine vordefinierte Länge zuzuführen und eine vordefinierte Menge des rückgewonnenen Drahts (17) von einem Zuführkopf (5) zuzuführen; 45
- eine Überführungseinheit (4), die eine Abisoliereinheit umfasst, ausgebildet, um die freie Zuleitung des rückgewonnenen Drahts (17) abzuisolieren, wobei eine erste Position des Zuführens des rückgewonnenen Drahts (17) der Ab-

isoliereinheit entspricht;

- mindestens eine Anschlussstation (6, 7, 8), ausgebildet, um die freie Zuleitung des rückgewonnenen Drahts (17) anzuschließen;
- wobei der Zuführkopf (5) ausgebildet ist, um sich auf programmierte Art zu drehen, um ein Endteil des rückgewonnenen Drahts (17) unter mindestens eine Anschlussstation (6, 7, 8) zu platzieren und nach den Anschlussvorgängen einen angeschlossenen rückgewonnenen Draht (17) in eine zweite Position zurückzunehmen, die sich nahe der Überführungseinheit (4) und erwarteten Ausgangsposition befinden kann;
- wobei die Vorrichtung (1) weiter eine Schneideinheit umfasst, ausgebildet, um den rückgewonnenen Draht (17) an einer gewünschten Abmessung zu schneiden, nachdem der Zuführkopf (5) den angeschlossenen rückgewonnenen Draht (17) in die Nähe der Überführungseinheit (4) zurückgebracht hat, und einen Kammlader (10) mit einem freien Sitz in einer vordefinierten Position;

wobei die Überführungseinheit (4) Folgendes umfasst:

- eine Führungsklemme, ausgebildet, um einen angeschlossenen rückgewonnenen Draht (17) geschnitten zu halten, wobei die Führungsklemme aus einem Paar von Schließblechen (11, 12) besteht, wobei diese Schließbleche (11, 12) ausgebildet sind, um sich in der Nähe eines angeschlossenen Endes des angeschlossenen rückgewonnenen Drahts (17) zu befinden und sich zu drehen; und
- einen Überführungsstempel, der ausgebildet ist, um in einem Raum zwischen dem Paar mobiler Schließbleche (11, 12) der Führungsklemme zu gleiten und den geschnittenen angeschlossenen rückgewonnenen Draht (17) in den freien Sitz des Kammladers (10) zu schieben.

2. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die zweite oder eine andere Rotationsposition des Zuführkopfs (5) derjenigen eines folgenden Anschlusses an einer geeigneten Anschlussvorrichtung (6, 7, 8) entspricht.

3. Vorrichtung gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Anschlussstationen (6, 7, 8) mit Bezug auf den Zuführkopf (5) kreisförmig oder auf einem Kreisbogen angeordnet sind.

4. Vorrichtung gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** die Drehung der Bleche (11, 12) ungefähr 90° mit Bezug

auf ihren oberen Anschluss beträgt.

5. Vorrichtung gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** eine Schließvorrichtung nahe einem Ende des Zuführkopfs (5) aus Riegeln (24) mit exzentrischem Profil besteht, die in der Lage sind, sich an den Durchmesser des rückgewonnenen Drahts anzupassen, und in ihrer Drehung des Anpressens des Drahts in seinem Sitz entgegengesetzt sind, durch elastische Mittel (26). 5
6. Vorrichtung gemäß einem oder mehreren der obigen Ansprüche, **dadurch gekennzeichnet, dass** der Zuführkopf (5) mit vielen Austrittslöchern (13) ausgestattet ist, die in Paaren angeordnet und beabstandet sind, um mehrere rückgewonnenen Drähte (17) zuzuführen, und dadurch, dass einige Überführungsmittel sowohl des Kammladers (10) als auch der Überführungseinheit (4) vorhanden sind. 10
7. Verfahren zum automatischen Anschließen einer freien Zuleitung eines rückgewonnenen Drahts (17), das die Vorrichtung gemäß den Ansprüchen 1 bis 6 nutzt, **gekennzeichnet durch** folgende Schritte: 15
 - das Zuführen des rückgewonnenen Drahts (17) an den Zuführkopf (5) durch die Speiseleitung (9), 20
 - das Abisolieren der freien Zuleitung des rückgewonnenen Drahts (17) durch die Abisoliereinheit, 25
 - das vorprogrammierte Drehen des Zuführkopfs (5) von der Überführungseinheit (4), wodurch die freie Zuleitung des rückgewonnenen Drahts (17) einer ersten Anschlussstation zugeführt wird; 30
 - ein mögliches zusätzliches vorprogrammiertes Drehen des Zuführkopfs (5), um die freie Zuleitung des rückgewonnenen Drahts (17) einem folgenden Anschluss an einer anderen Anschlussstation zuzuführen; 35
 - ein mögliches Wiederholen des vorhergehenden Schritts an anderen Anschlussstationen; 40
 - das Drehen des Zuführkopfs (5), um den rückgewonnenen Draht mit seiner angeschlossenen Zuleitung an einer Überführungseinheit (4) zuzuführen, 45
 - das Zuführen des rückgewonnenen Drahts (17), um die gewünschte Länge zu erreichen, 50
 - das Drehen der mobilen Schließbleche (11, 12) der Führungsklemme bei Annäherung an den rückgewonnenen Draht (17), um ihn zu halten,
 - das Schneiden des rückgeführten Drahts (17) durch die Schneideinheit, 55
 - das Absenken des Überführungsstempels (16) im Raum zwischen dem Paar mobiler Bleche

(11, 12) mit Einführen des rückgewonnenen Drahts (17) in den freien Sitz des Kammladers (10).

Revendications

1. Dispositif (1) pour le raccordement automatique en bout d'un conducteur libre d'un fil récupéré (17), un fil récupéré (17) étant un fil électrique d'un câblage électrique avec des connecteurs autodénudants et ayant un conducteur libre pour un raccordement en bout différent à partir du connecteur autodénudant, le dispositif (1) comportant :

- un dispositif d'alimentation (9) d'un ou plusieurs fils électriques, le dispositif d'alimentation (9) étant configuré pour acheminer au moins un fil récupéré (17) à raccorder en bout sur une longueur prédéterminée et pour soumettre une quantité prédéterminée du fil récupéré (17) provenant d'une tête d'alimentation (5),
- une unité de transfert (4) comportant une unité de dénudage configurée pour dénuder le conducteur libre du fil récupéré (17), dans lequel une première position de soumission du fil récupéré (17) correspond à l'unité de dénudage,
- au moins une station de raccordement en bout (6, 7, 8) configurée pour raccorder en bout le conducteur libre du fil récupéré (17),
- dans lequel ladite tête d'alimentation (5) est configurée pour tourner d'une manière programmée pour placer une partie d'extrémité du fil récupéré (17) sous au moins une station de raccordement en bout (6, 7, 8) et reprendre un fil récupéré raccordé en bout (17), après les opérations de raccordement en bout, sur une seconde position qui peut être près de l'unité de transfert (4) et une position de départ attendu,
- le dispositif (1) comportant en outre une unité de coupe configurée pour couper le fil récupéré (17) à une mesure souhaitée après que la tête d'alimentation (5) a repris le fil récupéré raccordé en bout (17) près de l'unité de transfert (4) et un chargeur à peigne (10) ayant un logement libre dans une position prédéterminée,

dans lequel ladite unité de transfert (4) comporte :

- une pince de guidage configurée pour maintenir un fil récupéré raccordé en bout (17) coupé, dans lequel la pince de guidage est constituée de deux plaques de blocage (11, 12), dans lequel ces plaques de blocage (11, 12) sont configurées pour être à proximité d'une extrémité raccordée en bout du fil récupéré raccordé en bout (17) et pour tourner, et
- un poinçon de transfert, qui est configuré pour

- coulisser dans un espace entre la paire de plaques de blocage mobiles (11, 12) de la pince de guidage, et pour pousser le fil récupéré raccordé en bout (17) coupé dans le logement libre du chargeur à peigne (10). 5
2. Dispositif selon la revendication 1, **caractérisé par le fait que** la seconde position ou une position différente de la rotation de la tête d'alimentation (5) correspond à celle d'un raccordement en bout suivant sur un dispositif de raccordement en bout (6, 7, 8) adapté. 10
3. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdites stations de raccordement en bout (6, 7, 8) sont agencées d'une manière circulaire ou sur un arc circulaire par rapport à la tête d'alimentation (5). 15
4. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ladite rotation des plaques (11, 12) est approximativement de 90° par rapport à leur connexion supérieure. 20
5. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé par le fait qu'un** dispositif de blocage près d'une extrémité de la tête d'alimentation (5) est composé de verrous (24) avec un profil d'excentrique capable de s'adapter au diamètre du fil récupéré et opposés dans leur rotation de pression du fil à l'intérieur de son logement, par des moyens élastiques (26). 25 30
6. Dispositif selon une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ladite tête d'alimentation (5) est équipée de nombreux trous de sortie (13) appariés et espacés les uns des autres, pour acheminer plusieurs fils récupérés (17) et **par le fait que** plusieurs moyens de transfert à la fois du chargeur à peigne (10) et de l'unité de transfert (4) sont présents. 35 40
7. Procédé pour le raccordement automatique en bout d'un conducteur libre d'un fil récupéré (17) qui utilise le dispositif selon les revendications 1 à 6, **caractérisé par** les étapes suivantes : 45
- acheminement du fil récupéré (17) par le dispositif d'alimentation (9) jusqu'à la tête d'alimentation (5), 50
 - dénudage du conducteur libre du fil récupéré (17) par l'unité de dénudage,
 - rotation préprogrammée de ladite tête d'alimentation (5) à partir de l'unité de transfert (4)
 - soumission du conducteur libre du fil récupéré (17) à une première station de raccordement en bout, 55
 - rotation préprogrammée supplémentaire pos-

sible de la tête d'alimentation (5) pour soumettre le conducteur libre du fil récupéré (17) à un raccordement en bout suivant sur une station de raccordement en bout différente,

- répétition possible de l'étape précédente sur d'autres stations de raccordement en bout,
- rotation de la tête d'alimentation (5) pour soumettre le fil récupéré avec son conducteur raccordé en bout sur une unité de transfert (4)
- acheminement du fil récupéré (17) pour obtenir la longueur voulue,
- rotation des plaques de blocage mobiles (11, 12) de la pince de guidage en approche du fil récupéré (17) pour le retenir,
- découpe du fil récupéré (17) par l'unité de coupe,
- descente du poinçon de transfert (16) à l'intérieur de l'espace entre la paire de plaques mobiles (11, 12) avec l'insertion du fil récupéré (17) dans le logement libre du chargeur à peigne (10).

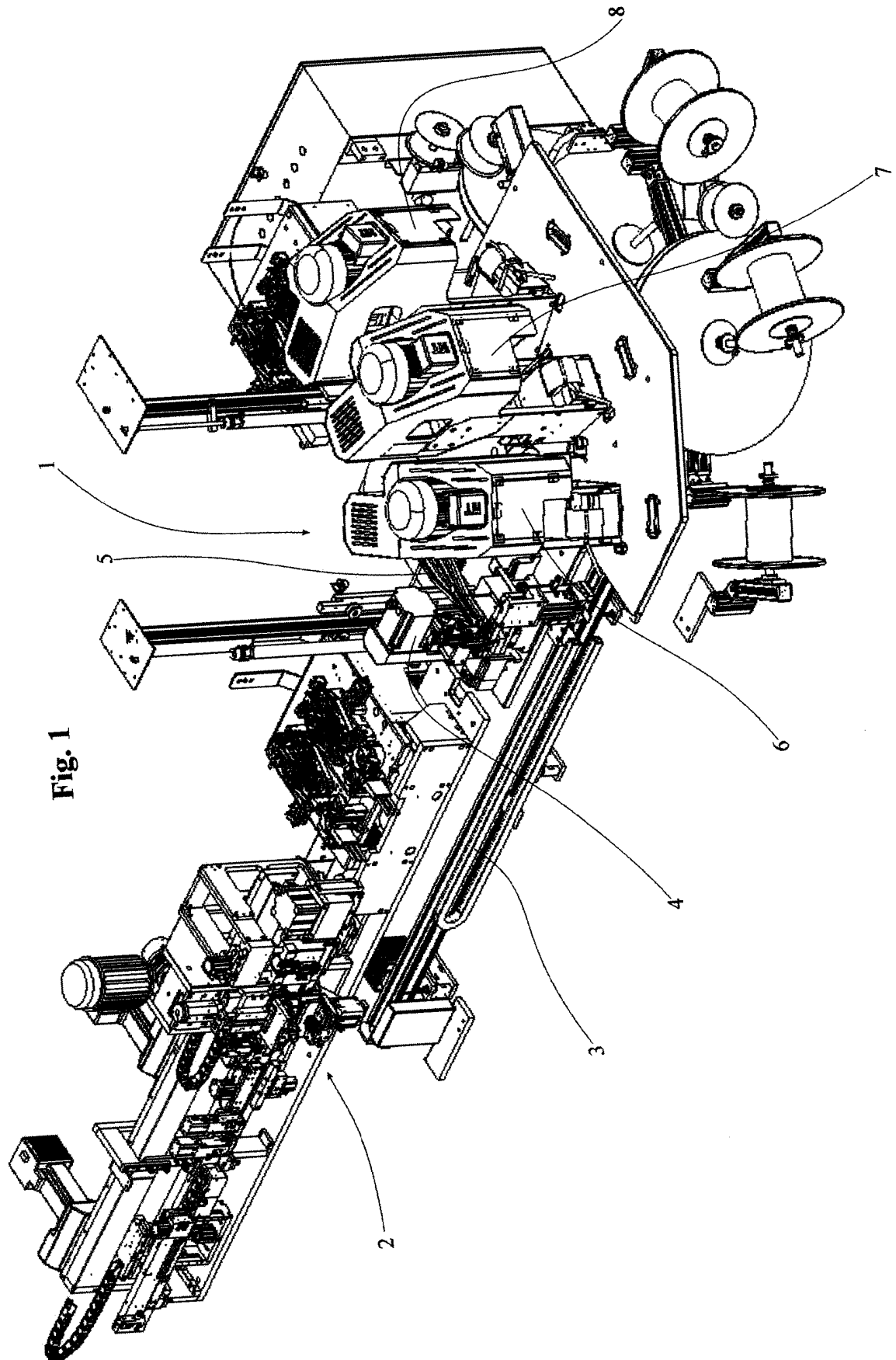


Fig. 1

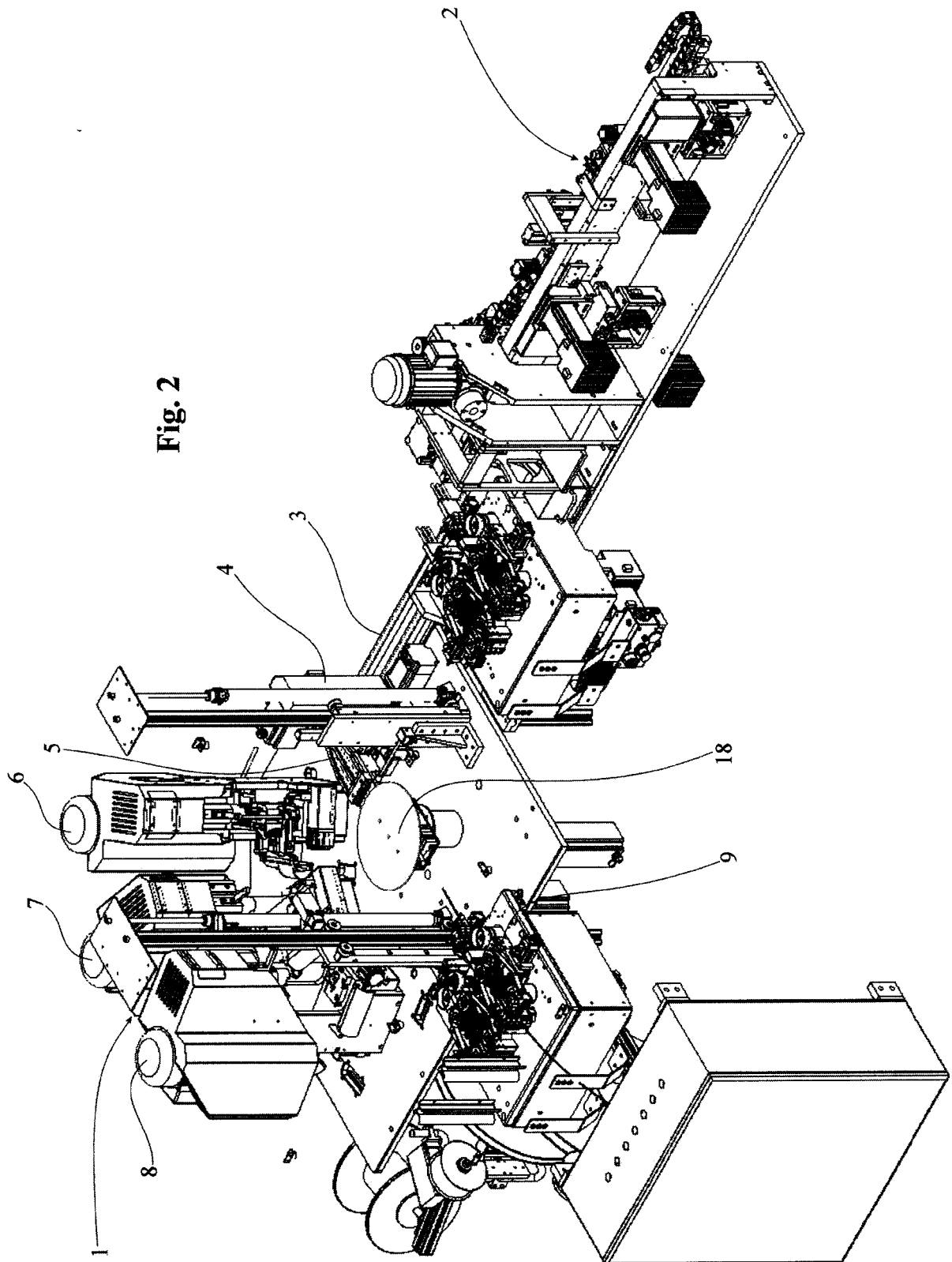


Fig. 2

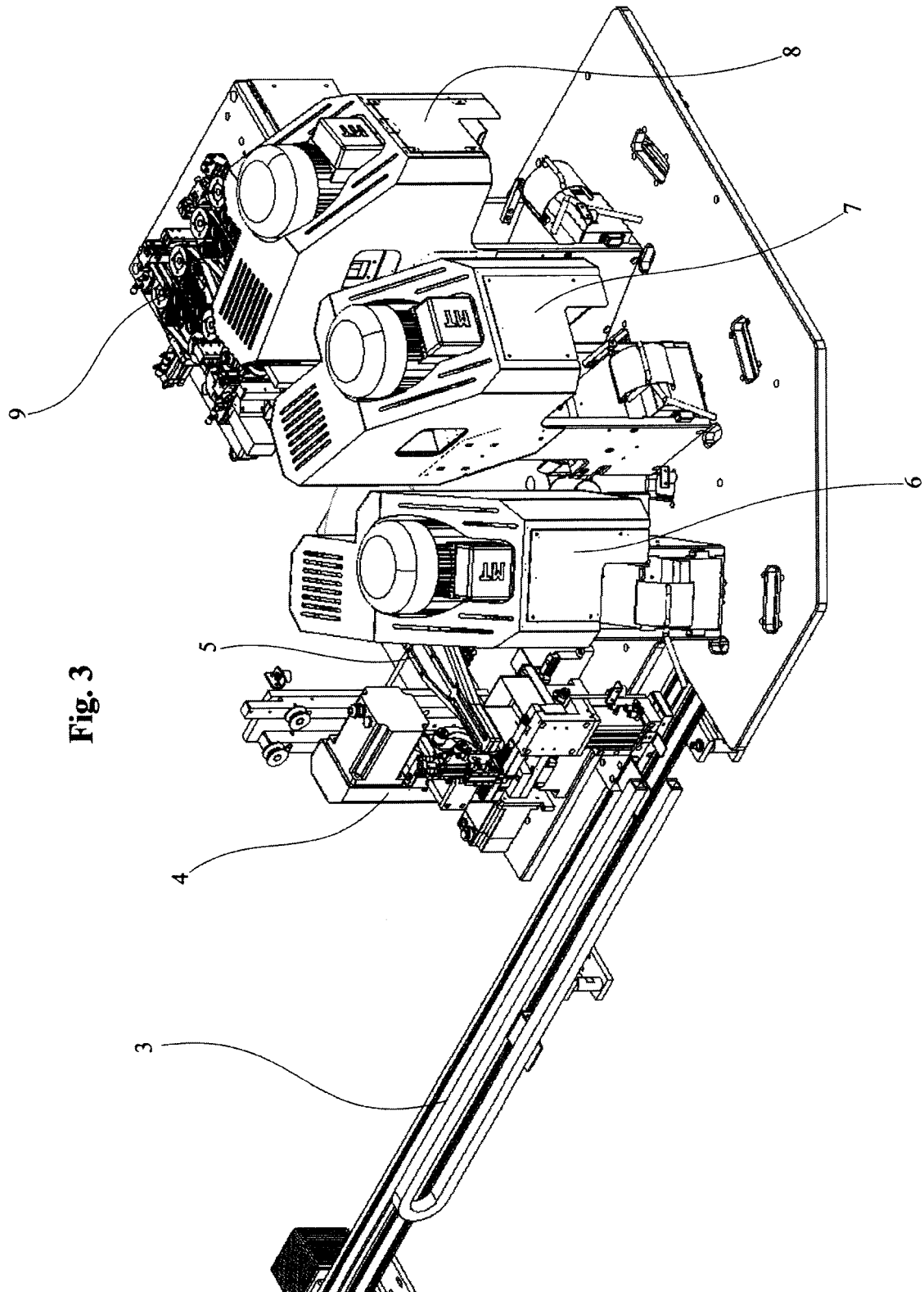


Fig. 3

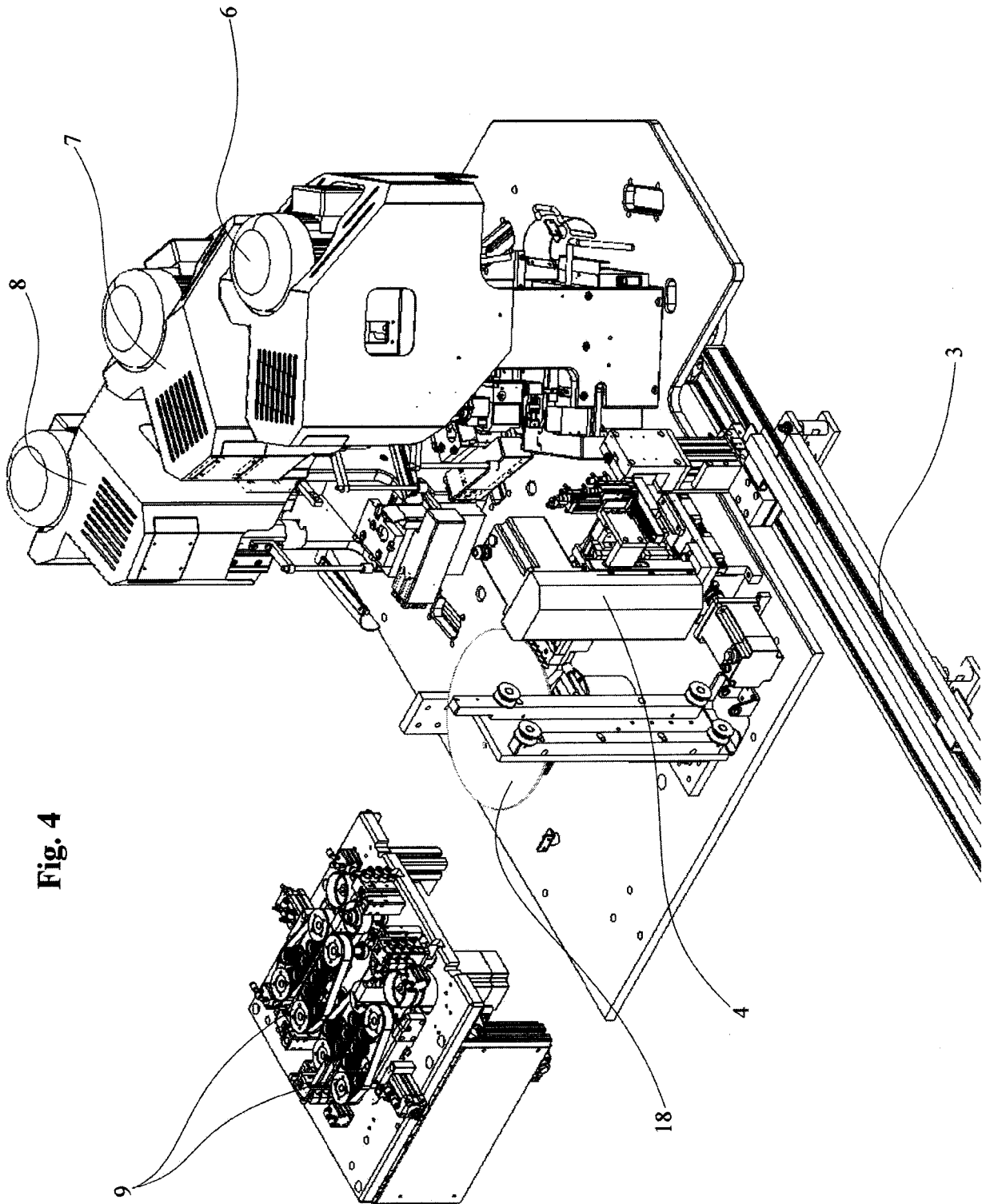


Fig. 4

Fig. 5

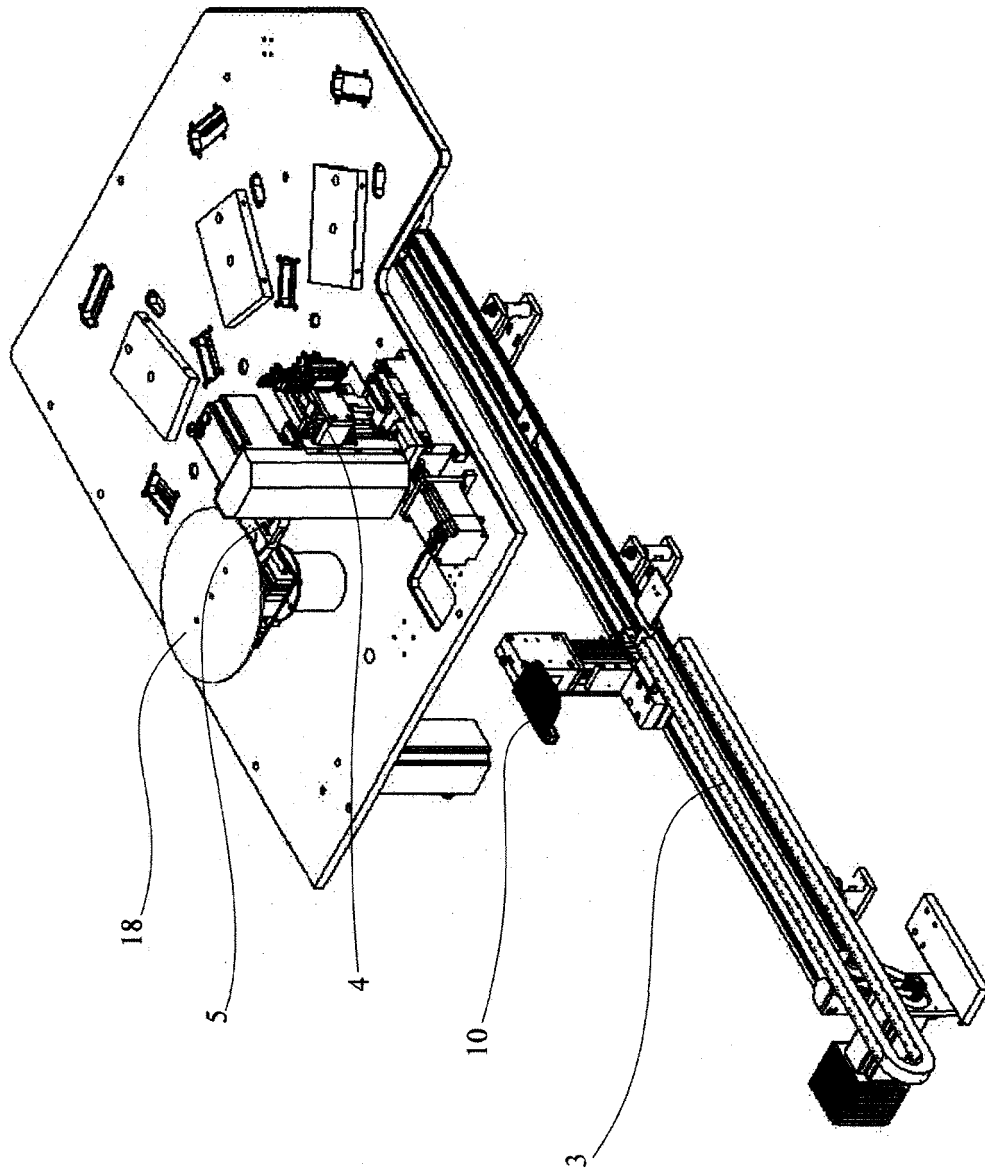
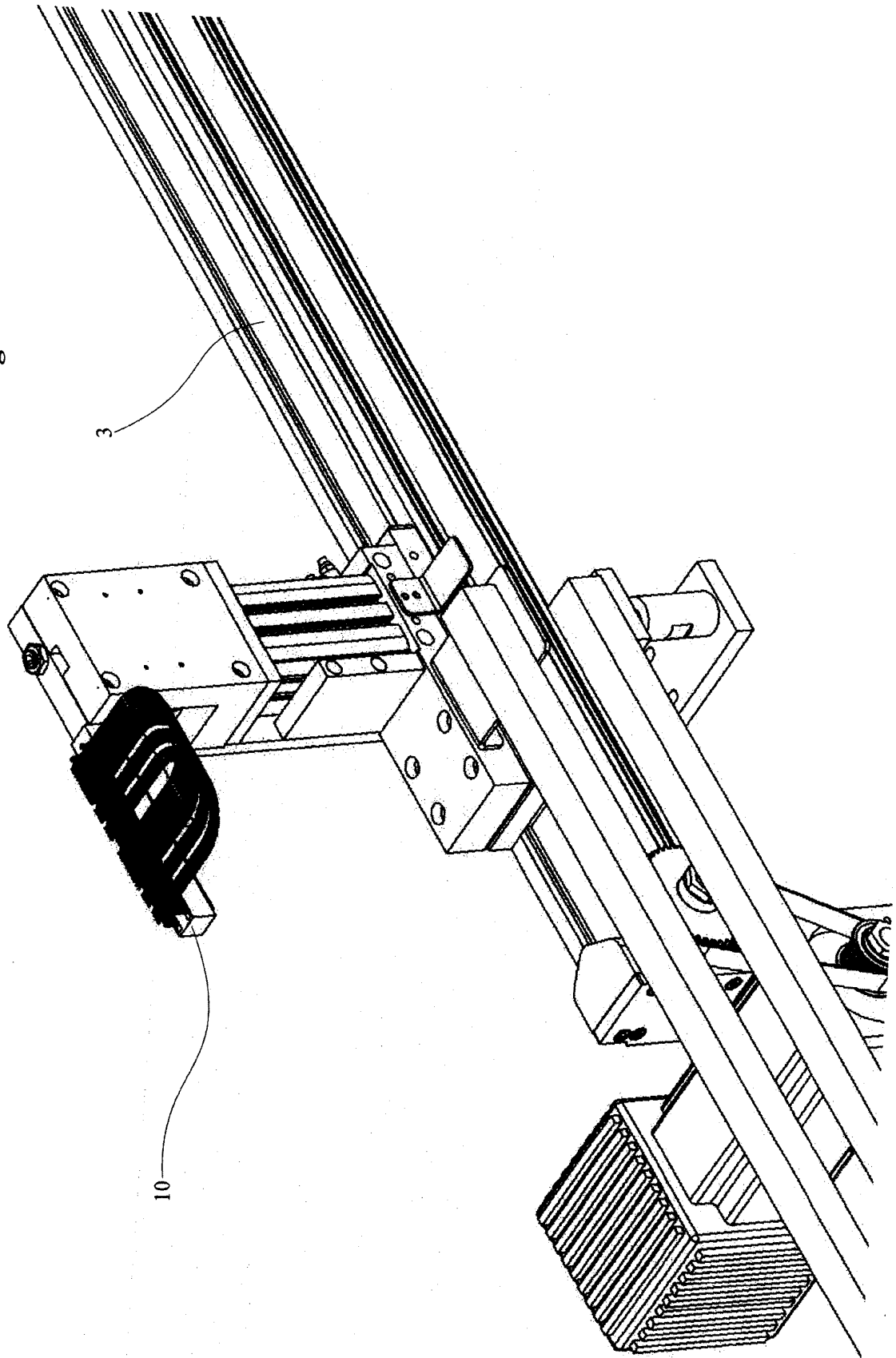


Fig. 6



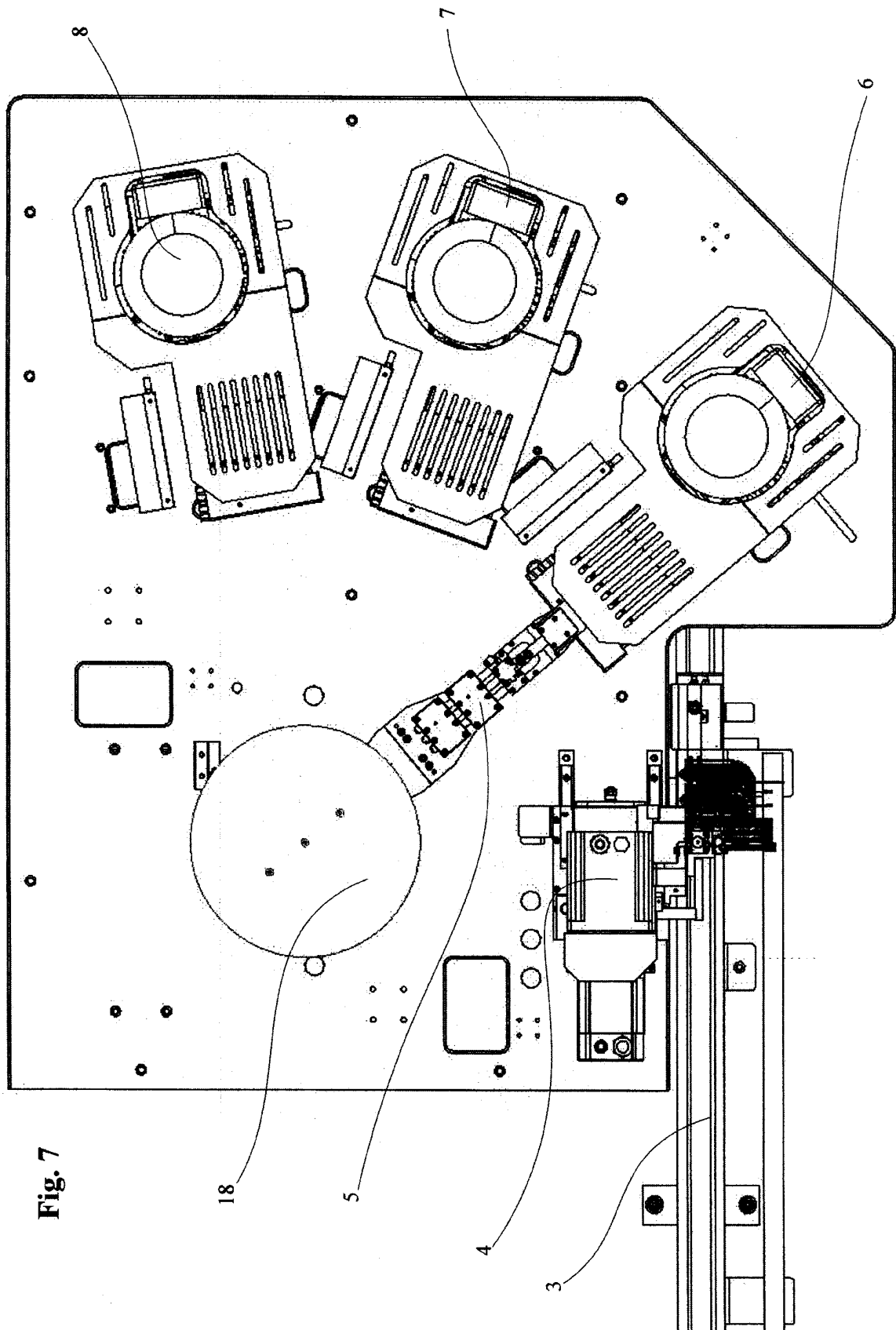


Fig. 7

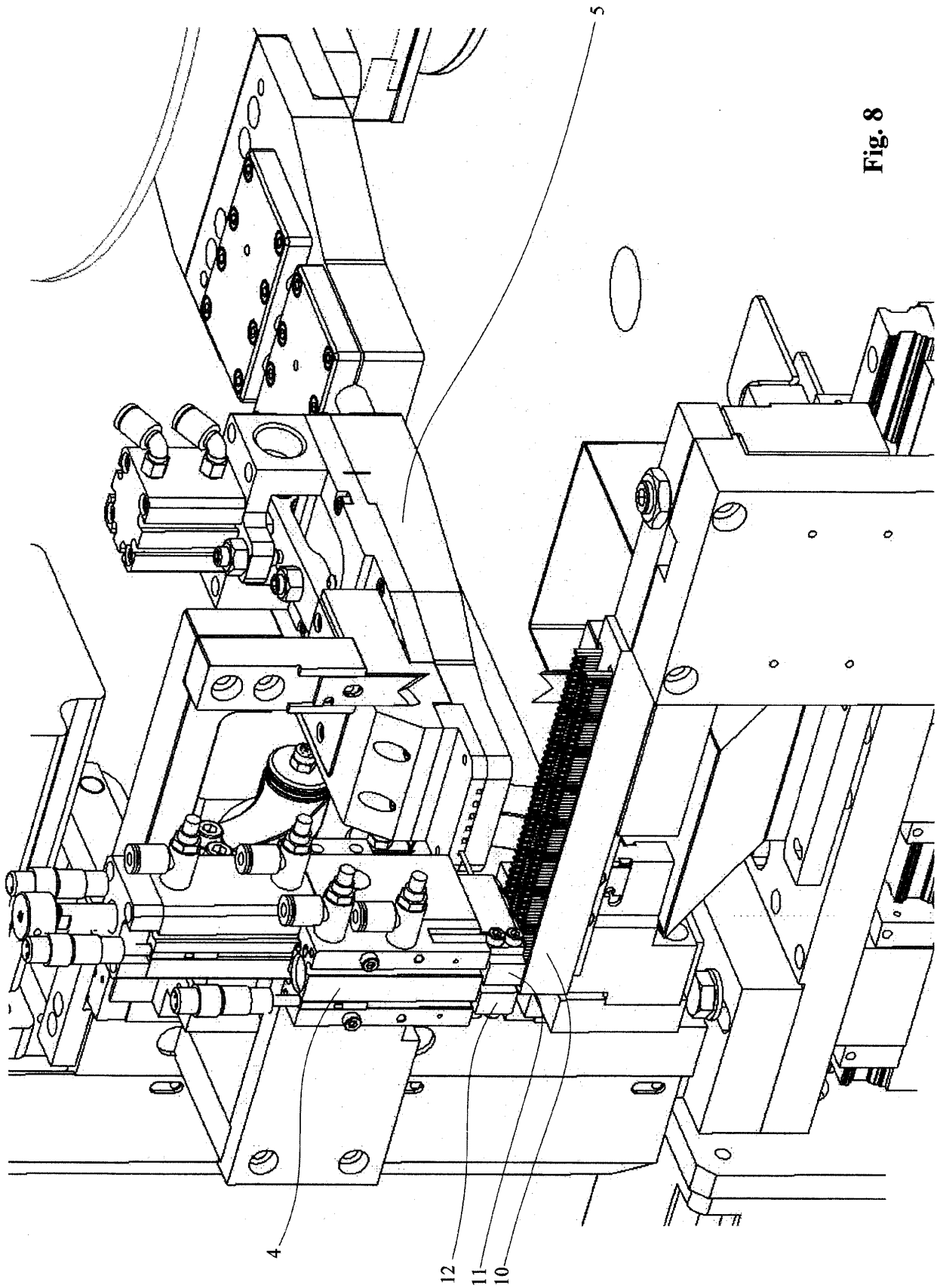


Fig. 8

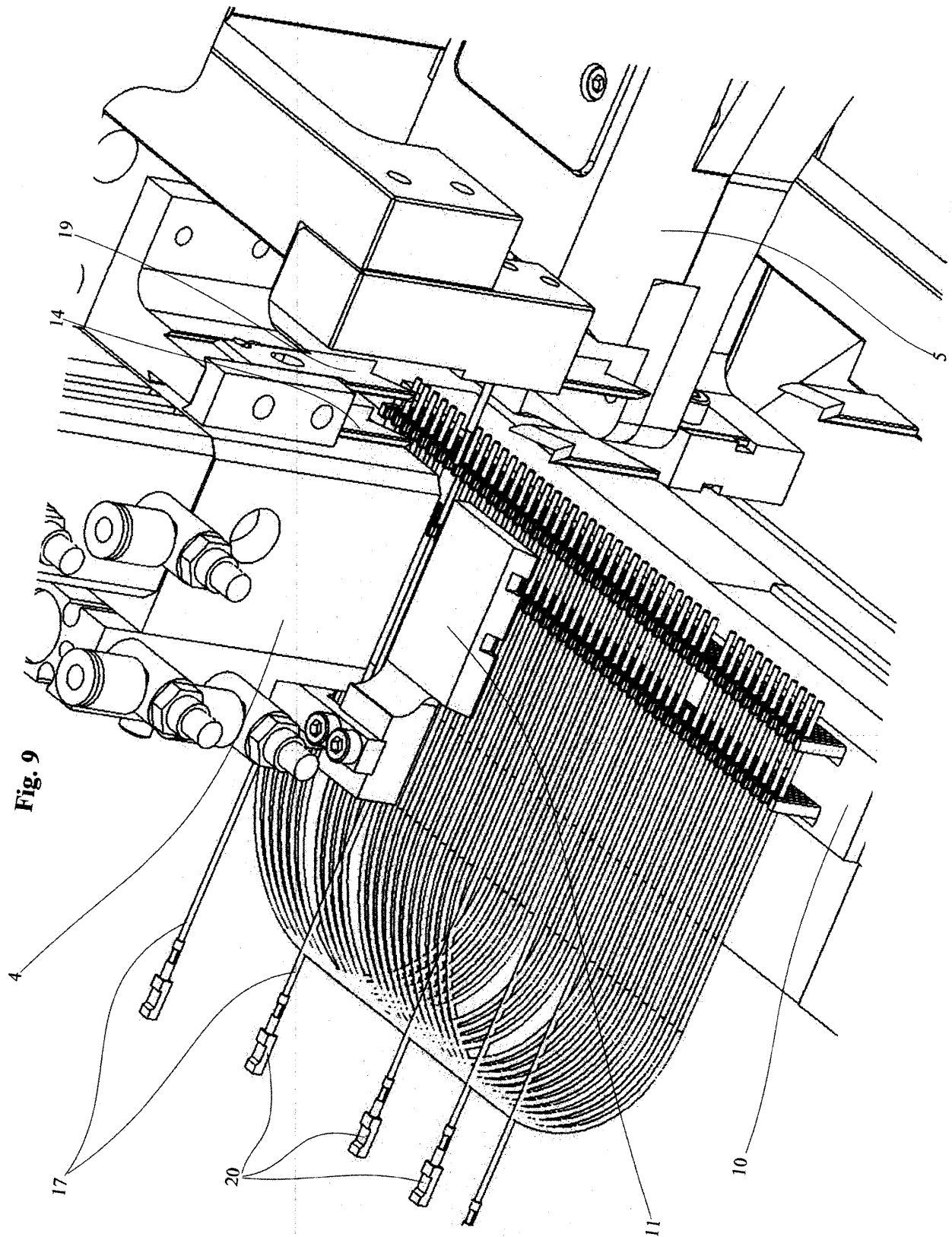


Fig. 9

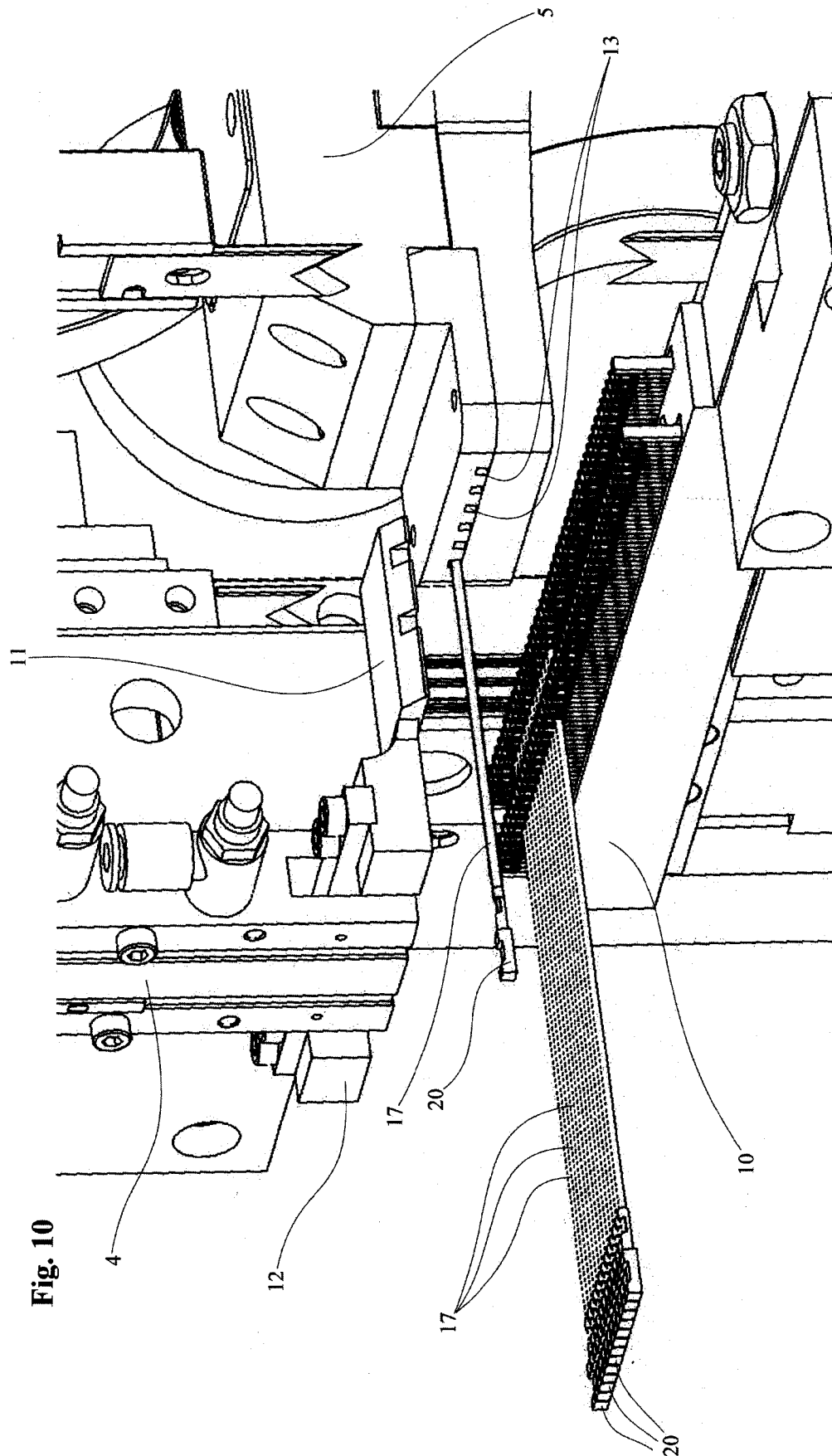
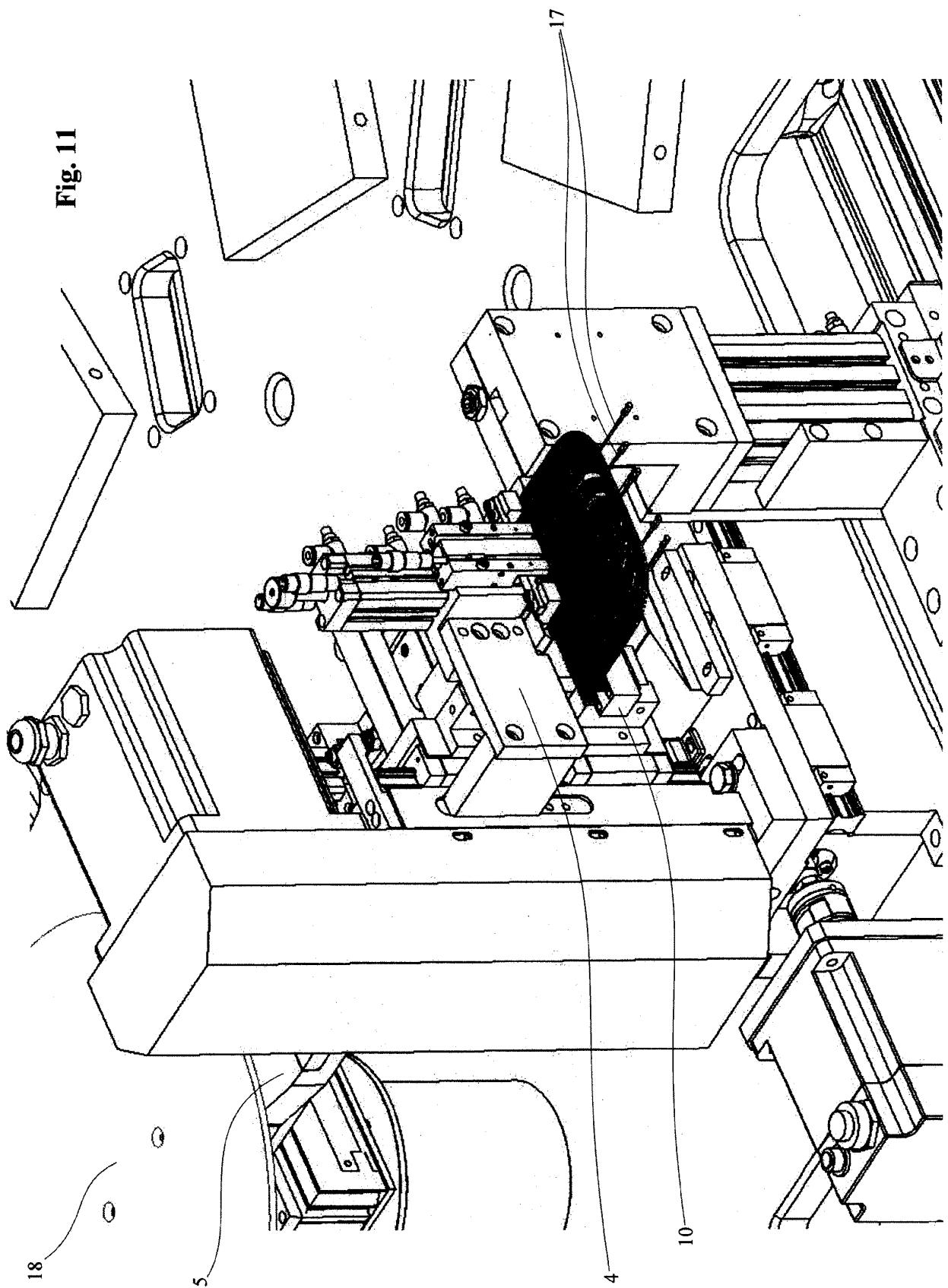


Fig. 10



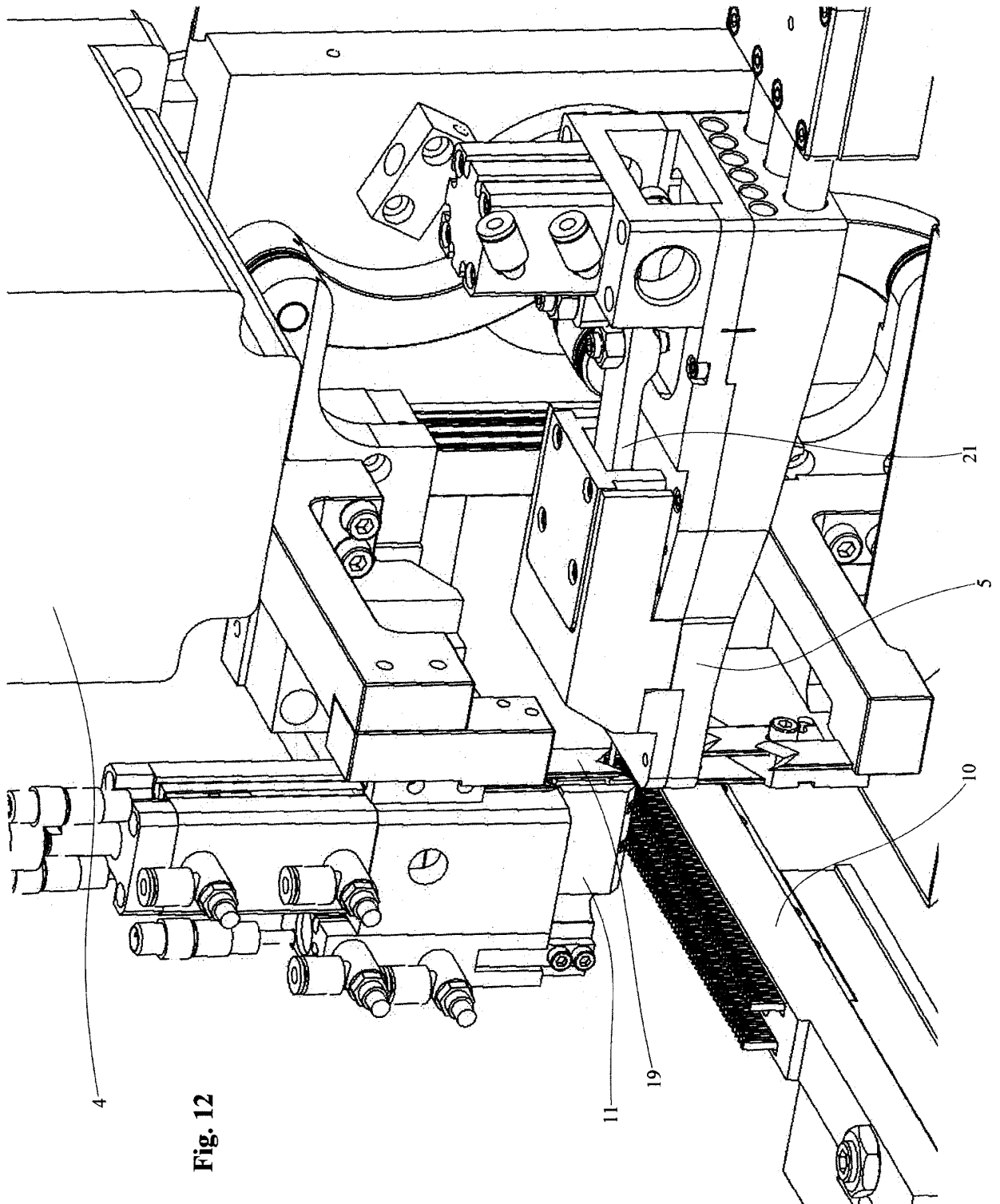


Fig. 12

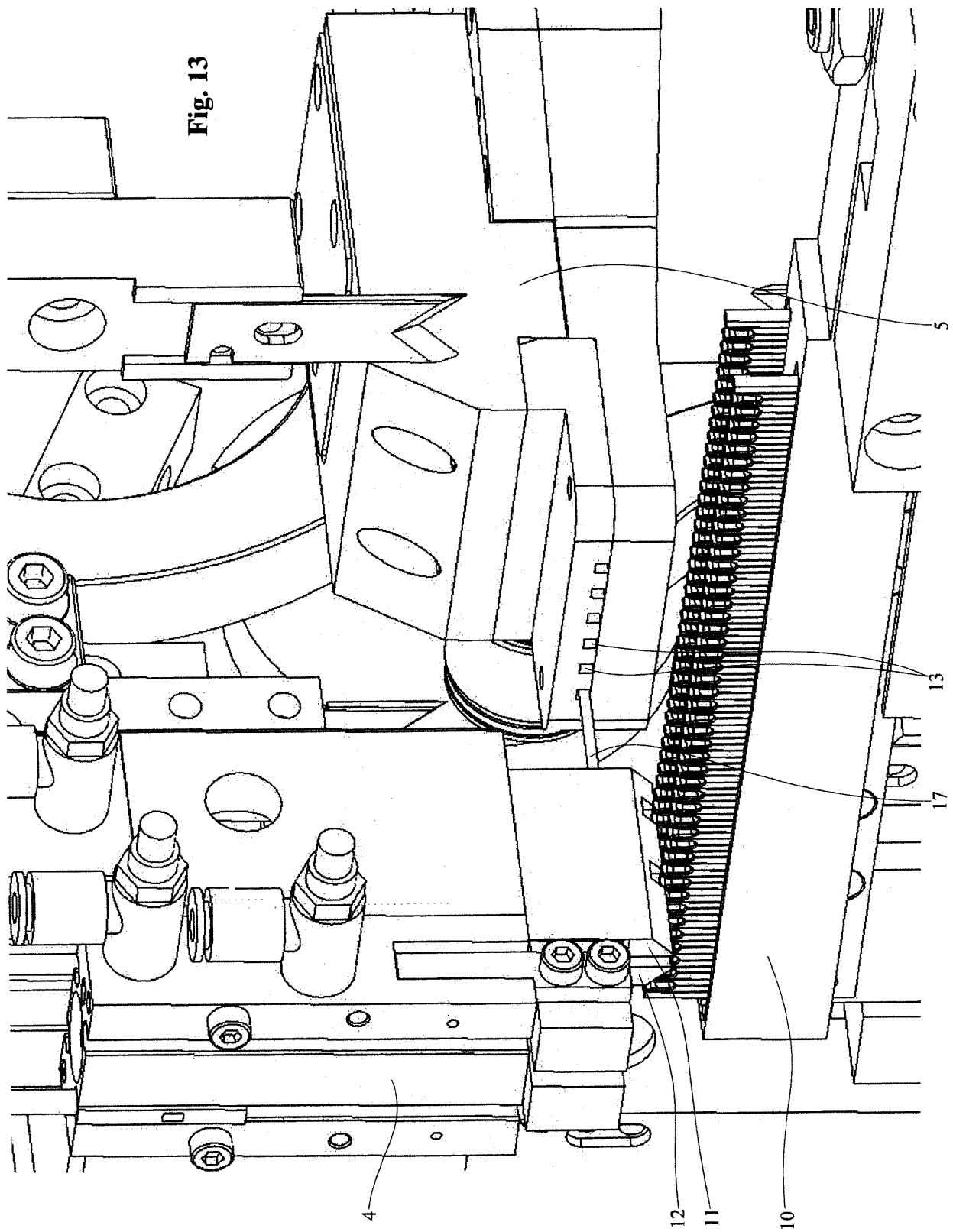
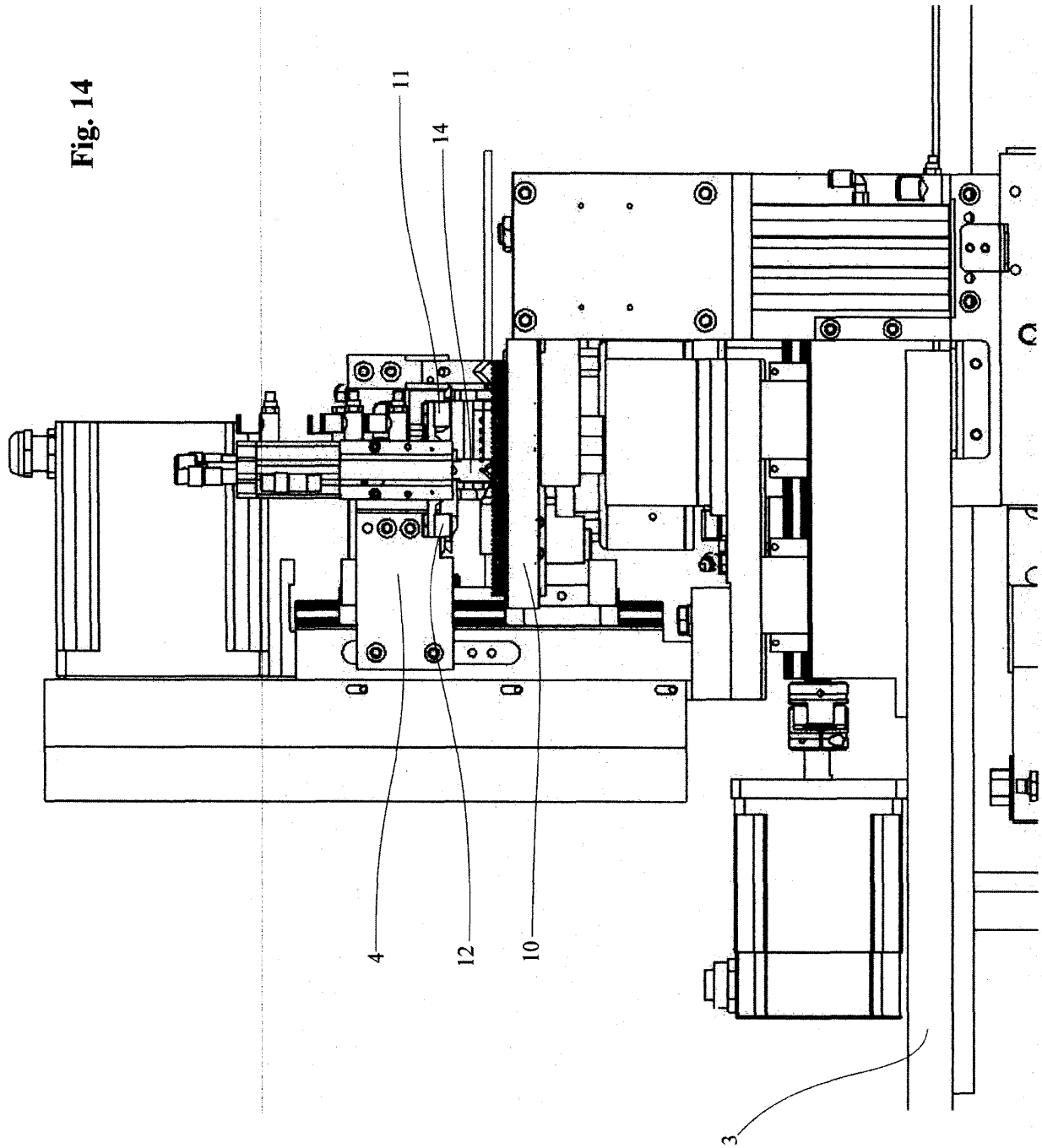


Fig. 14



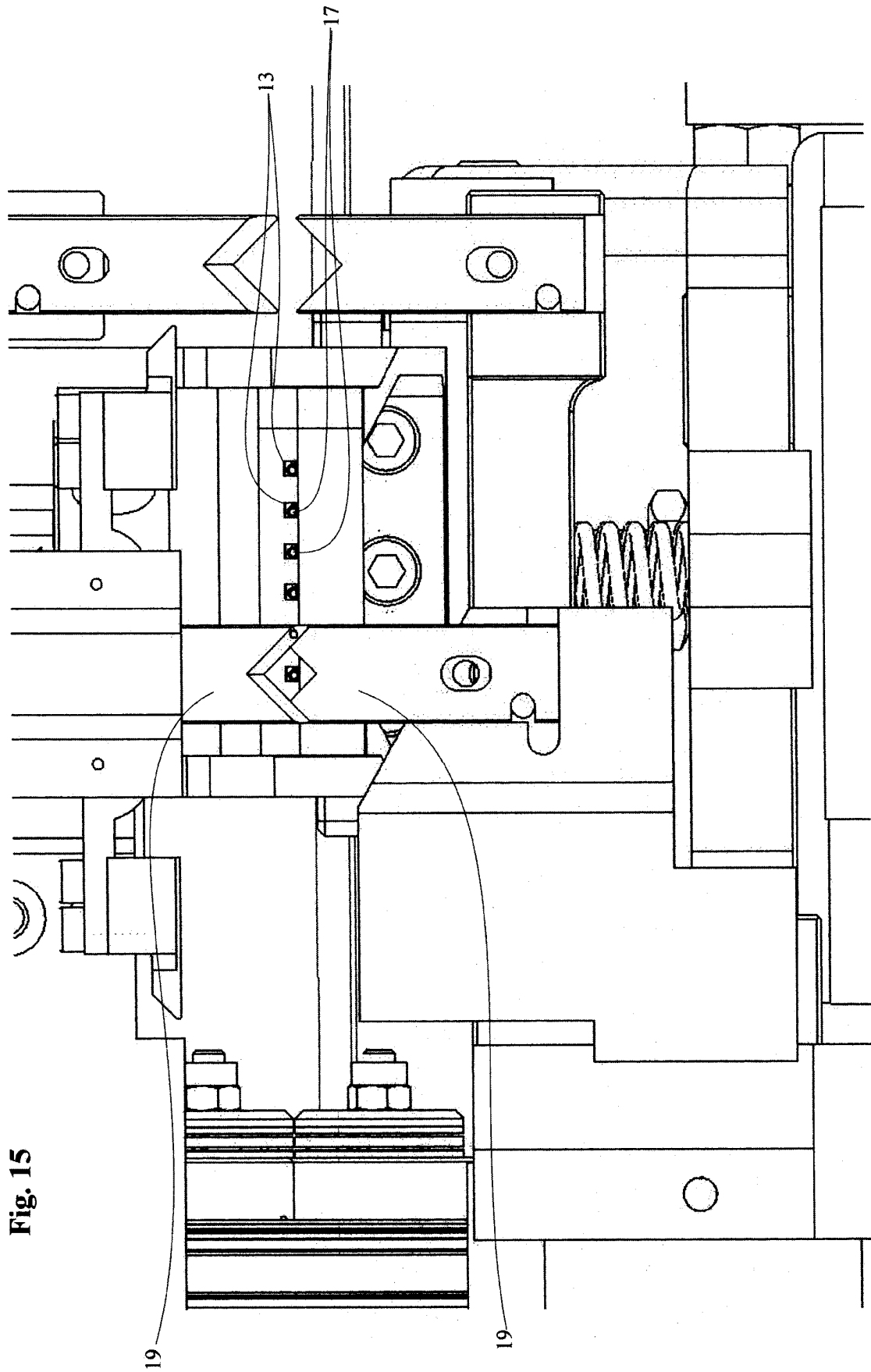


Fig. 15

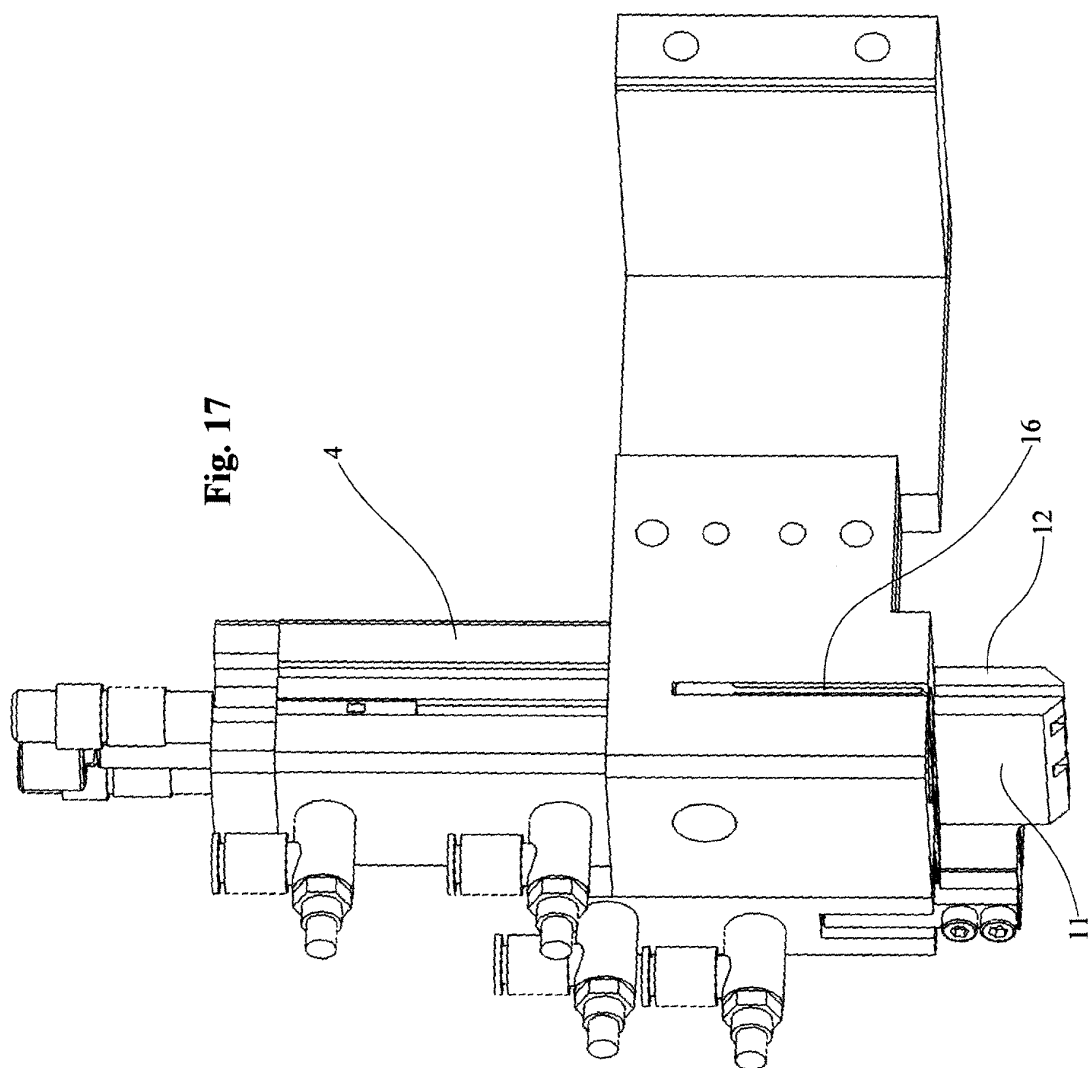


Fig. 17

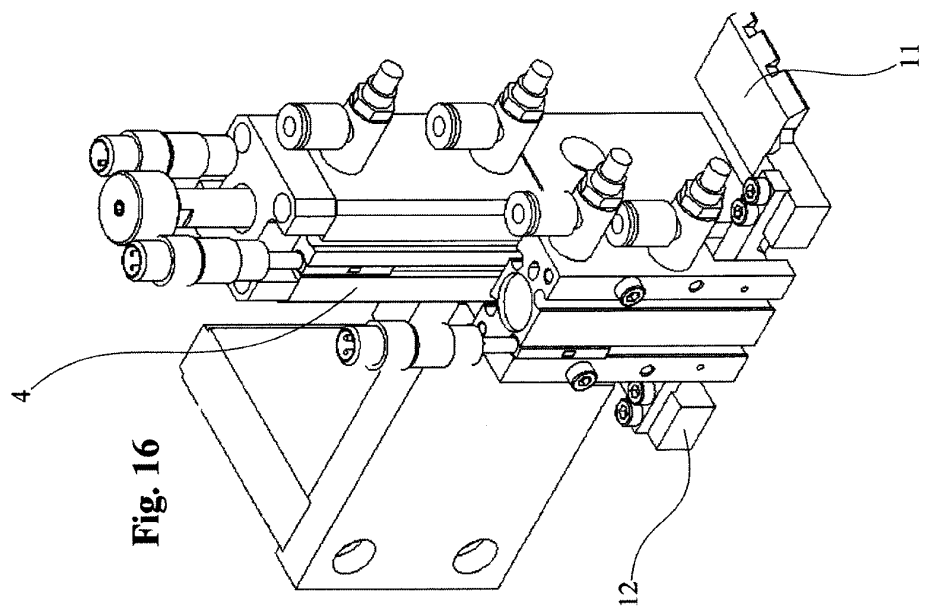


Fig. 16

Fig. 19

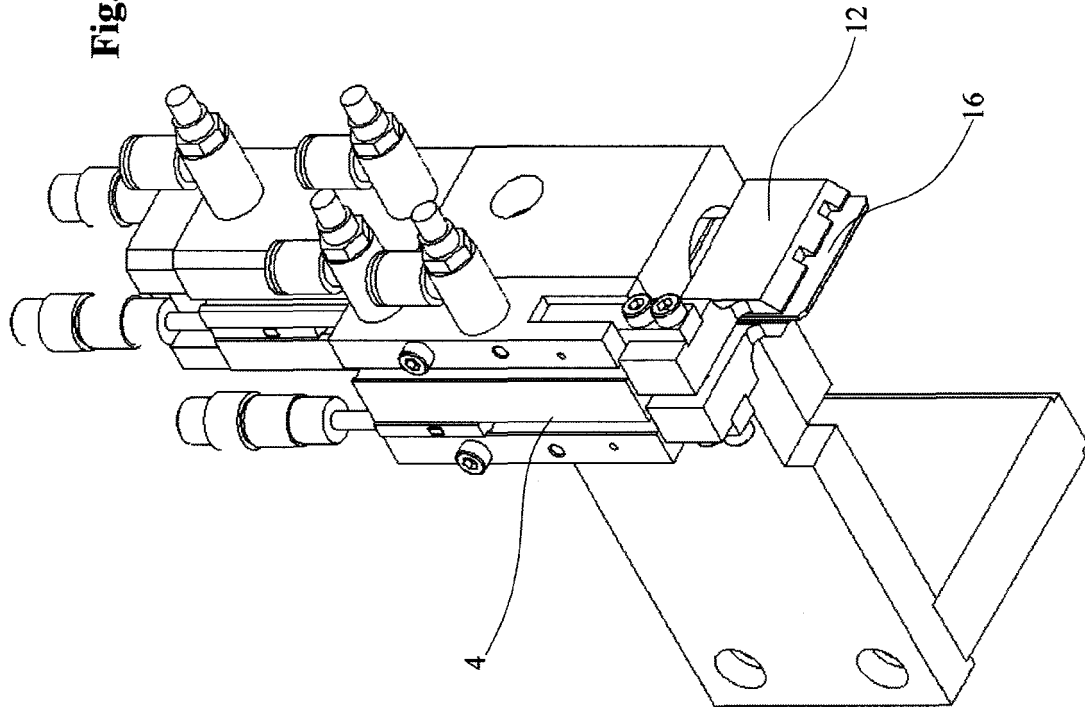
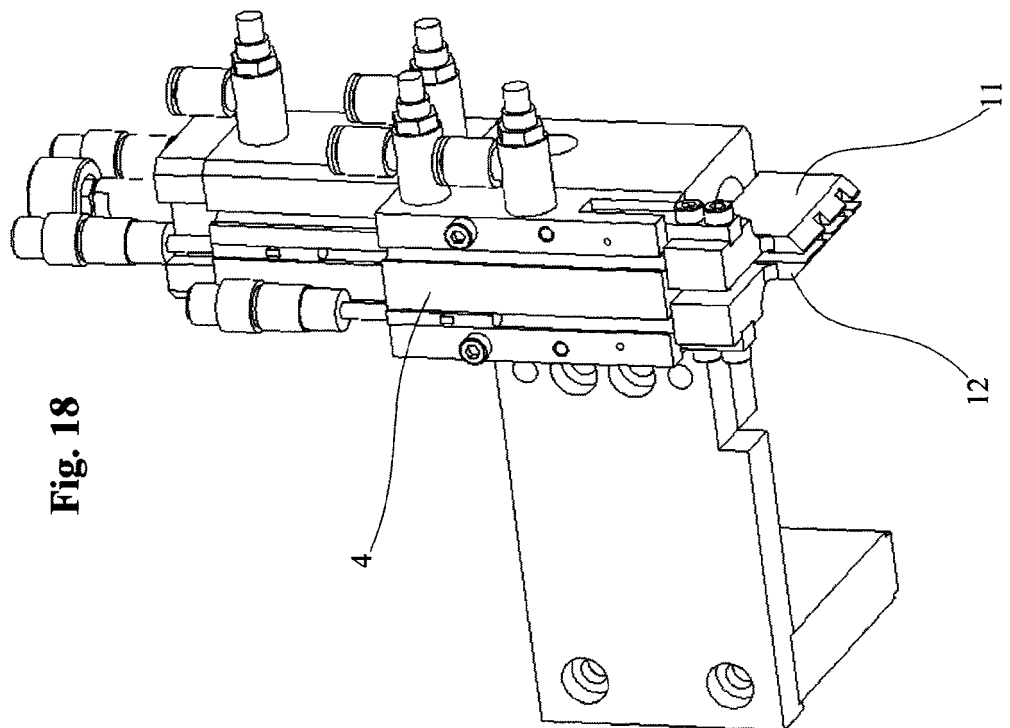
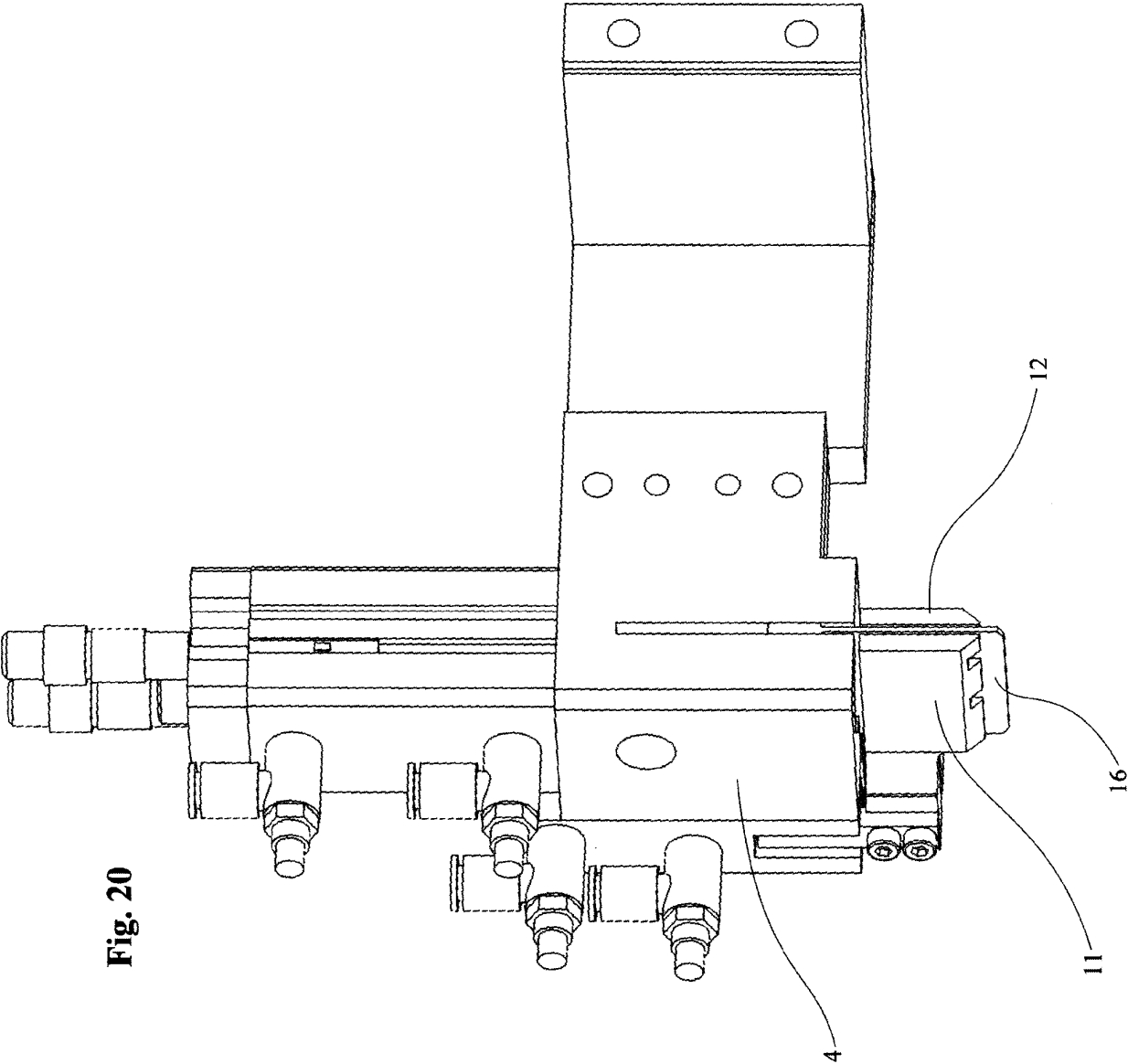
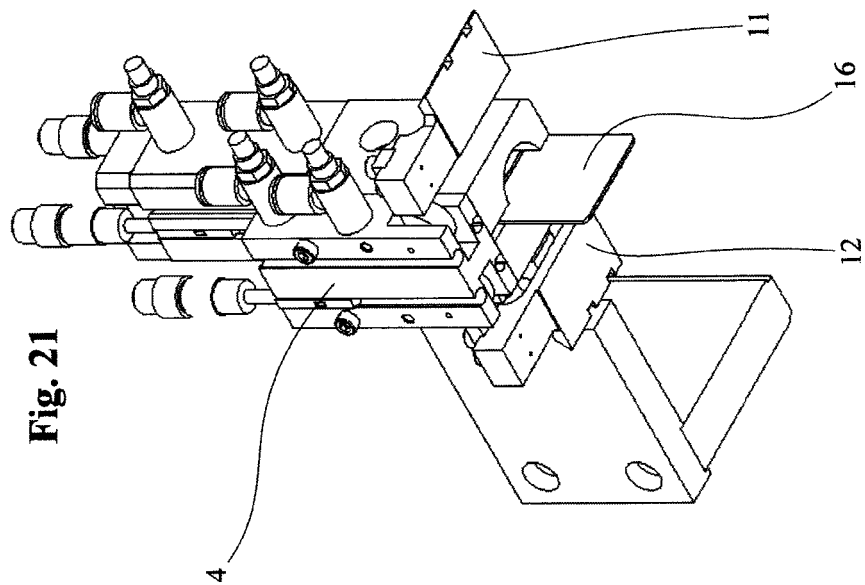
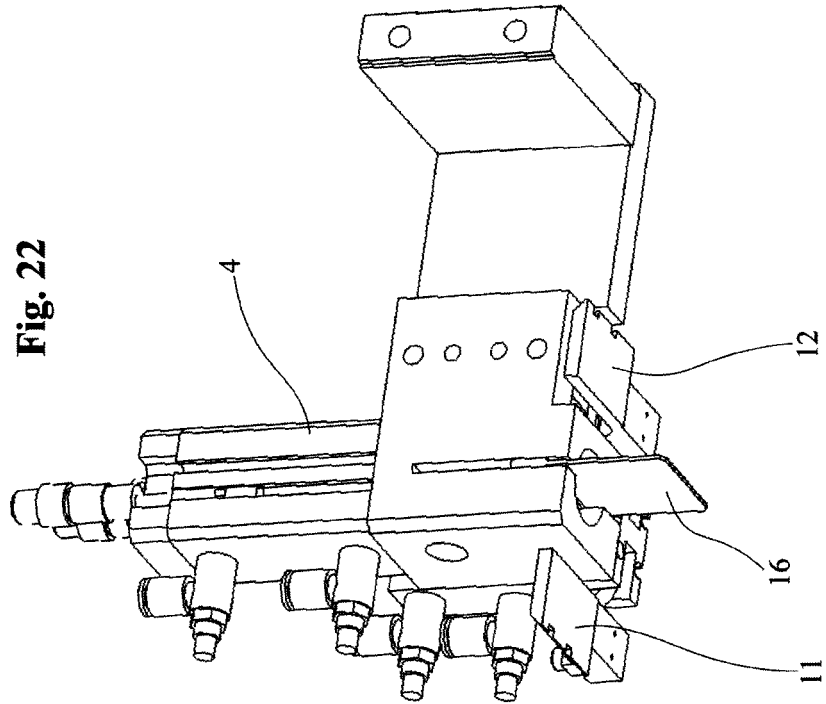


Fig. 18







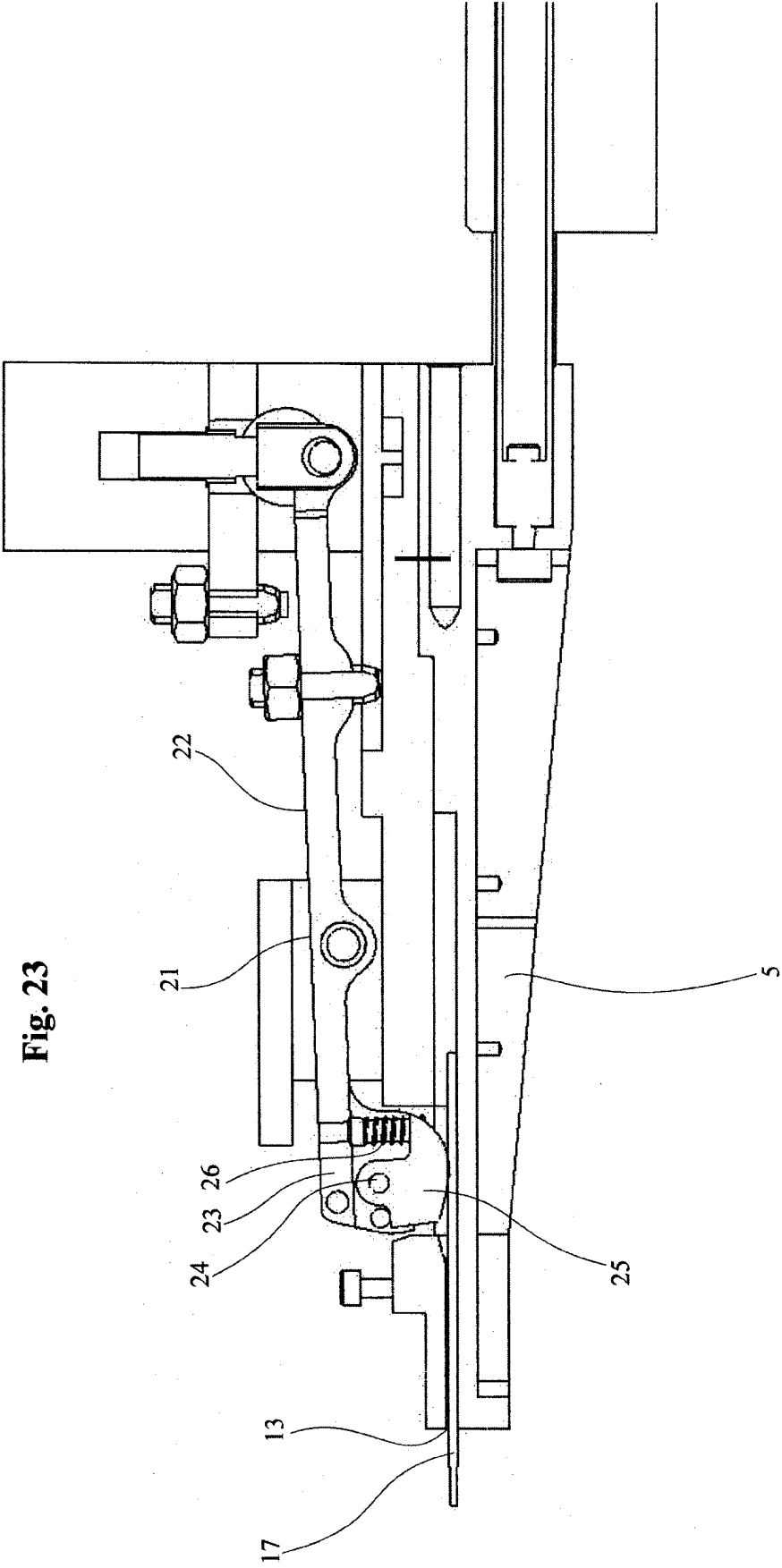


Fig. 23

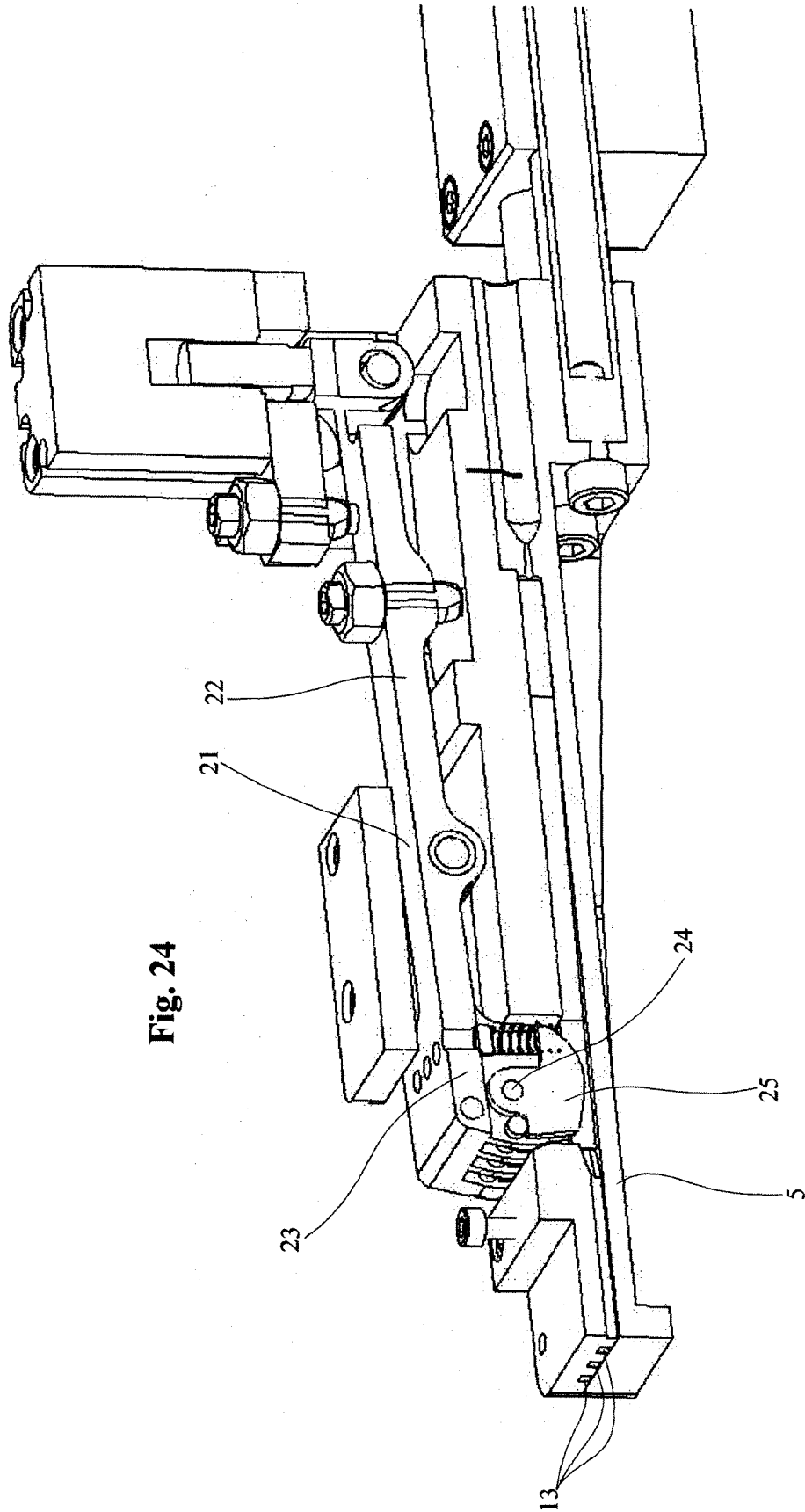
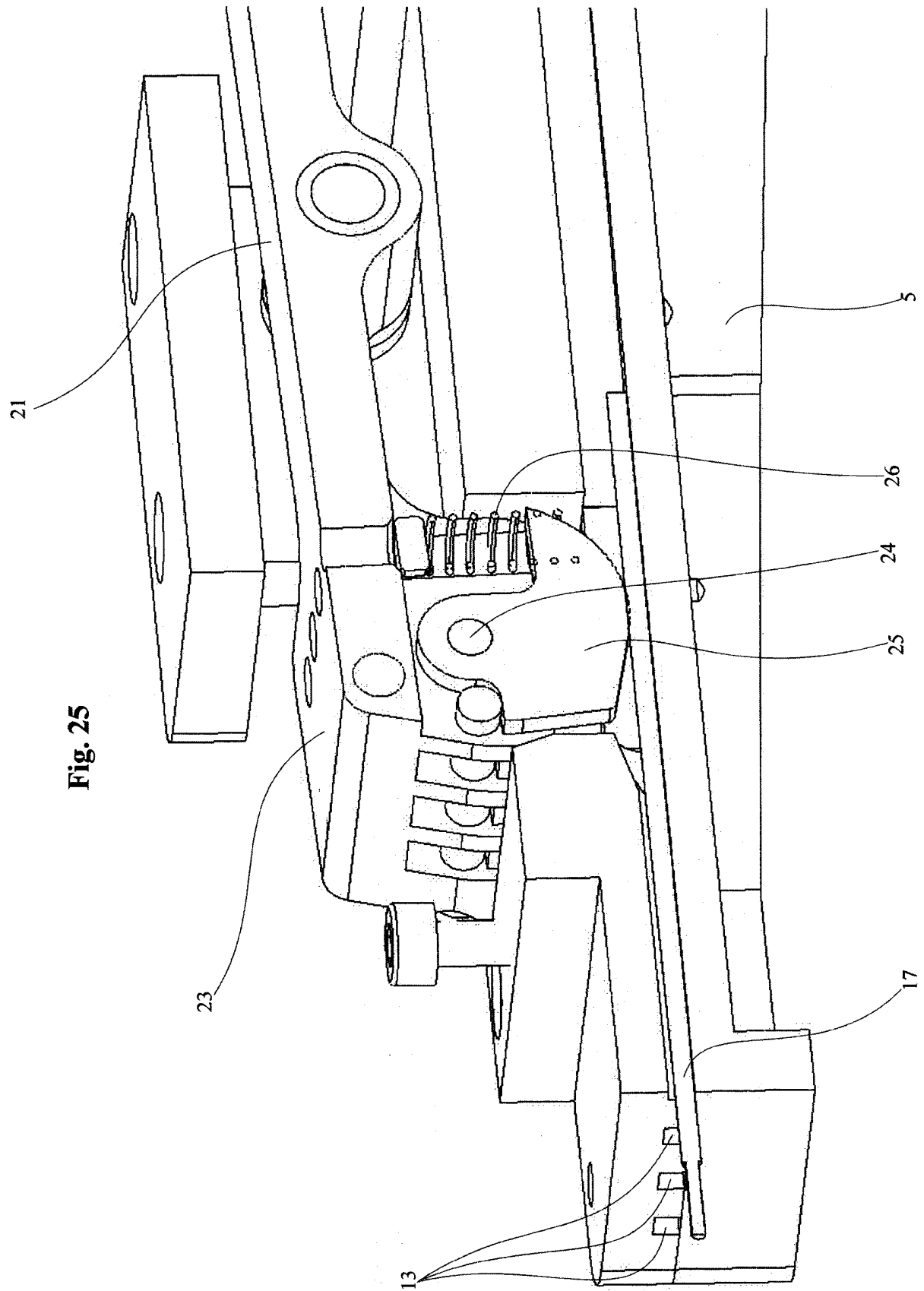


Fig. 24



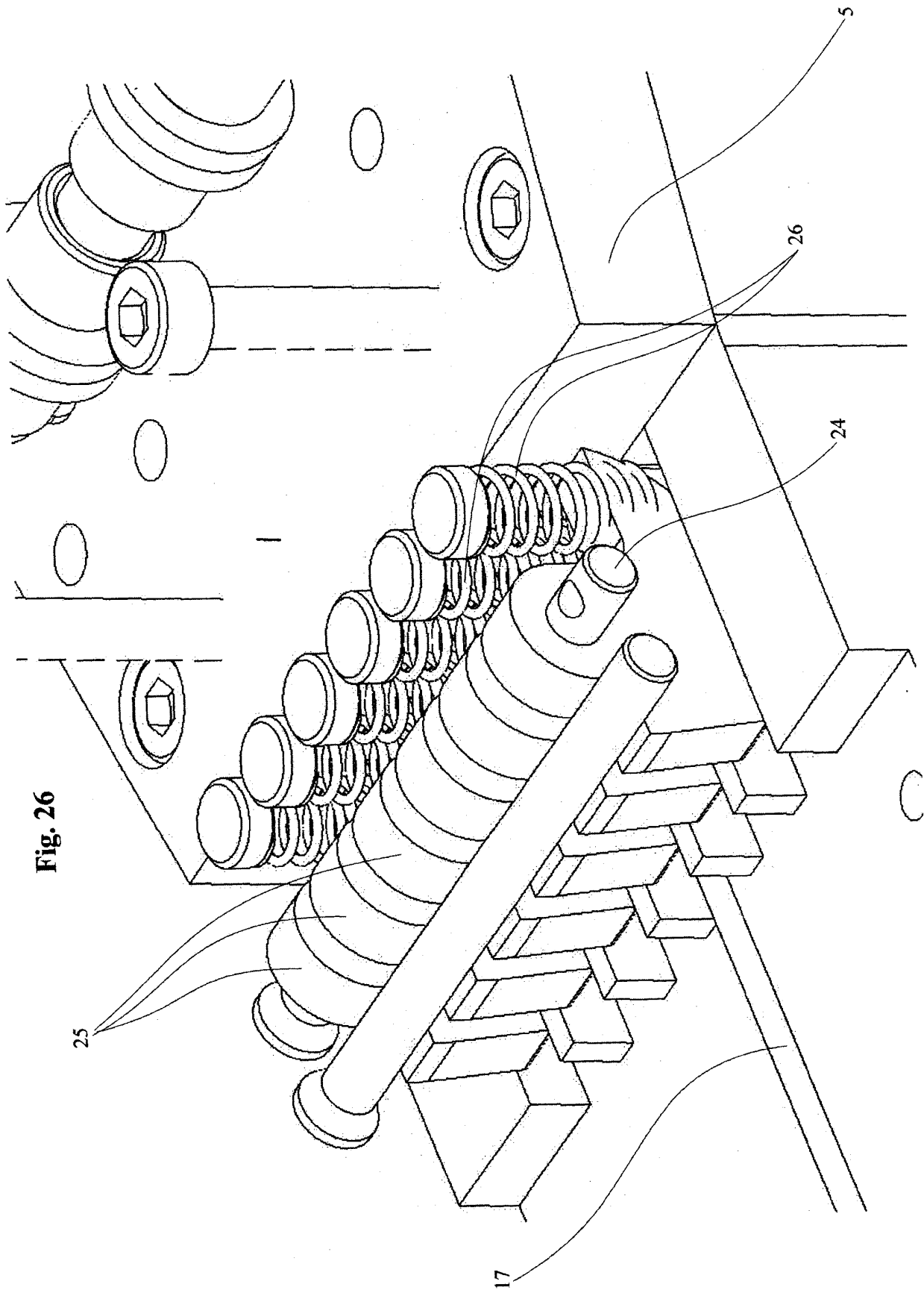


Fig. 26

REFERENCES CITED IN THE DESCRIPTION

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