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(54) **PACKING APPARATUS**

VERPACKUNGSVORRICHTUNG

APPAREIL D'EMBALLAGE

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(73) Proprietor: **Sacmi Cooperativa Meccanici
Imola Societa' Cooperativa
40026 Imola (BO) (IT)**

(72) Inventors:
• **CARNEVALI, Fabio**
40141 Bologna (BO) (IT)
• **STEFANI, Roberto**
42019 Scandiano (RE) (IT)
• **SAVORANI, Giovanni**
48018 Faenza (RA) (IT)

(74) Representative: **Villanova, Massimo**
Luppi Crugnola & Partners S.r.l.
Viale Corassori, 54
41124 Modena (IT)

(56) References cited:
EP-A- 0 994 043 EP-A- 1 481 903
DE-A1- 3 743 797 DE-A1- 4 114 896
DE-B- 1 081 372 FR-A- 2 621 895
US-A- 1 929 161

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Description

Background of the invention

[0001] The invention relates to a packing apparatus, in particular for packing flat products, such as, for example, ceramic tiles, building materials shaped as slabs and the like. Specifically, but not exclusively, the invention can be used for packing flat products of polygonal shape (for example objects with the shape of a rectangular plate) such as ceramic tiles, building materials shaped as slabs and the like, which are optionally arranged stacked.

[0002] The invention further relates to a handling device, in particular for handling cartons. Specifically, but not exclusively, the invention can be used for handling cartons (generally carton blanks) in the field of apparatuses for packing flat products of polygonal shape (for example objects with the shape of a rectangular plate) such as ceramic tiles, slab-shaped products made of a building material and the like, which are optionally arranged stacked. A non-limiting example of the use of the invention is positioning a packing carton on a side of a substantially flat and stiff product to be packaged in which two opposite longitudinal flaps of the carton are folded on the two opposite faces of the product. From WO 2007/148183 a system for packing tiles is known that prepares a number of carton blanks that is equal to the number of sides of the tile, folds the cartons along two folding lines, and assembles the cartons to create a polygonal frame that is associated with the perimeter of the tile.

[0003] Document DE 4114896 A1 discloses an apparatus from which the subject-matter of claim 1 differs in that it comprises a first and a second supporting means pressing a flap of the carton in a second operating configuration.

Summary of the invention

[0004] An object of the invention is to provide a packing system for packing products that is able protect the products effectively (in particular during conveying and/or storage). Another object is to protect the corners of flat products of polygonal shape.

[0005] A further object is to provide a packing with high productivity.

[0006] Still another object is to obtain packing of flat products with a relatively reduced quantity of packing material (carton).

[0007] An advantage of the invention is to enable effective packing of flat products with carton blanks, avoiding the use of glue.

[0008] Another advantage consists of providing a method/packing apparatus that is able to reduce the overall dimensions of the packing material store.

[0009] A further advantage is to make a method/packing apparatus that is able to adapt easily and practically

to various sizes of products, particularly of flat products.

[0010] Still another advantage is to provide packing that is simple and cheap to implement.

[0011] An advantage is to provide a packing system for packing products that is able to adapt easily to the change in the size of the products.

[0012] An advantage is to provide packing of great productivity and versatility.

[0013] An advantage is to make a packing apparatus that is able to adapt easily and practically to various products sizes, particularly to flat products of different widths.

[0014] A further object of the invention is to provide a handling device for handling objects (such as cartons or other objects that are usable for packing) that is adaptable to objects of various sizes.

[0015] An advantage of the invention is to make a handling device, in particular for packing apparatuses for packing flat products by carton blanks, that is able to adapt easily and practically to various product sizes, in particular to flat products of various thicknesses.

[0016] Still another advantage is to provide a manipulator that is simple and cheap to implement.

[0017] Such objects and advantages and still others are achieved by one or more of the following claims.

Short description of the drawings

[0018] The invention can be better understood and implemented with reference to the attached drawings that illustrate some non-limiting examples thereof.

Figure 1 shows an embodiment of the packing apparatus.

Figure 2 is a side view of the apparatus in figure 1.

Figure 3 is a view from the left of figure 2.

Figure 4 is a top plan view of the apparatus in figure 1.

Figure 5 shows the frame that supports the stations 3 and 4 of the apparatus in figure 1.

Figure 6 shows the carton movement means of the apparatus in figure 1.

Figure 7 is an enlargement of figure 6.

Figures 8A to 8C show three steps in sequence of the movement of a carton from a store to the side edge of the product to be packaged.

Figure 9 shows the abutment means of the upper flap of the cartons of the apparatus in figure 1.

Figures 10A to 10C show three steps in sequence of the folding of the longitudinal flaps of a carton on the faces of the product to be packaged, with some parts that are not shown to better show other parts thereof.

Figures 11A to 11C are three enlargements of figures 10A to 10C.

Figure 12 shows the first supporting means that supports in position the product to be packaged before folding of the lower longitudinal flap on the lower face of the product.

Figure 13 shows the second supporting means that

supports in position the product to be packaged after folding of the lower longitudinal flap.

Figure 14 shows the stores of the cartons of the apparatus in figure 1.

Figure 15 shows the means for binding the products of the apparatus in figure 1.

Figure 16 shows the station for preparing the products to be packaged of the apparatus in figure 1.

Figures 17A to 17C show three steps in sequence of a first example of packing of a product.

Detailed description

[0019] With reference to figures 1 to 4, with 1 has been indicated a packing apparatus overall, with 2 a product preparing station, with 3 a carton applying station, with 4 a band applying station. The products to be packaged, which can be in particular be products of flat shape (such as, for example, slabs, ceramic tiles, piles of tiles and the like), enter the preparing station 2, thus pass first to the carton applying station 3 and then to the band applying station 4 and lastly leave the apparatus 1. Both the entry of the products to be packaged and the exit of the packaged products is achieved by conveying means of known type that is not disclosed in detail.

[0020] With reference to figure 5, with 5 has been indicated a (rectangular) frame that optionally supports both the carton applying station 3 and the band applying station 4. The frame 5 optionally comprises two parallel and opposite sides 6. The sides 6 extend in length between stations 3 and 4. The sides 6 are optionally parallel to an advance direction F of the products from the station 3 to the station 4. The sides 6 are optionally movable in relation to one another such that the mutual distance is adjustable in order to adjust the width of the operating zone of the stations 3 and 4. This enables the apparatus to be adapted to products of a different width. The sides 6 are optionally slidable on at least two guides 7. The guides 7 are guides that are optionally linear and perpendicular to the advance direction of the products. The guides 7 are optionally carried by a base 8 of the frame 5. The base 8 optionally has the shape of a horizontal rectangular frame. Each side 6 optionally carries a supporting structure 9 that in turn carries the operating means (not shown in figure 5) of the carton applying station 3, as will be explained better below. Each supporting structure 9 has optionally at least partially a portal structure. The two movable sides 6 are connected to a movement system (not illustrated) configured for moving in a coordinated manner the two sides 6. The movement system optionally operates so as to maintain the two sides 6 arranged specularly with respect to a median axis of advance of the products. The movement system optionally comprises a working-screw movement device (for example with two working screws, one right-hand one and the other one a left-hand one, to provide the aforesaid specularity) and a device for transmitting motion to a flexible member (chain) configured for enabling the move-

ment system to be controlled by a single working member.

[0021] With reference to figures 6 and 7, with 10 have been indicated two carton-moving devices. Optionally, the devices 10 are arranged specularly in relation to the cartons advance axis. Each device 10 optionally comprises a plurality of suction cup members 11 and a plurality of pairs of pushing members 12. The suction cup members 11 are configured for moving the cartons. The pairs of pushing members 12 are configured for folding two opposite flaps of the cartons. The cartons are positioned in a store 13 that houses the cartons 14, which are optionally arranged stacked on top of one another. The suction cup members 11 are movable with the possibility of assuming a position for removing cartons from the store (for example from the bottom of the store) and an approaching position for making the removed carton approaching a side edge of the product to be packaged positioned in the station 3.

[0022] Each device 10 optionally comprises a first support 15 provided, at opposite ends, with two pins 16, each of which can be rotatably coupled with a support 17 for rotation that is optionally carried by the structure 9. The two pins 16 are optionally coaxial. The first support 15 is optionally provided with the possibility of rotating (with respect to the structure 9) around a horizontal rotation axis (defined by the axis of the two pins 16). The first support 15 can rotate (at least by a rotation angle of approximately 90°) on the command of at least one actuator 18. The actuator 18 optionally comprises a linear actuator having an axially movable part that is hinged on the first support 15 around a pin with an axis that is parallel to and spaced apart from the rotation axis of the first support 15. The first support 15 optionally comprises a beam element extended in length having longitudinal axis optionally coinciding in substance with the rotation axis thereof. Each device 10 optionally comprises a second support 19 that is movable in relation to the first support 15. The second support 19 is optionally slidable with respect to the first support 15 on linear guides 20. The second support 19 can slide in relation to the first support 15 according to a sliding direction that lies on a plane that is optionally perpendicular to the rotation axis of the first support 15. The second support 19 can optionally slide in relation to the first support 15 on command of one or more actuators 21 (of linear type). The second support 19 optionally has the members 11 and 12. The suction cup members 11 are optionally mounted (to the second support 19) with the possibility of axial sliding (this sliding being optionally parallel to the sliding axis of the second support 19). Each suction cup member 11 can be movable (with respect to the pushing members 12) with the possibility of assuming an advanced position and a retracted position and can be operationally associated with an elastic element 22 (spring) that optionally maintains the member 11 in an advanced position. The suction cup members 11 are optionally arranged on two opposite rows (one for each side of the product). Each group (row)

of suction cup members 11 optionally defines a fluid-sucking gripping plane. The pushing members 12 are optionally arranged on four opposite rows (two for each side of the product). Each group (row) of suction cup members 11 optionally defines a (horizontal) pushing line that is parallel to the aforesaid gripping plane and is used to fold a longitudinal flap of a carton. On each side of the product two groups of pushing members 12 are optionally arranged, the two groups being optionally arranged on opposite sides with respect to the suction cup members 11. Each pushing member 12 optionally comprises an elongated body with a longitudinal axis perpendicular to the gripping plane defined by the suction cup members 11.

[0023] Each row of pushing members 12, as well as the row of the suction cup members 11 (in an example that is not illustrated it is possible to provide for the use of two or more rows or groups of suction cup members that are parallel to one another and optionally defining the same gripping plane), is mounted optionally on a respective supporting beam 34 (for example horizontal as in the illustrated example). One, or more, of such supporting beams 34 (for example at least a supporting beam 34 of the pushing members 12 as in the illustrated example) is configured with the possibility of positioning so as to adjust the distance between the rows of members. In the specific case a row of pushing members 12 is mounted on a supporting beam 34 extended in length and is in turn mounted with the possibility of sliding and being removably fixed in a desired position along one or more guides 35 (for example linear, optionally sliding, guides that are perpendicular to the row of pushing members 12 and/or parallel to the gripping plane defined by the suction cup members 11). Each device 10 is thus optionally configured to enable the distance between two rows of pushing members (folders) and/or the distance between two rows of gripping members (positioners) and/or the distance between a row of pushing members (folders) and a row of gripping members (positioners) to be adjusted. This enables adaptation of the device 10 to various product sizes T to be facilitated, in particular in function of the height or thickness of the product and consequently in function of the width of the carton to be handled.

[0024] The members 11 and 12 can perform the sequence of movements illustrated in figures 8A to 8C. In a first step (figure 8A) the first support 15 is positioned such that the suction cup members 11 face upwards (the actuator 18 is in an elongated position) and can remove (by linear movement guided by the actuators 21) the carton placed at the base of the store 13. In a second step (figure 8B) the first support 15 is rotated whilst the suction cup members 11 retain the carton 14. In a third step (figure 8C) the carton 14 is placed alongside a side edge of the product T to be packaged, the suction cup members 11 are advanced (driven by the actuators 21) as far as contact with the side edge of the product, after which the pushing members 12 continue to advance (still driven by

the actuators 21, whilst the elastic elements 22 are compressed to enable mutual movement between the suction cup members 11 and the pushing members 12, the members 11 pressing the carton against the edge of the product) to fold the two external flaps (opposite, one above and the other below) of the carton on the two faces of the flat product T.

[0025] The station 3 optionally comprises, on each side, an abutment device 23 (figure 9) mounted on the respective supporting structure 9. The devices 23 are optionally arranged opposite one another specularly (with respect to the working position of a product and/or with respect to the advance axis of the products). The device 23 is configured for maintaining in position (against the upper face of the product) the upper flap folded by the pushing members 12. Each device 23 optionally comprises an abutment element 24 extended along the side edge of the product T and provided with a horizontal flat surface configured for maintaining the upper flap of the carton folded in position towards the upper face of the product. The abutment element 24 is optionally vertically movable on command of one or more actuators 25. The abutment element 24 is optionally provided with openings 26 to enable (if necessary) the pushing members 12 and/or the suction cup members 11 to pass.

[0026] The apparatus 1 optionally comprises a first conveyor 27 (for example of the chain type or another closed-loop flexible conveying element) for conveying the products from the station 2 to the station 3 and optionally a second conveyor 28 (for example of the belt type or another closed-loop flexible conveying element) for conveying the products from the station 3 to the station 4.

[0027] Optionally, the first conveyor 27 and/or the second conveyor 28 are configured to move the product T parallel to itself, in particular by maintaining the product in a horizontal configuration.

[0028] In the station 3 the product is optionally transferred from the first conveyor 27 to the second conveyor 28, as illustrated in figures 10A to 10B, which also illustrate the operation of the abutment devices 23 of the upper flaps of the carton 14. It should be noted that the second conveyor 28 can operate as an abutment element for the lower flaps of the carton 14.

[0029] In a first step (figures 10A and 10B) the product in a horizontal position rests on the first conveyor 27, which acts in contact with a more internal zone of the product, whilst the second conveyor 28 has an end zone that is alongside an end zone of the first conveyor 27. The second conveyor 28 is arranged more outside the product than the first conveyor and is spaced apart from the lower face of the product so as to enable the lower pushing members 12 and the lower flap of the carton to be inserted.

[0030] In a second step (figure 10C) the second conveyor 28 enters into contact with the lower flap (through the effect of a mutual movement in a vertical direction of

the two conveyors 27 and 28, made, for example, by lifting the second conveyor 28 and/or lowering the first conveyor 27) immediately after (or whilst) the pushing members are retracted to leave space for the second conveyor 28. The abutment devices 23 are lowered to maintain the upper flap folded in position, whilst the lower flap is pressed (at least through the effect of the weight of the product) between the product T and the second conveyor 28. The lower flap thus remains pressed even during conveying to the subsequent station 4, where packing bands are applied to the product that laterally tighten the cartons onto the product, maintaining both flaps and also the rest of the carton locked in position.

[0031] In figures 12 and 13 there are illustrated the two conveyors 27 and 28.

[0032] In figure 14 the two stores 13 are illustrated that are configured for receiving the piles of cartons 14 to be applied to the sides of the products in the station 3. Each store 13 optionally comprises four corner walls 29, extending vertically, which are optionally mutually arranged rectangularly. The walls 29 are optionally mounted on a frame (of rectangular shape with at least a side that is movable and fixable in a desired position) with the possibility of adjusting the two dimensions of the aforesaid rectangle. In particular the four walls 29 can be arranged, in pairs, on two bars of the frame that are parallel to one another and arranged at an adjustable reciprocal distance. Each wall 29 is optionally slidable on the respective bar of the frame and is fixable on the bar in the desired position to enable the store 13 to receive various sizes of cartons 14.

[0033] In figure 15 a device 30 for applying bands is illustrated that is operating in the station 4. The device 30 optionally comprises a portal structure that has two tools 31 configured for applying bands or straps around the products. Each tool 31 wraps one band as a loop and tightens the band laterally around a product so as to retain the cartons applied to the side edges thereof. The structure and the operation of the tools 31 are substantially known and do not require further explanations. It should be noted that the bands applied around a product can act as handles (this can be facilitated by the fact that the central part of the upper face of the product is free from cartons).

[0034] In figure 16 there is illustrated in greater detail the product preparing station 2, where the products are prepared for the next station 3. In the station 2 the products are advanced in an intermittent manner one after another and then, especially if the product comprises a pile of superimposed stiff products, such as ceramic tiles and the like, the products are compacted transversely and/or axially by compacting means that may comprise, for example, a frontal abutting element 32 (comprising two abutments extending vertically and placed alongside one another) so as to position the products in a preset reference position. The products are further optionally compacted transversely, aligned and centred with respect to the advance axis by two movable lateral abutting

elements that operate in contact with the side edges of the product. The station 2 can be provided with means for forming the product to be packaged, which can comprise a certain number of objects (tiles) stacked on top of one another, in which case the aforesaid means for forming the product to be packaged may comprise means for receiving a pile consisting of m objects to form a pile of n objects, where m and n are integers ≥ 1 , with $m \neq n$.

[0035] The packing apparatus is configured in particular for packing flat and stiff products, in particular products arranged in a pile, such as, for example a pile of ceramic tiles. Optionally, the packing apparatus can be part of a packing line for flat products (ceramic tiles, for example arranged stacked on top of one another) that further comprises a palletising device (of known type) arranged downstream of the packing apparatus. The palletising device can be configured for receiving (for example intermittently or continuously) the products packaged by the packing apparatus and for palletising the products (for example ordering various piles of tiles on a pallet).

[0036] Optionally, the packing apparatus can be part of a packing line (for example a line like the one above-mentioned) for packing flat products (ceramic tiles) that further comprises (upstream of the packing apparatus) a device (of known type) for selecting that selects the products (for example ceramic tiles) on the basis of preset criteria (for example quality criteria) and sorts the various products on the basis of the selection made. The device for selecting can be configured to send (for example intermittently or continuously) the products of a preset selection to the packing apparatus.

[0037] The packing apparatus can be configured in particularly for forming a package comprising a carton blank placed alongside at least a side of the flat product. The carton blank has a first longitudinal flap (for example upper) that is folded to a first face (for example upper) of the flat product, and a second longitudinal flap (that is substantially opposite and parallel to the first longitudinal flap), which is folded towards a second face (for example lower) of the product.

[0038] In figures 17A to 17C there is illustrated in brief the packing method implemented with the operation of the apparatus disclosed above. The method consists of placing alongside two carton blanks on opposite sides of the tile (figure 17A), of folding the two opposite longitudinal flaps on the opposite faces of the tile (figure 17B), and thus tightening one or more bands 33 (consisting, for example, of plastic straps) around the aforesaid side edges so as to retain the carton blanks firmly in position (figure 17C).

Legend:

[0039]

T Flat product to be packaged
F (Intermittent) advance direction of the products T arranged one after another

- 1 Packing apparatus
- 2 Product preparing station
- 3 Carton applying station
- 4 Band applying station
- 5 Supporting frame for supporting the station 3 and, optionally, the station 4
- 6 Sides of the frame 5 (that are mutually movable for adjusting the width of the work station)
- 7 Sliding guides of the sides 6
- 8 Base of the frame 5
- 9 Supporting structure (for the operating means of the carton applying station 3)
- 10 Carton movement devices
- 11 Suction cup members of the device 10
- 12 Pushing members for folding the flaps of the cartons
- 13 Carton store
- 14 Cartons for packing the products T
- 15 First support (being part of the device 10)
- 16 Pins carried by the first support 15
- 17 Support for rotation (enables the structure 9 to rotatably support the first support 15 by the pins 16)
- 18 Movement (rotation) actuator of the first support 15
- 19 Second support (being part of the device 10)
- 20 Movement guides of the second support 19
- 21 Movement actuators of the second support 19
- 22 Elastic element (operationally associated with a respective suction cup member 11)
- 23 Abutment device (operationally associated with the folded upper flap of the cartons)
- 24 (Movable) abutment element of the device 23
- 25 Actuators of the element 24
- 26 Openings on the element 24 (for the passage of the members 11 and/or 12)
- 27 First conveyor (for conveying the products T from the station 2 to the station 3)
- 28 Second conveyor (for conveying the products from the station 3 to the station 4)
- 29 Corner walls of the store 13
- 30 Band-applying device
- 31 Band-applying tools
- 32 Frontal abutting element
- 33 Bands
- 34 Supporting beams for supporting the members 11 and 12
- 35 Guides for positioning at least a beam 34 for each device 10

Claims

1. Apparatus (1) comprising:

- supporting means (27; 28) configured for supporting a flat product (T) having at least a first side edge; and
- first positioning means (10) for positioning a first carton (14) extended in length in at least an

approaching position in which said first carton (14) is arranged alongside near said first side edge and is parallel said first side edge;

said supporting means (27; 28) comprising at least first supporting means (27) and second supporting means (28), which are configured so as to assume at least a first operating configuration in which said first supporting means (27) supports said flat product (T) and at least a second operating configuration in which said second supporting means (28) supports said flat product (T); in said first operating configuration said first supporting means (27) and said second supporting means (28) being spaced apart from said first side edge so as to leave a space free to enable a first flap of said first carton (14) that is folded and faces a first face of said flat product (T) to be positioned; in said second operating configuration said second supporting means (28) supporting said flat product (T) by pressing said first flap against said first face.

2. Apparatus according to claim 1, wherein in said second operating configuration said second supporting means (28) is configured so as to support said flat product (T) in a substantially horizontal position in which said first face is a lower face of said flat product (T) the weight of which lies at least partially by resting on a resting zone of said second supporting means (28), so that said first flap is pressed between said resting zone and said first face through the effect of said weight.

3. Apparatus according to claim 1 or 2, wherein said second supporting means (28) comprises second conveying means configured for moving said flat product (T) whilst maintaining said second operating configuration.

4. Apparatus according to any preceding claim, wherein said second supporting means (28) comprises a slidable flexible loop conveying element, which, in said second operating configuration, is configured for interacting in contact with said first flap.

5. Apparatus according to claim 4, wherein said loop conveying element comprises a flexible belt made of elastomeric material configured for interacting in contact with said first flap.

6. Apparatus according to any preceding claim, comprising second positioning means (10) for positioning a second carton (14) extended in length in an approaching position in which said second carton is arranged alongside near a second side edge of said flat product (T) and is parallel thereto; in said first operating configuration said first supporting means (27) and said second supporting means (28) being

spaced apart from said second side edge so as to leave a space free to enable a second flap of said second carton (14) that is folded and faces said first face of said flat product (T) to be positioned; in said second operating configuration said second supporting means (28) supporting said flat product (T) by pressing said second flap against said first face.

7. Apparatus according to any preceding claim, comprising a carton applying station (3) in which said first and/or second positioning means (10) operates for positioning a first and/or a second carton (14), and a band applying station (4) in which binding means (30) operates that is configured for wrapping with one or more bands (33) said flat carton-packed product (T), said first supporting means comprising first conveying means (27) configured for moving said flat product (T) from a source (2) of flat products to said carton applying station (3), said second supporting means comprising second conveying means (28) configured for receiving said flat product (T) from said first conveying means (27) and for moving said flat product (T) from said carton applying station (3) to said band applying station (4).
8. Apparatus according to claim 7, wherein said first conveying means (27) and said second conveying means (28) are configured to advance said flat product (T) intermittently.
9. Apparatus according to any preceding claim, wherein said first supporting means (27) and said second supporting means (28) are provided with the possibility of performing a mutual movement having at least one motion component in a vertical direction during the passage between said first operating configuration and said second operating configuration.
10. Apparatus according to any preceding claim, comprising folding means (12) which is configured for operating on said first carton (14) in said approaching position and is provided with the possibility of performing a movement in relation to said first positioning means (27) through the effect of which said folding means (12) folds said first flap towards said first face, said folding means (12) being further configured for folding a further band of said first carton (14) opposite said first flap towards a further face of said flat product (T) opposite said first face.
11. Apparatus according to claim 10, comprising abutment means configured for interacting in contact with said further flap to maintain said further flap in a folded position substantially facing said further face, said abutment means being movable with the possibility of assuming at least an inactive position in which said abutment means is spaced apart from said further face and does not interact in contact with said

further flap and at least an active position in which is near said further face and interacts in contact with said further flap.

12. Packing system according to any one of claims 1 to 11.

Patentansprüche

1. Vorrichtung (1), mit:

- Stützmitteln (27; 28), die zum Stützen eines flachen Produktes (T) ausgebildet sind, das zumindest eine erste Seitenkante aufweist; und
- ersten Positioniermitteln (10) zum Positionieren eines ersten längs erstreckten Kartons (14) in zumindest einer Annäherungsposition, in der der erste Karton (14) längsseits nahe der ersten Seitenkante angeordnet und parallel zur ersten Seitenkante ist;

wobei die Stützmittel (27; 28) zumindest erste Stützmittel (27) und zweite Stützmittel (28) aufweisen, die so ausgebildet sind, dass sie zumindest eine erste Betriebsstellung, in der die ersten Stützmittel (27) das flache Produkt (T) stützen, und zumindest eine zweite Betriebsstellung annehmen, in der die zweiten Stützmittel (28) das flache Produkt (T) stützen; wobei in der ersten Betriebsstellung die ersten Stützmittel (27) und die zweiten Stützmittel (28) von der ersten Seitenkante beabstandet sind, um so einen Raum freizulassen, damit eine erste Lasche des ersten Kartons (14), die umgeschlagen wird und einer ersten Fläche des flachen Produktes (T) zugewandt ist, positioniert werden kann; wobei in der zweiten Betriebsstellung die zweiten Stützmittel (28) das flache Produkt (T) durch Andrücken der ersten Lasche gegen die erste Fläche stützen.

2. Vorrichtung nach Anspruch 1, wobei in der zweiten Betriebsstellung die zweiten Stützmittel (28) so ausgebildet sind, dass sie das flache Produkt (T) in einer im Wesentlichen horizontalen Position stützen, in der die erste Fläche eine untere Fläche des flachen Produktes (T) ist, dessen Gewicht zumindest teilweise durch Ruhen auf einer Ruhezone der zweiten Stützmittel (28) liegt, so dass die erste Lasche durch die Wirkung des Gewichtes zwischen der Ruhezone und der ersten Fläche angeedrückt wird.
3. Vorrichtung nach Anspruch 1 oder 2, wobei die zweiten Stützmittel (28) zweite Fördermittel aufweisen, die zum Bewegen des flachen Produktes (T) ausgebildet sind, während die zweite Betriebsstellung beibehalten wird.
4. Vorrichtung nach irgendeinem vorhergehenden An-

spruch, wobei die zweiten Stützmittel (28) ein verschiebbares flexibles Schleifenfördererelement aufweisen, das in der zweiten Betriebsstellung zum berührenden Wechselwirken mit der ersten Lasche ausgebildet ist.

5. Vorrichtung nach Anspruch 4, wobei das Schleifenfördererelement ein flexibles Förderband aufweist, das aus einem elastomeren Material gefertigt ist, das zum berührenden Wechselwirken mit der ersten Lasche ausgebildet ist.
6. Vorrichtung nach irgendeinem vorhergehenden Anspruch, mit zweiten Positioniermitteln (10) zum Positionieren eines zweiten längs erstreckten Kartons (14) in einer Annäherungsposition, in der der zweite Karton längsseits nahe einer zweiten Seitenkante des flachen Produktes (T) angeordnet und parallel zu dieser ist; wobei in der ersten Betriebsstellung die ersten Stützmittel (27) und die zweiten Stützmittel (28) von der zweiten Seitenkante beabstandet sind, um so einen Raum freizulassen, damit eine zweite Lasche des zweiten Kartons (14), die umgeschlagen wird und der ersten Fläche des flachen Produktes (T) zugewandt ist, positioniert werden kann; wobei in der zweiten Betriebsstellung die zweiten Stützmittel (28) das flache Produkt (T) durch Andrücken der zweiten Lasche gegen die erste Fläche stützen.
7. Vorrichtung nach irgendeinem vorhergehenden Anspruch, mit einer Kartonanbringstation (3), in der die ersten und/oder zweiten Positioniermittel (10) zum Positionieren eines ersten und/oder eines zweiten Kartons (14) wirksam sind, und mit einer Bandanbringstation (4), in der Bindermittel (3) wirken, die zum Umschlingen des flachen kartonverpackten Produktes (T) mit einem oder mehreren Bändern (33) ausgebildet sind, wobei die ersten Stützmittel erste Fördermittel (27) aufweisen, die zum Bewegen des flachen Produktes (T) von einer Quelle (2) flacher Produkte zu der Kartonanbringstation (3) ausgebildet sind, wobei die zweiten Stützmittel zweite Fördermittel (28) aufweisen, die zum Empfangen des flachen Produktes (T) von den ersten Fördermitteln (27) und zum Bewegen des flachen Produktes (T) von der Kartonanbringstation (3) zu der Bandanbringstation (4) ausgebildet sind.
8. Vorrichtung nach Anspruch 7, wobei die ersten Fördermittel (27) und die zweiten Fördermittel (28) dazu ausgebildet sind, das flache Produkt (T) intermittierend vorwärts zu bewegen.
9. Vorrichtung nach irgendeinem vorhergehenden Anspruch, wobei die ersten Stützmittel (27) und die zweiten Stützmittel (28) mit der Möglichkeit der Durchführung einer wechselseitigen Bewegung versehen sind, die zumindest eine Bewegungskompo-

nente in einer vertikalen Richtung während des Übergangs zwischen der ersten Betriebsstellung und der zweiten Betriebsstellung aufweist.

10. Vorrichtung nach einem der vorhergehenden Ansprüche, mit Umschlagemitteln (12), die zum Einwirken auf den ersten Karton (14) in der Annäherungsposition ausgelegt und mit der Möglichkeit der Durchführung einer Bewegung in Relation zu den ersten Positioniermitteln (27) versehen sind, durch deren Wirkung die Umschlagemittel (12) die erste Lasche gegen die erste Fläche umschlagen, wobei die Umschlagemittel (12) weiterhin zum Umschlagen einer weiteren Lasche des ersten Kartons (14), das der ersten Lasche gegenüberliegt, zu einer weiteren Fläche des flachen Produktes (T) hin ausgebildet sind, die der ersten Fläche gegenüberliegt.
11. Vorrichtung nach Anspruch 10, mit Anlagemitteln, die zum berührenden Wechselwirken mit der weiteren Lasche ausgebildet sind, um die weitere Lasche in einer umgeschlagenen Position zu halten, die der weiteren Fläche im Wesentlichen zugewandt ist, wobei die Anlagemittel beweglich sind mit der Möglichkeit, zumindest eine nicht aktive Position, in der die Anlagemittel von der weiteren Fläche beabstandet sind und nicht berührend mit der weiteren Lasche wechselwirken, und zumindest eine aktive Position anzunehmen, in der sie nahe der weiteren Fläche sind und berührend mit der weiteren Fläche wechselwirken.
12. Verpackungssystem nach einem der Ansprüche 1 bis 11.

Revendications

1. Dispositif (1) comprenant:

- des moyens supports (27; 28) configurés pour soutenir un produit plat (T) ayant au moins un premier bord latéral; et
- des premiers moyens de positionnement (10) pour positionner un premier carton (14) étendu en longueur dans au moins une position d'approche dans laquelle ledit premier carton (14) est placé le long et près dudit premier bord latéral et est parallèle audit premier bord latéral;

lesdits moyens supports (27; 28) comprenant au moins des premiers moyens supports (27) et des deuxièmes moyens supports (28), qui sont configurés de façon à prendre au moins une première configuration opérationnelle dans laquelle lesdits premiers moyens supports (27) soutiennent ledit produit plat (T) et au moins une deuxième configuration opérationnelle dans laquelle lesdits deuxièmes moyens

supports (28) soutiennent ledit produit plat (T); dans ladite première configuration opérationnelle, lesdits premiers moyens supports (27) et lesdits deuxièmes moyens supports (28) sont espacés dudit premier bord latéral de façon à laisser un espace libre pour permettre à un premier volet dudit premier carton (14) qui est plié et fait face à une première face dudit produit plat (T) d'être positionné; dans ladite deuxième configuration opérationnelle, lesdits deuxièmes moyens supports (28) soutiennent ledit produit plat (T) en pressant ledit premier volet contre ladite première face.

2. Dispositif selon la revendication 1, dans lequel, dans ladite deuxième configuration opérationnelle, lesdits deuxièmes moyens supports (28) sont configurés de manière à soutenir ledit produit plat (T) dans une position sensiblement horizontale dans laquelle ladite première face est une face inférieure dudit produit plat (T) dont le poids repose au moins partiellement sur une zone de repos desdits deuxièmes moyens supports (28), de sorte que ledit premier volet est pressé entre ladite zone de repos et ladite première face sous l'effet dudit poids.
3. Dispositif selon la revendication 1 ou 2, dans lequel lesdits deuxièmes moyens supports (28) comprennent des deuxièmes moyens de transport configurés pour déplacer ledit produit plat (T) tout en conservant ladite deuxième configuration opérationnelle.
4. Dispositif selon l'une quelconque des revendications précédentes, dans lequel lesdits deuxièmes moyens supports (28) comprennent un élément de transport en boucle flexible coulissant qui, dans ladite deuxième configuration opérationnelle, est configuré pour interagir en contact avec ledit premier volet.
5. Dispositif selon la revendication 4, dans lequel ledit élément de transport en boucle comprend un tapis flexible constitué d'un matériau élastomère configuré pour interagir en contact avec ledit premier volet.
6. Dispositif selon l'une quelconque des revendications précédentes, comprenant des deuxièmes moyens de positionnement (10) pour positionner un deuxième carton (14) étendu en longueur dans une position d'approche dans laquelle ledit deuxième carton est agencé le long et près d'un deuxième bord latéral dudit produit plat (T) et est parallèle à celui-ci; dans ladite première configuration opérationnelle, lesdits premiers moyens supports (27) et lesdits deuxièmes moyens supports (28) sont espacés dudit deuxième bord latéral de manière à laisser un espace libre pour permettre à un deuxième volet dudit deuxième carton (14) qui est plié et fait face à ladite première face dudit produit plat (T) d'être positionné; dans ladite deuxième configuration opérationnelle, lesdits

deuxièmes moyens supports (28) soutiennent ledit produit plat (T) en pressant ledit deuxième volet contre ladite première face.

7. Dispositif selon l'une quelconque des revendications précédentes, comprenant un poste d'application de carton (3) dans lequel lesdits premiers et/ou deuxièmes moyens de positionnement (10) opèrent pour positionner un premier et/ou un deuxième carton (14), et un poste d'application de bande (4) dans lequel des moyens de liaison (30) opèrent, qui sont configurés pour envelopper avec une ou plusieurs bandes (33) ledit produit plat (T) mis en carton, lesdits premiers moyens supports comprenant des premiers moyens de transport (27) configurés pour déplacer ledit produit plat (T) depuis une source (2) de produits plats jusqu'àudit poste d'application de carton (3), lesdits deuxièmes moyens supports comprenant des deuxièmes moyens de transport (28) configurés pour recevoir ledit produit plat (T) depuis lesdits premiers moyens de transport (27) et pour déplacer ledit produit plat (T) dudit premier poste d'application de carton (3) jusqu'àudit poste d'application de bande (4).
8. Dispositif selon la revendication 7, dans lequel lesdits premiers moyens de transport (27) et lesdits deuxièmes moyens de transport (28) sont configurés pour faire avancer ledit produit plat (T) par intermitence.
9. Dispositif selon l'une quelconque des revendications précédentes, dans lequel lesdits premiers moyens supports (27) et lesdits deuxièmes moyens supports (28) sont munis de la possibilité d'effectuer un mouvement mutuel ayant au moins une composante de mouvement dans une direction verticale durant le passage entre ladite première configuration opérationnelle et ladite deuxième configuration opérationnelle.
10. Dispositif selon l'une quelconque des revendications précédentes, comprenant des moyens de pliage (12) qui sont configurés pour agir sur ledit premier carton (14) dans ladite position d'approche et sont munis de la possibilité d'effectuer un mouvement par rapport auxdits premiers moyens de positionnement (27) sous l'effet duquel lesdits moyens de pliage (12) plient ledit premier volet en direction de ladite première face, lesdits moyens de pliage (12) étant de plus configurés pour plier une autre bande dudit premier carton (14) opposée audit premier volet en direction d'une autre face dudit produit plat (T) opposée à ladite première face.
11. Dispositif selon la revendication 10, comprenant des moyens de butée configurés pour interagir en contact avec ledit autre volet pour maintenir ledit autre

volet dans une position pliée sensiblement tournée vers ladite autre face, lesdits moyens de butée étant mobiles avec la possibilité de prendre au moins une position inactive dans laquelle lesdits moyens de butée sont espacés de ladite autre face et n'interagissent pas en contact avec ledit autre volet et au moins une position active dans laquelle ils sont près de ladite autre face et interagissent en contact avec ledit autre volet.

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12. Système de conditionnement selon l'une quelconque des revendications 1 à 11.

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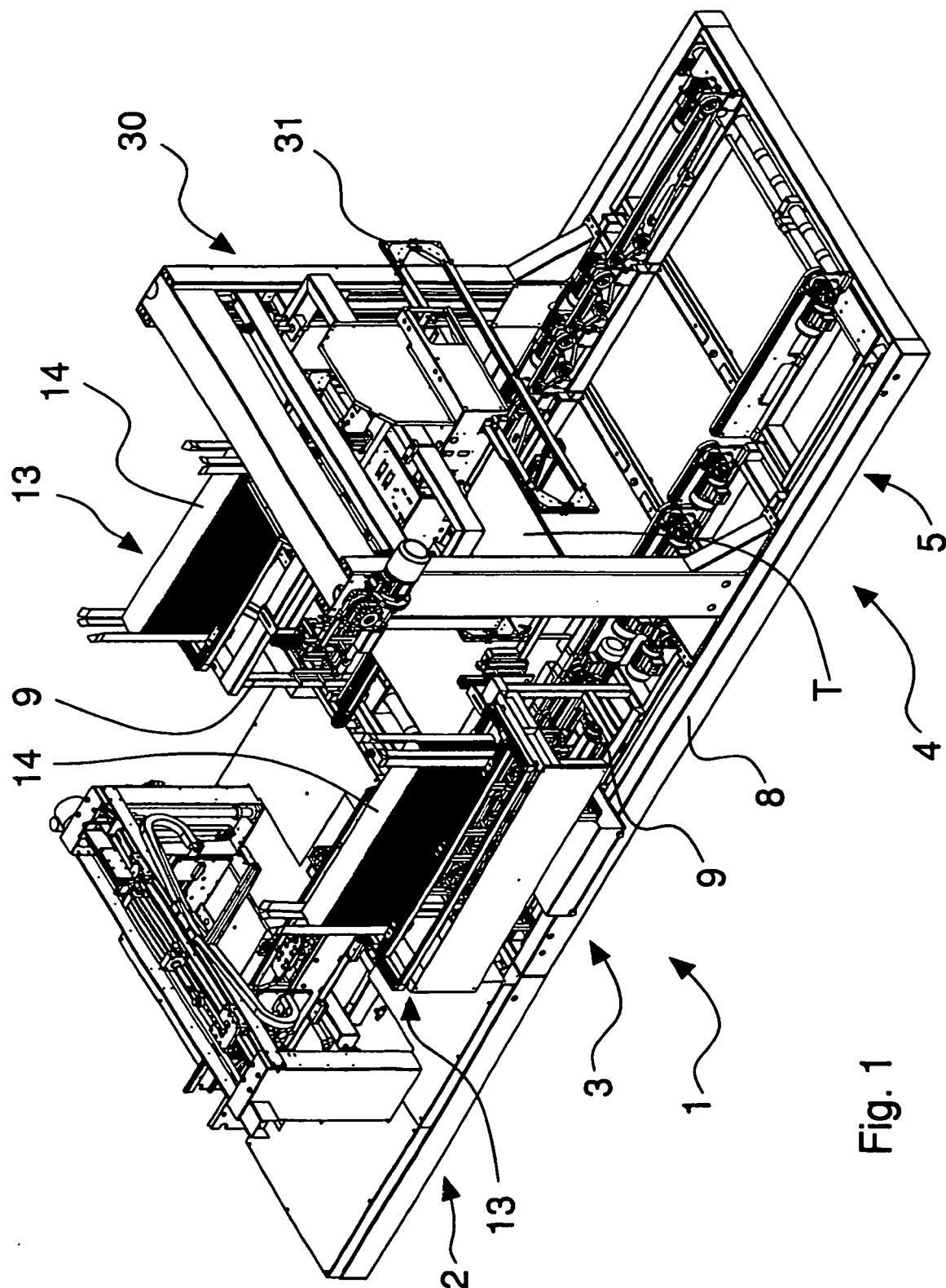


Fig. 1

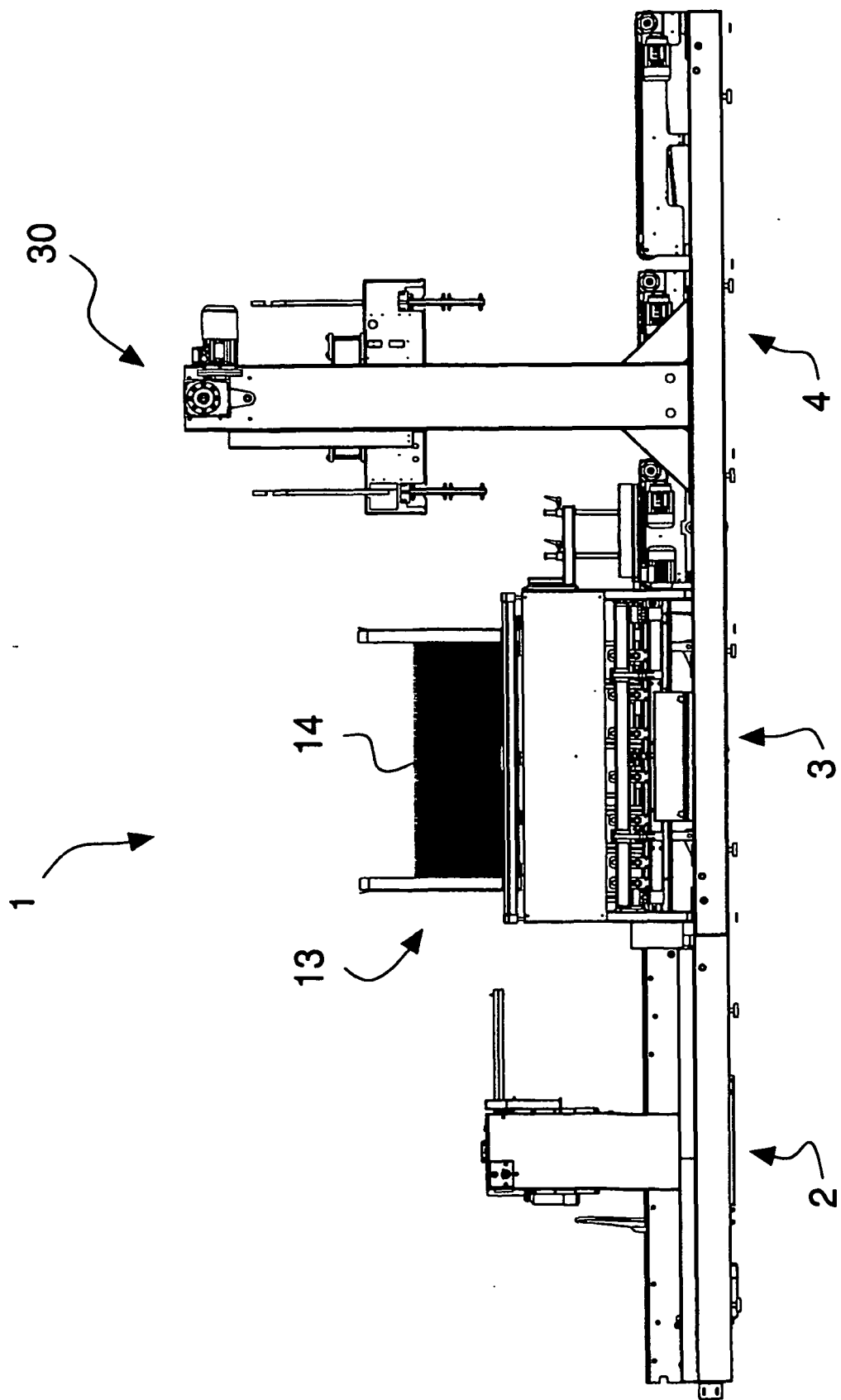


Fig. 2

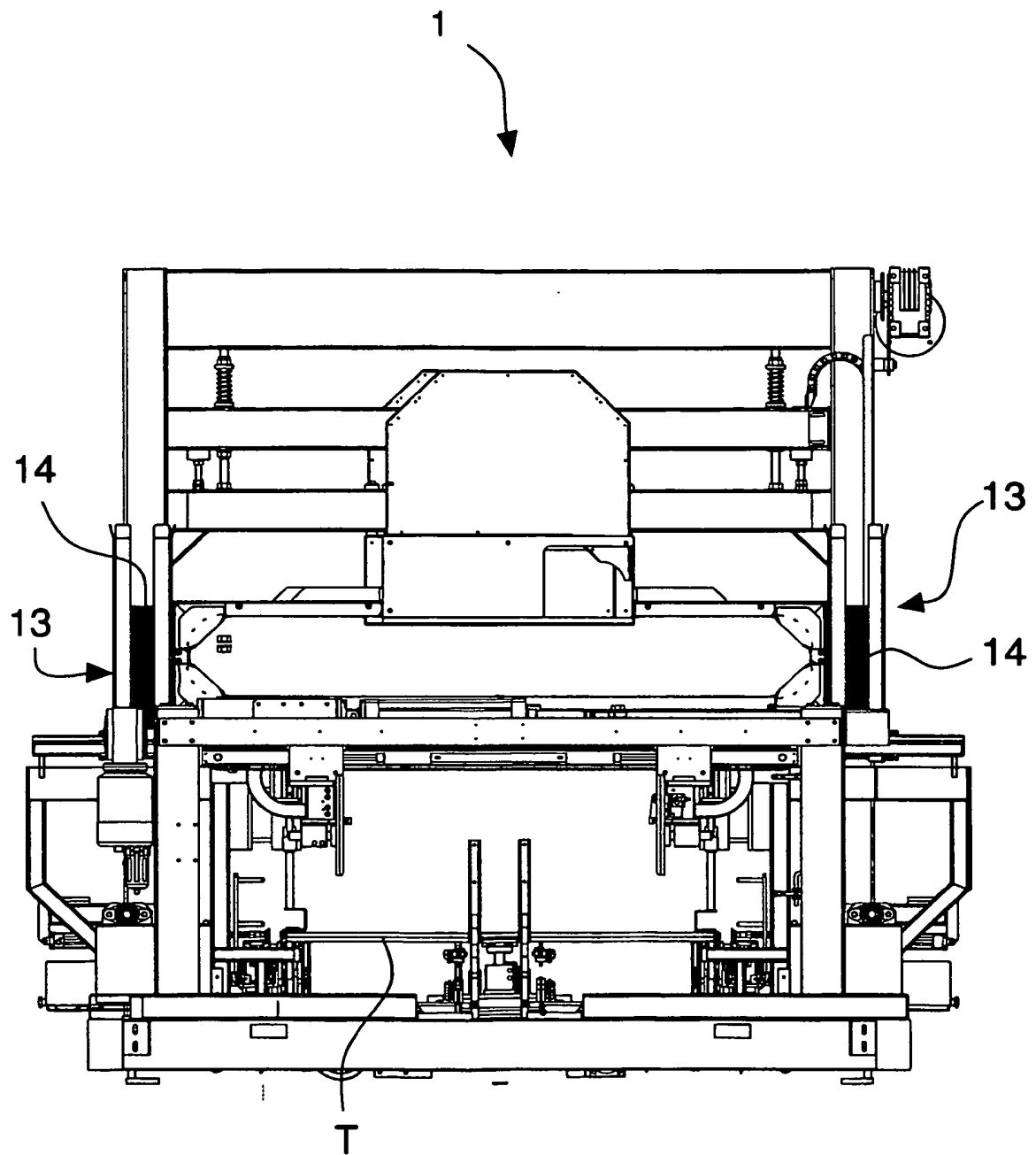


Fig. 3

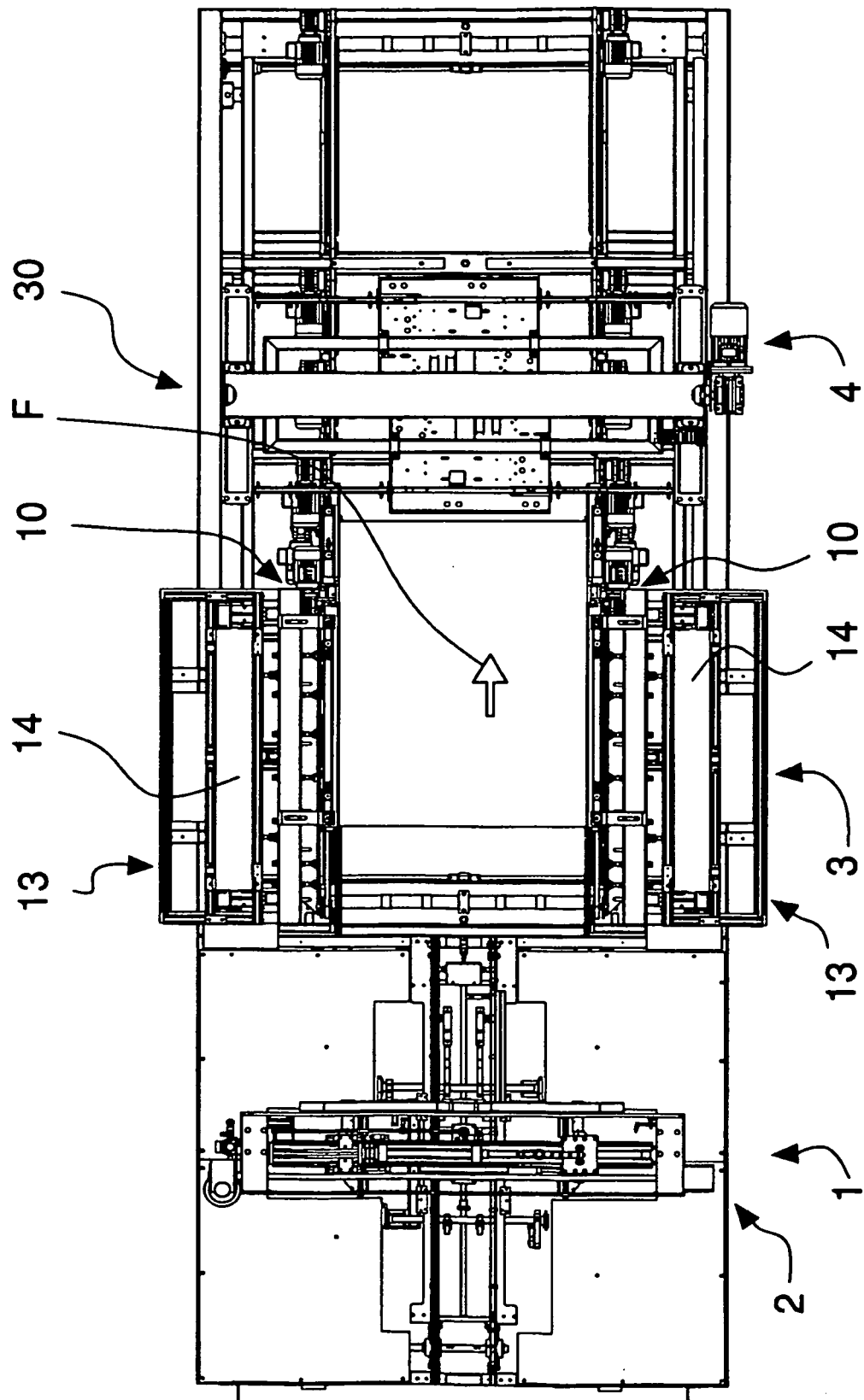


Fig. 4

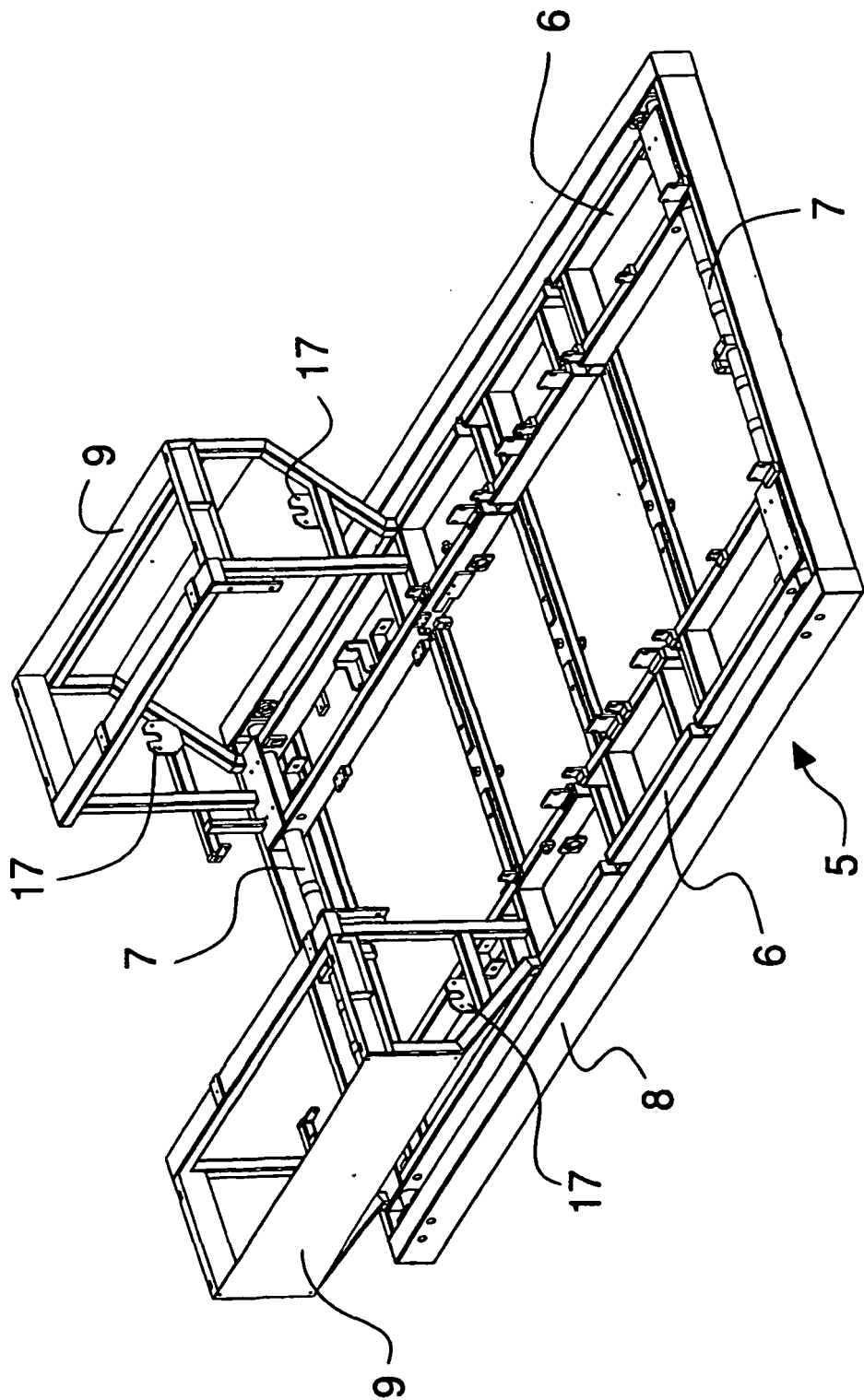


Fig. 5

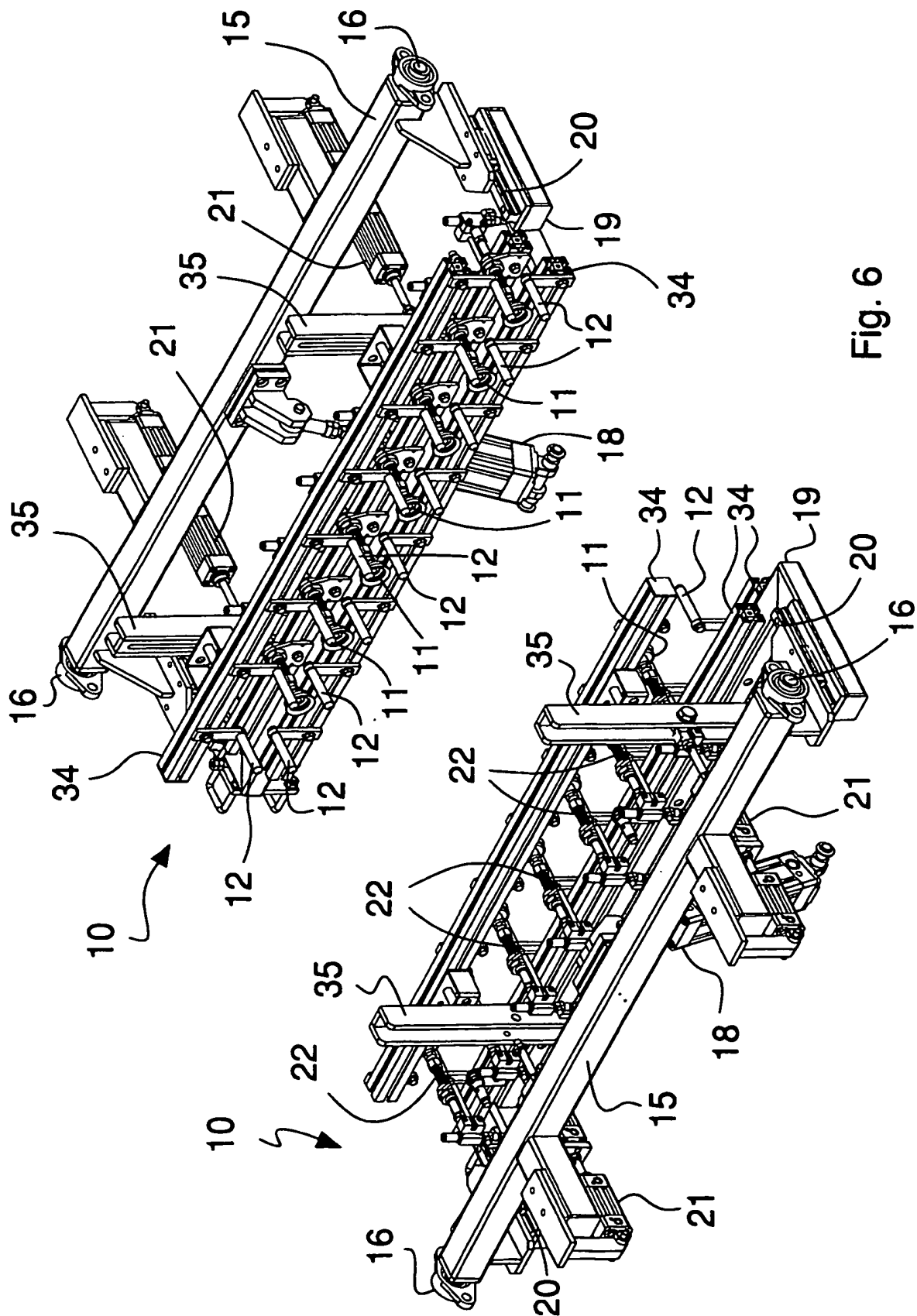


Fig. 6

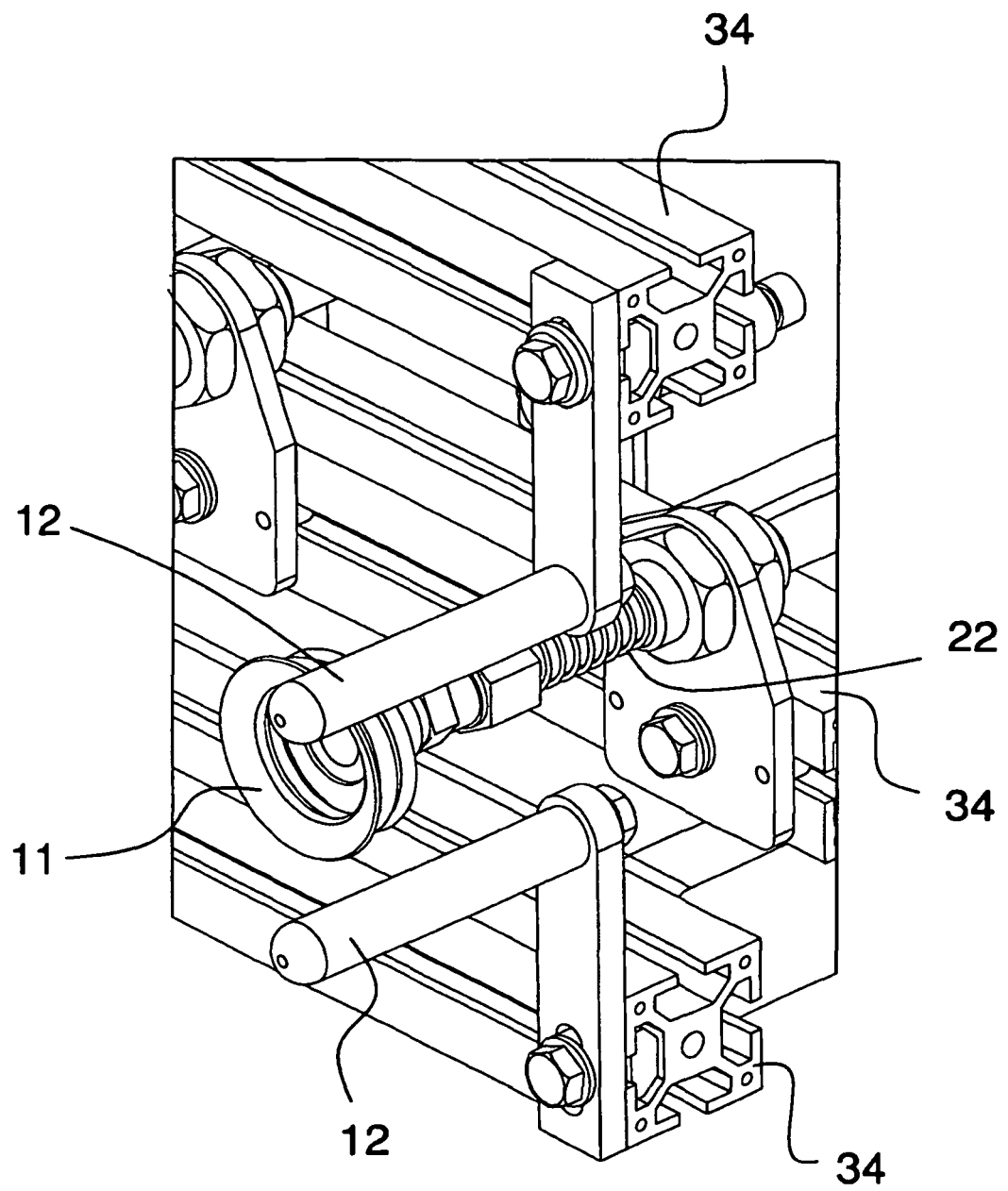
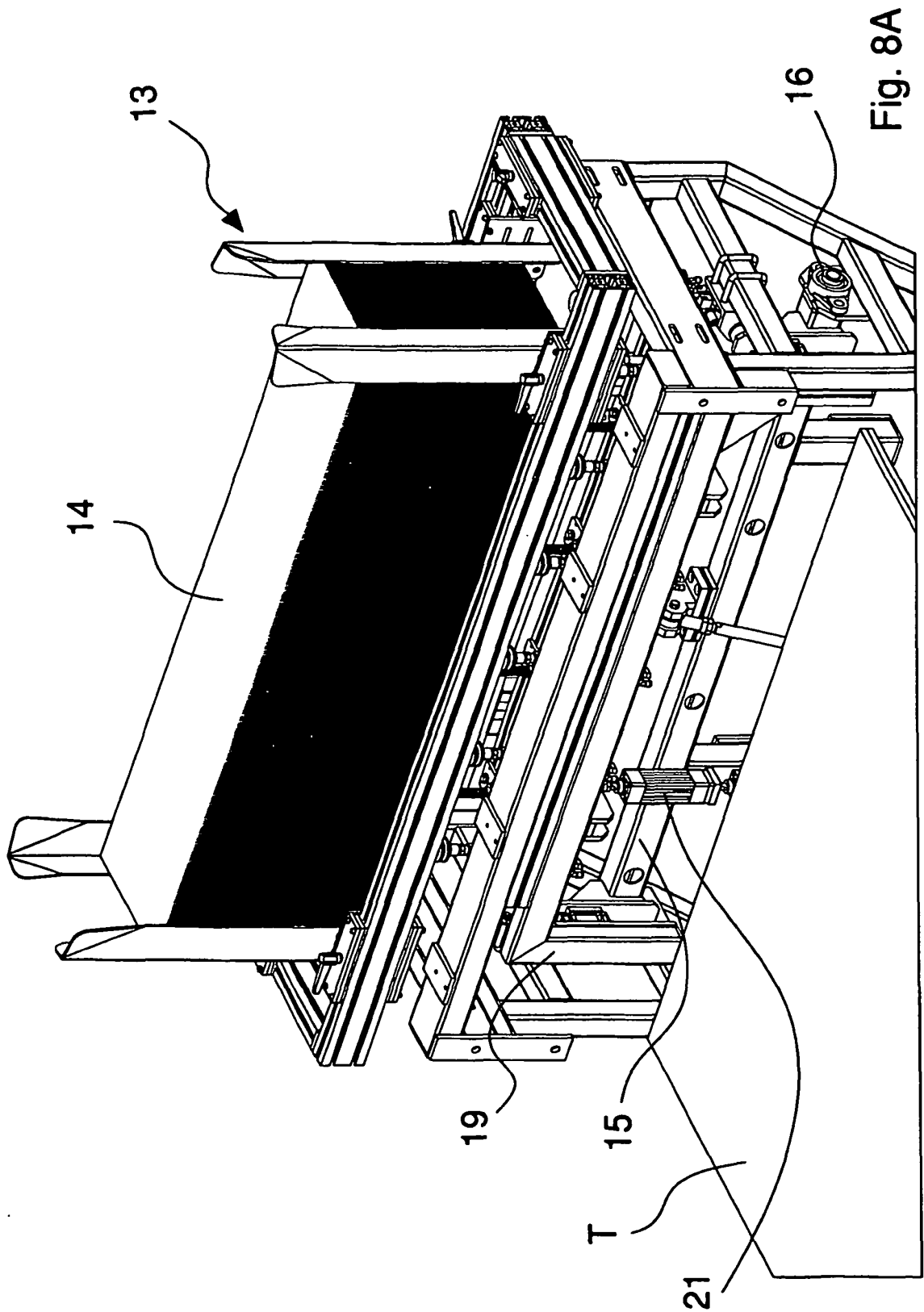


Fig. 7



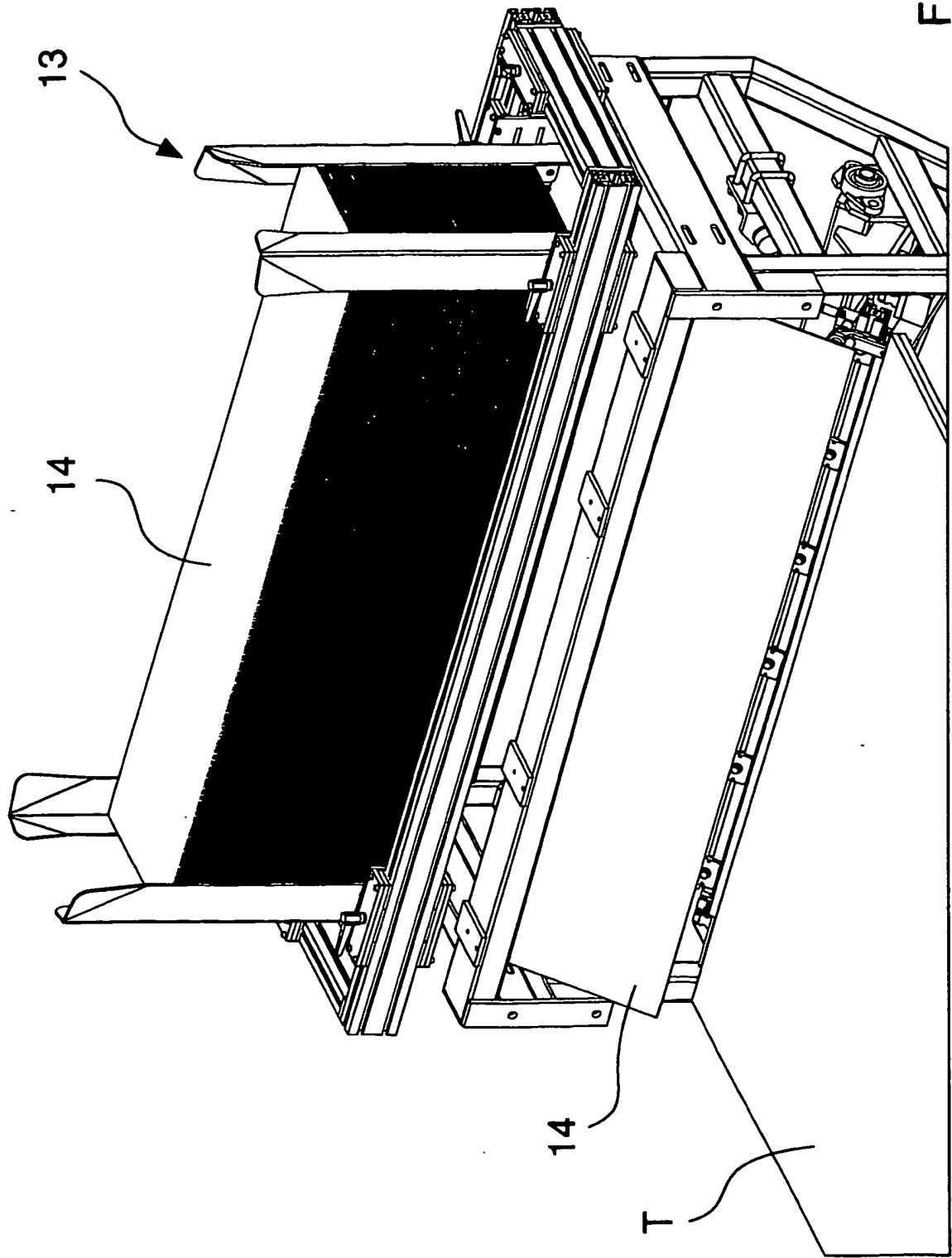


Fig. 8B

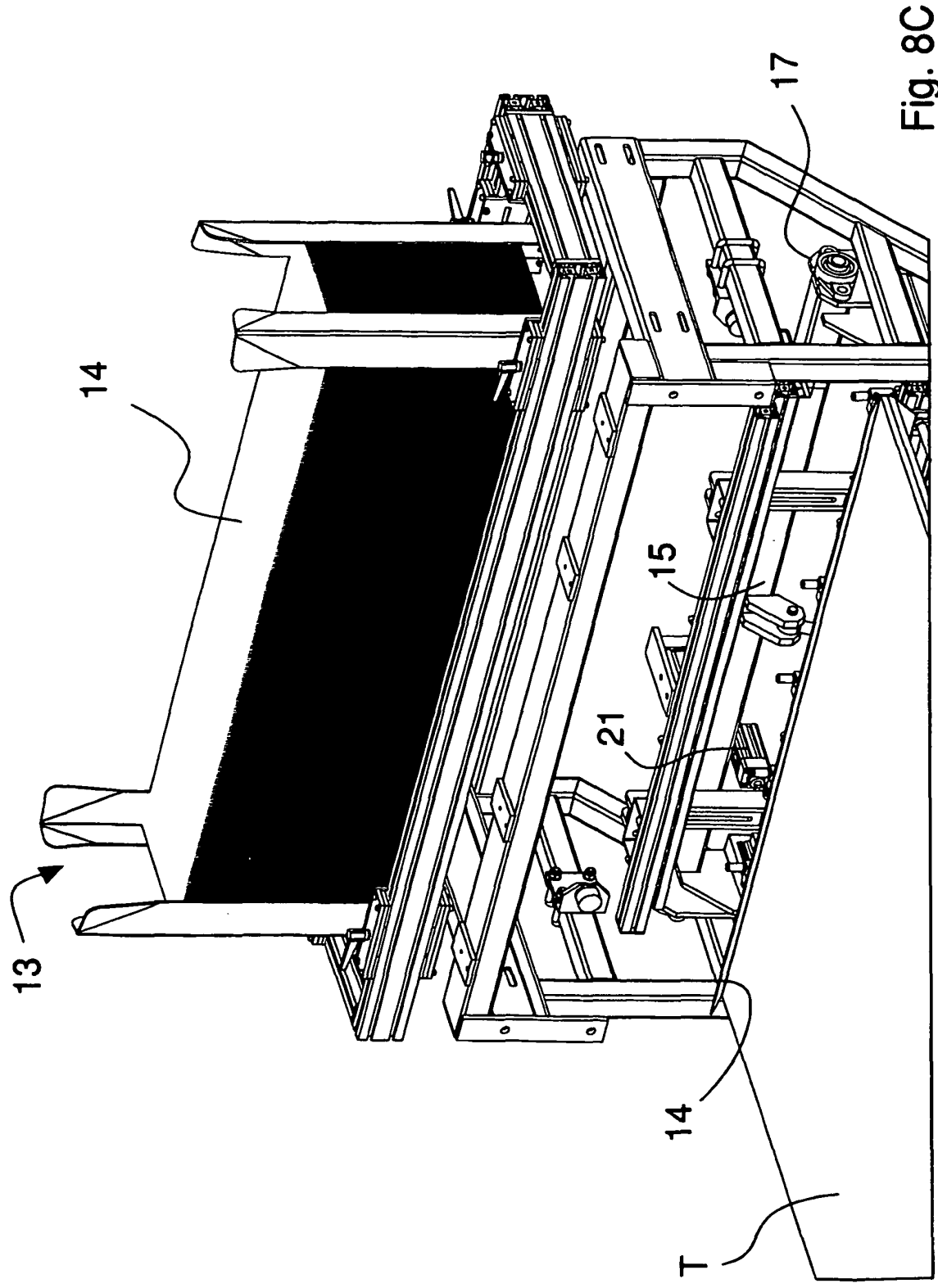


Fig. 8C

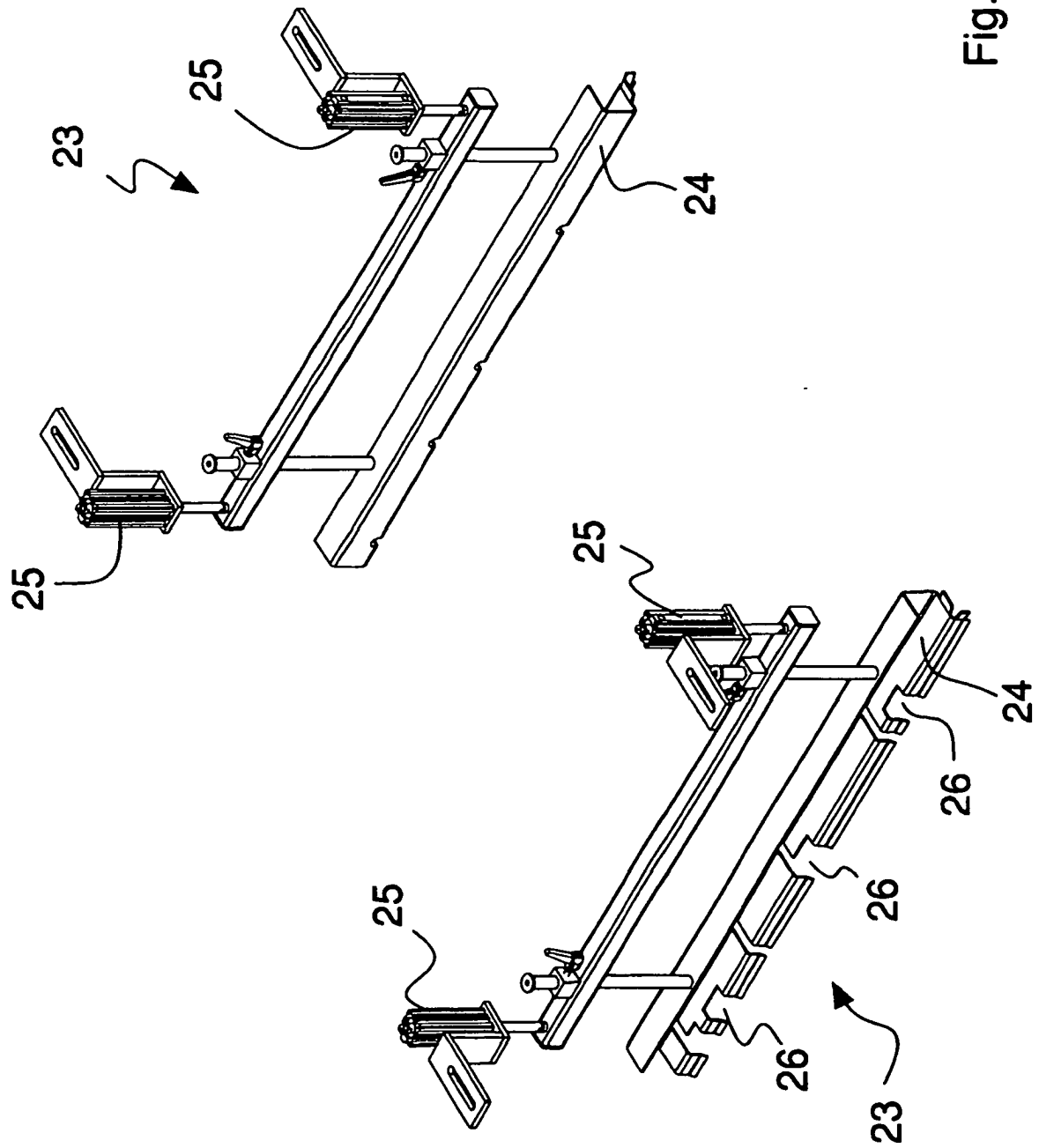


Fig. 9

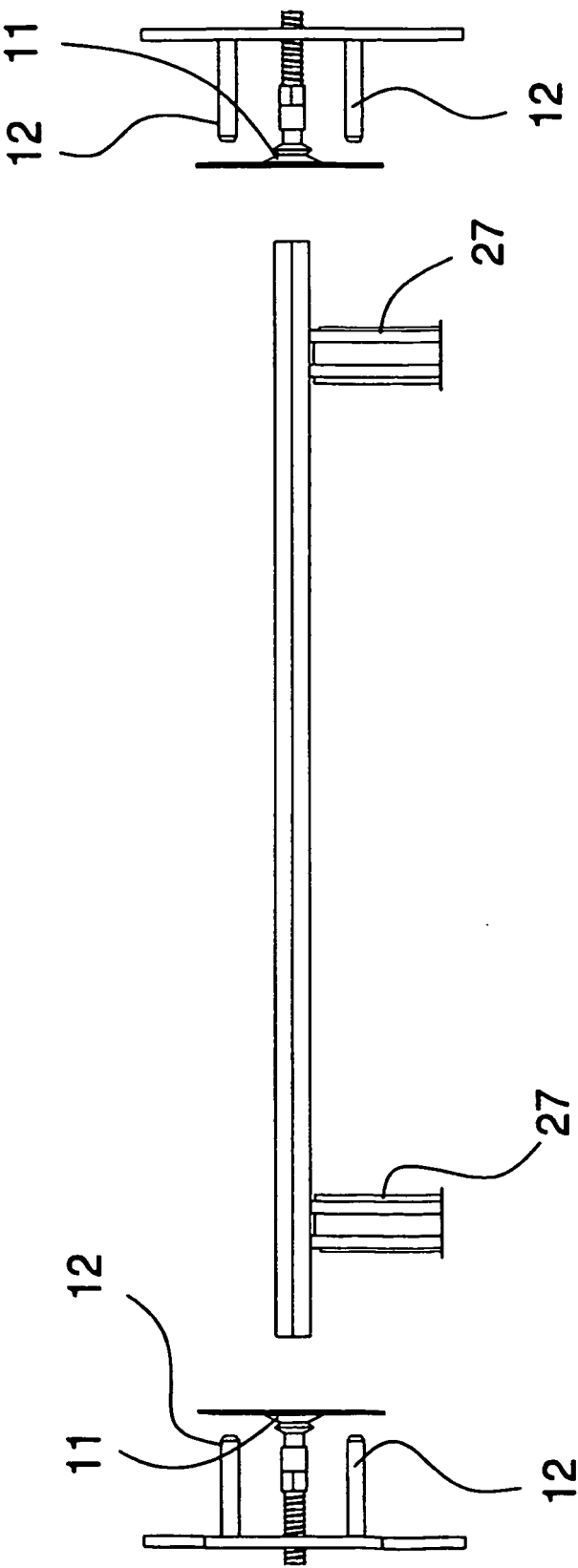


Fig. 10A

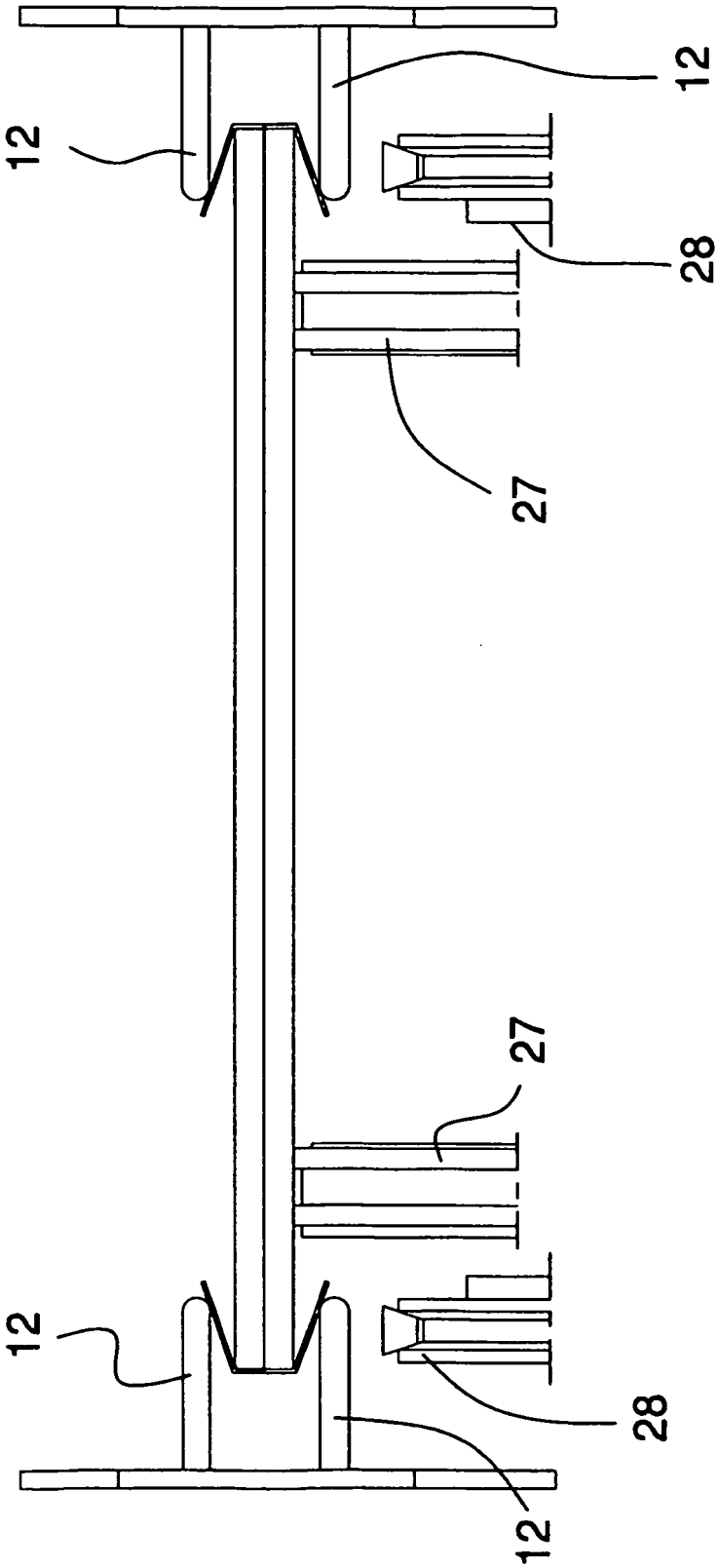


Fig. 10B

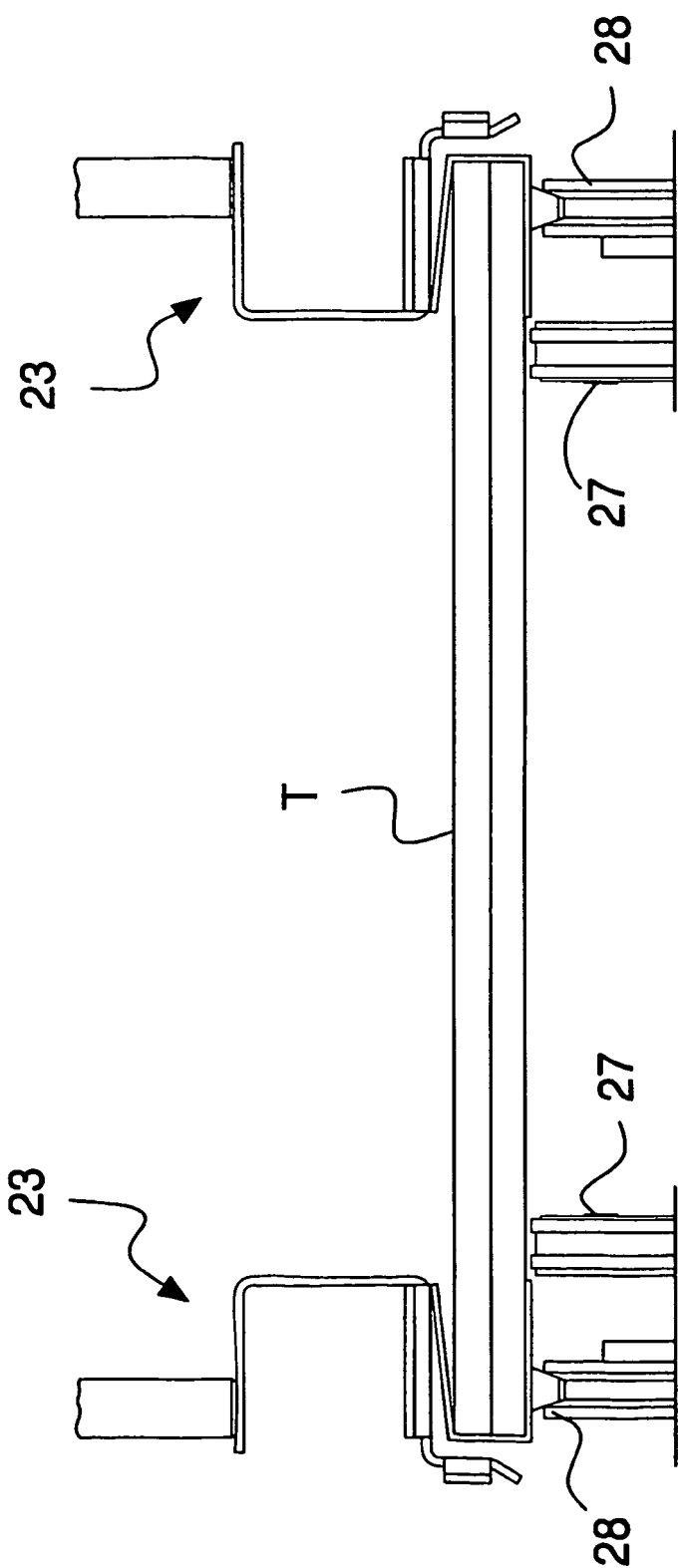


Fig. 10C

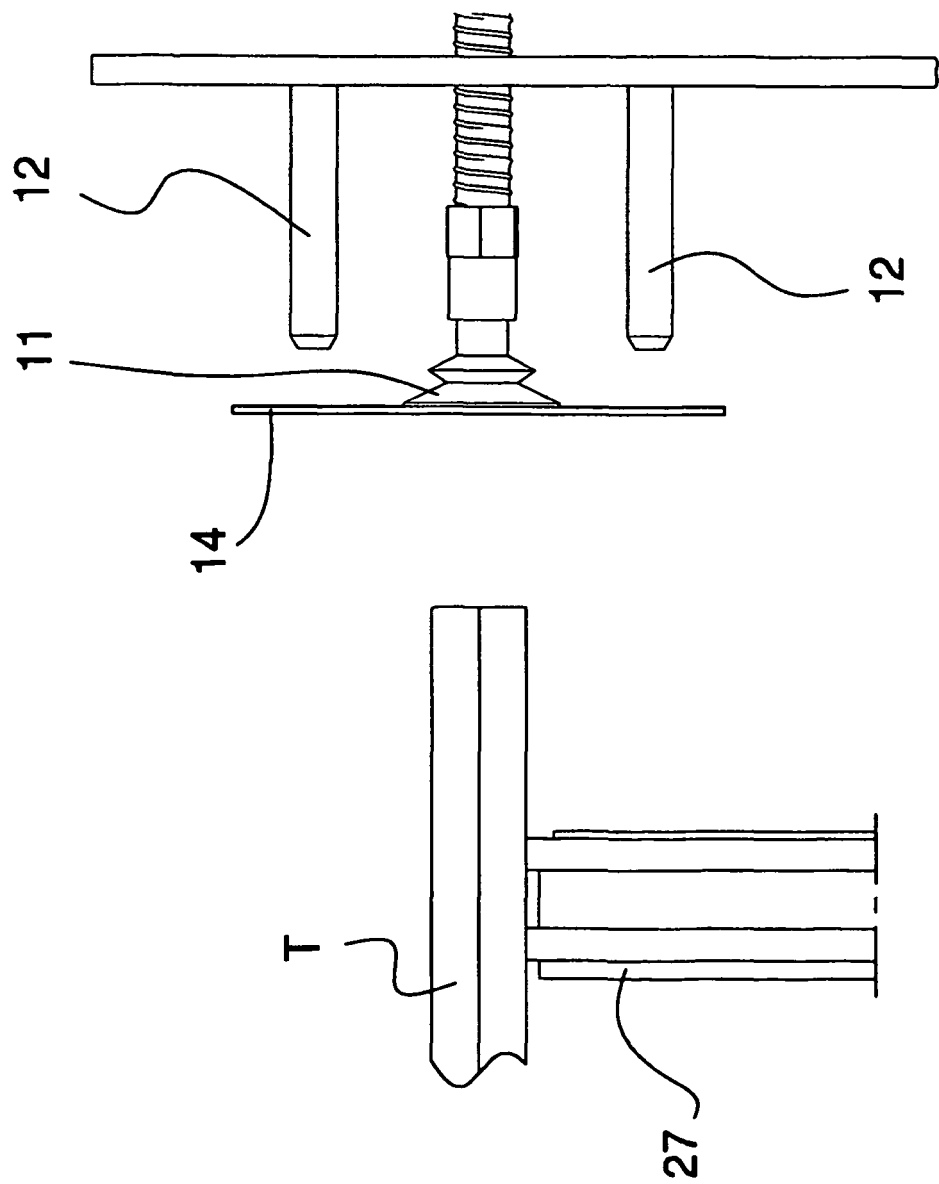


Fig. 11A

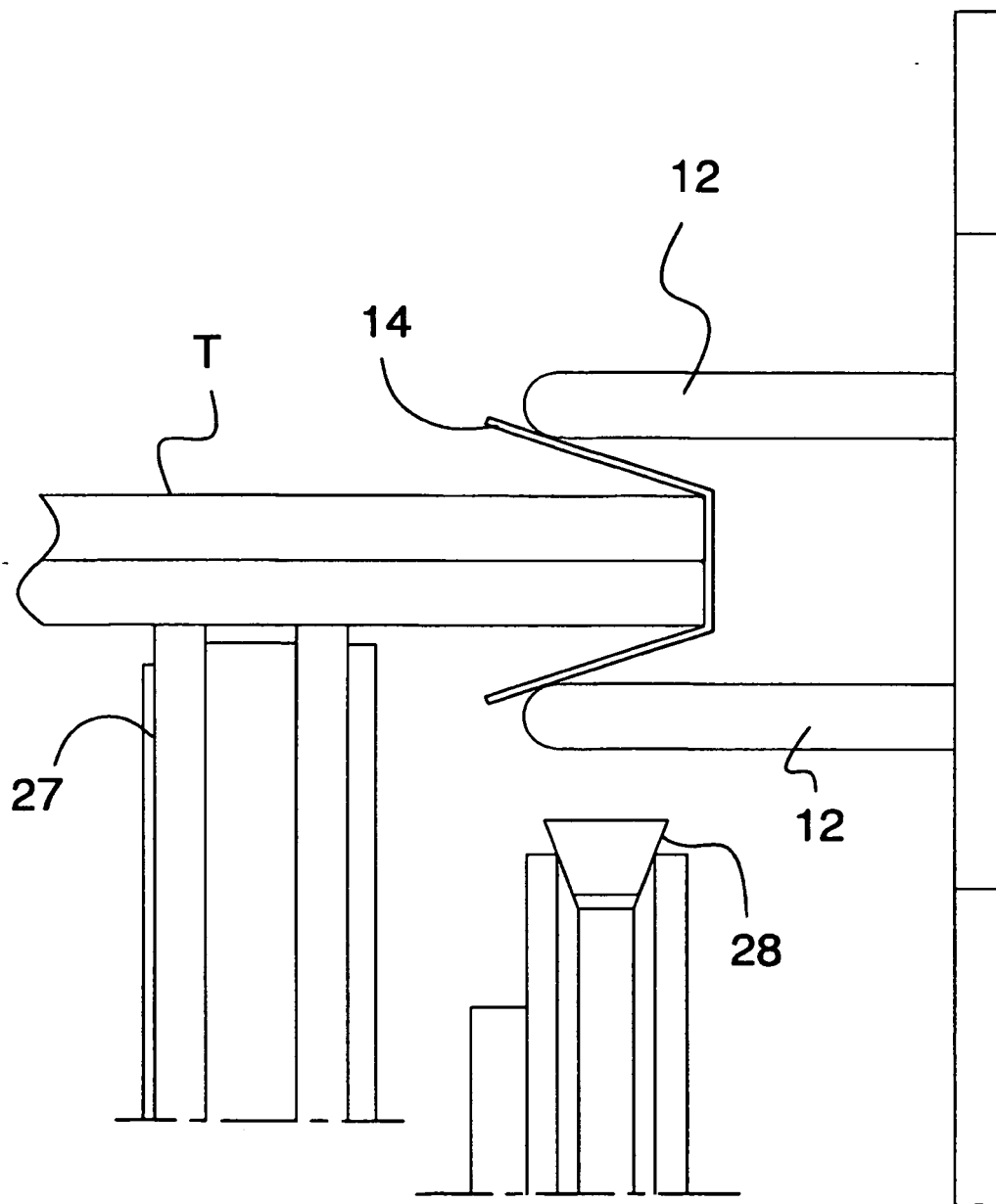


Fig. 11B

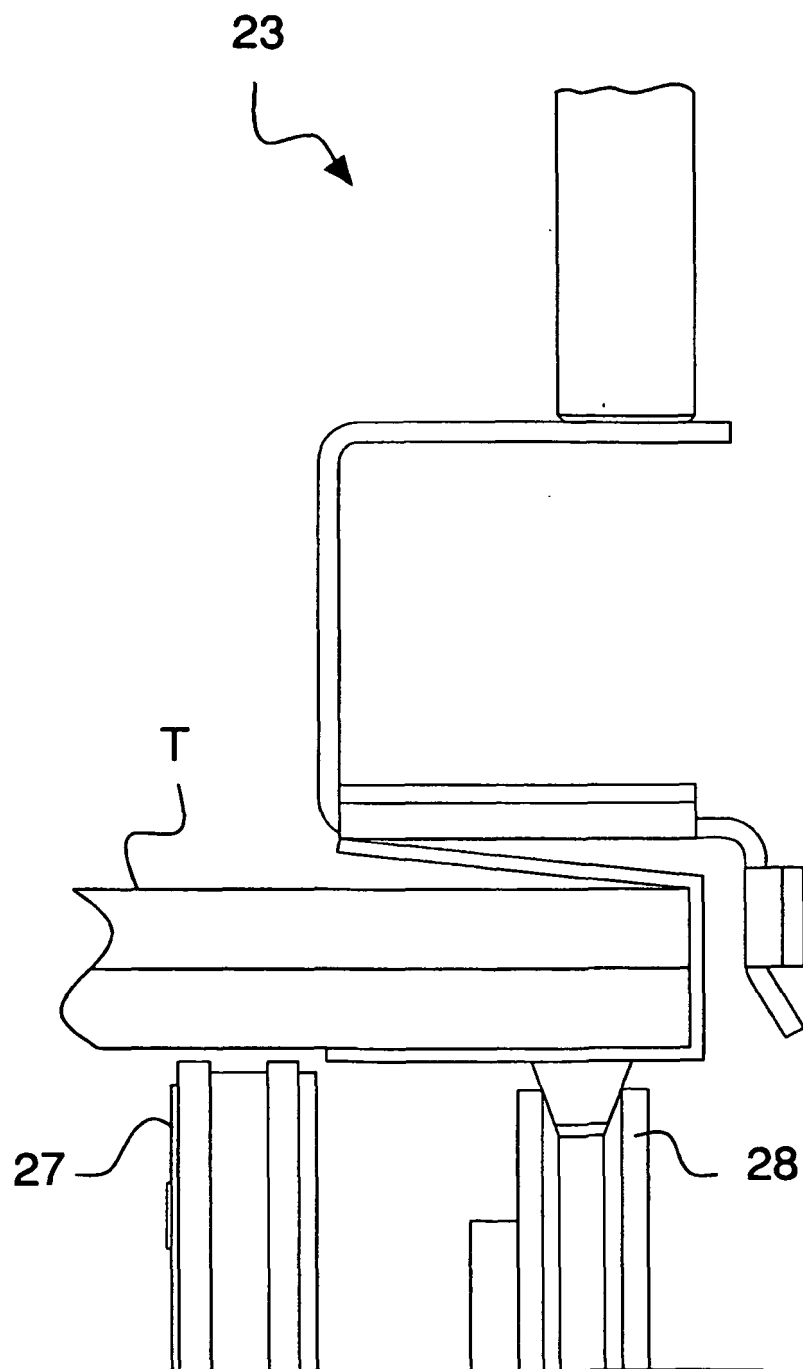


Fig. 11C

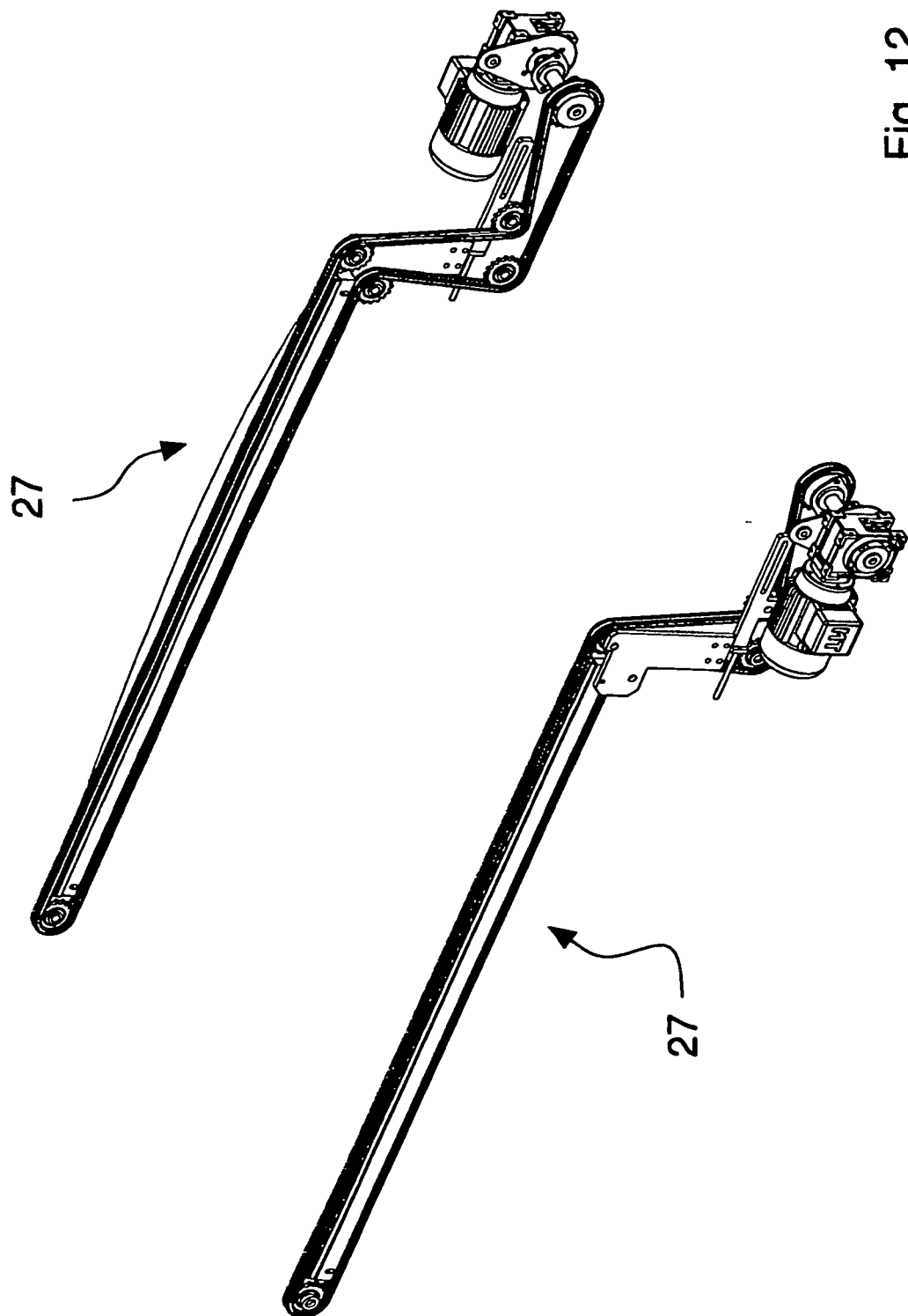


Fig. 12

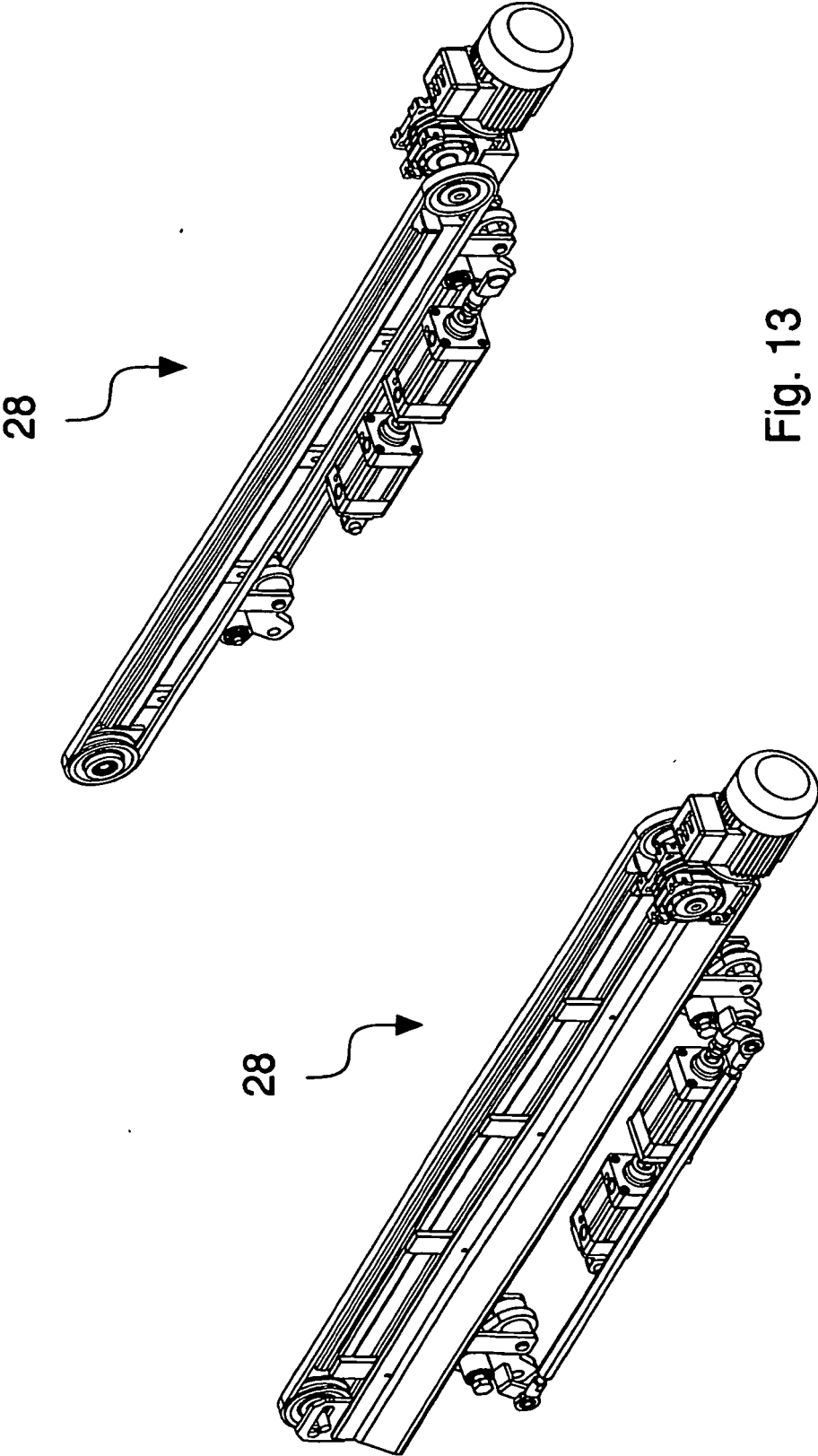


Fig. 13

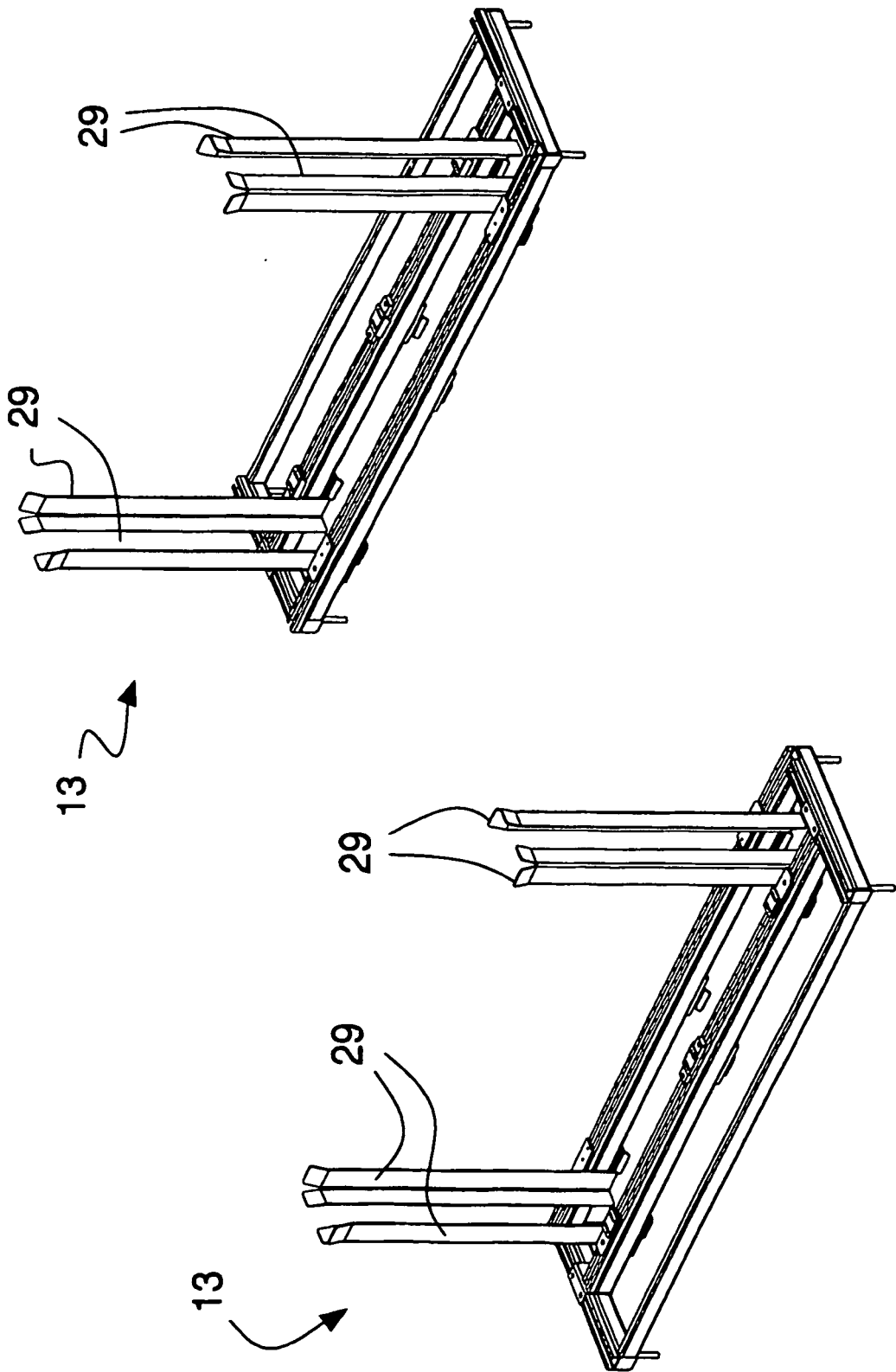


Fig. 14

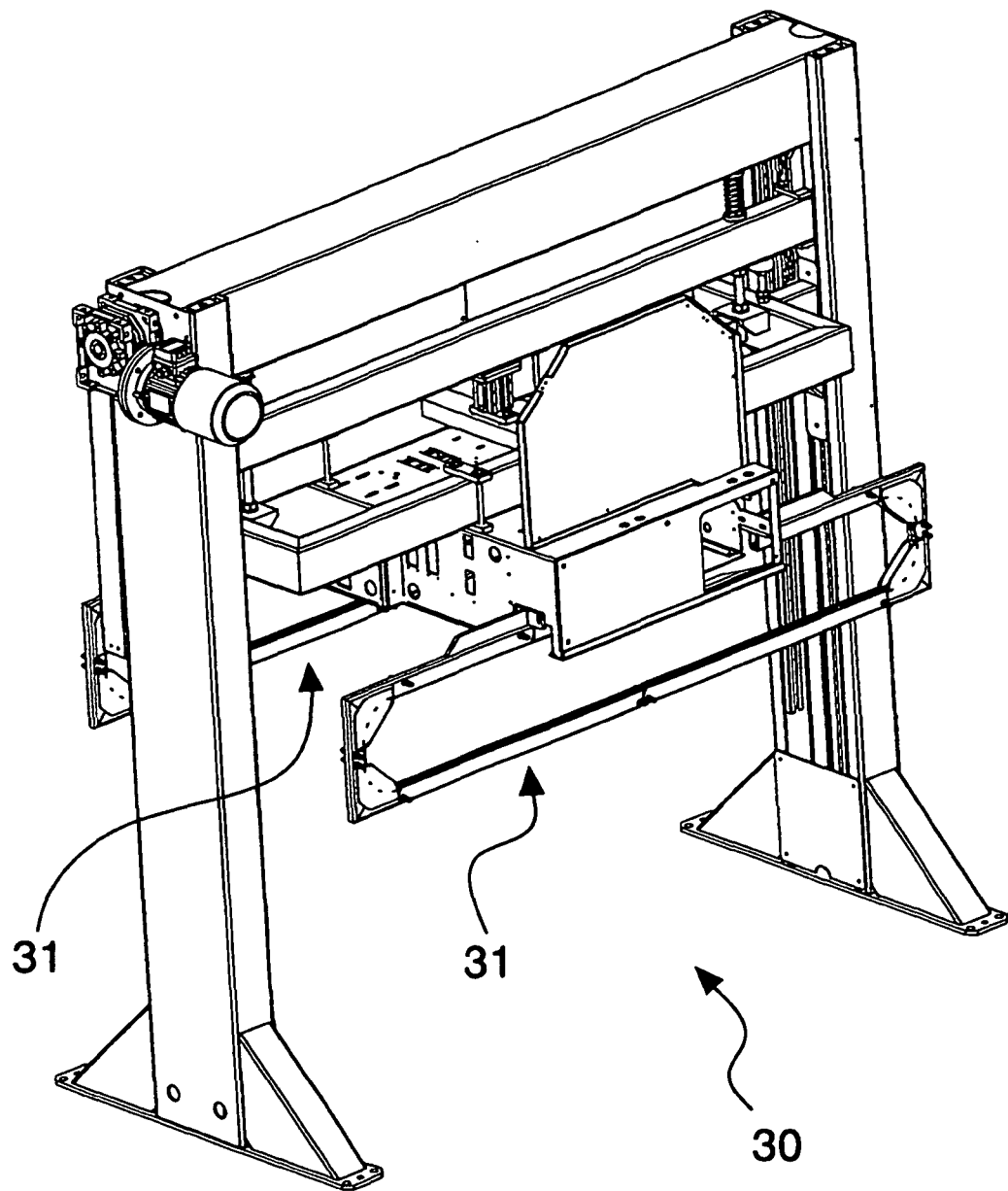


Fig. 15

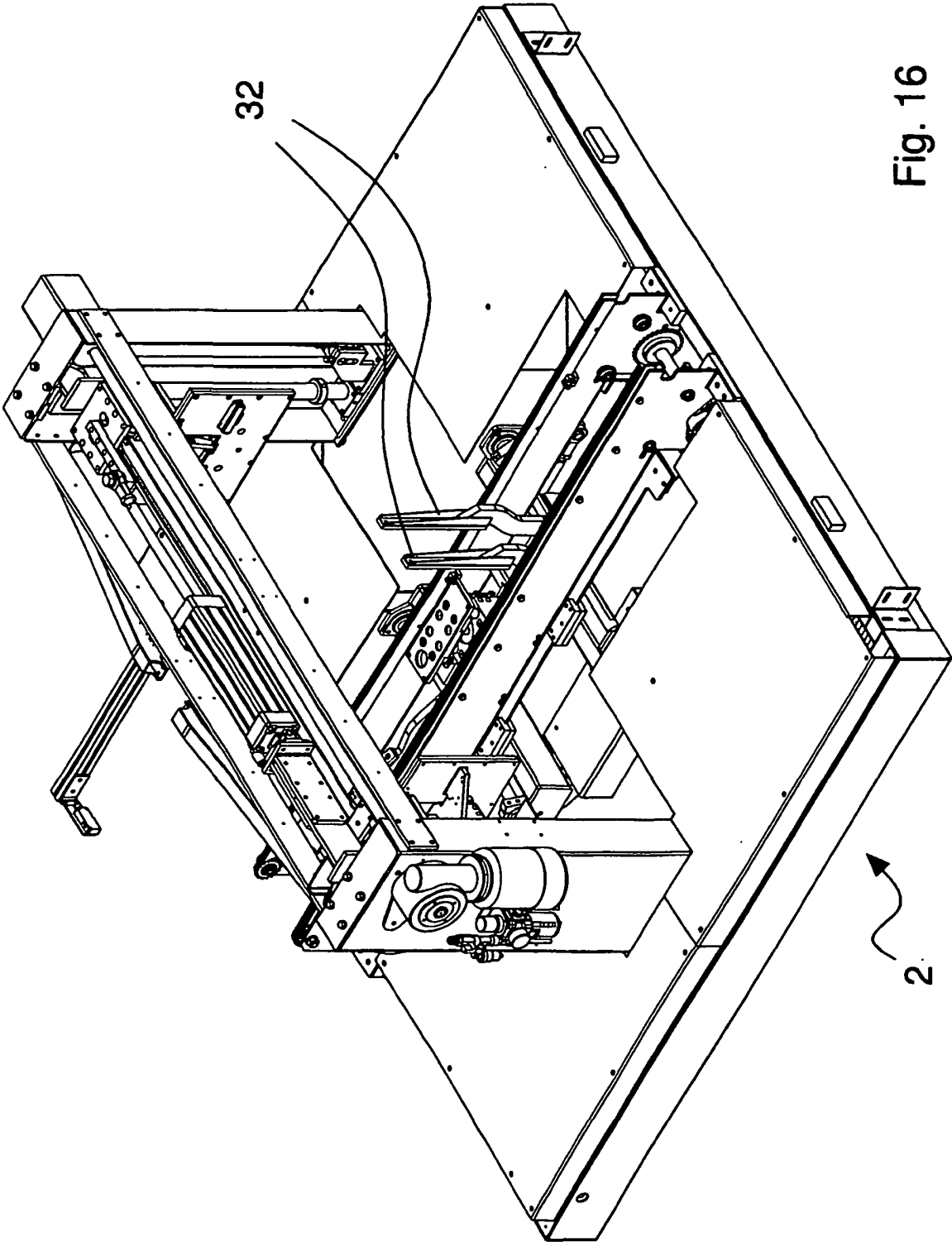


Fig. 16

Fig. 17A

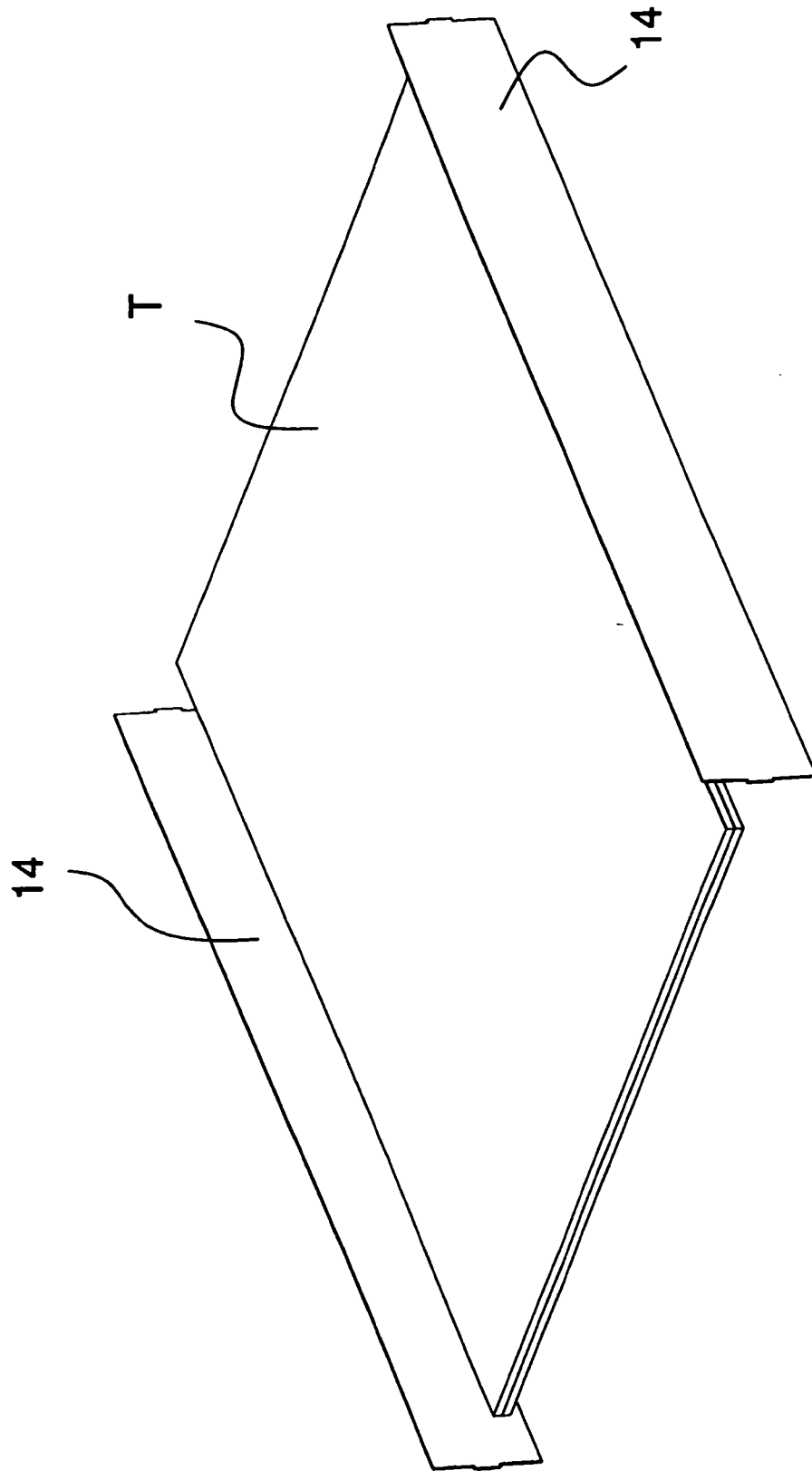


Fig. 17B

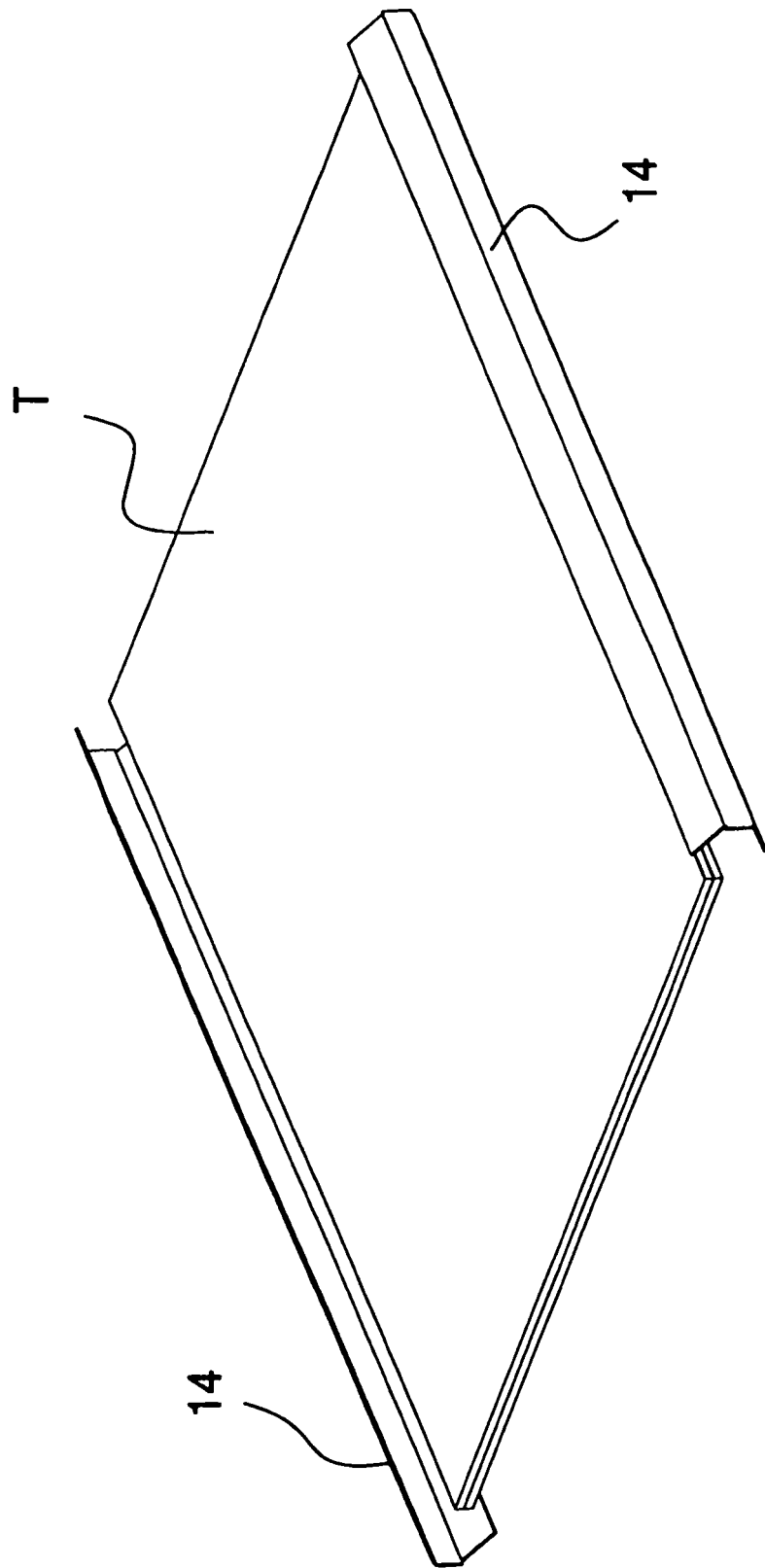
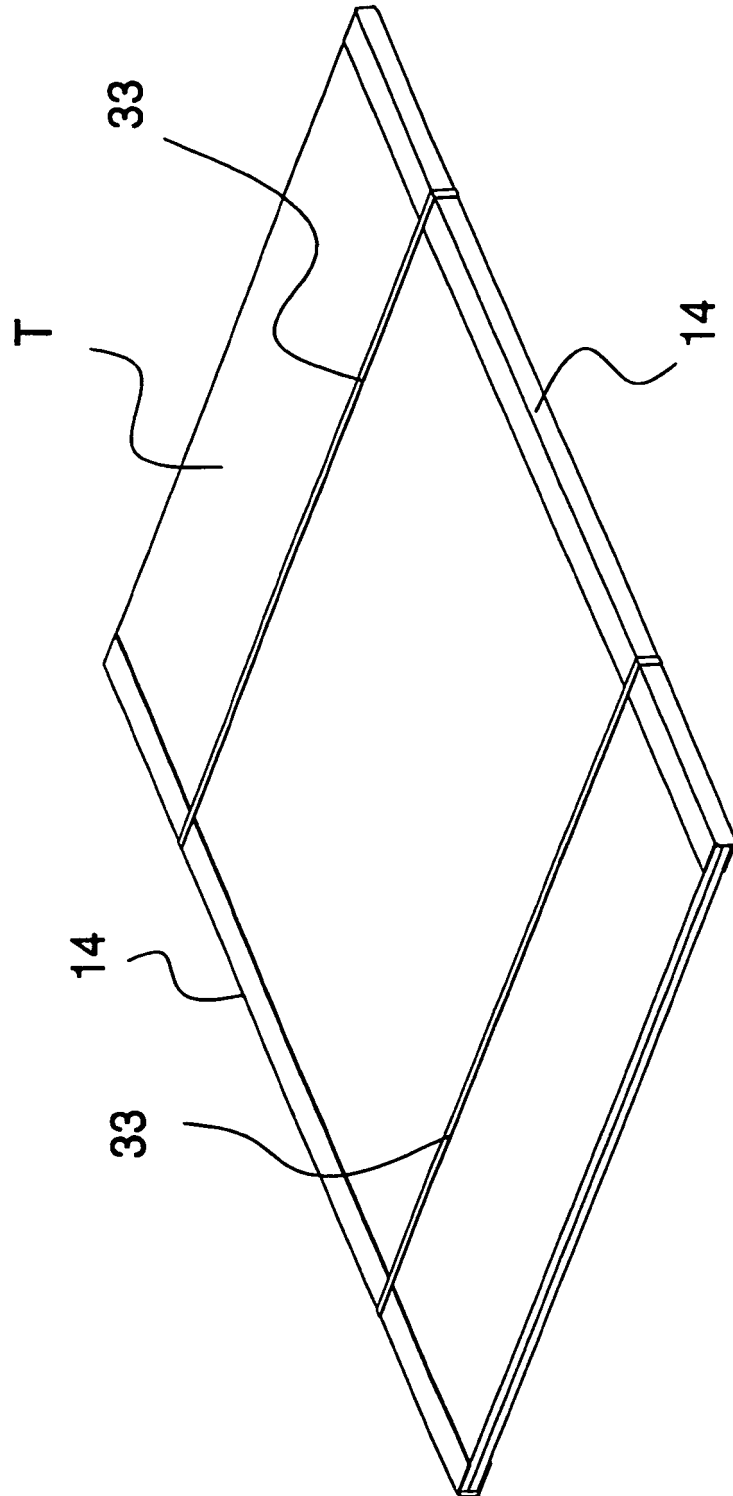


Fig. 17C



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2007148183 A [0002]
- DE 4114896 A1 [0003]