



(11)

EP 4 056 341 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.09.2022 Bulletin 2022/37

(51) International Patent Classification (IPC):
B27D 5/00 (2006.01) B27M 1/04 (2006.01)

(21) Application number: **22160140.4**

(52) Cooperative Patent Classification (CPC):
B27D 5/003; B27D 5/006; B27M 1/04

(22) Date of filing: **04.03.2022**

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

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(30) Priority: **04.03.2021 IT 202100005030**

(54) **EDGE-BANDING MACHINE**

(57) Edge-banding machine comprising a gluing group (12), which is adapted to glue a coating edge (B) on one side (L) of the panels (P), making an excess quantity of glue exit outward beyond the longitudinal flanks (FL) of such side (L), a trimming group (13) adapted to cut portions of the coating edge (B) which project beyond the longitudinal flanks (FL) of the side (L) of the panel (P), and a glue-scraper group (15) arranged for removing the aforesaid excess quantity of glue along the longitudinal flanks (FL) of the side (L) of the panel (P) coated with the coating edge (B). The glue-scraper group (15) comprises two blades (17) each provided with a tilted cutter (19), and horizontal guide means (20) which allow adjusting, in a particularly precise and simple manner, the position of the cutter (19) of the blades (17), in a manner such that the latter act flush along the longitudinal flanks (FL) of the sides (L) of the panels (P) in order to scrape away the excess glue without ruining the surface of the panels (P) themselves.

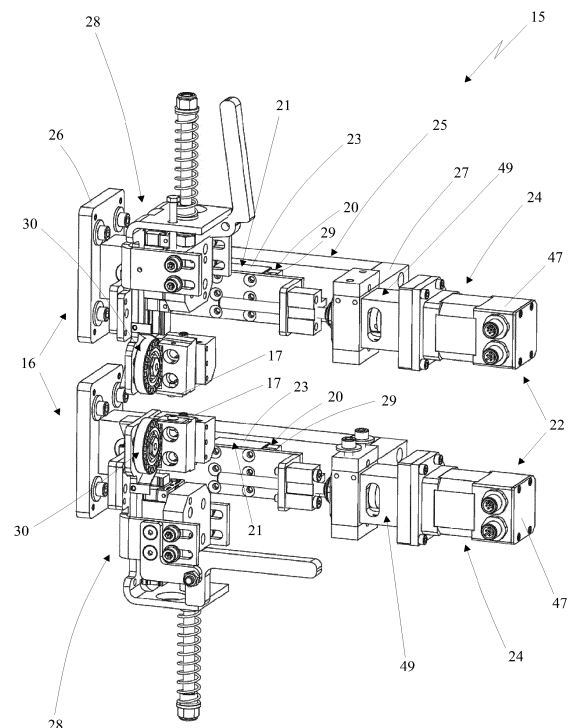


Fig. 4

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Description

Field of application

[0001] The present invention regards an edge-banding machine according to the preamble of independent claim 1.

[0002] The present edge-banding machine is intended to be advantageously employed for executing the application of coating edges on panels of different materials such as wood, chip, multilayer, MDF, etc.

State of the art

[0003] In the industry for working wood, in particular in the furniture industry, it is known to finish the panels by means of the application of edge bands which come to form the coating edges of the panels and which are then machined, rounding the edges thereof according to the desired profiles.

[0004] For such purpose, edge-banding machines were introduced in the market which are adapted to apply the coating edges on the sides of the panels and are provided with operating groups adapted to execute, in an automated manner, the necessary finishing operations for the edges themselves.

[0005] More in detail, the edge-banding machines of known type comprise a support frame provided with a sliding guide extended between an inlet port and an outlet port, and movement means (for example obtained with a slidable belt) adapted to move the panels to advance along the sliding guide from the inlet port to the outlet port.

[0006] The edge-banding machine also comprises a storage station adapted to house an edge band to apply to the panels and which will form the coating edge thereof. More in detail, such storage station comprises a rotatable support which carries, wound thereon, the edge band and is actuatable to rotate in order to unwind the edge band along the sliding line in order to apply the edge band to the side of the panel.

[0007] The edge-banding machine comprises a grinding group placed along the sliding line downstream of the inlet port and provided with one or more mills adapted to act on the side of the panel in order to eliminate the irregularities thereof.

[0008] The edge-banding machine also comprises a gluing group placed downstream of the grinding group and adapted to deposit, on the side of the panel, a glue layer (for example of hot melt type) and to compress, by means of two or more rollers, the edge band on the glue layer in order to glue the band to the side of the panel. The gluing group is provided with a cutting tool adapted to cut the edge band at the rear end of the panel.

[0009] In the aforesaid gluing operation, it is important that the glue layer deposited by the gluing group substantially covers the entire side of the panel, in order to ensure that the coating edge is not separated from the panel. For such purpose, the gluing group is set in a man-

ner such that the quantity of glue deposited on the side of the panel is such that, when the edge band is applied on such side, a small part of glue is crushed beyond the profile of the side of the panel, going beyond the edge band. In this manner, one ensures that substantially the entire area of the side of the panel has been covered with the glue.

[0010] The edge band glued to the panel by means of the aforesaid gluing group has length greater than the panel and width greater than the thickness of the panel itself, in a manner such that the edge band protrudes with respect to the ends and to the longitudinal flanks of the side of the panel.

[0011] The edge-banding machine also comprises an end facing group placed downstream of the gluing group and provided with a circular saw adapted to cut the portions of the edge band which project beyond the ends of the side of the panel, linearly cutting the ends of the edge band substantially flush with the ends of the side of the panel.

[0012] The edge-banding machine also comprises a trimming group placed downstream of the end facing group and adapted to cut the portions of the edge band which project beyond the longitudinal flanks of the side of the panel.

[0013] The edge-banding machine also comprises a rounding group placed downstream of the trimming group and provided with a milling device adapted to round the ends of the edge band in order to connect, without interruption, the external surface of the edge band with the adjacent orthogonal side of the panel.

[0014] One example of an edge-banding machine of the abovementioned type is described in the document CN 111516092 A.

[0015] The aforesaid end facing, trimming and rounding groups, which redefine the profile of the edge band attached to the panel, are unable to remove the aforesaid excess glue portion that protrudes beyond the side of the panel covered by the coating edge.

[0016] The removal of such excess glue portion requires a further very precise finishing operation, so as to prevent ruining the main faces of the panel and the coating edge. In particular, the main faces of the panel are increasingly covered with thin coating sheets, which bear the color or aesthetic motif of the panel printed thereon. In this situation, even a slight incision or scratch of the coating sheet is sufficient for removing the color from the surface of the panel, causing an aesthetic defect that involves discarding the panel itself.

[0017] It is known to execute such operation manually, in which an operator scrapes with a scalpel the profile of each panel so as to remove the excess glue. Nevertheless, such operation is particularly lengthy in terms of time.

[0018] In order to resolve such drawback, edge-banding machines were introduced on the market, provided - downstream of the above-described operating groups - with a glue-scraper group, which is arranged for inter-

cepting the side of the panel along the upper and lower longitudinal flank of the side to which the coating edge has been applied, in order to remove the excess glue along such longitudinal flanks.

[0019] For such purpose, the glue-scrapers group comprises two fixed blades, one upper and one lower, spaced from each other, in a manner such to define a passage traversed by the panel which advances along the sliding guide of the edge-banding machine. The distance between the two blades is set as a function of the thickness of the panel, in a manner such that each blade is placed flush with the corresponding longitudinal flank of the side of the panel, so as to remove the excess glue along such longitudinal flank without scratching the main face of the panel itself. The distance between the blades must be settable in a very fine manner, with a precision at least to a tenth or hundredth of a millimeter, so as to adapt the glue-scrapers group to the different panels to be machined.

[0020] For such purpose, each blade of the glue-scrapers group is mounted on a block inserted in a corresponding vertical guide and movable by means of an adjustment screw placed in proximity to the corresponding blade. In particular, in order to set the desired distance between the blades, the operator acts manually on the adjustment screws, setting a distance that he/she deems suitable. Subsequently, the operator passes a sample panel between the blades of the glue-scrapers group and verifies if the blades have also cut the main faces of the panel. In such case, the operator acts further on the adjustment screws and executes another test with a sample panel, repeating such operations until the desired result is obtained.

[0021] Also the latter solution of known type, nevertheless, has demonstrated that it does not lack drawbacks.

[0022] A first drawback is due to the fact that it is particularly difficult to obtain a precise adjustment of the distance of the blades of the glue-scrapers group, since the movement of the adjustment screw does not allow setting, in a very fine manner, the position of the block (on which the blade is fixed) along the corresponding vertical guide. In particular this involves the need to repeat the above-described test operations many times, in order to verify that the blades are correctly flush with the longitudinal profiles of the panel.

[0023] A further drawback is due to the fact that the operator must in any case manually act on the glue-scrapers group in order to adjust the distance between the blades, requiring the operator to access the space of the edge-banding machine and to execute operations that are not always easy.

[0024] A further drawback is due to the fact that, in order to move the adjustment screws, the operator must bring his/her hands quite close to the blades of the glue-scrapers group, with the risk of injury.

Presentation of the invention

[0025] In this situation, the problem underlying the present invention is therefore that of overcoming the drawbacks manifested by the solutions of known type by providing an edge-banding machine, which allows setting, in a simple and precise manner, the position of the blades of the glue-scrapers group.

[0026] Another object of the present invention is to provide an edge-banding machine which allows setting, in a quick and reliable manner, the position of the blades of the glue-scrapers group, in particular without the operator having to intervene directly on the glue-scrapers group.

[0027] Another object of the present invention is to provide an edge-banding machine which allows setting the position of the blades of the glue-scrapers group in a convenient and safe manner for the operator.

[0028] Another object of the present invention is to provide an edge-banding machine which is capable of operating in an entirely efficient and reliable manner.

[0029] Another object of the present invention is to provide an edge-banding machine which is structurally simple and inexpensive to attain.

Brief description of the drawings

[0030] The technical characteristics of the invention, according to the aforesaid objects, are clearly seen in the contents of the below-reported claims and the advantages thereof will be more evident in the following detailed description, made with reference to the enclosed drawings, which represent several merely exemplifying and non-limiting embodiments of the invention, in which:

- figure 1 shows a perspective view of an example of the edge-banding machine, object of the present invention;
- figure 2 shows a side view of the edge-banding machine illustrated in figure 1;
- figure 3 shows a side view of a detail of the edge-banding machine of figure 2 relative to a glue-scrapers group;
- figure 4 shows a front perspective view of the glue-scrapers group, in accordance with a first embodiment of the present invention;
- figure 5 shows a rear perspective view of the glue-scrapers group of figure 4;
- figure 6 shows a side view of the glue-scrapers group of figure 4;
- figure 7 shows a side view of the glue-scrapers group of figure 4;
- figure 8 shows a top plan view of the glue-scrapers group of figure 4;
- figure 9 shows a front perspective view of a detail of the glue-scrapers group, relative to the blades of the latter;
- figure 10 shows a front view of the detail of the glue-

- scrapper group illustrated in figure 9;
- figure 11 shows a front perspective view of the glue-scrapper group, in accordance with a second embodiment of the present invention;
- figure 12 shows an example of a panel intended to be machined by the present edge-banding machine;
- figure 13 shows a detail of the panel with a coating edge applied to one side of the panel itself.

Detailed description of a preferred embodiment

[0031] With reference to the enclosed drawings, reference number 1 overall indicates the edge-banding machine, object of the present invention.

[0032] The present edge-banding machine 1 is adapted to execute the application of coating edges on panels P for example made of wood, chip, multilayer, MDF (Medium-density fiberboard), etcetera.

[0033] Conventionally, with reference to the examples of figures 12 and 13, each panel P has substantially parallelepiped shape and is provided with two main faces FP, generally coated, parallel to and opposite each other and connected to each other perimetrically by four sides L, preferably two-by-two parallel, which define the thickness of the panel P itself, in particular extended perpendicular to the main faces FP.

[0034] Each side L of the panel P (with quadrangular shape, in particular rectangular) is extended, longitudinally, between two opposite end edges SE (a front end edge and a rear end edge), and is extended transversely between two opposite longitudinal flanks FL that are preferably parallel to each other. Each longitudinal flank FL (preferably rectilinear) connects the side L to the corresponding main face FP of the panel P, and advantageously each end edge SE connects the side L to the corresponding adjacent side L of the panel P itself.

[0035] The edge-banding machine 1 is adapted to apply a coating edge B (e.g. of PVC, ABS, melamine, wood, Formica, aluminum, etc.) on one or more sides L of the panel P.

[0036] In accordance with the embodiment illustrated in figures 1 and 2, the edge-banding machine 1 is in particular of monolateral type, being adapted to apply a coating edge B to only one side L of the panel P with each passage of the panel P through the edge-banding machine 1 itself. Advantageously, the edge-banding machine 1 comprises a support frame 2 intended to be abutted against the ground and provided with a sliding line 3 extended between an inlet port 4 and an outlet port 5 according to a substantially rectilinear and in particular horizontal sliding direction DS.

[0037] The sliding line 3 lies on a sliding plane PS parallel to the sliding direction DS and preferably substantially horizontal.

[0038] Suitably, the sliding line 3 is provided with an operating side (on which the below-described operating groups 11, 12, 13, 14, 15 are placed) and with an opposite rear side.

[0039] The edge-banding machine 1 also comprises advancing means 6 adapted to move the panels P to advance along the sliding line 3 from the inlet port 4 to the outlet port 5.

5 **[0040]** The aforesaid advancing means 6 are adapted to advance each panel P positioned with the main faces FP parallel to the sliding plane PS (in particular horizontal) and with the longitudinal flanks FL parallel to the sliding direction DS (in particular these too also horizontal).

10 **[0041]** Preferably, with reference to figures 1-3, the advancing means 6 comprise a conveyor belt 7 (e.g. with belts, of per se conventional type), adapted to advance the panels P separately on the sliding plane PS (in horizontal position), in succession one with respect to the other from the inlet port 4 to the outlet port 5. In particular, the panel P is placed with one of its main faces FP abutted against the conveyor belt 7 with the side L to be covered placed on the operating side of the sliding line 3.

15 **[0042]** Suitably, the sliding line 3 comprises an abutment track 8, parallel to the sliding direction DS and placed substantially at the same height as the advancing means 6 (and in particular as the conveyor belt 7) in order to define, with the latter, the sliding plane PS. In this manner, in particular, the panels P are susceptible of advancing along the sliding direction DS abutted against the conveyor belt 7 and against the abutment track 8.

20 **[0043]** Advantageously, the edge-banding machine 1 also comprises a storage station 9 adapted to house an edge band to apply to the sides L of the panels P and which will form the coating edge B of the panels P themselves. More in detail, such storage station 9 comprises a rotatable support 10 which carries the edge band (not illustrated) wound thereon and is actuatable to rotate in order to unwind the edge band along the sliding line 3, in order to apply the edge band to the side L of the panel P.

25 **[0044]** The edge-banding machine 1 advantageously comprises a grinding group 11, of per se known type, placed along the sliding line 3 downstream of the inlet port 4 and provided with one or more mills (not illustrated) adapted to act on the side L of the panel P in order to eliminate the irregularities thereof.

30 **[0045]** The edge-banding machine 1 comprises a gluing group 12 mounted on the support frame 2 along the sliding line 3 (in particular downstream of the grinding group 11) and arranged for gluing the edge band on one of the sides L of the panel P (in particular on the side L placed on the operating side of the sliding line 3) in order to form a coating edge B thereon.

35 **[0046]** More in detail, the gluing group 12 is arranged for depositing, on the side L of the panel P, a glue layer and subsequently apply on such glue layer a coating edge B (i.e. the edge band that will form it) in order to fix the latter to the side of the panel P.

40 **[0047]** The gluing group 12 is arranged for depositing, on the side L of the panel P, a quantity of glue (predefined) such that, when the edge band is applied, the latter makes an excess quantity of glue go beyond the longitudinal flanks FL of the side L of the panel P itself. Such

arrangement allows ensuring (also by means of a simple visual control by the operator) that the glue has been spread substantially over the entire surface of the side L of the panel P, so as to prevent the coating edge B from detaching from the latter.

[0048] Advantageously, the gluing group 12 comprises, in a per se conventional manner, a distribution device adapted to pick up the glue (e.g. of hot melt type) from a containment tank and to deposit the layer of such glue on the side L of the panel P. The gluing group 12 is also provided with two or more rollers adapted to compress the edge band on the glue layer in order to glue the edge band to the side L of the panel P. The gluing group 12 is also provided with a cutting tool adapted to cut the edge band at the rear end edge SE of the side L of the panel P, in a manner such that the portion of edge band attached to the side L of the panel P forms a coating edge B of the panel P itself.

[0049] The coating edge B glued to the corresponding side L of the panel P by means of the gluing group 12 has length greater than the side L of the panel P and width greater than the thickness of the panel P itself, in a manner such that the coating edge B projects with respect to the end edges SE and with respect to the longitudinal flanks FL of the side L of the panel P.

[0050] The edge-banding machine 1 also comprises a trimming group 13, of per se known type, placed downstream of the gluing group 12 (between the latter and the output station) and adapted to cut the portions of the coating edge B which project beyond the longitudinal flanks FL of the side L of the panel P, in particular substantially flush with the main faces FP of the panel P itself. Advantageously, the edge-banding machine 1 comprises a milling group 14 mounted on the support frame 2 along the sliding line 3, placed between the gluing group 12 and the outlet port 5 (in particular downstream of the trimming group 13), and arranged for milling the portions of the coating edge B which project beyond the end edges SE of the side L of the panel P, defining two ends of the coating edge B substantially aligned with the end edges SE of the corresponding side L of the panel P.

[0051] Advantageously, the milling group 14 can be arranged for executing an end facing operation (in order to cut, in a rectilinear manner, the ends of the coating edge B) or a rounding operation (in order to round the ends of the coating edge B of the panel P, in a manner such to connect without interruption the external surface of such coating edge B with the adjacent main face FP of the panel P).

[0052] Suitably, in accordance with the embodiment illustrated in figures 1 and 2, the milling group 14 comprises a milling device with rotary mill selectively settable to execute the end facing operation or the rounding operation.

[0053] In accordance with a non-illustrated embodiment variant, the milling group 14 can comprise two separate rotary mill devices, of which one is arranged for executing the end facing operation and the other is ar-

ranged for executing the rounding operation. In accordance with a further embodiment variant, the trimming group 13 and the milling group 14 can be integrated on a same operating unit.

[0054] The edge-banding machine 1 can be advantageously provided with further operating groups of per se known type and not described in the present document.

[0055] The panel P, after having been machined by the trimming group 13 and by the milling group 14, has the coating edge B sized flush with the longitudinal flanks FL and the end edges SE of the side L on which it is applied.

[0056] The machining of the aforesaid trimming 13 and milling 14 groups, nevertheless, do not allow removing (at least entirely) the excess quantity of glue that is present along the longitudinal flanks FL of the side L of the panel P following the operation conducted by the gluing group 12. In order to remove such excess quantity of glue, the edge-banding machine 1 comprises a glue-scraper group 15 mounted on the support frame 2 along the sliding line 3, and placed between the trimming group 13 and the outlet port 4 (in particular downstream of the milling group 14). Such glue-scraper group 15 is arranged for removing the excess quantity of glue along the longitudinal flanks FL of the side L of the panel P coated with the coating edge B, without ruining the main faces FP of the panel P itself.

[0057] Advantageously, the edge-banding machine 1 comprises an electronic control unit, in particular provided with a PLC, adapted to control in an automated or semi-automated manner the operating groups 11, 12, 13, 14, 15 of the edge-banding machine 1 itself.

[0058] According to the invention, with reference to the examples of figures 4-11, the glue-scraper group 15 comprises a support structure 16 fixed on the support frame 2 of the edge-banding machine 1, and at least one at least one blade 17, which is mounted on the aforesaid support structure 16 and is adapted to scrape the excess quantity of glue from the longitudinal flank FL of the panel P.

[0059] More in detail, as is visible in the details illustrated in figures 9 and 10, the blade 17 of the glue-scraper group 15 is provided with a front face 18 (external) that is directed (permanently) towards the sliding line 3 of the edge-banding machine 1, in a manner such to be susceptible of facing towards the coated side L of the panels P that advance along the sliding line 3 itself.

[0060] The front face 18 of the blade 17 is delimited on the front part by a cutter 19, which is extended transversely to the sliding direction DS and is arranged for the flush interception of a corresponding longitudinal flank FL of the side L of the panel P in order to scrape away the excess quantity of glue.

[0061] Preferably, the front face 18 of the blade 17 has substantially flat shape and is parallel to the sliding direction DS.

[0062] Suitably, the front face 18 is extended, according to a direction parallel to the sliding direction DS, be-

tween a front edge, defined by the aforesaid cutter 19, and an opposite rear edge. Advantageously, the cutter 19 of the blade 17 is directed towards the inlet port 4 of the edge-banding machine 1, in a manner such to intercept the panels P (at one of their longitudinal flanks FL) which are advanced by the advancing means 6 towards the outlet port 5.

[0063] Preferably, the cutter 19 of the blade 17 has rectilinear shape and is perpendicular (bent) with respect to the sliding direction DS.

[0064] In accordance with the idea underlying the present invention, the cutter 19 of the blade of the glue-scraper group 15 is tilted with respect to the sliding plane PS by a specific tilt angle α smaller than 90° .

[0065] Advantageously, the tilt angle α is comprised between 1° and 30° , and preferably between 1° and 10° , and still more preferably between 1° and 5° , for example $3^\circ \pm 1^\circ$.

[0066] Advantageously, as is visible in figure 10, such tilt angle α is extended between the sliding plane PS and the front face 18 of the blade 17 at the cutter 19.

[0067] In particular, the tilt of the cutter 19 of the blade 17 is to be intended as the tilt of the projection of such cutter 19 on a projection plane orthogonal to the sliding direction DS, with respect to the line of intersection of the sliding plane PS with said projection plane. Therefore, the tilt angle is defined between the aforesaid projection of the cutter 19 and the aforesaid line of intersection of the sliding plane PS.

[0068] Advantageously, the front face 18 (preferably flat) of the blade 17 and it is also tilted with respect to the sliding plane PS, preferably by the same tilt angle α as the cutter 19.

[0069] In addition, the glue-scraper group 15 comprises guide means 20, which are mounted on the support structure 16 and define an adjustment direction DR parallel to the sliding plane PS and orthogonal to the sliding direction DS, and preferably horizontal.

[0070] In addition, the glue-scraper group 15 comprises displacement means 21, which are constrained to the aforesaid guide means 20 and carry, mounted thereon, the blade 17, and movement means 22, which are mechanically connected to the displacement means 21 and are actuatable to move the latter along the adjustment direction DR in order to adjust the distance of the cutter 19 of the blade 17 with respect to the longitudinal flank FL of the side L of the panel P.

[0071] In this manner, in particular, the tilted position of the cutter 19 of the blade 17 ensures that its movement along the adjustment direction DR (parallel to the sliding plane PS) allows moving the cutter 19 itself close to or away from the point at which the longitudinal flanks FL of the panels P pass.

[0072] Indeed, the tilted position of the cutter 19 allows the blade 17 to act on the longitudinal flank FL of the side L of the panel P partially from the side of such side L and therefore the movement of the blade 17 along the above-defined (horizontal) adjustment direction DR allows mod-

ifying the point on which the cutter 19 acts on the longitudinal flank FL.

[0073] In particular, the tilted configuration of the cutter 19 with respect to the adjustment direction DR ensures that, by moving the blade 17 along the latter, the distance of the cutter 19 from the point at which the longitudinal flank FL of the panel passes varies both horizontally and vertically (generally both along the adjustment direction DR and orthogonally to the sliding plane PS), allowing positioning the cutter 19 in an extremely precise manner in the desired position.

[0074] The claimed configuration allows adjusting, in a precise and simple manner, the position of the blade 17 with respect to the panel P, by acting simply on the movement means 22 without having to execute complex operations at the blade 17 of the glue-scraper group 15.

[0075] In addition, the tilted position of the cutter 19 of the blade 17 ensures that the latter works according to a plane that is tilted with respect to the main face FP of the panel P, further reducing the risk of ruining the coating of the main face FP itself.

[0076] Advantageously, the glue-scraper group 15 comprises two blades 17 adapted to act on the two longitudinal flanks FL of the side L of the panel P, one on the upper longitudinal flank FL and the other on the lower longitudinal flank FL.

[0077] The two blades 17 are mounted on the displacement means 21 and are positioned spaced from each other along a spacing direction DD orthogonal to the sliding plane PS with the front faces 18 facing each other, in a manner such that the panel P can pass between the two blades 17 themselves.

[0078] In this manner, the two blades 17 are arranged for scraping, with their corresponding cutters 19, the excess quantity of glue along the corresponding longitudinal flanks FL of the side L of the panel P.

[0079] In particular, the front face 18 of each blade 17 (due to its tilt) is in part directed towards the front face 18 of the other blade 17 and in part directed towards the sliding line 3 of the edge-banding machine 1 in order to face the corresponding longitudinal flank FL of the panels P which advance along the sliding line 3 itself.

[0080] The distance between the two blades 17 is defined as a function of the thickness of the panel P (defined as the distance between the two lateral faces FP thereof). On such matter, the aforesaid tilted position of the cutters 19 of the blades 17 ensures that the movement of the blades 17 along the adjustment direction DR carries such blades 17 to act against the two longitudinal flanks FL of the side L of the panel P at two respective closer or further-apart points of the two cutters 19.

[0081] Preferably, the blade 17 is arranged for operating in a stationary manner, in particular in a manner such that, once the blade 17 is placed in an operating position thereof, this is stopped when it is adapted to intercept the panel P transported by the advancing means 6. Advantageously, the displacement means 21 comprise two adjustment sliders 23, each of which carries the corre-

sponding blade 17 of the glue-scrapers group 15 mounted thereon, is slidably constrained to the guide means 20 and is connected to the movement means 22 in order to be moved along the adjustment direction DR.

[0082] Preferably, the adjustment sliders 23 are mechanically free from each other with respect to their displacement along the adjustment direction DR on the guide means 20, and the movement means 22 are arranged for independently moving the adjustment sliders 23 along the adjustment direction DR itself.

[0083] In this manner, it is possible to adjust the position of each blade 17 in a manner independent from that of the other blade 17, therefore allowing the adaptation, in a particularly precise manner, of the glue-scrapers group 15 to the size and morphological characteristics of the panels P, e.g. for panels P which have tilted sides L and/or the two longitudinal flanks FL with different shape (e.g. more or less rounded or smoothed).

[0084] Advantageously, the movement means 22 comprise two separate movement devices 24, each of which only connected to the corresponding adjustment slider 23 and actuatable independently with respect to the other movement device 24, in a manner such that the position of each of the two blades 17 can be set in a particularly easy manner.

[0085] In accordance with the embodiments illustrated in figures 4-11, the support structure 16 of the glue-scrapers group 15 comprises two support brackets 25, each of which extended, parallel to the adjustment direction DR, between a first end 26 (preferably flanged) fixed to the support frame 2 of the edge-banding machine 1, and a second end 27, on which the corresponding movement device 24 is mounted.

[0086] Suitably, the glue-scrapers group 15 comprises two operating heads 28 mounted on the support structure 16 and each carrying the corresponding blade 17 mounted thereon.

[0087] In particular, each operating head 28 carries fixed thereto the corresponding adjustment slider 23, through which it is slidably constrained to the guide means 20.

[0088] Advantageously, each operating head 28 is mounted, by means of the guide means 20 and displacement means 21, on the corresponding support bracket 25, preferably positioned between the first end 26 and the second end 27 of the support bracket 25 itself.

[0089] Advantageously, the guide means 20 comprise at least one guide track 29 fixed to the support structure 16 and extended along adjustment direction DR in order to guide the movement of the displacement means 21 (and in particular of the two adjustment sliders 23) along the adjustment direction DR itself.

[0090] In particular, two guide tracks 29 are provided, at each of which the corresponding adjustment slider 23 is slidably connected.

[0091] Preferably, each guide track 29 is fixed to the corresponding support bracket 25, in particular positioned between the first end 26 and the second end 27

of the latter.

[0092] In accordance with the examples illustrated in the enclosed figures, the guide track 29 comprises an elongated body with shaped transverse section (e.g. dovetail shaped) and the corresponding adjustment slider 23 is provided with a respective seat with transverse section counter-shaped with respect to that of the elongated body, in a manner such that the latter is inserted to size in the seat with a minimum clearance in order to allow the sliding of the adjustment slider 23.

[0093] In accordance with an alternative non-illustrated embodiment, the guide means 20 are defined by a portion of the movement means 22 (for example by the movable member of a linear actuator).

[0094] Advantageously, the glue-scrapers group 15 comprises a coupler 30 mounted on each operating head 28 and adapted to abut against the corresponding main face FP of the panel P (during passage of the latter through the glue-scrapers group 15) in order to maintain the corresponding blade 17, during the scraping of the glue, constantly in a specific operating position with respect to the longitudinal flank FL of the panel P in order to ensure a uniform machining.

[0095] Preferably, the coupler 30 and the blade 17 of each operating head 28 are mounted on a slidable frame 31 of the latter, which is movable according to a displacement direction SS orthogonal to the sliding plane PS (in particular vertical). Suitably, the slidable frame 31 is connected to elastic means 32 adapted to push the corresponding slidable frame 31 towards the other operating head 28. In this manner, when the panel P intercepts the coupler 30, the latter is maintained pressed by the elastic means 32 against the corresponding main face FP of the panel P itself.

[0096] Advantageously, the coupler 30 is provided with a coupling surface 33 having a contact zone 33', which is placed substantially at the same height as the cutter 19 of the corresponding blade 17 and adapted to abut against the main face FP of the panel P in order to maintain the blade 17 at a constant height with respect to the panel P during the passage of the latter through the glue-scrapers group 15.

[0097] Suitably, the coupler 30 is obtained with an idle wheel 30' with axis parallel to the adjustment direction R and provided with an annular surface that defines the coupling surface 33 of the coupler 30 itself.

[0098] In accordance with the embodiments illustrated in the enclosed figures, each operating head 28 comprises a support body 34 carrying, fixed thereto, the corresponding adjustment slider 23 coupled to the guide means 20.

[0099] Advantageously, such support body 34 is extended, according to the adjustment direction DR, between a first end 35, to which the movement means 22 and preferably the corresponding movement device 24 are connected, and a second end 36, at which the blade 17 and preferably the coupler 30 are positioned.

[0100] In particular, at the second end 36, the support

body 34 is provided with a vertical guide 37, parallel to the displacement direction SS, with which the slidable frame 31 is slidably engaged. More in detail, the second end 36 of the support body 34 is provided with a bent portion to which a fork body 38 is fixed, provided with two arms 39 between which the aforesaid vertical guide 37 is fixed.

[0101] Advantageously, the slidable frame 31 is provided with a first end 40, at which the blade 17 and the coupler 30 are mounted, and with a second end 41 comprising a projecting portion 42 placed in front of the vertical guide 37. The latter carries a rod 43 fixed thereto, which traverses a through hole made on the projecting portion 42 of the slidable frame 31 and provided with an enlarged free end 44 positioned beyond the projecting portion 42 on the opposite side of the latter with respect to that on which the vertical guide 37 is placed. Suitably, the elastic means 32 comprise a helical spring 32' wound around the aforesaid rod 43 and compressed between the enlarged free end 44 of the latter and the projecting portion 42 of the slidable frame 31, in a manner such to push the latter away from the enlarged free end 44 and hence towards the other operating head 28 (therefore pushing the coupler 30 against the main face FP of the panel P which intercepts the coupler 30 itself).

[0102] Preferably, each operating head 28 comprises an attachment block 45, which carries, fixed thereto, the corresponding blade 17 (e.g. by means of a fixing screw 46), and, in particular, is suitably fixed to the slidable frame 31 at the first end 40 of the latter.

[0103] Advantageously, according to a first embodiment of the present invention illustrated in figures 4-8, the movement means 22 (which actuate the displacement of the blade 17 along the adjustment direction DR) comprise at least one motorized actuation member 47, in particular provided with an electric motor, e.g. of stepper type.

[0104] Preferably, each movement device 24 comprises a corresponding aforesaid motorized actuation member 47, actuatable independently from that of the other movement device 24. Advantageously, the electronic control unit of the edge-banding machine 1 is operatively connected to the motorized actuation member 47 and is arranged for commanding the actuation of the latter by means of numeric control.

[0105] Suitably, the electronic control unit comprises a control panel, through which the operator can set and control the advancement rate of the adjustment sliders 23 along the adjustment direction DR.

[0106] In particular, the movement by means of motorized actuation member 47 and electronic control unit allows adjusting the position of the blades 17 in a particularly accurate and facilitated manner, since it is not necessary to access the glue-scraper group.

[0107] In accordance with a second embodiment of the present invention illustrated in figure 11, the movement means 22, and in particular the movement devices 24, are of manual type. For example, the movement devices

24 comprise an actuation knob 48 intended to be manually moved in rotation by a user.

[0108] Advantageously, the movement device 24 comprises a linear actuator 49 provided with a movable member 50 having movement direction parallel to the adjustment direction DR. Preferably, the linear actuator comprises a support jacket 51 fixed to the support structure 16, in particular to the respective support bracket 25 at the first end 26 of the latter. On such support jacket 51, the movable member 50 is mounted which is connected to the respective adjustment slider 23, preferably connected to the respective operating head 28, in particular to the support body 34 at the first end 35 of the latter.

[0109] In accordance with the embodiments illustrated in the enclosed figures, the movable member 50 comprises a screw-nut screw mechanism, and is provided with a threaded rod 52 (whose thread is not illustrated) parallel to the adjustment direction DR and rotatably mounted on the support jacket 51, and with a sliding block 53 provided with a nut screw in which the threaded rod 52 is fixed and fixed to the operating head 28 in particular to the support body 34 of the latter.

[0110] In accordance with the first embodiment of the present invention, in which the movement device 24 comprises a motorized actuation member 47, the electric motor of the latter is connected to the threaded rod 52 in order to actuate the rotation thereof and thus the displacement of the corresponding sliding block 53.

[0111] In accordance with the second embodiment of the present invention, in which the movement device 24 is of manual type, the threaded rod 52 is connected to the actuation knob 48.

[0112] The invention thus conceived therefore attains the pre-established objects.

Claims

1. Edge-banding machine (1), which comprises:

- a support frame (2) provided with a sliding line (3), which is extended, along a sliding direction (DS), between an inlet port (4) and an outlet port (5), and lies on a sliding plane (PS) parallel to said sliding direction (DS);
- advancing means (6) adapted to advance panels (P) to be machined along the sliding line (3) of said support frame (2) from said inlet port (4) towards said outlet port (5); each said panel (P) being provided with two main faces (FP) that are substantially opposite and parallel to each other and connected to each other perimetrically by four sides (L), each of which is extended, longitudinally, between two opposite end edges (SE) and, transversely, between two longitudinal flanks (FL), each of which joins said side (L) to the corresponding said main face (FP); said advancing means (6) being adapted to advance

each said panel (P) with said main faces (FP) parallel to said sliding plane (PS) and said longitudinal flanks (FL) parallel to said sliding direction (DS);

- a gluing group (12), which is mounted on said support frame (2) along said sliding line (3) and is arranged for depositing, on at least one of the sides (L) of said panel (P), a glue layer and for applying a coating edge (B) on said side (L) in order to fix said coating edge (B) to said side (L), making an excess quantity of glue exit outward beyond the longitudinal flanks (FL) of said side (L);

- a trimming group (13) mounted on said support frame (2) along said sliding line (3), placed between said gluing group (12) and said outlet port (5) and adapted to cut portions of the coating edge (B) which project beyond the longitudinal flanks (FL) of the side (L) of said panel (P);

- a glue-scraper group (15) mounted on said support frame (2) along said sliding line (3), placed between said trimming group (13) and said outlet port (5), and arranged for removing said excess quantity of glue along the longitudinal flanks (FL) of said side (L) coated with said coating edge (B);

wherein said glue-scraper group (15) comprises:

- a support structure (16) fixed on said support frame (2);

- at least one blade (17), which is mounted on said support structure (16), is provided with a front face (18) directed towards said sliding line (3) and on the front delimited by a cutter (19), which is extended transversely to said sliding direction (DS) and is arranged for the flush interception of a corresponding said longitudinal flank (FL) of the side (L) of said panel (P) in order to scrape away said excess quantity of glue;

said edge-banding machine (1) being **characterized in that** the cutter (19) of said at least one blade (17) of said glue-scraper group (15) is tilted with respect to said sliding plane (PS) by a specific tilt angle (α) less than 90°;

wherein said glue-scraper group (15) comprises:

- guide means (20), which are mounted on said support structure (16) and define an adjustment direction (DR) parallel to said sliding plane (PS) and orthogonal to said sliding direction (DS);

- displacement means (21), which are constrained to said guide means (20) and carry, mounted thereon, said at least one blade (17);

- movement means (22), which are mechanically connected to said displacement means (21) and are actuatable to move said displacement

means (21) along said adjustment direction (DR) in order to adjust the distance of the cutter (19) of said at least one blade (17) with respect to the longitudinal flank (FL) of the side of said panel (P).

2. Edge-banding machine (1) according to claim 1, **characterized in that** said glue-scraper group (15) comprises two said blades (17), which are mounted on said displacement means (21), are positioned spaced from each other along a spacing direction (DD) orthogonal to said sliding plane (PS) with said front faces (18) facing each other, and they are arranged for scraping, with their corresponding said cutters (19), said excess quantity of glue along the corresponding longitudinal edges (FL) of the side (L) of said panel (P).

3. Edge-banding machine (1) according to claim 2, **characterized in that** said displacement means (21) comprise two adjustment sliders (23), each of which carries, mounted thereon, the corresponding said blade (17), is slidably constrained to said guide means (20) and is connected to said movement means (22) in order to be moved along said adjustment direction (DR).

4. Edge-banding machine (1) according to claim 3, **characterized in that** said adjustment sliders (23) are mechanically free with respect to their displacement along said adjustment direction (DR) on said guide means (20), and said movement means (22) are arranged for independently moving said adjustment sliders (23) along said adjustment direction (DR).

5. Edge-banding machine (1) according to claim 4, **characterized in that** said movement means (22) comprise two movement devices (24), each of which is connected to the corresponding said adjustment slider (23) and is actuatable independently with respect to the other said movement device (24).

6. Edge-banding machine (1) according to any one of the preceding claims, **characterized in that** said movement means (22) comprise at least one motorized actuation member (47).

7. Edge-banding machine (1) according to claim 6, **characterized in that** it comprises an electronic control unit operatively connected to said at least one motorized actuation member (47) and arranged for commanding said at least one motorized actuation member (47) by means of numeric control.

8. Edge-banding machine (1) according to any one of the preceding claims, **characterized in that** said movement means (22) comprise at least one linear

actuator (49) provided with a movable member (50) having movement direction parallel to said adjustment direction (DR).

9. Edge-banding machine (1) according to any one of the preceding claims, **characterized in that** said guide means (20) comprise at least one guide track (29) fixed to said support structure (16) and extended along said adjustment direction (DR). 5 10
10. Edge-banding machine (1) according to any one of the preceding claims, **characterized in that** said tilt angle (α) is comprised between 1° and 30°.
11. Edge-banding machine (1) according to any one of the preceding claims, **characterized in that** said blade (17) has shape substantially flat and parallel to said sliding direction (DS). 15
12. Edge-banding machine (1) according to any one of the preceding claims, **characterized in that** the front face (18) of said blade (17) is extended, according to a direction parallel to said sliding direction (DS), between a front edge, defined by said cutter (19), and an opposite rear edge. 20 25

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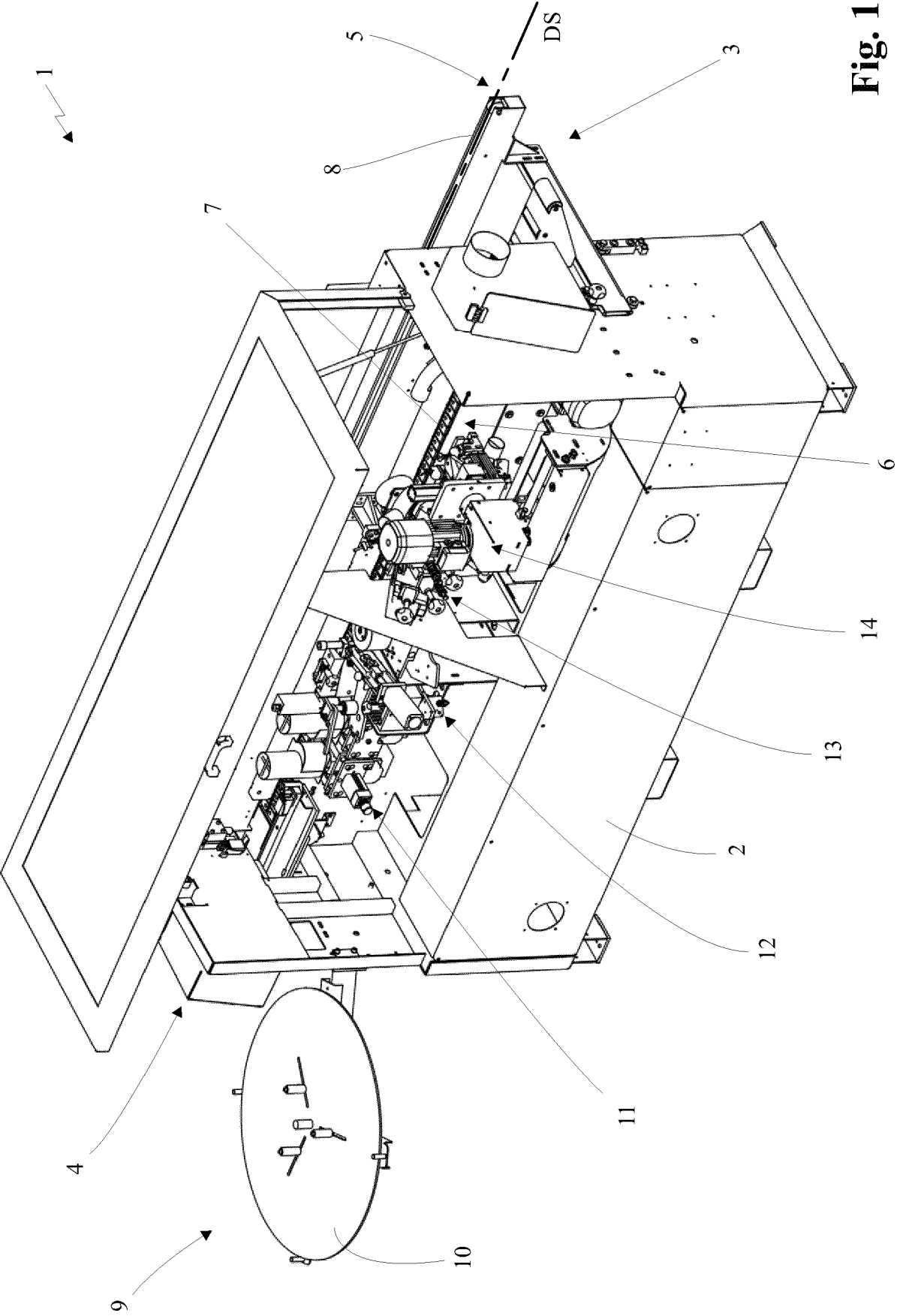


Fig. 1

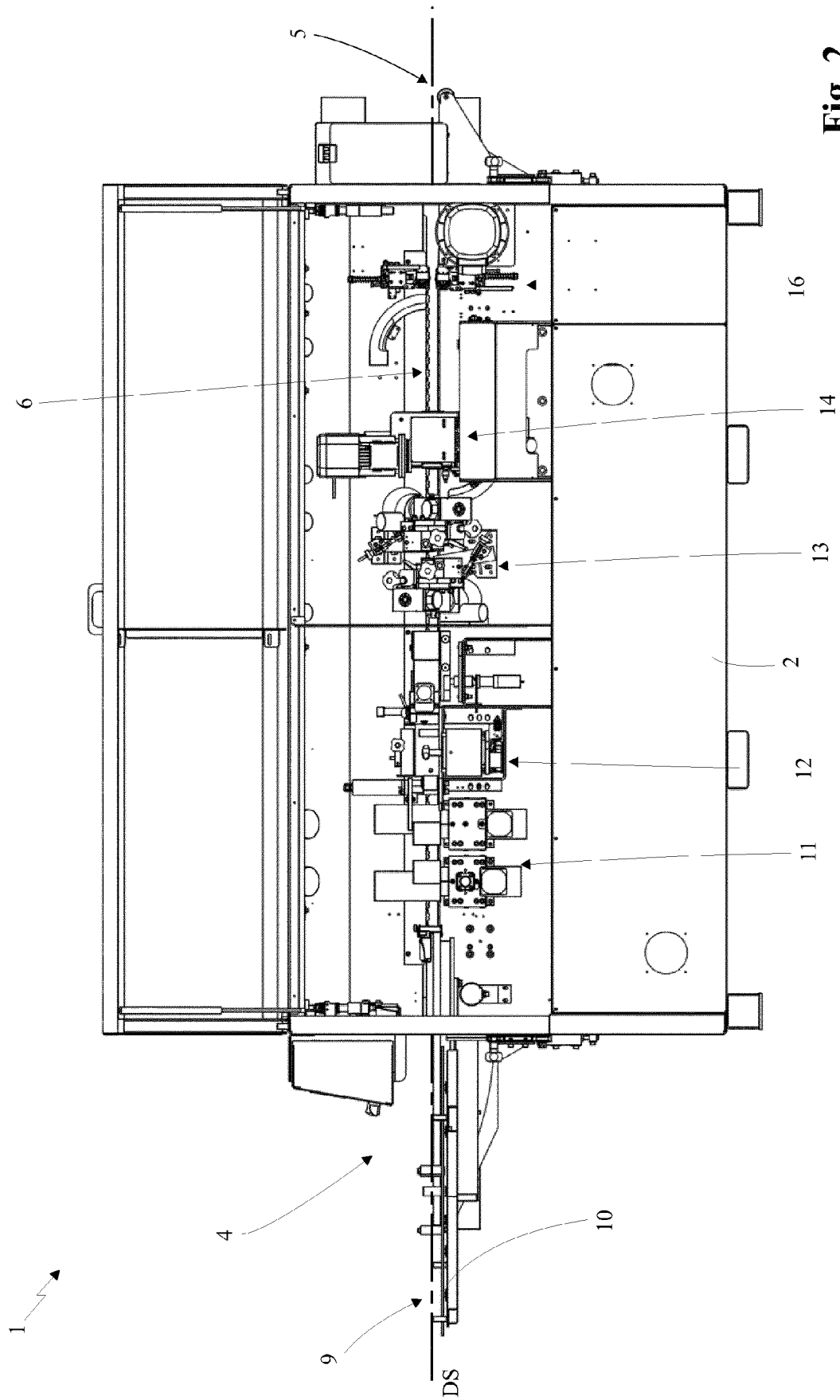
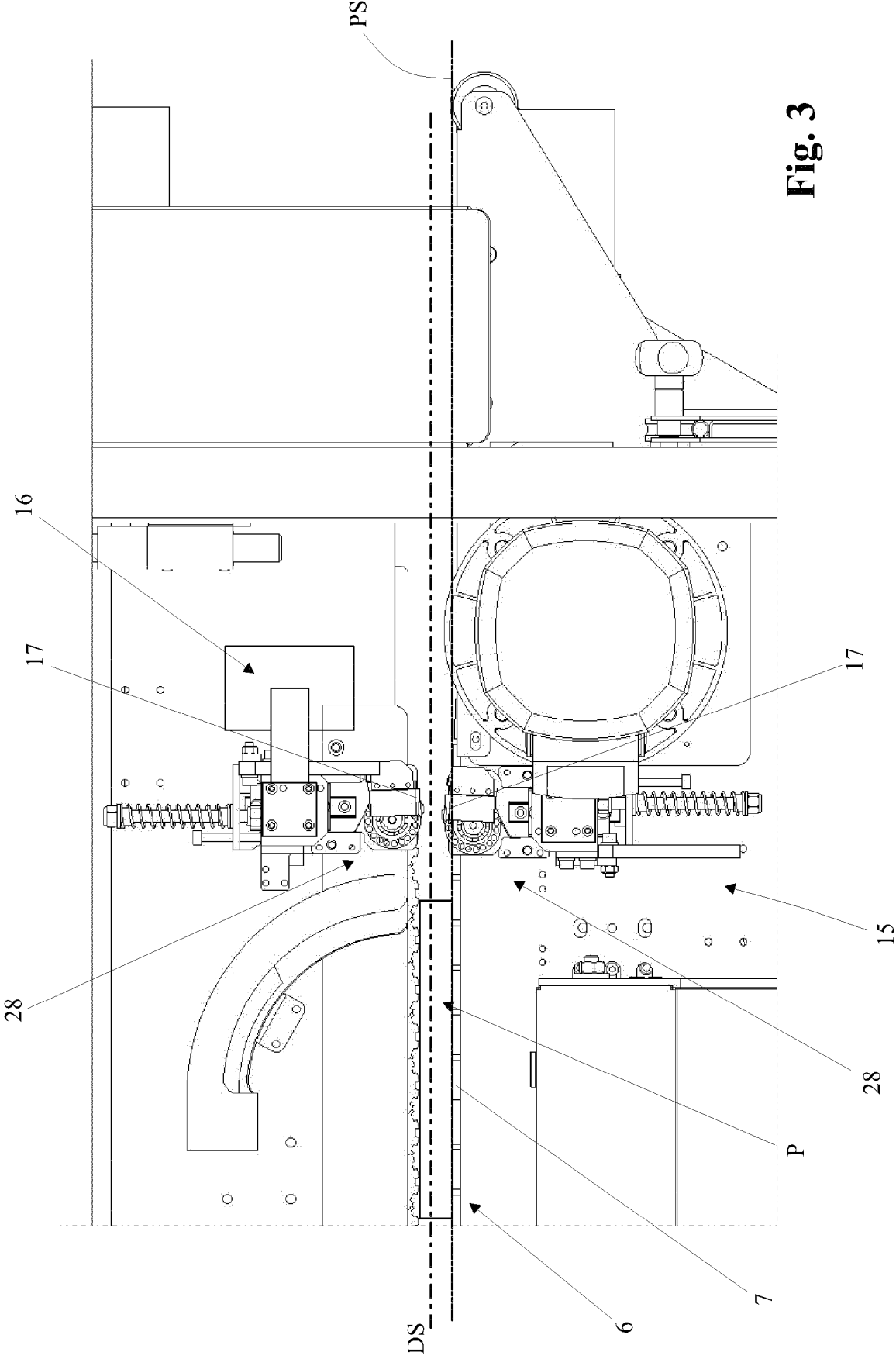


Fig. 2



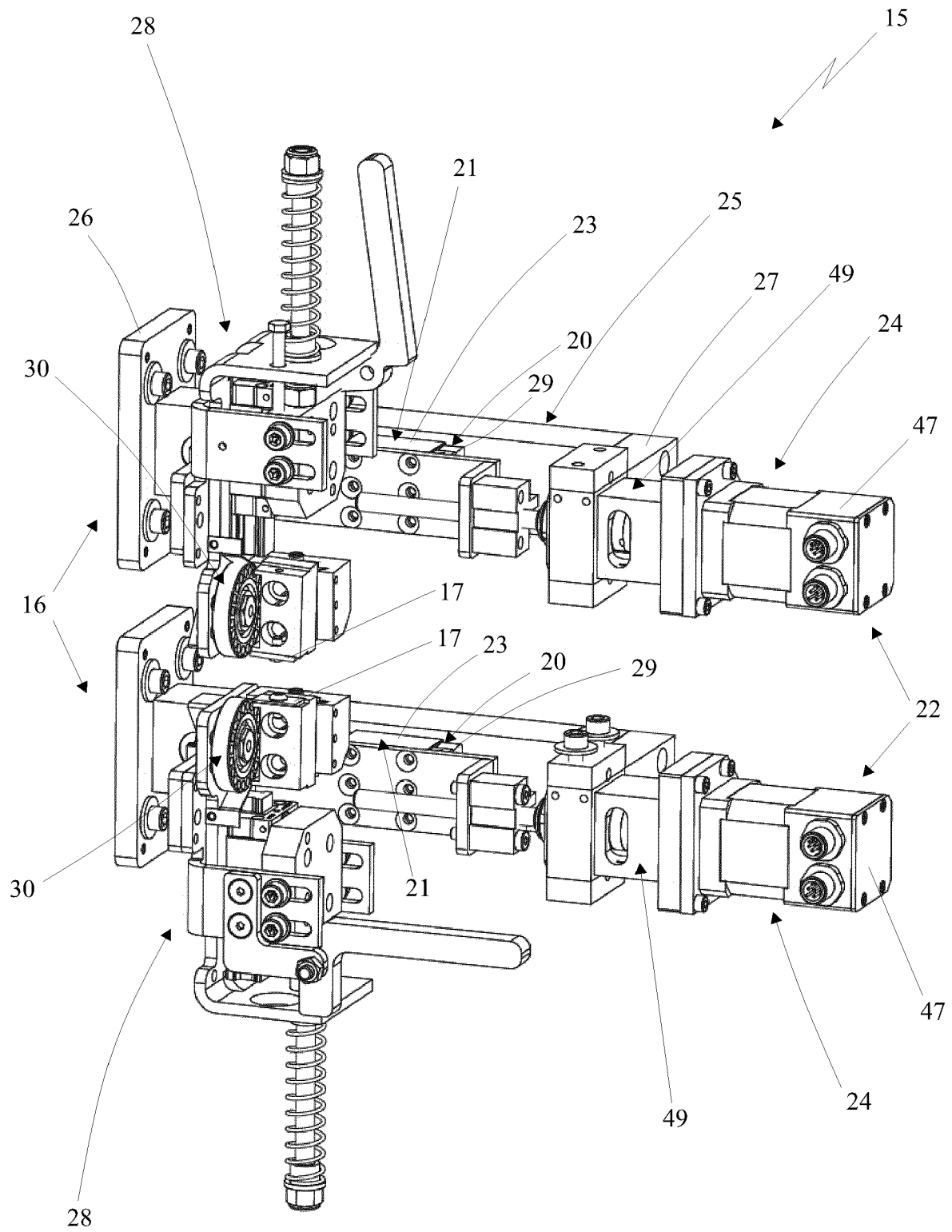


Fig. 4

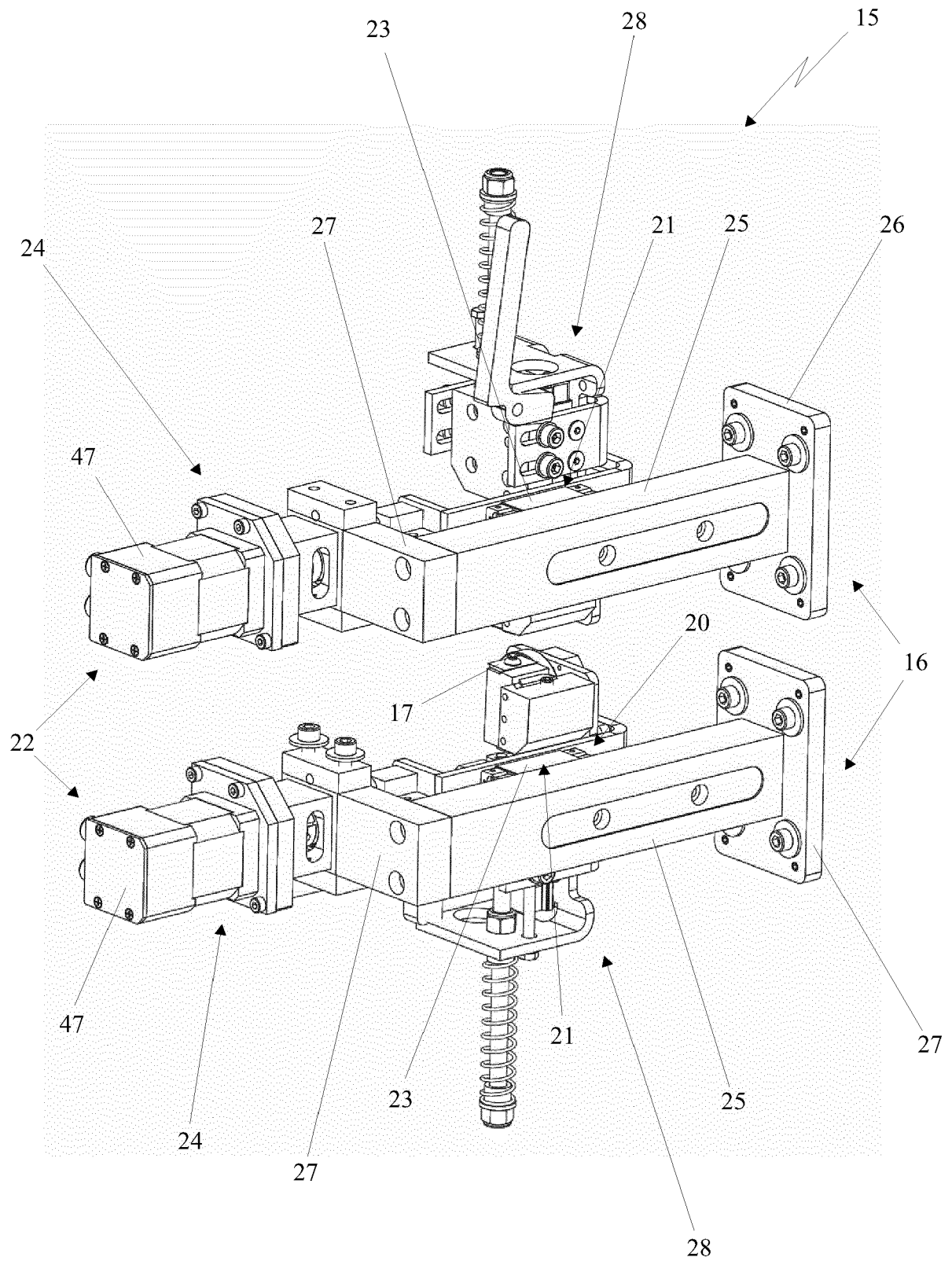


Fig. 5

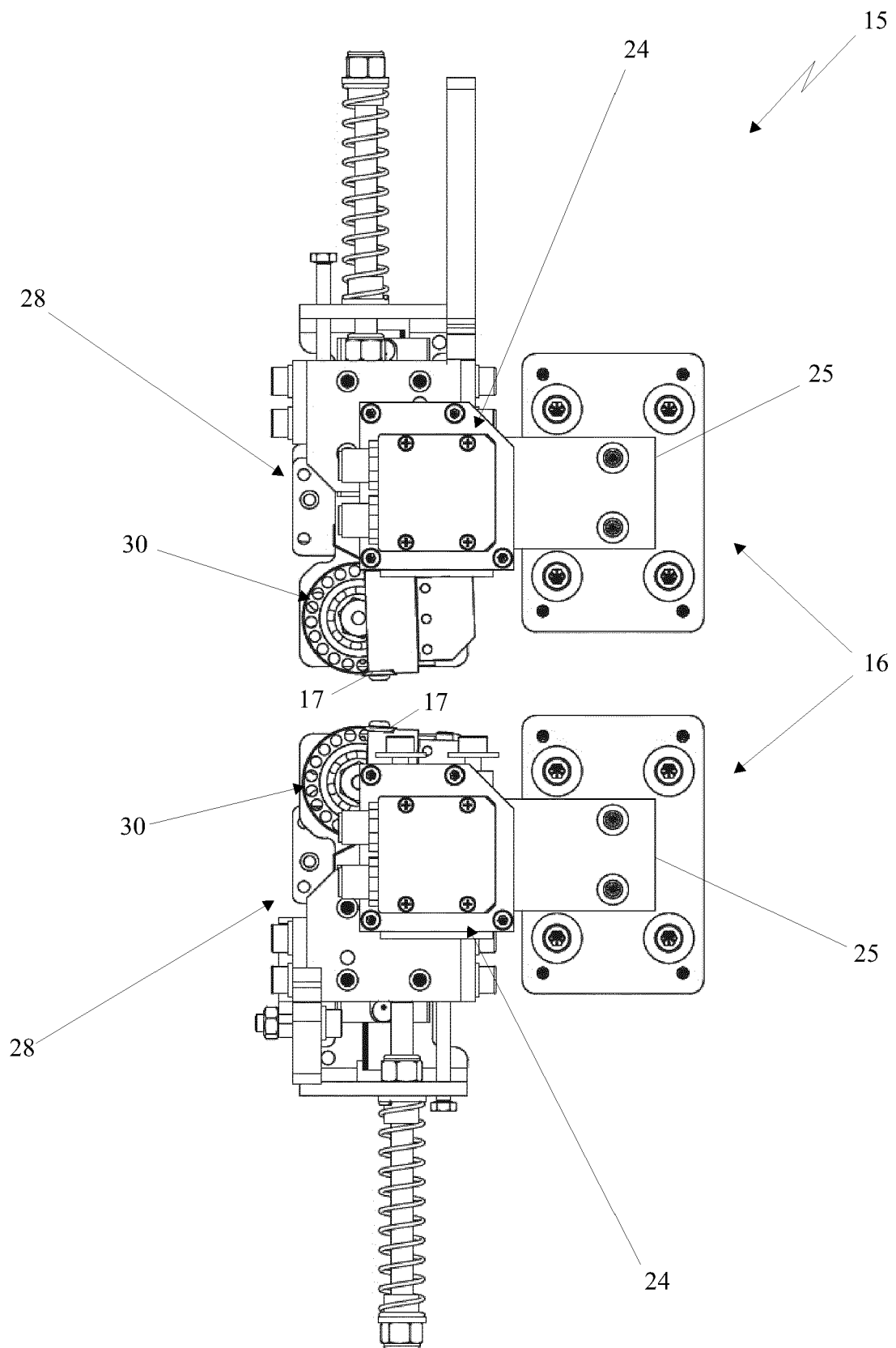


Fig. 6

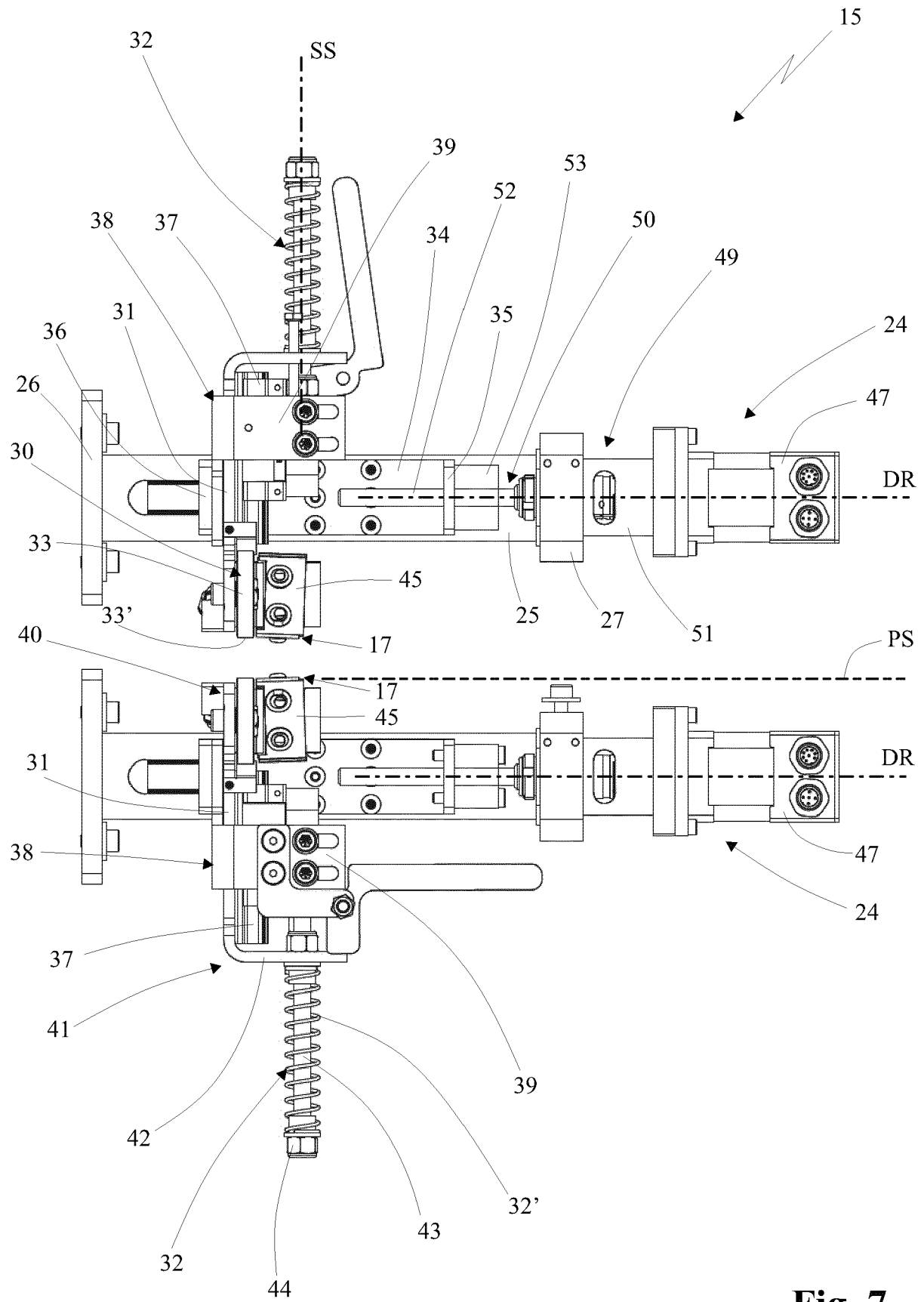


Fig. 7

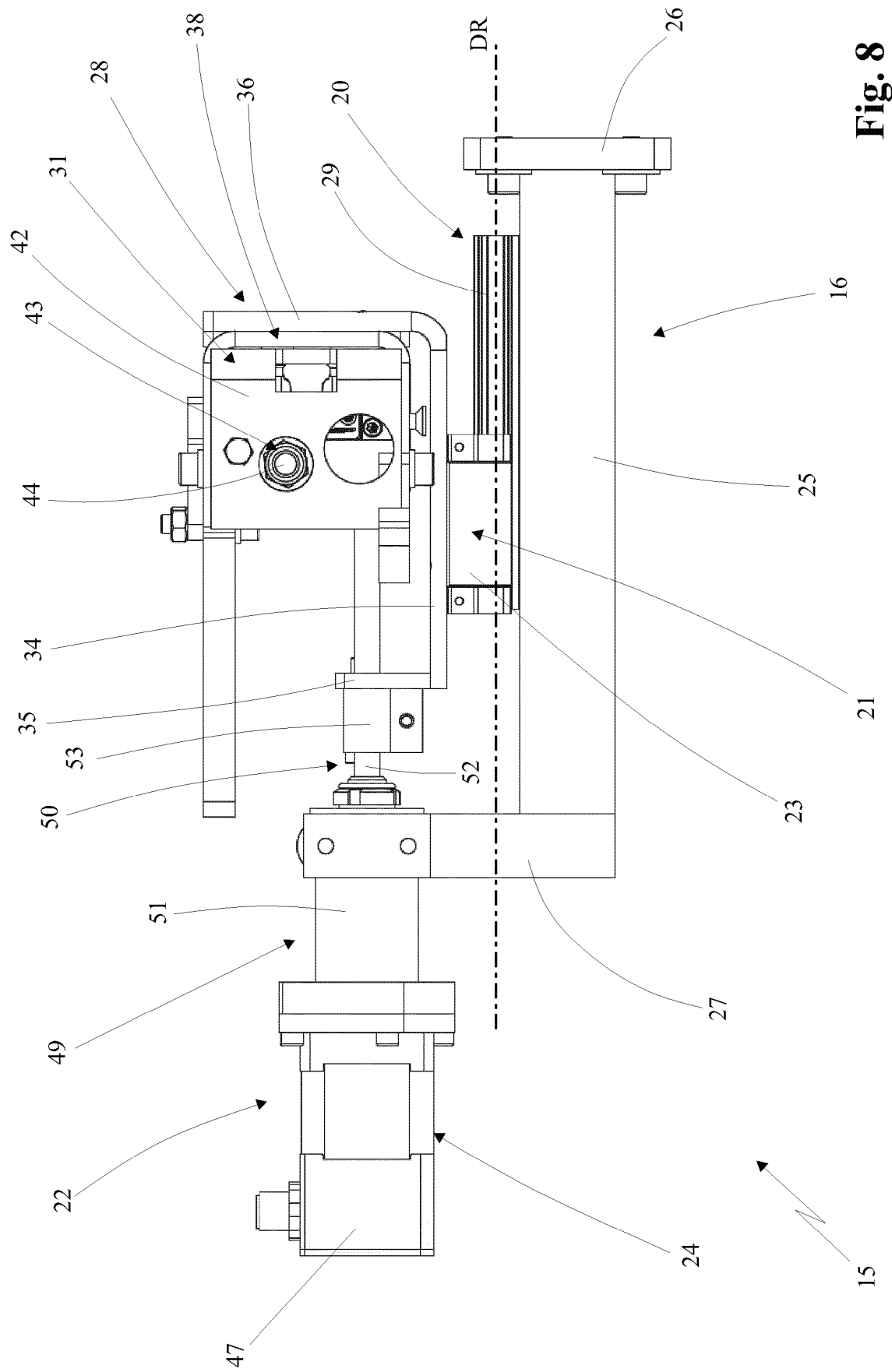


Fig. 8

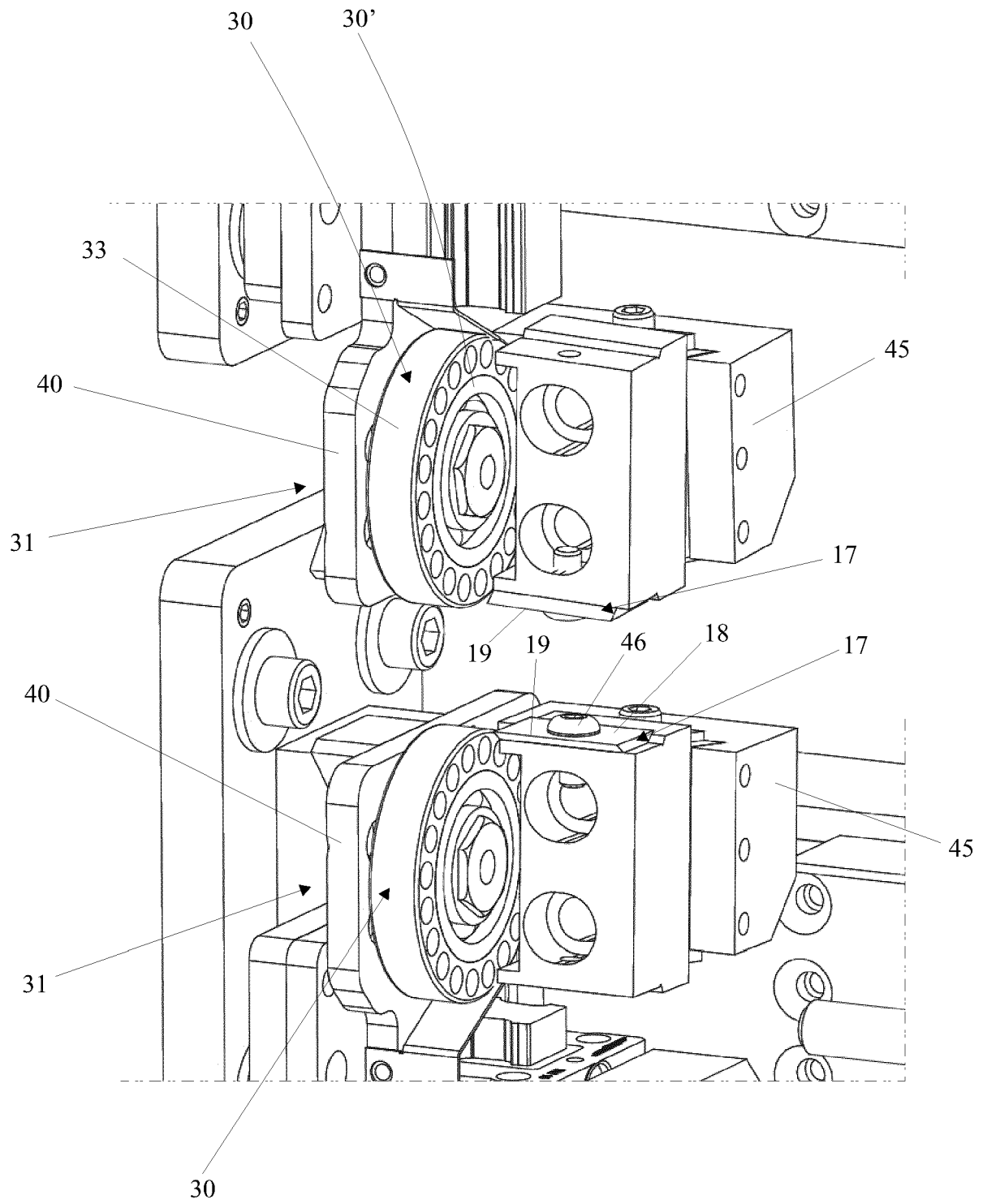


Fig. 9

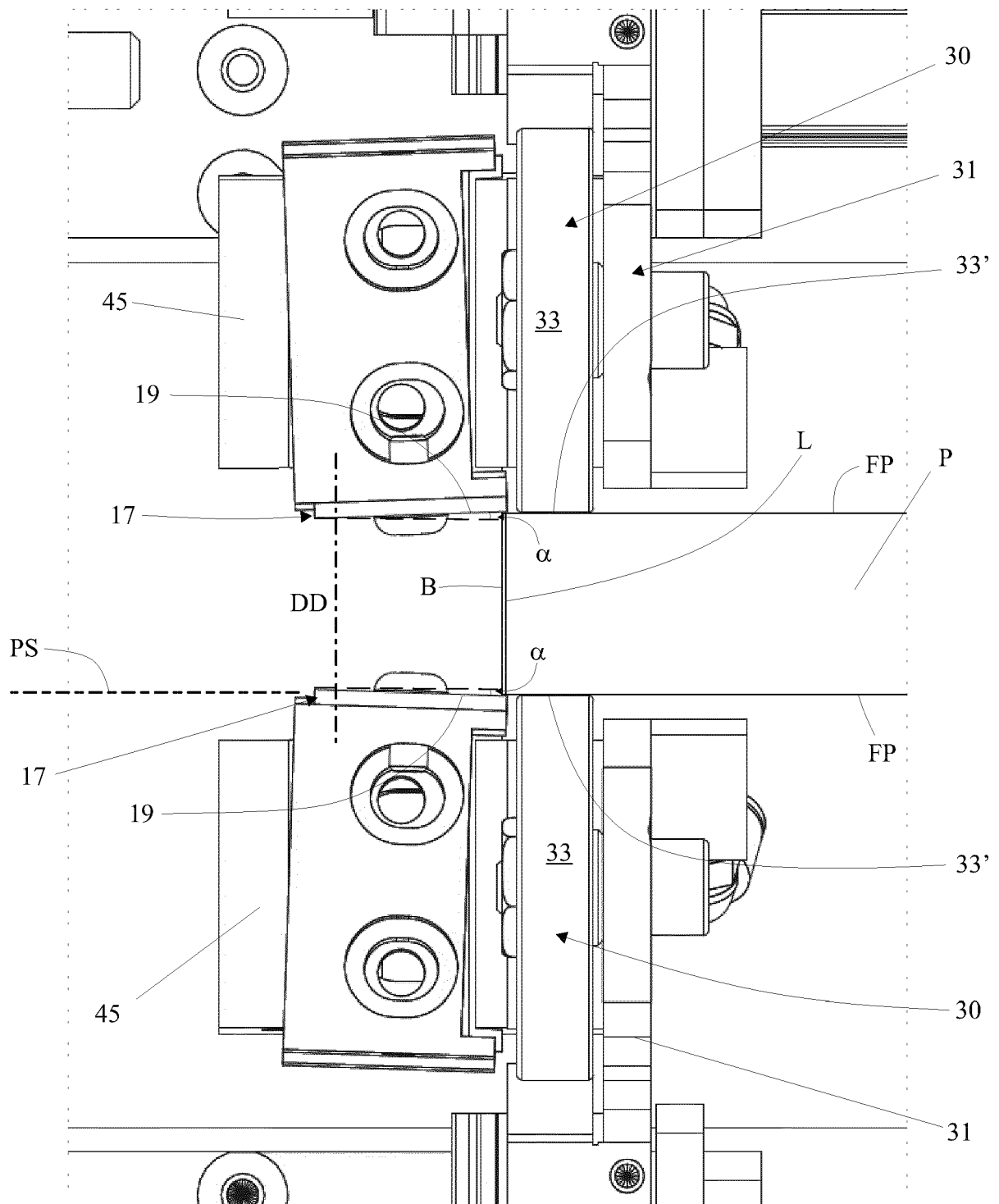


Fig. 10

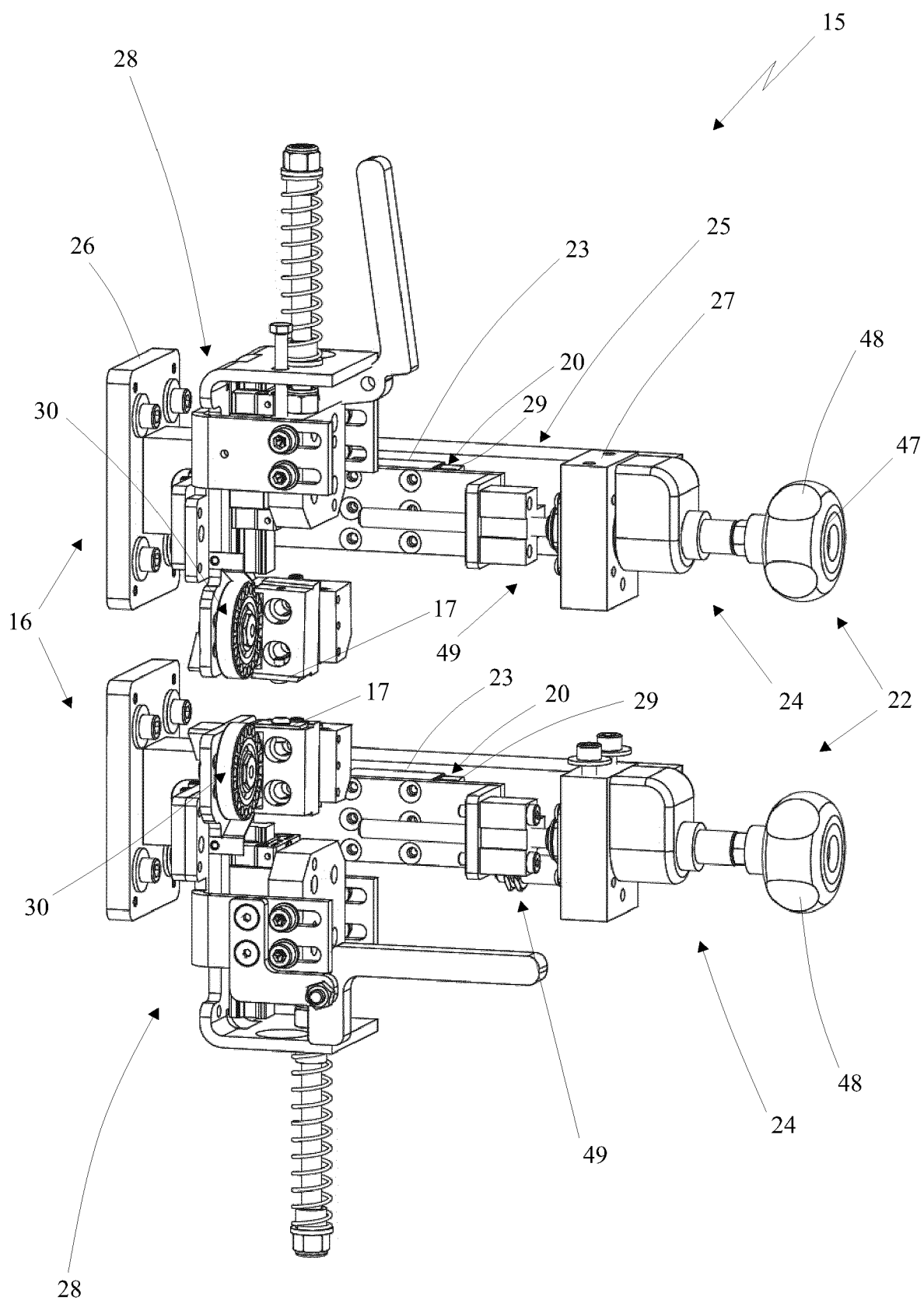


Fig. 11

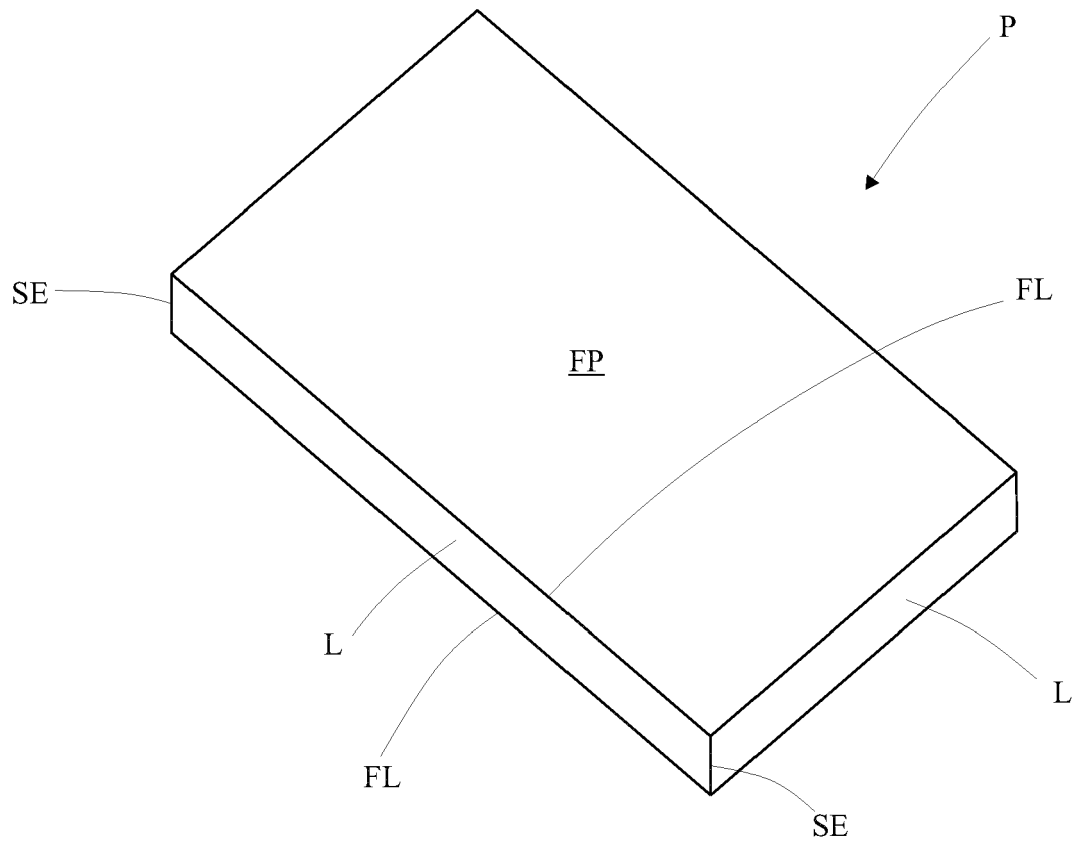


Fig. 12

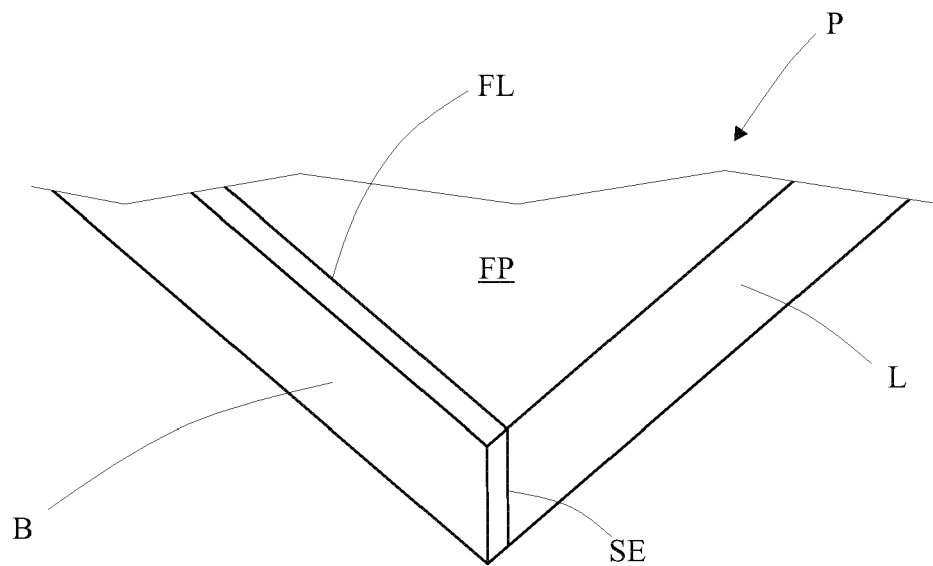


Fig. 13



EUROPEAN SEARCH REPORT

Application Number

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Y	EP 0 976 483 A2 (HOMAG MASCHINENBAU AG [DE]) 2 February 2000 (2000-02-02)	2, 3	
A	* abstract * * paragraph [0031] * * claims 11,12 * * figures * -----	1, 4-10	
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			B27D B27M
Place of search		Date of completion of the search	Examiner
The Hague		31 July 2022	Hamel, Pascal
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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