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(54) **Unit for stacking slats on a support ladder provided with double crossbeams for the production of venetian blinds**

(57) The invention concerns a unit for stacking slats on a support ladder with double crossbeams for the production of venetian blinds. The unit 1 comprises a device 20 for guiding a ladder on a positioning plane (m) and means 40 for divaricating at least one pair of crossbeams T1, T2 of such ladder S. The guiding device and the divaricator means are arranged along a longitudinal axis X along which the slats L are inserted. The divaricator means comprise a laminar element 41, movable parallel to the axis X between an advanced position, wherein it crosses the positioning plane at least with a front penetration portion 42, and a rearward position, wherein it does not cross such plane. The divaricator means comprise two divaricator tabs 51, 52 associated with the laminar element and arranged in correspondence to the front portion in opposite positions with respect to the axis X. Each tab is movable between a lowered position, wherein it is substantially parallel with the laminar element, and a raised position, wherein it forms an angle (a) with the laminar element.

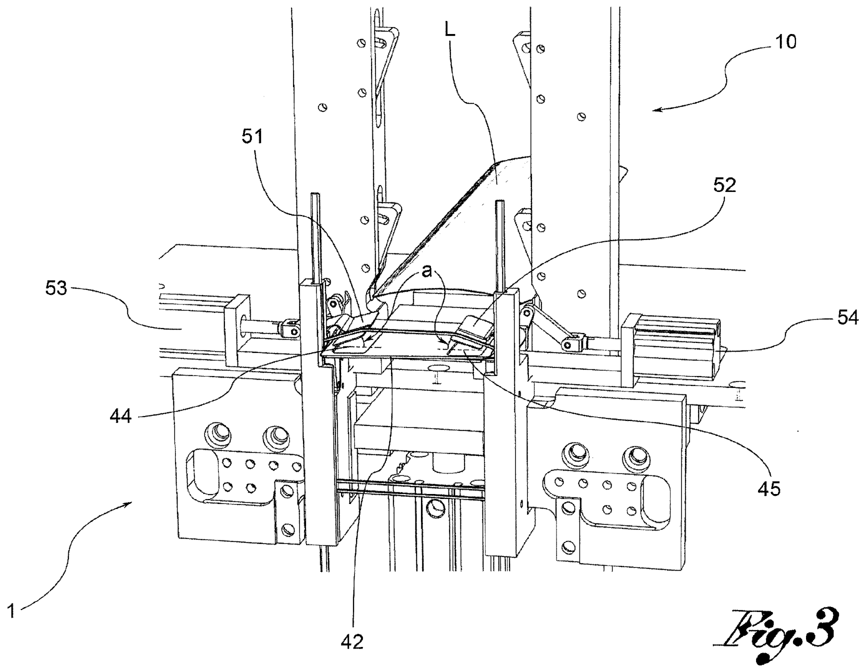

Fig.3

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Description

Scope of application

[0001] The subject of the present invention is a unit for stacking slats on a support ladder provided with double crossbeams for the production of venetian blinds.

State of the art

[0002] As is known, venetian blinds consist of a plurality of slats, arranged parallel to one another and kept in position by means of a cord supporting structure. Such structures consist of two parallel longitudinal elements (arranged in the direction of blind height) and of a plurality of cross elements connecting together the two longitudinal elements at regular distances. To each crossbeam is associated a slat. Because of their shape, such supporting structures are generally known as "support ladders".

[0003] In the case of venetian blinds for interiors, e.g., for insulated glazing, the support ladders are of the simpler type, i.e., with single crossbeams, distanced the one from the other. The single slat is inserted between one crossbeam and the other to be then simply rested on the lower crossbeam. The distance between one crossbeam and the other is equivalent to the distance that has to exist between one slat and the other (a few centimetres). Inserting the slats is therefore very easy.

[0004] In the case of venetian blinds for outdoors, the support ladders are instead more complex, of the type with pairs of crossbeams, moved closer together to form an eyelet. The distance between the two crossbeams is substantially equivalent to the height of a curved slat (generally no more than 4-5 mm). The slat must be inserted in the eyelet, i.e. between the two crossbeams. This way, a more stable positioning of the slat is obtained, with a considerable reduction in the risk of the slat turning on itself through the action of the wind.

[0005] For the production of venetian blinds, systems are known having a plurality of units for stacking slats on support ladders. Such units are distributed along a longitudinal axis of the system, along which the single slats are made to slide in insertion. Each stacking unit associates the slats with a single support ladder.

[0006] In the case of ladders with double crossbeams, a reliable insertion of the slats is only possible if the crossbeams are tensioned enough and at the same time divaricated to the extent that the slat can freely enter. Otherwise, at best, the slat is inserted outside the eyelet, or, at worst, it severs one of the crossbeams. In both cases, it is then necessary to replace the support ladder. The problem of stacking exists in particular with slats for long and wide venetian blinds with cross curve.

[0007] The divarication of the crossbeams is done by means of shaped elements, having a very thin penetration portion, which favours the initial insertion in the eyelet, and a widening portion, joined to that of penetration and having a growing section to cause the gradual opening of the crossbeams. A stacking unit is known, for example with the European application EP2314822A1, having a pair of rotating divaricators, shaped like a sickle and arranged specularly with respect to the longitudinal centre line of the support ladder. Operatively, with a progressive rotary movement, each divaricator engages the eyelet of a ladder in the proximity of one of the two longitudinal elements. The divaricator starts to engage the eyelet (still closed) with the tip portion of the sickle and then gradually widens it with the widening portion which is joined to the tip portion and has a section which gradually increases in height. The surface of the divaricator which in position is turned towards the ladder is convex to receive sliding the side edge of the slat without hindering its transit.

[0008] The sickle divaricator described above, though very effective, nevertheless has a number of drawbacks.

[0009] The divarication operation is successful if the ladder eyelet is positioned exactly in correspondence to the working space of the divaricators. It is not however easy to control ladder positioning. This is due to the fact that the ladder is not rigid and is therefore subject to movements and to the fact that often the ladders are made with considerable dimensional tolerances. It therefore becomes essential to be able to check in real time whether or not the divarication operation has been successful, so as to repeat it in case of failure, before the insertion of the slat. Such check is performed by verifying the position actually taken up by the divaricators with respect to the ladder eyelets.

[0010] The very shape of the sickle divaricator and the rotary movement make such verification, and therefore also the control of the divaricator itself, complicated. This inevitably determines less system reliability.

[0011] It may also occur that due to a non-perfect orientation of the ladder, the crossbeams are not parallel with the working plane of the two divaricators. It can therefore occur that only one divaricator manages to enter the eyelet. This causes further verification and control complications.

[0012] The sickle-shaped divaricator is furthermore, constructively complicated to make, also taking into consideration the dimensional tolerances to be respected.

Presentation of the invention.

[0013] Consequently, the object of the present invention is to eliminate in whole or in part the drawbacks of the aforementioned prior art, placing at disposal a unit for stacking slats on a support ladder with double crossbeams for the production of venetian blinds which allows a more simple control of the divarication operation of the crossbeams of a ladder.

[0014] A further object of the present invention is to place at disposal a unit for stacking slats which has divaricator means that are simpler to make and control.

Brief description of the drawings

[0015] The technical characteristics of the invention, according to the above-mentioned objects, are clearly to be found in the contents of the claims shown below and the benefits of same will be more evident in the detailed description that follows, made with reference to the attached drawings, which show one or more embodiments of the invention provided as an example only and not to be deemed limitative, wherein:

[0016] - the Figures from 1 to 9 show, in sequence, the stages of divarication of the crossbeams of a ladder, of the insertion of a slat in a ladder and of the deposit of the slat in a loader by means of a stacking unit according to a preferred embodiment of the present invention;

[0017] - the Figure 10 shows a plan view of a laminar element of divaricator means of the stacking unit shown in the Figures from 1 to 9;

[0018] - the Figure 11 shows a front view of the laminar element of Figure 10 according to the arrow I shown therein;

[0019] - the Figure 12 shows a section view of the laminar element of Figure 11 according to the section plan II-II shown therein;

[0020] - the Figures 13 and 14 show two perspective views from above of the laminar element of Figure 10, shown with two divaricator tabs respectively, both lowered and with just one divaricating tab raised;

[0021] - the Figure 15 shows a side view of the stacking unit of Figure 1 according to the arrow XV indicated therein, shown with some parts removed to better highlight others; and

[0022] - the Figure 16 shows a perspective view of a laminar element adjustable in width.

[0023] Detailed description

[0024] With reference to the attached drawings a unit for stacking slats on a support ladder provided with double crossbeams for the production of venetian blinds according to the invention has been altogether indicated by 1.

[0025] In particular, the stacking unit 1 is meant to be fitted - together with one or more identical units - in a more complex production system. More in detail, the unit 1 can be movably associated with a longitudinal support bar (not shown) at one extremity of which is arranged a slat production machine (not shown).

[0026] Here and in the rest of the description and of the claims, reference will be made to the stacking unit in operating condition. The references to a lower and an upper position will therefore have to be deemed in this sense.

[0027] According to a general embodiment of the invention, the stacking unit 1 comprises a device 20 for guiding a ladder on a positioning plane m and means 40 for divaricating at least one pair of crossbeams T1, T2 of such ladder S.

[0028] The guiding device 20 for the ladder S can be of any type. In particular, in the attached Figures, the guiding device 20 comprises two guides 21 and 22, inside which slide the longitudinal elements P1,P2 of a ladder. The two guides 21, 22 can be moved, the one with respect to the other, to place under tension the crossbeams T1, T2 of the ladder S. In particular, the illustrated guiding device 20 arranges the ladder on a vertical positioning plane m.

[0029] The divaricator means 40 are arranged in the proximity of the guiding device 20. The guiding device and the divaricator means are arranged along a longitudinal axis X along which the slats L are inserted in the stacking unit 1. As can be seen in the Figures, the longitudinal axis (X)is incident to the positioning plane m of the ladder S.

[0030] The divaricator means 40 comprise a laminar element 41, movable parallel to the longitudinal axis X between an advanced position, in which it crosses the positioning plane m of the ladder with at least a front portion of penetration 42 in correspondence to the guiding device 20 to insert itself between two crossbeams (see Figure 2), and a rearward position, in which it does not cross the positioning plane m of the ladder (see Figures 1 and 9).

[0031] Operatively, the laminar element 41 accommodates sliding the single slat L during insertion in the stacking unit.

[0032] The divaricator means 40 comprise two divaricator tabs 51, 52 associated with the laminar element 41 and arranged in correspondence to the front portion 42 of the laminar element 41 in opposite positions with respect to the longitudinal axis X.

[0033] Preferably, the divaricator tabs 51, 52 are arranged symmetrically with respect to the axis X. Alternative solutions can be envisaged wherein the tabs are not symmetrical with respect to the axis X.

[0034] Each divaricating tab 51, 52 is movable (independently the one from the other) between a lowered position, in which it is substantially parallel with the laminar element (see Figures 1 and 13), and a raised position, in which it forms an angle a with the laminar element 41 (see Figures 3 and 14).

[0035] Operatively, as illustrated in the sequence of the Figures 2 and 3, when the laminar element 41 is in the advanced position, the divaricator tabs 51, 52 can be moved from the lowered position to the raised position to divaricate the two crossbeams T1, T2 and thus allow the insertion of a slat (see sequence Figures 3 and 4).

[0036] Advantageously, the divaricator means 40 comprise an actuator 53, 54 for each tab 51, 52 suitable for moving it between the lowered position and at least one raised position.

[0037] In particular, as shown for example in the Figure 1, each tab 51, 52 is kinematically connected to the actuator 53, 54 by means of a lever mechanism (53a, 54a). The actuator 53, 54 can in particular be a pneumatic cylinder.

[0038] As can be seen in particular in the Figures 10, 13 and 14, each raisable tab 51, 52 is hinged to the laminar element 41 on opposite sides with respect to the longitudinal axis X.

[0039] Preferably, the hinging axis Y1, Y2 of both tabs 51, 52 is substantially parallel to the longitudinal axis X along which the slats are inserted in the stacking unit 1. This way, the raising of the tabs 51, 52 beyond a determinate angle completely frees the passage of the slat on the laminar element, as shown in the Figure 3.

[0040] The hinging parallel to the axis X further allows, during the divarication step of the crossbeams, a symmetric opening of the crossbeams T1, T2, taking into account the fact that preferably the positioning plane m of the ladder is substantially vertical and substantially at right angles to the axis X.

[0041] Advantageously, the raising angle a of the tab is variable. In other words, each tab can take on different raised positions. The divarication opening angle is fixed by the characteristics of the ladder and is acute. As shown in the Figure 6, if they are not in divarication, the tabs can be fully raised, with a substantially right angle a.

[0042] Advantageously, the laminar element 41 comprises, for each raisable tab 51, 52, a housing seat 44, 45, dug in the thickness of the laminar element, wherein the tab can be collocated.

[0043] Preferably, the seat 44, 45 has a depth of not less than the thickness of the tab 51, 52 in such a way that the tab does not protrude from the laminar element when it is in lowered position and can therefore insert itself between the two crossbeams following the front portion 42 of the laminar element.

[0044] According to an alternative embodiment which is not shown, each raisable tab consists of a portion of the laminar element, cut out from the latter. In lowered position each tab is positioned in the corresponding cut-out cavity present in the laminar element.

[0045] Advantageously, the front penetration portion 42 of the laminar element has a profile with an extension differentiated in the direction of the axis X so as to define at least one portion more developed along such axis X having a width less than the total width of the laminar element with respect to a transversal direction Z.

[0046] In particular, as shown in the attached Figures and in particular in Figure 10, the front penetration portion 42 of the laminar element has an oblique profile with respect to a direction Z transversal with respect to the axis X. The laminar element thus appears more developed on one side, thereby determining the formation of a protruding part which, thanks to the limited dimensions, can more easily penetrate between the two crossbeams.

[0047] Alternative solutions can be envisaged, with nonlinear profiles, e.g., arched or also irregular.

[0048] Advantageously, the laminar element 41 has a thickness less than the distance between the two crossbeams T1, T2 of a ladder S at least in correspondence to the edge of the front portion 42 or of the most protruding part of such front portion.

[0049] Advantageously, as shown in particular in the Figures from 11 to 14, the rims 46, 47 of the laminar element 41 on opposite sides with respect to the longitudinal axis X are at least partially raised so as to act as side guides for the slat L which slides on the laminar element 41. In the proximity of the front portion, the height of such raised rims 46, 47 is gradually reduced to zero.

[0050] Advantageously, the laminar element 41 comprises a rear portion 43, opposite the front penetration portion 42 with respect to the longitudinal axis X, shaped so as to invite the entrance of a slat L on the laminar element 41. In particular, as shown in the Figures 12, 13 and 14, the rear portion 43 has a chute 48 which receives at entrance the front extremity of a slat, guiding it in case it is lowered as far as the main level of the laminar element.

[0051] Advantageously, the raised rims 46, 47 connect to the rear invitation portion 43.

[0052] As shown in the Figure 16, the laminar element 41 can be adjusted in width, i.e. along the transversal direction Z. In particular, for such purpose, the laminar element 41 is split into two longitudinal parts 41a and 41b, movably connected together to change their relative distance in a transversal direction. This way, the laminar element is adaptable to ladders of different dimensions.

[0053] According to the preferred embodiment, shown in the Figures from 1 to 9, the stacking unit 1 comprises at least one slat loader 10.

[0054] The loader can be of any type suitable for the purpose. In particular, as shown in the attached Figures, the loader 10 can consist of two bars 11 and 12 having sprung teeth 13, 14 for positioning the slats already inserted in the ladder.

[0055] Advantageously, the stacking unit 1 comprises at least one elevator 30 for bringing a slat L from a position of insertion in the ladder S to a position of deposit in the loader (see the sequence of the Figures from 6 to 8).

[0056] In particular, the loader 10 is arranged upstream of the divaricator means 40 and of the guiding device 20 with respect to the direction of insertion of the slats along the longitudinal axis X. In other words, the divaricator means and the guiding device are placed on the side of the loader opposite that of slat entrance.

[0057] As can be seen in particular in the Figure 15, the laminar element 41 is guidingly associated with a support structure 49 with respect to which it is movable by means of an actuator 55 parallel to the longitudinal axis X to move between the advanced position and the rearward position.

[0058] The elevator 30 (consisting for example of a pneumatic cylindrer) can be associated with the support structure 49 of the laminar element 41 to move such structure 49 and the associated laminar element with respect to the loader 10. Operatively, as shown in the sequence of the Figures 6 and 7, the slat L is supported by the laminar element 41 in the switch from the position of insertion in the ladder S to a position of deposit in the loader.

[0059] According to an alternative embodiment not shown, the elevator is not associated with the support structure of the laminar element, but operates directly on the slat. In this case, the laminar element does not move in height with respect to the loader and does not therefore support the slat in the switch from the position of insertion to a position of deposit in the loader.

[0060] The operating steps of the stacking unit 1 are briefly described as appears from the sequence of the Figures from 1 to 9. In the Figure 1, the unit is in initial condition: the ladder has been positioned in the guiding device and the laminar element is in the rearward position with both the tabs lowered. The laminar element is inserted together with the tabs between the two crossbeams (Figure 2). The tabs are raised and the two crossbeams are divaricated (Figure 3). The slat is inserted between the two divaricated crossbeams (Figure 4). The laminar element and the associated tabs are drawn back (Figure 5). Once the laminar element has been drawn back, the tabs are fully raised to permit the disengagement of the slat (Figure 6). The slat can be lifted separately from the laminar element or, as shown in Figure 7, the slat is lifted by means of the laminar element inside the loader above the first sprung teeth. The slat is left inside the loader and the laminar element with the tabs still fully raised is lowered in the initial position (Figure 8). The tabs can now be lowered again to restart the cycle (Figure 9).

[0061] Advantageously, for each raisable tab, the stacking unit 1 comprises a sensor (not shown in the attached Figures) suitable for measuring the angle between the tab and the laminar element. The sensor is connected to an electronic unit which controls the stacking unit to control the movement of the divaricator tabs and the position of the laminar element. Depending on the amplitude of the angle a detected by the sensor after the divarication step, the electronic control unit is able to assess whether the divaricator tab has been correctly inserted between the two crossbeams. If the laminar element and therefore the tabs are inserted above the upper crossbeam, the tabs are free to fully open. If the insertion has occurred under the lower crossbeam, the tabs are instead hindered by the two crossbeams and open less with respect to the case of correct insertion. The electronic unit can therefore assess whether the insertion and divarication operation has to be repeated again.

[0062] The invention permits obtaining numerous benefits in part already described.

[0063] The divaricator means with laminar element having raisable slats permit having a stacking unit wherein the control of the divarication operation of the crossbeams of a ladder is simpler. The parameter which has to be detected and therefore assessed is in fact only the lifting angle a of the tabs.

[0064] The fact that the two divaricator tabs are associated with the laminar element itself substantially eliminates the risk of only one of the divaricator elements having penetrated between the two crossbeams. In fact, if the laminar element has been inserted between the two crossbeams, both the tabs associated with it are correctly positioned. This further simplifies the control of the divaricator means.

[0065] The divaricator means with laminar element having raisable tabs are constructively much simpler to make than sickle-shaped divaricators.

[0066] The movement of the divaricator means is also simpler. The operation of initial insertion between the crossbeams is completely separate from that of divarication. The insertion of the two tabs between the two crossbeams, as already said, is done at the same time as the forward movement of the laminar element. Divarication requires a simple linear movement of an actuator, instead of a rotation movement, which is more complex to control.

[0067] The invention thus conceived therefore achieves the preset objects.

[0068] Obviously, in its practical realization, it can also take on different shapes and configurations other than those shown above without, because of this, moving outside the present scope of protection.

[0069] Furthermore, all the parts can be replaced by technically equivalent elements and the dimensions, the shapes and the materials used can be any, depending on need.

Claims

1. 1. Unit for stacking slats on a support ladder provided with double crossbeams for the production of venetian blinds, comprising a device (20) for guiding a ladder on a positioning plane (m) and means (40) for divaricating at least one pair of crossbeams (T1, T2) of such ladder (S), said divaricator means (40) being positioned in the vicinity of the guiding device (20), the guiding device and the divaricator means being positioned along a longitudinal axis (X) along which the slats (L) are inserted in the stacking unit, the longitudinal axis (X) being incident to the positioning plane (m) of the ladder, **characterised in that** the divaricator means (40) comprise a laminar element (41), movable parallel to the longitudinal axis (X) between an advanced position, in which it crosses, at least with a front penetration portion (42), the positioning plane (m) of the ladder in correspondence to the guiding device (20) to insert itself between two crossbeams, and a rearward position, in which it does not cross the positioning plane (m) of the ladder, the laminar element (41) slidingly receiving the single slat (L) during the insertion in the stacking unit, and **in that** the divaricator means (40) comprise two divaricator tabs (51, 52) associated with the laminar element (41) and positioned in correspondence to the front portion (42) of the laminar element (41) in positions opposite the longitudinal axis (X), each tab (51, 52) being movable between a lowered position, in which it is substantially parallel with the laminar element, and a raised position, in whichi it forms an angle (a) with the laminar element, when the laminar element is in the forward position it being possible to move the divaricator tabs from the lowered position to the raised position to divaricate the two crossbeams and thereby permit the insertion of a slat.

2. Stacking unit according to claim 1, wherein the divaricator tabs (51, 52) are positioned symmetrically to the axis (X).

3. Stacking unit according to claim 1 or 2, wherein the divaricator means (40) comprise an actuator (53, 54) for each tab (51, 52) to move it between a lowered position and at least a raised position.

4. Stacking unit according to one or more of the preceding claims, wherein each raisable tab (51, 52) is hinged to the laminar element (41), preferably with a hinging axis (Y1, Y2) substantially parallel to the longitudinal axis (X).

5. Stacking unit according to one or more of the preceding claims, wherein the laminar element (41) comprises a housing seat (44, 45) for each raisable tab (51, 52) made in the thickness of the laminar element, wherein the tab may be placed, said seat preferably having a depth not less than the thickness of the tab so that the tab does not protrude from the laminar element when it is in the lowered position.

6. Stacking unit according to one or more of the claims from 1 to 4, wherein each raisable tab (51, 52) consists of a portion of the laminar element (41), cut from the latter, in the lowered position each tab being positioned in the corresponding cut-out cavity present in the laminar element.

7. Stacking unit according to one or more of the preceding claims, wherein the front penetration portion (42) has a profile with a differentiated extension in the direction of the axis (X) so as to define at least one more developed portion along such axis (X) having a width less than the total width of the laminar element with respect to a transversal direction (Y).

8. Stacking unit according to claim 7, wherein the front penetration portion (42) has an oblique profile with respect to a transversal direction (Y) with respect to the axis (X).

9. Stacking unit according to one or more of the preceding claims, wherein the laminar element (41) has a thickness less than the distance between the two crossbeams (T1, T2) of a ladder (S) at least in correspondence to the rim of the front portion (42).

10. Stacking unit according to one or more of the preceding claims, wherein the rims of the laminar element (41), on opposite sides with respect to the longitudinal axis (X), are at least partially raised so as to act as lateral guides for the slats.

11. Stacking unit according to one or more of the preceding claims, wherein the laminar element (41) comprises a rear portion (43), opposite the front penetration portion (42) with respect to the longitudinal axis (X), shaped so as to invite the entrance of a slat (L) on the laminar element (41).

12. Stacking unit according to claims 10 and 11, wherein the raised rims connect to the rear invitation portion (43).

13. Stacking unit according to one or more of the preceding claims, wherein the laminar element (41) is divided into two longitudinal parts (41a, 41b), connected to each other to modify the relative distance from each other in a transversal direction and therefore the width of the laminar element (41).

14. Stacking unit according to one or more of the preceding claims, comprising at least one slat loader (10) and at least one lifter (30) to bring a slat (L) from a position for being inserted in the ladder (S) to a position for being dropped in the loader, the loader being positioned upstream of the divaricator means (40) and of the guiding device (20) in the direction of insertion of the slats along the longitudinal axis (X).

15. Stacking unit according to one or more of the previous claims, wherein the laminar element (41) is guidingly associated with a support structure (49) in relation to which it is movable by means of an actuator (55) parallel to the longitudinal axis (X) to shift between the advanced position and the rearward position.

16. Stacking unit according to claims 14 and 15, wherein the lifter (30) is associated with the support structure of the laminar element (41) so as to move such structure and the associated laminar element with respect to the loader (10), the slat (L) being supported by the laminar element (41) in the switch from the position of insertion in the ladder (S) to a position of deposit in the loader.

17. Stacking unit according to one or more of the preceding claims, comprising for each raisable tab (51, 52) a sensor able to measure the angle (a) between the tab and the laminar element (41), said sensor being connected to an electronic control unit of the stacking unit to control the movement of the divaricator tabs and the position of the laminar element.

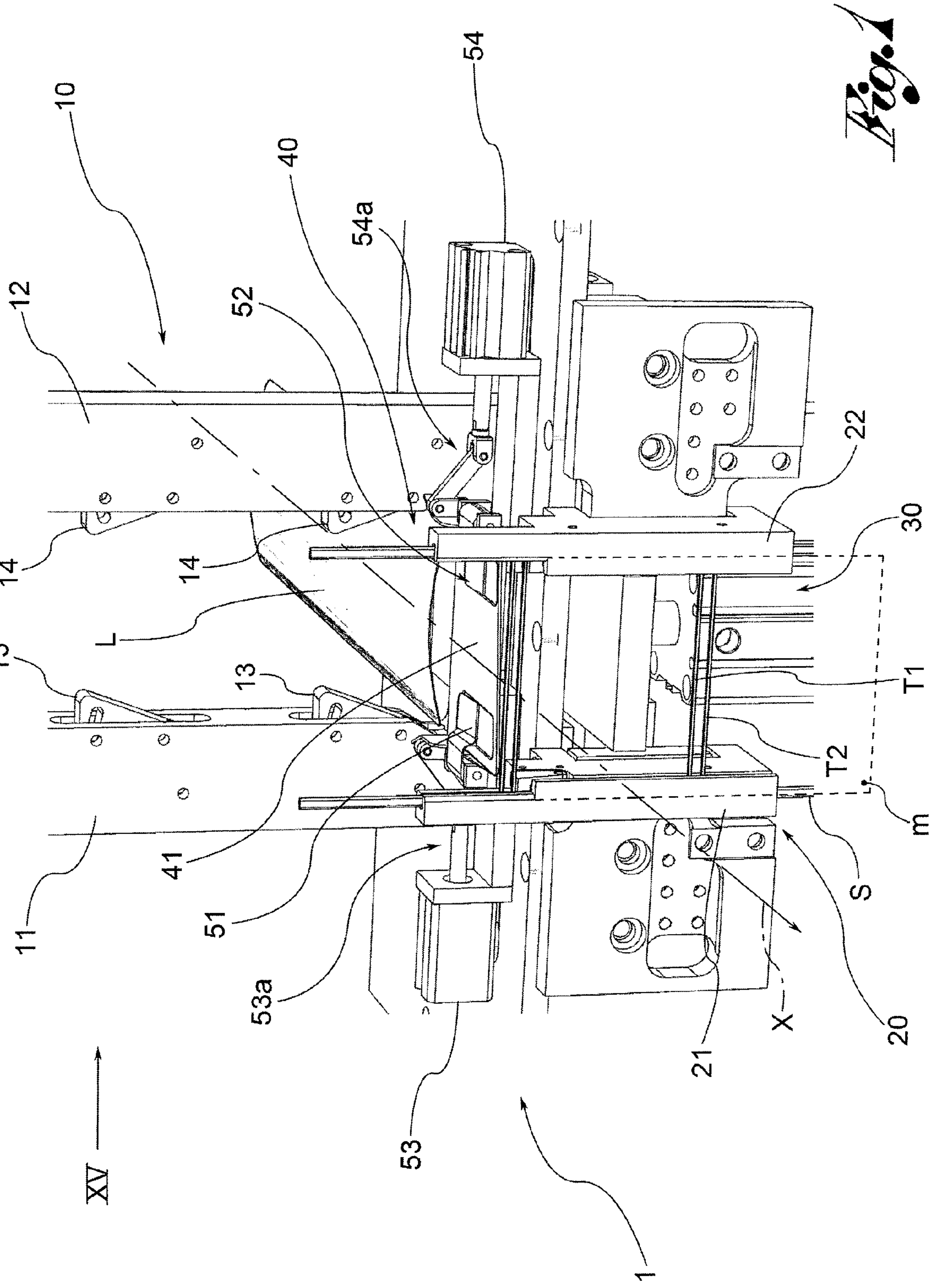
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Fig. 1

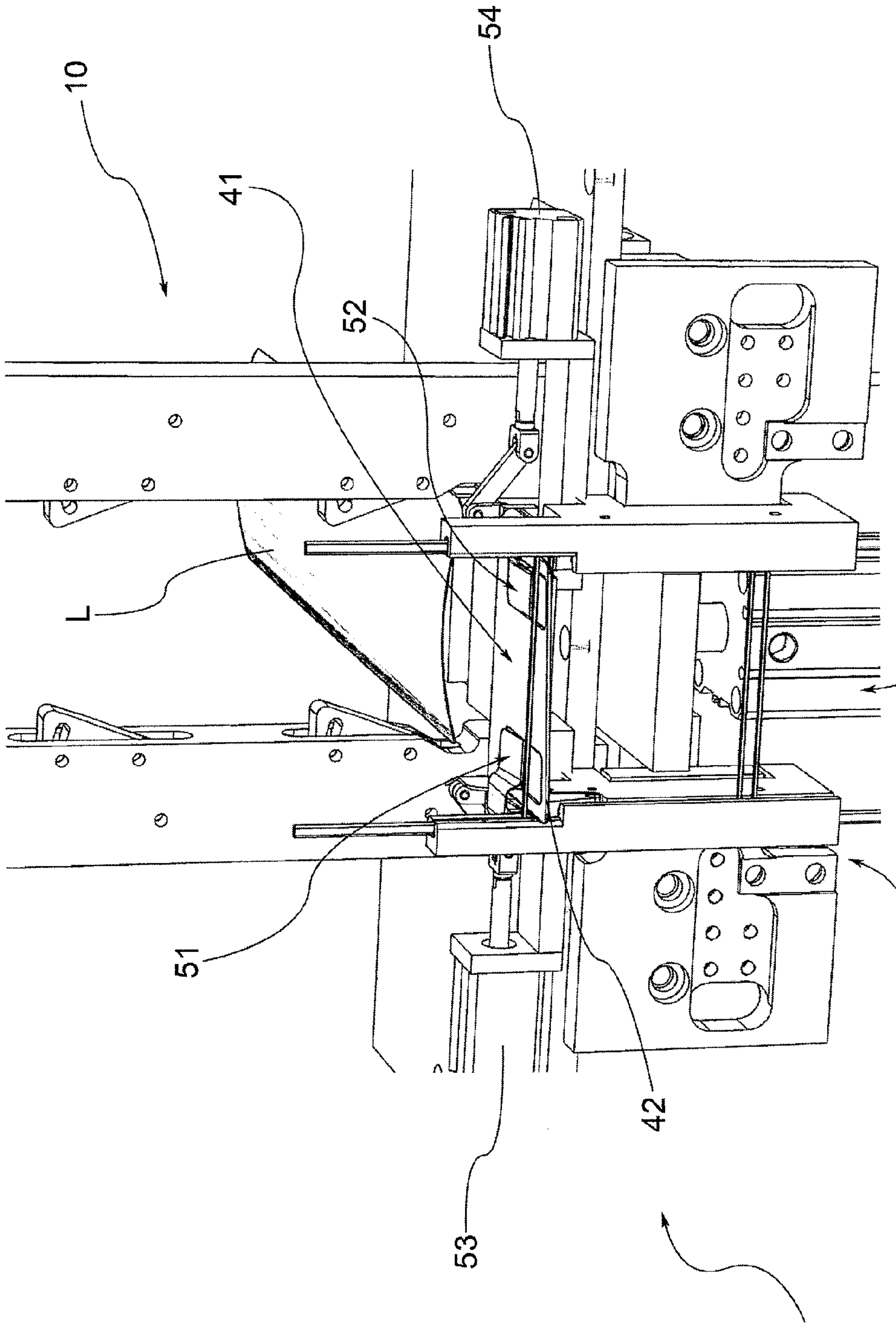


Fig. 2

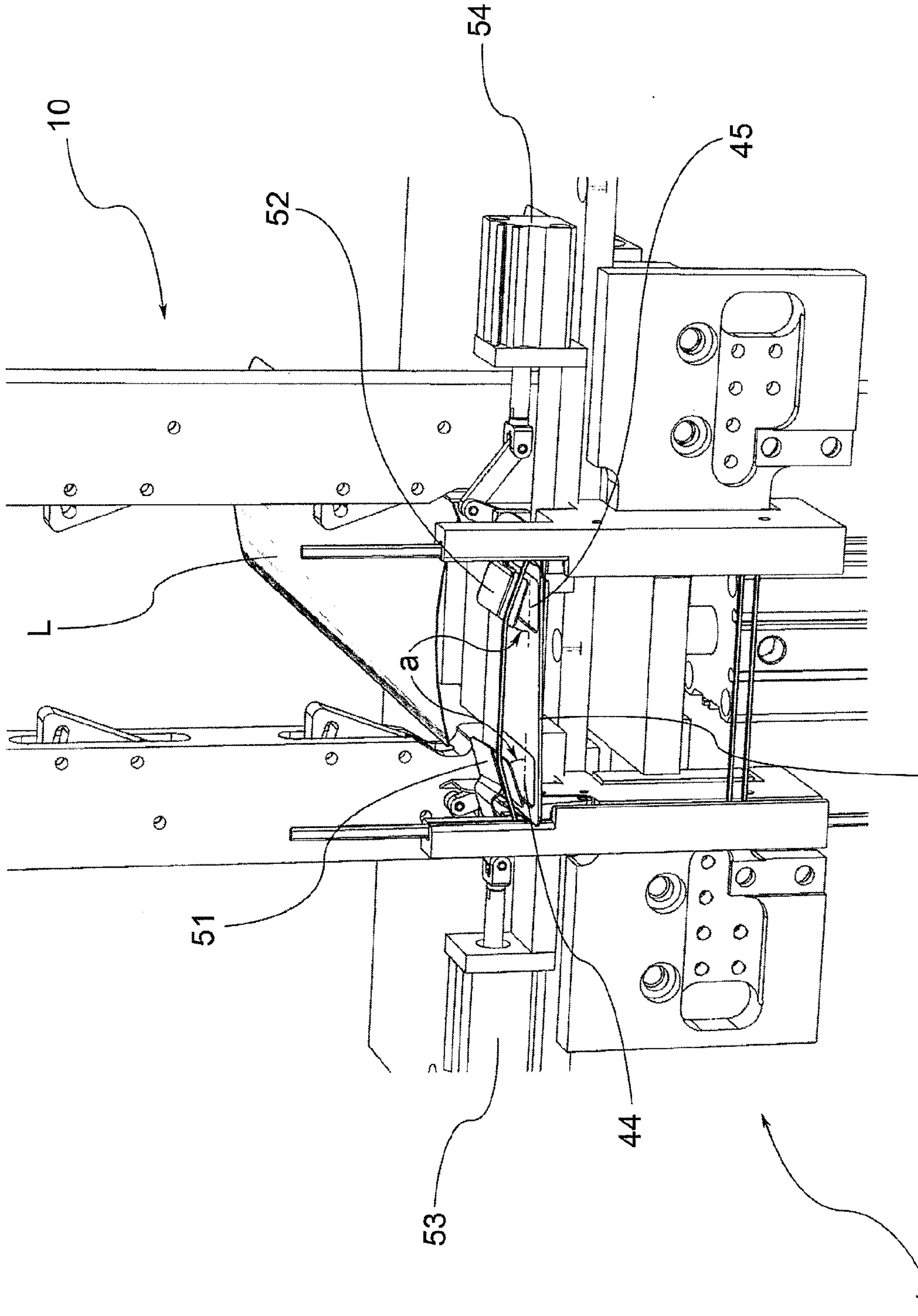


Fig.3

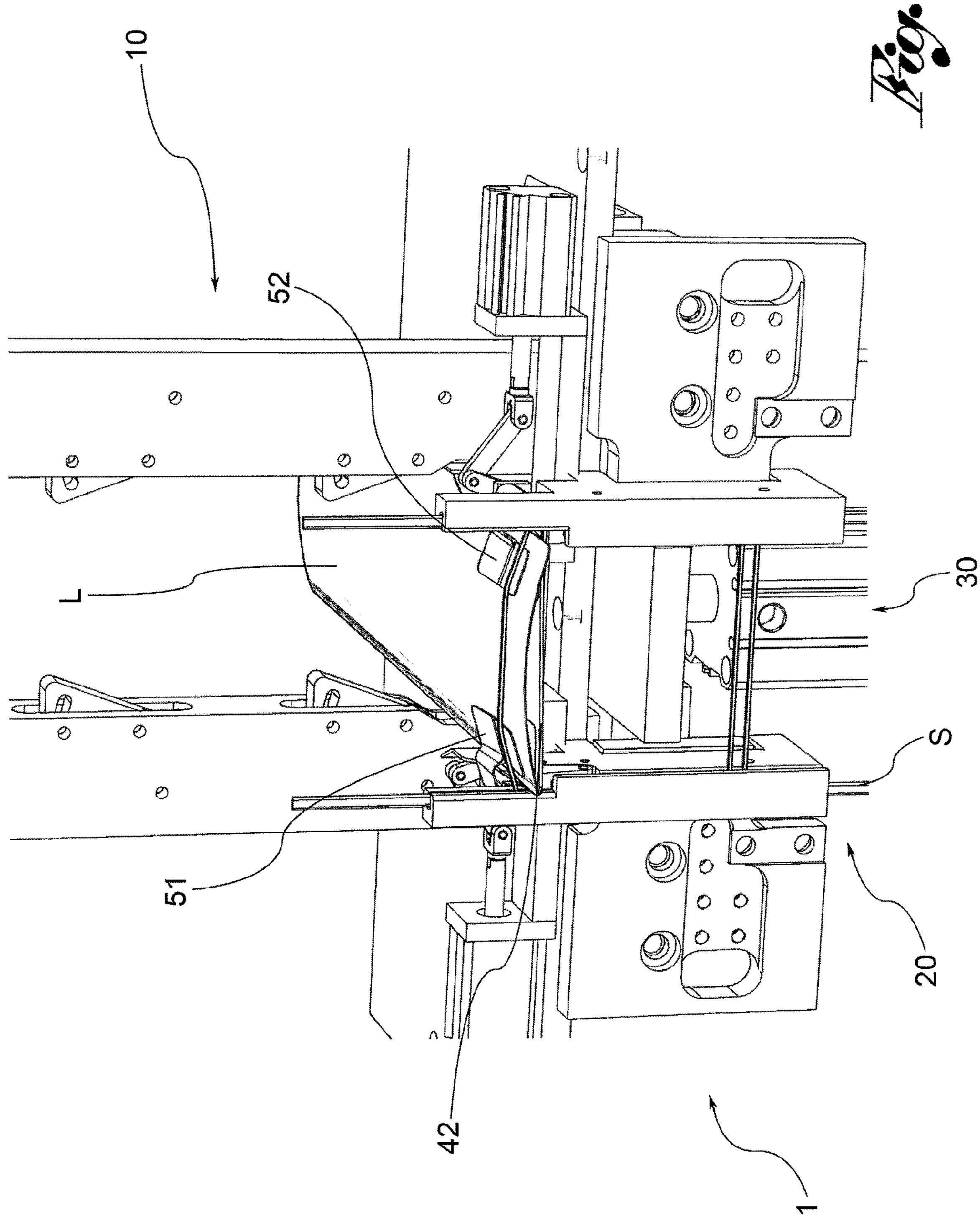


Fig. 4

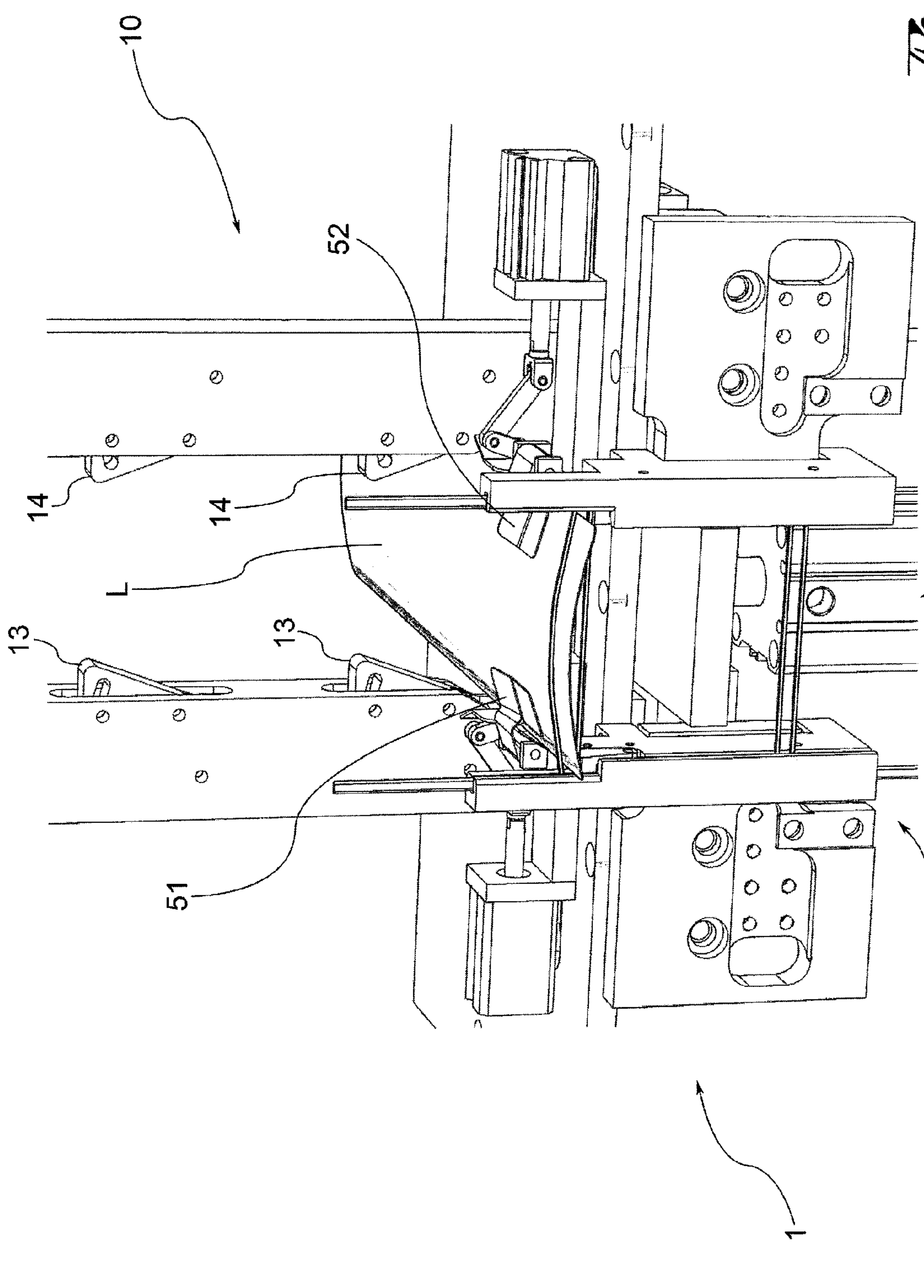


Fig. 5

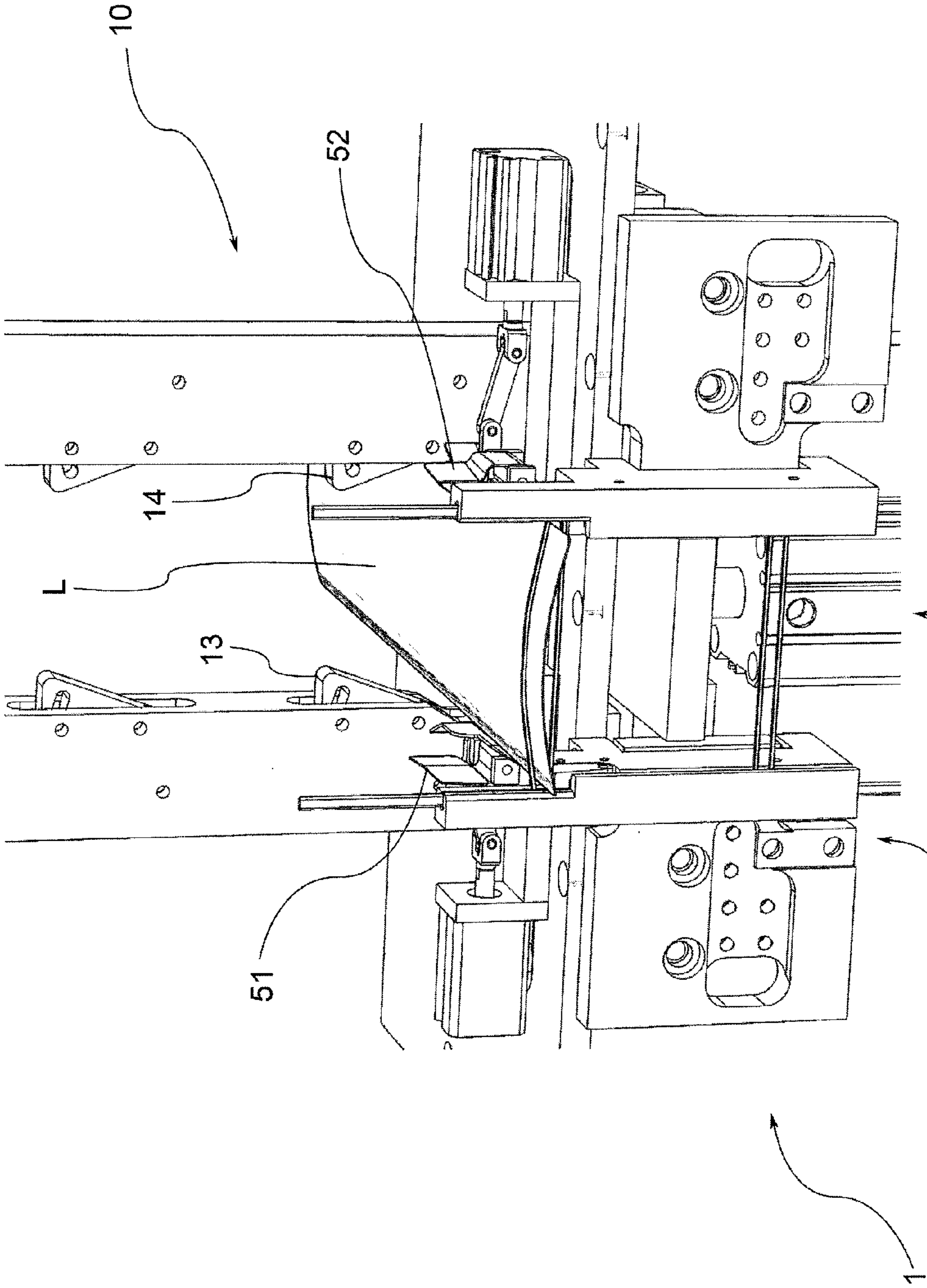


Fig.6

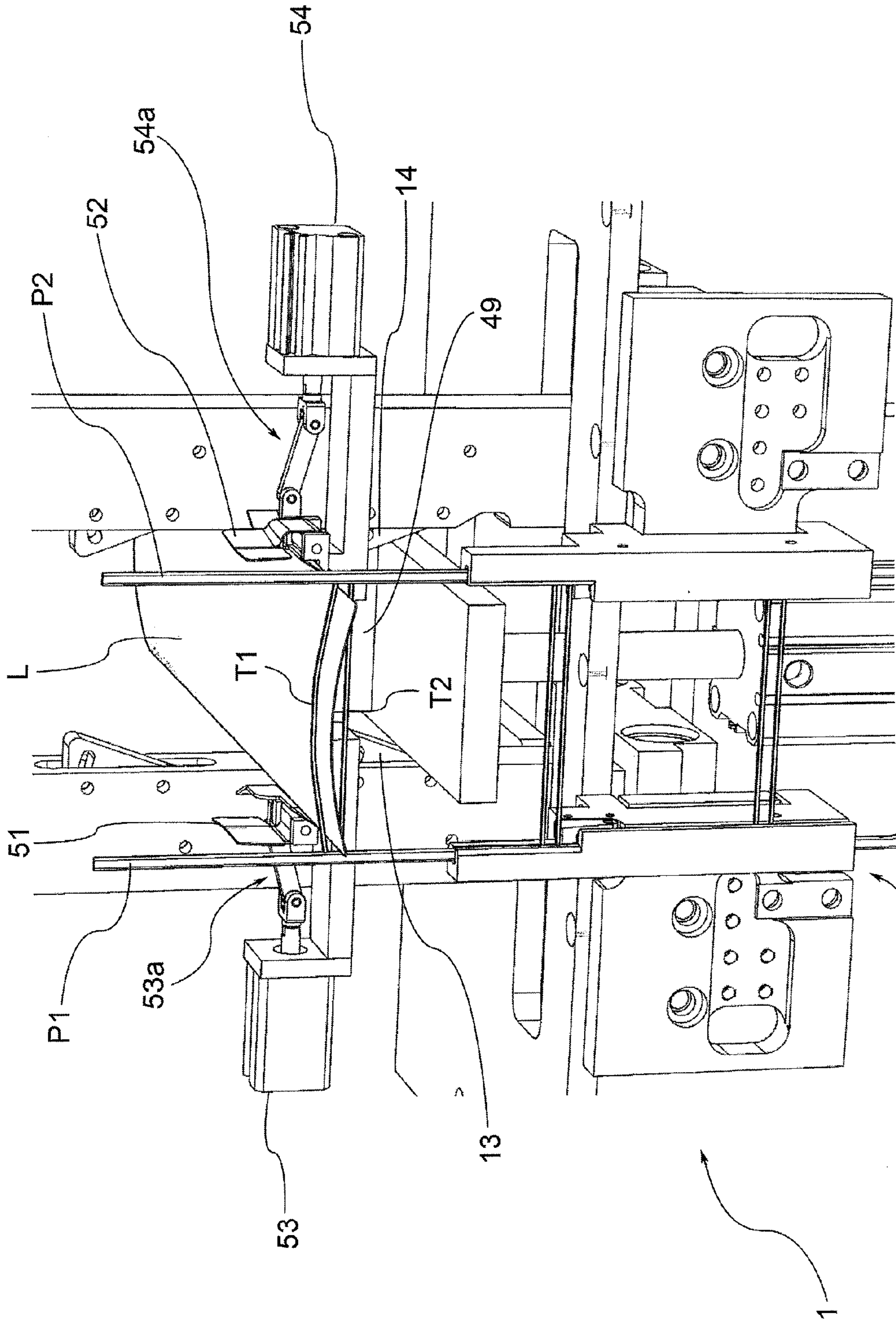


Fig.7

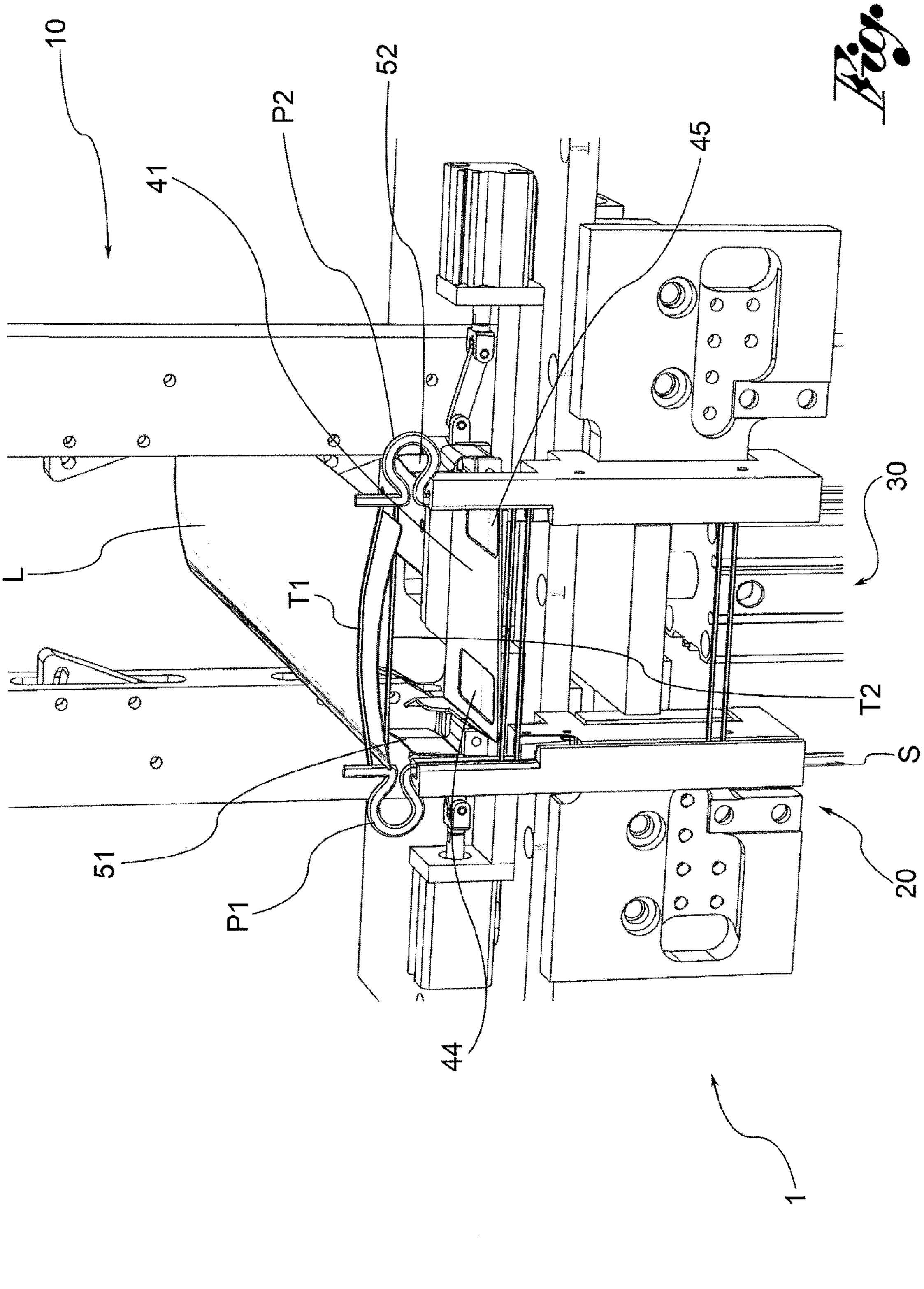
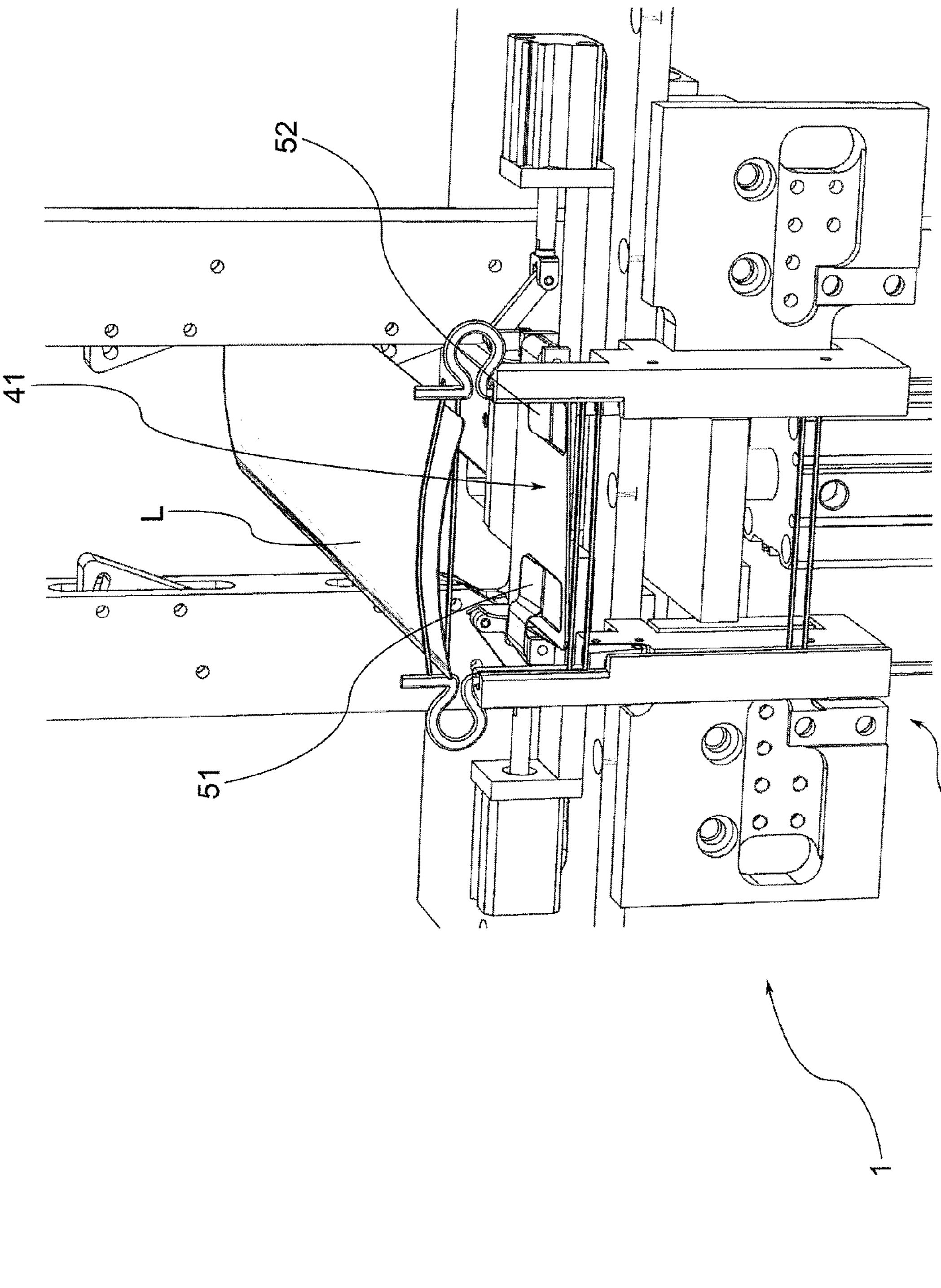


Fig.8

Fig.9



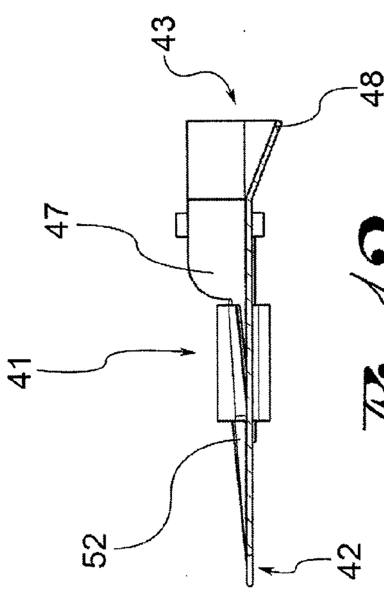


Fig.12

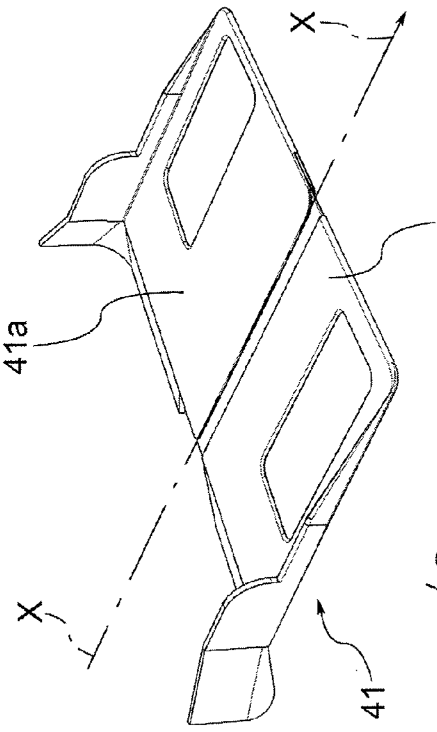


Fig.16

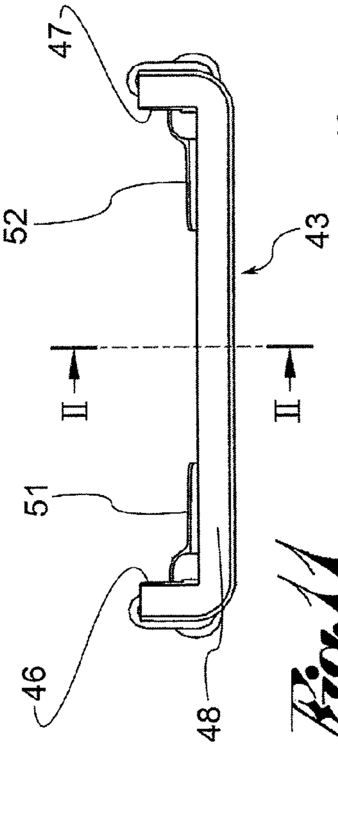


Fig.11

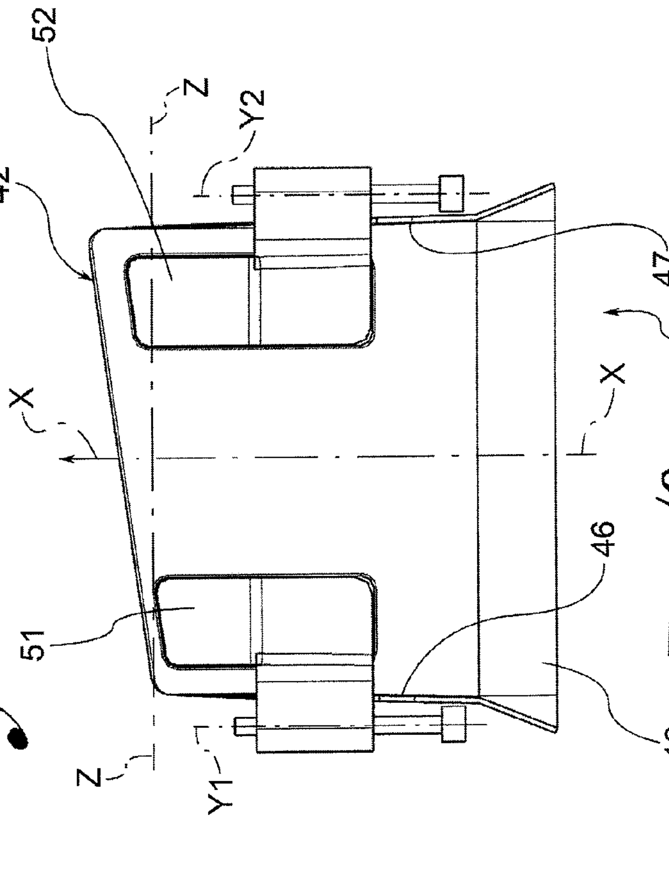


Fig.10

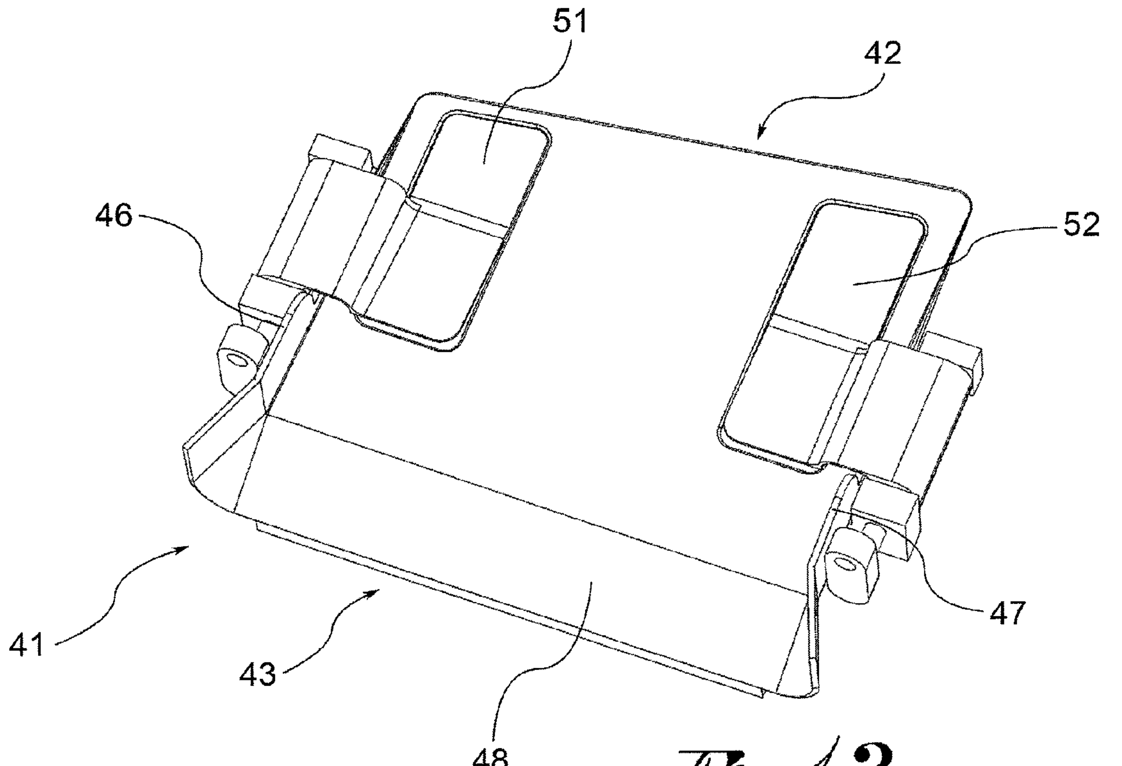


Fig.13

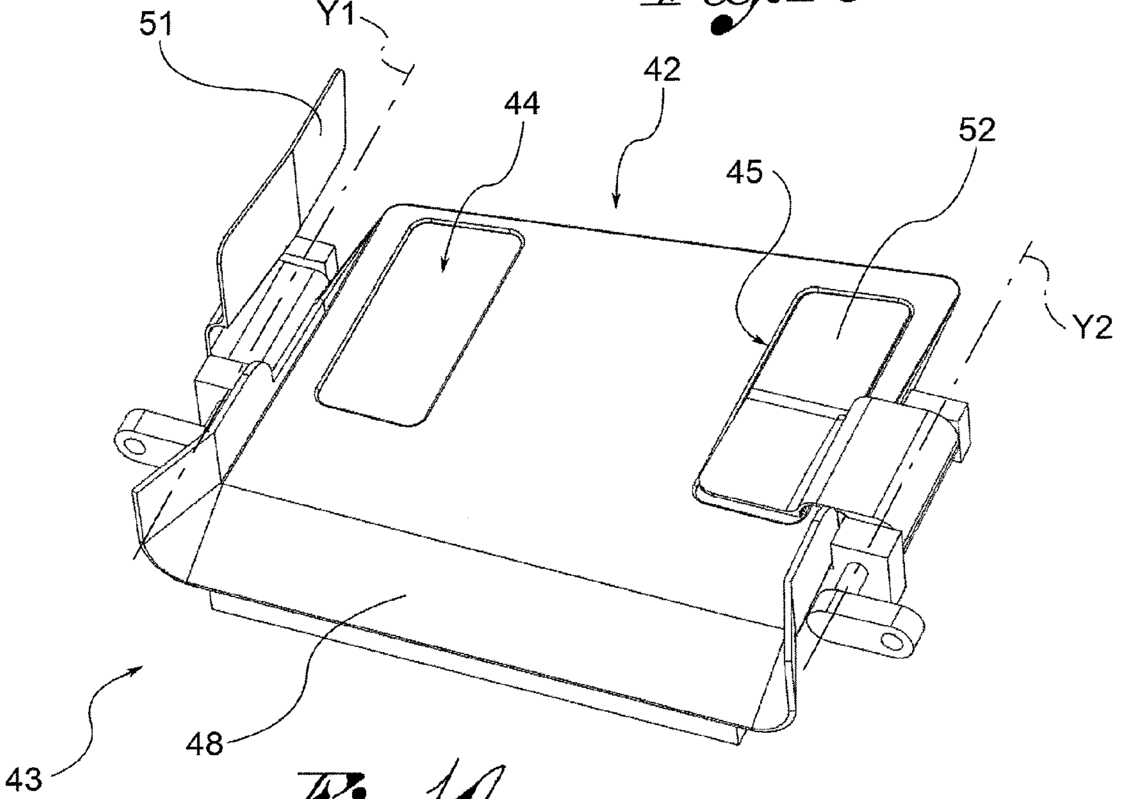


Fig.14

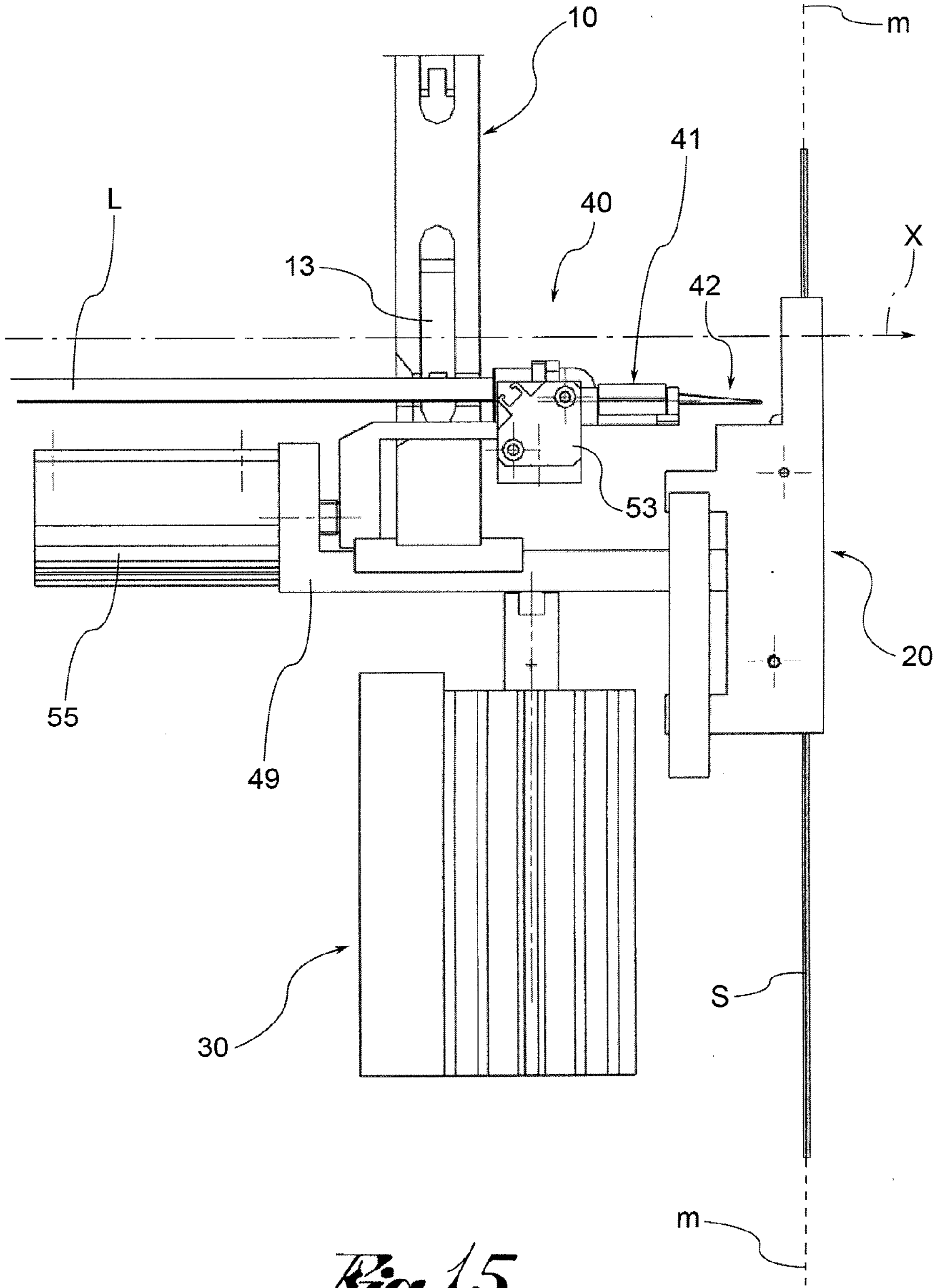


Fig.15

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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 5139

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 314 822 A1 (ZEBR S R O [CZ]) 27 April 2011 (2011-04-27) * the whole document * -----	1-17	INV. E06B9/266
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
Munich	13 November 2013	Kofoed, Peter

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13-11-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2314822 A1	27-04-2011	DE 09466023 T1	15-03-2012
		EP 2314822 A1	27-04-2011

EPO FORM P0459

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Patent documents cited in the description

- EP 2314822 A1 **[0007]**