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(71) Applicant: **Dallan S.p.A.**
31033 Castelfranco Veneto (Treviso) (IT)

(72) Inventor: **Dallan, Sergio**
31033 Castelfranco Veneto, Treviso (IT)

(74) Representative: **Zanettin, Gianluigi**
Jacobacci & Partners S.p.A.
Via Berchet, 9
35131 Padova (IT)

(54) Stacking unit of slats on a support ladder with double crossbeams for the production of venetian blinds and method of attaching slats to a ladder with double crossbeams

(57) The invention relates to a stacking unit of slats on a support ladder provided with double crossbeams for the production of Venetian blinds. The unit comprises: - a sliding lane C which extends along a longitudinal extension axis X on an insertion plane m and along which a slat L is made to slide; - a device for positioning a ladder S on a positioning plane p orthogonal to the insertion plane m of the slat and transversal to the longitudinal axis X and to the sliding lane C. The unit 1 comprises means 10 for locally moving a slat L along a longitudinal axis X next to the positioning plane p of the ladder, once the slat has been inserted in a pair of crossbeams of the ladder. The present invention also relates to an attachment method of a slat to a ladder for the production of Venetian blinds.

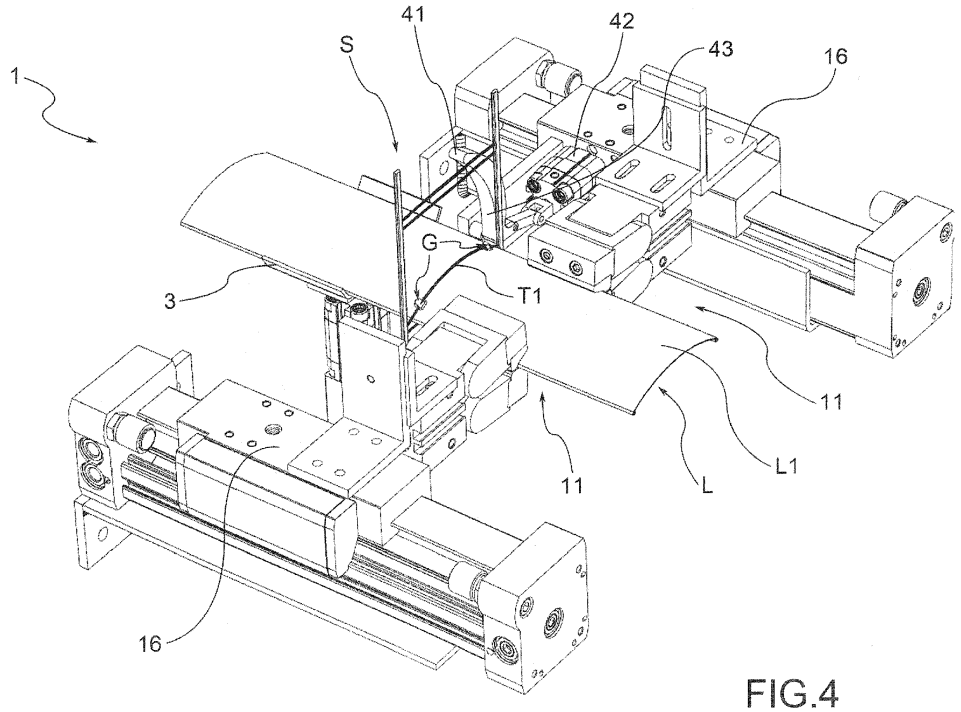

FIG.4

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Description

Field of application

[0001] The present invention relates to a stacking unit of slats on a support ladder with double crossbeams for the production of Venetian blinds and method of attaching slats to a ladder with double crossbeams.

State of the art

[0002] As is known, Venetian blinds consist of a plurality of slats, arranged parallel to each other and kept in position by a plurality of cord support structures distributed in the length of the slats.

[0003] In particular, each of said support structures may be of the type consisting of two parallel longitudinal elements (arranged in the direction of the height of the blind) and of a plurality of transversal elements connecting the two longitudinal elements at regular intervals. A slat has to be associated to each crossbeam. Due to their shape these support structures are generally known as "support ladders".

[0004] One type of ladder which is very widespread provides for the transversal elements to consist of a pair of crossbeams, positioned near each other to form an eyelet, inside which the slat is inserted.

[0005] The automated insertion of slats inside the eyelets requires devices suitable for such purpose. A stacking unit specifically designed for such operations is described in the Italian patent application for industrial invention no. PD2012A000224 dated 13.07.2012 in the name of the same Applicant.

[0006] Slats for Venetian blinds are known of, provided with means for coupling the ladders to the slat. Said coupling means may be of various types.

[0007] In particular coupling means exist which are applied to the slat at special seats made on said slat. In particular, these coupling means consist of plastic inserts which, once inserted in the seat provided, define with the slat one or more grooves inside which the crossbeams of the half-ladder can be snap-inserted.

[0008] Coupling means also exist made directly on the slat. These are in particular tongues made by shearing of the slat. The tongues are placed in a raised position so as to be able to couple the crossbeam and are lowered to stably hold the crossbeam of the ladder. Said tongues may be made on the longitudinal edges of the slat, as provided for in the Italian patent application for industrial invention no. PD2012A0000177 dated 31.05.2012, in the name of the same Applicant, or on the surface of the slat itself (as individual tongues or in pairs), as provided for in the Italian patent application for industrial invention no. PD2012A0000178 of 31.05.2012, in the name of the same Applicant.

[0009] Currently, the ladders are manually associated to the aforesaid coupling means provided in the slats.

[0010] More in detail, once completed the insertion of all the slats in the support ladder inside a stacking unit, the Venetian blind thus made is withdrawn from the stacking unit and attached to a support structure from which it is made to hang so that the blind extends to its full height. At this point, each ladder is made to slide manually along the slats until it enters the aforesaid coupling means. This operation is carried out manually. In the case in which the attachment means are of the tongue type made on the slat, the closure of the tongues is also provided for. Also this operation is performed manually.

[0011] This manual processing method, while being entirely effective, requires a great deal of labour and is time-consuming. Furthermore, a dedicated space must be provided to hang the blinds and in which to perform the processing.

[0012] There is therefore a need in the sector to simplify the aforementioned processing of the semi-finished blinds for the attachment of the ladders, making it faster and more efficient and thus reducing production costs.

Presentation of the invention

[0013] Consequently, the purpose of the present invention is to eliminate entirely or in part the drawbacks of the prior art mentioned above, by providing a stacking unit of slats on a support ladder for the production of Venetian blinds, which makes it possible to attach the ladders to the slats more quickly and efficiently.

[0014] A further purpose of the present invention is to make available a stacking unit of slats which makes it possible to attach the ladders to the slats in a mechanically simple and reliable manner.

[0015] A further purpose of the present invention is to make available a stacking unit of slats which makes it possible to manage the attachment of the ladders to the slats simply.

[0016] A further purpose of the present invention is to make available a stacking unit of slats which automatically performs the attachment of the ladders to the slats and which is both simple and inexpensive to construct.

[0017] A further purpose of the present invention is to make available an attachment method of slats to a ladder with double crossbeams in a stacking unit of slats which makes it possible to obtain the attachment of a ladder to a slat fitted with coupling means, simply and reliably.

Brief description of the drawings

[0018] The technical characteristics of the invention, according to the aforesaid purposes, will be clearly evident from the contents of the claims below and the advantages thereof will be evident from the detailed description given below with reference to the appended drawings showing one or more embodiments, purely by way of a non-limiting example, wherein:

- Figure 1 shows a perspective view of a stacking unit according to a first preferred embodiment of the

present invention, where a slat already inserted between two crossbeams of a ladder is shown;
- Figures 2 to 5 show the steps of the attachment method according to a particular embodiment performed in the stacking unit of figure 1; and
-Figure 6 shows a perspective view of a stacking unit according to a first preferred embodiment of the present invention, where a closing step of the tongues of a slat is shown.

Detailed description

[0019] With reference to the appended drawings reference numeral 1 globally denotes a stacking unit of slats on a support ladder with double crossbeams for the production of Venetian blinds according to the invention.

[0020] As will be clarified by the rest of the description and in particular by the part relative to the attachment method of the present invention, the stacking unit 1 is specifically structured to perform the automatic attachment of a ladder with double crossbeams to slats provided with means for coupling said crossbeams.

[0021] The coupling means may be of various types. In particular they may be of the type attached to the slat at special seats made in said slat, or of the type made directly on the slat, for example in the form of tongues made in one piece with the slat by shearing.

[0022] In particular, the stacking unit 1 is designed to be inserted - together with one or more identical units - in a more complex production plant (not shown in the figures) for inserting a plurality of slats on several ladders. The number of ladders of a blind determines the number of stacking units since the single stacking unit manages a single ladder. In particular, the production plant may be equipped with a longitudinal support bar (not shown) to which the individual stacking units 1 are associated and at one end of which a slat production machine (not shown) is placed. Generally said production plant with two or more stacking units is equipped with standard means for inserting the slat inside the stacking unit so that said slats are inserted between the crossbeams of the ladders. These moving means may be of any type, such as a belt or rollers.

[0023] Here and henceforth in the description and claims, reference will made to the stacking unit of the invention in conditions of use. The references to an upper or lower position should be understood in such sense.

[0024] According to a general embodiment of the invention shown in the appended drawings, the stacking unit 1 comprises a sliding lane C for a slat L along a longitudinal insertion axis X on an insertion plane m.

[0025] Preferably, said lane C is defined by at least one guide element 3 which may consist, for example, of a plate connected to a support structure of the stacking unit 1. Operatively, the slat L is made to slide inside the stacking unit along the aforesaid lane C to be inserted between two crossbeams of a ladder appropriately positioned in the stacking unit 1.

[0026] Advantageously, the stacking unit 1 is provided with devices to perform the insertion of the slat between two crossbeams of the ladder. Such devices may be of any type suitable for the purpose.

[0027] Considered that the methods and means used for the insertion of the slat in a ladder are not the object of the present invention and are in any case known to a person skilled in the art, they will not be described in the rest of the description. In particular, for simplicity and clarity of illustration, in the appended drawings relative to a particular embodiment of the present invention, all the above devices used for inserting a slat in a ladder have been omitted.

[0028] According to a particular embodiment of the present invention, with regard to the insertion of the slat between the crossbeams of a ladder and other devices functional to the operation of the stacking unit, the stacking unit 1 may be made as described in the Italian patent application for industrial invention no. PD2012A000224 dated 13.07.2012 in the name of the Applicant. The content of the application no PD2012A000224 shall be deemed fully incorporated herein as reference.

[0029] According to the aforementioned general embodiment of the invention illustrated in the appended drawings, the stacking unit 1 comprises a device for positioning a ladder S on a positioning plane p orthogonal to the insertion plane m of the slat and transversal to the longitudinal axis X and to the sliding lane C.

[0030] According to a particular embodiment of the invention (not shown in the appended drawings), the positioning device of the ladder may comprise two guides, spaced from each other, which each receive inside one of the two longitudinal ribs P1, P2 of the ladder S. Said two guides extend in height over the insertion plane m, delimiting the positioning plane p of the ladder and the insertion zone of the slat between two crossbeams of the ladder. The pair of crossbeams T1, T2 of the ladder S are in fact positioned in the free space between the two guides. A positioning device of this type is described for example in Italian patent application no. PD2012A000224, to which reference can be made for details.

[0031] According to an alternative embodiment, the positioning device does not comprise guides which extend in height beyond the insertion plane m. The device has means (not shown in the appended drawings) which support the ladder above and below the insertion plane, keeping it properly positioned in the positioning plane p.

[0032] For simplicity of graphic illustration, in the appended drawings the positioning device of the ladder is not shown, but simply a portion of a ladder S to define the positioning plane p.

[0033] The stacking unit 1 comprises means 10 for locally moving a slat L parallel to the longitudinal axis X next to the positioning plane p of the ladder, once the slat has been inserted in a pair of crossbeams T1 and T2 of the ladder S.

[0034] Preferably, as shown in the appended draw-

ings, the aforesaid local movement means 10 are positioned next to the positioning plane p of the ladder S.

[0035] Advantageously, the aforesaid local movement means 10 of the slat permit a translation of the slat in a direction parallel to the longitudinal axis X with a stroke A of a predetermined maximum width. In particular, the aforesaid stroke A has a predetermined maximum width of 1 to 15 cm. In other words, the aforesaid local movement means are used for translations of limited width of the slat near the positioning plane p of the ladder. In a production plant, provided with several stacking units, the local movement means of a single stacking unit thus add to the means used to move the slats for their entire length.

[0036] Preferably, the aforesaid local movement means 10 are provided with end stops 14 and 15 which define the ends of the aforesaid stroke A.

[0037] As described further below, the local translation imposed by the aforesaid local movement means 10 on the slat aims to bring the coupling means present on the slat to engage on at least one crossbeam of the ladder.

[0038] Advantageously, the stacking unit 1 comprises control means to control the activity of the aforesaid local movement means 10 depending on the coupling activity of the coupling means of the slat to the crossbeam of the ladder.

[0039] In particular, the aforesaid control means (not shown in the appended drawings) may comprise devices to detect the position assumed by the local movement means 10 in relation to the positioning plane p of the ladder S. Said control means comprise a control panel not shown in the appended drawings) which controls the local movement means 10 depending on the signals coming from the aforesaid detection means.

[0040] Alternatively or in combination with the devices for detecting the position assumed by the local movement means 10, the aforementioned control means may comprise one or more sensors to detect the movement of at least one crossbeam of a ladder from the positioning plane p. Said sensors are managed by the aforesaid control unit.

[0041] More specifically, said one or more sensors are suitable to detect whether during the local translation of the slat S the coupling means of said slat have engaged or not a crossbeam of the ladder. In particular, said sensors may be pressure or position sensors which detect shifts of the crossbeam of the ladder from the positioning plane p. In fact, when the coupling means engage on a crossbeam, it is dragged in movement by the slat. As soon as this occurs, the sensors command the movement means to stop.

[0042] According to the embodiment illustrated in the appended drawings, the aforesaid local movement means 10 may comprise at least one mobile pliers 11, which is positioned next to the sliding lane C of the slat, laterally to said lane in relation to the longitudinal insertion axis X, to pick up the slat S at one of its two longitudinal rims B. The pliers 11 is associated to a slide 16 moving parallel to the longitudinal axis X along a guide 17, in turn, attached to the support structure 2 of the stacking unit 1.

[0043] Advantageously, the aforesaid mobile pliers 11 comprises two jaws 12, 13 which are rotationally connected to the slide 16, one below and one above the insertion plane m of the slat. Preferably, each jaw 12 and 13 is rotationally independent of the other, i.e. each jaw has its own rotation axis r1 and r2, of which one is placed above and one below the insertion plane m. This makes the pliers more adaptable to changes in position of the slat in a direction Z orthogonal to the insertion plane m.

[0044] Preferably, as shown in the appended drawings, the local movement means 10 comprise two mobile plierss 11, positioned on opposite sides of the sliding lane C near the positioning plane p of the ladder so as to pick up the slat on both of its two longitudinal rims and thus move it in a more balanced manner.

[0045] Advantageously, the stacking unit 1 comprises means 30 of raising the slat S in a direction Z orthogonal to the insertion plane m. The function of this lifting will be clarified below in the description.

[0046] According to the embodiment illustrated in the appended Figures, the lifting means 30 consist of the aforementioned plate 3 (which acts as the guide element of the slat) and of one or more actuation cylinders 31 connected underneath to said plate to move it in the direction Z.

[0047] Advantageously, the stacking unit 1 may comprise means 40 for compressing at least one side of a slat placed in the sliding lane C. Such means are provided in case of processing slats equipped with coupling means G of the type made directly on the slat, for example in the form of tongues made in one piece with the slat by shearing. The compression of the slat serves to engage said tongues and take them from the raised position to the lowered position.

[0048] Advantageously, as shown in the appended drawings, the compression means 40 are positioned next to the positioning plane p of the ladder S.

[0049] According to the two embodiments illustrated in the appended drawings, the aforesaid compression means 40 comprise at least one arm 41, which is rotationally connected to the support structure, laterally to the sliding lane C of the slat. The arm 41 is provided with actuation means 42 to be shifted between a raised position, in which the arm 41 is raised from said lane (see figures 1 to 4), and a lowered position, in which the arm 41 is lowered onto said lane to abut with at least a contact portion thereof 43 on the upper surface of a slat positioned along the lane (see figures 5 and 6).

[0050] In particular, the aforesaid contact portion 43 is counter-shaped to the slat against which the arm 41 must come into contact.

[0051] In particular, as shown in figures 1 to 5, the arm 41 is oriented transversely to the longitudinal axis X and extends in length so as to cover the width of the sliding lane C of the slat. This solution is used when processing

slats provided with several coupling means G arranged on the same transversal cross-section of the slat (as shown in particular in Figures 3 and 4).

[0052] Alternatively, as shown in Figure 6, the arm 41 is oriented transversely to the longitudinal axis X and extends in length by less than the width of the sliding lane C of the slat. This solution is used when processing slats provided with a single coupling means G positioned for example on the centreline of the slat.

[0053] The present invention also relates to an attachment method of a slat to a ladder for the production of Venetian blinds.

[0054] As already indicated above, the ladder S comprises a plurality of pairs of crossbeams T1, T2; the slat comprises a plurality of coupling means G to the crossbeams of a slat. The coupling means may be of any type, and in particular those already discussed above.

[0055] According to a general embodiment of the present invention; the attachment method comprises the following operating steps:

a) arranging a stacking unit 1 of slats L according to the present invention, and in particular as already described above;
b) inserting a slat L between a pair of crossbeams T1, T2 of a ladder previously positioned in the stacking unit 1, making the slat slide on an insertion plane m along the longitudinal insertion axis X.

[0056] Figure 1 shows a slat L already inserted between two crossbeams in a stacking unit according to a particular embodiment of the invention.

[0057] Subsequent to the insertion step b), the method then comprises a step c) of translating (by means of the aforesaid local movement means 10) the slat L in relation to the positioning plane p (and thus in relation to the ladder S positioned therein) in a direction parallel to the longitudinal axis X until at least one of the coupling means G present on the slat has engaged one of the two crossbeams of the pair of crossbeams between which the slat is inserted (see sequence figures 3 and 4).

[0058] Advantageously in the step c) of translating the slat a monitoring step of the engagement of the coupling means G of the slat on one of the crossbeams is provided for. This can be achieved in particular as already described above, i.e.:

[0059] - detecting the position assumed by the local movement means 10 in relation to the positioning plane p of the ladder S; or alternatively or in combination with the previous mode

- detecting the shift of at least one of the crossbeams from the positioning plane p.

[0060] Once the engagement of the coupling means G of the slat on one of the crossbeams has been detected, the translation step c) is completed and the translation of the slat interrupted.

[0061] In the translation step c) the translational movement may be in a single direction or in both directions with respect to the longitudinal axis X with alternate motion, e.g. in case in the insertion step the coupling means G of the slat have gone past the positioning plane p of the ladder and thus the ladder itself.

[0062] Generally, the coupling means G of a slat are positioned at least on a first side L1 of said slat. Normally, said first side L1 is the top side of the slat 1. The crossbeam of a pair of crossbeams of a ladder S destined to engage with said coupling means G is thus the upper crossbeam T1.

[0063] Preferably, before the translation step c) of the slat L a step d) is conducted of stretching the crossbeam T1 of the ladder faced on said first side L1 of the slat in order to make said crossbeam T1 adhere to the first side of the slat L and thus allow the coupling means G of the slat to engage said crossbeam T1 in the subsequent translation step c),(see sequence in figures 1 and 2).

[0064] Advantageously, the stretching step d) is conducted causing a relative motion between the ladder S and the slat L in a direction Z orthogonal to the insertion plane m to push the first side L1 of the slat against the crossbeam T1 faced on it.

[0065] In particular, the stretching step d) is conducted moving the slat L in a direction orthogonal to the insertion plane m and keeping the ladder S still, to push the first side L1 of the slat against the crossbeam of the ladder faced on such first side(see figures 1 and 2).

[0066] Alternatively, it may be provided that the slat is held still and the ladder is stretched in the aforesaid direction Z. The combination of the two movements may also be provided for.

[0067] Advantageously, in the translation step c) the translation of the slat in a direction parallel to the longitudinal axis X has a stroke A of a predetermined maximum width. In particular, said stroke A has a predetermined maximum width of 10 to 30 cm. Preferably said stroke A has a predetermined maximum width of 1 to 15 cm. The translation step c) is in fact separate from the insertion step of the slat between the crossbeams of the ladder, said latter step providing for the translation of the slat by a length substantially equivalent to its entire length.

[0068] Preferably in the insertion step b) the slat L is positioned in relation to the ladder S so that at least one of the coupling means G of the slat is positioned next to the pair of crossbeams between which the slat is inserted (see figure 1). This can be performed automatically knowing with an acceptable tolerance the longitudinal distribution of the coupling means G on the slat.

[0069] Advantageously, in the insertion step b) the slat is positioned in relation to the ladder so that at least one of the coupling means of the slat is positioned next to the pair of crossbeams at a distance from the ladder along the longitudinal axis X less than the maximum width of stroke A of the translation of the slat conducted in the translation step c).

[0070] As mentioned above, the coupling means G of a slat L may in particular be of the tongue type made in one piece with the slat and may assume a raised position in which they project from the slat, and a lowered position in which they do not project from the slat. Advantageously, in the case of processing slats of this type, the coupling method comprises the following additional operating steps:

- step e) of arranging the slat with the tongues of the coupling means G in the raised position before the translation step c); and
- step f) of lowering the tongues into the lowered position at the end of the translation step c) to block the crossbeams onto the slat.

[0071] Advantageously, the step f) of lowering the tongues is performed by the compression means 40 of the stacking unit (see figures 5 and 6).

[0072] Preferably, in the insertion step b) the pair of crossbeams (in which the slat is inserted) is divaricated so that during the insertion of the slat the coupling means G distributed along the length of the slat do not catch on one or both of the crossbeams hindering the passage of the slat. The methods of divaricating the crossbeams are known to a person skilled in the art. In particular, the divarication of the crossbeams may be performed as described in the patent application no. PD2012A000224 in the name of the same Applicant.

[0073] The invention permits numerous advantages to be achieved, some of which already described.

[0074] The stacking unit 1 and attachment method according to the invention make it possible to attach the slats to the ladders in a completely automated manner, and therefore more quickly and efficiently. The attachment of the ladders to the slat is performed directly in the stacking unit immediately after the insertion of the slat in the ladder. This makes it possible to significantly reduce the labour required for the production of a Venetian blind and thereby the production costs.

[0075] The stacking unit 1 and attachment method according to the invention make it possible to attach the ladders to the slats in a mechanically simple and reliable manner, without requiring the use of complex and costly devices. The attachment requires solely the controlled translation of the slat in relation to the ladder and possibly the closing of the coupling means of the slats, should this be necessary for the type of coupling means present on the slats being processed.

[0076] The stacking unit of slats and the method according to the invention also make it possible to easily and reliably manage the attachment of the ladders to the slats.

[0077] Based on the above description the stacking unit according to the invention thus makes it possible to automatically perform the attachment of the slats to the ladders and is at the same time simple and inexpensive to construct.

[0078] The invention thus conceived thereby achieves the intended purposes.

[0079] Obviously, its practical embodiments may assume forms and configurations different from those illustrated above while remaining within the scope of protection of the invention.

[0080] In addition, all the parts may be replaced with technically equivalent elements and the dimensions, shapes and material used may be varied as needed.

Claims

1. Unit for stacking slats on a support ladder provided with double crossbeams for the production of Venetian blinds, comprising:

   - a sliding lane (C) which extends along a longitudinal extension axis (X) on an insertion plane (m) and along which a slat (L) is made to slide;
   - a device for positioning a ladder (S) on a positioning plane (p) orthogonal to the insertion plane (m) of the slat and transversal to the longitudinal axis (X) and to the sliding lane (C),

   characterised in that it comprises means (10) for locally moving a slat (L) along a longitudinal axis (X) next to the positioning plane (p) of the ladder, once the slat has been inserted in a pair of crossbeams of the ladder.

2. Stacking unit according to claim 1, wherein said local movement means (10) are positioned next to the positioning plane (p) of the ladder.

3. Stacking unit according to claim 1 or 2, wherein said local movement means (10) of the slat permit a translation of the slat in a direction parallel to the longitudinal axis (X) with a stroke (A) of a predetermined maximum width.

4. Stacking unit according to claim 3, wherein said stroke (A) has a predetermined maximum width of 1 to 15 cm.

5. Stacking unit according to claim 2, 3 or 4, wherein said local movement means (10) are provided with two end stops which define the ends of such stroke (A).

6. Stacking unit according to one or more of the previous claims, comprising means for detecting the position assumed by said local movement means (10) in relation to the positioning plane (p) of the ladder (S), said unit (1) comprising a control unit which controls the local movement means (10) depending on the signals coming from said detection means.

7. Stacking unit according to one or more of the previous claims, comprising one or more sensors for detecting the shift of at least one crossbeam of a ladder from the positioning plane (p), said unit (1) comprising a control unit which controls the local movement means (10) depending on the signals coming from said one or more detection sensors.

8. Stacking unit according to one or more of the previous claims, wherein said local movement means (10) comprise at least one mobile pliers (11), which is positioned next to the sliding lane (C) of the slat, laterally to said lane in relation to the longitudinal insertion axis (X), to pick up the slat (L) at one of its two longitudinal rims, said pliers (11) being associated to a slide moving parallel to said longitudinal axis (X).

9. Stacking unit according to claim 8, wherein said pliers comprises two jaws (12, 13) rotationally connected to said slide, each with its own rotation axis (r1; r2).

10. Stacking unit according to one or more of the previous claims, comprising means (30) for lifting the slat (L) in a direction (Z) orthogonal to the insertion plane (m).

11. Stacking unit according to one or more of the previous claims, comprising means (40) for compressing at least one side of a slat positioned in said sliding lane (C).

12. Stacking unit according to claim 11, wherein said compression means (40) are positioned next to the positioning plane (p) of the ladder.

13. Stacking unit according to claim 11 or 12, wherein said compression means (40) comprise at least one arm (41), which is rotationally connected to a support structure (2), laterally to the sliding lane (C) of the slat, and is provided with actuation means (42) to be shifted between a raised position, in which the arm (41) is raised from said lane, and a lowered position, in which the arm (41) is lowered onto said lane to abut with at least a contact portion thereof (43) on the upper surface of a slat positioned along said lane.

14. Method for attaching a slat to a ladder for the production of Venetian blinds, said ladder (S) comprising a plurality of pairs of crossbeams (T1, T2), and said slat comprising a plurality of coupling means (G) to the crossbeams of a ladder, the method comprising the following operating steps:

a) arranging a stacking unit (1) of slats (L) according to one or more of the previous claims;
b) inserting a slat (L) between a pair of crossbeams (T1, T2) of a ladder previously positioned in the stacking unit (1) by making the slat slide on an insertion plane (m) along the longitudinal insertion axis (X)

characterised in that it comprises - subsequent to the insertion step b) - a step c) of translating the slat (L) in relation to the ladder (S) in a direction parallel to the longitudinal axis (X) using said local movement means (10) until at least one of the coupling means (G) present on the slat has engaged one of the two crossbeams between which the slat is inserted.

15. Method of attachment according to claim 14, wherein said coupling means (G) are positioned at least on a first side (L1) of said slat and wherein before the translation step c) a step d) is conducted of stretching the crossbeam (T1) of said pair of crossbeams faced on said first side (L1) of the slat in order to make said crossbeam (T1) adhere to the first side of the slat (L) and thus allow the coupling means (G) of the slat to engage said crossbeam (T1) in the subsequent translation step c).

16. Method of attachment according to claim 15, wherein the stretching step d) is conducted causing a relative motion between the ladder (S) and the slat (L) in a direction (Z) orthogonal to the insertion plane (m) to push the first side (L1) of the slat against the crossbeam (T1) facing it.

17. Method of attachment according to claim 15 or 16, wherein the stretching step d) is conducted moving the slat (L) in a direction orthogonal to the insertion plane (m) and keeping the ladder (S) still, to push the first side (L1) of the slat against the crossbeam of the ladder facing such first side.

18. Method of attachment according to one or more of the claims from 14 to 17, wherein in said translation step c) the translation of the slat in a direction parallel to the longitudinal axis (X) has a stroke of a predetermined maximum width, preferably 1 to 15 cm.

19. Method of attachment according to one or more of the claims from 14 to 18, wherein in said insertion step b) the slat (L) is positioned in relation to the ladder (S) so that at least one of the coupling means (G) of the slat is positioned next to the pair of crossbeams between which the slat is inserted.

20. Method of attachment according to claims 18 and 19, wherein in said insertion step b) the slat is positioned in relation to the ladder so that at least one of the coupling means of the slat is positioned next to the pair of crossbeams between which the slat is inserted at a distance from the ladder along the longitudinal axis (X) less than the maximum width of stroke of the translation of the slat conducted in the

translation step c).

21. Method of attachment according to one or more of the claims from 14 to 20, wherein the coupling means (G) are of the tongue type made in one piece with the slat and may assume a raised position in which they project from the slat, and a lowered position in which they do not project from the slat, and wherein said attachment method comprises the further operating steps of:

step e) arranging the slat with the tongues of the coupling means in the raised position before the translation step c); and
step f) of lowering the tongues into the lowered position at the end of the translation step c) to block the crossbeams onto the slat.

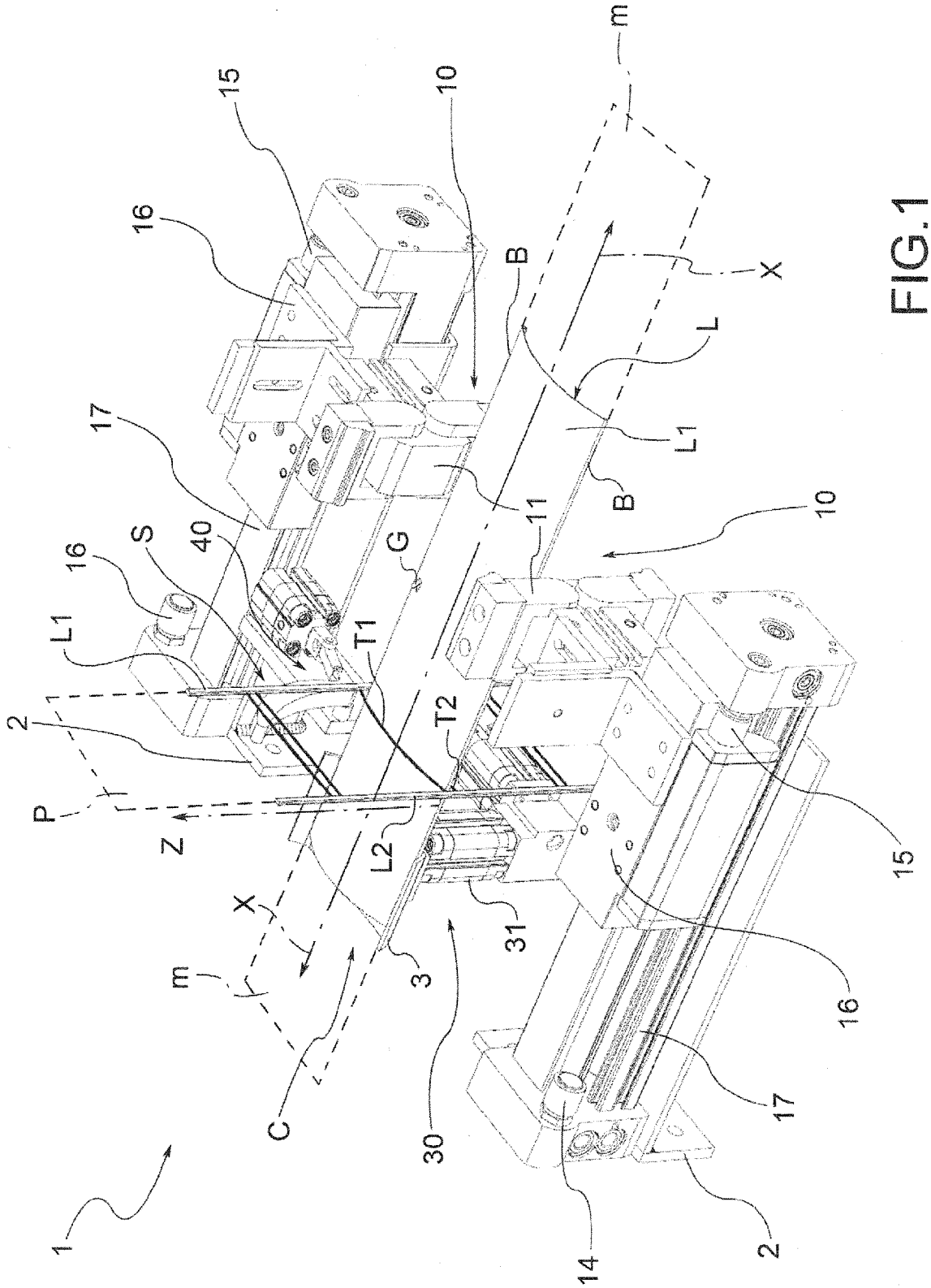
m
15
10
16
B
X
L
L1
17
B
11
10
S
40
G
16
L1
T1
T2
2
P
Z
L2
15
X
31
m
3
16
17
C
30
14
2
1

FIG.1

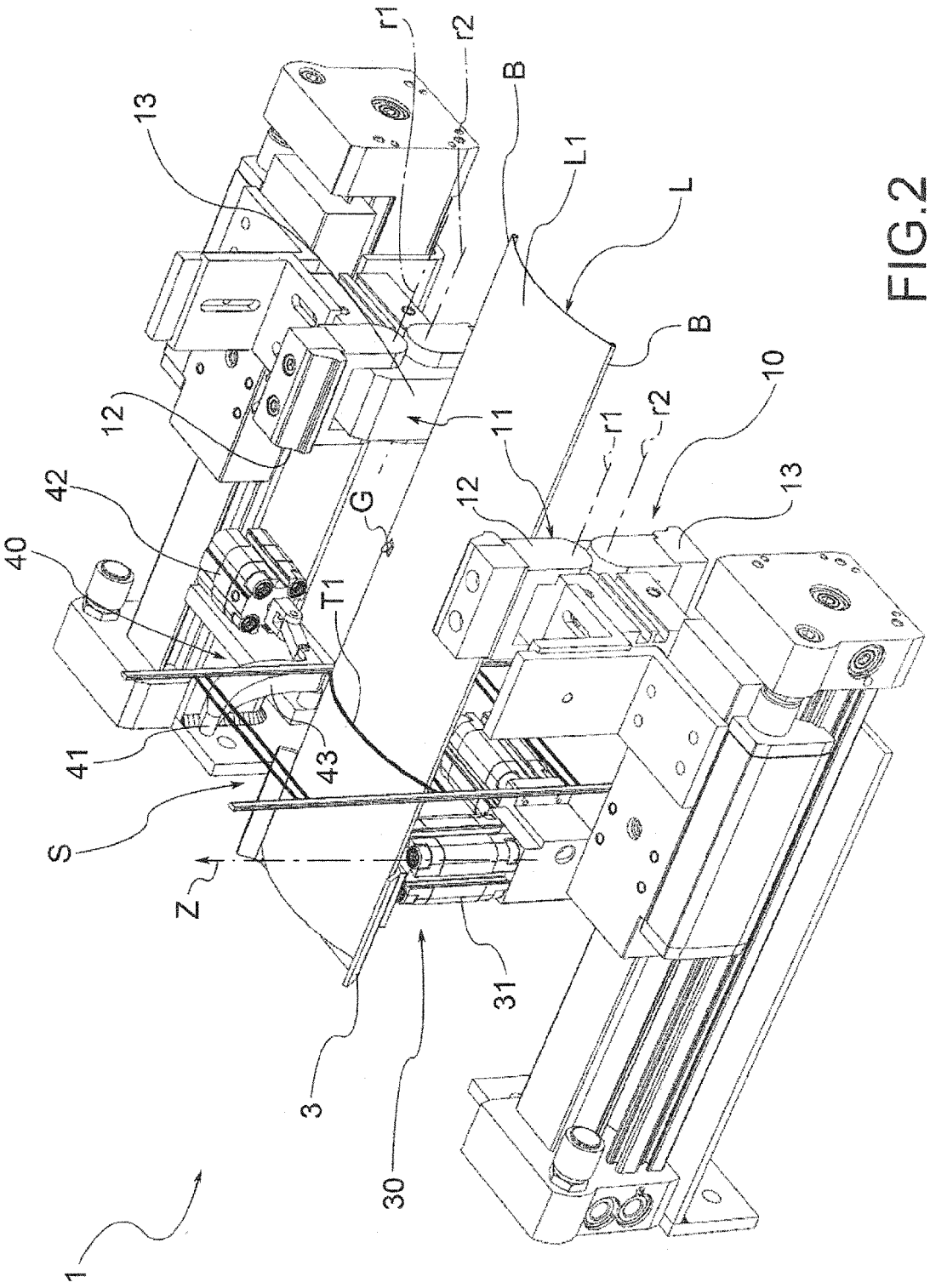

FIG.2

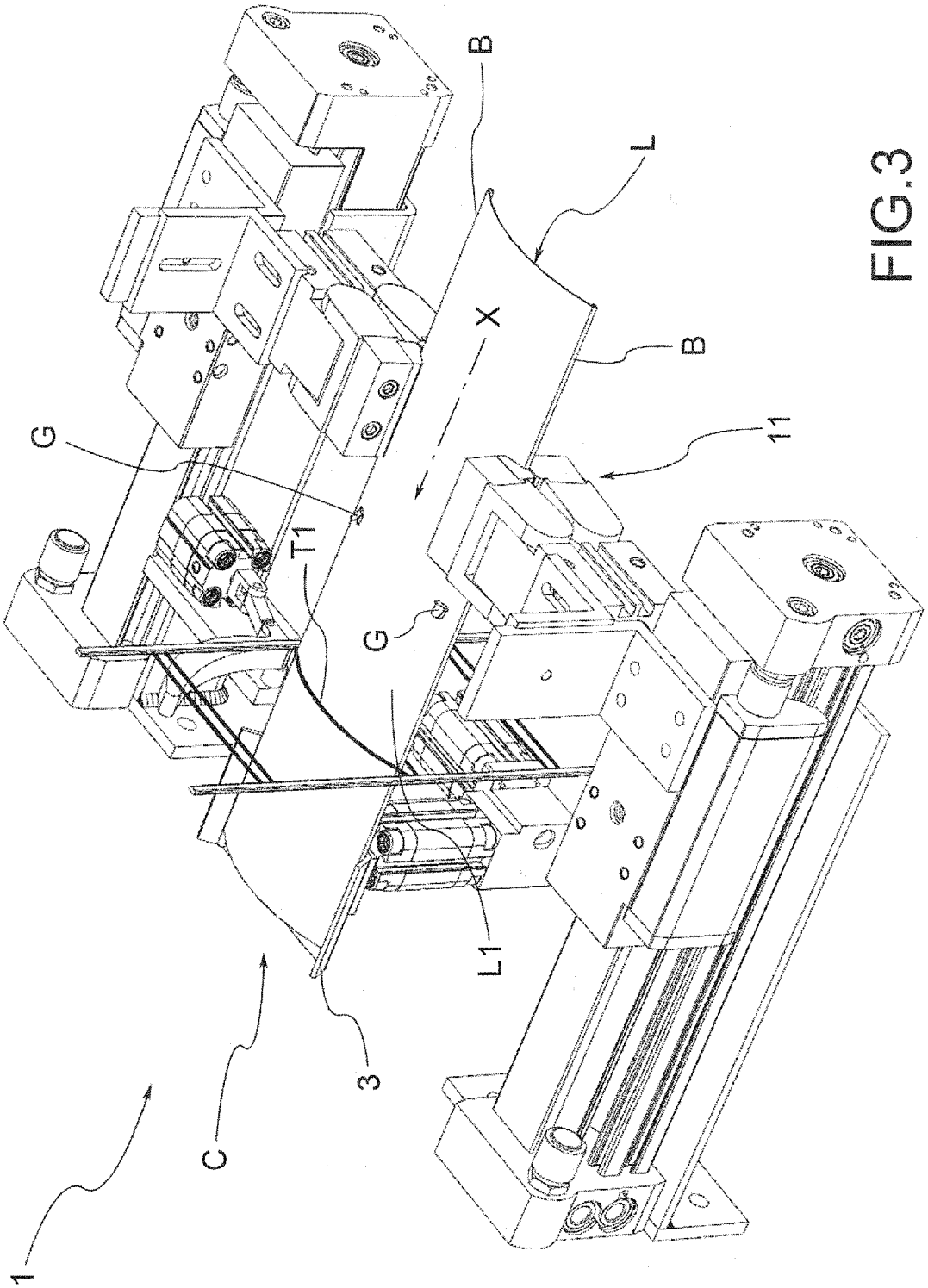

FIG.3

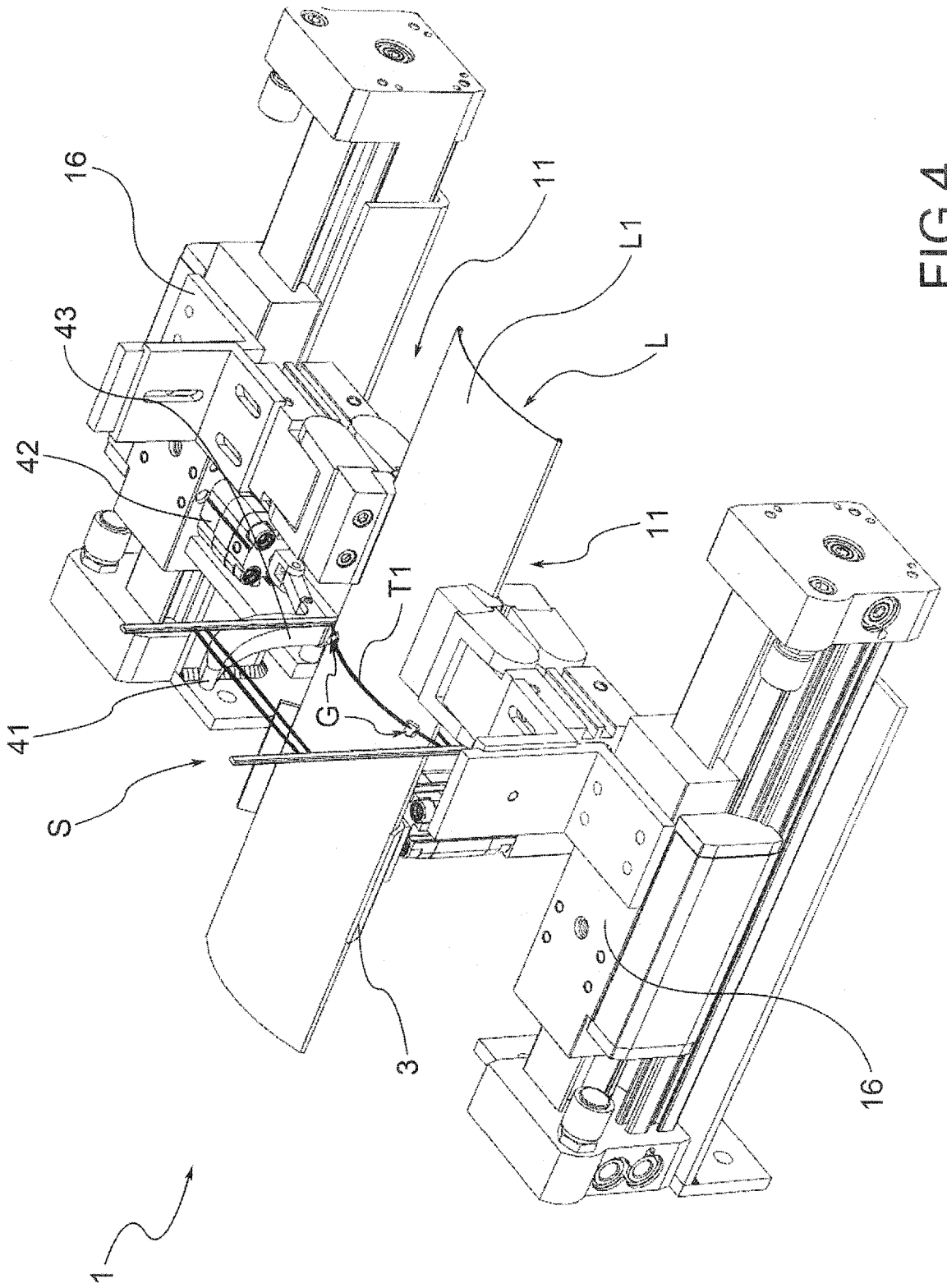

FIG.4

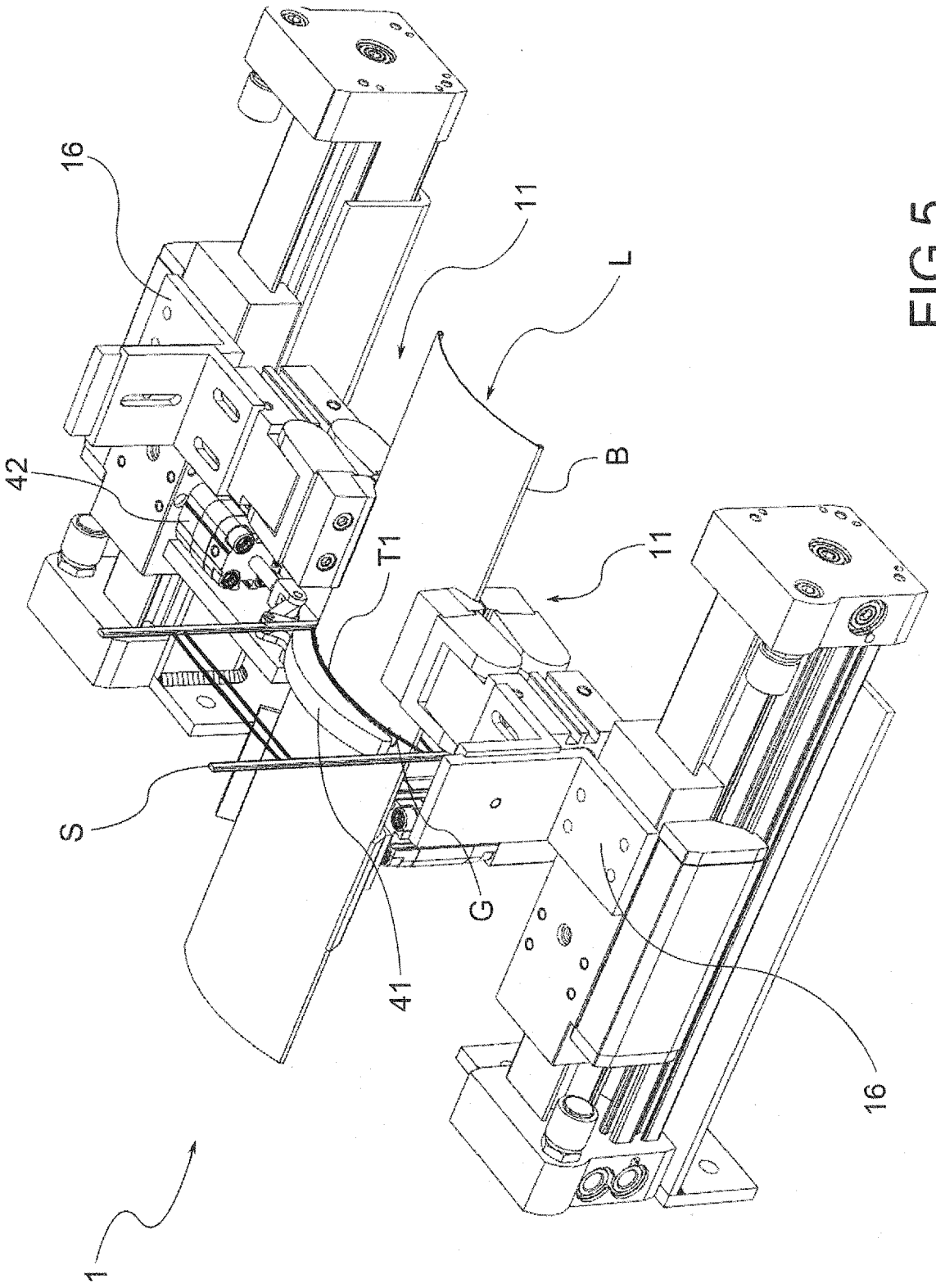

FIG.5

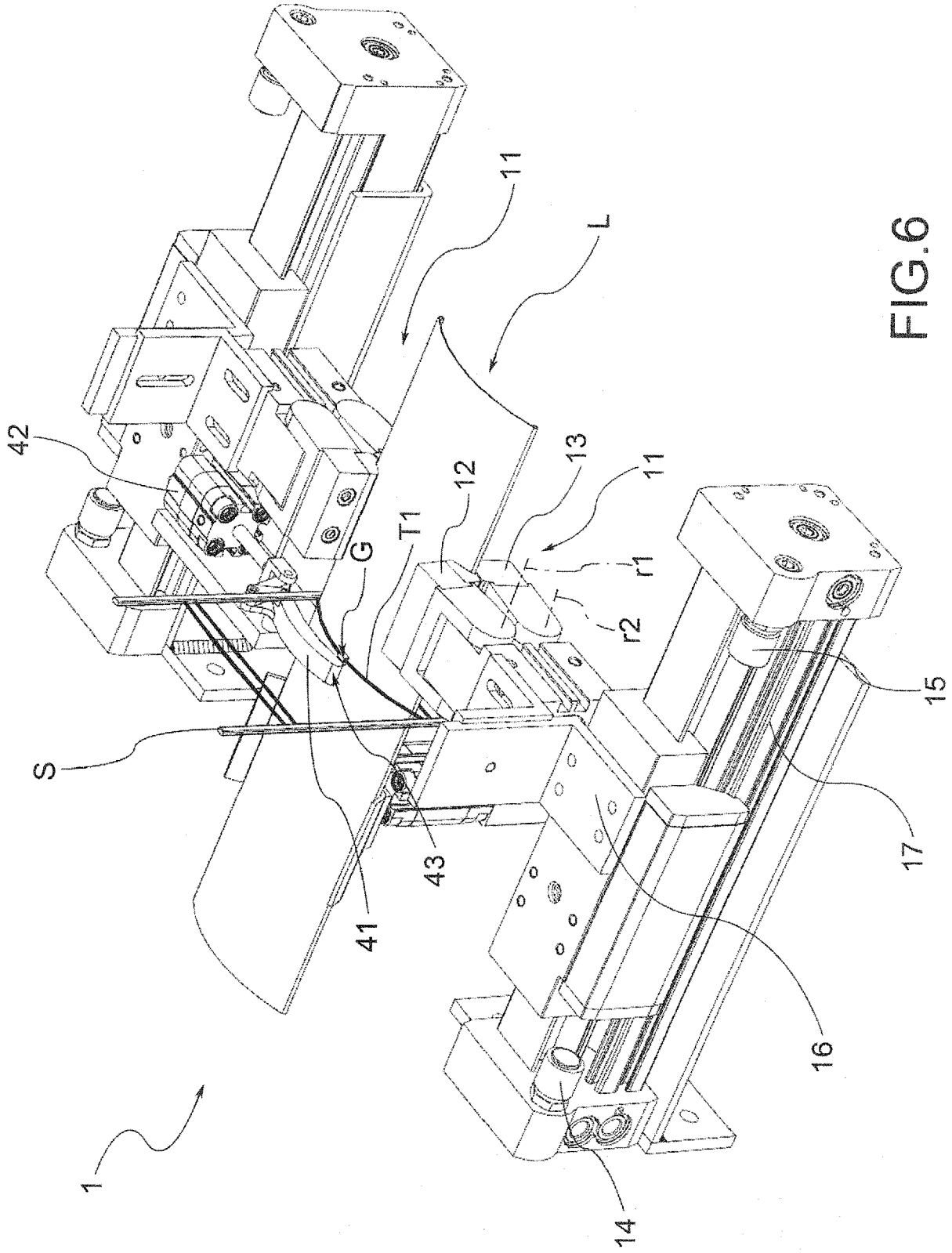

FIG.6

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EUROPEAN SEARCH REPORT

Application Number
EP 14 19 8006

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E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 April 2015	Weißbach, Mark

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28-04-2015

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