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(71) Applicant: **ST.LA.Srl**
56025 Pontedera (PI) (IT)

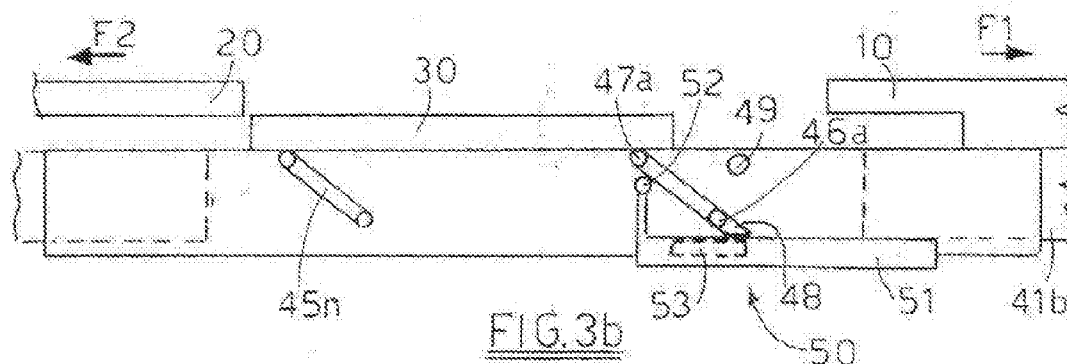
(72) Inventor: **Zappolini, Stefano**
56020 Montopoli V.A. (PI) (IT)

(74) Representative: **Leotta, Antonio et al**
Italbrevetti S.r.l.
Via S. D'Acquisto, 40/N
56025 Pontedera (PI) (IT)

(54) **Centrally extensible table**

(57) In an extensible table (100) comprising at least a cover plate (10,20), at least an extension plate (30) that in the state of table not extended is placed at least partly under the cover plate (10,20) and in the state of table extended is placed at the same height with the cover plate (10,20) adjacent to it, and an extension mechanism for passing from the table not extended state to the table extended state and vice-versa, in which the extension mechanism comprises drive members (40) for moving

the extension plate (30) relative to said cover plate (10,20), and operating members (50) for controlling the movement of the drive members (40), and in which the drive members (40) comprise at least a horizontal rail and a parallelogram kinematic system supporting the extension plate (30), the operating members (50) directly cooperates with the levers of the parallelogram kinematic system for passing from the not extended state to the extended state and vice-versa by simply shifting the cover plate (10,20).



Description

Technical Field

[0001] The present invention concerns an extensible table comprising at least a cover plate, at least an extension plate that in the state of table not extended is placed at least partly under the cover plate and in the state of table extended is placed at the same height with the cover plate adjacent to it, and an extension mechanism for passing from the table not extended state to the table extended state and vice-versa, in which the extension mechanism comprises drive members for moving the extension plate relative to said cover plate, and operating members for controlling the movement of said drive members, and in which the drive members comprise at least a horizontal rail and a parallelogram kinematic system.

Background Art

[0002] They are known extensible tables comprising at least a cover plate and at least an extension plate that in the state of table not extended is placed at least partly under the cover plate and in the state of table extended is placed at the same height with the cover plate adjacent to it, and an extension mechanism for passing from the table not extended state to the table extended state and vice-versa.

[0003] This kind of extensible tables is largely used as the extension plate (plates) is blinded under the cover plate (plates) when the table is in the not extended state and it is aligned with the cover plate when it is moved to the extended state.

[0004] In this field it is felt the need of mechanisms for automatically moving from the not extended state to the extended state and vice-versa. In addition the movement has to be fluid, the mechanism has to be not bulky and blinded as much as possible, and, obviously, at the lowest possible cost.

[0005] In the above outlined category of extensible tables they are known tables in which the extension mechanism comprises drive members for moving the extension plate relative to the cover plate comprising, in addition to horizontally sliding members, also a parallelogram kinematic system supporting the extension plate and operating members for actuating the movement of the parallelogram kinematic system.

[0006] In addition, within the above category of tables a further distinguishing can be made between tables in which the cover plate is fixed to the legs and the extension plate previously slides outward and then moves up at the height of the cover plate for extending the length of the table, and those tables in which the cover plates outward slide relative to the legs and the extension plate moves up in the space created by the movement of the cover plates and remains within.

[0007] A table of this last kind is described in DE

3429928 A1 in which the operating members comprise an operating rod connected at one end to a cover plate and cooperating at the other end with operating member integral to the extension plate, in which the end of the rod cooperating with the above operating member is shaped so that it forms two different surfaces cooperating the operating member, one for lifting the extension plate and the other for lowering the extension plate. The above extension mechanism is quite effective, but the kinematic system and structure is quite complex so that it also has quite high production costs.

[0008] In EP 1 371 305 B1 it is described another extensible table of the above type in which the movement from the extended state to the not extended state and vice-versa can be completely or partly automatic. When it is automatic in both directions the operating members comprise operating members for passing to the extended state which are physically separated and different from the operating members for passing to the not extended state. With reference to the drawings of the above cited patent the operating members for moving to the extended state comprise at least a flexible pull cable Z bound at one end to a rail portion S3 integral to a cover plate TP1 and bound at the other end to a point of action AP of a lever H which is part of the parallelogram kinematic system which lifts the extension plate TP3. The mutual movement of the rail portions S1, S2 and S3 leads to a force applied to the point of action AP of the lever H by the cable Z so that the lever H rotates around its pivoting axis SA. The operating members for passing to the not extended state comprise elastic hook shaped driver devices M and M1 integral to a cover plate TP2 and cooperating with the extension plate TP3. The extension mechanism described in EP 1 371 305 B1 is an automatic one but the operating members are not so efficient, mainly the operating members for passing to the not extended state and they also have to be directly bound to the cover plate which could affect the safety of use features of the table.

Summary of invention

[0009] It is an object of the present invention to propose an extensible table with an improved extension mechanism: simple, efficient and with very low production costs.

[0010] According to an aspect of the present invention the above objects are attained by an extensible table comprising at least a cover plate, at least an extension plate that in the state of table not extended is placed at least partially under the cover plate and in the state of table extended is placed at the same height with the cover plate adjacent to it, and an extension mechanism for passing from the table not extended state to the table extended state and vice-versa, in which the extension mechanism comprises drive members for moving said extension plate relative to said cover plate, and operating members for controlling the movement of said drive members, in which said drive members comprise at least a guide comprising at least two guide elements mutually

sliding with a first guide element connected to the extension plate through a lever mechanism comprising levers hinges to the extension plate and to the first guide element in order to compose an articulated parallelogram kinematic system, and a second guide element integral to the cover plate, and wherein the operating members comprise at least a first operating element integral to the second guide element and acting upon one of the levers, and at least a second resilient operating element integral to the second guide element and acting upon the lever.

[0011] Thanks to the above outlined extension mechanism the table of the present invention can be brought from the extended state to the not extended state and vice-versa by simply translating the cover plate. In addition, the operating members cooperating only with the levers of the parallelogram kinematic system allow very low production costs and great versatility.

[0012] Advantageously the first operating element acts upon the lever at an intermediate region between an upper hinge member and a lower hinge member of the lever and the second operating element acts upon a protrusion of the lever extending from the lower hinge member.

[0013] Still advantageously the second operating member is a leaf spring.

[0014] Preferably the extensible table comprises two cover plates and a transmission assembly for transmitting movement from one cover plate to the other cover plate so that when a cover plate moves to the other cover plate it performs a mirror movement with reference to a center vertical plane of the table.

[0015] Advantageously the transmission assembly comprises two pulleys rotatably bound to opposite longitudinal ends of the first guide element, at least a flexible cable extending between the pulleys for performing a circumferential path, and binding elements for binding a second guide element integral to one cover plate to a lower path of the flexible cable and another second guide element integral to the other cover plate to the upper path of the flexible cable, respectively.

Brief description of drawings

[0016] These and more features of the invention will be more easily comprehensible from the following description of a preferred embodiment of the invention, given as a not limiting example, with reference to the accompanying drawings in which:

- Figure 1 shows two perspective views of an extensible table according to the present invention: fig. 1 shows the table not extended state, fig. 2 shows the table extended state;
- Figures 2a and 2b show a side view of the table of fig. 1 (without the legs) in the not extended and the extended states respectively;
- Figures 3a to 3d show a side view of components of the table of fig. 1 in various steps of the run from the not extended state to the extended state;

- Figures 4a to 4d show a side view of components of the table of fig. 1 in various steps of the run from the extended state to the not extended state;
- Figure 5 shows a detailed view of some components of the table of fig. 1 during a step of the run from the not extended state to the extended state: fig. 5a is a side view in detail of some components, figs. 5b and 5c show section views obtained by the section line V-V of fig. 5a;
- Figures 6a to 6c are views similar to the views of figs 5a to 5c showing the same components of the table of fig. 1 during steps of the run from the extended state to the not extended state; fig. 6a is a side view, figs. 6b and 6c show section views obtained by the section line VI-VI of fig. 6a.

Description of embodiments

[0017] In figs 1 a and 1 b it is shown an extensible table, 100, according to the present invention, in the not extended and extended states, respectively. The extensible table 100 comprises a cover plate, 10, a further cover plate, 20, and an extension state, 30, that in the not extended state is placed under the cover plates 10 and 20 partially covered by both plates, while in the extended states it is at the same height with the cover plates 10 and 20 adjacent to them.

[0018] In figs. 2a and 2b the extensible table according to the embodiment of fig. 1 is shown in a side view without its legs and the extension members for moving the cover plates and the extension plate are better shown. In fig. 2a the table 100 is in its not extended state with the cover plate 10 adjacent to the other cover plate 20 and the extension plate 30 is placed underneath, covered in part by the cover plate 10 and in part by the cover plate 20. Drive members 40 are mounted below the plates 10, 20 and 30 and they comprise a horizontal guide 41 composed of a first guide element, 41 a and second guide elements, 41 b, 41 c, and a set of levers 45a, 45n, each hinged at two points. The first guide element 41a is a fixed horizontal rail connected to the leg supporting structure (not shown) and the second guide elements 41 b and 41 c are horizontally slide members integral to the first cover plate 10 and the second cover plate 20 respectively. The movement of the second guide element 41 c is depending on the movement of the other second guide element 41 b by a transmission assembly composed of two pulleys 42a, 42b, rotatably bound at opposite longitudinal ends of the first guide element 41 a, a flexible cable, 43, forming a closed loop circumferential path between the pulleys 42a and 42b, and binding element, 44a and 44c for binding the second guide element 41 b to the lower path of the flexible cable 43 and the other second guide element 41 c to the upper path of the flexible cable 43, respectively. Thanks to the above transmission assembly a movement of the second guide element 41 b cause a mirror movement, with reference to the longitudinal symmetry plane S, of the other second guide element 41 c.

ment 41c and then mirror movements with reference to S of the cover plates 10 and 20. Each lever 45a, 45n of the lever mechanism is hinged at its lower end to the first guide element 41 a, at the side opposite to the pulleys 42a, 42b, by first hinge members, 46a, 46n, and it is also hinged at its upper end to the extension plate 30 by second hinge members 47a, 47n, so that the first guide element 41 a, the extension plate 30 and the levers 45a, 45n form together an articulated parallelogram kinematic system which allows the extension plate 30 to perform with respect to the first guide element 41 a a translation movement according to a curve path. In fig. 2b the second guide elements 41 b and 41 c and the cover plates 10 and 20 are shown with broken line in the most outward protruding position they assume in their run from the not extended state to the extended state and vice-versa.

[0019] In figs. 3 to 6 is shown a side view of a portion of the table according to the embodiment of fig. 1 during steps of the run from the not extended state to the extended state and vice-versa emphasizing the way in which operating members, 50, work for controlling the movement of the levers 45a, 45n as a function of the movement of the second guide element 41 b relative to the first guide element 41 a. The operating members 50 are composed of a carriage, 51, mounting a first operating member, 52, integral to it, and a second resilient operating member, 53.

[0020] With reference to figs. 3a to 3d and 5a to 5d will be now described the steps of the run from the not extended state to the extended state.

[0021] In fig. 3a the table is shown in its not extended state. To pass to the extended state the cover plate 10 is moved in the direction shown by arrow F1 of fig. 3b and, thanks to the transmission assembly also the cover plate 20 moves in the direction of arrow F2. The carriage 51 moves integral to the cover plate 10 and the first operating member 52 goes pushing the lever 45a at an intermediate region between its hinge members 46a and 47a, while the second operating member 53 passes below a protrusion, 48, downward extending from hinge member 46a of the lever. In this state thanks to the first operating member 52 the rotation of the hinge 45a and movement of the extension plate 30 start. In fig. 3c the cover plate 10 has moved outward of a further amount and the first operating member 52 has pushed the lever 45a until it lies against an end-of-stroke member, 49, integral to the first guide element 41 a. The end-of-stroke member 49 also defines the most outward protruding position of the cover plate 10. The region where is located the lever 45a in the state of fig. 3c is shown in greater detail in fig. 5a with the broken lines showing the carriage 51 as a transparent element, and the same region is also shown in a horizontal section view in fig. 5b. In addition, in fig. 5b can be comprehended the shape of the second operating member 53 which is a spring leaf bound to the internal side of the carriage 51. Finally, in fig. 3d the table is shown in the extended state. From the position of fig. 3c to the position of fig. 3d the cover plate 10 is moved

in the direction of arrow F3 of fig. 3d and, as a consequence, also the cover plate 20 moves in the direction of arrow F4 of fig. 3d, until the cover plates 10 and 20 are adjacent to the extension plate 30 which is now at a same height with them. During the movement from the position of fig. 3c to the position of fig. 3d the second operating member 53 is bent, as shown in fig. 5c, by the protrusion 48 of the lever 45a, so it passes through the protrusion without operating the lever 45a.

[0022] With reference to figs. 4a to 4d and 6a to 6d will be now described the steps of the run from the extended state to the not extended state.

[0023] In fig. 4a the table is in its extended state. To pass to the not extended state the cover plate 10 is moved in the direction of arrow F1 of fig. 4b and, thanks to the transmission assembly also the cover plate 20 moves in the direction of arrow F2. The region where is located the lever 45a in the state of fig. 4a is shown in greater detail in fig. 6a with the broken lines showing the carriage 51 as a transparent element, and the lever 45a and the extension plate 30 in their position in the not extended state, and the same region is also shown in a horizontal section view in fig. 6b. During the movement from the position of fig. 4a to the position of fig. 4b the carriage 51 moves integral to the cover plate 10 and the second operating member 53 engages the protrusion 48 of the lever 45a. In fig. 4c the second operating member 53, while passing through, rotated the lever causing the extension plate 30 to move to the not extended position. Fig. 6c shows the second operating member 53 in the position of fig. 4b and the second operating member and the lever 45a are shown with broken line in the position of fig. 4c. When the lever 45a has been rotated in the position of fig. 4c the cover plate 10 is stopped moving in the direction of arrow F1 (otherwise the first operating member would rotate again the lever 45a) and the cover 10 plate is moved in the direction of the arrow F3, together with the cover plate 20 which moves in the direction of the arrow F4, until the cover plate 10 and 20 are adjacent each other in the not extended state.

[0024] The above described extensible table has an extension mechanism which allows moving the extension plate from the not extended state to the extended state and vice-versa by simply outward shifting a cover plate and then moving it back inward. The operating mechanism is very simple so that the production costs are low. Furthermore, since the extension plate is moved always acting upon the levers of the mechanism, the drive mechanism can be used with any types of cover plates and extension plates.

[0025] The above features and advantages of the extensible table of the present invention remain unchanged also in different embodiments of the invention.

[0026] A different embodiment of an extensible table according to the invention could have just one cover plate, and the transmission members 42a, 42b, 43, 44a, 44b could be not required in that case.

[0027] The drive members could be different in shape

but still useful to allow the above described movements in which the cover plate 10 perform a horizontal translation and the extension plate 30 a translation according to a curve path.

[0028] The guides and the levers of the drive members could be in a different amount and of a different shape, according to the size and shape of the table.

[0029] Generally speaking, all the components of the above described extensible table could be replaced with functionally equivalent components.

[0030] These and more changes and modifications could be made to the extensible table of the present invention, still remaining within the ambit of protection defined by the following claims.

Claims

1. Extensible table (100) comprising at least a cover plate (10, 20), and at least an extension plate (30) that in the state of table not extended is placed at least partly under the cover plate (10, 20) and in the state of table extended is placed at the same height with the cover plate (10, 20) adjacent to it, and an extension mechanism for passing from the table not extended state to the table extended state and vice-versa, in which the extension mechanism comprises drive members (40) for moving said extension plate (30) relative to said cover plate (10, 20), and operating members (50) for controlling the movement of said drive members (40), in which said drive members (40) comprise at least a guide (41) comprising at least two guide elements (41 a, 41 b, 41 c) mutually sliding with a first guide element (41 a) connected to the extension plate (30) through a lever mechanism comprising levers (45a, 45n) hinged to the extension plate (30) and to the first guide element (41 a) in order to compose an articulated parallelogram kinematic system, and a second guide element (41 b, 41 c) integral to the cover plate (10, 20), **characterized in that** said operating members (50) comprise at least a first operating element (52) integral to the second guide element (41 b) and acting upon one of said levers (45a), and at least a second resilient operating element (53) integral to the second guide element (41 b) and acting upon said lever (45a).
2. Extensible table (100) according to claim 1 **characterized in that** said first operating element (52) acts upon said lever (45a) at an intermediate region between an upper hinge member (47a) and a lower hinge member (46a) of said lever (45a), and said second operating element (53) acts upon a protrusion (48) of said lever (45a) extending from said lower hinge member (46a).
3. Extensible table (100) according to claim 1 or 2 **characterized in that** said second resilient operating el-

ement (53) is a leaf spring.

4. Extensible table (100) according to any preceding claim **characterized in that** it comprises two cover plates (10, 20) and a transmission assembly for transmitting movement from one cover plate (10) to the other cover plate (20) so that when a cover plate (10) moves the other cover plate (20) performs a mirror movement with reference to a center vertical plane (S) of said table (100).
5. Extensible table (100) according to the previous claim **characterized in that** said transmission assembly comprises two pulleys (42a, 42b) rotatably bound to opposite longitudinal ends of the first guide element (41 a), at least a flexible cable (43) extending between said pulleys (42a, 42b) for performing a circumferential path, and binding elements (44a, 44b) for binding a second guide element (41b) integral to one cover plate (10) to a lower path of said flexible cable (43) and the other second guide element (41 c) integral to the other cover plate (20) to the upper path of the flexible cable (43), respectively.

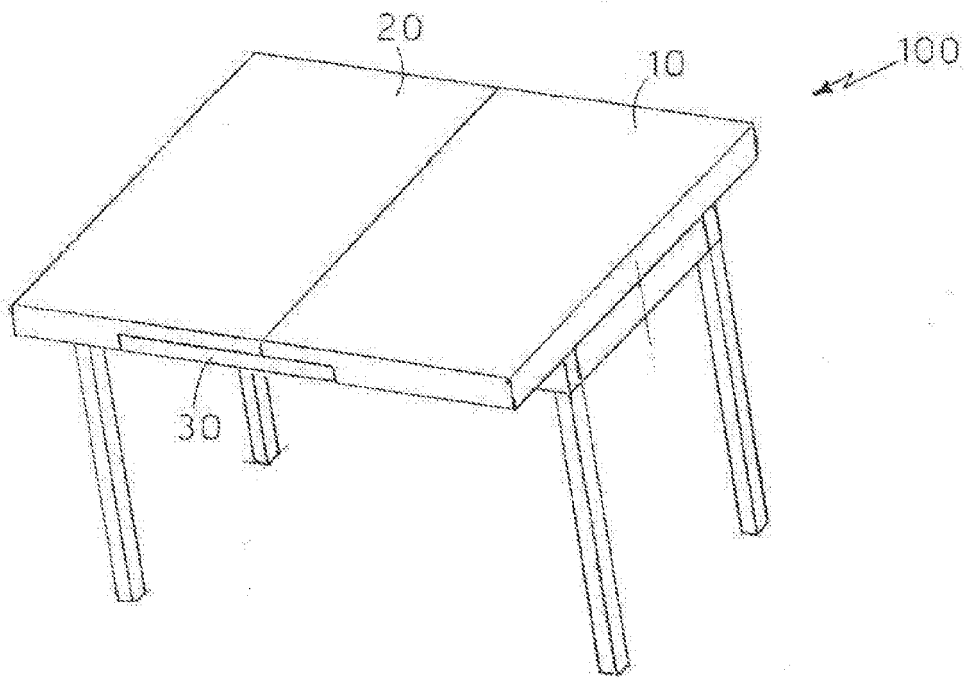


FIG. 1a

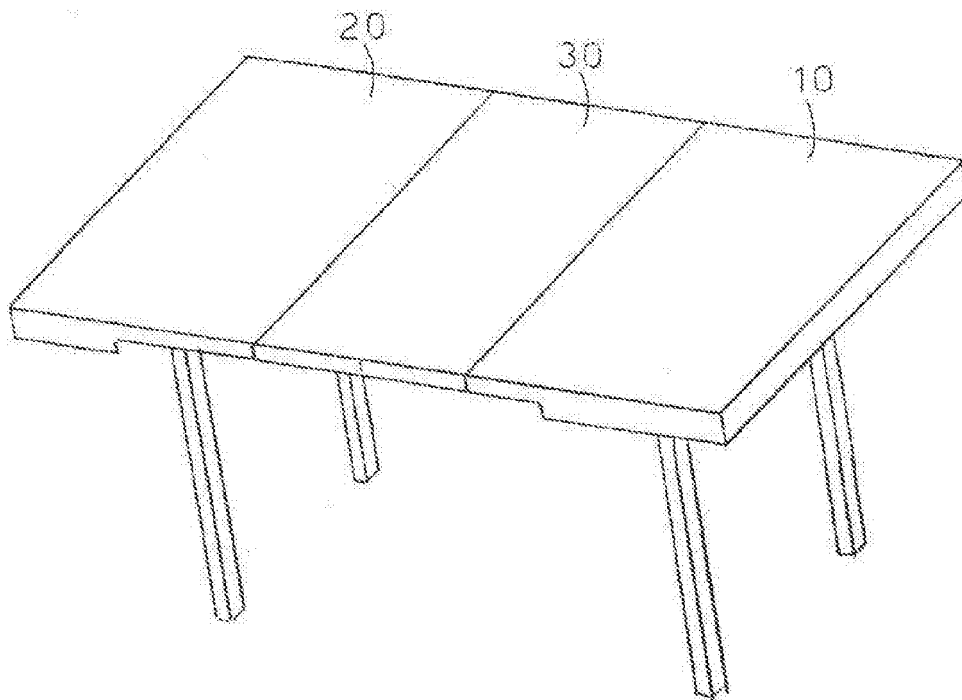
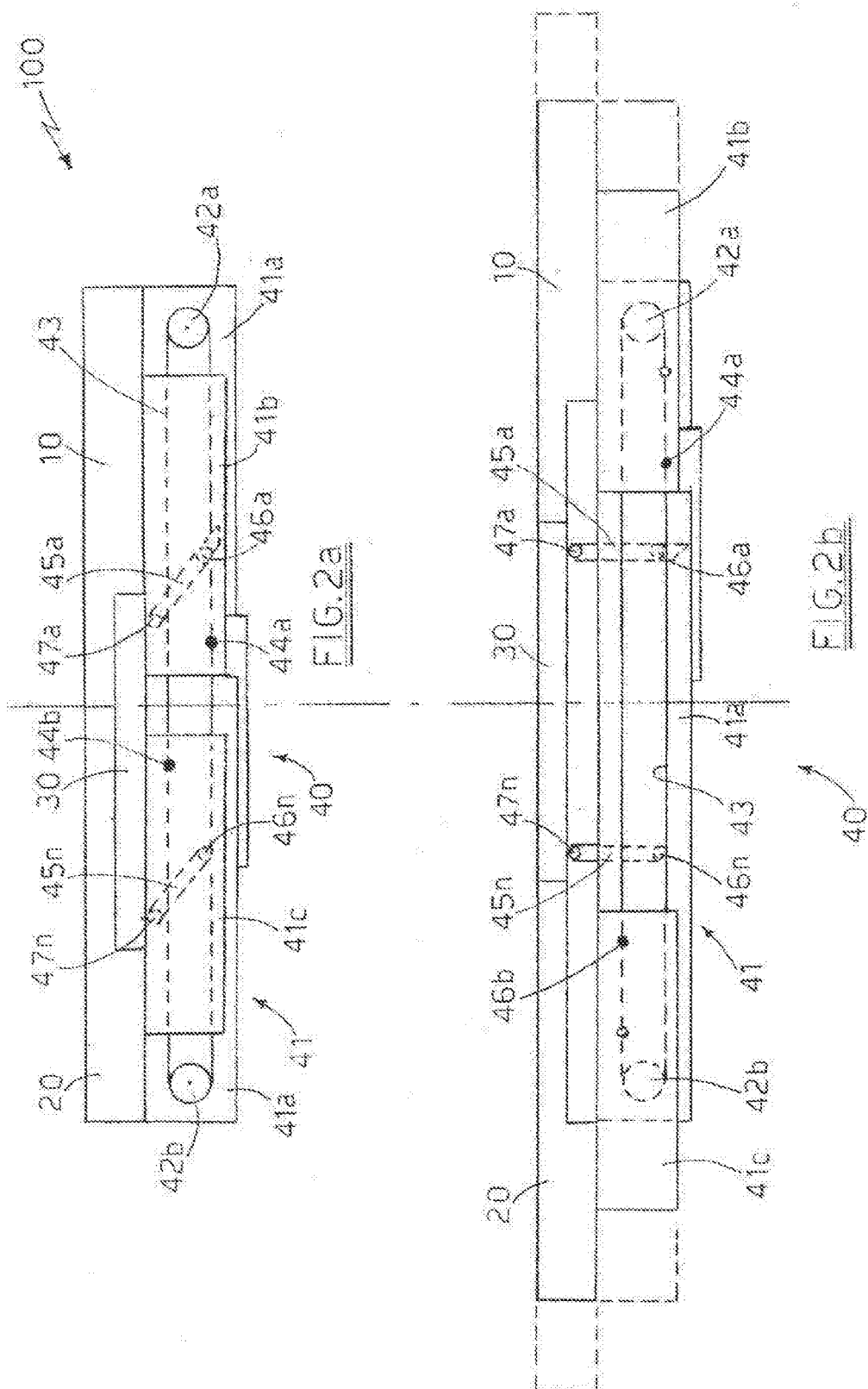
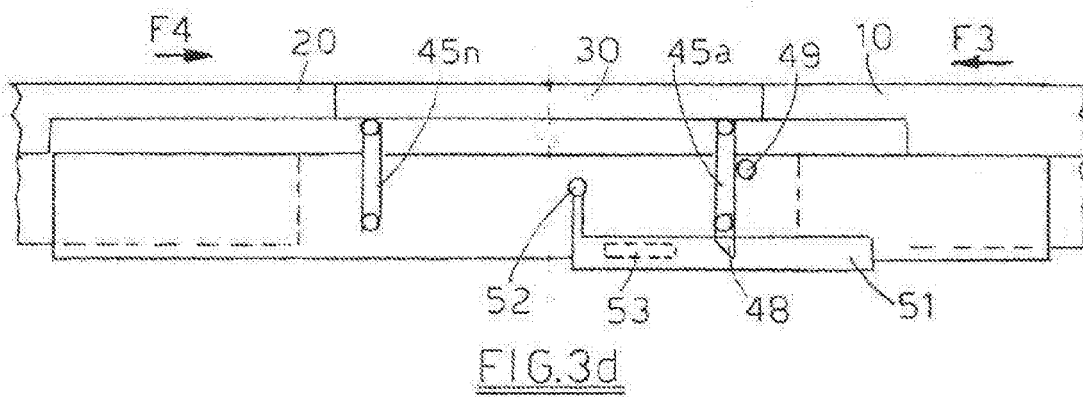
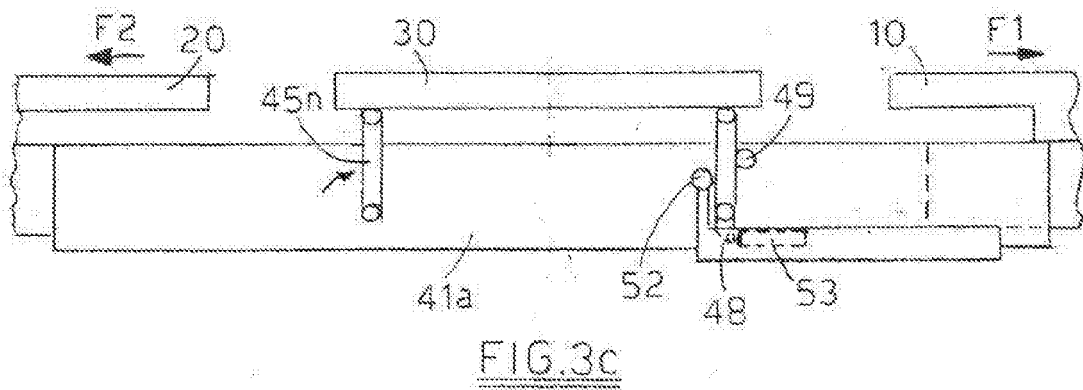
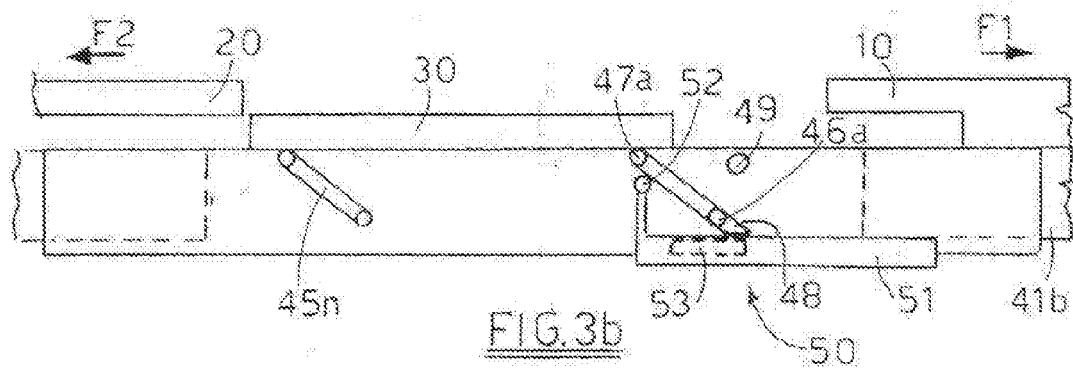
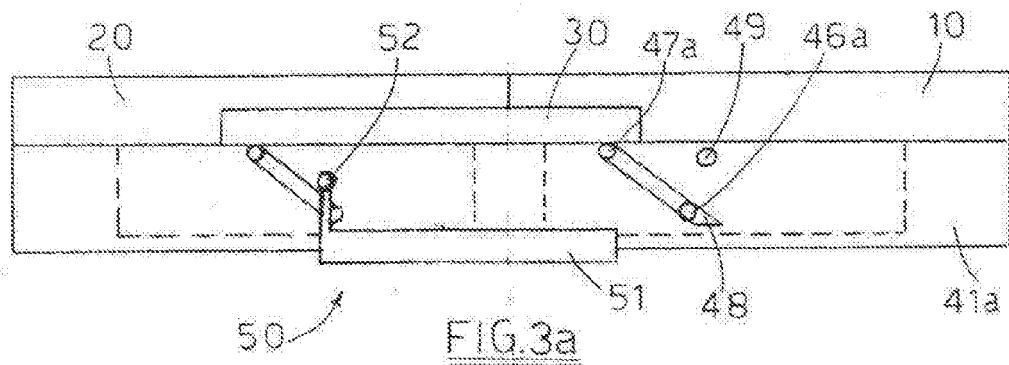
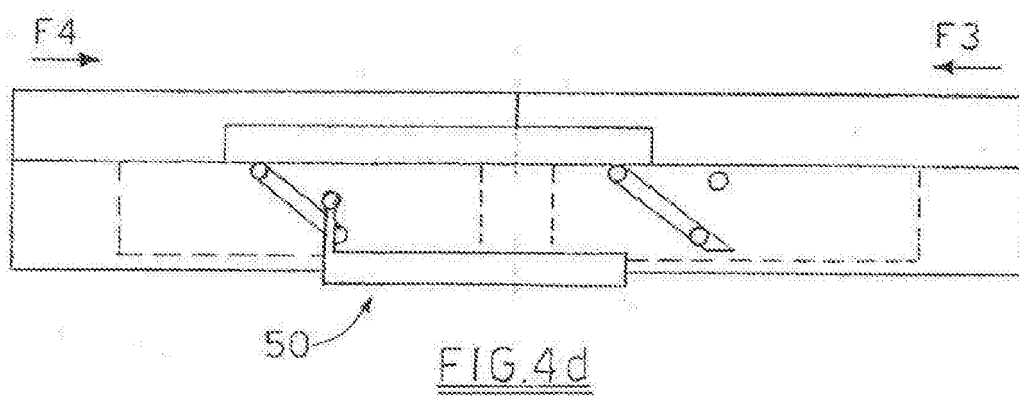
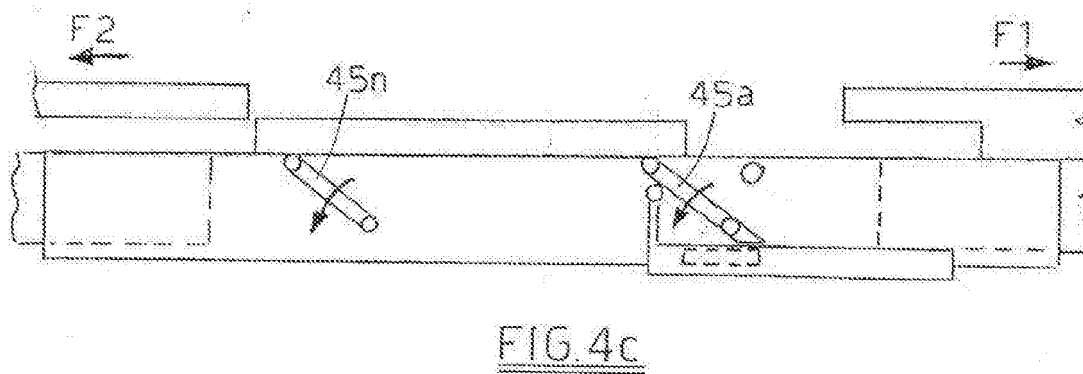
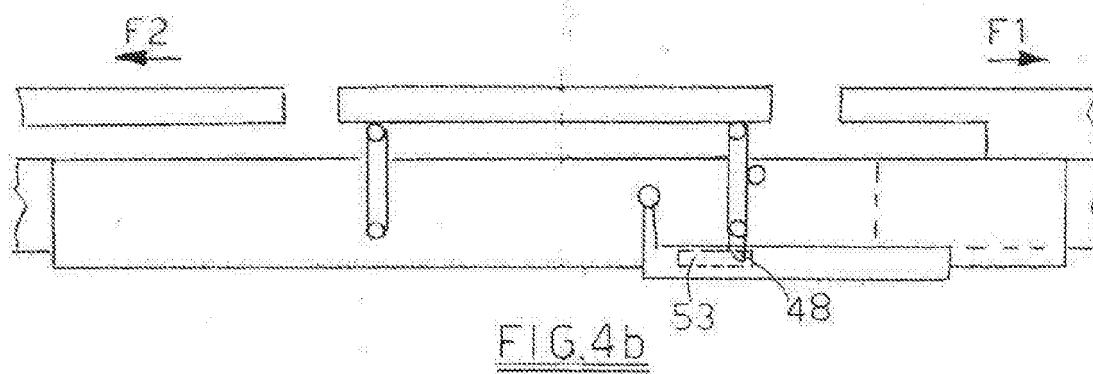
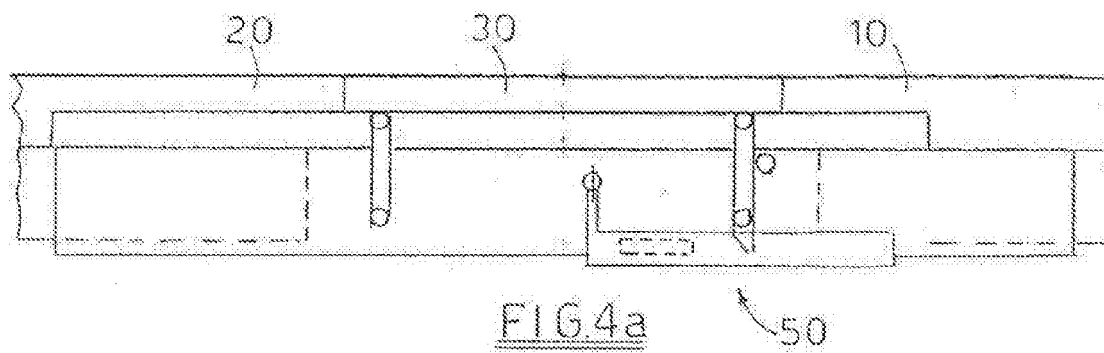
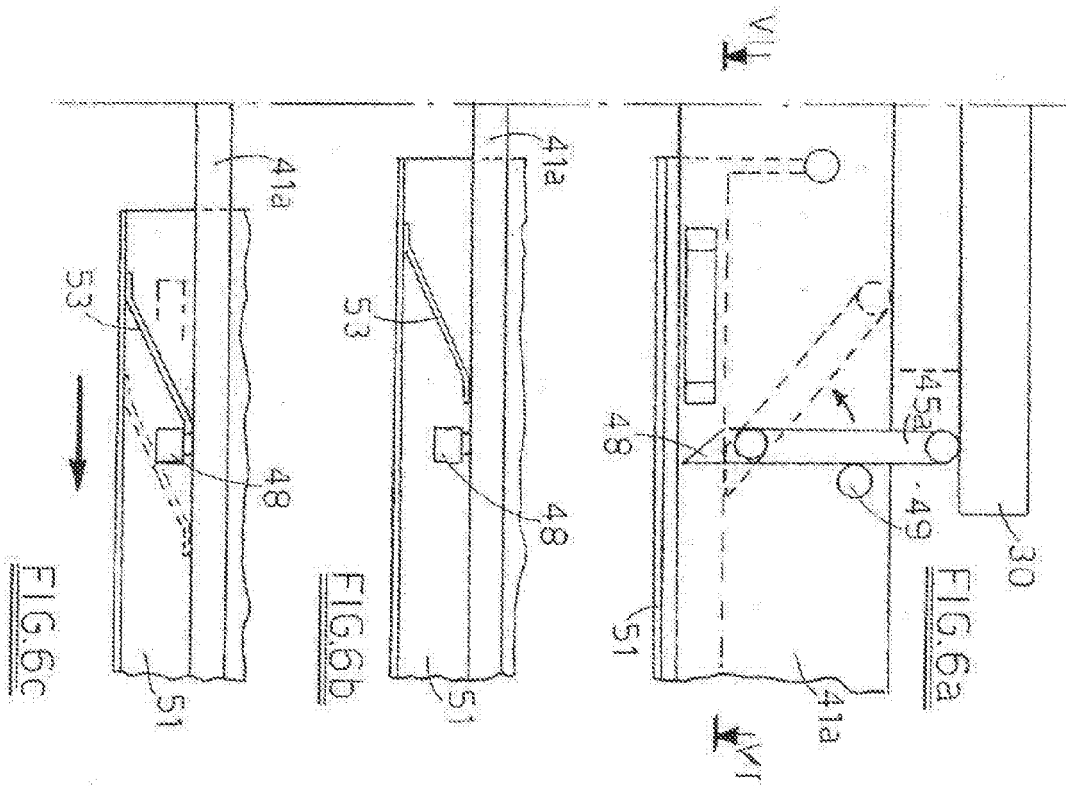
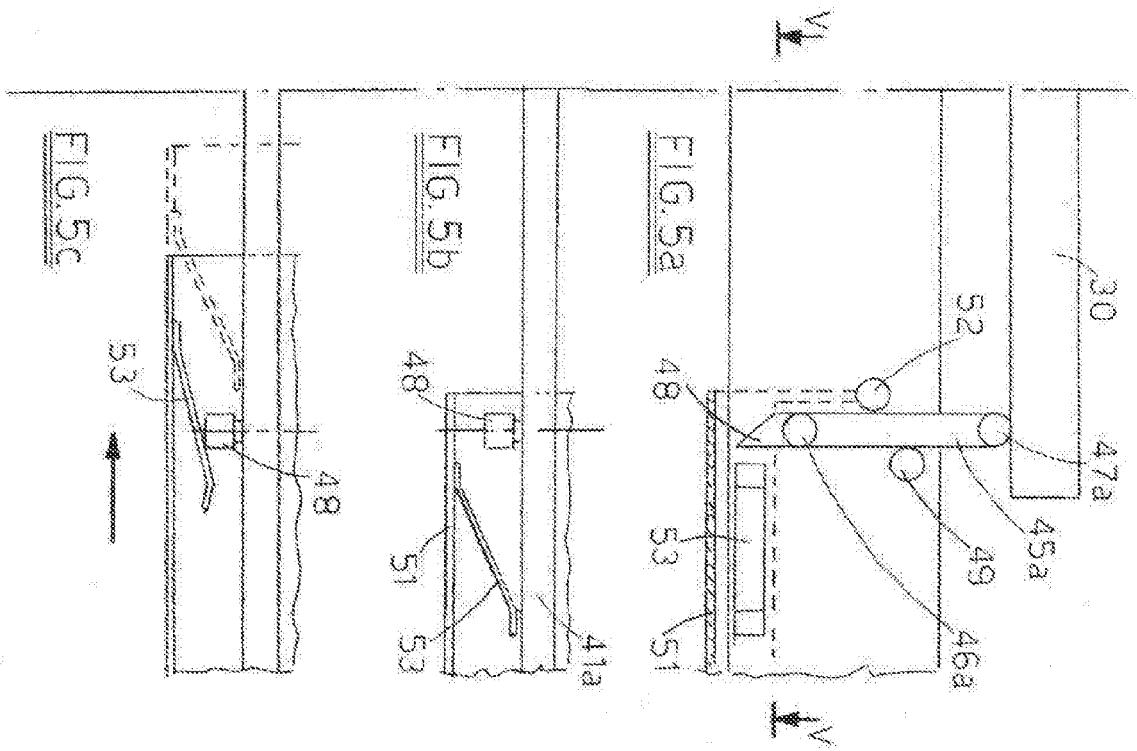


FIG. 1b











EUROPEAN SEARCH REPORT

Application Number
EP 11 17 7473

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 371 305 A1 (HELMSTADT METALLWERK) 17 December 2003 (2003-12-17)	1,2	INV. A47B1/02
Y	* figures 1a-1d, 5a-5d * * page 21, line 3 - page 23, line 26 * -----	3-5	
Y	FR 2 578 729 A1 (MOBIJER) 19 September 1986 (1986-09-19) * figures 4, 5, 7, 8, 16, 17 * -----	3,4	
Y	GB 456 885 A (BURRILL) 17 November 1936 (1936-11-17) * figures 1, 2 * -----	4,5	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A47B
Place of search		Date of completion of the search	Examiner
The Hague		18 November 2011	Linden, Stefan
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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 17 7473

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REFERENCES CITED IN THE DESCRIPTION

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