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(54) **Extendable table**

(57) Extendable table comprising a supporting frame (11) suitable to support a main top (12) and an extension top (13) which is disposed, in a first operating configuration, below the main top (12) and, by means of an extraction mechanism (40, 63), is suitable to assume a second co-planar operating configuration, aligned and adjacent in proximity to the main top (12). A first (25) and a second structure (30) are provided to support respectively the main top (12) and the extension top (13) and are both selectively slidable, on rectilinear guides (17, 18), parallel to each other provided on the supporting frame (11). The extraction mechanism comprises first lever means (63) associated both with the supporting frame (11) and with a cam device (40) solidly associated with the second structure (30) and suitable to support the extension top (13). The first lever means (63) and the cam device (40) are provided in combination to move the extension top (13) linearly, to rotate it on itself, on its lying plane, to lift it and take it into the second operating configuration.

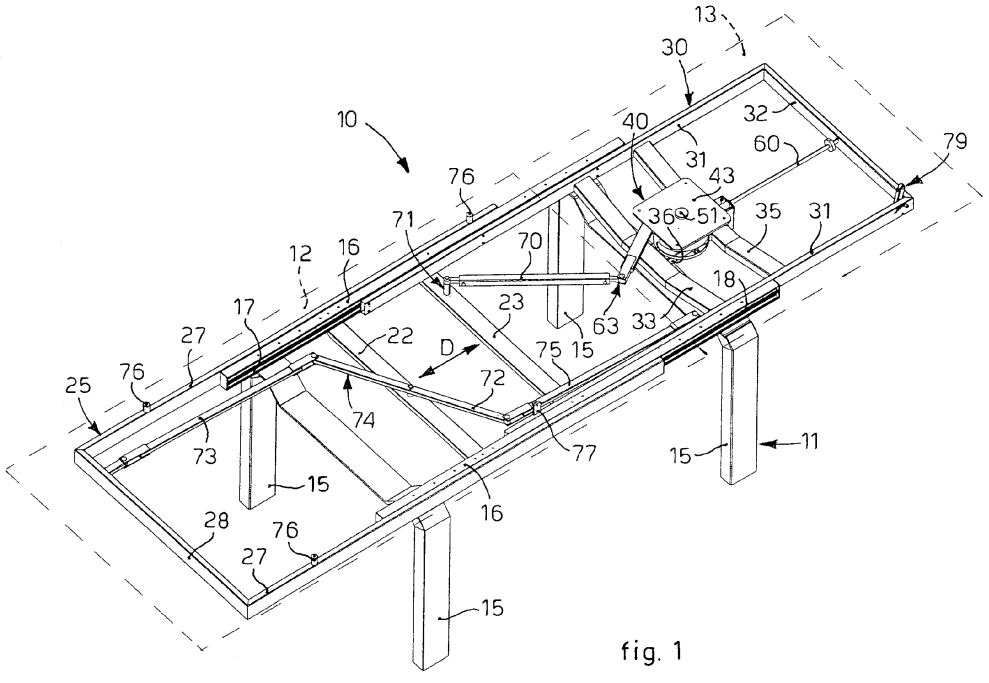

fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns an extendable table provided with a main top and an extension top which, according to needs, can be put adjacent to the main top to increase its usable supporting surface, or can be kept in a non-operating position such as to reduce the overall bulk of the table.

BACKGROUND OF THE INVENTION

[0002] Different types of extendable tables are known, for example from documents DE-U-8535142, US-A-2.007.475 and DE-B-102004053941, which differ from each other in the number, disposition and extraction mechanism of the extension top/tops.

[0003] Expendable tables are known in which the extension top is retractable under the main top, and is extracted on one side to be disposed coplanar and adjacent to the main top when the usable surface needs to be increased.

[0004] Tables are also known in which, while it is being extracted sideways with respect to the main top, the extension top is also lifted to be adjacent with the latter. In these cases, mechanisms are used which comprise, for example, one or more guides typically made on the fixed part of the frame and one or more sliders typically attached to the mobile part of the frame.

[0005] These solutions are complex and costly, and also require the user to perform complex operations to move the extension top coplanar with the main top.

[0006] In any case, the extension top is disposed adjacent to the main top, while the latter remains fixed with respect to the frame.

[0007] This entails a lack of symmetry in the positioning of the table top with respect to the supporting frame which, apart from the unpleasant aesthetic effect, may cause it to turn over when a heavy load is put on the protruding part of the extension top.

[0008] One purpose of the present invention is to obtain an extendable table that is economical, simple to make and reliable, and which also allows to install the extension top with simple operations.

[0009] Another purpose of the present invention is to obtain an extendable table which is stable and safe substantially in all operating conditions.

[0010] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0011] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0012] In accordance with the above purposes, an extendable table comprises a supporting frame suitable to support a main top and an extension top which is disposed, in a first operating configuration, under the main top and, by means of an extraction mechanism, is suitable to assume a second, coplanar operating configuration, aligned and adjacent in proximity to one side of the main top.

[0013] According to one feature of the present invention, a first and a second structure are provided to respectively support the main top and the extension top, and are both selectively able to slide, in coordination with each other, and reciprocally moving nearer to/away from each other, in a longitudinal direction, on rectilinear guides, parallel to each other, provided on the supporting frame. The extraction mechanism comprises first lever means associated both to the supporting frame and also to a cam device solidly associated to the second structure and suitable to support the extension top. The first lever means and the cam device are provided in combination to move the extension top linearly, rotate it on itself on the lying plane which is normally substantially horizontal, lift it and move it into the second operating configuration.

[0014] These operations occur in the above sequences during the extraction step, and in inverse sequences during the repositioning step.

[0015] The second lever means are associated both to the supporting frame and also to the first and the second structure to allow the reciprocal movement of the main top and the extension top in the longitudinal direction with respect to the supporting frame.

[0016] More specifically, when the extraction means are actuated, the cam device causes the translation of the second structure toward the extraction position with respect to the supporting frame; the movement of the second structure, since it is connected by means of the second lever means to the first structure, also causes a correlated movement of the latter away from the second structure.

[0017] In the second operating configuration, the main top and the extension top define an overall support top disposed substantially in a centered position with respect to the supporting frame; apart from obtaining a better aesthetic effect, this also allows to obtain greater stability.

[0018] According to a preferential form of embodiment the cam device comprises:

- a cylindrical body solidly associated to the supporting frame and provided with a shaped circumferential eyelet;
- a tubular element associated to the supporting frame, disposed inside and coaxial with respect to the cylindrical body, selectively rotatable and movable along its own axis;
- a support element of the extension top, solidly associated with the tubular element and provided with a slider suitable to slide in the shaped circumferential

eyelet to move the extension top and take it to the first and second operating configuration.

[0019] In particular, during the sliding of the slider inside the shaped circumferential eyelet, the extension top is both translated, by means of a simultaneous rotation thereof, and also lifted from its condition under the table to its raised condition, coplanar with the main top.

[0020] According to one form of embodiment, the shaped circumferential eyelet comprises a first segment that extends substantially parallel with respect to the extension top and an oblique segment inclined toward the extension top. More specifically, when the slider travels along the oblique segment of the eyelet, the extension top is lifted to the same level as the main top.

[0021] The shaped circumferential eyelet extends along the cylindrical body substantially for an angle of 180°, so that the extension top passes from the first to the second operating configuration by means of a rotation of the extension top, on its lying plane, of about 180°.

[0022] The extendable table also comprises a clamping device suitable to constrain the position of the extension top when the latter is in the second operating configuration, thus conferring greater stability on the table.

[0023] According to one form of embodiment, the clamping device comprises an actuation element provided at one end with a terminal suitable to cooperate with the slider of the cam device in order to constrain its rotation and hence the movement of the extension top.

[0024] According to another form of embodiment, supporting spacer elements are associated to the first structure in order to support the main top and to define an interspace between the main top and the supporting frame through which the extension top can be moved. This gives a lesser bulk to the extension top when it is disposed under the main top.

[0025] In another form of embodiment, a support device is associated to the second structure, selectively actuated during the passage from the second operating configuration to the first operating configuration, in order to at least partly support the main top. In particular, the support device is actuated to confer greater stability on the zones that are not supported by the supporting spacer elements and that must necessarily be free, so as to prevent problems of interference between the movements of the extension top and the fixed supporting spacer elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a perspective view of an extendable table according to the present invention;
- fig. 2 shows an enlarged detail of fig. 1;
- fig. 3 is a plan view of a detail of fig. 2, in a first operating configuration;
- fig. 4 shows the detail in fig. 3 in a second operating configuration;
- fig. 5 is a plan view of the extendable table in fig. 1 in a first operating configuration;
- fig. 6 is a front view of fig. 5;
- fig. 7 shows an enlarged detail of fig. 6;
- fig. 8 is a plan view of the extendable table in fig. 1, in an intermediate operating configuration;
- fig. 9 is a front view of fig. 8;
- figs. 10 and 11 are plan views of the extendable table in fig. 1 in other intermediate operating configurations;
- fig. 12 is a plan view of the extendable table in fig. 1 in a second operating configuration;
- fig. 13 is a front view of fig. 12;
- fig. 14 shows an enlarged detail of fig. 13.

[0027] To facilitate comprehension, the same reference numbers have been used, where possible, to identify identical common elements in the drawings.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF

EMBODIMENT

[0028] With reference to the attached drawings, an extendable table according to the present invention is denoted in its entirety by the reference number 10, and comprises a supporting frame 11, a main top 12 and an extension top 13 which, in a first operating configuration, is selectively positionable under the main top 12 (figs. 5, 6) or, in a second operating configuration (figs. 12, 13) is disposed aligned, coplanar and adjacent in proximity to one side of the main top 12.

[0029] The supporting frame 11 (fig. 1) comprises, in a known manner, support legs 15 to which two longitudinal members 16 are solidly associated, disposed parallel to each other in a longitudinal direction D, and each provided on the side facing toward the inside of the table with first guides 17 and, on the side facing toward the outside, with second guides 18.

[0030] The two longitudinal members 16 are kept distanced from each other by a first 22 and a second crosspiece 23 of the supporting frame 11, disposed fixed and transverse to their longitudinal extension.

[0031] On the second guides 18 of the longitudinal members 16 a first structure 25 is suitable to slide, comprising two longitudinal section bars 27 that slide, using known means, on the second guides 18 of the longitudinal members 16, and a transverse section shape 28 associated to respective ends of the longitudinal section bars.

[0032] A second structure 30 is suitable to slide on the first guides 17 of the longitudinal members 16; this too

comprises two longitudinal section bars 31 which slide directly on the first guides 17 and a transverse section bar 32 associated to the respective ends of the longitudinal section bars 31.

[0033] On the inner sides of the two longitudinal section bars 31 of the second structure 30 a first bar 33 and a second bar 35 are solidly associated, both shaped concave upward and connected transversely, in direction D, by a third bar 36.

[0034] On the third bar 36 (fig. 2), a cam device 40 is mounted, comprising a cylindrical body 41, a tubular element 42 disposed inside the cylindrical body 41, a support element 43 of the extension top 13 and a clamping device 45.

[0035] The cylindrical body 41 and the tubular element 42 are mounted on the third bar 36 coaxial with respect to each other along the axis of rotation Z, so that the latter, in use, is disposed substantially orthogonal to the tops 12 and 13 of the table.

[0036] The cylindrical body 41 is provided with a shaped eyelet 47 that extends for an angle of amplitude of at least 180° and is provided with a first segment 49 that extends substantially circumferential, that is, horizontal and parallel with respect to the extension top 13, along its periphery, and a second oblique segment 50, inclined toward the support element 43 and with its terminal end disposed substantially parallel with respect to the longitudinal direction D.

[0037] A pin 51 is associated with the support element 43, coaxial with the axis of rotation Z and sliding axially inside the tubular element 42, and a peripheral plate 52 on which a slider 53 is mounted, suitable to slide, by means of rotation of the support element 43 around the axis of rotation Z, inside the shaped eyelet 47.

[0038] A striker element 55 is also attached to the plate 52, with which the clamping device 45 cooperates in order to clamp the sliding of the slider 53 in the shaped eyelet 47.

[0039] An abutment element 57 is disposed substantially orthogonal with respect to the second bar 35 and functions as an end-of-travel for the rotation of the plate 52 to which the slider 53 is associated.

[0040] Specifically, when the extension top 13 is disposed under the main top 12, the slider 53 is disposed inside the first segment 49 of the shaped eyelet 47 and in proximity to its closed end, making the extension top 13 and therefore the support element 43 rotate around the axis of rotation Z by an angle equal to 180°, the slider 53 slides inside the first and second segment of the shaped eyelet 47.

[0041] When the slider 53 starts sliding inside the second segment 50, the pin 51 not only rotates but is also translated along the axis of rotation Z, with consequent lifting of the extension top 13 to the same height as the main top 12.

[0042] When this last condition is reached, the plate 52 is in contact with the abutment element 57 while the striker element 55 cooperates with the clamping device 45 (fig. 3). In this way the sliding of the slider 53 inside the shaped eyelet 47 is constrained, in both clockwise and anti-clockwise direction.

[0043] The clamping device 45 (fig. 2) comprises a terminal 59, suitable to cooperate with the striker element 55, with which a rod 60 is associated which is disposed substantially aligned to the longitudinal direction D, and is provided with a gripping element 61, able to be actuated selectively by the user, in order to constrain/release the sliding of the slider 53.

[0044] The rod 60 is supported by a support element 64, associated to the second bar 35, and by the transverse section bar 32 of the second structure 30.

[0045] Elastic means are associated, in known manner, to the rod 60, in order to keep the terminal 59 in a position suitable to constrain the slider 53.

[0046] The terminal 59 (figs. 3 and 4) is provided with an inclined surface 62 which, cooperating with the striker element 55, provides to thrust the rod 60 axially and to clamp the slider 53 between the striker element 55 and the abutment element 57.

[0047] First lever means 63 (fig. 1) are associated both to the supporting frame 11 in proximity to the second cross-piece 23, and also to the cam device 40, and, anchored to the lower part of the support element 43, comprise a first lever 66 that extends substantially parallel to the extension top 13, and is pivoted by one of its ends to a connection arm 70 by means of first 67 and second pivoting means 68 (fig. 2).

[0048] Specifically, the first 67 and second pivoting means 68 allow the connection arm 70 to rotate respectively around a first axis X and a second axis Y disposed respectively the first always perpendicular, while the second is always parallel to the extension top 13. The second pivoting means 68 guarantee that the extension top 13 can be moved along the axis of rotation Z.

[0049] The other end of the connection arm 70 is connected to the second cross-piece 23 of the supporting frame 11 by means of other pivoting means 71 (fig. 1), totally identical to the first and second pivoting means 67, 68.

[0050] Second lever means 74 are associated both to the supporting frame 11, in proximity to the first cross-piece 22, and also to the first 25 and second structure 30 to allow the reciprocal movement of the main top 12 and the extension top 13 in direction D.

[0051] The second lever means 74 comprise a second lever 72 pivoted, in proximity to its center line, to the first cross-piece 22 of the supporting frame 11, and a first 73 and a second arm 75.

[0052] The first 73 and second arm 75 are pivoted with their first ends to the second lever 72 and, with their second ends, respectively to the first structure 25 and the second structure 30.

[0053] Specifically, the first arm 73 is pivoted in proximity to the transverse section bar 28 of the first structure 25, while the second arm 75 is pivoted on the inner side of the longitudinal section bar 31 of the second structure

30.

[0054] The main top 12 is attached to the first structure 25 by means of three fixed support elements 76, which are disposed peripherally in proximity to three tops of the main top 12.

[0055] Specifically, the three support elements 76 keep the main top 12 distanced with respect to the longitudinal members 16 by a distance such as to allow the extension top 13 to be able to pass through the space defined between the structures 25 and 30 and the main top 12 (fig. 6).

[0056] A first sliding support element 77 (fig. 1) and a second support element 79 (figs. 7 and 14) of the retractable type are associated to the second structure 30 to support the main top 12 respectively when the table is in its extended condition and in its compact condition.

[0057] Specifically, the second support element 79 comprises a selector 80 disposed during use inside the second structure 30, pivoted around a fulcrum 82 and provided at one end with a rolling element 81 that, when the second support element 79 is active, supports the main top 12.

[0058] A transverse pin 83 is solidly associated with the selector 80, disposed through in the second structure 30 and protruding from the outer side of the longitudinal section bar 31 of the second structure 30.

[0059] The transverse pin 83 is suitable to slide in a circular seating 84 made through in the longitudinal section bar 31 and, when the second structure 30 is moved toward the central part of the table, contacts the longitudinal member 16 in proximity to one end, making the selector 80 rotate which, in turn, moves into contact against the main top 12 in order to support it (fig. 6).

[0060] With reference to the attached drawings, we shall now describe the functioning of the extendable table 10 according to the present invention.

[0061] With reference to figs. 5-7, the extendable table 10 according to the present invention is in its first operating configuration where the extension top 13 is disposed completely under the main top 12, and inside the bulk defined thereby.

[0062] In this condition, the main top 12 is supported by the fixed support elements 76 that are disposed in proximity to its three tops, and the second support element 79 is in its active position, that is, with the rolling element 81 in contact against the lower surface of the main top 12.

[0063] In order to increase the usable surface of the table, the extension top 13 is removed from under the main top 12 by rotating it around the axis of rotation Z (figs. 8 and 9). Specifically, due to the subsequent rotation of the extension top 13, and by means of the first 63 and second lever means 74, the first structure 25 and the second structure 30 reciprocally translate away from each other along the guides 17, 18 of the longitudinal members 16.

[0064] The slider 53 of the cam device 40 slides inside the shaped eyelet 47 and, passing through the oblique segment 50 of the shaped eyelet 47, causes the extension top 13 to move along the axis of rotation Z. During the rotation of the extension top 13 (figs. 10, 11), the first lever means 63 determine the reciprocal translation of the second structure 30 with respect to the supporting frame 11, in the longitudinal direction D.

[0065] The second lever means 74, being connected to the second structure 30, in turn determine the translation of the first structure 25 in the direction of feed D and in the opposite direction to the translation direction of the extension top 13.

[0066] After a rotation of the extension top 13 through 180°, the latter is in a position substantially aligned, coplanar and adjacent to one side of the main top 12 (figs. 12-14).

[0067] In this last configuration, the clamping device 45 is automatically activated and keeps the position of the extension top 13 constrained.

[0068] The first support element 77, associated to the second structure 30, is disposed in proximity to one of the tops of the main top 12 and provides to support it.

[0069] When it is required to return the extendable table 10 to its compact configuration, by acting on the gripping element 61 the clamping device 45 is deactivated (fig. 4) and, by rotating it in the opposite direction by another 180°, the extension top 13 is returned under the main top 12 (figs. 5-7).

[0070] It is clear that modifications and/or additions of parts may be made to the extendable table 10 as described heretofore, without departing from the field and scope of the present invention.

Claims

1. Extendable table comprising a supporting frame (11) suitable to support a main top (12) and an extension top (13) which is disposed, in a first operating configuration, below the main top (12) and, by means of an extraction mechanism (40, 63), is suitable to assume a second co-planar operating configuration, aligned and adjacent in proximity to one side of the main top (12), **characterized in that** a first (25) and a second structure (30) are provided to support respectively said main top (12) and said extension top (13) and are both selectively slidable, in a coordinated manner with each other, and with a reciprocal movement of distancing/approach, on rectilinear guides (17, 18), parallel to each other provided on the supporting frame (11), **in that** said extraction mechanism comprises first lever means (63) associated both with the supporting frame (11) and with a cam device (40) solidly associated with said second structure (30) and suitable to support said extension top (13), **in that** said first lever means (63) and said cam device (40) are provided in combination to move the extension top (13) linearly, to rotate it on itself, on its lying plane, to lift it and take it into

said second operating configuration, **and in that** second lever means (74) are associated both with the supporting frame (11) and with the first (25) and second structure (30) in order to allow the reciprocal movement of the main top (12) and the extension top (13) with respect to the supporting frame (11).

2. Extendable table as in claim 1, **characterized in that**, in said second operating configuration, said main top (12) and said extension top (13) define an overall support top disposed substantially in a centered position with respect to said supporting frame (11).

3. Extendable table as in claim 1 or 2, **characterized in that** said cam device (40) comprises:

- a cylindrical body (41) associated solidly with said supporting frame (11) and provided with a shaped circumferential eyelet (47);
- a tubular element (42) associated with said supporting frame (11), disposed internally and coaxial with respect to the cylindrical body (41), selectively rotatable and movable along its own axis (Z);
- a support element (43) of said extension top (13), associated solidly with said tubular element (42) and provided with a slider (53) suitable to slide in said shaped circumferential eyelet (47) in order to move said extension top (13) and take it to said first and second operating configuration.

4. Extendable table as in claim 3, **characterized in that** said shaped circumferential eyelet (47) comprises a first segment (49) that extends substantially parallel with respect to said extension top (13) and an oblique segment (50) inclined toward said extension top (13).

5. Extendable table as in claim 3 and 4, **characterized in that** said shaped circumferential eyelet (47) extends along said cylindrical body (41) substantially for an angle of 180°, so that the passage of said extension top (13) from said first to said second operating configuration occurs by means of rotation, on its lying plane, of the extension top by 180°.

6. Extendable table as in any claim hereinbefore, **characterized in that** it comprises a clamping device (45) suitable to constrain the position of said extension top (13) when it is in said second operating configuration.

7. Extendable table as in claim 3 and 6, **characterized in that** said clamping device (45) comprises an actuation element (60) provided at one end with a terminal (59) suitable to cooperate with said slider (53) in order to constrain the rotation thereof.

8. Extendable table as in any claim hereinbefore, **characterized in that** supporting spacer elements (76) are associated with said first structure (25) to support said main top (12) and to define an interspace between said main top (12) and said supporting frame (11) through which said extension top (13) can be moved.

9. Extendable table as in any claim hereinbefore, **characterized in that** a support device (79) is associated with said second structure (30), able to be selectively actuated during the passage from said second operating configuration to said first operating configuration so as to at least partly support said main top (12).

10. Extendable table as in claim 3, **characterized in that** said first lever means (63) comprise a first lever (66) associated solidly with said support element (43), and a connection arm (70) pivoted at one end to said first lever (66) and at the other end to said supporting frame (11).

11. Extendable table as in any claim hereinbefore, **characterized in that** said second lever means (74) comprise a second lever (72) pivoted in proximity to its center line to the supporting frame (11), and a first (73) and a second arm (75), respectively pivoted with their first ends to the second lever (72), and with their second ends respectively to the first structure (25) and the second structure (30).

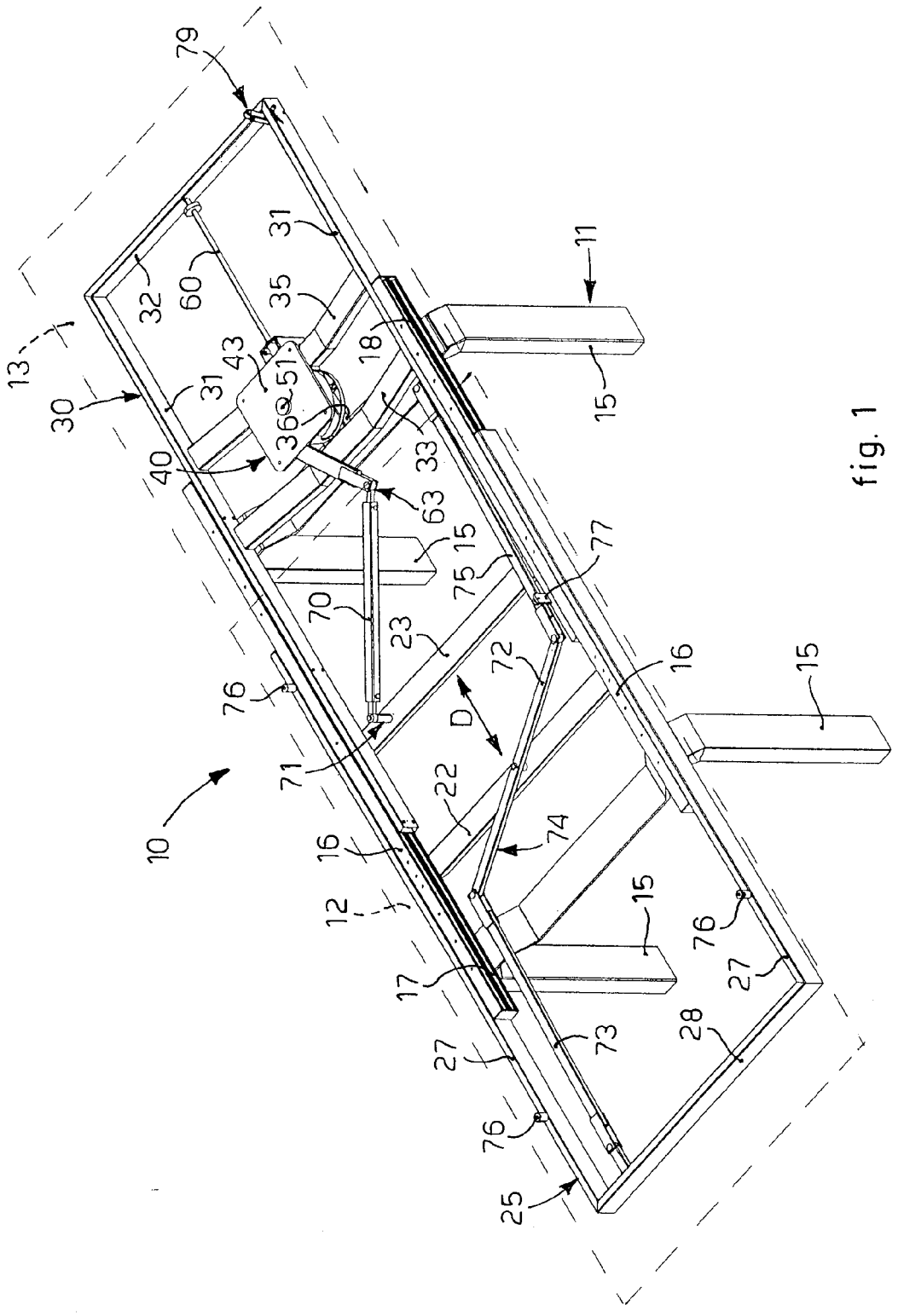
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fig. 1

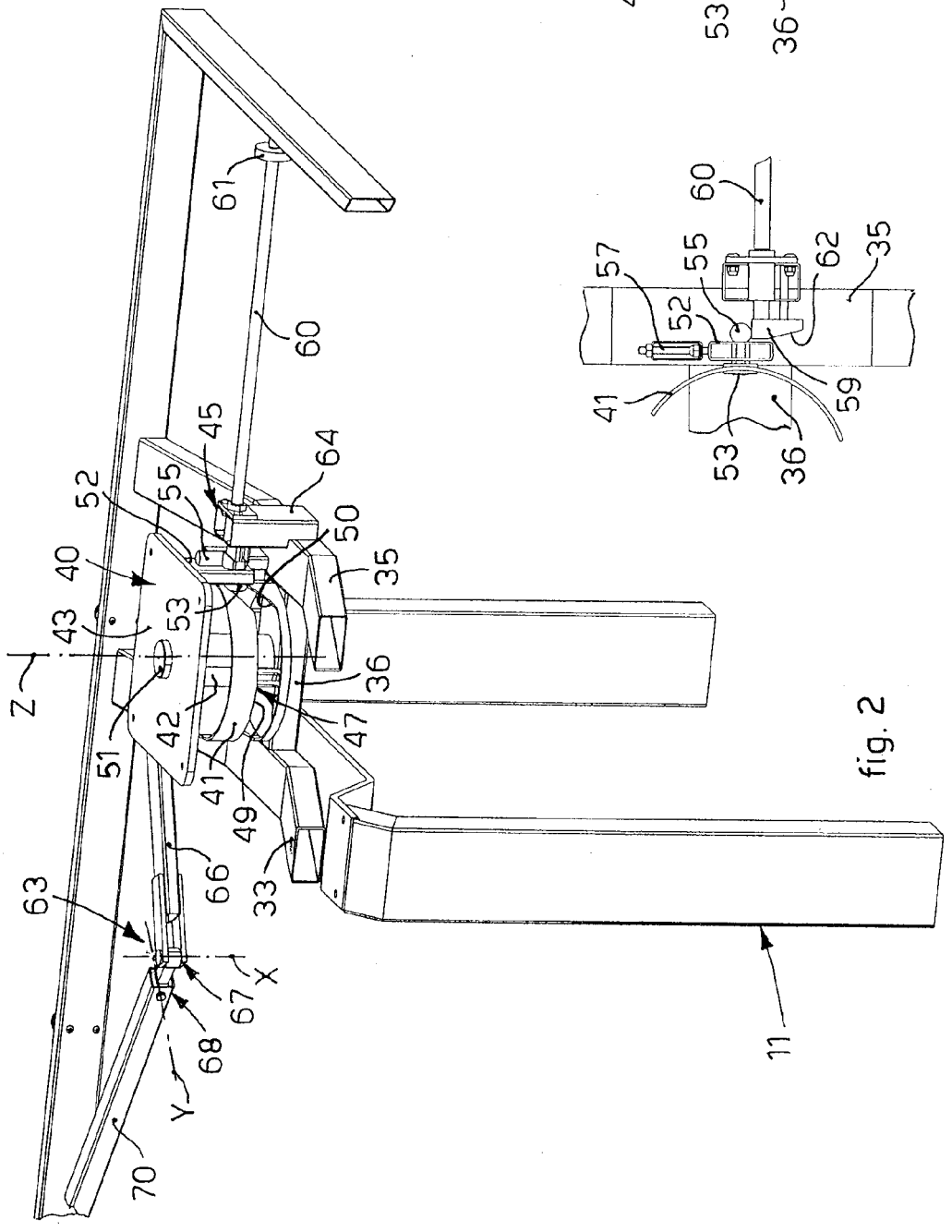

fig. 2

fig. 3

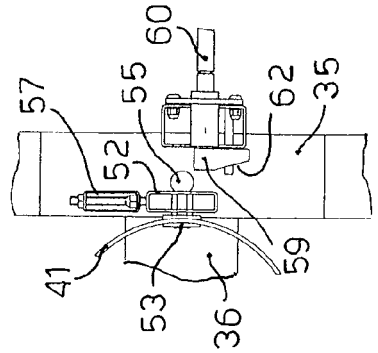

fig. 4

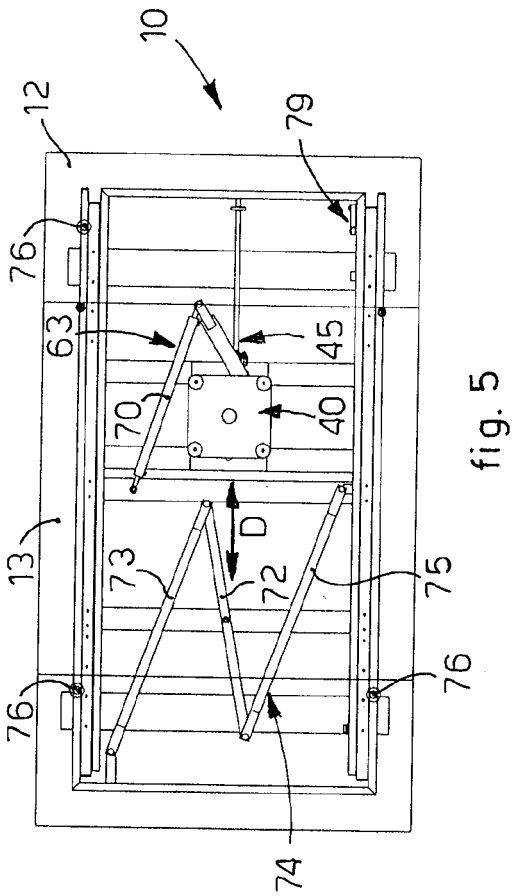

fig. 5

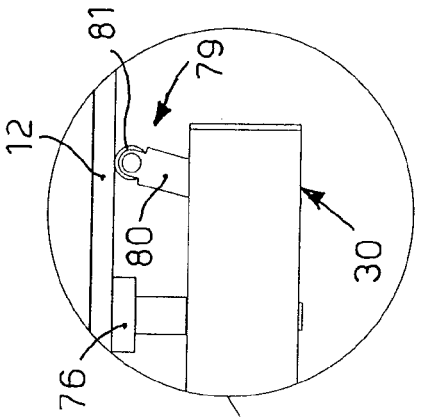

fig. 7

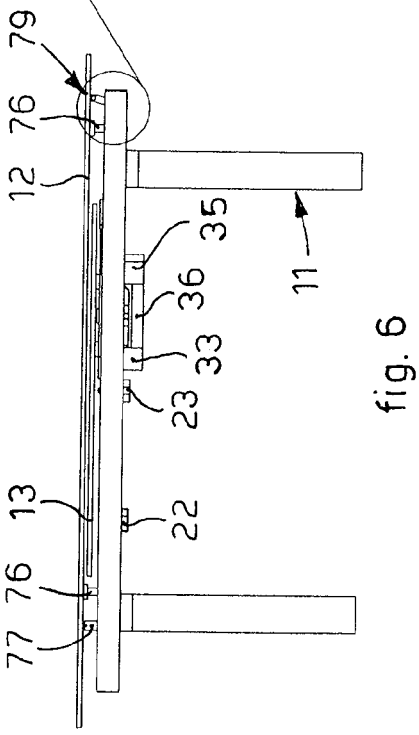

fig. 6

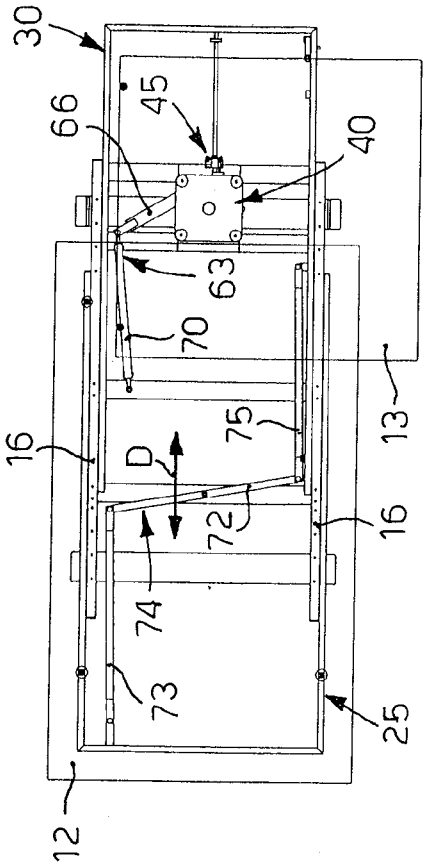

fig. 10

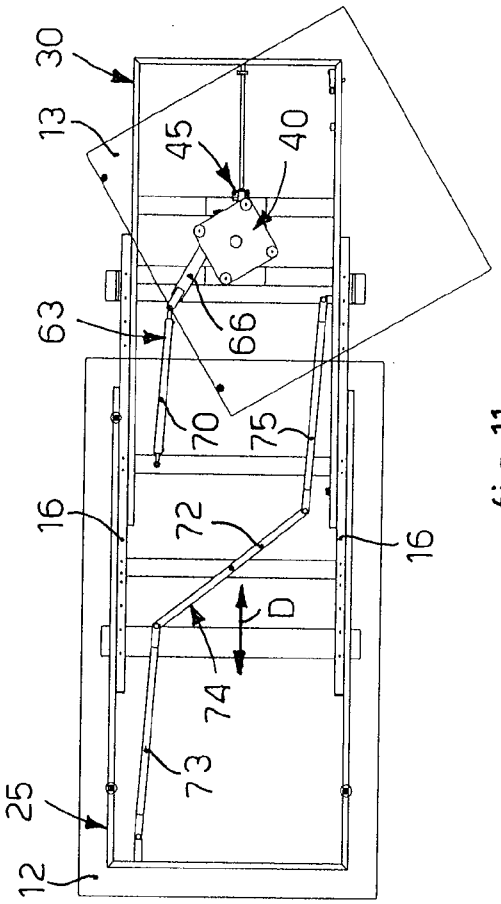

fig. 11

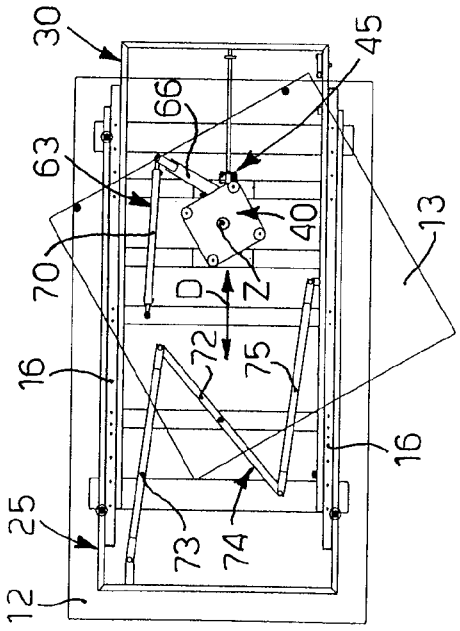

fig. 8

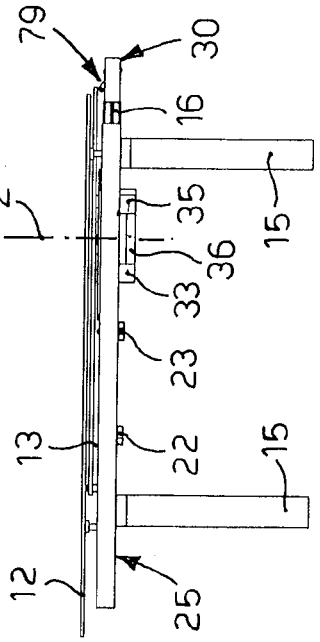

fig. 9

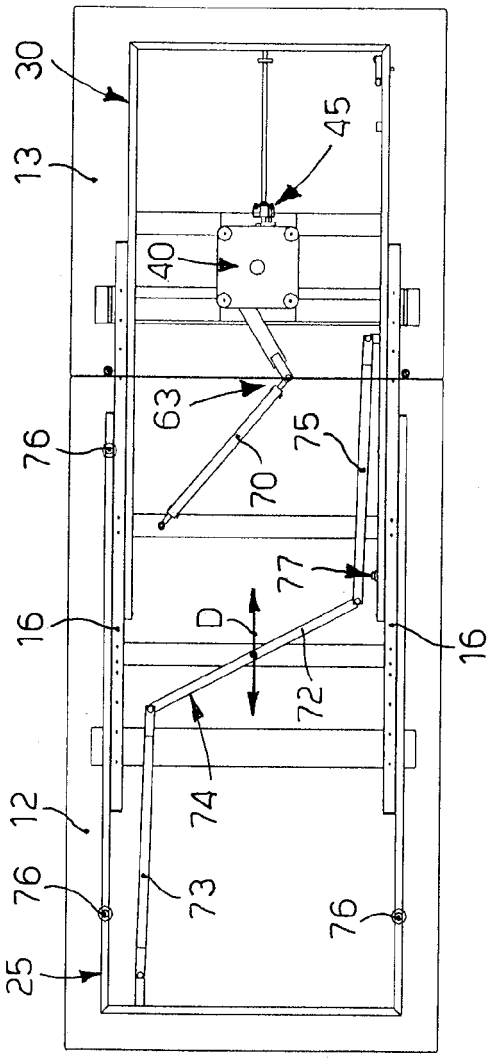

fig. 12

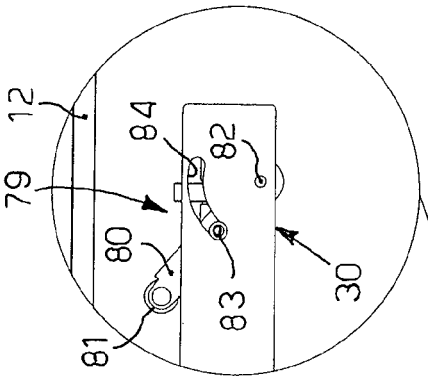

fig. 14

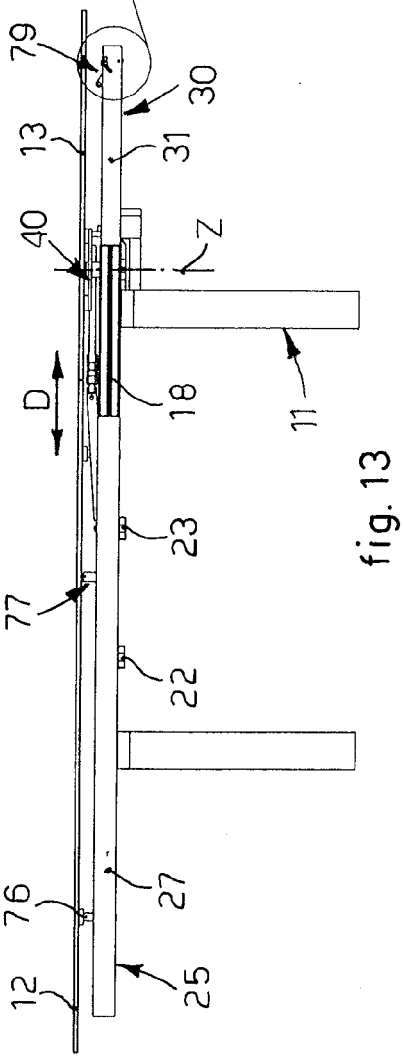

fig. 13

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EUROPEAN SEARCH REPORT

Application Number
EP 12 16 3030

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	DE 85 35 142 U1 (OTM MÖBELWERKE) 20 February 1986 (1986-02-20) * page 11, line 12 - page 21, line 3; figures 1-14 *	1-11	INV. A47B1/10
A	US 2 007 475 A (MILLER CHARLES J) 9 July 1935 (1935-07-09) * page 1, left-hand column, line 43 - page 2, left-hand column, line 47; figures 1-5 *	1-11	
A	DE 10 2004 053941 B3 (INFORM GMBH ENTWICKLUNG UND KO [DE]) 2 February 2006 (2006-02-02) * paragraph [0031] - paragraph [0042]; figures 1-9 *	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 July 2012	Klintebäck, Daniel

CATEGORY OF CITED DOCUMENTS

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04-07-2012

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REFERENCES CITED IN THE DESCRIPTION

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