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(54) Press brake with automatically variable length bending tool

(57) A press brake for metal sheets (9, 90) is described, comprising a tool (10) for bending the mental sheet; the tool comprising a die (11) and pressure means (12) opposite to said die and adapted to press the metal sheet against the die to determine the bending of the metal sheet. The pressure means (12) comprise a plurality of first segments (13) aligned along the bending direction of the metal sheet and adapted to press said metal sheet against the die. The press brake comprises control means (100, 15, 14', 14", 19, 40) adapted to change the longitudinal dimension of the pressure means (12); the control means (100, 15, 14', 14", 19, 40) are adapted to individually drive each first segment for its longitudinal sliding along the bending direction of the metal sheet, so that the longitudinal dimension of the pressure means corresponds to the longitudinal dimension of the fold to be carried out on the metal sheet. (Fig. 1)

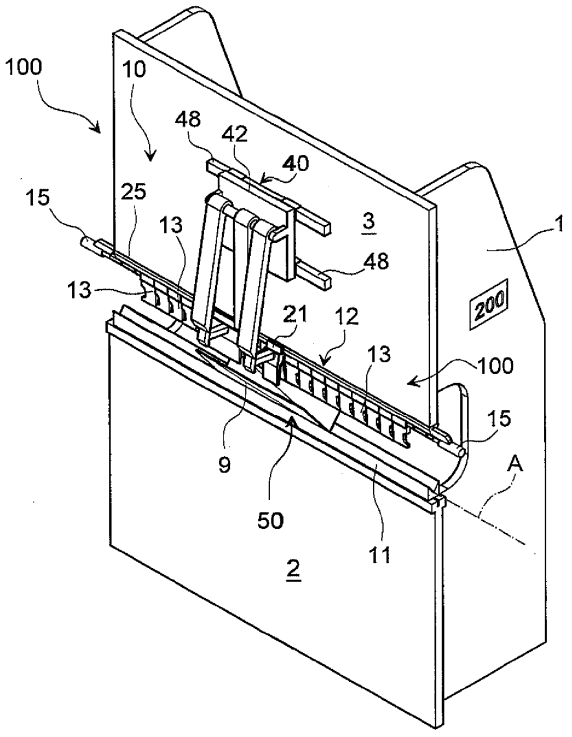

Fig.1

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Description

[0001] The present invention relates to a press brake with automatically variable length bending tool.

[0002] Press brakes adapted to bend metal sheets by exerting a pressure by means of a specific tool are known in the prior art. The metal sheets to be bent may have folded ends and different lengths. The bending tool must be manually varied to adapt it to the various lengths of the metal sheets.

[0003] With regards to the prior art, it is the object of the present invention to provide a press brake with automatically variable length bending tool so as to adapt the tool to the different lengths of the metal sheet.

[0004] In accordance with the present invention, said object is achieved by a press brake for metal sheets as defined in claim 1.

[0005] The features and advantages of the present invention will be apparent from the following detailed description of a practical embodiment thereof, shown by way of non-limitative example in the accompanying drawings, in which:

figure 1 is a perspective view of a press brake with automatically variable length bending tool in accordance with the present invention;

figures 2-5 are front views of the press brake in figure 1, in which the bending tool takes different lengths according to the length of the metal sheet to be bent;

figures 6-8 show first segments of the bending tool in figure 1;

figures 9-10 show second segments of the bending tool in figure 1 with a device for the insertion between the first segments;

figures 11-14 show various steps of inserting a second segment between the first segments of the bending tool in figure 1;

figures 15-19 show various steps for removing the bending tool in figure 1 from a metal sheet with edges folded inwards due to folds previously made in sequence on the sheet sides adjacent to the side being bent.

[0006] Figures 1-19 show a press brake 1 with a variable length bending tool 10 according to the present invention. The bending tool 10 of press brake 1 comprises a fixed length die 11 arranged on the lower part 2 of the press brake along a longitudinal axis A and pressure means 12 arranged on the upper part 3 of press brake 1 and opposite to die 11. The pressure means 12 are adapted to press the metal sheet 9 against die 11 to make a bend on the metal sheet itself; the bending direction of the sheet coincides with the longitudinal axis A.

[0007] The pressure means 12 are associated with a device 100 for changing the length thereof, i.e. the longitudinal dimension thereof, so as to make it either slightly smaller than or equal to the longitudinal dimension of the metal sheet to be bent, i.e. so that the longitudinal dimension of the pressure means 12 corresponds to the longitudinal dimension of the fold to be made on the metal sheet 9. Pressure means 12 comprise a plurality of segments 13 sliding along an upper longitudinal guide 25 and shown in greater detail in figures 6 and 7; in particular, guide 25 is hollow and each segment 13 is held in position on guide 25 by the presence of an upper part 26 inserted into the hollow guide 25. Each segment 13 comprises a groove 130 so as to have one end 16 which may be arranged within a U-shaped fold of the edge of metal sheet 9 to be bent, Each segment 13 preferably comprises a flat section 17 on the opposite side of groove 130 for approaching to the next, adjacent segment 13 of the plurality of segments 13.

[0008] Device 100 is adapted to drive the longitudinal sliding of segments 13 along guide 25. Each segment 13 comprises a longitudinal through hole 18 for engaging one of the half guides or longitudinal bars 14', 14", arranged one after the other in the bending direction of the metal sheet and longitudinally movable, and an actuator 19, which cooperate for the sliding of segment 13 along guide 25.

[0009] The control device 100 comprises a processing unit 200, arranged on the body of press brake 1 or spaced therefrom, set by a user and adapted to control means 15 and actuators 19; each actuator 19 is individually controlled by the processing unit 200 connected to the actuator by means of wires. Unit 200 may control either all the actuators 19 of segments 13 at the same time or only one or some of them adapted to engage one of bars 14', 14" for sliding on guide 25. In particular, each actuator 19 comprises a piston which is movable by means of a cylinder (not shown in the figures) and may be inserted into one of the holes 20 on bar 14', 14". Once segment 13 has been blocked on bar 14', 14", the bar itself may be longitudinally moved so as to longitudinally slide one of or all segments 13 (figure 8); movement means 15 controlled again by the central unit 200 allow to longitudinally move the bars 14', 14".

[0010] Bars 14', 14" are preferably interrupted in the longitudinal direction by a central empty space 30. All elements 13 have equal length D and size.

[0011] The pressure means 12 comprise another plurality of segments 21; the length of each segment 21 is different from the other segments 21 of the plurality, i.e. segments 21 have different lengths D1, D2..Dn. A single segment 21 or several segments 21 may be inserted between segments 13; in particular, the insertion of one of or more segments 21 occurs in the central space 30 of the plurality of segments 13. Each segment 21 is either shorter or longer than each segment 13. One or more segments 21 are inserted between part or all of segments 13, if the metal sheet to be bent, in particular the part of the metal sheet to be bent, has a length L which is not a whole multiple of the length D of segment 13, i.e. $L=n*D+e$, where "n" is an integer and "e" is a real number complementary to length L. In such as case, one or more elements 21 should be inserted to cover the missing dis-

tance "e"; e.g. for a metal sheet of length L1, L1=n1*D+Dx where "n1" is an integer and "Dx" is the length of a specially made segment 21.

[0012] Each segment 21 has a cross section of the lower part equal to the cross section of the lower part of segments 13 and is inserted into space 30 so as to be longitudinally aligned with the other segments 13.

[0013] Each segment 21 is connected to movement means 40 which allow it to be inserted into the central space 30 or moved away from the central space 30. The movement means 40, controlled by the unit 200 and better seen in figures 9 and 10, comprise a plate 42 connected to the upper part 3 of press brake 1, a motorized rotation joint 44 and a motorized translation joint 41, 43; plate 42 slides along longitudinal guides 48 integral with the upper part 3 of press brake 1. The translation joint 41, 43 comprises an arm 41 connected to plate 42 by means of the rotation joint 44 and a second motorized arm 43, slidingly connected to the first arm 41 and connected to segment 21; both the motorized rotation joint 44 and the motorized translation joint 41, 43 are controlled by the central unit 200. Arm 41 may rotate on a plane transversal to the bending direction of the metal sheet, and arm 43 may translate either downwards or upwards along arm 41. The movement means 40 shown on the front of the press brake may also be arranged on the back of the same press brake.

[0014] Figures 11-14 show the various steps in which a segment 21 is inserted between the segments 13 in the central space 30. Starting from a condition in which segment 21 is spaced apart from space 30 (figure 11), the central unit 200 controls a downward sliding movement of arm 43 on arm 41 with a downward translation of segment 21 (figure 12), a following rotation of arm 41 of a plane transversal to the bending direction of the metal sheet until segment 41 is placed inside space 30, underneath the segments 13 (figure 13), and finally an upward translation of segment 21 by means of the sliding movement of arm 43 again on arm 41 until the upper end of segment 21 is arranged within the hollow guide 25 and abuts against the upper inner part of the hollow guide itself (figure 14). The insertion position of segment 21 in space 30 being reached, with the upper part inserted into the hollow guide 25 and aligned with segments 13, is indicated by a specific sensor 27 arranged on the inner wall of the hollow guide 25 on which the upper part 26 of segment 21 abuts.

[0015] Movement means 40, movement means 15 and actuators 19 belong to device 100, which is adapted to change the length, i.e. the longitudinal dimension, of the pressure means 12. In particular, device 100 is adapted to change the length of the pressure means 12 in accordance with the length of the metal sheet 9, thus allowing whether inserting one or more segments 21 or not, and providing for moving some segments 13 in the longitudinal direction from the central part 50 where the metal sheet 9 to be bent is arranged.

[0016] For example, considering that the pressure means 12 comprise eighteen segments 13 of length D and three segments 21 of different lengths D1, D2 and D3, different combinations are possible according to the length of the metal sheet 9 to be bent, as shown in figures 2-5.

[0017] For example, if the length of the metal sheet, i.e. the part of metal sheet to be bent, is L1=18*D+D2. the situation shown in figure 2 will occur, in which segment 21 having length D2 is firstly inserted, by the movement means 40 controlled by central unit 200, into the central space 30 between the segments 13 of length D equally arranged across segment 21, i.e, nine on one side and nine on the other side with respect to segment 21. Segments 13 then move towards the segment 21 arranged in the central space 30 until segments 13 are adjacent to segment 21, so that there are no interruptions of the pressure means 12 for bending the metal sheet; said movement is implemented by controlling all actuators 19 of segments 13 for the connection to bars 14', 14" and the following longitudinal movement of bars 14', 14" towards the central space 30 by means of the movement means 15 controlled by the central unit 200.

[0018] If the length of the metal sheet, i.e. the part of the metal sheet to be bent, is L2=10*D+D2, the situation shown in figure 3 will occur, in which segment 21 having length D2 is firstly inserted, by the movement means 40 controlled by the central unit 200, into the central space 30 between segments 13 of length D equally across segment 21, Only ten segments 13 then move towards the segment 21 arranged in the central space 30, i.e. five segments carried by bar 14' and five segments carried by bar 14", until segments 13 are adjacent to segment 21, so that there are no interruptions of the pressure means 12 for bending the metal sheet; said movement is implemented by controlling actuators 19 of the only ten segments 13 for the connection to bars 14', 14" and the following longitudinal movement of bars 14', 14" towards the central space 30 by means of the movement means 15 controlled by the central unit 200. Thereby, side interruptions 51, 52 are made in the plurality of segments 13 which are especially useful in the case of metal sheets 9 with folded edges.

[0019] If the length of the metal sheet, i.e. the part of the metal sheet to be bent, is L3=3*D+D2, the situation shown in figure 4 will occur, in which segment 21 having length D2 is firstly inserted, by means of the movement means 40 controlled by the central unit 200, into the central space 30 between segments 13 of length D equally arranged across segment 21. Only three segments 13 then move towards segment 21 arranged in the central space 30, i.e. two segments carried by bar 14' and a segment carried by bar 14", until segments 13 are adjacent to segment 21; said movement is implemented by controlling actuators 19 of the only three segments 13 for the connection to bars 14', 14" and the following longitudinal movement of bars 14', 14" towards the central space 30 by means of the movement means 15 controlled by the central unit 200. The side interruptions 51, 52 are

again made in the plurality of segments 13.

[0020] If the length of the metal sheet, i.e. the part of the metal sheet to be bent, is L4=2*D+D1 the situation shown in figure 5 will occur, in which plate 42 firstly longitudinally translates on the upper part 3 of press brake 1 to reach the central space 30 and then segment 21 having length D1 is inserted by the movement means 40, controlled by the central unit 200, into the central space 30 between the segments 13 of length D equally arranged across segment 21. Only two segments 13 then move towards the segment 21 arranged in the central space 30, i.e. one segment carried by bar 14' and one segment carried by bar 14", until the segments 13 are adjacent to segment 21; said movement is implemented by controlling the actuators 19 of the only two segments 13 for the connection to bars 14', 14" and the following longitudinal movement of bars 14', 14" towards the central space 30 by means of the movement means 15 controlled by the central unit 200. The side interruptions 51, 52 are again made in the plurality of segments 13.

[0021] If the length of the metal sheet 9, i.e. the part of the metal sheet to be bent, is L5=n5*D, i.e. the length of the metal sheet is an exact multiple of the length D of segment 13, only the necessary segments 13 will be moved, i.e. six segments if n5=6, towards the central space 30, i.e, three segments carried by bar 14' and three segments carried by bar 14", until the segments 13 carried by a bar 14', 14" are adjacent to the segments carried by the other bar 14', 14" to totally cover the central space 30; said movement is implemented by controlling the actuators 19 of the only six segments 13 for the connection to bars 14', 14" and the following longitudinal movement of bars 14', 14" towards the central space 30 by means of the movement means 15 controlled by the central unit 200. The side interruptions 51, 52 are again made in the plurality of segments 13.

[0022] If the edges of the metal sheet to be bent have a sequence of U-shaped profile folds on the previously bent adjacent sides, as shown in figure 15, the problem of extracting the bending tool arises because of problems of geometrical fitting. Firstly, the same operations as the previous cases are carried out, i.e. considering a length of the metal sheet 9 L9=6*D+D2, segment 21 having length D3 is inserted, by means of the movement means 40 controlled by the control unit 200, into the central space 30 between segments 13 of length D equally arranged across segment 21. Only six segments 13 then move towards the segment 21 arranged in the central space 30, i.e. three segments 13 carried by bar 14' and three segments carried by bar 14", until the six segments are adjacent to segment 21, so that there are no interruptions of the pressure means 12 for bending the metal sheet 9; said movement is implemented by controlling the actuators 19 of the only six segments 13 for the connection to bars 14', 14" and the following longitudinal movement of bars 14', 14" towards the central space 30 by means of the movement means 15 controlled by the central unit 200. Thereby, side interruptions 51, 52 are made in the plurality of segments 13.

[0023] The metal sheet 9 is then inserted, as usual in the working position, under the bending tool so as to obtain a metal sheet 90 with length L90 and U-folded edges.

[0024] The bending tool is released once the U shaped edges have been made (figure 15); the pressure means 12 are vertically lifted to create a distance Z between the lower part of the pressure means 12 and the metal sheet 90 (figure 16).

[0025] Segment 21 having length D2 is then moved away from the central space 30 by the movement means 40 controlled by unit 200. Arm 43 thus slides downwards on arm 41 with a downward translation of segment 21 (figure 17), a following rotation of arm 41 on a plane transversal to the bending direction of the metal sheet until segment 21 is moved away from space 30 (figure 18), and finally an upward translation of segment 21 again by means of sliding arm 43 on arm 41 to return segment 21 to the initial position in figure 10.

[0026] Six segments 13 then move towards the central space 30, i.e. three segments carried by bar 14' and three segments carried by bar 14", until the length of the pressure means given by the six segments 13 is shorter than the distance between the opposite ends of the folded edges of the metal sheet 90. Said movement is implemented by controlling the actuators 19 of the only six segments 13 for the connection to bars 14', 14" and the following longitudinal movement of bars 14', 14" towards the central space 30 by means of the movement means 15 controlled by the central unit 200 (figures 18,19).

[0027] The metal sheet 90 may thus be removed (figure 19).

[0028] An alternative release mode consists in only moving forward and slightly rotating sheet 90 so as to determine a diagonal space sufficient to extract the pressure means 12 in the length composition used for bending.

Claims

1. Press brake for metal sheets (9, 90) comprising a tool (10) for bending the metal sheet, said tool comprising a die (11) and pressure means (12) opposite to said die and adapted to pressing the metal sheet against the die to determine the bending of the metal sheet, said pressure means (12) comprising a plurality of first segments (13) aligned along the bending direction of the metal sheet and adapted to press said metal sheet against said die and said press brake comprises control means (100, 15, 14', 14", 19, 40) adapted to change the longitudinal dimension of said pressure means (11), said control means (100, 15, 14', 14", 19, 40) being adapted to individually drive each first segment for its longitudinal sliding along the bending direction of the metal sheet so that the longitudinal dimension of the pressure means corresponds to the longitudinal dimension of

the fold to effectuate on the metal sheet, said pressure means comprising a plurality of second segments (21), said control means being adapted to individually drive each second segment for inserting it between said first segments (13) so that the second segment is aligned to the first segments along the bending direction of the metal sheet and so that the longitudinal dimension of the pressure means comprising at least one first segment and at least one second segment corresponds to the longitudinal dimension of the fold to effectuate on the metal sheet, **characterized in that** said control means (100, 15, 14', 14", 19, 40) comprises first means (40) adapted to determine the insertion of at least one second segment (21) between two first segments (13) by means of a movement transversal to the bending direction of the metal sheet, said first means (40) comprise movement means (41, 43, 44) configured to carry out a combination of a rotation movement and a translation movement of said at least one second segment (21) for inserting said at least one second segment (21) between two first segments (13).

2. Press brake according to claim 1, **characterized in that** all the first segments (13) have the same longitudinal dimension (D).

3. Press brake according to claim 1 or 2, **characterized in that** each second segment (21) has a longitudinal dimension (D1, D2, D3) lower or higher than each first segment (D).

4. Press brake according to any one of the preceding claims, **characterized in that** said first means (40) comprise a plate (42) longitudinally sliding on a fixed part of the press brake and movement means (41, 43, 44) for each second segment (21), said movement means comprising a rotation motorized joint (44) and a motorized translation joint (41,43) connected with the second segment (21).

5. Press brake according to claim 4, **characterized in that** said fixed part of the press brake is located above said first segments (13) and **in that** said pressure means (12) comprises a hollow guide (25) for the arrangement of said first segments and **in that** said motorized translation joint (41, 43) comprises a first arm (41) and a second arm (43) sliding connected with the first arm and carrying at an end said second segment, said movement means (41, 43, 44) determining said insertion of at least one second segment (21) between two first segments (13) by sliding directed downward of the second arm (43) on the first arm (41), by rotation of the first arm by means of a rotation of the rotation joint (44) and sliding directed upward of the second arm on the first arm for inserting said second segment inside the hollow guide (25) of the pressure means (12).

6. Press brake according to any one of the preceding claims, **characterized in that** said control means comprise two longitudinal bars (14', 14") arranged one successive the other along the bending direction of the metal sheet and second means (15) adapted to longitudinally move said two longitudinal bars (14', 14"), each first segment (13) comprising a longitudinal through hole (18) for engagement with one of said two longitudinal bars (14', 14") and an actuator (19), said actuator being adapted to block the first segment (13) at one of the two longitudinal bars (14', 14") for the longitudinal sliding of the same first segment.

7. Press brake according to claim 6, **characterized in that** said two longitudinal bars (14', 14") are spaced by a empty space (30) for the insertion of at least one second segment (21) between said at least two first segments (13) belong to two bars, said control means (100) being adapted to control two bars and the relative actuators for the longitudinal movement of said at least two first segments (13) toward the at least one inserted second segment (21) until said at least two first segments (13) are adjacent to the at least one inserted second segment (21) so that interruptions of the pressure means along the bending line of the metal sheet are not present.

8. Press brake according to any one of the preceding claims, **characterized in that** each one of said first segments (13) comprises an end (16) adapted to engage with the edges of the metal sheet which are bent in U shape.

9. Press brake according to claim 8, **characterized in that** said control means , in the case wherein the metal sheet (90) has edges bent in U shape, are adapted to control the first means so as to go the at least one second segment (21) away from said space between two first segments, said control means being adapted to successively control said two longitudinal bars and the actuators relative to the at least two first segments (13) for longitudinally moving said at least two first segments (13) toward the space (30) which is left empty by the at least one second segment so as to allow the removal of the metal sheet with edges bent in U shape.

10. Press brake according to any one of the claims from 1 to 7, **characterized in that** said control means are adapted to place said first segments (13) and said second segments (21) adjacent to each other along the bending direction of the metal sheet.

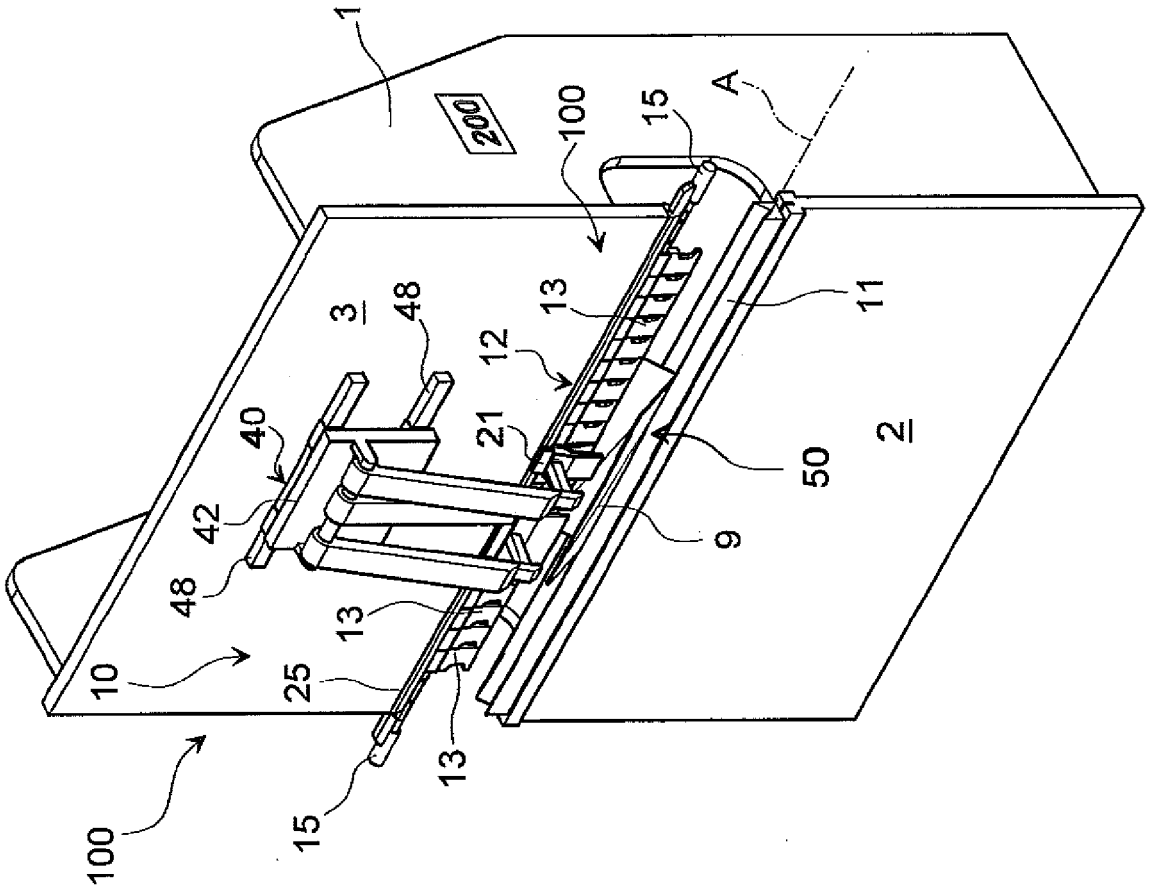

Fig.1

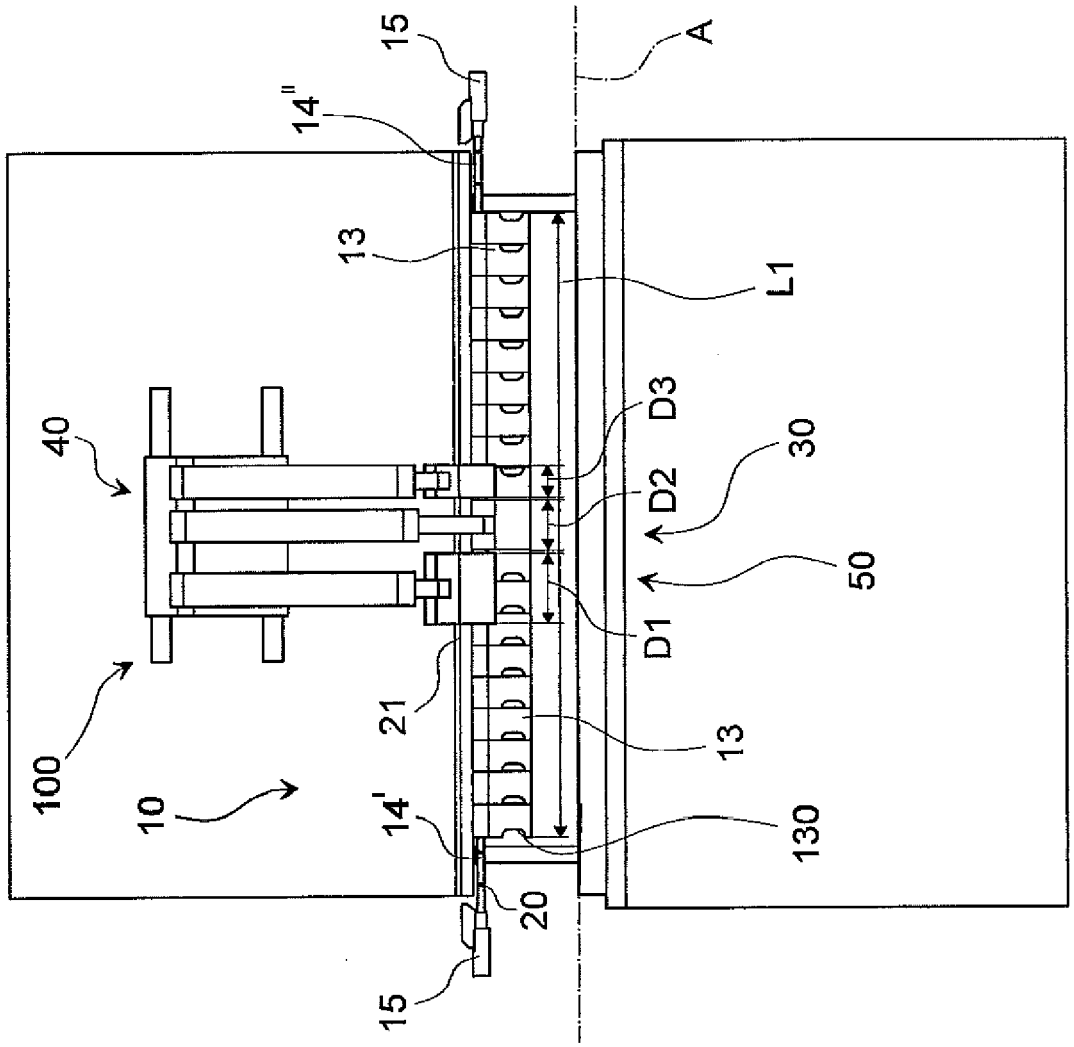

Fig.2

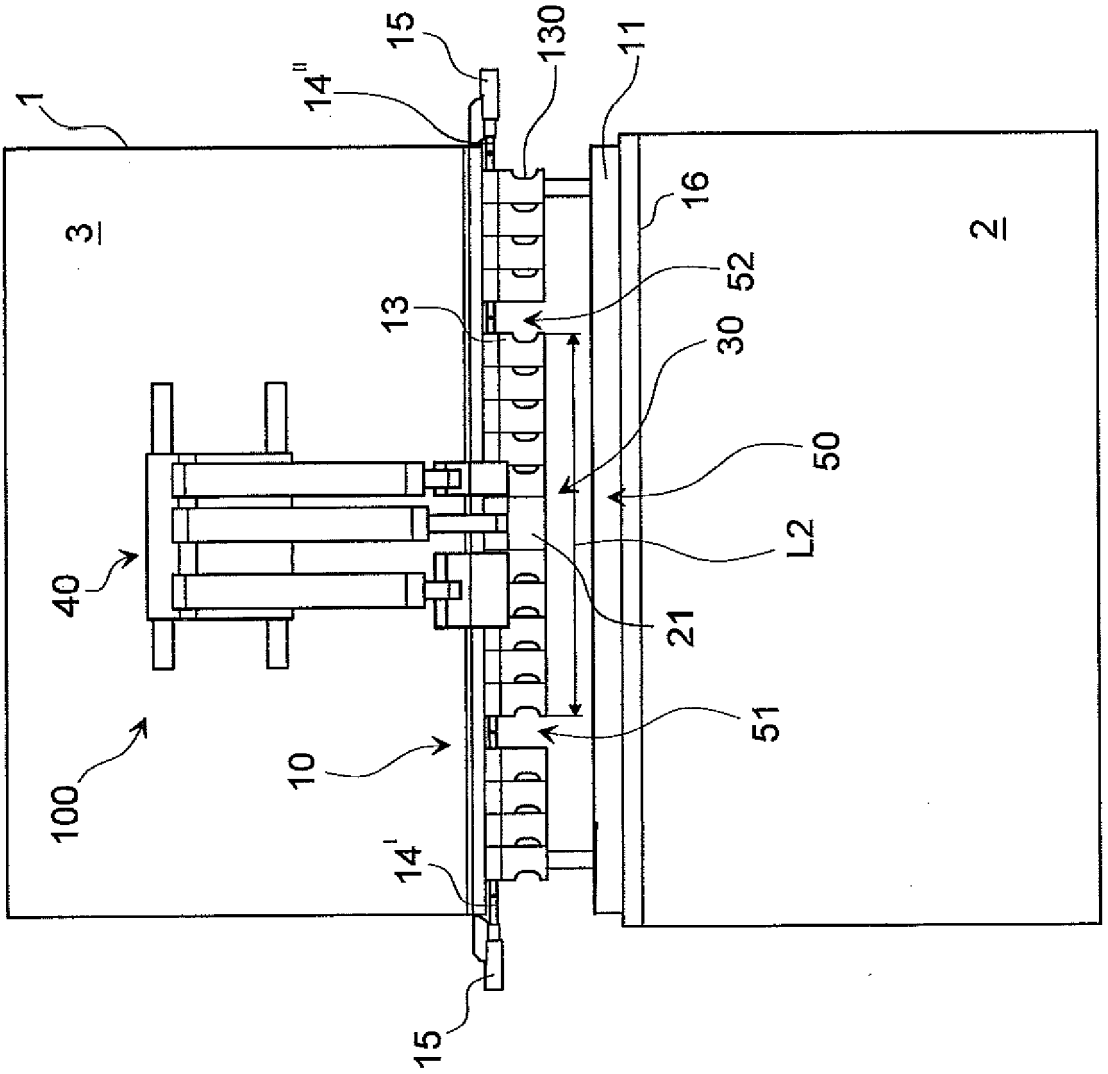

Fig.3

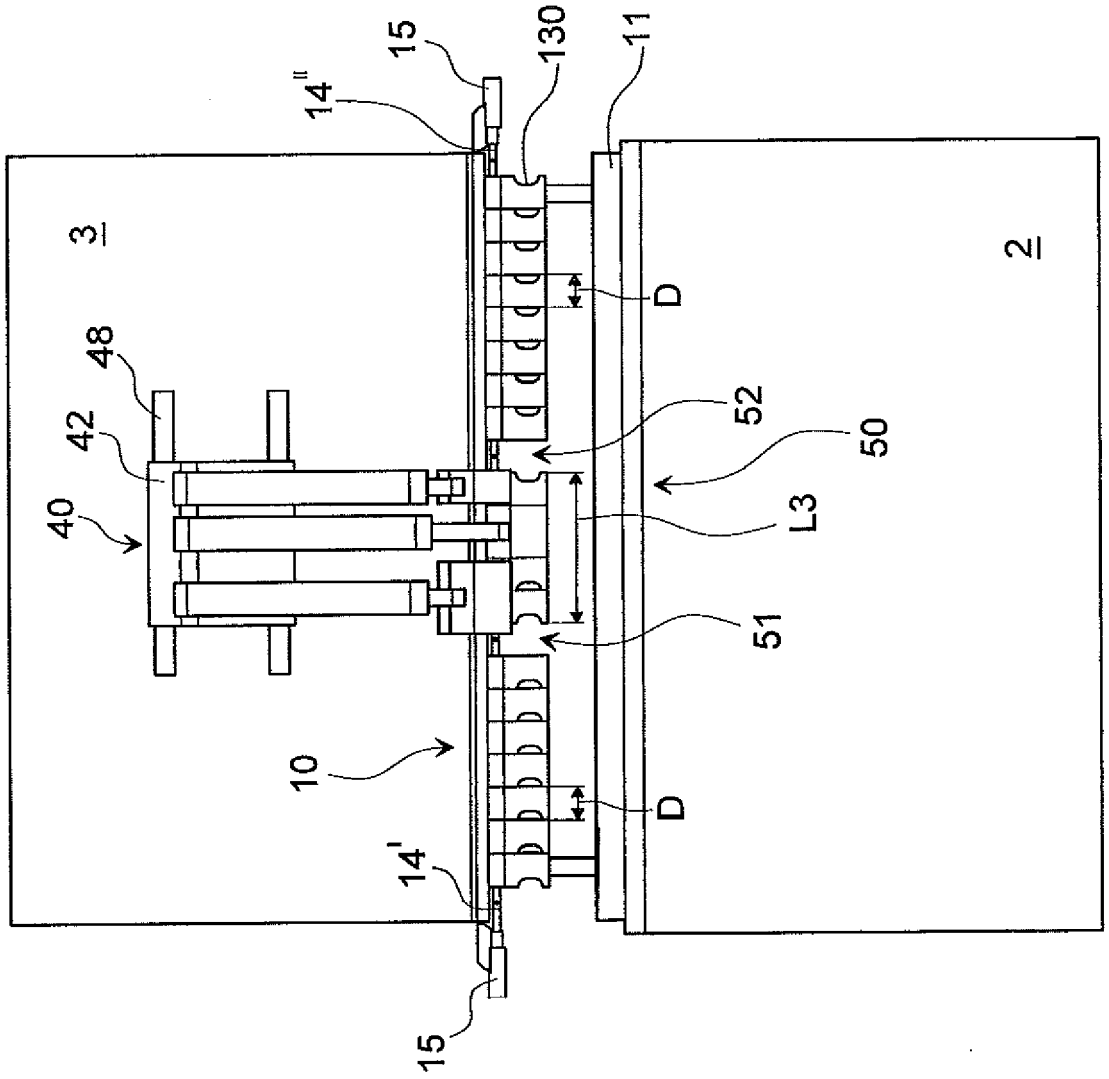

Fig.4

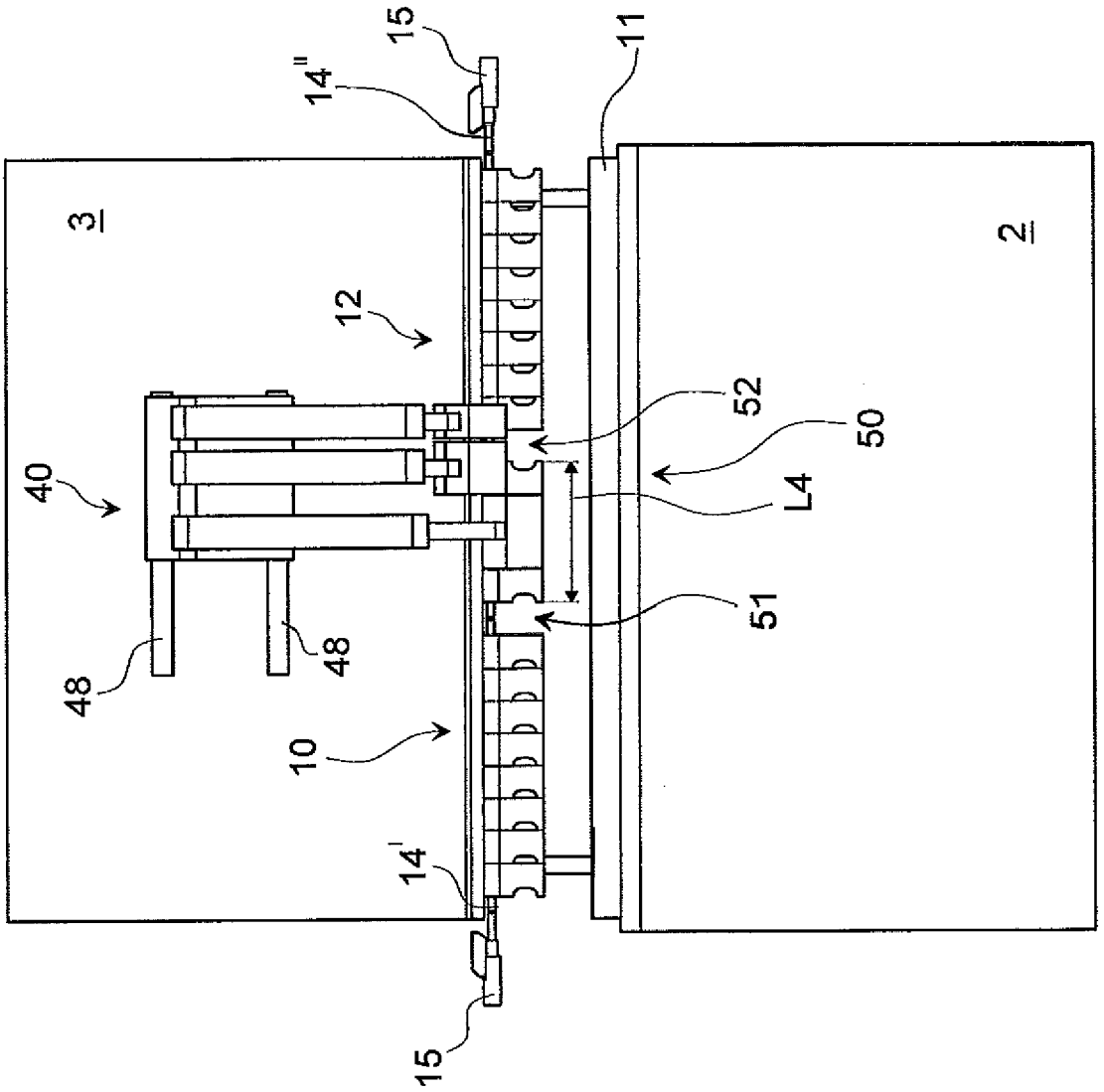

Fig.5

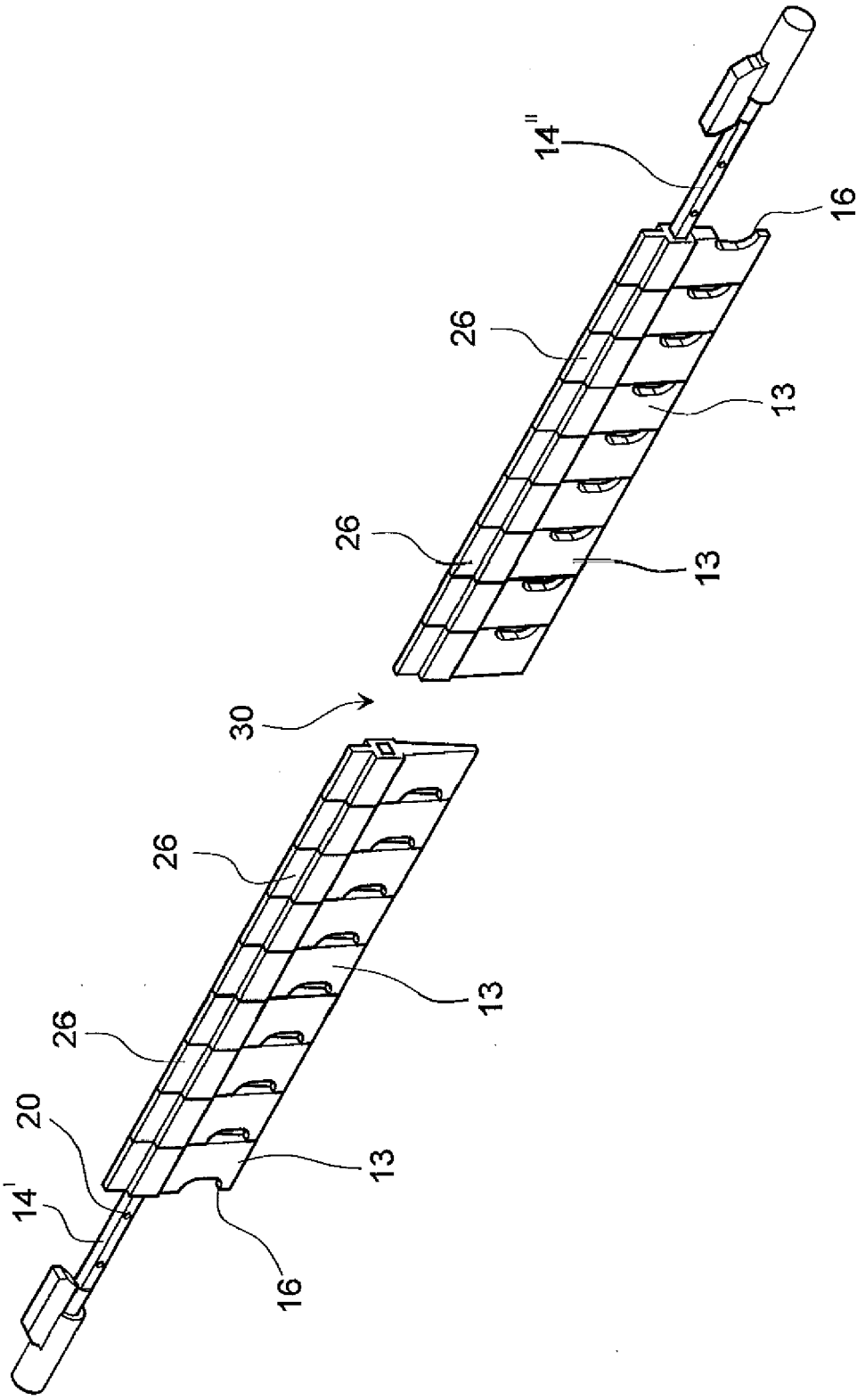

Fig.6

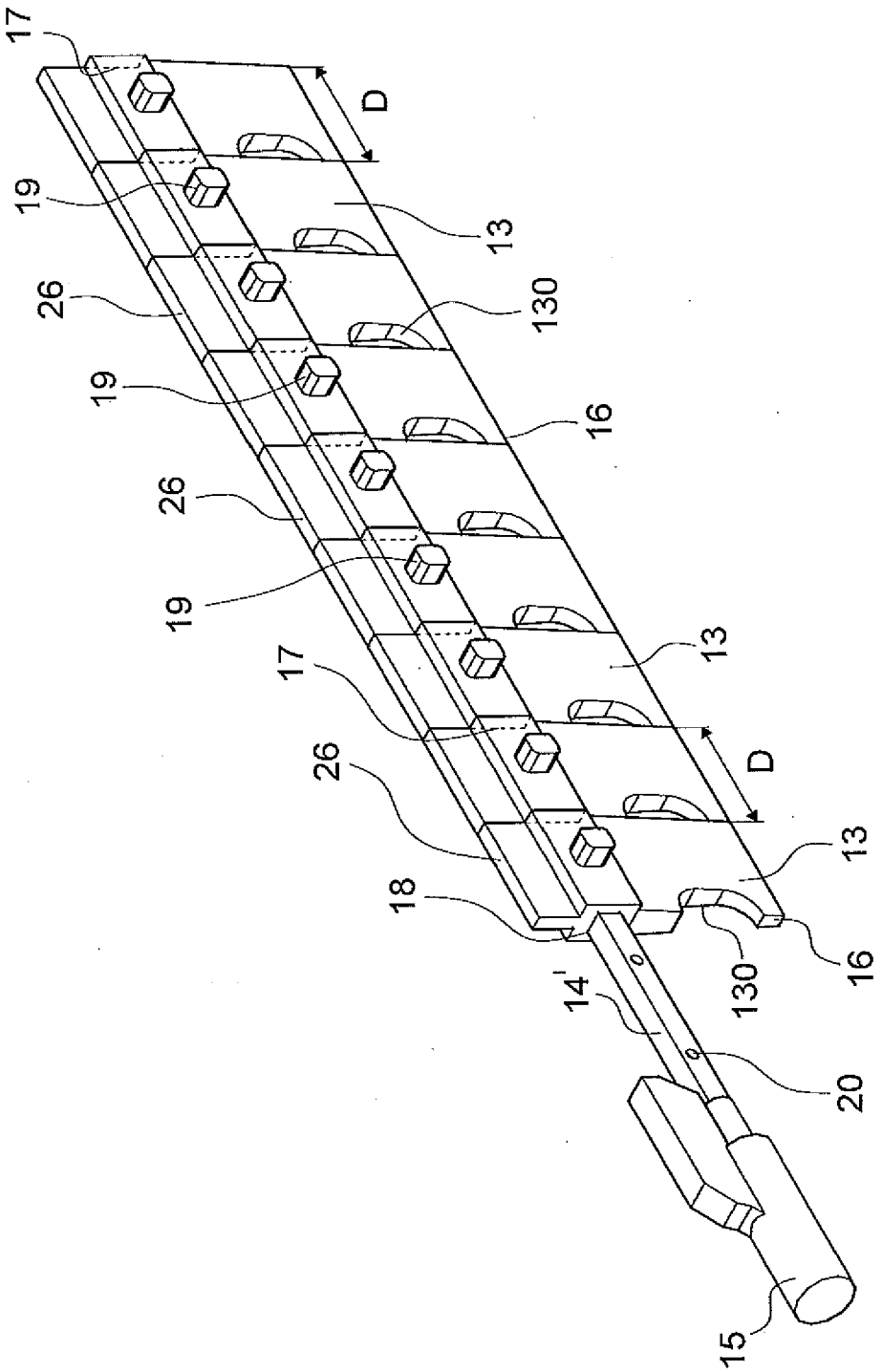

Fig.7

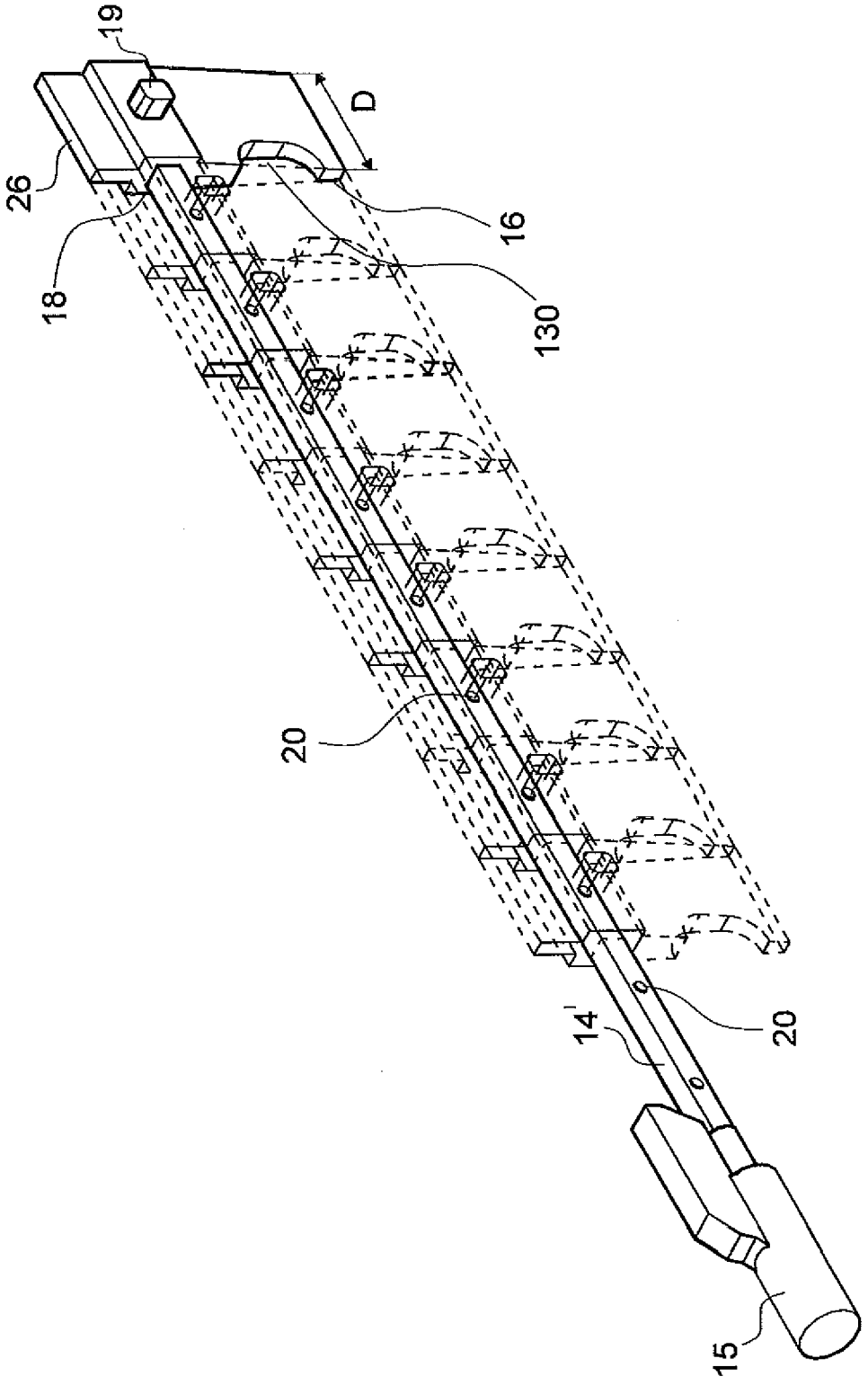

Fig.8

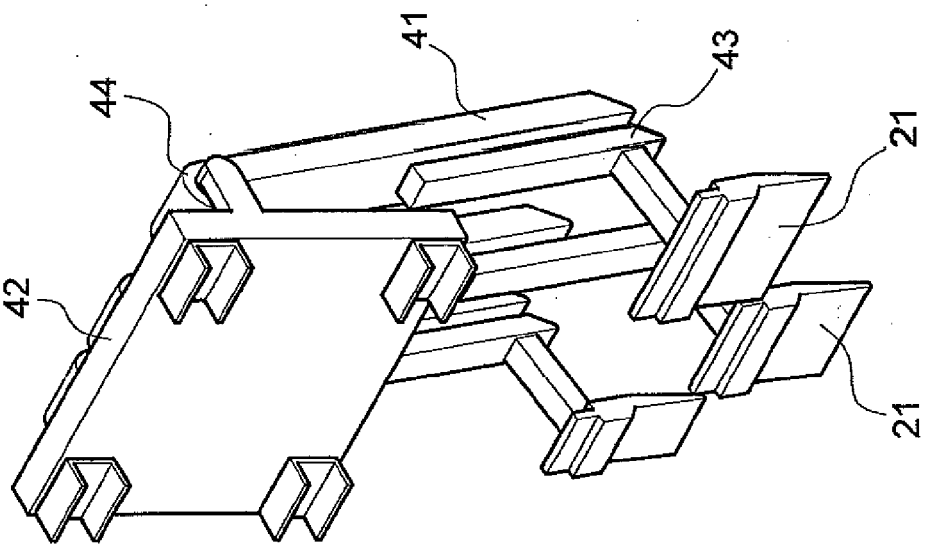

Fig.10

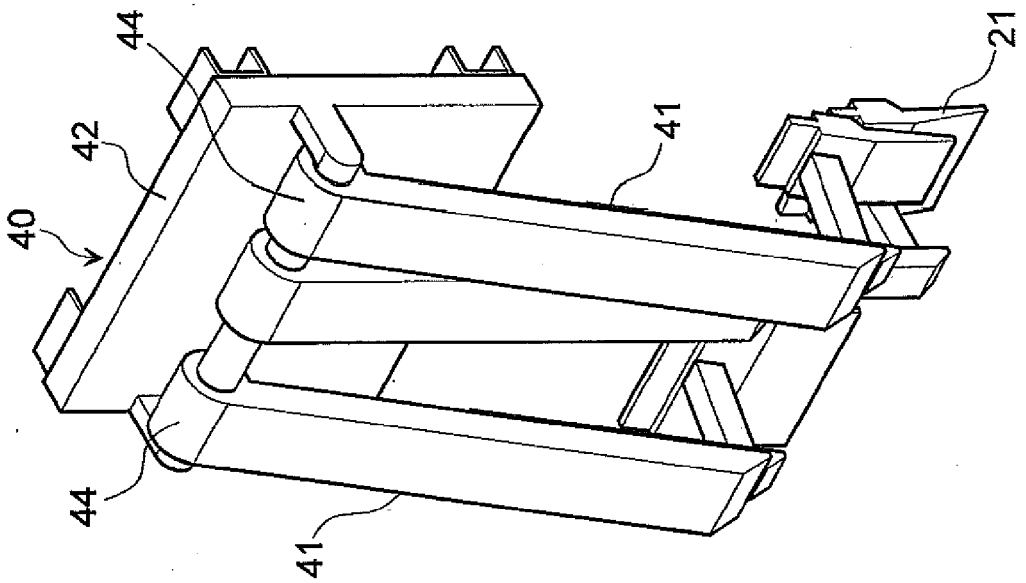

Fig.9

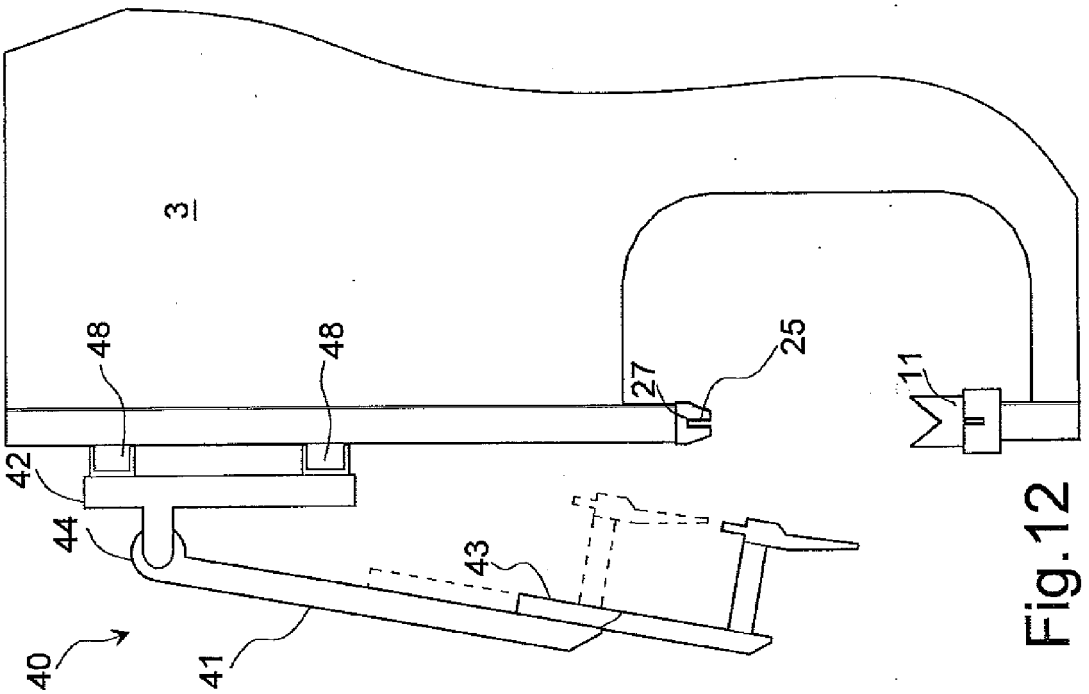

Fig.12

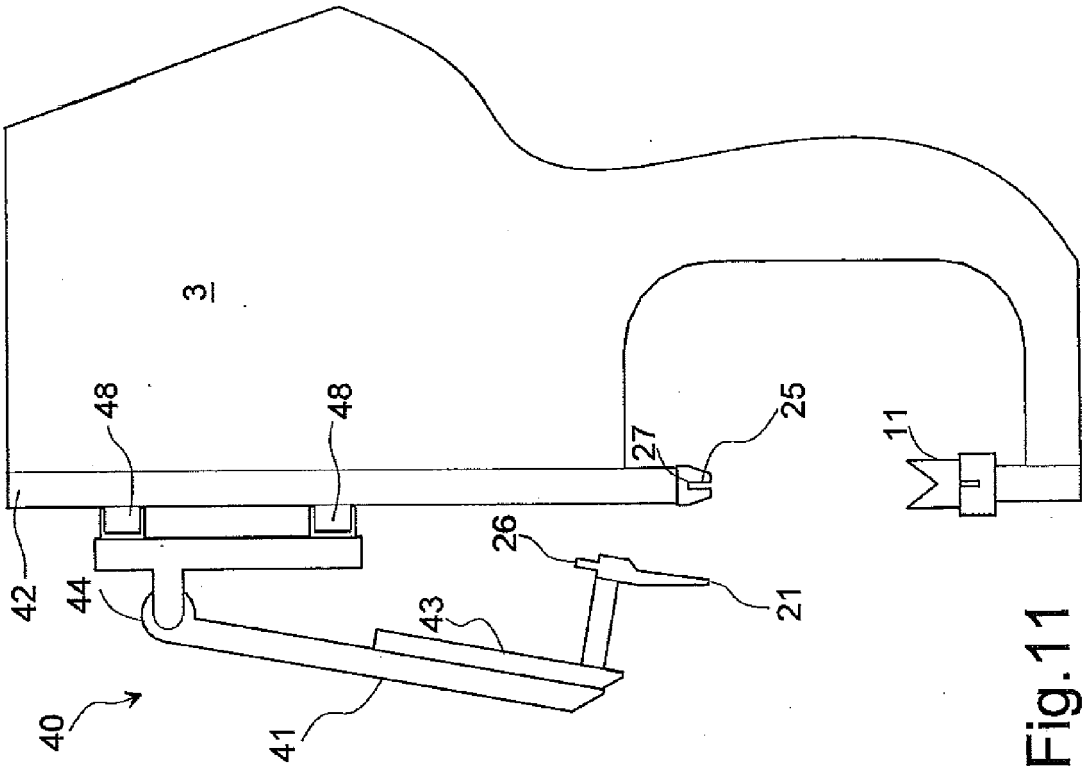

Fig.11

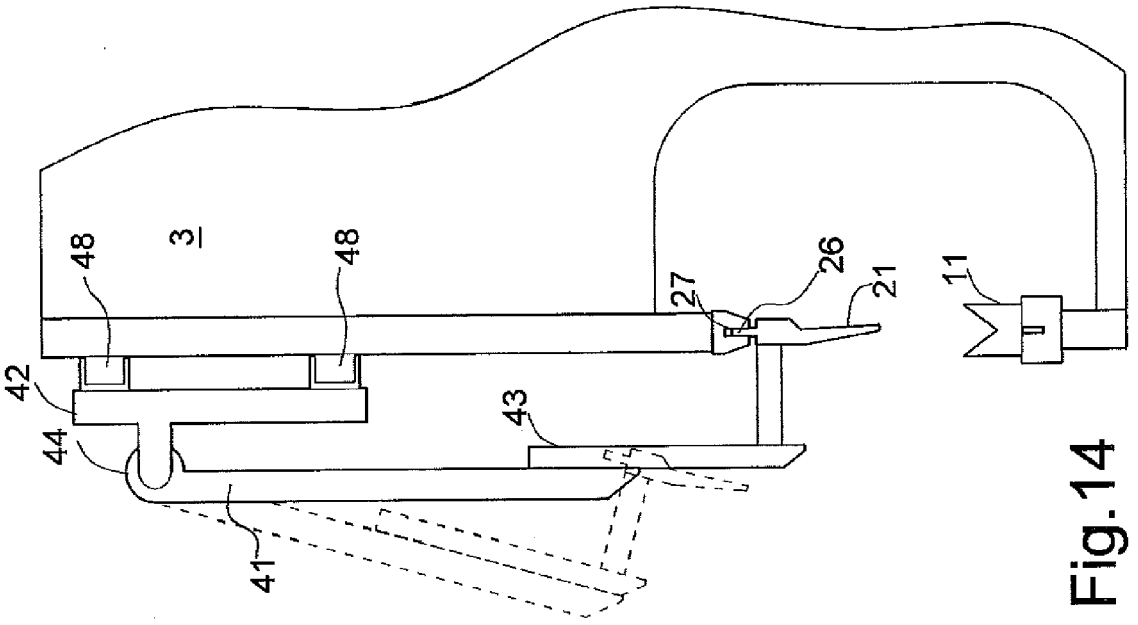

Fig.14

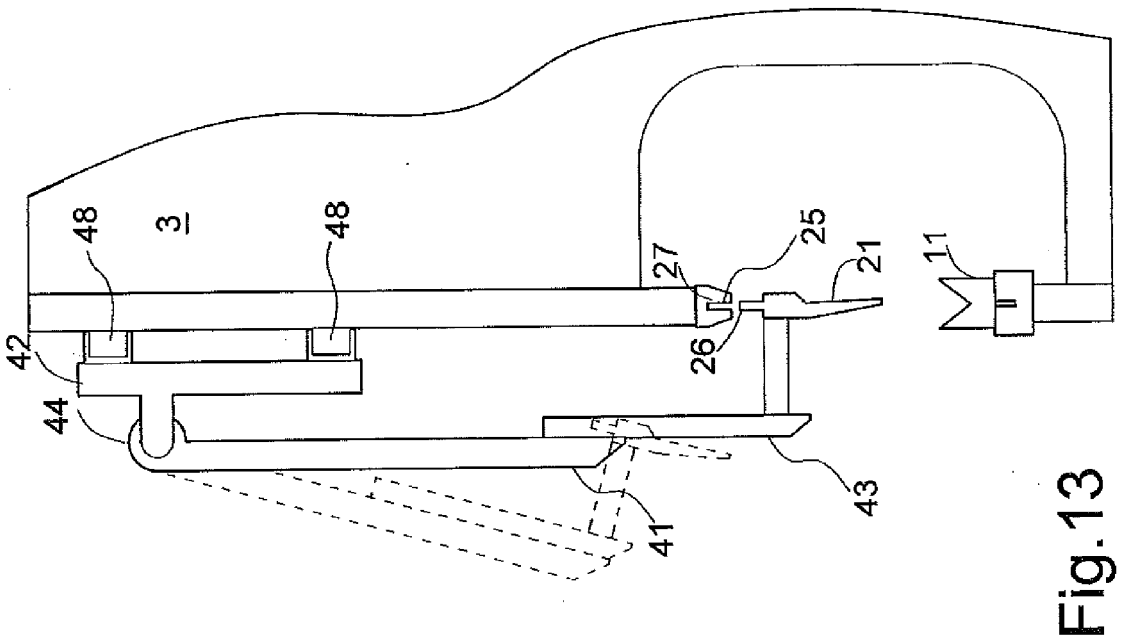

Fig.13

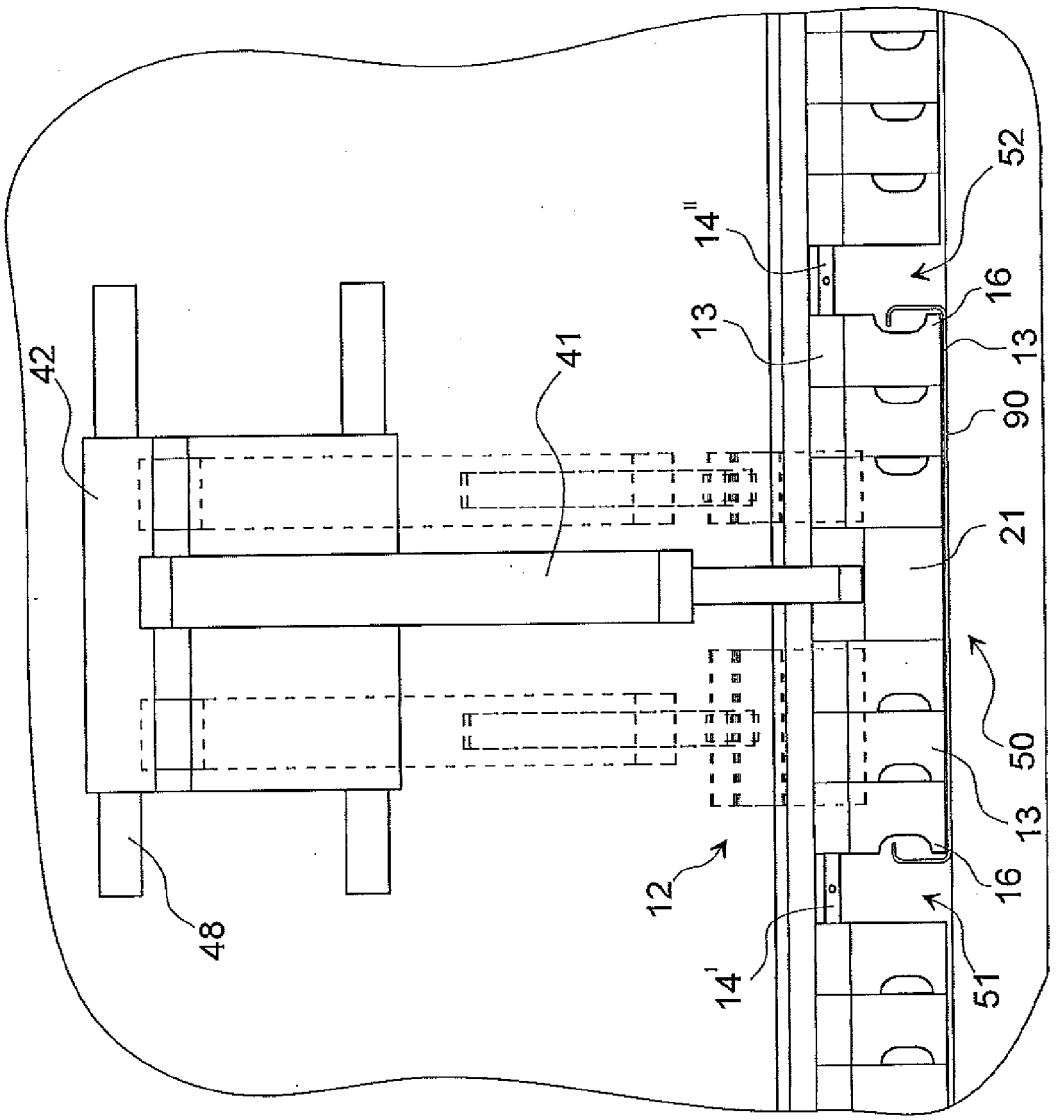

Fig.15

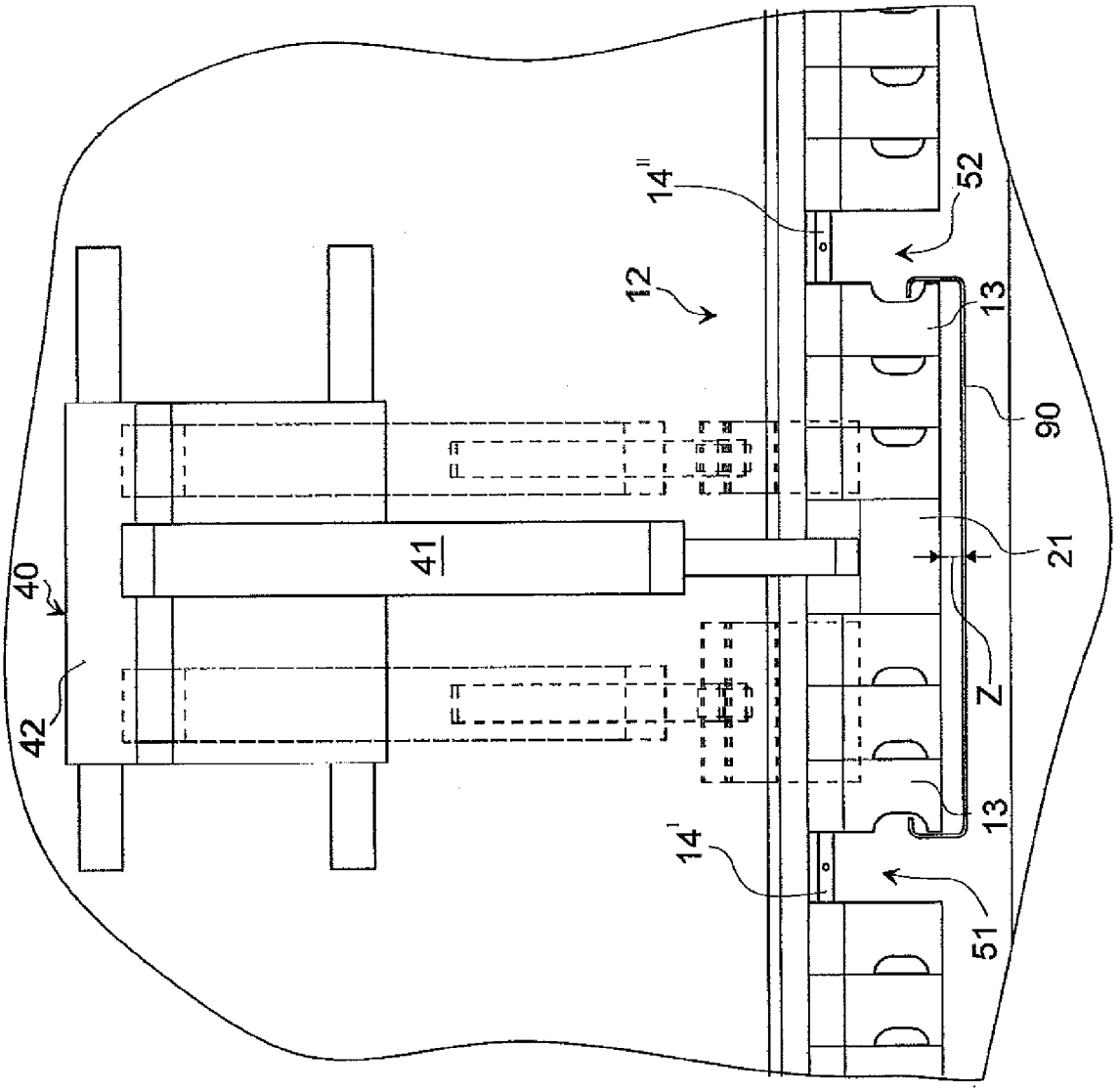

Fig.16

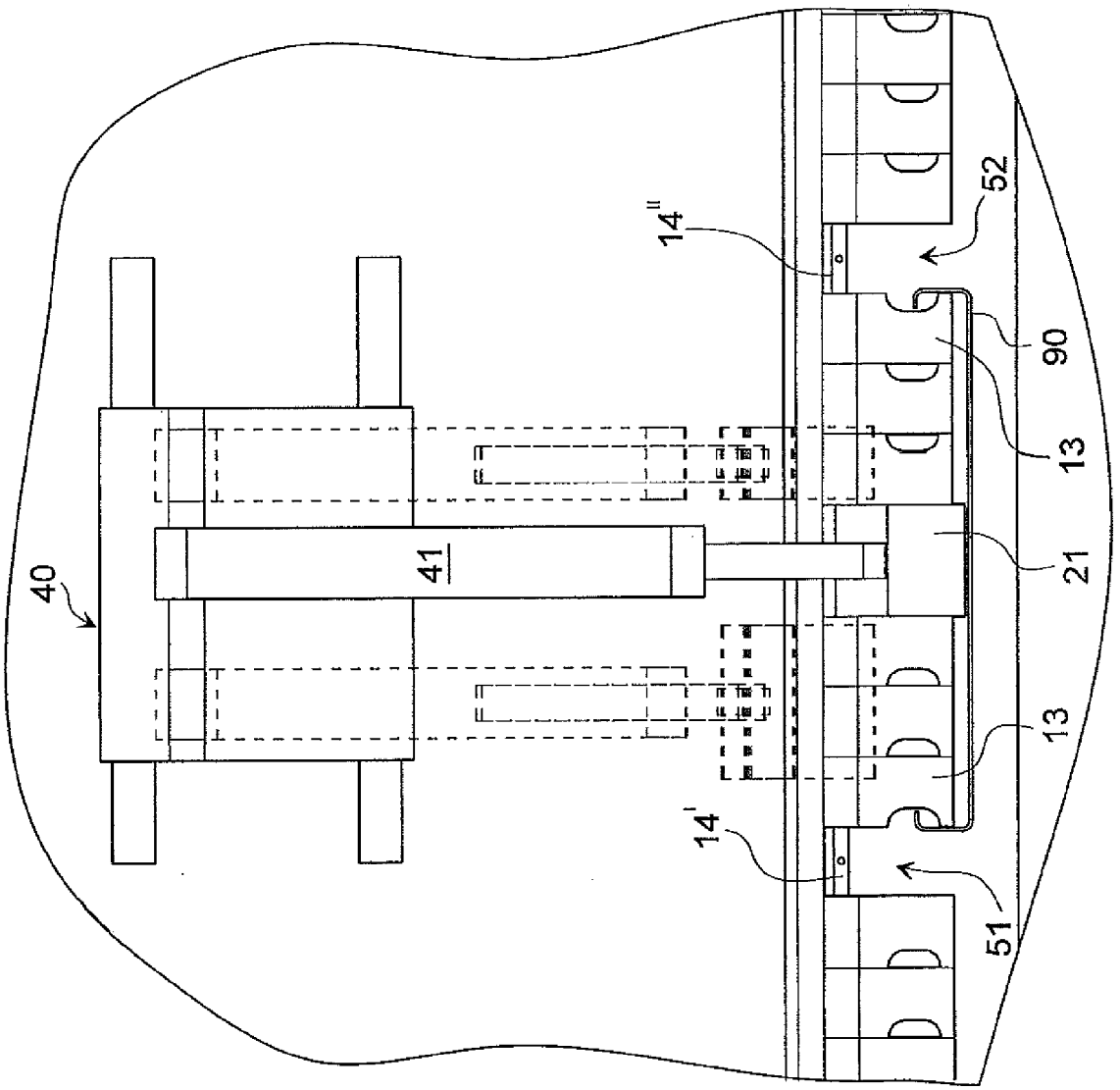

Fig.17

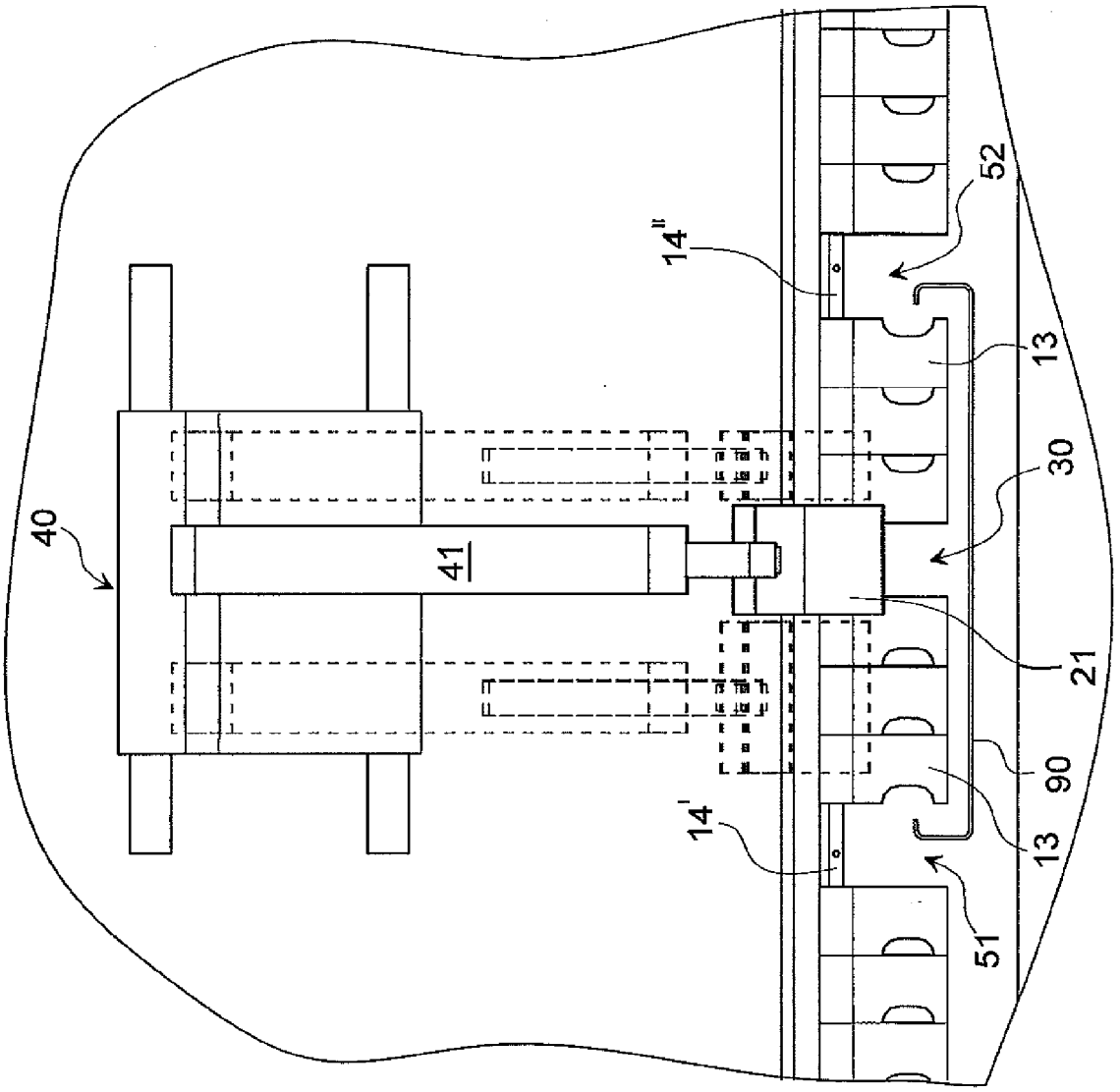

Fig.18

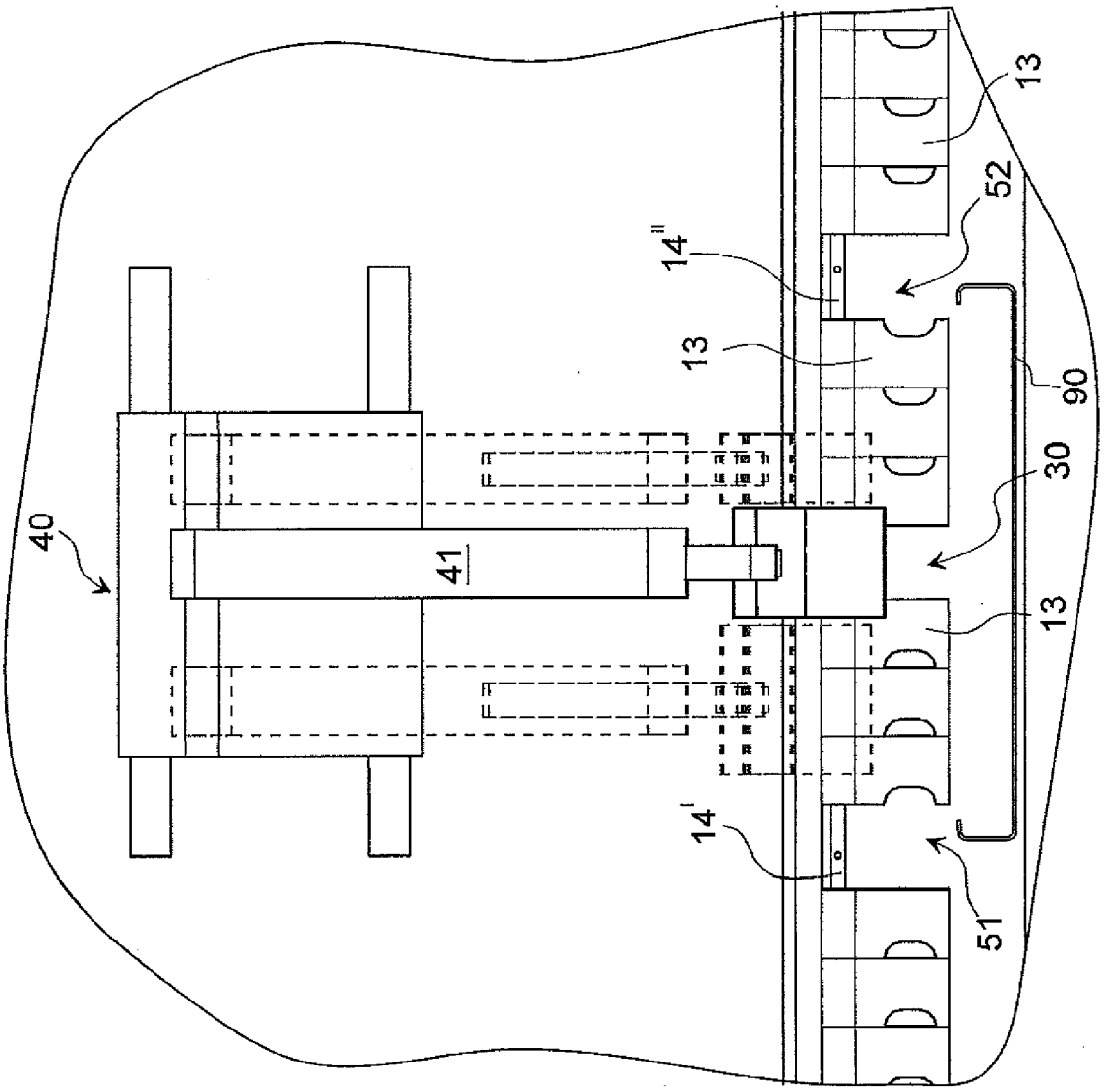

Fig.19

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EUROPEAN SEARCH REPORT

Application Number
EP 11 15 7289

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	JP 6 304660 A (NISSHIN SPINNING) 1 November 1994 (1994-11-01) * abstract; figures *	1-10	INV. B21D5/02 B21D37/02
Y	JP 7 100540 A (KOMATSU MFG CO LTD) 18 April 1995 (1995-04-18) * abstract; figures *	1-10	
Y	JP 63 207419 A (AMADA CO LTD) 26 August 1988 (1988-08-26) * abstract; figures *	1-10	
Y	CH 668 035 A5 (BEYELER MACHINES SA) 30 November 1988 (1988-11-30) * page 3; figures *	1-10	
Y	US 4 188 815 A (MIZUSHIMA AKIRA [JP]) 19 February 1980 (1980-02-19) * figure 2 *	1-10	
Y	JP 7 275941 A (AMADA CO LTD; CHIKAMOTO ENG KK) 24 October 1995 (1995-10-24) * abstract; figures *	1-10	TECHNICAL FIELDS SEARCHED (IPC) B21D
A	NL 8 800 453 A (LIET CORNELIS HENDRICUS) 18 September 1989 (1989-09-18) * figures *	1-10	
A	EP 1 160 024 A1 (AMADA CO LTD [JP]) 5 December 2001 (2001-12-05) * the whole document *	1-10	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 June 2011	Knecht, Frank

CATEGORY OF CITED DOCUMENTS

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22-06-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 6304660 A	01-11-1994	JP 3476213 B2	10-12-2003
JP 7100540 A	18-04-1995	NONE	
JP 63207419 A	26-08-1988	JP 2521742 B2	07-08-1996
CH 668035 A5	30-11-1988	NONE	
US 4188815 A	19-02-1980	DE 2844509 A1	19-04-1979
		FR 2405765 A1	11-05-1979
		JP 1081529 C	29-01-1982
		JP 54056969 A	08-05-1979
		JP 56025328 B	11-06-1981
JP 7275941 A	24-10-1995	NONE	
NL 8800453 A	18-09-1989	NONE	
EP 1160024 A1	05-12-2001	AT 460998 T	15-04-2010
		EP 2143505 A2	13-01-2010
		EP 2143506 A2	13-01-2010
		EP 2143507 A2	13-01-2010
		WO 0041824 A1	20-07-2000
		JP 4672868 B2	20-04-2011
		US 6656099 B1	02-12-2003

EPO FORM P0459

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