

(19)



(11)

EP 1 870 232 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
06.10.2010 Bulletin 2010/40

(51) Int Cl.:
B31B 3/44^(2006.01) B31B 3/46^(2006.01)

(21) Application number: **07380181.3**

(22) Date of filing: **22.06.2007**

(54) **Push head for a cardboard box forming machine**

Formstempel für eine Faltschachtelherstellungsmaschine

Poinçon pour une machine pour former des cartons

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

(30) Priority: **23.06.2006 ES 200601698**

(43) Date of publication of application:
26.12.2007 Bulletin 2007/52

(73) Proprietor: **González Olmos, Telesforo 03202 Elche Alicante (ES)**

(72) Inventor: **González Olmos, Telesforo 03202 Elche Alicante (ES)**

(74) Representative: **Gislon, Gabriele et al Torner, Juncosa i Associats, S.L. C/Gran Via de les Corts Catalanes, 669bis 1è 2º 08013 Barcelona (ES)**

(56) References cited:
DE-A1- 2 530 527 DE-A1- 4 222 461 US-A- 1 826 260

EP 1 870 232 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

Field of the Art

[0001] The present invention relates to a push head for a cardboard box forming machine starting from flat, die-cut cardboard templates.

Background of the Invention

[0002] Patent documents US-A-2798416, ES-A-0442914, ES-A-0550143, ES-A-235835-U and ES-A-255122-U disclose automatic open cardboard box assembling machines starting from flat templates, generally comprising four corner forming units arranged as vertical columns defining a molding cavity on which a flat die-cut cardboard template supplied sequentially by a feed device is horizontally introduced. The flat die-cut cardboard template is then pushed downwards by a push head joined to a moving arm of the machine, each of said corner units cooperating in the formation of the box by folding several parts of the flat cardboard template.

[0003] Spanish addition patent application N° 200402985 relating to Spanish patent application N° 200302184 describes a push head for a cardboard box forming machine comprising a support structure formed from two longitudinal side plates joined by three transverse bridges, one of which is a central bridge defining a fixing base adapted to be joined to a moving member of the machine that is able to transmit an up-down reciprocating movement to said support structure. Assembled at the ends of the side plates there are corner posts and a swiveling thruster is assembled at each of the two end bridges. The push head includes several adjustable fixing devices to adjust the relative positions of the side plates, bridges, corner posts and swiveling thrusters for the purpose of adapting the push head to different box formats and allowing operation adjustments.

[0004] Document US-A-1826260 discloses a push head, which is longitudinally, transverse and vertically adjustable.

Description of the Invention

[0005] The present invention provides a push head for a cardboard box forming machine comprising a support structure provided with a fixing base adapted to be joined to a moving member of said machine that is able to transmit an up-down movement to said support structure, four swiveling thrusters projecting from four corresponding corners of said support structure, two on one side and two others on the other opposite side in a longitudinal direction. Each swiveling thruster is individually assembled to rotate about a horizontal shaft and in cooperation with a rotation limiter which keeps it stiff so as to press against a cardboard box template during a downward movement and which allows it to pivot so as to overcome a flap of the cardboard box during an upward movement.

Adjustment means allow adjusting the distances between the swiveling thrusters in the longitudinal and transverse directions of the support structure. The support structure comprises first and second side plates arranged longitudinally on opposite sides and joined to one another by means of a transverse bridge having adjustable length and several transverse bars also having adjustable length. The mentioned transverse bridge supports the fixing base, and is assembled such that its position can be adjusted in the vertical direction in relation to the first and second side plates. The swiveling thrusters are assembled in respective supports fixed to the first and second side plates such that their position can be individually adjusted in the longitudinal direction.

[0006] This construction is simplified in relation to the push heads of the state of the art and allows precise adjustments in the longitudinal, transverse and vertical directions in a fast and practical manner.

[0007] The transverse bridge further has fixed thereto several hooks projecting above the fixing base. These hooks are adapted to engage a coupling member joined to said moving member for the purpose of temporarily supporting the push head during a push head installation or removal operation. With the push heads of the state of the art, in order to carry out, for example, a push head installation operation in the machine, one person had to support the push head with the fixing base opposite to the moving member of the machine while another person installed and tightened corresponding locking screws. With the push head of the present invention, a single operator can "hang" the push head from the moving member by means of the mentioned hooks and can then install and tighten the locking screws.

Brief Description of the Drawings

[0008] The foregoing and other features and advantages will be better understood using the following detailed description of an embodiment in reference to the attached drawings, in which:

Figure 1 is a perspective view of an embodiment of the push head of the present invention;

Figure 2 is a partial front elevational view of a transverse bridge of the push head of Figure 1 just about to be coupled to a moving member of the cardboard box assembling machine;

Figure 3 is a cross-sectional view according to the plane indicated as III-III in Figure 2;

Figure 4 is a partial plan view showing an adjustment device for adjusting the vertical position of the transverse bridge of the push head of Figure 1;

Figure 5 is a perspective view of one of the swiveling thrusters assembled in its support;

Figure 6 is a partial side elevational view showing an adjustment device for adjusting the longitudinal position of the support and swiveling thruster of Figure 5 in relation to one of the side plates;

Figure 7 is a partially sectioned side elevational view of a push head for a cardboard box forming machine according to another embodiment of the present invention;

Figure 8 is a partially sectioned plan view of the push head of Figure 7;

Figure 9 is a side view of a transverse bridge forming part of a support structure of the push head of Figures 7 and 8;

Figure 10 is a cross-sectional view according to the plane indicated as X-X in Figure 8; and

Figure 11 is a partially sectioned partial plan view showing an adjustment device for adjusting the vertical position of the transverse bridge of the push head of Figures 7 and 8.

Detailed Description of an Embodiment

[0009] Figure 1 shows a push head for a cardboard box forming machine according to an embodiment of the present invention. The push head comprises a support structure 1 formed from first and second side plates 6a, 6b arranged longitudinally on opposite sides of the structure. The mentioned first and second side plates 6a, 6b are joined to one another by a transverse bridge 8 having adjustable length and several transverse bars 7 also having adjustable length. Arranged in the transverse bridge 8 there is a fixing base 2 adapted to be joined to a moving member 3 (shown in Figures 2 and 3) of said machine. The mentioned moving member is actuated to transmit an up-down reciprocating movement to the support structure 1. The support structure 1 has a general rectangular shape with a longitudinal dimension and a transverse dimension, and is substantially symmetrical both in relation to a longitudinal vertical midplane and in relation to a transverse vertical midplane. Projecting from the four corners of the support structure 1 there are four corresponding swiveling thrusters 4, two on one side and two others on the other opposite side in the longitudinal direction.

[0010] In relation to Figures 2 and 3, the construction of the transverse bridge 8 is described below, which bridge comprises a central body 10 with an upper part in which the fixing base 2 is defined and opposite side faces 12 in which guide grooves 11 are defined. Coupled in each of such guide grooves in a sliding manner there is a first guide member 13a projecting on one side and a second guide member 13b projecting on the other opposite side. Therefore projecting from one side of the central body there are two first guide members 13a joined to the first side plate 6a in an adjustable manner in the vertical direction, and projecting from the other opposite side there are two second guide members 13b joined to the second side plate 6b in an adjustable manner in the vertical direction. The transverse bridge includes fixing means for fixing the first and second guide members 13a, 13b to the central body 10 in an adjustable manner in the transverse direction comprising round holes 22 formed

in the guide members 13a, 13b opposite to elongated holes 23 formed in the central body 10, or vice versa, said round holes 22 and corresponding elongated holes 23 are traversed by locking screws 24 screwed into screw threads formed in the round holes 22 of some of said guide members. Alternatively, the locking screws could be tightened by respective nuts. By virtue of the elongated holes 23, by loosening the mentioned locking screws 24 the first and second guide members 13a, 13b can slide along the guide grooves 11 of the central body 10 to reduce or increase the length of the transverse bridge 8 or to simply shift the central body 10 without changing the length of the transverse bridge 8.

[0011] The mentioned moving member 3 of the machine ends in a coupling member 16 adapted to be joined to the fixing base 2 of the push head. Formed in the fixing base 2 there are centering holes 18 adapted to receive corresponding centering lugs 17 projecting from the lower part of the coupling member 16, or vice versa. Formed in the fixing base 2 there are also holes 20 opposite to corresponding holes 19 existing in the coupling member 16. These holes 19, 20 are adapted for installing vertical locking screws (not shown) for joining the push head to the moving member 3.

[0012] The central body 10 has fixed thereto, for example by means of some of the same locking screws 24 joining the first and second guide members 13a, 13b to the central body 10, hooks 15 projecting above the fixing base 2. The mentioned hooks 15 are adapted to engage in the coupling member 16 joined to said moving member 3 for the purpose of temporarily supporting the push head during a push head installation or removal operation. When the push head is supported by the hooks 15 in the coupling member 16, the mentioned centering lugs 17 remain opposite to said centering holes 18, though outside of them, and the holes 19 of the coupling member 16 remain opposite to the holes 20 of the fixing base 2, as shown in Figure 2. The mentioned vertical locking screws have a suitable length to project from the lower end of the holes 20 of the fixing base 2 and to couple, for example, to corresponding nuts when the push head is supported by the hooks 15 in the coupling member 16. In this position, slowly tightening the vertical locking screws allows bringing the coupling member 16 closer to the fixing base 2 with the insertion of the centering lugs 17 in the centering holes 18 until fixedly joining the push head to the moving member 3 during a push head installation operation. Inversely, during a push head removal operation, slowly loosening the vertical locking screws allows gradually separating the coupling member 16 from the fixing base 2 with the extraction of the centering lugs 17 from the centering holes 18 until the hooks 15 rest on the coupling member 16. Therefore, by virtue of the hooks 15, a single operator can install and remove the push head easily and without making any unnecessary efforts.

[0013] In relation to Figure 4, a description is provided below of a device for joining the first and second guide members 13a, 13b to the first and second side plates 6a,

6b which allows adjusting the position of the transverse bridge 8 in the vertical direction in relation to said first and second side plates 6a, 6b. To that end, the two first guide members 13a are fixed to a first block 14a, which is assembled such that it can be shifted along a first vertical guide 25a formed or arranged in the first side plate 6a, whereas the two second guide members 13b are fixed to a second block 14b assembled such that it can be shifted along a second vertical guide 25b formed or arranged in the second side plate 6b (also see Figure 1). The first and second guide members 13a, 13b are fixed to the corresponding first and second blocks by means of screws 34. To fix the first and second blocks 14a, 14b to the first and second side plates 6a, 6b, respectively, in an adjustable manner in the vertical direction fixing means are provided comprising a trapezium-shaped groove 26 formed in each first and second block 14a, 14b in the vertical direction, each trapezium-shaped groove 26 being opposite to its corresponding first and second side plate 6a, 6b. A trapezium-shaped bar 27 is inserted in a sliding manner in each trapezium-shaped groove 26, and locking screws 28 traverse opposite holes of the corresponding trapezium-shaped bar 27 and of the first or second side plate 6a, 6b. Tightening said locking screws 28 brings each trapezium-shaped bar 27 towards the corresponding first or second side plate 6a, 6b and presses it against the vertical guide 25a, 25b, thus locking the corresponding first or second block 14a, 14b.

[0014] Each of the mentioned transverse bars 7 having adjustable length (Fig. 1) is formed by a tightener type that is well known in the state of the art, comprising two mutually aligned rods externally threaded in reverse helical directions, which are coupled by threading with corresponding screw threads formed internally in reverse helical directions in opposite portions of a through hole existing in an adjustment member adapted to be rotated manually or by means of a tool.

[0015] Now in reference to Figures 5 and 6, said figures show one of the four swiveling thrusters 4, and the description thereof can also be used for the three other swiveling thrusters 4, which are equal and/or symmetrical to the one shown in Figures 5 and 6. Each of the swiveling thrusters 4 is assembled in a respective support 9 fixed to the first or second side plate 6a, 6b such that its position can be adjusted individually in the longitudinal direction. The mentioned support 9 has an overturned U shape and comprises two opposite parallel plates between which a rear portion of the swiveling thruster 4 is arranged. A horizontal shaft 5 traversing the swiveling thruster 4 and a pin 29 adjacent thereto extend from one of the side plates of the support 9 to the other. The swiveling thruster 4 can rotate about the horizontal shaft 5 and the pin 29 acts as a rotation limiter. The longitudinal shafts 5 of two of the swiveling thrusters 4 located at the same longitudinal end of the support structure 1 can optionally be aligned and connected with the two rods forming part of one of the transverse bars 7 having adjustable length (Fig. 1).

[0016] When the push head carries out a downward movement, the rotation limiter keeps the swiveling thruster 4 stiff (as it is shown by means of continuous lines in Figure 6) to press the cardboard box template towards the inside of the molding cavity of the machine forcing the folding of the flaps for forming the open cardboard box. Then when the push head carries out an upward movement, the swiveling thruster 4 can pivot (towards the position shown by means of dotted lines in Figure 6) in order to overcome a flap of the formed cardboard box. Each swiveling thruster 4 is associated to a corresponding elastic element 33 (Fig. 1) arranged to push the swiveling thruster 4 towards the mentioned stiff position in contact with the rotation limiter pin 29.

[0017] The push head includes adjustment means to adjust the distances between the swiveling thrusters 4 in the longitudinal direction of the support structure 1. To that end, one of the two opposite parallel plates of each support 9 has threaded holes 30, which are opposite to elongated holes 31 formed in the corresponding first or second side plate 6a, 6b (Fig. 6). Locking screws 32 traverse said elongated holes 31 and are screwed in said threaded holes 30 to lock the support 9 in relation to the side plate 6a, 6b. Preferably, around the elongated holes there is a perimetral step 35 in which plates 36 provided with holes are arranged for the locking screws 32, and the locking screws 32 have heads which press against said plates 36. By virtue of the elongated holes 31 of the first and second plates 6a, 6b, loosening the locking screws 32 allows independently changing the position of each support 9 in the longitudinal direction in relation to the corresponding first and second side plates 6a, 6b, and tightening the locking screws 32 allows locking each support 9 in relation to the first or second side plates 6a, 6b.

[0018] Now in reference to Figures 7 to 11, another alternative embodiment of the push head of the present invention is described below, and the same reference numbers are used to designate equal or equivalent features as those in the embodiment described above in relation to Figures 1 to 6. The principal difference of the push head shown in Figures 7 to 11 is that the first and second longitudinal side plates 6a, 6b of the support structure 1 therein are formed by respective first and second central portions 61a, 61b and respective first and second end portions 62a, 62b. The mentioned first and second central portions 61a, 61b are joined to opposite ends of said transverse bridge 8, and said first and second end portions 62a, 62b are joined to opposite sides of their corresponding central portion 61a, 61b by connecting members 63a, 63b having adjustable length. Given that in this embodiment, the supports 9 in which the swiveling thrusters 4 are assembled are fixed to the first and second end portions 62a, 62b, an adjustment of the length of the mentioned connecting members 63a, 63b allows adjusting the length of the push head determined by the positions of the swiveling thrusters 4. Furthermore, each of the supports 9 of the swiveling thrusters 4 is fixed

to its corresponding end portion 62a, 62b by means including screws traversing elongated holes 31 (Fig. 7) similar to those described above in relation to Figure 6, such that the position of each of the swiveling thrusters 4 can be additionally adjusted in the longitudinal direction in relation to its corresponding end portion 62a, 62b.

[0019] In this embodiment, the first and second central portions 61a, 61b of the side plates 6a, 6b are metallic, for example steel or aluminum, and each of the mentioned connecting members 63a, 63b comprises a slider rail 64a, 64b rigidly fixed at one of its ends, preferably by welding, to the corresponding central portion 61a, 61b of the side plate 6a, 6b. Each slider rail 64a, 64b is inserted in a sliding manner in a groove defined in a guide part 65a, 65b, which in turn is fixed to its corresponding first or second end portion 62a, 62b of the side plate 6a, 6b. Each guide part 65a, 65b has holes 66 adapted for installing locking screws cooperating with elongated holes 67 formed in said slider rail 64a, 64b for fixing the slider rail 64a, 64b to the sliding guide part 65a, 65b in a selected position when said screws are tightened. Therefore, by sliding the slider rails 64a, 64b more or less in relation to the guide parts 65a, 65b and fixing their relative position by means of the mentioned screws, it is possible to adjust the longitudinal dimension of the push head.

[0020] In this embodiment, the first and second end portions 62a, 62b of the side plates 6a, 6b are made of a plastic material, and each guide part 65a, 65b is coupled in a sliding manner in a recessed area 70 of the corresponding first or second end portion 62a, 62b (Fig. 7). For the fixing thereof, the guide part 65a, 65b has holes 68 adapted for installing locking screws cooperating with elongated holes 69 formed in the first or second end portion 62a, 62b for fixing the guide part 65a, 65b to the first or second end portion 62a, 62b in a selected position, which provides the possibility of an additional adjustment of the dimension of the push head in the longitudinal direction.

[0021] Here the transverse bars 7 having adjustable length are connected at their ends to the first and second end portions 62a, 62b. Preferably, and in a manner that is similar to that of the first embodiment, two of these transverse bars 7 having adjustable length, namely those which are located at a lower level, are connected at their ends to the supports 9, which in turn are fixed to the corresponding first and second end portions 62a, 62b as described above.

[0022] The transverse bridge 8 is formed by a central body 10 and first and second guide members 13a, 13b. However, as is best shown in Figure 10, another difference of this embodiment shown in Figures 7 to 11 in relation to the first embodiment shown in Figures 1 to 6 is that here each of the mentioned guide grooves 11 of the central body 10 has sufficient depth so as to house, mutually overlapped, the mentioned first and second guide members 13a, 13b, such that the first and second guide members 13a, 13b can slide in their guide groove with respect to one another and in turn with respect to

the central body 10. As shown in Figure 9, the first guide members 13a have elongated holes 71a and the second guide members 13b also have elongated holes 71b, which, in an operative position, partially overlap the mentioned elongated holes 71a of first guide members 13a. The overlapping area of the elongated holes 71a, 71b of the first and second guide members 13a, 13b is opposite to a transverse hole 72 formed in the central body 10. Therefore, a locking screw installed through said transverse hole 72 and said elongated holes 71a, 71b can be tightened to fix the first and second guide members 13a, 13b to the central body 10 in selected positions. The overlapping arrangement of the first and second guide members 13a, 13b and of the elongated holes 71a, 72a provides this second embodiment with greater adjustment capacity of the transverse dimension of the push head in comparison with the first embodiment.

[0023] As shown in Figure 8, the first and second guide members 13a, 13b are fixed at their ends farthest from the central body 10 to respective first and second blocks 14a, 14b, which are assembled such that they can be shifted along corresponding first and second vertical guides 25a, 25b formed in the first and second central portions 61a, 61b. Fixing means are arranged for fixing the positions of the first and second blocks 14a, 14b in relation to the first and second central portions 61a, 61b, respectively, whereby providing a possibility of adjusting the vertical position of the push head in relation to the moving member 3 of the cardboard box assembling machine.

[0024] As is best shown in Figure 11, the mentioned fixing means comprise, for each side plate 6a, 6b, a trapezium-shaped bar 27 inserted in a sliding manner in a corresponding trapezium-shaped groove 26 formed in the corresponding first or second block 14a. A series of threaded holes are formed along said trapezium-shaped bar 27, which holes are opposite to a series of holes formed in the corresponding first or second central portion 61a, 61b of the first or second side plate 6a, 6b. Locking screws 28 are inserted through said opposite holes, which locking screws, when tightened, bring the trapezium-shaped bar 27 towards the corresponding first or second central portion 61a, 61b and press it against the vertical guide 25a, 25b, thus locking the corresponding first or second block 14a, 14b. Figure 11 only shows the fixing means on one side of the push head, given that the fixing means on the opposite side are identical.

[0025] A person skilled in the art may devise variations and modifications to the embodiment that has been shown and described without departing from the scope of the present invention as it is defined in the attached claims.

55 Claims

1. A push head for a cardboard box forming machine, of the type comprising a support structure (1) pro-

- vided with a fixing base (2) adapted to be joined to a moving member (3) of said machine that is able to transmit an up-down movement to said support structure (1), four swiveling thrusters (4) projecting from four corresponding corners of said support structure (1), two on one side and two others on the other opposite side in a longitudinal direction, each swiveling thruster (4) being individually assembled to rotate about a horizontal shaft (5) and in cooperation with a rotation limiter which keeps it stiff to press against a cardboard box template during a downward movement and which allows it to pivot to overcome a flap of the cardboard box during an upward movement, and adjustment means to adjust the distances between the swiveling thrusters (4) in the longitudinal and transverse directions of the support structure (1), **characterized in that** the support structure (1) comprises first and second longitudinal side plates (6a, 6b) on opposite sides in the transverse direction joined to one another by a transverse bridge (8) having adjustable length and several transverse bars (7) having adjustable length, in which said transverse bridge (8) supports said fixing base (2) and is assembled such that its position can be adjusted in the vertical direction in relation to said first and second side plates (6a, 6b), and in which the swiveling thrusters (4) are assembled in respective supports (9) fixed to the first and second side plates (6a, 6b) such that their position can be individually adjusted in the longitudinal direction.
2. A push head according to claim 1, **characterized in that** the transverse bridge (8) has fixed thereto hooks (15) projecting above the fixing base (2), said hooks (15) being adapted to engage in a coupling member (16) joined to said moving member (3) for the purpose of temporarily supporting the push head during a push head installation or removal operation.
 3. A push head according to claim 1, **characterized in that** said transverse bridge (8) comprises a central body (10) defining the fixing base (2) in an upper part and at least one guide groove (11) adapted to receive in one side at least one first guide member (13a) joined to the first side plate (6a) in an adjustable manner in the vertical direction, and on an opposite side at least one second guide member (13b) joined to the second side plate (6b) in an adjustable manner in the vertical direction, fixing means being provided for fixing the first and second guide members (13a, 13b) to the central body (10) in an adjustable manner in the transverse direction.
 4. A push head according to claim 3, **characterized in that** the central body (10) has fixed thereto hooks (15) projecting above the fixing base (2), said hooks (15) being adapted to engage a coupling member (16) joined to said moving member (3) for the purpose of temporarily supporting the push head during a push head installation or removal operation.
 5. A push head according to claim 4, **characterized in that** said coupling member (16) comprises centering lugs (17) adapted to fit in centering holes (18) formed in the fixing base (2), or vice versa, said centering lugs (17) being opposite to said centering holes (18) outside of them when the push head is supported by the hooks (15) in the coupling member (16).
 6. A push head according to claim 5, **characterized in that** the coupling member (16) comprises holes (19) opposite to corresponding holes (20) formed in the fixing base (2), said holes (19, 20) being adapted for installing vertical locking screws of a suitable length to allow bringing the coupling member (16) closer to the fixing base (2) with the insertion of the centering lugs (17) in the centering holes (18) until fixedly joining them when said vertical locking screws are tightened during a push head installation operation and to allow separating the coupling member (16) from the fixing base (2) with the extraction of the centering lugs (17) from the centering holes (18) until the hooks (15) rest on the coupling member (16) when said vertical locking screws are loosened during a push head removal operation.
 7. A push head according to claim 3, **characterized in that** the central body (10) comprises two of said guide grooves (11) formed in opposite side faces (12) thereof, two of said first guide members (13a) fixed to a first block (14a) assembled such that it can be shifted along a first vertical guide (25a) arranged in the first side plate (6a), two of said second guide members (13b) fixed to a second block (14b) assembled such that it can be shifted along a second vertical guide (25b) arranged in the second side plate (6b), and fixing means for fixing the first and second blocks (14a, 14b) to the first and second side plates (6a, 6b), respectively, in an adjustable manner in the vertical direction.
 8. A push head according to claim 7, **characterized in that** said fixing means for fixing the first and second guide members (13a, 13b) to the central body (10) comprise round holes (22) formed in the guide members (13a, 13b) opposite to elongated holes (23) formed in the central body (10), or vice versa, and locking screws (24) traversing said round holes (22) and corresponding elongated holes (23) and adapted to be tightened by a nut or screwed into screw threads formed in some of said round holes (22).
 9. A push head according to claim 7, **characterized in that** said fixing means for fixing the first and second blocks (14a, 14b) to the first and second side plates (6a, 6b), respectively, comprise a trapezium-shaped

groove (26) formed in each first and second block (14a, 14b) in the vertical direction and opposite to the corresponding first and second side plate (6a, 6b), a trapezium-shaped bar (27) inserted in a sliding manner in each trapezium-shaped groove (26), and locking screws (28) traversing opposite holes of the corresponding trapezium-shaped bar (27) and first or second side plate (6a, 6b) to press each trapezium-shaped bar (27) towards the corresponding first or second side plate (6a, 6b), locking the corresponding first or second block (14a, 14b).

10. A push head according to claim 1 or 2, **characterized in that** said support (9) of each thrusting element (4) has an overturned U shape and comprises two opposite parallel plates between which said horizontal shaft (5) and a pin (29) acting as said rotation limiter extend.

11. A push head according to claim 10, **characterized in that** one of said opposite parallel plates of each support (9) has formed threaded holes (30) opposite to elongated holes (31) formed in the corresponding first or second side plate (6a, 6b), locking screws (32) being installed, traversing said elongated holes (31) and screwed in said threaded holes (30) to lock the support (9) in relation to the side plate (6a, 6b).

12. A push head according to claim 10, **characterized in that** each swiveling thruster (4) is associated to a corresponding elastic element (33) arranged to push the swiveling thruster (4) to said rigid position determined by contact of the swiveling thruster (4) against said rotation limiter pin (29).

13. A push head according to claim 1 or 2, **characterized in that** each of said transverse bars (7) having adjustable length comprises two rods externally threaded in reverse helical directions, mutually aligned and coupled by threading in corresponding screw threads formed internally in reverse helical directions in opposite portions of a through hole existing in an adjustment member adapted to be rotated manually or by means of a tool.

14. A push head according to any one of claims 1 to 13, **characterized in that** said first and second longitudinal side plates (6a, 6b) of the support structure (1) comprise respective first and second central portions (61a, 61b) and respective first and second end portions (62a, 62b), in which:

said first and second central portions (61a, 61b) are joined to opposite ends of said transverse bridge (8);

said first and second end portions (62a, 62b) are joined to opposite sides of their corresponding central portion (61a, 61b) by connecting mem-

bers (63a, 63b) having adjustable length; said supports (9), in which the swiveling thrusters (4) are assembled, are fixed to the first and second end portions (62a, 62b); and said transverse bars (7) having adjustable length are connected at their ends to the first and second end-portions (62a, 62b).

15. A push head according to claim 14, **characterized in that** at least two of the transverse bars (7) having adjustable length are connected at their ends to the supports (9), which in turn are fixed to the corresponding first and second end portions (62a, 62b).

16. A push head according to claim 14, **characterized in that** each of said connecting members (63a, 63b) having adjustable length comprises a slider rail (64a, 64b) fixed at one of its ends to the corresponding central portion (61a, 61b) and inserted in a sliding manner in a guide part (65a, 65b) fixed to its corresponding first or second end portion (62a, 62b), said guide part (65a, 65b) having holes (66) adapted for installing locking screws cooperating with elongated holes (67) formed in said slider rail (64a, 64b) for fixing the slider rail (64a, 64b) to the sliding guide part (65a, 65b) in a selected position.

17. A push head according to claim 16, **characterized in that** each guide part (65a, 65b) is coupled in a sliding manner in a recessed area (70) of the corresponding first or second end portion (62a, 62b), and the guide part (65a, 65b) has holes (68) adapted for installing locking screws cooperating with elongated holes (69) formed in the first or second end portion (62a, 62b) for fixing the guide part (65a, 65b) to the first or second end portion (62a, 62b) in a selected position.

18. A push head according to claim 14, **characterized in that** each of said guide grooves (11) of the central body (10) has sufficient depth so as to house, mutually overlapped, the first and second guide members (13a, 13b), such that the first and second guide members (13a, 13b) can slide with respect to one another and with respect to the central body (10), and the first and second guide members (13a, 13b) have respective elongated holes (71a, 71b) partially overlapping and opposite to a transverse hole (72) formed in the central body (10), a locking screw being installed through said transverse hole (72) and said elongated holes (71a, 71b) for fixing the first and second guide members (13a, 13b) to the central body (10) in selected positions.

19. A push head according to claim 18, **characterized in that** the first and second guide members (13a, 13b) are fixed to respective first and second blocks (14a, 14b) assembled such that they can be shifted

along corresponding first and second vertical guides (25a, 25b) formed in the first and second central portions (61a, 61b), and fixing means are arranged for fixing the positions of the first and second blocks (14a, 14b) in relation to the first and second central portions (61a, 61b), respectively, in an adjustable manner in the vertical direction.

Patentansprüche

1. Schiebekopf für eine Kartonformmaschine, derart umfassend eine Stützstruktur (1), welche mit einem Fixierboden (1) versehen ist, der dazu angepasst ist, mit einem beweglichen Glied (3) der genannten Maschine verbunden zu werden, welches eine Auf- und Abwärtsbewegung auf die genannte Stützstruktur (1) übertragen kann, vier Schwenkschubvorrichtungen (4), welche an vier entsprechenden Ecken der genannten Stützstruktur (1) überstehen, zwei auf einer Seite und weitere zwei auf der anderen gegenüberliegenden Seite in Längsrichtung, wobei jede Schwenkschubvorrichtung (4) individuell zusammengebaut ist, um sich um eine horizontale Welle (5) und zusammen mit einer Dreh Sperre zu drehen, welche sie starr hält, um während einer Abwärtsbewegung gegen eine Kartonschablone gepresst zu werden, und welche ihr ein Schwenken ermöglicht, um eine Klappe des Kartons während einer Aufwärtsbewegung zu überwinden, und Stellmittel zum Einstellen der Abstände zwischen den Schwenkschubvorrichtungen (4) in der Längs- und Querrichtung der Stützstruktur (1), **dadurch gekennzeichnet, dass** die Stützstruktur (1) eine erste und eine zweite Längsseitenplatte (6a, 6b) auf gegenüberliegenden Seiten in der Querrichtung umfasst, welche miteinander durch einen Quersteg (8) mit einstellbarer Länge und mehrere Querstangen (7) mit einstellbarer Länge verbunden sind, wobei der genannte Quersteg (8) den genannten Fixierboden (2) trägt und derart zusammengebaut ist, dass seine Position in vertikaler Richtung in Bezug auf die genannte erste und zweite Seitenplatte (6a, 6b) eingestellt werden kann, und wobei die Schwenkschubvorrichtungen (4) in jeweiligen Stützen (9) zusammengebaut sind, welche an der ersten und zweiten Seitenplatte (6a, 6b) fixiert sind, so dass ihre Position individuell in Längsrichtung eingestellt werden kann.
2. Schiebekopf nach Anspruch 1, **dadurch gekennzeichnet, dass** an dem Quersteg (8) Haken (15) fixiert sind, welche über den Fixierboden (2) überstehen, wobei die genannten Haken (15) dazu angepasst sind, in ein Koppelglied (16) einzugreifen, welches mit dem genannten beweglichen Glied (3) verbunden ist, um den Schiebekopf während eines Installations- oder Entfernungsvorgangs des Schiebekopfs vorübergehend zu stützen.
3. Schiebekopf nach Anspruch 1, **dadurch gekennzeichnet, dass** der genannte Quersteg (8) einen zentralen Körper (10) umfasst, welcher den Fixierboden (2) in einem oberen Teil definiert, und zumindest eine Führungsnut (11), welche dazu angepasst ist, auf einer Seite zumindest ein erstes Führungsglied (13a) aufzunehmen, welches mit der ersten Seitenplatte (6a) in vertikaler Richtung verstellbar verbunden ist, und auf einer gegenüberliegenden Seite zumindest ein zweites Führungsglied (13b), welches mit der zweiten Seitenplatte (6b) in vertikaler Richtung verstellbar verbunden ist, wobei Fixiermittel zum in Querrichtung einstellbaren Fixieren des ersten und zweiten Führungsglieds (13a, 13b) an dem zentralen Körper (10) vorgesehen sind.
4. Schiebekopf nach Anspruch 3, **dadurch gekennzeichnet, dass** an dem zentralen Körper (10) Haken (15) fixiert sind, welche über den Fixierboden (2) überstehen, wobei die genannten Haken (15) dazu angepasst sind, in ein Koppelglied (16) einzugreifen, welches mit dem genannten beweglichen Glied (3) verbunden ist, um den Schiebekopf während eines Installations- oder Entfernungsvorgangs des Schiebekopfs vorübergehend zu stützen.
5. Schiebekopf nach Anspruch 4, **dadurch gekennzeichnet, dass** das genannte Koppelglied (16) Zentrieransätze (17) umfasst, welche dazu angepasst sind, in dem Fixierboden (2) gebildete Zentrierlöcher (18) eingepasst zu werden, bzw. umgekehrt, wobei die genannten Zentrieransätze (17) den genannten Zentrierlöchern (18) gegenüberliegen, außerhalb derselbigen, wenn der Schiebekopf durch die Haken (15) in dem Koppelglied (16) gestützt wird.
6. Schiebekopf nach Anspruch 5, **dadurch gekennzeichnet, dass** das Koppelglied (16) Löcher (19) umfasst, welche entsprechenden, in dem Fixierboden (2) gebildeten Löchern (20) gegenüberliegen, wobei die genannten Löcher (19, 20) dazu angepasst sind, vertikale Feststellschrauben geeigneter Länge zu installieren, um ein Annähern des Koppelglieds (16) an den Fixierboden (2) mit einem Einsetzen der Zentrieransätze (17) in die Zentrierlöcher (18) zu ermöglichen, bis diese fest verbunden sind, wenn die genannten vertikalen Feststellschrauben während eines Installationsvorgangs des Schiebekopfs angezogen werden, und um ein Trennen des Koppelglieds (16) von dem Fixierboden (2) mit einem Herausziehen der Zentrieransätze (17) aus den Zentrierlöchern (18) zu ermöglichen, bis die Haken (15) auf dem Koppelglied (16) aufliegen, wenn die genannten vertikalen Feststellschrauben während eines Entfernungsvorgangs des Schiebekopfs gelöst werden.
7. Schiebekopf nach Anspruch 3, **dadurch gekennzeichnet,**

- zeichnet, dass** der zentrale Körper (10) zwei der genannten Führungsnuten (11) umfasst, welche in gegenüberliegenden Seitenflächen (12) desselbigen gebildet sind, des Weiteren zwei der genannten ersten Führungsglieder (13a), welche an einem ersten Block (14a) fixiert sind, welcher derart zusammengebaut ist, dass er entlang einer ersten, in der ersten Seitenplatte (6a) angeordneten Vertikalführung (25a) verschoben werden kann, des Weiteren zwei der genannten zweiten Führungsglieder (13b), welche an einem zweiten Block (14b) fixiert sind, welcher derart zusammengebaut ist, dass er entlang einer zweiten, in der zweiten Seitenplatte (6b) angeordneten Vertikalführung (25b) verschoben werden kann, sowie Fixiermittel zum in vertikaler Richtung einstellbaren Fixieren des ersten und zweiten Blocks (14a, 14b) jeweils an der ersten und zweiten Seitenplatte (6a, 6b).
8. Schiebekopf nach Anspruch 7, **dadurch gekennzeichnet, dass** die genannten Fixiermittel zum Fixieren des ersten und zweiten Führungsglieds (13a, 13b) an dem zentralen Körper (10) Rundlöcher (22) umfassen, welche in den Führungsgliedern (13a, 13b) gegenüber von Langlöchern (23) gebildet sind, welche wiederum in dem zentralen Körper (10) gebildet sind, bzw. umgekehrt, sowie Feststellschrauben (24), welche die genannten Rundlöcher (22) und entsprechende Langlöcher (23) durchqueren, und welche dazu angepasst sind, durch eine Mutter angezogen zu werden, oder in Schraubengewinde, welche in einigen der genannten Rundlöcher (22) gebildet sind, eingeschraubt zu werden.
9. Schiebekopf nach Anspruch 7, **dadurch gekennzeichnet, dass** die genannten Fixiermittel zum Fixieren des ersten und zweiten Blocks (14a, 14b) jeweils an der ersten und zweiten Seitenplatte (6a, 6b) eine trapezförmige Nut (26) umfassen, welche in jedem ersten und zweiten Block (14a, 14b) in vertikaler Richtung und gegenüber der entsprechenden ersten und zweiten Seitenplatte (6a, 6b) gebildet ist, des Weiteren eine trapezförmige Stange (27), welche gleitend in jede trapezförmige Nut (26) eingesetzt ist, sowie Feststellschrauben (28), welche gegenüberliegende Löcher der entsprechenden trapezförmigen Stange (27) und der ersten oder zweiten Seitenplatte (6a, 6b) durchqueren, um jede trapezförmige Stange (27) zu der entsprechenden ersten oder zweiten Seitenplatte (6a, 6b) zu pressen, wobei der entsprechende erste oder zweite Block (14a, 14b) blockiert wird.
10. Schiebekopf nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die genannte Stütze (9) jedes Schubelements (4) die Form eines umgedrehten U's hat, und zwei gegenüberliegende, parallele Platten, zwischen welchen sich die genannte horizontale Welle (5) und ein Bolzen (29), welcher als die genannte Drehsperre fungiert, erstrecken.
11. Schiebekopf nach Anspruch 10, **dadurch gekennzeichnet, dass** in einer der genannten gegenüberliegenden, parallelen Platten jeder Stütze (9) Gewindebohrungen (30) gebildet sind, welche Langlöchern (31) gegenüberliegen, welche wiederum in der entsprechenden ersten oder zweiten Seitenplatte (6a, 6b) gebildet sind, wobei Feststellschrauben (32) installiert sind, welche die genannten Langlöcher (31) durchqueren und in den genannten Gewindebohrungen (30) eingeschraubt sind, um die Stütze (9) in Bezug auf die Seitenplatte (6a, 6b) festzustellen.
12. Schiebekopf nach Anspruch 10, **dadurch gekennzeichnet, dass** jede Schwenkschubvorrichtung (4) einem entsprechenden elastischen Element (33) zugeordnet ist, welches angeordnet ist, um die Schwenkschubvorrichtung (4) zu der genannten starren Position zu schieben, welche durch den Kontakt der Schwenkschubvorrichtung (4) gegen den genannten Drehsperrbolzen (29) bestimmt ist.
13. Schiebekopf nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** jede der genannten Querstangen (7) mit einstellbarer Länge zwei Stäbe umfasst, welche ein äußeres Gewinde mit umgekehrten Spiralrichtungen aufweisen, welche zueinander fluchten und durch Einschrauben in entsprechende Schraubengewinde gekoppelt sind, welche im Inneren in umgekehrten Spiralrichtungen in gegenüberliegenden Teilen einer Durchgangsbohrung gebildet sind, welche sich in einem Stellglied befindet, welches dazu angepasst ist, von Hand oder durch ein Werkzeug gedreht zu werden.
14. Schiebekopf nach einem der Ansprüche 1 bis 13, **dadurch gekennzeichnet, dass** die genannte erste und zweite Längsseitenplatte (6a, 6b) der Stützstruktur (1) einen jeweiligen ersten und zweiten zentralen Teil (61a, 61b) und einen jeweiligen ersten und zweiten Endteil (62a, 62b) umfassen, in welchen:
- der genannte erste und zweite zentrale Teil (61a, 61b) mit gegenüberliegenden Enden des genannten Querstegs (8) verbunden ist; der genannte erste und zweite Endteil (62a, 62b) mit gegenüberliegenden Seiten seines entsprechenden zentralen Teils (61a, 61b) durch Anschlussglieder (63a, 63b) mit einstellbarer Länge verbunden ist; die genannten Stützen (9), in welchen die Schwenkschubvorrichtungen (4) zusammengebaut sind, an dem ersten und zweiten Endteil (62a, 62b) fixiert sind; und

die genannten Querstangen (7) mit einstellbarer Länge an ihren Enden an den ersten und zweiten Endteil (62a, 62b) angeschlossen sind.

15. Schiebekopf nach Anspruch 14, **dadurch gekennzeichnet, dass** zumindest zwei der Querstangen (7) mit einstellbarer Länge an ihren Enden an die Stützen (9) angeschlossen sind, welche wiederum an dem entsprechenden ersten und zweiten Endteil (62a, 62b) fixiert sind.

16. Schiebekopf nach Anspruch 14, **dadurch gekennzeichnet, dass** jedes der genannten Anschlussglieder (63a, 63b) mit einstellbarer Länge eine Gleitschiene (64a, 64b) umfasst, welche an einem ihrer Enden an dem entsprechenden zentralen Teil (61a, 61b) fixiert und gleitend in einem Führungsteil (65a, 65b) eingesetzt ist, welcher an seinem entsprechenden ersten oder zweiten Endteil (62a, 62b) fixiert ist, wobei der genannte Führungsteil (65a, 65b) Löcher (66) hat, welche zum Installieren von Feststellschrauben angepasst sind, welche mit in der genannten Gleitschiene (64a, 64b) gebildeten Langlöchern (67) zusammenwirken, um die Gleitschiene (64a, 64b) an dem gleitenden Führungsteil (65a, 65b) in einer ausgewählten Position zu fixieren.

17. Schiebekopf nach Anspruch 16, **dadurch gekennzeichnet, dass** jeder Führungsteil (65a, 65b) gleitend in einem ausgesparten Bereich (70) des entsprechenden ersten oder zweiten Endteils (62a, 62b) gekoppelt ist, und dass der Führungsteil (65a, 65b) Löcher (68) hat, welche zum Installieren von Feststellschrauben angepasst sind, welche mit in dem ersten oder zweiten Endteil (62a, 62b) gebildeten Langlöchern (69) zusammenwirken, um den Führungsteil (65a, 65b) an dem ersten oder zweiten Endteil (62a, 62b) in einer ausgewählten Position zu fixieren.

18. Schiebekopf nach Anspruch 14, **dadurch gekennzeichnet, dass** jede der genannten Führungsnuten (11) des zentralen Körpers (10) eine ausreichende Tiefe hat, um das erste und zweite Führungsglied (13a, 13b) derart aufzunehmen, dass sie sich gegenseitig überlappen, so dass das erste und zweite Führungsglied (13a, 13b) in Bezug auf das andere und in Bezug auf den zentralen Körper (10) gleiten kann, und dass das erste und zweite Führungsglied (13a, 13b) ein jeweiliges Langloch (71a, 71b) hat, welche sich gegenseitig teilweise überlappen, und welche einem Querloch (72) gegenüberliegen, welches in dem zentralen Körper (10) gebildet ist, wobei eine Feststellschraube durch das genannte Querloch (72) und durch die genannten Langlöcher (71a, 71b) hindurch installiert ist, um das erste und zweite Führungsglied (13a, 13b) an dem zentralen Körper (10) in ausgewählten Positionen zu fixieren.

19. Schiebekopf nach Anspruch 18, **dadurch gekennzeichnet, dass** das erste und zweite Führungsglied (13a, 13b) an einem jeweiligen ersten und zweiten Block (14a, 14b) fixiert ist, welche derart zusammengebaut sind, dass sie entlang einer entsprechenden ersten und zweiten Vertikalführung (25a, 25b) verschoben werden können, welche in dem ersten und zweiten zentralen Teil (61a, 61b) gebildet sind, und dass Fixiermittel angeordnet sind, um die Positionen des ersten und zweiten Blocks (14a, 14b) in Bezug auf das jeweils erste und zweite zentrale Teil (61a, 61b) in vertikaler Richtung verstellbar zu fixieren.

15 Revendications

1. Une tête pousseuse pour une machine à former des boîtes en carton du genre comportant une structure de support (1) munie d'une base de fixation (2) adaptée pour être reliée à un membre mobile (3) de cette machine capable de transmettre un mouvement montant et descendant à cette structure de support (1), quatre poussoirs pivotants (4) se projetant des quatre coins correspondants de cette structure de support (1), deux sur un côté et deux autres sur le côté opposé en direction longitudinale, chaque poussoir pivotant (4) étant individuellement assemblé pour tourner autour d'un axe horizontal (5) et en coopération avec un limiteur de rotation le maintenant raide pour être pressé contre une règle guide de boîte en carton durant un mouvement descendant et lui permettant de pivoter pour éviter le volet de la boîte en carton durant un mouvement ascendant et des moyens de réglage pour régler les écarts entre les poussoirs pivotants (4) dans les directions longitudinale et transversale de la structure de support (1), **caractérisée en ce que** la structure de support (1) comporte des première et deuxième plaques latérales longitudinales (6a, 6b) sur les côtés opposés en direction transversale reliées l'une à l'autre par un pont transversal (8) ayant une longueur réglable et plusieurs barres transversales (7) ayant des longueurs réglables dans lesquelles ce pont transversal (8) soutient cette base fixe (2) et est assemblé de sorte que sa position puisse être réglée en direction verticale par rapport à ces première et deuxième plaques latérales (6a, 6b) et dans lesquelles les poussoirs pivotants (4) sont assemblés dans des supports respectifs (9) fixés aux première et deuxième plaques latérales (6a, 6b) de sorte que leur position puisse être réglée individuellement en direction longitudinale.
2. Une tête pousseuse conformément à la revendication 1, **caractérisée en ce que** le pont transversal (8) porte des crochets qui y sont fixés (15) se projetant au-dessus de la base de fixation (2), ces crochets (15) étant adaptés pour s'engager dans un

membre d'accouplement (16) relié à ce membre mobile (3) à l'effet de soutenir temporairement la tête pousseuse durant l'installation ou le retrait de cette tête pousseuse.

3. Une tête pousseuse conformément à la revendication 1, **caractérisée en ce que** ce pont transversal (8) comporte un corps central (10) définissant la base de fixation (2) dans une partie supérieure et au moins une rainure guide (11) adaptée pour recevoir sur un côté au moins un premier membre guide (13a) relié à la première plaque latérale (6a) de façon réglable en direction verticale et sur un côté opposé au moins un deuxième membre guide (13b) relié à la deuxième plaque latérale (6b) réglable dans la direction verticale, des moyens de fixation étant prévus pour fixer les premier et deuxième membres guides (13a, 13b) au corps central (10) réglable en direction transversale.
4. Une tête pousseuse conformément à la revendication 3, **caractérisée en ce que** le corps central (10) porte des crochets qui y sont fixés (15) se projetant au-dessus de la base de fixation (2), ces crochets (15) étant adaptés pour s'engager dans un membre d'accouplement (16) relié à ce membre mobile (3) à l'effet de soutenir temporairement la tête pousseuse durant l'installation ou le retrait de cette tête pousseuse.
5. Une tête pousseuse conformément à la revendication 4, **caractérisée en ce que** ce membre d'accouplement (16) comporte des écrous de centrage (17) adaptés pour être insérés dans ces trous de centrage (18) formés dans la base de fixation (2) ou vice versa, ces écrous de centrage (17) étant opposés à ces trous de centrage (18) au-dehors d'eux lorsque la tête pousseuse es soutenue par les crochets (15) dans le membre d'accouplement (16).
6. Une tête pousseuse conformément à la revendication 5, **caractérisée en ce que** le membre d'accouplement (16) comporte des trous (19) opposés aux trous correspondants (20) formés dans la base de fixation (2), ces trous (19, 20) étant adaptés pour installer ces vis de fixation verticale ayant une longueur appropriée pour permettre de rapprocher le membre d'accouplement (16) de la base de fixation (2) en insérant les écrous de centrage (17) dans les trous de centrage (18) jusqu'à les relier fixes lorsque ces vis de fixation verticales sont serrées durant l'opération d'installation de la tête pousseuse et permettre d'écarter le membre d'accouplement (16) de la base de fixation (2) avec l'extraction des écrous de centrage (17) des trous de centrage (18) jusqu'à ce que les crochets (15) reposent sur le membre d'accouplement (16) lorsque ces vis de fixation verticales sont desserrées durant une opération de re-

trait de la tête pousseuse.

7. Une tête pousseuse conformément à la revendication 3, **caractérisée en ce que** le corps central (10) comporte deux de ces rainures guides (11) formées sur des faces latérales opposées (12) de celle-ci, deux de ces premiers membres guides (13a) fixés sur un premier bloc (14a) assemblé de sorte qu'il puisse être pivoté le long d'un premier guide vertical (25a) aménagé dans la première plaque latérale (6a), deux de ces deuxième membres guides (13b) fixés sur un deuxième bloc (14b) assemblé de sorte qu'il puisse être pivoté le long d'un deuxième guide vertical (25a) aménagé dans la deuxième plaque latérale (6b) et des moyens de fixation pour fixer les premier et deuxième blocs (14a, 14b) aux première et deuxième plaques latérales (6a, 6b), respectivement, de façon réglable en direction verticale.
8. Une tête pousseuse conformément à la revendication 7, **caractérisée en ce que** ces moyens de fixation pour fixer les premier et deuxième membres guides (13a, 13b) au corps central (10) comportent des trous ronds (22) formés dans les membres guides (13a, 13b) opposés aux trous oblongs (23) formés dans le corps central (10) ou vice versa, et des vis de fixation (24) traversant ces trous ronds (22) et des trous oblongs correspondants (23) et adaptés pour être serrées par un écrou ou bien vissées dans des filets de certains de ces trous ronds (22).
9. Une tête pousseuses conformément à la revendication 7, **caractérisée en ce que** ces moyens de fixation pour fixer les premier et deuxième blocs (14a, 14b) aux première et deuxième plaques latérales (6a, 6b), respectivement, comporte une rainure à forme de trapèze (26) formée dans chaque premier et deuxième bloc (14a, 14b) dans la direction verticale et opposées à la première et deuxième plaque latérale correspondante (6a, 6b), une barre à forme de trapèze (27) insérée coulissante dans chaque rainure à forme de trapèze (26) et des vis de fixation (28) traversant des trous opposés de la barre à forme de trapèze correspondante (27) et une première ou deuxième plaque latérale (6a, 6b) pour presser chaque barre à forme de trapèze (27) vers la première ou deuxième plaque latérale correspondante (6a, 6b), en fixant le premier ou deuxième bloc correspondant (14a, 14b).
10. Une tête pousseuse conformément à la revendication 1 ou 2 **caractérisée en ce que** ce support (9) de chaque élément pousseur (4) a une forme en U inversé et comporte deux plaques parallèles opposées entre lesquelles cet axe horizontal (5) et une cheville (29) agissant comme limiteur de rotation s'étendent.

11. Une tête pousseuse conformément à la revendication 10, **caractérisée en ce qu'**une de ces plaques parallèles opposées de chaque support (9) a des trous filetés (30) formés opposés à des trous oblongs (31) formés dans la première ou deuxième plaque latérale correspondante (6a, 6b), des vis de fixation (32) étant installées, traversant ces trous oblongs (31) et vissées dans ces trous filetés (30) pour verrouiller le support (9) par rapport à la plaque latérale (6a, 6b).
12. Une tête pousseuse conformément à la revendication 10 **caractérisée en ce que** chaque poussoir pivotant (4) est relié à un élément élastique correspondant (33) aménagé pour pousser le poussoir pivotant (4) à cette position raide déterminée par le contact du poussoir pivotant (4) contre cette cheville limiteuse de rotation (29).
13. Une tête pousseuse conformément à la revendication 1 ou 2, **caractérisée en ce que** chacune de ces barres transversales (7) ayant une longueur réglable comporte deux tiges vissées à l'extérieur dans des directions hélicoïdales inverses, alignées entre elles et accouplés par vissage dans des filets de vis correspondants formés à l'intérieur dans des directions hélicoïdales inverses, dans des portions opposées d'un trou traversant existant dans un membre de réglage à être tourné à la main ou à l'aide d'un outil.
14. Une tête pousseuse conformément à une des revendications 1 ou 13, **caractérisée en ce que** ces première et deuxième plaques latérales longitudinales (6a, 6b) de la structure de support (1) comporte des première et deuxième portions respectives (61a, 61b) et des première et deuxième portions d'extrémité respectives (62a, 62b) dans lesquelles:
- ces première et deuxième portions centrales (61a, 61b) sont reliées à des extrémités opposées de ce pont transversal (8) ;
- ces première et deuxième portions d'extrémité (62a, 62b) sont reliées à des côtés opposés de leur portion centrale correspondante (61a, 61b) par des membres de connexion (63a, 63b) ayant une longueur réglable ;
- ces supports (9) dans lesquels les poussoirs pivotants (4) sont assemblés sont fixés aux première et deuxième portions d'extrémité (62a, 62b) ; et
- ces barres transversales (7) ayant une longueur réglable sont connectées à leurs extrémités aux première et deuxième portions d'extrémité (62a, 62b).
15. Une tête pousseuse conformément à la revendication 14, **caractérisée en ce qu'**au moins deux des barres transversales (7) ayant une longueur réglable

sont connectées à leurs extrémités aux supports (9) qui à leur tour, sont fixés aux première et deuxième portions d'extrémité correspondantes (62a, 62b).

16. Une tête pousseuse conformément à la revendication 14, **caractérisée en ce que** chacun de ces membres de connexion (63a, 63b) ayant une longueur réglable comporte une glissière (64a, 64b) fixée à une de ses extrémités à la portion centrale correspondante (61a, 61b) et insérée coulissante dans une part de guide (65a, 65b) fixée à sa première ou deuxième portion d'extrémité correspondante (62a, 62b), cette part de guide (65a, 65b) ayant des trous (66) adaptés pour y installer des vis de fixation coopérant avec les trous oblongs (67) formés dans cette glissière (64a, 64b) pour fixer la glissière (64, 64b) sur la partie de guide coulissante (65a, 65b) dans une position choisie.
17. Une tête pousseuse conformément à la revendication 16, **caractérisée en ce que** chaque part de guide (65a, 65b) est accouplée coulissante dans une région évidée (70) de la première ou deuxième portion correspondante (62a, 62b) et la part de guide (65a, 65b) a des trous (68) adaptés pour y installer des vis de fixation coopérant avec des trous oblongs (69) formés dans la première ou deuxième portion d'extrémité (62a, 62b) pour fixer la part de guide (65a, 65b) sur la première ou deuxième portion (62a, 62b) dans la position choisie.
18. Une tête pousseuse conformément à la revendication 14, **caractérisée en ce que** chacune de ces rainures guides (11) du corps central (10) a une profondeur suffisante pour y loger, mutuellement superposés, les premier et deuxième guides (13a, 13b), de sorte que les premier et deuxième membres guides (13a, 13b) puissent glisser l'un par rapport à l'autre et par rapport au corps central (10) et les premier et deuxième membres guides (13a, 13b) ont des trous oblongs respectifs (71a, 71b) superposés en partie et opposés à un trou transversal (72) formé dans le corps central (10), une vis de fixation étant installée à travers ce trou transversal (72) et ces trous oblongs (71a, 71b) pour fixer les premier et deuxième membres guides (13a, 13b) au corps central (10) dans des positions choisies.
19. Une tête pousseuse conformément à la revendication 18, **caractérisée en ce que** les premier et deuxième membres guides (13a, 13b) sont fixés dans des premier et deuxième blocs respectifs (14a, 14b) assemblés de sorte qu'ils puissent pivoter le long des premier et deuxième guides verticaux (25a, 25b) formés dans les première et deuxième portions centrales (61a, 61b) et des moyens de fixation sont aménagés pour fixer les positions des premier et deuxième blocs (14a, 14b) par rapport aux première

et deuxième portions centrales (61a, 61b), respectivement, réglables en direction verticale.

5

10

15

20

25

30

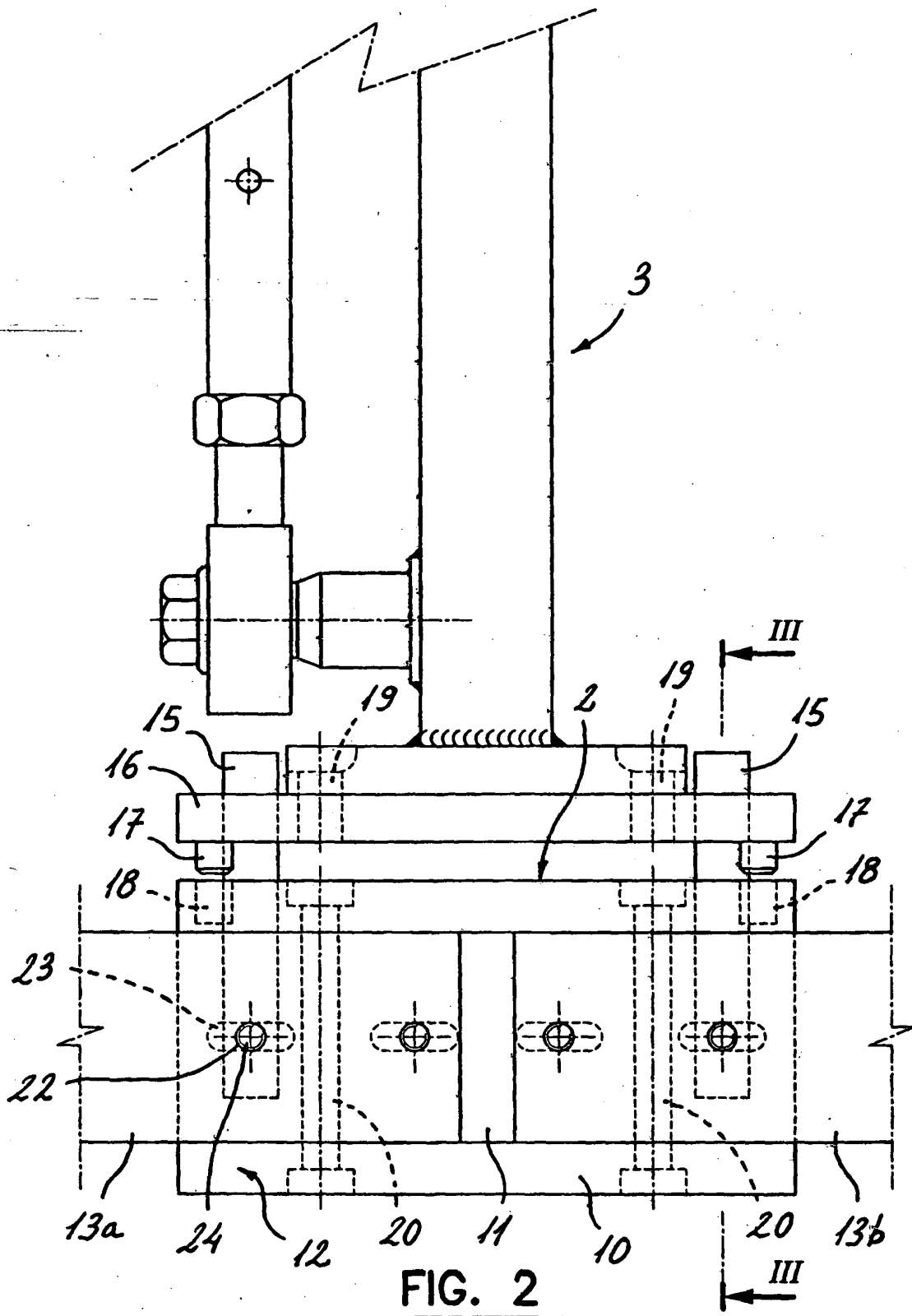
35

40

45

50

55



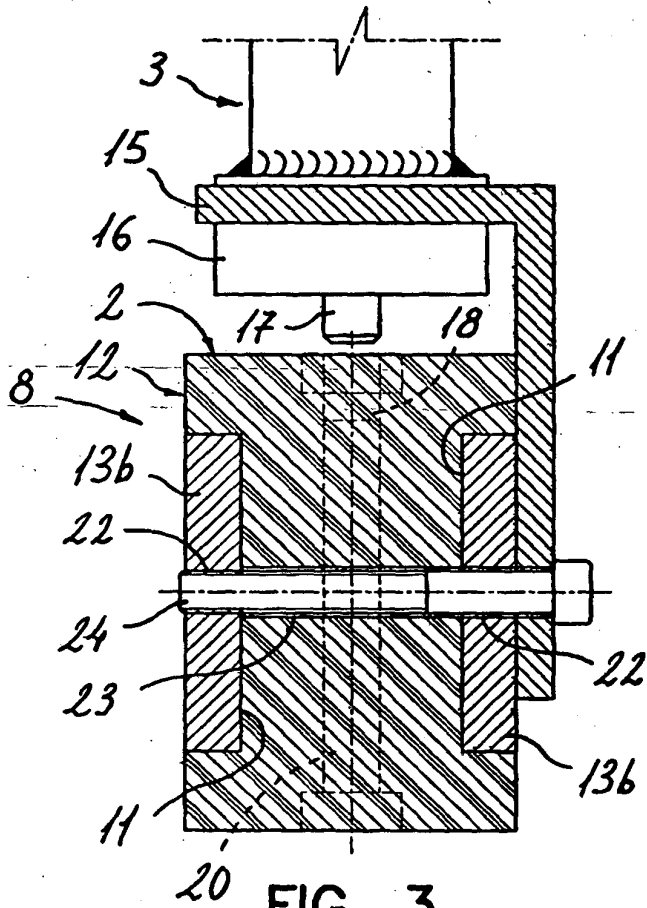


FIG. 3

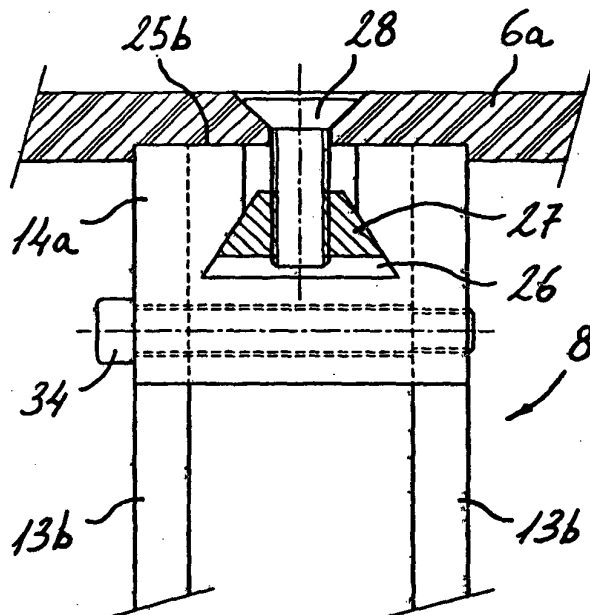


FIG. 4

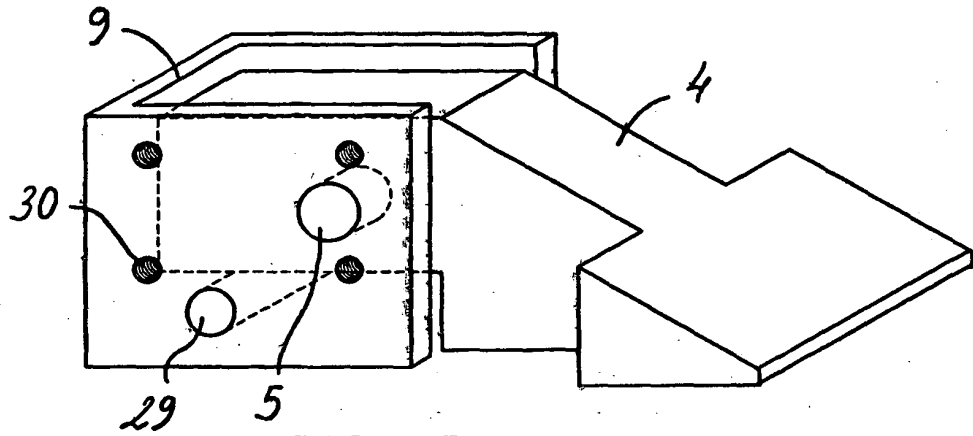


FIG. 5

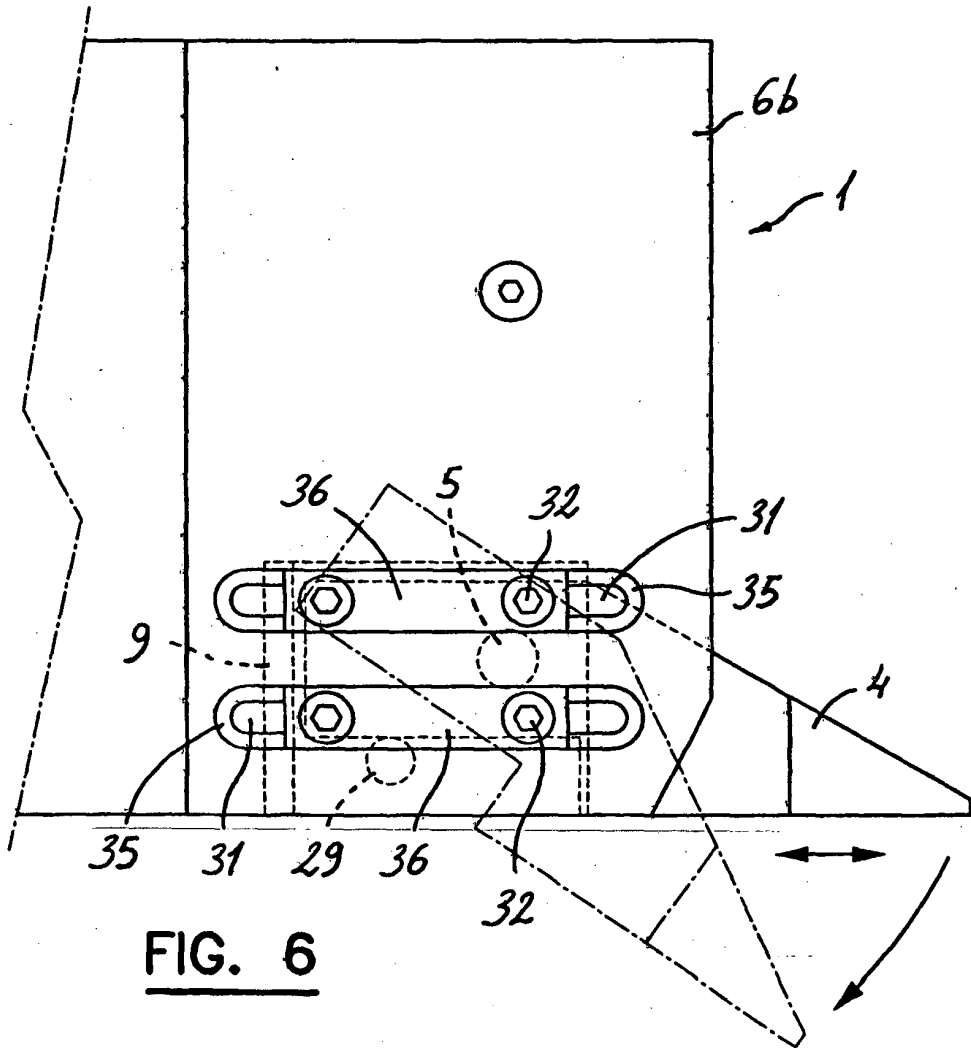


FIG. 6

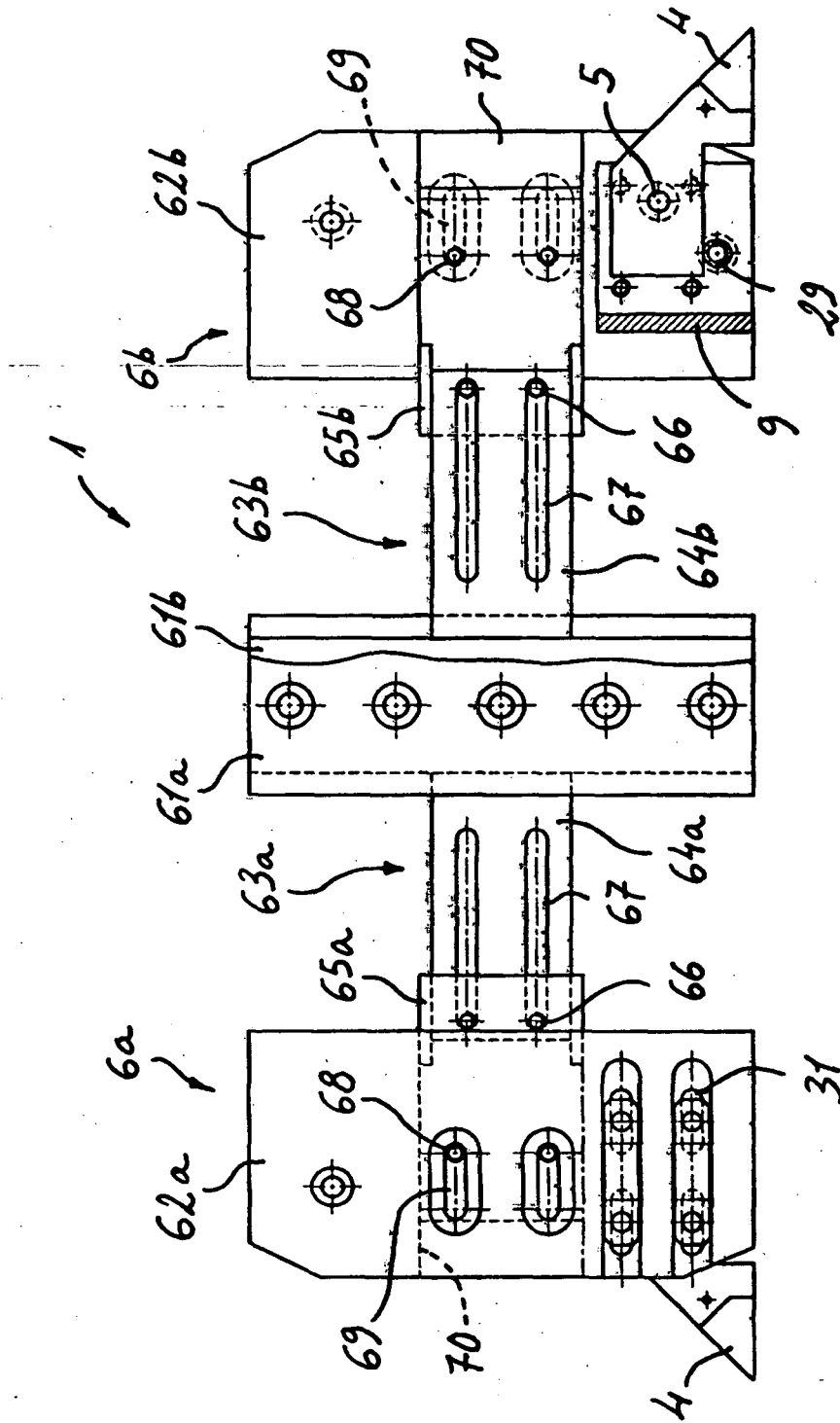


FIG. 7

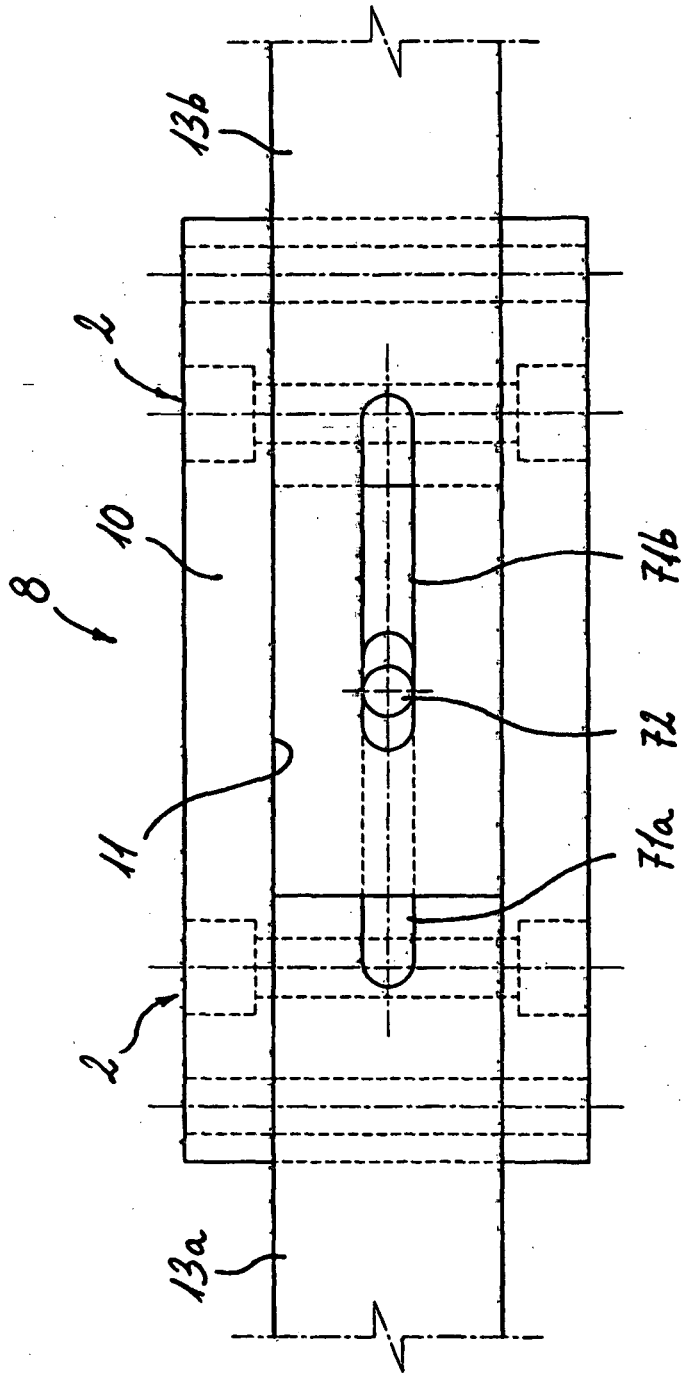


FIG. 9

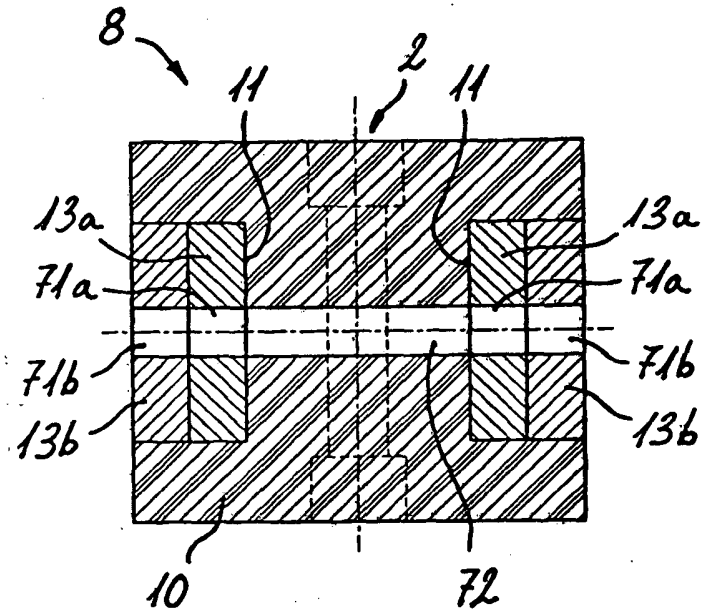


FIG. 10

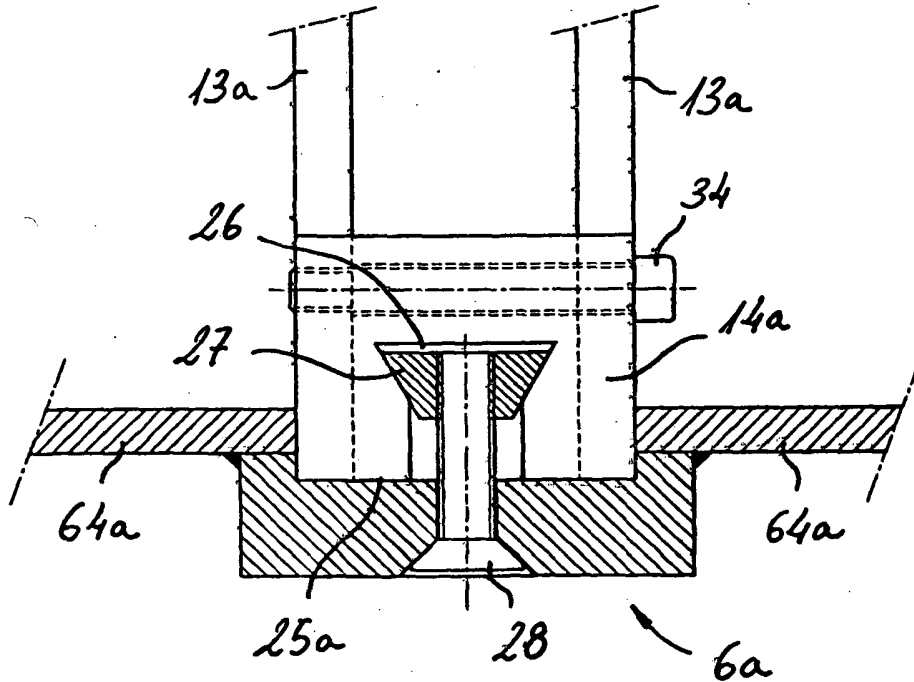


FIG. 11

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 2798416 A [0002]
- ES 0442914 A [0002]
- ES 0550143 A [0002]
- ES 235835 A [0002]
- ES 255122 A [0002]
- ES 200402985 [0003]
- ES 200302184 [0003]
- US 1826260 A [0004]