



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 553 022 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**13.07.2005 Bulletin 2005/28**

(51) Int Cl.7: **B65B 69/00**

(21) Application number: **05075048.8**

(22) Date of filing: **07.01.2005**

(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 MC NL PL PT RO SE SI SK TR**  
Designated Extension States:  
**AL BA HR LV MK YU**

(72) Inventor: **Andeweg, Johannes Cornelis**  
**3281 NC Numansdorp (NL)**

(74) Representative: **Ferguson, Alexander**  
**Octrooibureau Vriesendorp & Gaade B.V.**  
**P.O. Box 266**  
**2501 AW Den Haag (NL)**

(30) Priority: **07.01.2004 NL 1025185**

(71) Applicant: **Systemate Group B.V.**  
**3281 NC Numansdorp (NL)**

(54) **Device for folding up crates**

(57) Device for folding up folding crates, which folding crates in two opposite first walls are provided with means for locking the unfolded position, in cooperation with connecting second walls, wherein the device comprises a first conveyor for passing the crates through the

device according to a process path, as well as means for deactivating the locking means, as well as folding means for during continuing conveyance of the folding crates folding down the first walls and the second walls.

**EP 1 553 022 A1**

## Description

**[0001]** The invention relates to a device for folding up folding crates. Such folding crates can be provided with a locking system. This may be folding crates of a system having various wall sizes, wherein the wall length remains the same, such as a system of folding crates having sizes of 400x300 and 400x600 mm, the locking means being disposed in the 400 mm walls. It may for instance regard so-called Europool-system crates.

**[0002]** After use or after cleaning, such crates are folded up again in order to be stored and/or conveyed in stacks. Up until now the folding up has been a partially manual and/or an interrupted process, wherein the conveyor on which the folding crates are conveyed has to be started and stopped over and over again, which adversely affects the capacity.

**[0003]** It is an object of the invention to provide a device of the type mentioned in the preamble, which is capable of achieving a high capacity.

**[0004]** From one aspect the invention to that end provides a device for folding up folding crates, which folding crates in two opposite first walls are provided with means for locking the unfolded position, in cooperation with connecting second walls, wherein the device comprises a first conveyor for passing the crates through the device according to a process path, as well as means for deactivating the locking means, as well as folding means for during continuing conveyance of the folding crates folding down the first walls and the second walls.

**[0005]** In the device according to the invention the folding crates are folded up in a continuously conveying manner, as a result of which the conveyor for the crates can remain activated and a high capacity is achievable.

**[0006]** The conveyor can remain activated at a continuous speed if the deactivation means are positioned for moving along in the process path while the deactivation means are operative.

**[0007]** The folding crates can be stably passed through the device if the first conveyor supports the crates on the bottom.

**[0008]** Preferably the deactivation means are adapted for engagement of the locking means from the outer sides of the first walls. In an embodiment thereof the locking means are provided with operation eyes, which for deactivation can be moved towards each other, and the deactivation means are provided with pins placeable in the eyes, as well as with means for moving the pins apart. In this way the first and second walls can easily, automatically and reliably be unlocked during conveyance. In a simple embodiment the pins are disposed at respective ends of levers, of which the other end is provided with a cam roller, wherein the device is further provided with permanently positioned roller guides for moving the cam rollers in question in a direction transverse to the process path.

**[0009]** Preferably the device is provided with flight means for taking along the folding crates, wherein the

flight means are preferably disposed on a second conveyor, which circulates at a speed differing from the speed of the first conveyor, preferably a lower speed. The folding crates, while being engaged by the first conveyor, can then about the flight means, as a result of which their position is fixed/determined. Preferably the second conveyor circulates according to a path situated above the first conveyor, having axes of rotation parallel to the bottom of the folding crate and perpendicular to the process path, as a result of which the room present above the first conveyor is utilised.

**[0010]** In a further development of the flight means they comprise a leading, first flight and a trailing, second flight, positioned so as to retain a folding crate in between them. In case of a lower speed of the flight means, the folding crates with their leading first wall run into the first flight.

**[0011]** In order to let the folding take place in an as unobstructed way as possible, the flights can be formed to at least engage the folding crate at a location beyond the folding walls.

**[0012]** If the mutual distance of the first and second flights is adjustable, crates of various sizes, per process, can be treated, for instance crates of 400x300 mm in a first process and crates of 400x600 mm in a second process.

**[0013]** In a constructively compact design the deactivation means are at least partially disposed on the flight means.

**[0014]** The deactivation means can simply engage onto the means for locking the unfolded position of the crate when the first conveyor is adapted for passing the crates through the device with the first walls transverse to the process path.

**[0015]** In a second further development the device comprises first folding means for during continuing conveyance of the folding crate folding down the first walls and second folding means for during continuing conveyance of the folding crate folding down the second walls.

**[0016]** Preferably the first folding means are placed upstream of the second folding means, as a result of which the second walls are free to be folded up.

**[0017]** In a preferred embodiment the first folding means comprise a first folder for folding up the leading first wall of a folding crate, as well as a second folder for folding up the trailing first wall of a folding crate, wherein the first folder is placed downstream of the second folder. The first folder thus cannot about an as yet upright trailing first wall, as a result of which it would otherwise be urged into an upright position.

**[0018]** In a simple embodiment the first folder can be placed stationary, preferably compliantly hinged about an axis transverse to the process path, parallel to the bottom, counter a pre-bias towards a pending position, so that it can be urged upwards by a trailing first wall of a crate that has inadvertently not been unlocked.

**[0019]** The second folder can be movable within the path of the trailing first wall for exerting a pressure force

on the outer side thereof, as a result of which the leading first wall is able to pass without problems prior to the trailing first wall is being folded down. The second folder preferably is rotatable about an axis parallel to the bottom of the folding crate and perpendicular to the process path, preferably at a speed higher than the conveyance speed of the folding crate in situ, as a result of which the folding down of the trailing first wall can take place quickly and effectively.

**[0020]** The second folding means can be provided with pressure means for exerting a pressure on the outer side of the second walls, which enhances the folding down of the second walls. The pressure means preferably are movable in and out of the movement path of the second walls, so that they can be optimally active but can be timely retracted from the path of the crates, so that failure/hindrance is avoided in case a crate would inadvertently still have upright first walls that might prevent the second walls from being folded down.

**[0021]** Preferably the pressure means are disposed on a lever, that can be hinged about a stationary axis oriented perpendicular to the bottom, which axis preferably is situated upstream of the pressure means.

**[0022]** In a further embodiment the device is furthermore provided with means for detecting a certain height of the crate after the first and second folding means have been passed, with which it can be established whether a folding crate has indeed been folded up. Means may be provided for in response to the measurement of the detection means discharging the measured folding crate from the first conveyor.

**[0023]** The invention furthermore provides, according to a further aspect, a device provided with means for folding up folding crates, particularly for during continuing conveyance through the device folding up the folding crates.

**[0024]** In a preferred embodiment the device comprises folding means for folding down the side walls of the folding crates.

**[0025]** In a preferred embodiment the device comprises deactivation means for deactivating means for mutual locking of the side walls of the crates, wherein preferably the deactivation means are positioned for moving along with the crates during operation of the deactivation means.

**[0026]** The invention will be elucidated on the basis of an exemplary embodiment of a device according to the invention shown in the drawings, in which:

Figures 1A-1D show an example of a folding crate that can be folded up using a device according to the invention;

Figure 2 shows a schematic side view of an exemplary embodiment of a device according to the invention;

Figure 3A-C show details of crate flights in the de-

vice of figure 2;

Figures 4A, B show a detail of a wall folder in the device of figure 2;

Figures 5A, B show a detail of a further wall folder in the device of figure 2; and

Figures 6A, B show a detail of a next wall folder in the direction of figure 2.

**[0027]** The folding crate 1 shown in the figures 1 A-D has a bottom 4, two first walls 2 and two second walls 3, which walls are hinged to the bottom 4. The crate shown in this example is of the Europool type, having a size of 400x300 mm. Europool crates are also available in the size 400x600 mm. In both cases the second walls 3 have a length of 400 mm and they are provided with operable closing means 5, that can be pulled towards each other for ending a locking between the upright edges of the meeting walls 2 and 3. The locking mechanism is designed to become automatically active by snapping, when the said edges of the walls 2 and 3 are correctly brought against each other.

**[0028]** In figure 1A the crate 1 is shown in flat folded condition, wherein the walls 2 lie over the walls 3. In figure 1B the walls 2 are almost fully erected, but the walls 3 still lie flat against the bottom 4. In figure 1C the walls 3 are raised, and in figure 1D the erected crate 1 can be seen, which can be brought into the flat folded position of figure 1A using the device shown in figure 2.

**[0029]** The crate folding device 10 shown in figure 2 comprises a frame 20, on which a conveyance/support path 21 is supported, optionally at a separate part of said frame 20, wherein a conveyor belt 22 is able to supply crates 1 from the direction A, through the device 10 to, as considered in the drawing on the right-hand side, the discharge end. The conveyor belt 22 is continuously driven by means of a motor that is not shown, and at both ends circulates about circulating rollers. The conveyor belt 22 is driven at a speed  $V_1$ .

**[0030]** Above the conveyor belt 22 a conveyor 11 is provided on a frame 20, the conveyor 11 having a chain set 14 circulating in a vertical plane and circulating about chain wheels 15 and 16, one of which is driven. Pairs of flights 12, 13 are disposed on the chain 14, which flights circulate along with the chain 14, anticlockwise as considered in the drawing.

**[0031]** On the chain wheel 16, at least at its axis, a second toothed wheel 17 is disposed for rotating along with it, around which toothed wheel a further chain 18 circulates, which at the other turn end circulates about a chain wheel 19, that is attached to a cross axle 30 bearing-mounted on the frame 20. As shown in figure 4A, B "second" folders 40 are disposed for rotation by axle 30.

**[0032]** Downstream thereof a "first" folder 50, further shown in the figures 5A, B, is disposed on the frame 20.

**[0033]** Downstream thereof side folders, further shown in the figures 6A, B, are disposed on the frame 20.

**[0034]** Referring to the figures 3A-C, the leading flight 13 of each pair of flights 12, 13 is provided with a holder 33, which moves through a slot 28 in fixed guide 25 that also offers support to the chain 14. At the lower end the holder 33 is provided with a transversely penetrating U-shaped profile 41, which at the trailing side is provided with a stop plate 43. On the holder 33, at some height hinges 36a, 36b are provided, on which -in this example explained for 36a- a lever 35a is attached that is hingeable in the horizontal plane. At one end the lever 35a is provided with an upright axis 34a having roller 39a, that can be operated by abutment against a guide path 26 attached at the bottom of rail 25, which guide path 26 then actually functions as a curve path. The other end of the lever 35a is provided with a pin 37a. Under the influence of the path 26 on the freely rotatable roller 39a, the latter is urged to the outside, as a result of which lever 35a hinges about hinge 36a and the pin 37a moves to the inside in transverse direction. The pins 37a are intended to extend into the eyes 5 of the locking mechanism of the folding crate 1. It will be understood that by moving the eyes 5 towards each other the locking mechanism in a folding crate will be ended, so that after that the walls 2 and 3 can be folded down. After operation of the levers 35a a spring 38 placed between both levers 35a, b, ensures that the levers 35a, b move to their initial positions again, in which, in a next course, they can be inserted into the unlocking eyes 5 of a next crate 1.

**[0035]** It will be understood that the flight 12 is similarly built, as can be seen in figures 3A, B. Its holder 32 however extends diagonally upwards, in order to enhance turning in into the path of the crates 1.

**[0036]** The mutual distance between the flights 12 and 13 is adjusted to the folding crate to be treated. In case of a crate of the aforementioned size 400x300 mm the crate with 400 mm is placed widthwise and the mutual distance between the stop plates 42 and 43 is 300 mm.

**[0037]** In figure 3B the conveyance surface that is formed by conveyor belt 22 can further be seen. The crates may be guided sideways by stationary guide rods 27.

**[0038]** When the crates 1 run into the area below the toothed wheel 15, the motion of the chain 14 is adjusted such to the motion of the conveyor belt 22, that it moves the flights 12 and 13 at a speed parallel to the direction A of  $V_2$  that is substantially lower than the speed  $V_1$ , in this example in terms of percentage some dozens. As a result after a leading flight 13 has run in, a folding crate 1 is urged against stop surface 43 of the leading flight by the conveyor belt 22. Subsequently the belt 22, that is continuously driven, slips through under the folding crate 1. Subsequently the next flight 12 is turned in into the path A, in order with stop plate 42 to optionally abut the trailing wall 3 of the folding crate. The folding crate

1 then is as it were kept confined during the further process, wherein the conveyor belt 22 remains slipping through under the crate 1.

**[0039]** The folding crate 1 then arrives at the "second" folder 40 of the figures 4A, B. Said folder 40 comprises two elongated blades 40a, b which for rotation are fixedly attached to cross axle 30. When as indicated in figure 4B the blades 40a, b are rotated in the direction B into the path of the folding crate 1, they slap against the outer surface of the trailing wall 3 of the folding crate 1. The chain 18 is driven at a speed  $V_3$ , which is such, that the circumferential speed of the blades 40a, b, is higher than the speed of the chain 14. The length of the blades 40a, b is chosen such, that the blades 40a, b are able to fold down the -after all unlocked- trailing wall 3 and then are capable of moving on without being obstructed. Depending on the chosen speed  $V_2$  the blades 40a, b might be moved with a free-running path, wherein they turn freely downwards over a path.

**[0040]** Subsequently the crate 1 arrives at the "first" folder 50, which comprises at least one elongated plate 51, which at the lower end is provided with a bent edge 52. At the upper end 56 (figure 5A) the plate 51 is freely hinged to frame 20, at the location of hinge 56. At a location 55 below the hinge 56 the plate 51 is connected to a fixed point 54 on the frame 20 by means of a spring 53.

**[0041]** When the folding crate 1 arrives in the direction A the profile 40, particularly the rear side of the plate 42, will abut the bent edge 52, as a result of which the plate 51 is rotated along in the direction C, to the inclined position shown. A tensile force is built up here in the spring 53. Subsequently the edge 52 is able to move over the plate 40/42, as a result of which spring forces are released and the plate 51 moves to the vertical position, slapping against the leading wall 3. When the wall 3 is not unlocked, the plate 51 can move along, hinging about hinge 56. The spring 53 subsequently ensures adjustment to the vertical position shown in figure 5B, for instance against a stop that is not shown.

**[0042]** Immediately downstream of the folder 50 the side folders 60 have been placed, also visible in figure 5B, further shown in the figures 6A, 6B. The side folders 60a, b are positioned on both sides of the path for the folding crates 1, and each comprise a synthetic finger 63, attached to a lever 62 by means of bolts, which lever is hingeable (direction D) about a vertical hinge 61. At the location of 64, the other end of the lever 62 is hinged to the piston rod of a pneumatic cylinder 65. By operation of the cylinder 65 the lever 62 is rotated in the direction D so that the finger 63 with bevelled surface 66 runs into the as yet upright side walls 2 and lets them fold down. Immediately after that the lever 62 is rotated back. It is noted that the fingers 65 are only activated by a central operation unit that is not further shown, when the "first" folder 50 has not been able to be operative because the crate 1 in question was not properly unlocked.

[0043] Subsequently the crate 1 arrives at the end of the device 10, where there is a photocell 80, with which the central operation unit is able to verify whether or not the crate 1 in question has been folded up.

## Claims

1. Device for folding up folding crates, which folding crates in two opposite first walls are provided with means for locking the unfolded position, in cooperation with connecting second walls, wherein the device comprises a first conveyor for passing the crates through the device according to a process path, as well as means for deactivating the locking means, as well as folding means for during continuing conveyance of the folding crates folding down the first walls and the second walls.
2. Device according to claim 1, wherein the deactivation means are positioned for moving along in the process path while the deactivation means are operative.
3. Device according to claim 1 or 2, wherein the deactivation means are adapted for engagement of the locking means from the outer sides of the first walls.
4. Device according to any one of the preceding claims, wherein the first conveyor supports the crates on the bottom.
5. Device according to any one of the preceding claims, wherein the locking means are provided with operation eyes, which for deactivation can be moved towards each other, and the deactivation means are provided with pins placeable in the eyes, as well as with means for moving the pins apart, wherein preferably the pins are disposed at respective ends of levers, of which the other end is provided with a cam roller, wherein the device is further provided with permanently positioned roller guides for moving the cam rollers in question in a direction transverse to the process path.
6. Device according to any one of the preceding claims, further provided with flight means for taking along the folding crates, wherein the flight means are preferably disposed on a second conveyor, which circulates at a speed differing from the speed of the first conveyor, preferably a lower speed, wherein preferably the second conveyor circulates according to a path situated above the first conveyor, having axes of rotation parallel to the bottom of the folding crate and perpendicular to the process path.
7. Device according to claim 6, wherein the flight

means comprise a leading, first flight and a trailing, second flight, positioned so as to retain a folding crate in between them, wherein preferably the flights are formed to at least engage the folding crate at a location beyond the folding walls.

8. Device according to claim 7, wherein preferably the mutual distance of the first and second flights is adjustable.
9. Device according to any one of the claims 2-5, in combination with any one of the claims 6-8, wherein the deactivation means are at least partially disposed on the flight means.
10. Device according to any one of the preceding claims, wherein the first conveyor is adapted for passing the crates through the device with the first walls transverse to the process path.
11. Device according to any one of the preceding claims, comprising first folding means for during continuing conveyance of the folding crate folding down the first walls and second folding means for during continuing conveyance of the folding crate folding down the second walls, wherein preferably the first folding means are placed upstream of the second folding means.
12. Device according to any one of the preceding claims, wherein the first folding means comprise a first folder for folding up the leading first wall of a folding crate, as well as a second folder for folding up the trailing first wall of a folding crate, wherein the first folder is placed downstream of the second folder, wherein preferably the first folder is placed stationary, preferably compliantly hinged about an axis transverse to the process path, parallel to the bottom, counter a pre-bias towards a pending position.
13. Device according to claim 12, wherein the second folder is movable within the path of the trailing first wall for exerting a pressure force on the outer side thereof, wherein preferably the second folder is rotatable about an axis parallel to the bottom of the folding crate and perpendicular to the process path, preferably at a speed higher than the conveyance speed of the folding crate in situ.
14. Device according to any one of the preceding claims, wherein the second folding means are provided with pressure means for exerting a pressure on the outer side of the second walls, wherein preferably the pressure means are movable in out of the movement path of the second walls, wherein preferably the pressure means are disposed on a lever, that can be hinged about a stationary axis ori-

ented perpendicular to the bottom, which axis preferably is situated upstream of the pressure means.

15. Device according to any one of the preceding claims, further provided with means for detecting a certain height of the crate after the first and second folding means have been passed, wherein preferably the device is furthermore provided with means for in response to the measurement of the detection means discharging the measured folding crate from the first conveyor. 5 10
16. Device for folding up folding crates, particularly provided with means for during continuing conveyance through the device folding up the folding crates. 15
17. Device according to claim 16, comprising folding means for folding down the side walls of the folding crates, particularly during continuing conveyance. 20
18. Device according to claim 16 or 17, comprising deactivation means for deactivating means for mutual locking of the side walls of the crates, wherein preferably the deactivation means are positioned for moving along with the crates during operation of the deactivation means. 25

30

35

40

45

50

55

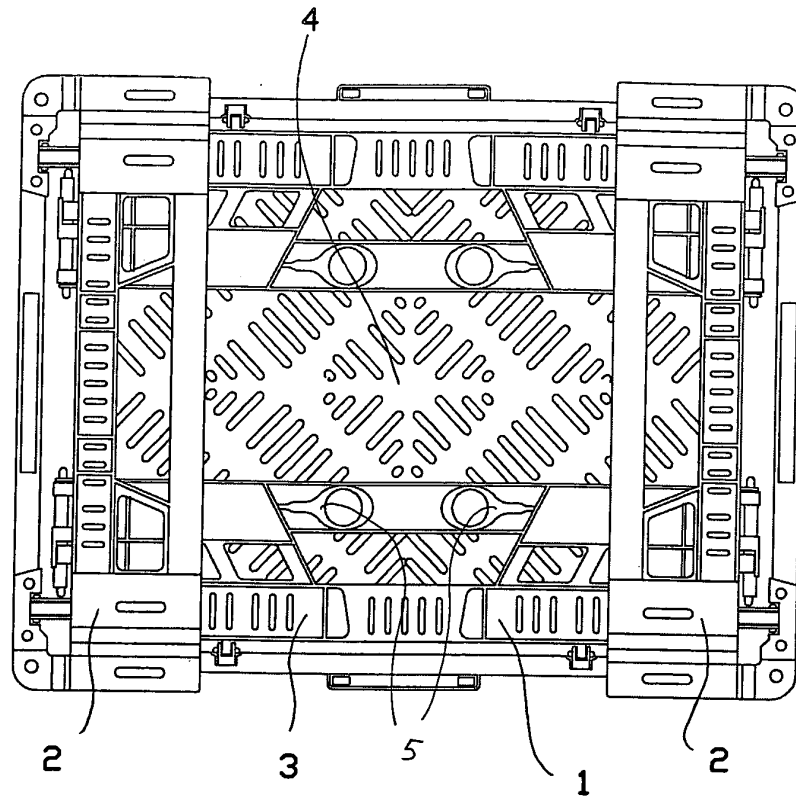


FIG. 1A

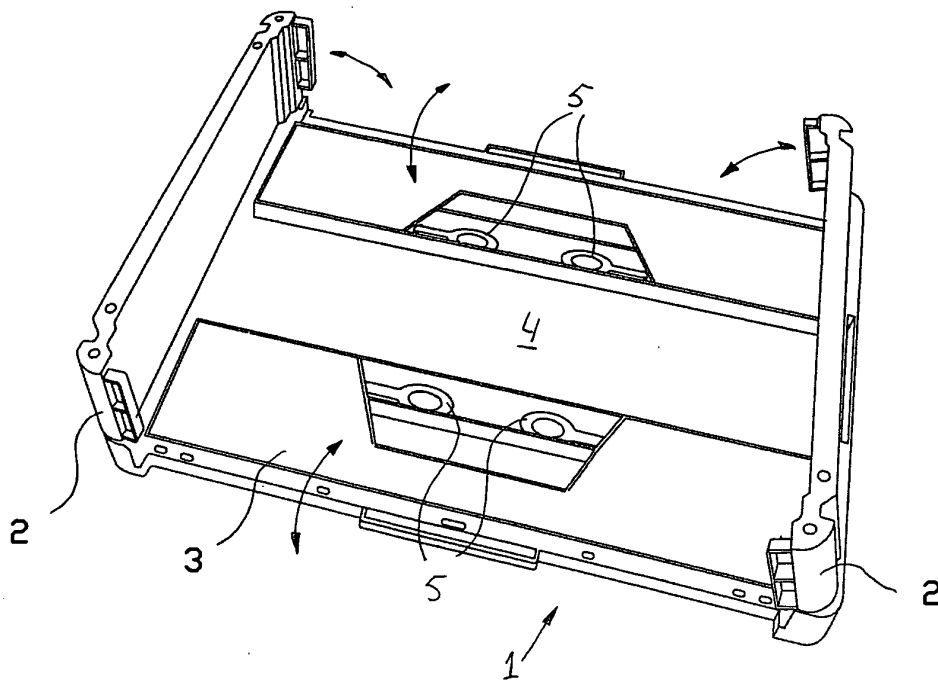


FIG. 1B

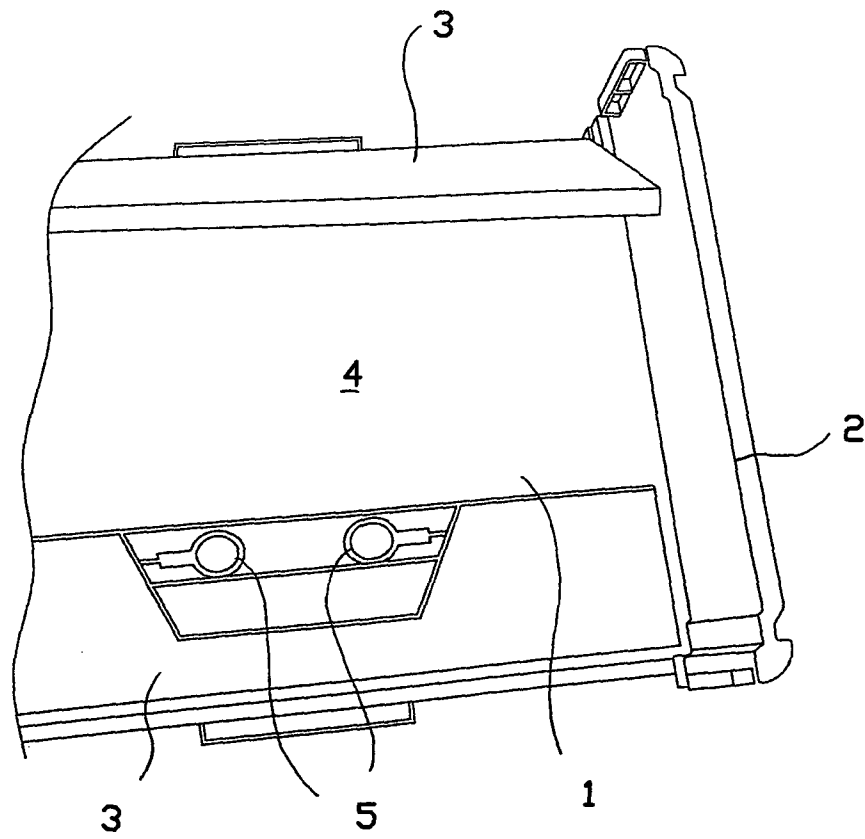


FIG. 1C

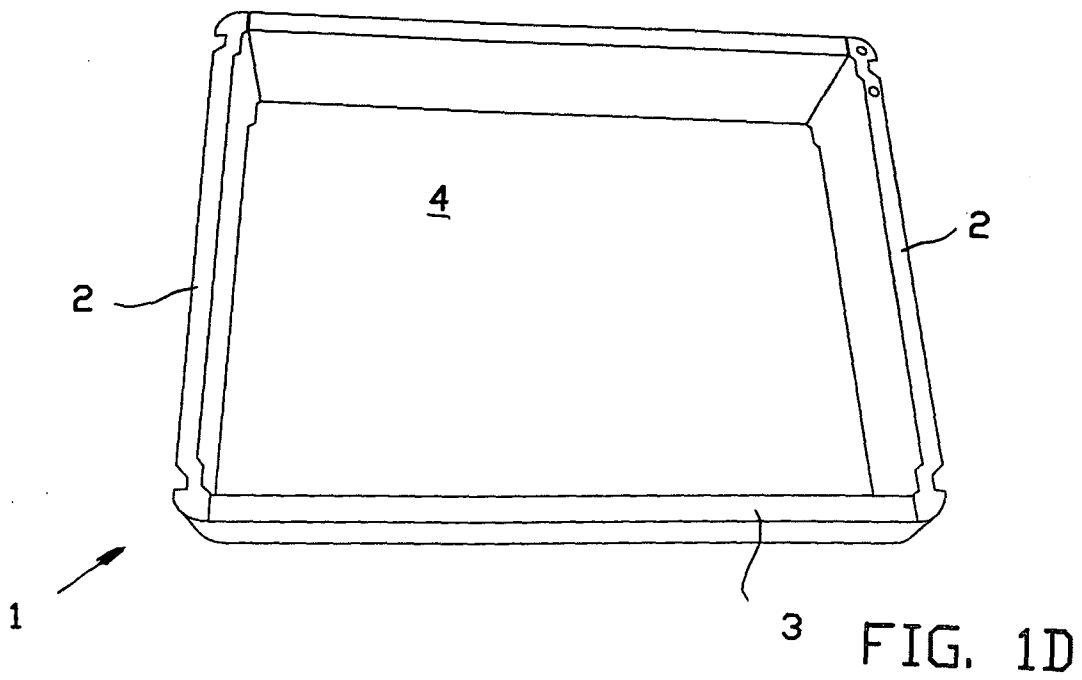
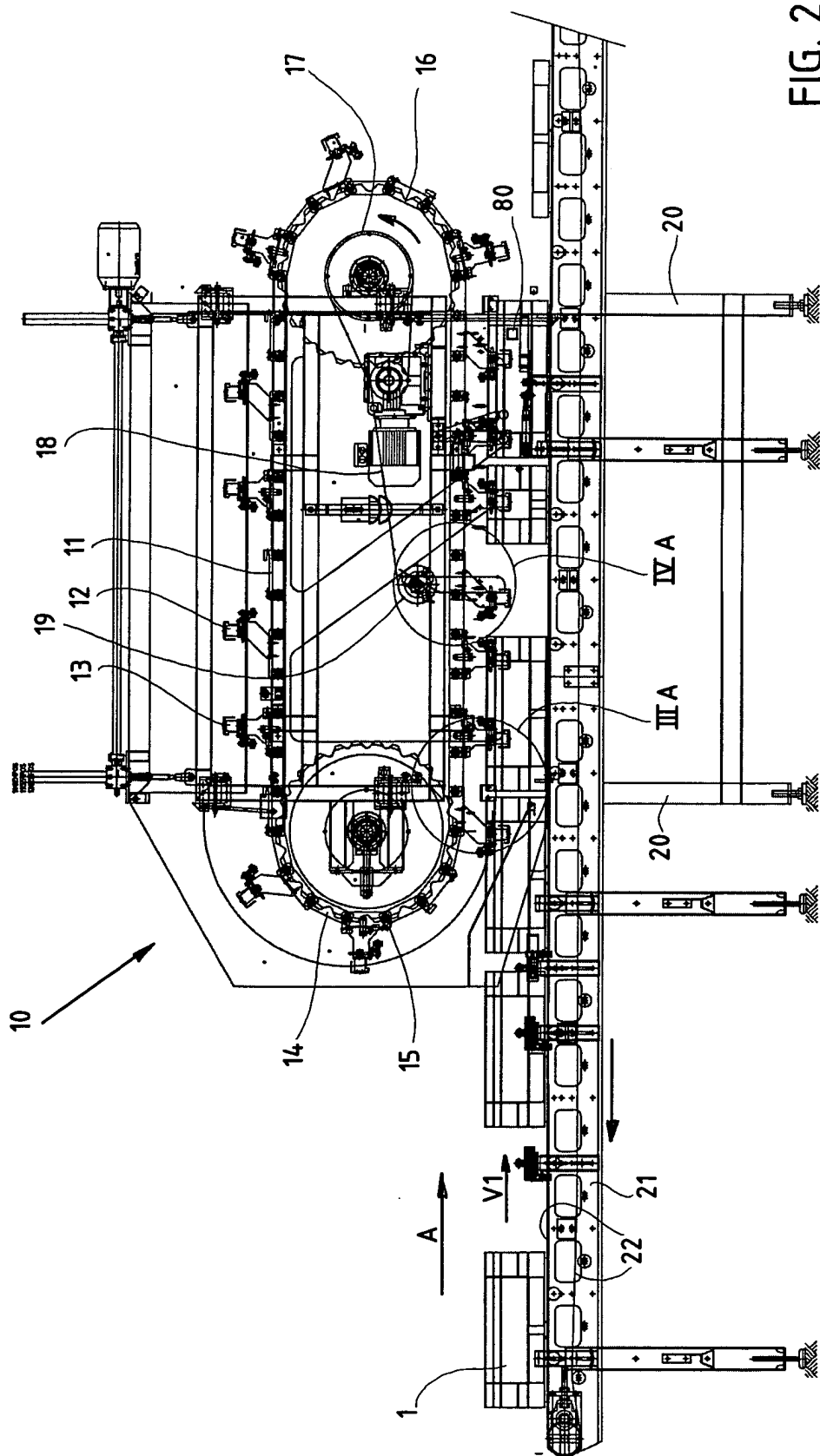


FIG. 1D





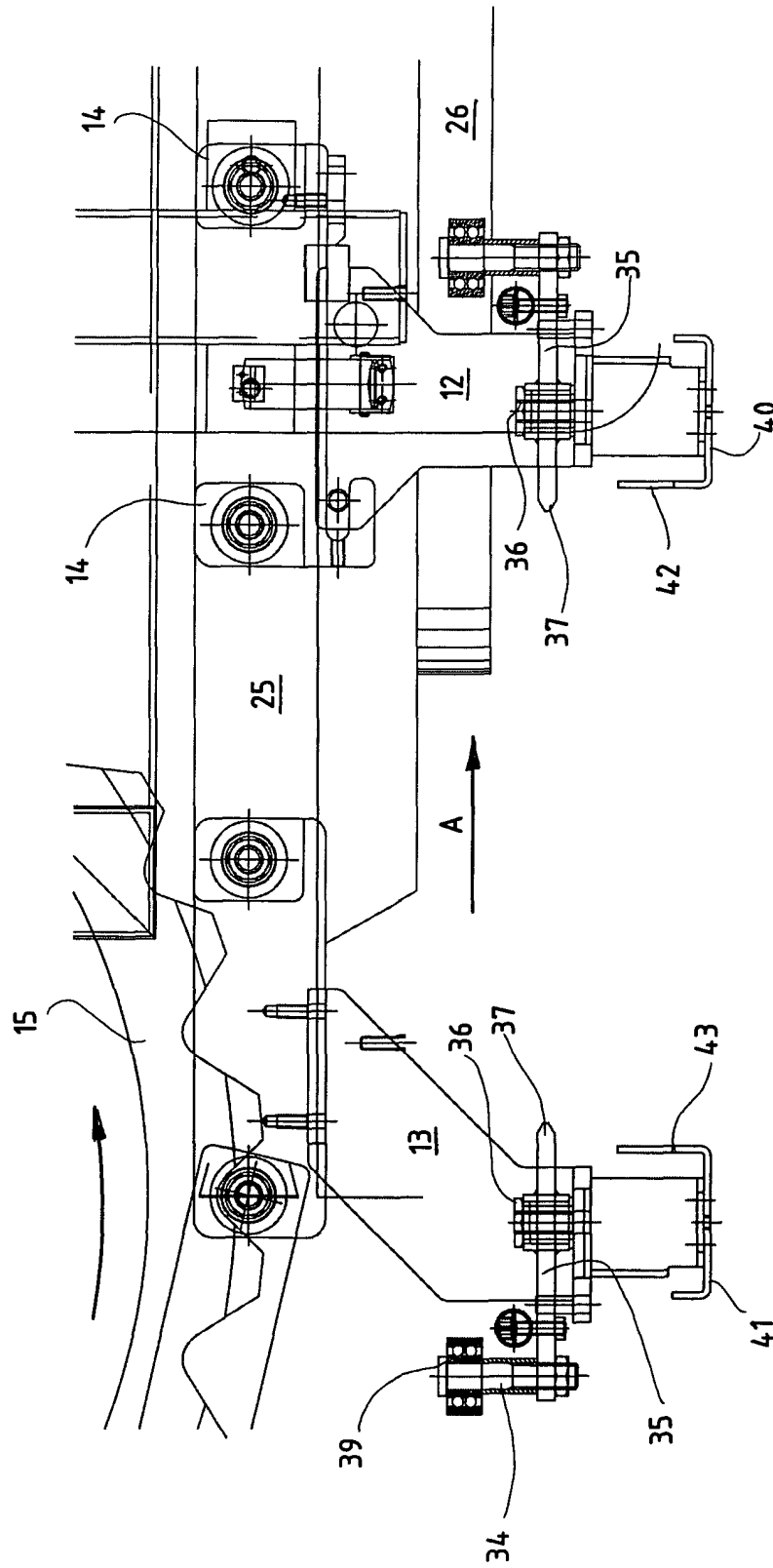
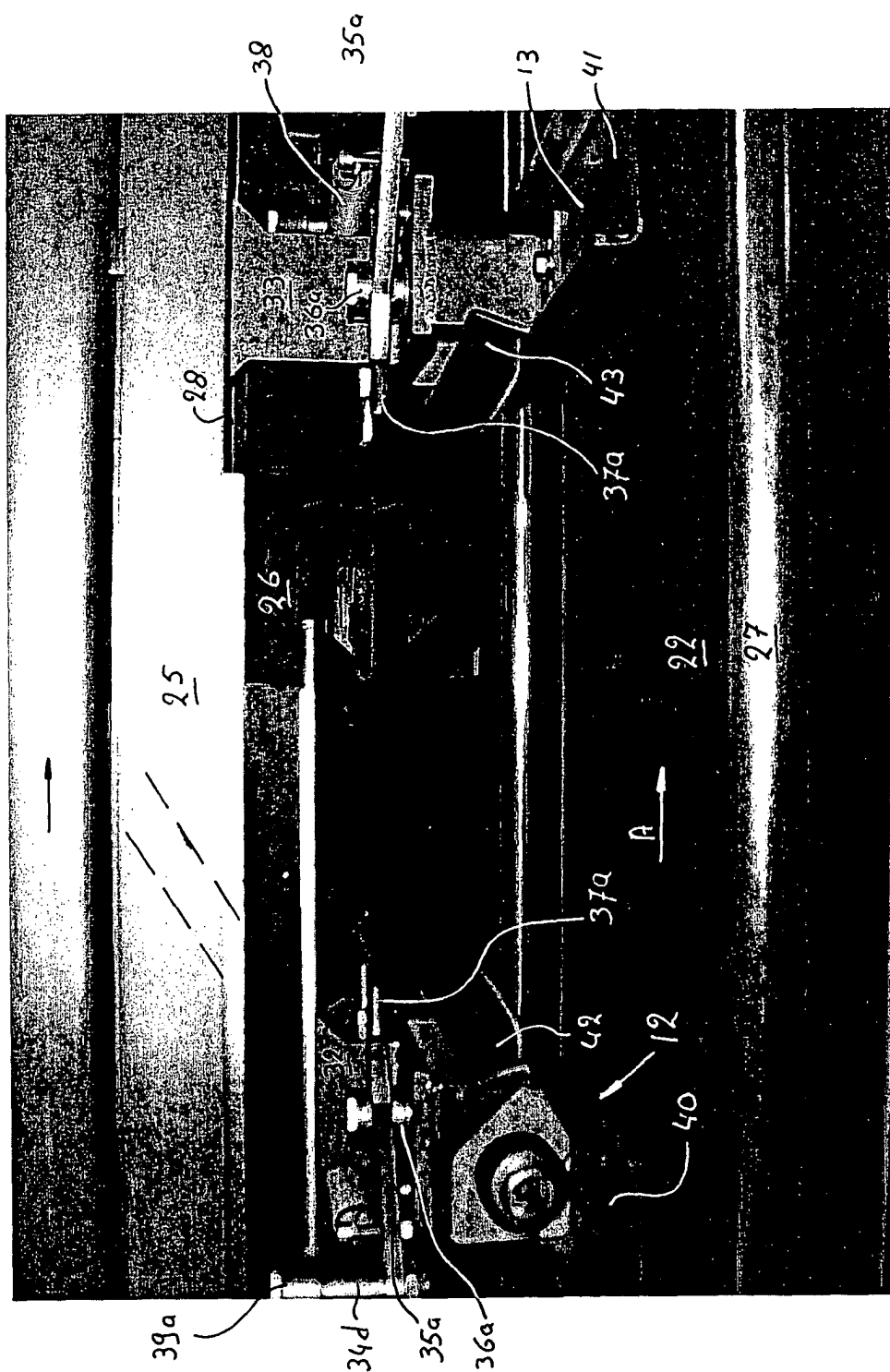
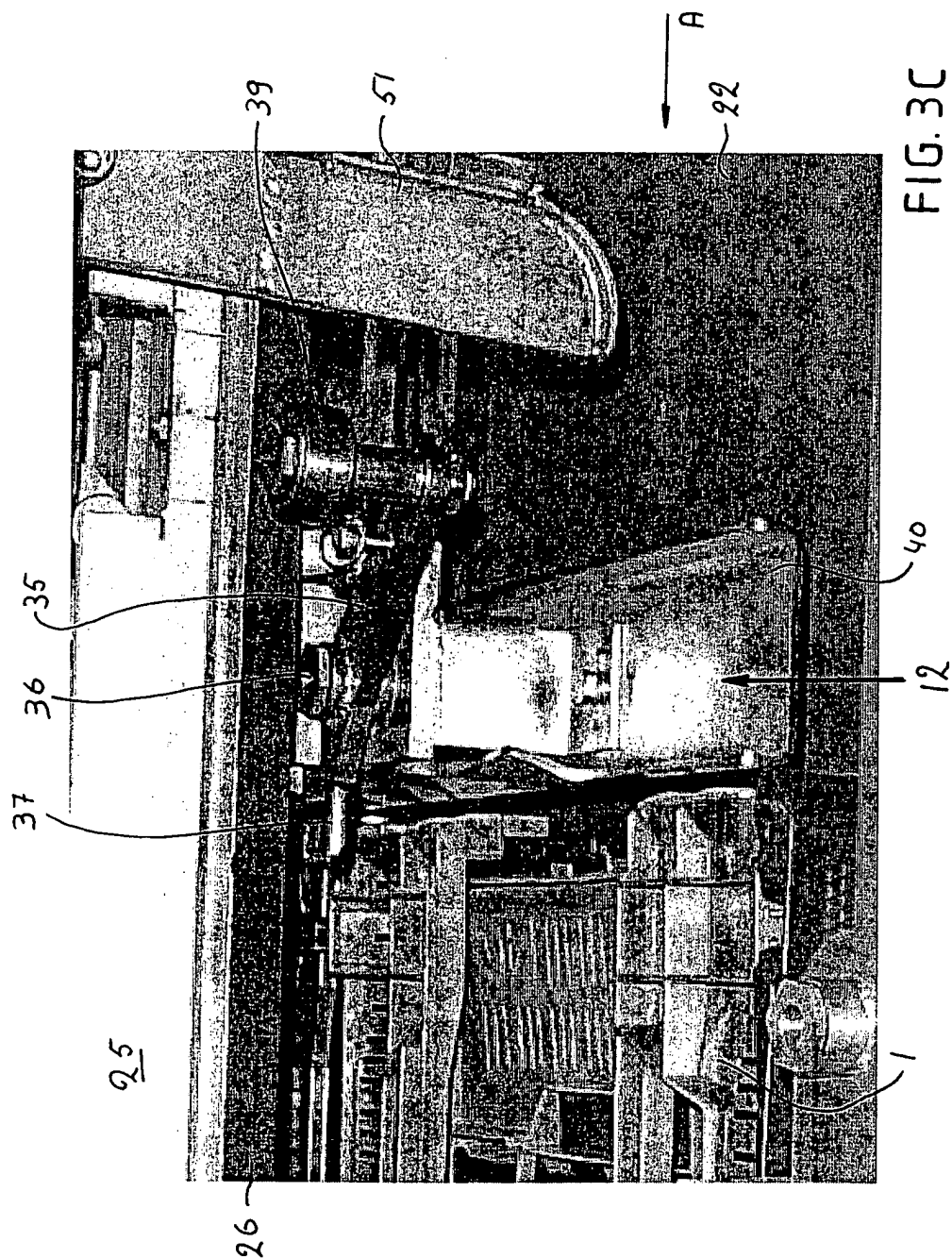


FIG. 3A





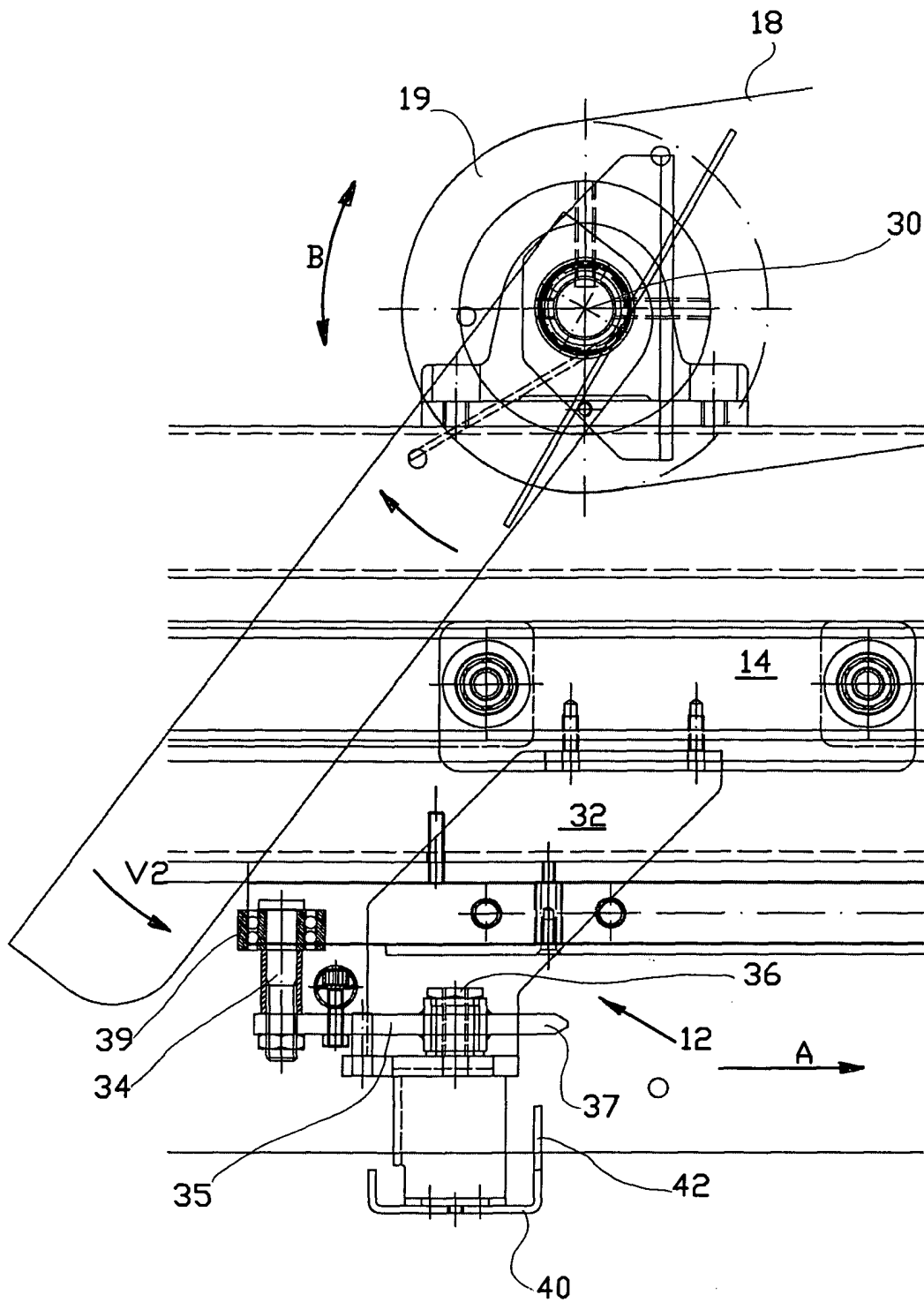


FIG. 4A

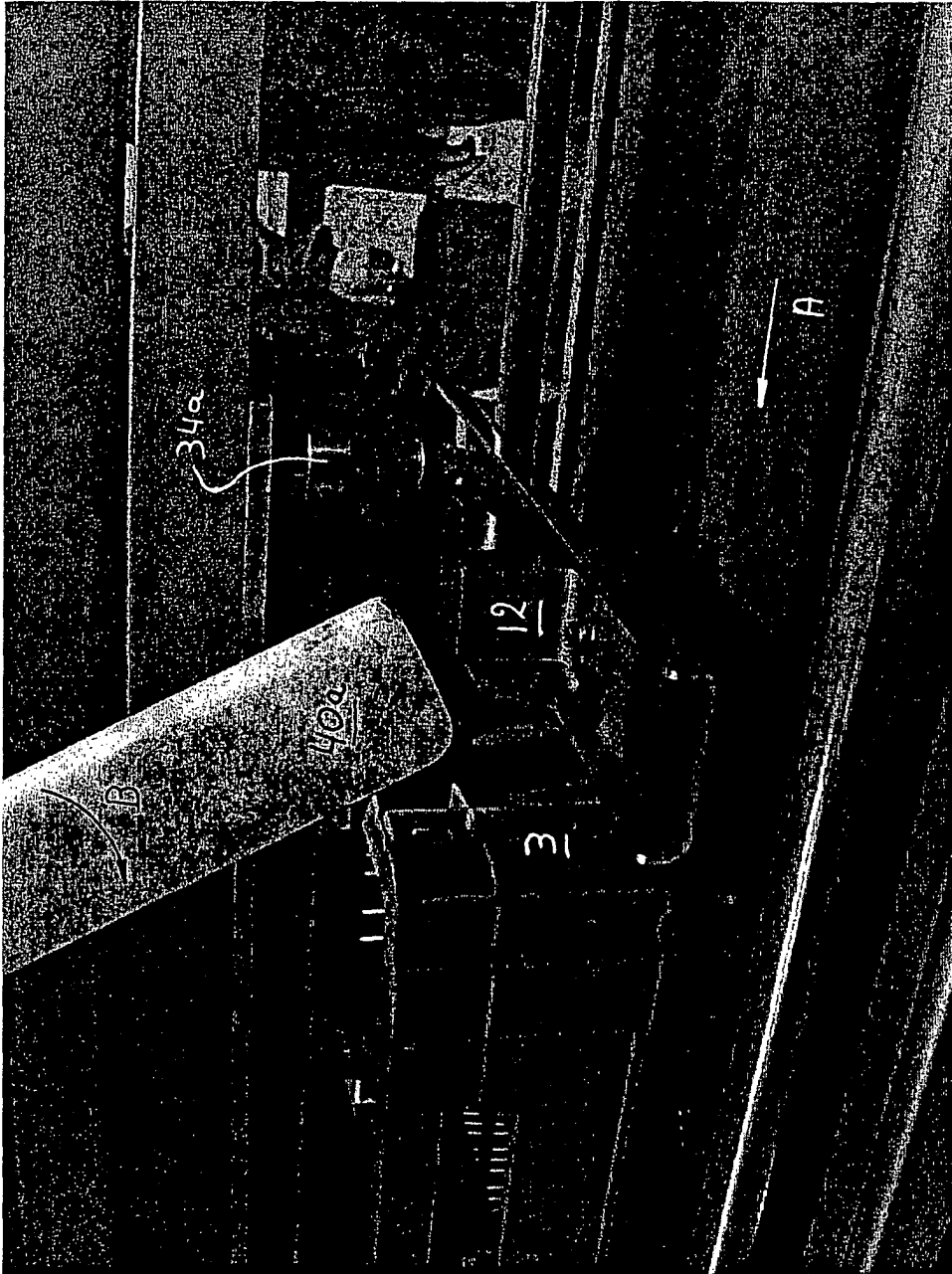


FIG. 4B

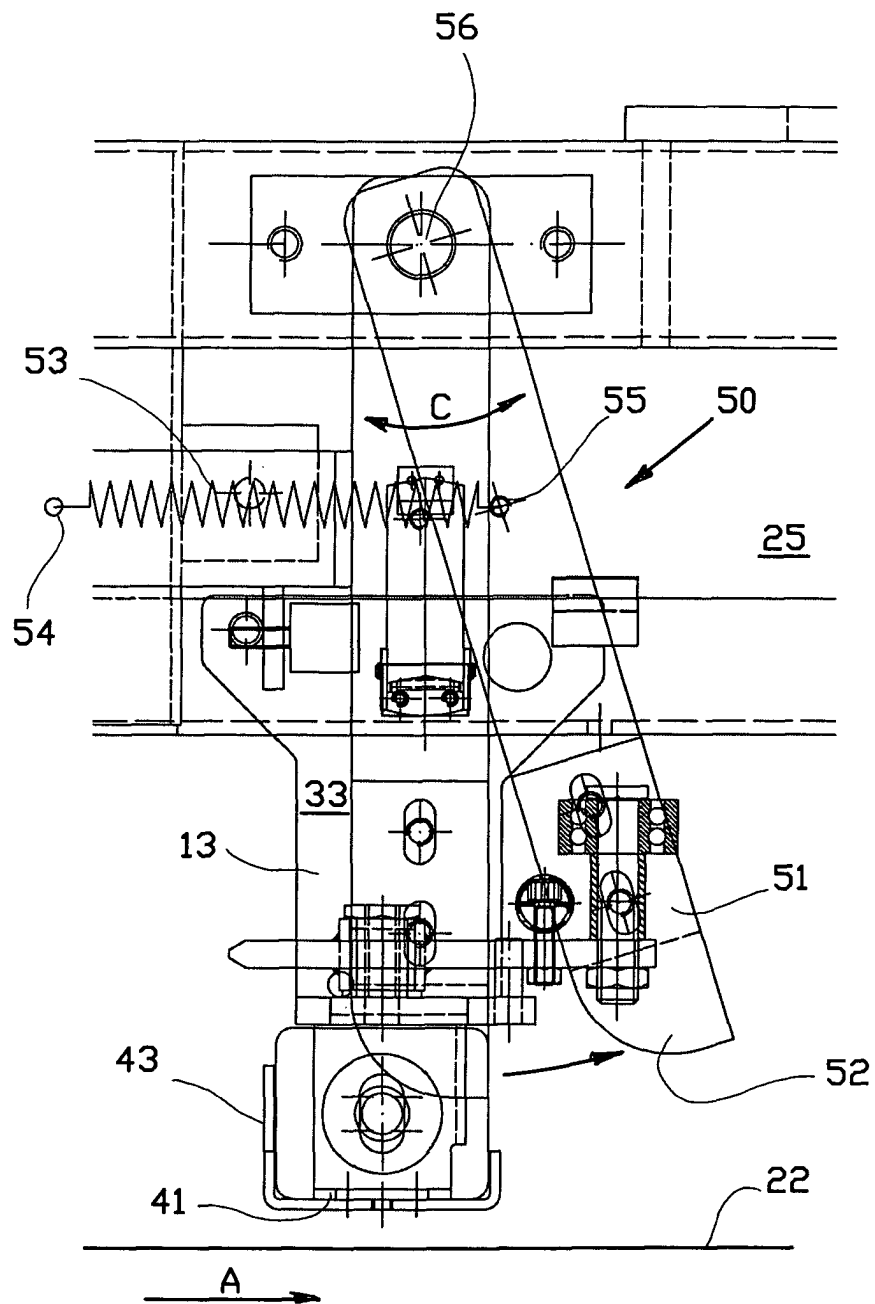


FIG. 5A

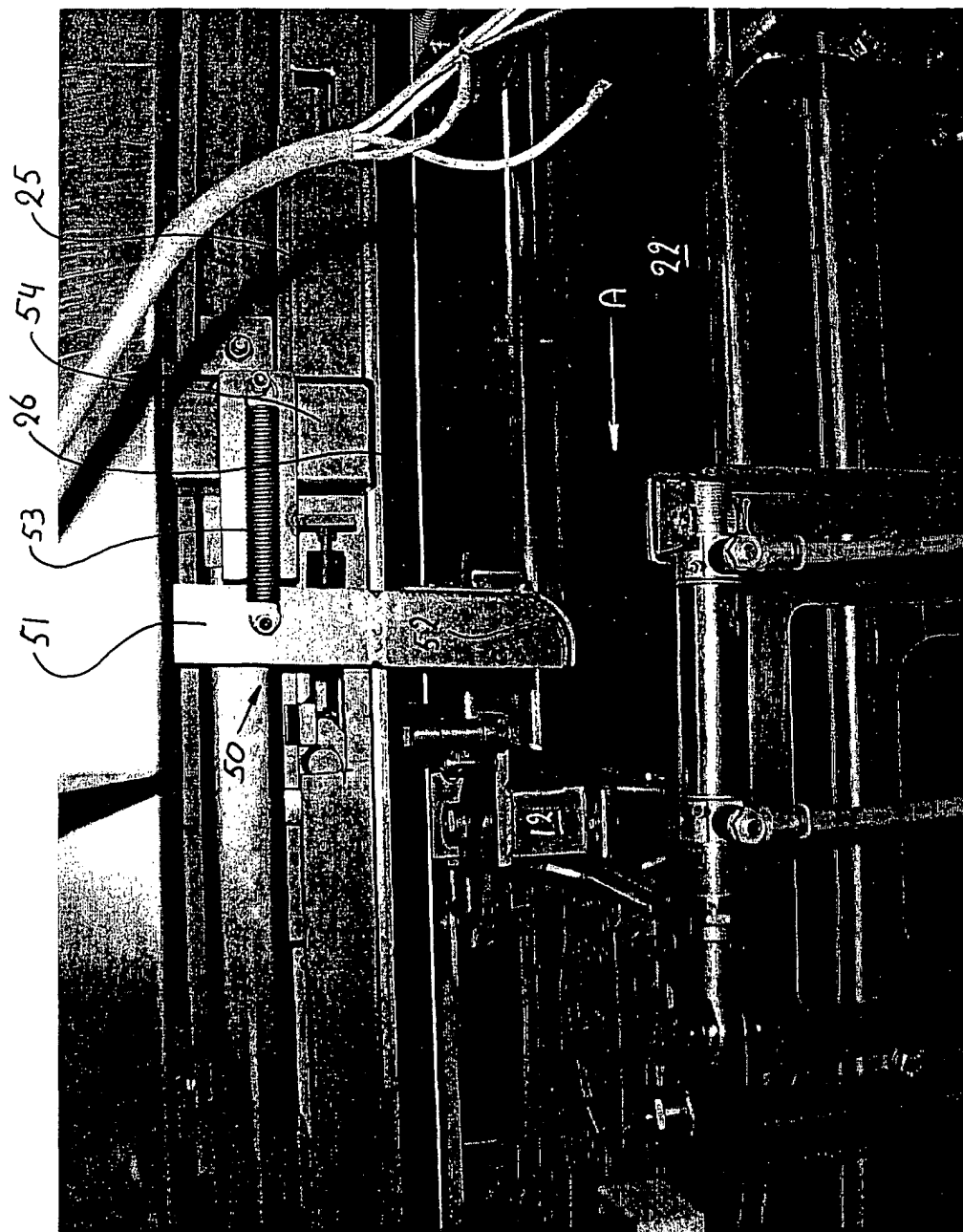


FIG. 5B



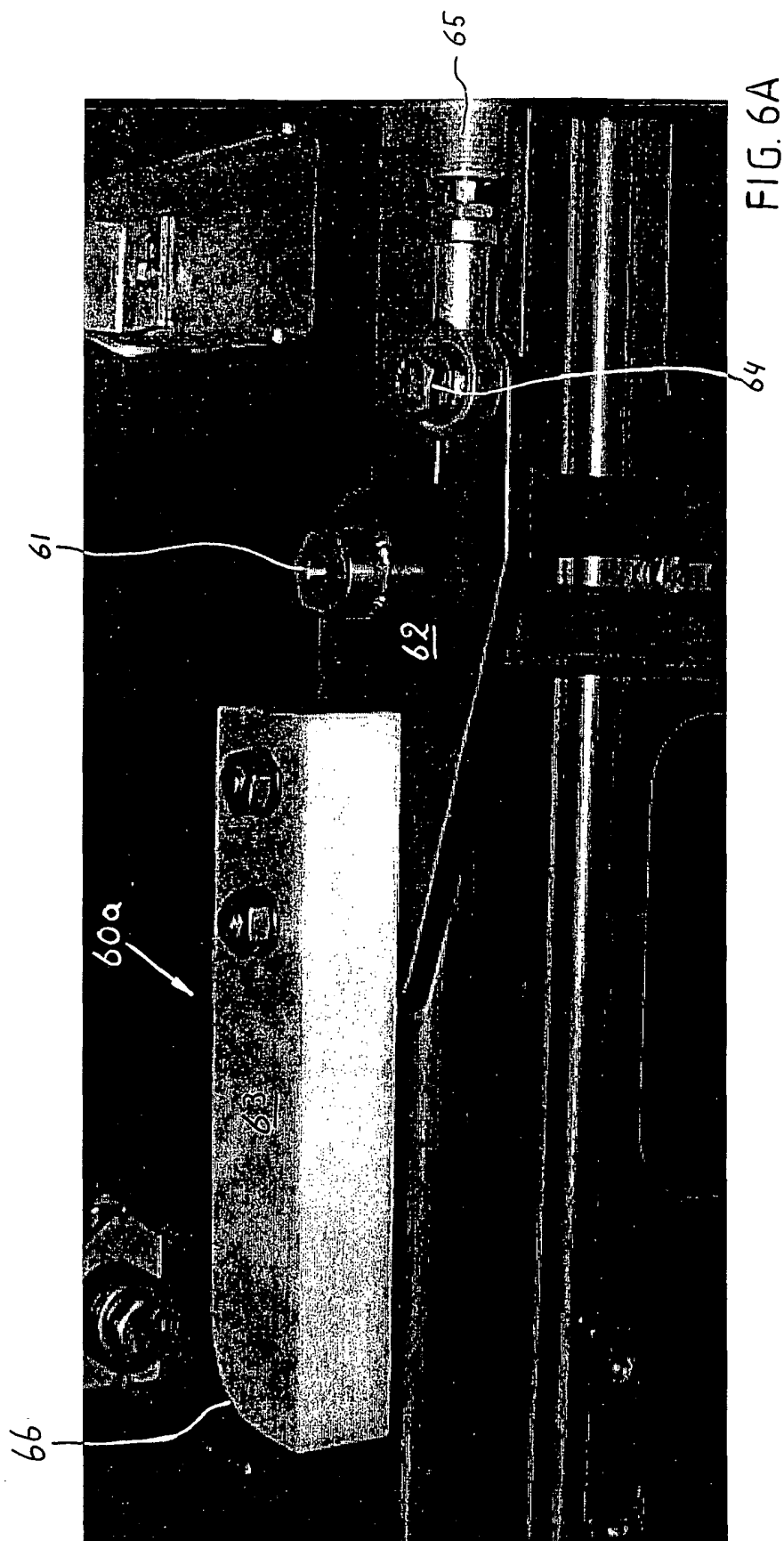


FIG. 6A

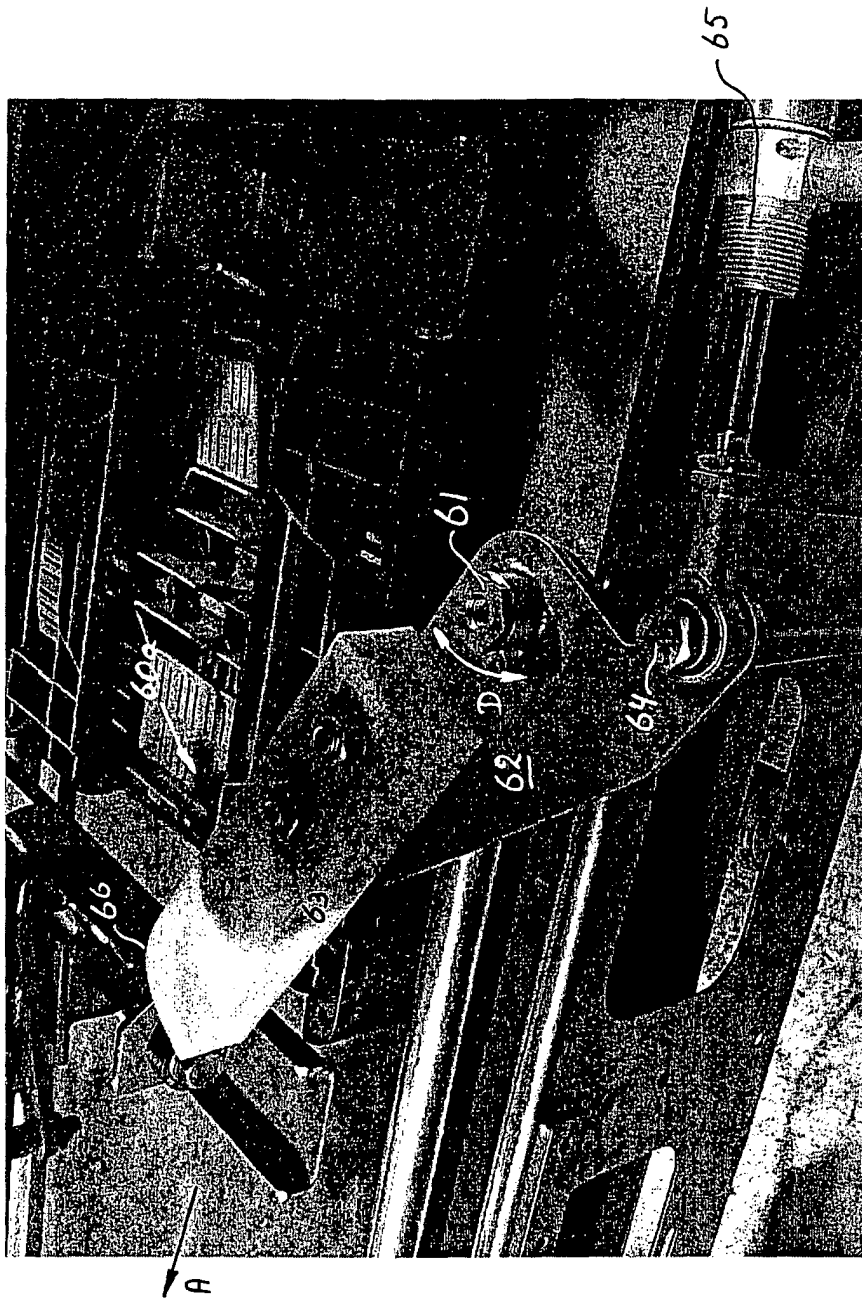


FIG. 6B



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 05 07 5048

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                |                                                |                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|----------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Citation of document with indication, where appropriate, of relevant passages                                                  | Relevant to claim                              | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EP 0 978 454 A (SYSTEMATE GROUP B V)<br>9 February 2000 (2000-02-09)<br>* column 9, line 57 - column 12, line 46;<br>figures * | 1,16                                           | B65B69/00                                    |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EP 1 081 049 A (FRUTMAC S R L)<br>7 March 2001 (2001-03-07)<br>* column 5, line 46 - column 8, line 1;<br>figures *            | 1,16                                           |                                              |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FR 2 702 198 A (RAEF SARL LOCATION)<br>9 September 1994 (1994-09-09)<br>* page 2, line 29 - page 4, line 31;<br>figures *      | 1                                              |                                              |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EP 1 375 355 A (FIEDERLING KARL)<br>2 January 2004 (2004-01-02)                                                                |                                                |                                              |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EP 0 067 323 A (FRIEDRICH UWE W)<br>22 December 1982 (1982-12-22)                                                              |                                                |                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                |                                                | TECHNICAL FIELDS SEARCHED (Int.Cl.7)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                |                                                | B65B<br>B65D                                 |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                |                                                |                                              |
| Place of search<br>The Hague                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                | Date of completion of the search<br>9 May 2005 | Examiner<br>Jagusiak, A                      |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                                |                                                |                                              |

2  
EPO FORM 1503 03.82 (P04C01)

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

EP 05 07 5048

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-05-2005

| Patent document<br>cited in search report |   | Publication<br>date |    | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---|---------------------|----|----------------------------|---------------------|
| EP 0978454                                | A | 09-02-2000          | NL | 1009800 C2                 | 08-02-2000          |
|                                           |   |                     | EP | 0978454 A1                 | 09-02-2000          |
| -----                                     |   |                     |    |                            |                     |
| EP 1081049                                | A | 07-03-2001          | IT | BZ990036 A1                | 27-02-2001          |
|                                           |   |                     | EP | 1081049 A2                 | 07-03-2001          |
| -----                                     |   |                     |    |                            |                     |
| FR 2702198                                | A | 09-09-1994          | FR | 2702198 A1                 | 09-09-1994          |
| -----                                     |   |                     |    |                            |                     |
| EP 1375355                                | A | 02-01-2004          | DE | 10229147 A1                | 15-01-2004          |
|                                           |   |                     | EP | 1375355 A2                 | 02-01-2004          |
| -----                                     |   |                     |    |                            |                     |
| EP 0067323                                | A | 22-12-1982          | DE | 8117370 U1                 | 24-12-1981          |
|                                           |   |                     | DE | 8119990 U1                 | 24-12-1981          |
|                                           |   |                     | AT | 17215 T                    | 15-01-1986          |
|                                           |   |                     | DE | 3268251 D1                 | 13-02-1986          |
|                                           |   |                     | EP | 0067323 A2                 | 22-12-1982          |
| -----                                     |   |                     |    |                            |                     |