(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 008 517 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.06.2000 Bulletin 2000/24

(51) Int. Cl.[7]: **B65B 5/02**

(21) Application number: **99122800.8**

(22) Date of filing: **16.11.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **16.11.1998 IT BO980637**

(71) Applicant: **Futura S.R.L.**
Alseno (Piacenza) (IT)

(72) Inventor: **Granelli, Fulvio, Ing.**
Salsomaggore Terme (Parma) (IT)

(74) Representative: **Negrini, Elena**
Agazzani & Associati S.r.l.
Via dell'Angelo Custode 11/6
40141 Bologna (IT)

(54) Machine for packaging articles inside boxes made from blanks

(57) A machine for packaging articles (2) inside boxes (4) made from blanks (3), having a plurality of longitudinal (3a) and transversal (3b) scores and a plurality of cuts (3c) defining front (8a) and rear (8b) wings and lateral flaps (9), essentially comprises:

- a magazine (5) of these blanks (3);
- at least a mechanical handling means (10) supported in a pivoting way by a carriage (7) and movable between the magazine (5) and the exit station (6) from a picking up condition (P), in which the mechanical handling means (10) picks up a blank (3), and a forming condition (F), in which the mechanical handling means (10) folds each blank (3) along the longitudinal scores (3a) by means of pivoting erecting members (14) connected to the mechanical hand means (10) that besides folds the rear wings (8b) inwards by means of rotating means (20);
- a closing station (30) provided with fixed folding means (35), fit to fold backwards the front wings (8a) in correspondence of a feeding condition (I) of said blank (3) in the closing station (30), of at least a gluing group (60) fit to supply glue onto the front (8a) and rear (8b) wings, and lower (40) and upper (50) folding means fit to tilt respectively the lateral flaps (9) onto the front (8a) and rear (8b) wings in such a way to close the box (4).

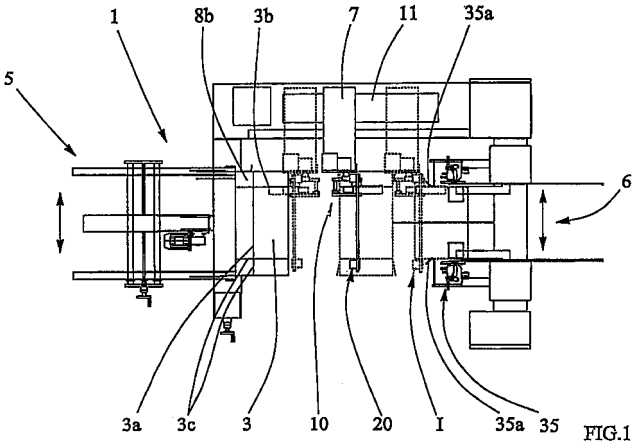

FIG.1

EP 1 008 517 A1

Description

[0001] The present invention relates to the technical field concerning the machines or automatism used for packaging articles into carton boxes, particularly refers to a machine for packaging articles inside boxes made from a flat blank or a flat tubular blank.

[0002] Packaging machines for various shaped articles are known, constituted by the following elements: a packaging carton magazine; a group for picking up the cartons; a forming group fit for erecting boxes from flat blanks or flat tubular blanks; a stacker group for articles to be packaged, displaced vertical o lateral with respect the operative axis of the machine; a group for inserting the grouped articles into boxes; a group for picking up the formed boxes; a group for closing the inner flaps of boxes; a group for gluing the flaps; a group for closing the external flaps and finally a group for exiting the boxes so packaged.

[0003] The main drawback of the known machines consists in using several devices, and therefore several machines, for handling the flat blanks or the flat tubular ones, so that these machine are fed with a single type of blank and therefore are not versatile at all.

[0004] Further drawback of the known machine is that the blank picking group and the box forming group are slidingly supported below these latter so that, when the articles to be packaged or the boxes are broken, the picking and forming groups and the related carriages are dirty so that the machine must be stopped for a long time for removing the broken articles, for cleaning said groups and for restarting the machine.

[0005] The main object of the invention is to propose a machine for packaging articles inside boxes made by a mechanical hand means fit for avoiding the machine stops in correspondence of article and/or box breaking during the packaging.

[0006] Further object is to propose a machine for packaging articles inside boxes constituted by a relatively reduced number of functional group, and fit for operating with both a flat blank and a flat tubular blank.

[0007] Another object is to propose a machine fit for operating any carton type since provided with a single mechanical handling and forming means of the box which avoids the box passage from a group to the next in correspondence of the forming and filling of this latter.

[0008] Another object is to propose a machine easy to install and of simple maintenance.

[0009] The above mentioned objects are achieved according to the content of claims.

[0010] The features of the invention are shown as following with reference to the enclosed drawings, in which:

- figure 1 shows a plan view of the machine object of the invention;
- figures 2A, 2B and 2C show each an enlarged front view of a mechanical handling means respectively in correspondence of a picking up condition of a flat tubular blank type from the magazine, a blank unfold condition and a partial blank folding condition;
- figures 3A and 3B show respectively a side and a plan view of the mechanical handling means;
- figures 4A and 4B show respectively a front and side view of the fixed closing station of the machine in figure 1;
- figure 5 shows a schematic view of the operative cycle of the packaging machine for articles inside boxes made from a flat tubular blank;
- figures 6A, 6B and 6C show each a front view of a second embodiment of the mechanical handling means in correspondence respectively of a picking up condition of a flat blank from the magazine, an blank unfolded condition and a partial blank folding condition;
- figure 7A and 7B show respectively a side and front view of the fixed closing station of a variant of the machine object of the invention;
- figure 8A, 8B and 8C show each respectively a schematic side and two front view of the operative steps for making an unfolded blank of the "display" type;
- figure 9A, 9B and 9C show each a schematic view of the final closing steps of a "display" type box;
- figure 10 and 11 show each a schematic view of the machine operative cycle using two different flat blanks.

[0011] With reference to figures 1 to 6, numeral 1 refers to a machine for packaging articles 2 inside boxes 4 made from a blank 3.

[0012] The blank has a series of longitudinal 3a and transversal 3b scores and a series of cuts 3c defining front 8a and rear 8b wings and lateral end flaps 9, lower 9a and upper 9b.

[0013] This machine essentially includes a magazine 5, a mechanical handling means 10 and a final closing station 30, an exit station 6 of the formed boxes and an unit fit to control and command the synchronous moving of the all operating elements of the machine 1.

[0014] The magazine 5, designed to contain a plurality of blanks 3 stacked in such a way to be picked up from the stack bottom, is provided with regulating means of the width in such a way to adjusted for the different size of the blanks stored therein.

[0015] In particular in figures from 2A to 3B is shown an handling means 10, fit for picking up flat tubular shaped blanks 3 from the magazine 5, which is supported in a rotating way by a carriage 7 sliding on a series of guides 11 parallel to the operative axis of the machine 1 in such a way that the handing means 10 extends from the guides 11 and can alternatively slide among the magazine 5 and the exit station 6.

[0016] The handling means 10 includes a pivoting body 12 pivoted to the carriage 7 and supporting at the

upper end a base 13 provided with first suction means 15 of the suction cup type, to which pivoting erecting members 14 are hinged, provided with second suction means 16 of suction cup type.

[0017] Rotating means 20 include a base 21a fixed to the handling means 10 and a movable base 21b supported in a sliding way by this latter and fit to be spaced from the fixed base 21a by virtue of known spacing means, of a driven screw type, or moved manually by means of an hand wheel, and on the basis of different operative needs depending on the side wall transversal size of each blank 3.

[0018] The bases, fixed 21a and movable 21b, support in a rotating way respectively an inner 22a and outer 22b brackets, fit for folding respectively the rear wings 8a and 8b.

[0019] Figures 4A and 4B show said closing station 30 that includes a frame 38 supporting a double couple of conveyors 55 fit for carrying said box 4 in correspondence of the passage from the feeding condition I to the exit station 6.

[0020] The closing station 30, shown in figures 4A and 4B, further includes lower folding means 40 that are constituted by a couple of first plates 41 hinged to the sides of each conveyor 55 and are fit to tilt the side flaps 9, lower 9a, during the passage from a non interference horizontal condition NI to an interference condition II with these latter.

[0021] The distances between the first plates 41 and the second plates 51 are adjustable according to the longitudinal size (height) of the box side walls, by means of known devices of a powered screw type or manually operated by a hand wheel screw type. Similarly, the first plates 41 and the second plates 51 are mutually spaced according to the transversal size (thickness) of the blank side walls.

[0022] The upper folding means 50 are constrained in a sliding way to the frame 38 through vertical guides 39 and can be spaced from the lower folding means 40 according to the side wall size of each blank 3 adjacent to the one that touches the conveyors 55.

[0023] Fixed folding means 35 are in the closing station 30, and are constituted by a couple of curved brackets 35a placed between the same station and the hand means 10, having the curved edge facing this latter.

[0024] The closing station 30 further includes a gluing group 60, placed downstream the fixed folding means 35 and upstream the lower 40 and upper 50 folding means, and are fitted to sprinkle with glue the front 8a and rear 8b wings of the blank 3 erected in an unclosed box by the handling means 10.

[0025] The operation of the machine 1 is controlled by the running software program executed by the control and command unit and includes the following sequence of operative conditions.

[0026] At first the handling means 10 is displaced into the picking up condition P, in which the suction cup base 13, when activated, engages the end blank 3 of the stack in the magazine 5: in particular the pivoting body 12 is rotated of about 80° with respect to the vertical axis, so that the base 13 is parallel to the plane formed by the flat blanks 3 stacked in the magazine 5.

[0027] Therefore during the passage from the tilting condition R, the handling means 10 is moved toward the closing station 30 and rotate its head until the base 12 become vertical and the blank is horizontal. The pivoting erecting members 14 are then activated and tilted onto the side wall of the blank 3 adjacent to the one horizontally hold by the suction base 13. The second suction cup means 16 are then activated and, with an opposite movement, the pivoting erecting members 14 come back orthogonal to the base 13 and the blank 3 is erected by stretching along the longitudinal scores 3a.

[0028] The command unit therefore drive the handling means into the forming condition F in which the folding means 22 tilt the outer rear wing 8b of the blank 3, by pivoting the movable outer base 21b. A this moment, as schematically shown in figure 4, the articles 2 are inserted, in a known way, by means of pushing means into the erected blank box up to the wing 8b.

[0029] Under the direct control of the command unit, the following operation are sequentially activated: activation of the fixed base 21b of the rotating means 20 for folding the inner rear wing 8b; activation of the feeding condition I in which the handling means 10 put the box 4 into the closing station 30, that, through its movement toward the closing station 30, cause the front wings 8a interfere with the fixed folding means 35, that fold them inwards the erected blank box; activation of the gluing group 60 that sprinkle warm glue on the front 8a and rear 8b wings; activation of the lower 41 and upper 51 plates that fold the lateral flaps 9, respectively lower 9a and upper 9b, against the wings 8a and 8b gluing them; deactivation of the suction cup means, first 15 and second 16.

[0030] Now the box 4 is fully formed and filled with articles 2 and then it is carried from the closing station 30 to the exit station 6 by activating the conveyors 55.

[0031] It is important to notice the extreme versatility of the machine 1 and in particular the hand means 10, by virtue of its extension from the its moving members (i.e., guides 11 supporting the carriage 7), keeps free, checkable, clean and clearable the underlying portion from anything, for instance accidental as broken boxes 4 and/or articles 2 during the forming condition F of the blank 3 and/or during the box filling with said articles.

[0032] Besides the "handling" of the blank 3, of the erected blank, of the formed and filled box with the articles 2, is always operated by the handling means 10 without transferring the blank and the successive filled box to other members (for example conveyor chains, shapes, forming heads, etc.) so that the secure keeping of the blank-box and then its "squaring" is guarantied during each operative step of forming-filling-carrying of

the box 4. That means the safe handling of the blank-box and then the reduction of the machine 1 failure, the increase of its reliability and, mainly, the independence from the quality and the type of the blank carton: indeed it can be used thin paperboard for small boxes till very thick corrugated cardboard.

[0033] A second embodiment of the machine 1 is shown in figures from 6A to 11, in which the mechanical hand means 11 and the closing station 30 include further members fit for forming the boxes 4 made from flat blanks 3 with which it is possible to make the so-called "wrap" package, as shown in figure 11.

[0034] The mechanical hand means 10 provides that the base 13 is hinged not only with the pivoting erecting members 14, called rear pivoting erecting members 14b, but also with a further front pivoting erecting members 14a, having second suction cup means 16. These pivoting erecting members, frontal 14a and rear 14b, are coplanar with the base 13 and are fit to engage the wall of free blank in the magazine 5, by means of the second suction cups 16, in correspondence of the picking up condition P.

[0035] In this case, the closing station 30 further includes free wheel means 90 connected to the frame 38 of the station 30 and fit to fold the side wall, so providing the cover 18 of said blank formed during the passage of the box 4 through said closing station 30 toward said exit station 6. At least a folder 95 is provided, hinged at the frame 38 facing the handling means 10 and fit to tilt the free wing 18a of said cover 18 onto a side wall of said blank 3.

[0036] The closing station 30 comprises besides the first gluing group 60, fit to sprinkle the front 8a and rear 8b wings with glue, also a second gluing group 65 fixed to the frame 38 by means of a bar 66, vertically movable, by virtue of a motor drive 67, so to be placed in correspondence of the free tab18a of the cover 18 for sprinkling glue thereon.

[0037] About this second embodiment, the operation of the machine are the same for forming the boxes so called "American" carried out from a closed flat tubular blank, with the difference that the mechanical hand means 10 pass from the picking up condition P to an extraction condition E, in which said pivoting body 12 is horizontal and the base 13 and the erecting members 14a and 14b are coplanar, and to a forming condition F in which these latter erecting members are orthogonal to said base 13 and said blank 3 is "U" shaped.

[0038] Besides the cover 18, still erect in the loading condition C of articles 2 inside this "U" blank-box, is pull down over this latter by means of the free wheel means 90 and finally the frontal folder 95 presses the free edge 18a of the cover 18 onto the adjacent side wall, after glue sprinkling inside said free edge 18a due to the second gluing group 65.

[0039] The commands and controls for making these operations are controlled by the control and command unit software that commands the actuators for synchronising their activation and deactivation.

[0040] The figure 10 shows a third embodiment of machine 1 in which the blanks 3 have a couple of lateral lower flaps 9 having free edge 9c designed to form a so-called "display" box.

[0041] In this third embodiment, the machine 1 has a shape 80, see figures 7A-8C, sliding vertically through lift means 81 fixed to the frame 38 of the same station, and the upper folding means 50 have hinged plates 51 fit to tilt inwards the "U" blank during the passage through the closing station 30 for tilting the free edge 9c.

[0042] The operation of the machine 1 according to this third embodiment is similar to the second embodiment with the difference that at the end of the forming condition F of the blank 3, this latter is "U" shaped and the lateral rear wings 8b are both folded by means of rotation of the inner 22a and outer 22b brackets. Another variant is that, after the condition F, a further condition FF is carried out, by means of the control and command unit, in which the mechanical hand means 10, during the movement inside the closing station 30, let the lateral front wings 8a to tilt; therefore, when the closing station 30 is reached, it release the "U" folded blanks with the lateral front 8a and rear 8b wings tilted, in such a way that the shape 80 is inserted into said "U" from the top so to be a shape for the box 4 and the lower folding means 40 tilt the lateral flaps 9 towards said shape 80.

[0043] The shape 80 is then raised from the blank-box and the mechanical hand means 10 carries back the so formed box in correspondence of the loading condition C of the articles inside therein.

[0044] A this moment, the control and command unit operate again the mechanical hand means 10 that releases the box 4 filled with articles 2 onto the conveyors 55 for completing the closing steps of the box 4 through the glue sprinkling on the free edge 18a of the cover 18 by means of the second gluing group 65 and the upper folding means 50 fold inwards said free edge of the side flaps 9 and the free wheel means 90 tilt the cover 18 and finally the frontal folder 95 folds the free edge 18a onto the side wall of the box, as for the second embodiment of the machine 1.

[0045] It is advantageous to notice that the mechanical hand means 10, since operated by said control and command unit, is stopped and moved in any direction between said magazine 5 and said station 30, in such a way to make the machine 1 extremely versatile, so, for example, to displace the blank or the box to be formed or just formed in front of eventual labelling or control stations, etc.

[0046] The main advantage of the invention is to provide a machine for packaging articles inside boxes made by a mechanical hand device designed to avoid the machine stops in correspondence of articles and/or boxes breaking during the packaging.

[0047] Further advantage is to provide a machine constituted by a reduced number of functional group,

and fit to work with both a flat blank and a flat tubular blank.

[0048] Another advantage is to provide a machine fit for working with any type of blank carton because it is provided with a single mechanical hand and forming device of the box that avoids the passage of the box from a group to another in correspondence of the forming and the filling of this latter.

[0049] Another advantage is to provide a machine easy to install and of simple maintenance.

Claims

1. Machine for packaging articles (2) inside boxes (4) made from blanks (3), having a plurality of longitudinal (3a) and transversal scores (3b) and a plurality of cuts (3c) defining front (8a) and rear (8b) wings and lateral flaps (9), said machine essentially comprising a magazine (5) for a plurality of said blanks (3) and an exit station (6) of said boxes (4) made and filled with said articles (2), said machine (1) being characterised in that includes:

   - at least a mechanical hand means (10) supported in a rotating way by a carriage (7) and movable between said magazine (5) and said exit station (6) from a picking up condition (P) in which said mechanical hand means (10) picks up a blank (3), a forming condition (F) in which said mechanical hand means (10) folds each blank (3) along said longitudinal scores (3a) by means of at least pivoting erecting members (14) connected to said mechanical hand means (10) that besides fold said rear wings (8b) inwards by means of rotating means (20);
   - at least a closing station (30) provided with fixed folding means (35), fit to fold backwards said front wings (8a) in correspondence of a feeding condition (I) of said blank (3) into said closing station (30), and lower (40) and upper (50) folding means designed to tilt respectively said lateral flaps (9) onto said front (8a) and rear (8b) wings in such a way to close said box (4).

2. Machine according to claim 1 characterised in that said carriage (7) is supported in a sliding way by a plurality of guides (11) parallel to the operative axis of said machine (1) in such a way that said mechanical hand means (10) extends beyond said guides (11) and alternatively slides between said magazine (5) and said exit station (6).

3. Machine according to claim 1 characterised in that said mechanical hand means (10) includes a pivoting body (12) hinged to said carriage (7) and supporting at the upper end a base (13) provided with first suction means (15) to which said pivoting erecting members (14) are hinged, provided with second suction means (16) with at least said base (13) fit to grasp a first side wall of each blank (3) in correspondence of said picking up condition (P) from the magazine (5) and with said pivoting erecting members (14) fit to grasp a side wall of said blank (3) next to said first side wall in correspondence of said forming condition (F).

4. Machine according to claim 3 characterised in that said blank (3) is a flat tubular and that said mechanical hand means (10) has said pivoting erecting members (14) orthogonal to said suction base (13) in correspondence of the picking up condition (P) of each blank (3) in which said pivoting body (12) is rotated in such a way that said base (13) is parallel to the surface defined by said flat blanks (3) stacked in said magazine (5) and picks up one blank (3), with said mechanical hand means (10) in vertical position in correspondence of the movement of this latter from said picking up condition (P) to a tilting condition (R) in which said pivoting erecting members (14) are tilted, with grasping condition, onto said flat tubular blank (3), and with pivoting erecting members (14) orthogonal to said base (13) in correspondence of said forming condition (F) in which said tubular blank (3) is erected.

5. Machine according to claim 1 characterised in that said rotating means (20) include a base (21a) fixed to said mechanical hand means (10) and a movable base (21b) supported in a sliding way by this latter and fit to be mutually spaced from said fixed base (21a) according to the transversal size of said side walls of each blank (3), with each of said bases, fixed (21a) and movable (21b), supporting in a rotating way respectively an inner (22a) and an outer (22b) bracket which rotates, tilting said rear external wing (8b) of said erected blank (3) after said forming condition (F) and before a loading condition (C) in which said articles (2) are placed into said box (4), while said inner bracket (22a) rotates, tilting inwards said rear inner wing (8b) of the erected blank (3) after said loading condition (C) and before said feeding condition (I).

6. Machine according to claim 1 characterised in that said fixed folding means (35) are constituted by a couple of curved brackets (35a) provided with an edge facing said mechanical hand means (10).

7. Machine according to claim 1 characterised in that said closing station (30) comprises a frame (38) supporting a conveyor (55) fit to convey said box (4) within said closing station (30) passing from said feeding condition (I) to said exit station (6) and said lower folding means (40) includes a couple of first plates (41) laterally hinged to said conveyor (55)

and fit to tilt said lateral flaps 9, lower 9a, passing from an horizontal non interference condition (NI) to an interference condition (II) with these latter, and that said upper folding means (50) includes a couple of second plates (51) laterally hinged to said conveyor (55) and fit to tilt said lateral flaps (9), upper (9b), passing from an horizontal non interference condition (NI) to an interference condition (II) with these latter.

8. Machine according to claim 1 characterised in that said closing station (30) further includes a gluing group (60), placed downstream said fixed folding means (35) and upstream said lower (40) and upper (50) folding means (40), and designed to sprinkle said front (8a) and rear (8b) wings with glue.

9. Machine according to claim 1 characterised in that said mechanical hand means (10) includes a pivoting body (12) hinged to said carriage (7) and supporting at the upper end a base (13) provided with first suction means (15) to which sides said pivoting erecting members, frontal (14a) and rear (14b), are hinged, provided with second suction means (16), with at least said base (13) fit to grasp a first side wall of each blank (3) in correspondence of said taking condition (P) from the magazine (5) and said pivoting erecting members, frontal (14a) and rear (14b), coplanar with said base (13), fit to grasp said first side wall in correspondence of said picking up condition (P), of an extraction condition (E) in which said pivoting body (12) is horizontal, and of said forming condition (F), in which said pivoting erecting members, frontal (14a) and rear (14b), are orthogonal to said base (13) and said blank (3) is "U" shaped.

10. Machine according to claim 1 characterised in that said rotating means (20) include a base (21a) fixed to said mechanical hand means (10) and a movable base (21b) supported in a sliding way by this latter and fit to be mutually spaced from said fixed base (21a) according to the transversal size of said side walls of each blank (3), with each of said bases, fixed (21a) and movable (21b), supporting in a rotating way respectively an inner (22a) and an outer (22b) bracket that rotates, tilting said rear wings (8b), inner and outer, of said erected blank (3) after said forming condition (F) and before a loading condition (C) in which said articles (2) are placed into said box.

11. Machine according to claims 9 and 10 characterised in that said closing station (30) comprises:

- a frame 38 supporting at least a conveyor 55 designed to carry said box (4) within said closing station (30);
- said lower folding means (40) being constituted by a couple of first plates (41) hinged to the sides of said conveyor (55) and designed to tilt said lateral flaps (9) in correspondence of a second forming condition (FF), following said forming condition and preceding said loading condition (C), in which said blank (3) is carried by said mechanical hand means (10) within said closing station (30);
- a shape (80) sliding vertically through a lifting means (81) fit to be inserted into blank (3) "U" shaped in correspondence of said second forming condition (FF);
- said upper folding means (50) including a couple of second plates (51) placed alongside said conveyor (55), movable vertically and fit to fold the free wings of said flaps (9);
- free wheel means (90), designed to fold the side wall acting as cover (18) of said "U" shaped blank, acting on said cover (18) during the passage of the box 4 through said closing station (30) to said exit station (6);
- at least a folder (95) hinged to said frame (38) and fit to tilt the free edge of said cover (18) on a side wall of said blank (3).

12. Machine according to claims 7 or 11 characterised in that both said first plates (41) and second plates (42) are mutually spaced according to the longitudinal size of the blank side walls.

13. Machine according to claims 7 or 11 characterised in that said upper folding means (50) are slidingly connected to said frame (38) by means of vertical guides (39) and are spaced from said lower folding means (40) according to the side wall size of each blank (3) adjacent to the one which contacts said conveyor (55).

14. Machine according to claim 11 characterised in that said closing station (30) further includes:

- a first gluing group (60), placed downstream said fixed folding means (35) and upstream said lower (40) and upper (50) folding means, and fit to sprinkle said front (8a) and rear (8b) wings with glue;
- a second gluing group (65) vertically connected to said frame (38) and fit to slide vertically so facing the free edge of the cover (18) for sprinkling it with glue.

15. Machine according to claim 1 characterised in that further includes a control and command unit fit to synchronise the activation and the moving of said mechanical hand means (10) in phase relationship with said closing station (30).

16. Machine according to claim 1 characterised in that said blank (3) is made of thin paperboard or corrugated cardboard.

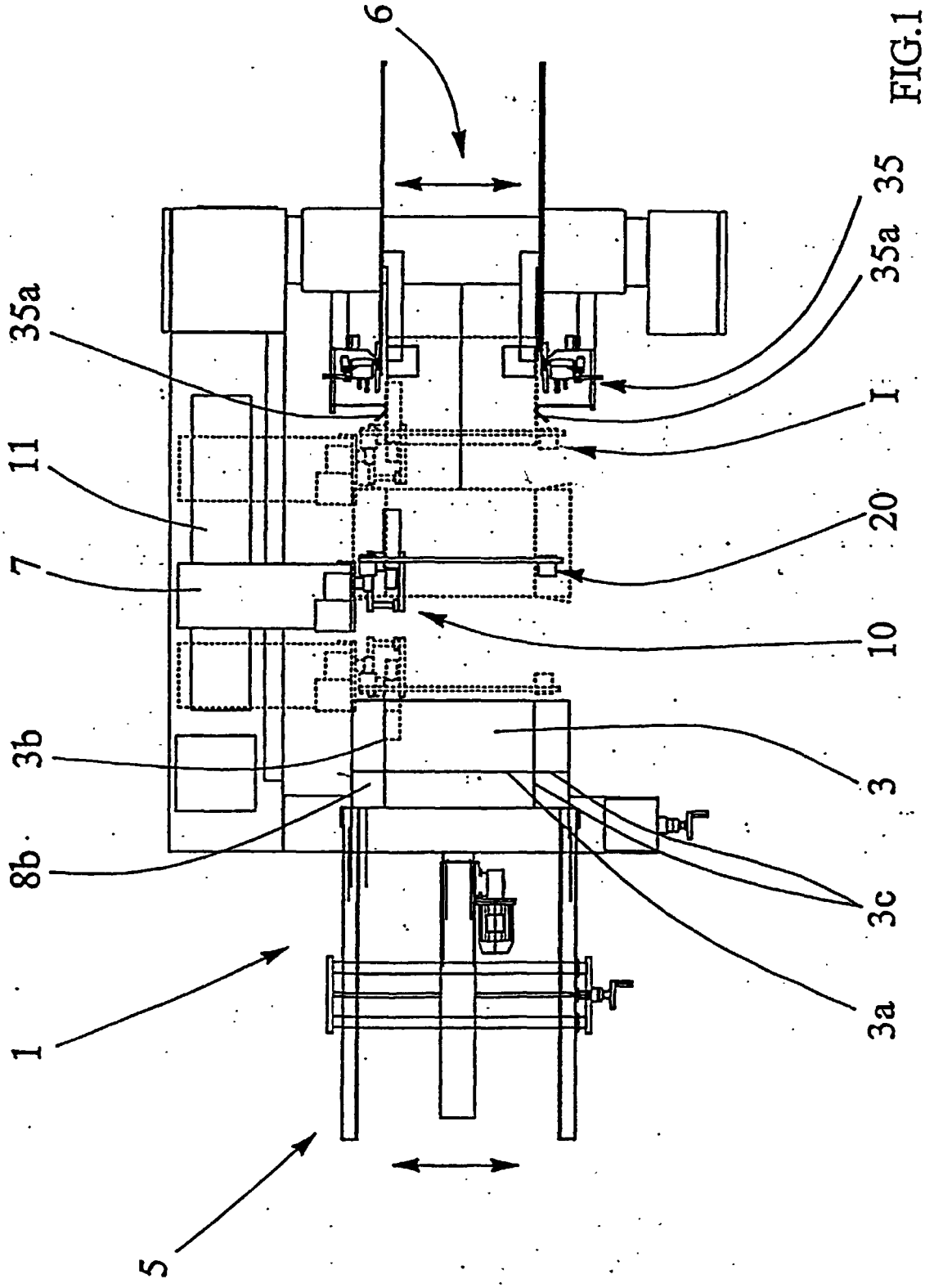

FIG.1

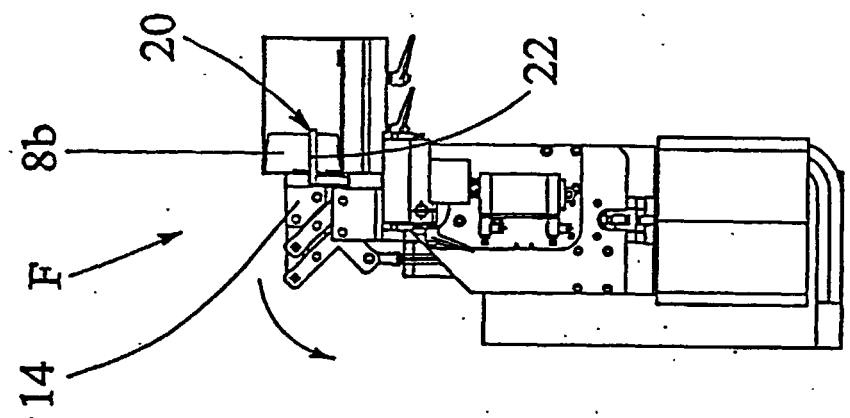

FIG.2C

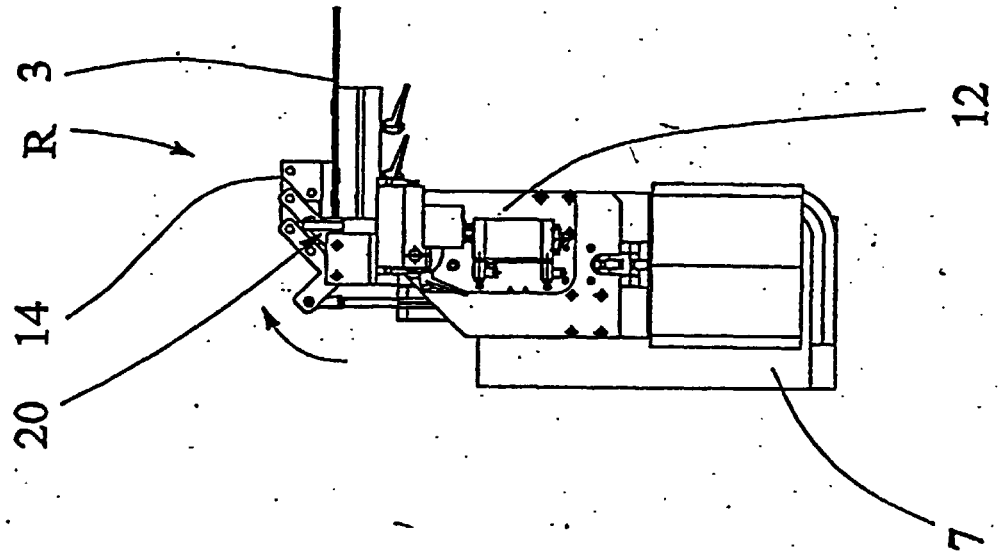

FIG.2B

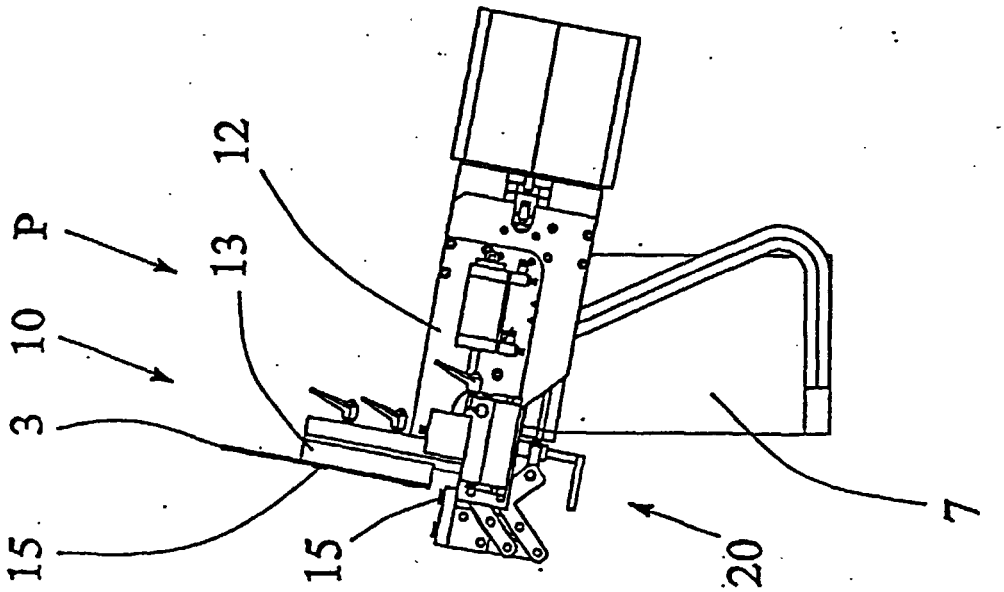

FIG.2A

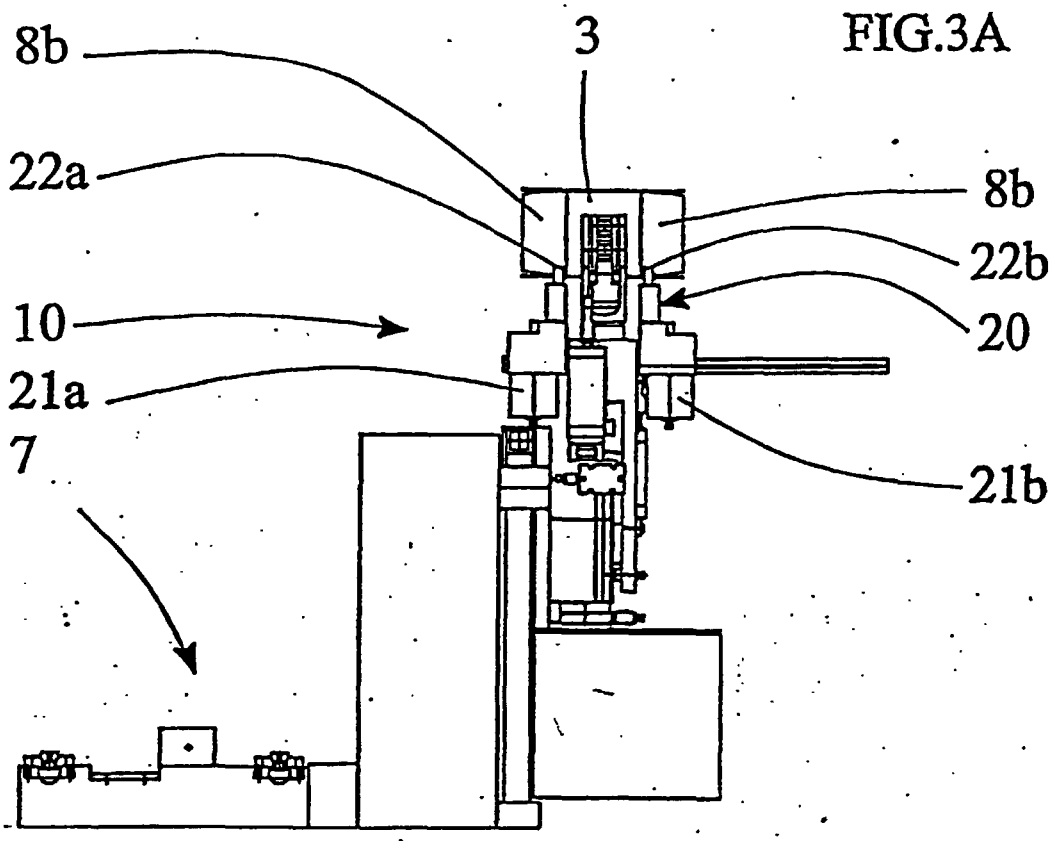

FIG.3A

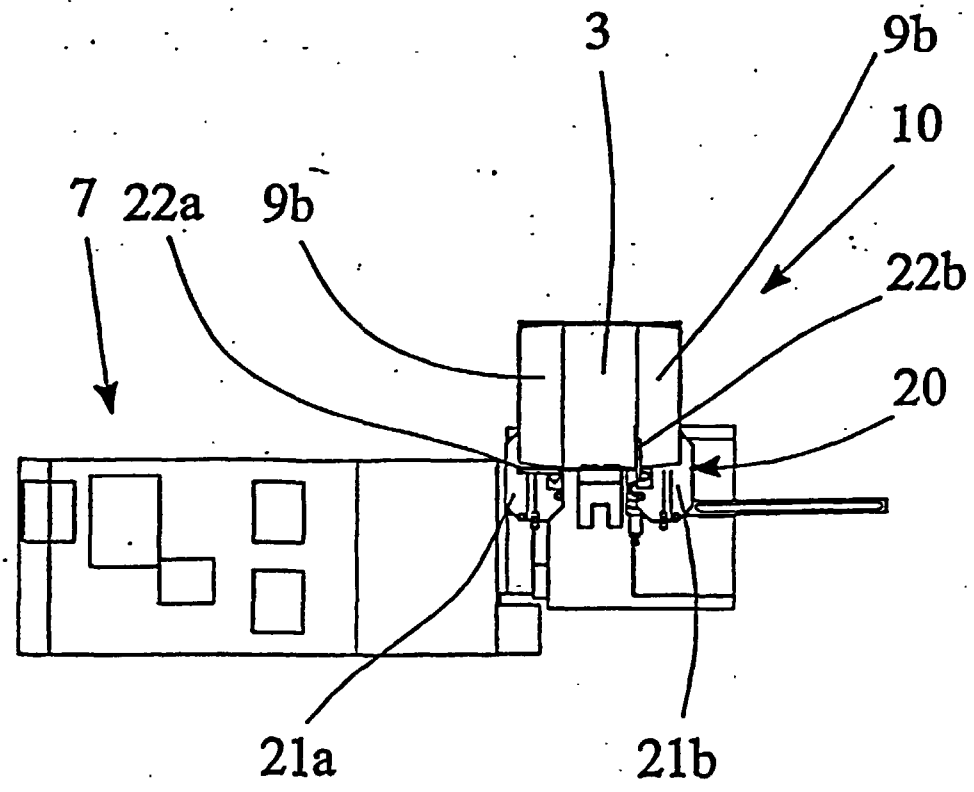

FIG.3B

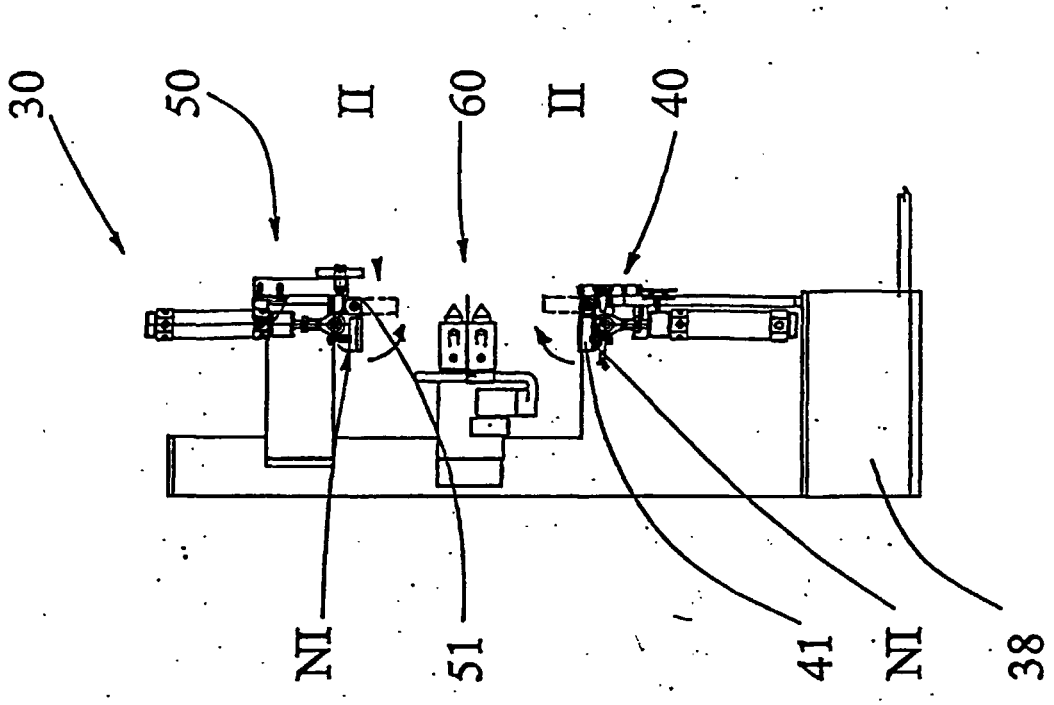

FIG.4B

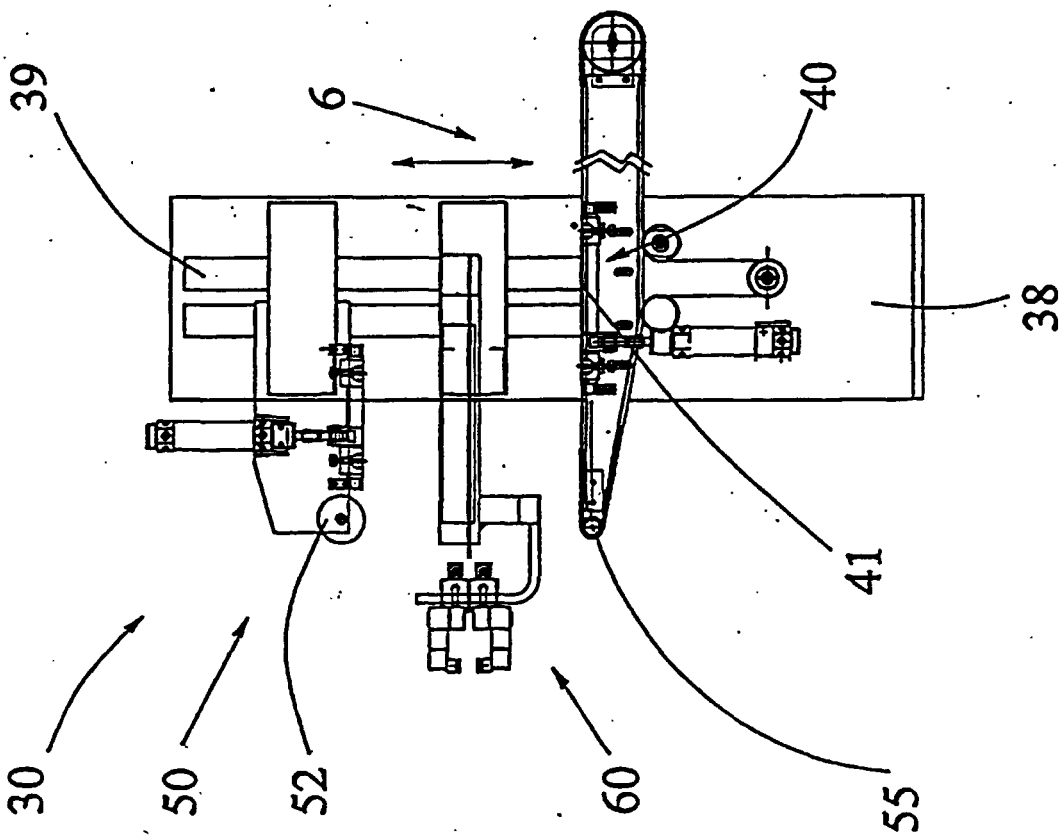

FIG.4A

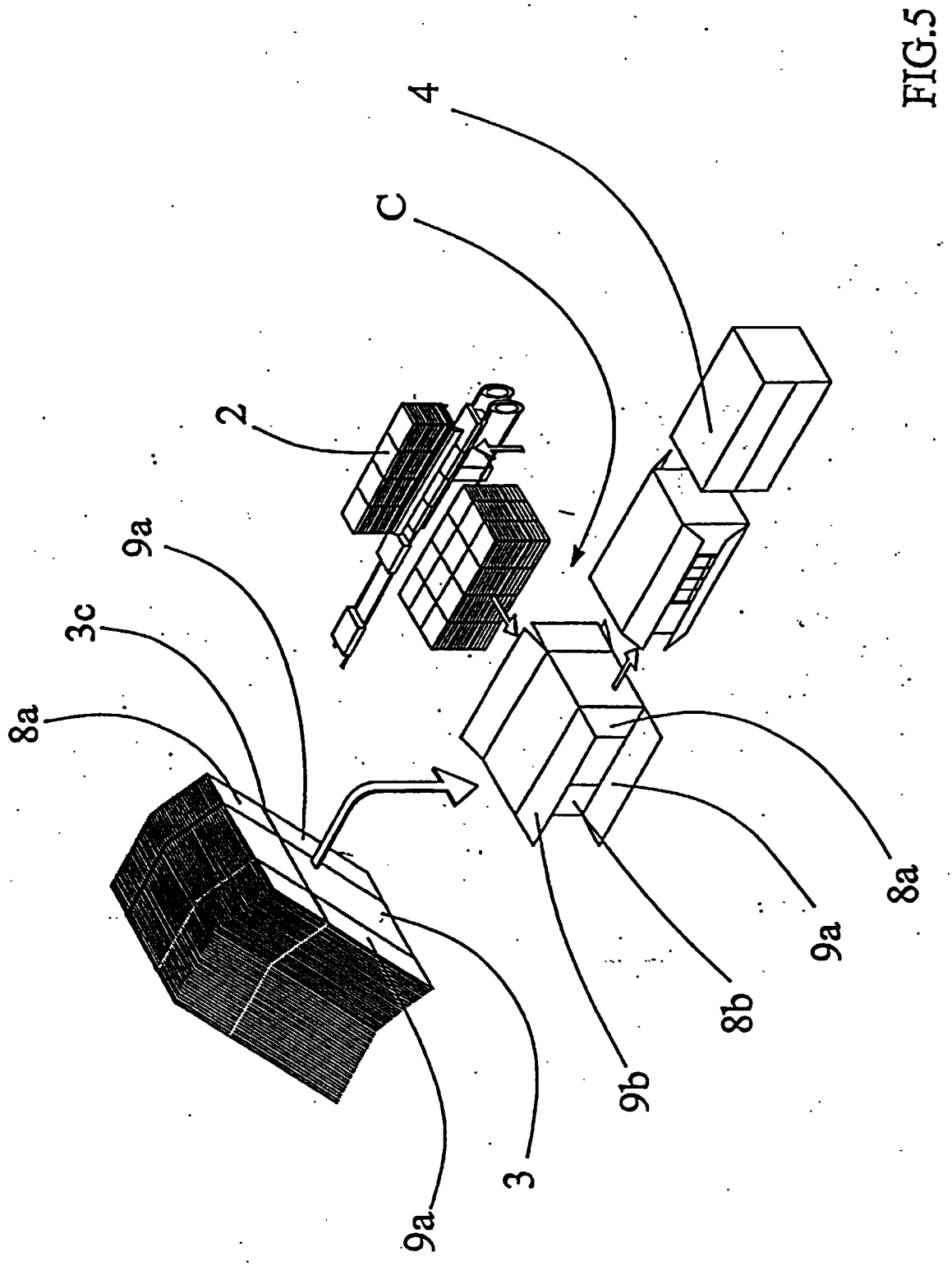

FIG.5

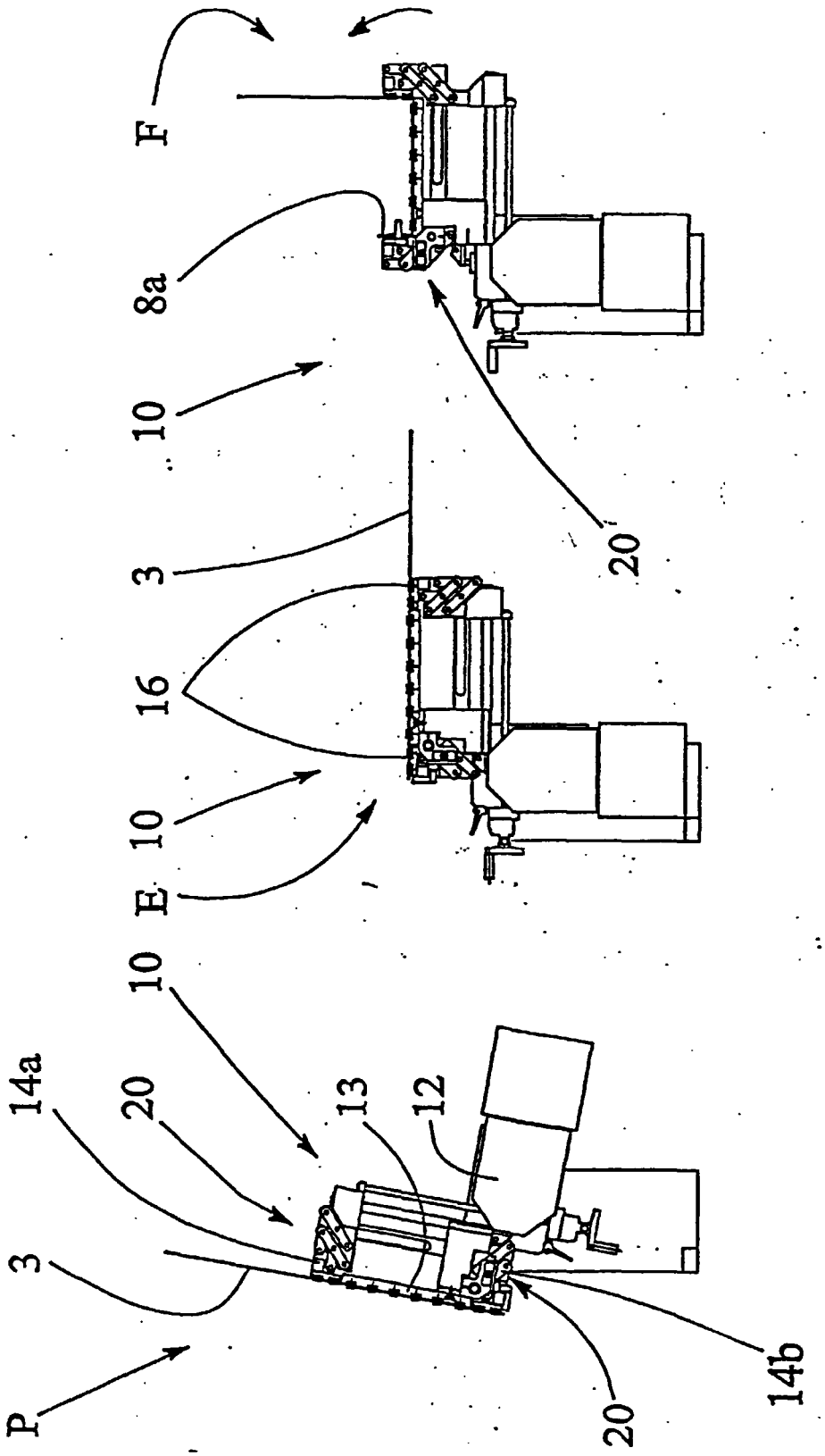

FIG.6C

FIG.6B

FIG.6A

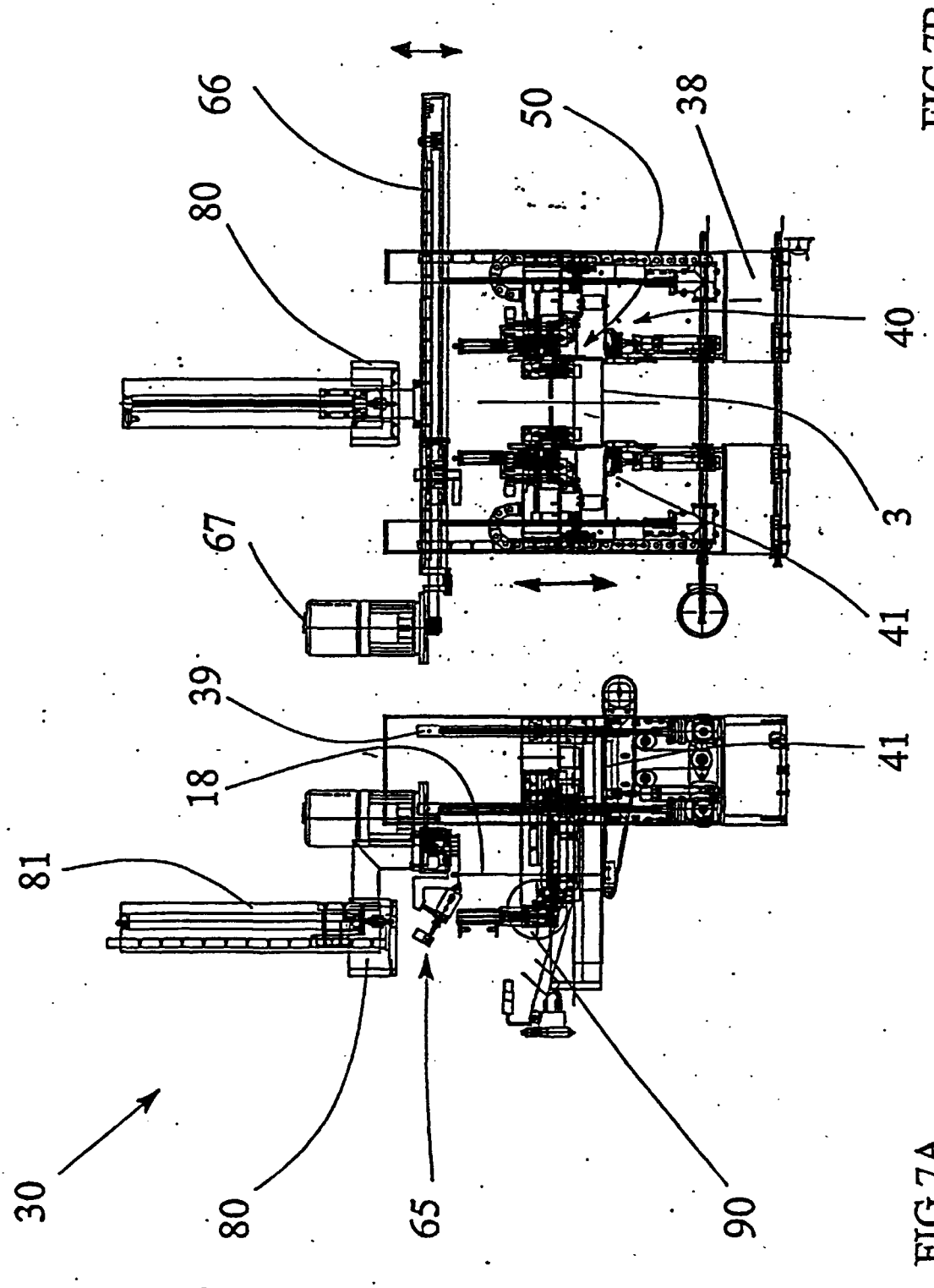

FIG.7A

FIG.7B

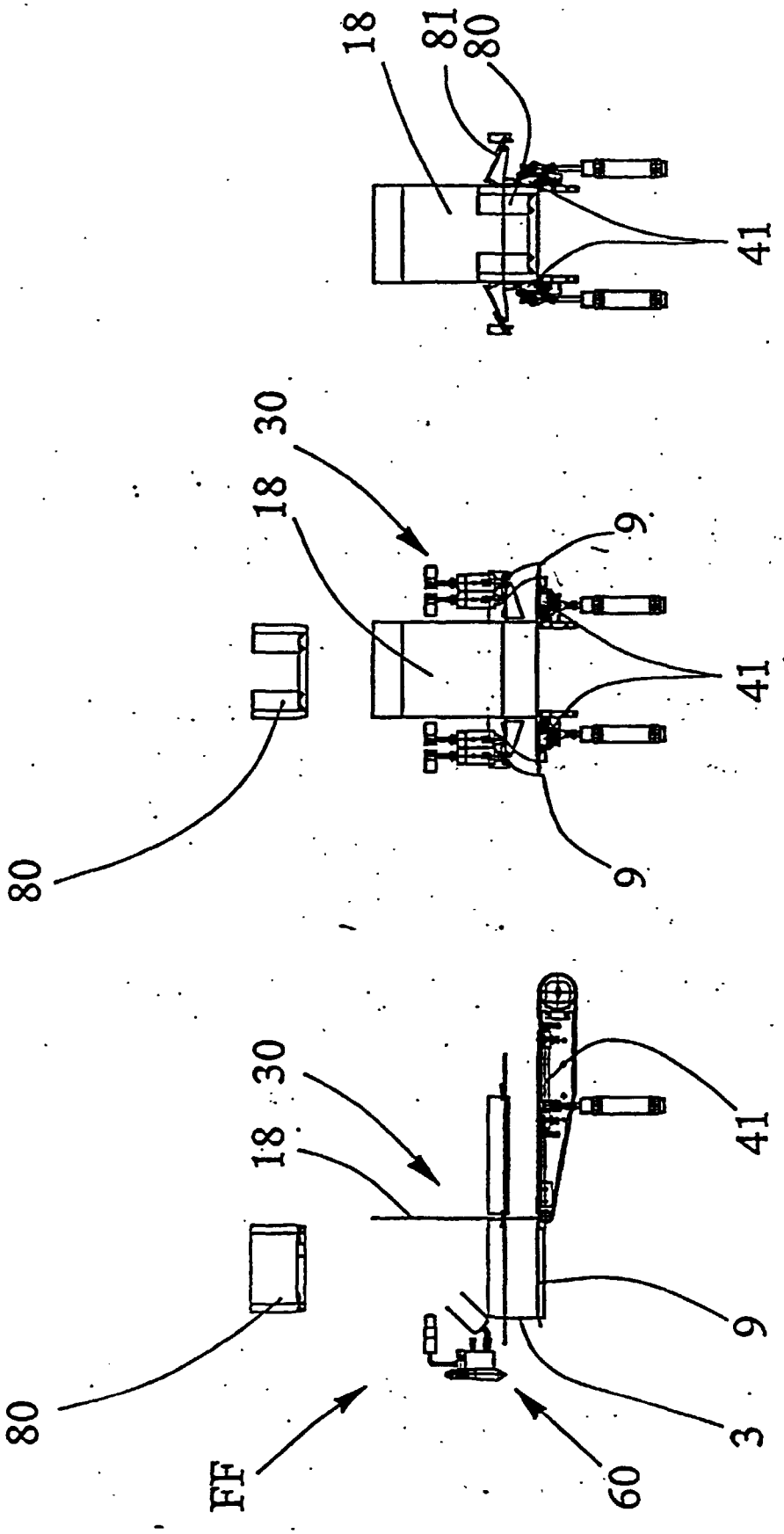

FIG.8C

FIG.8B

FIG.8A

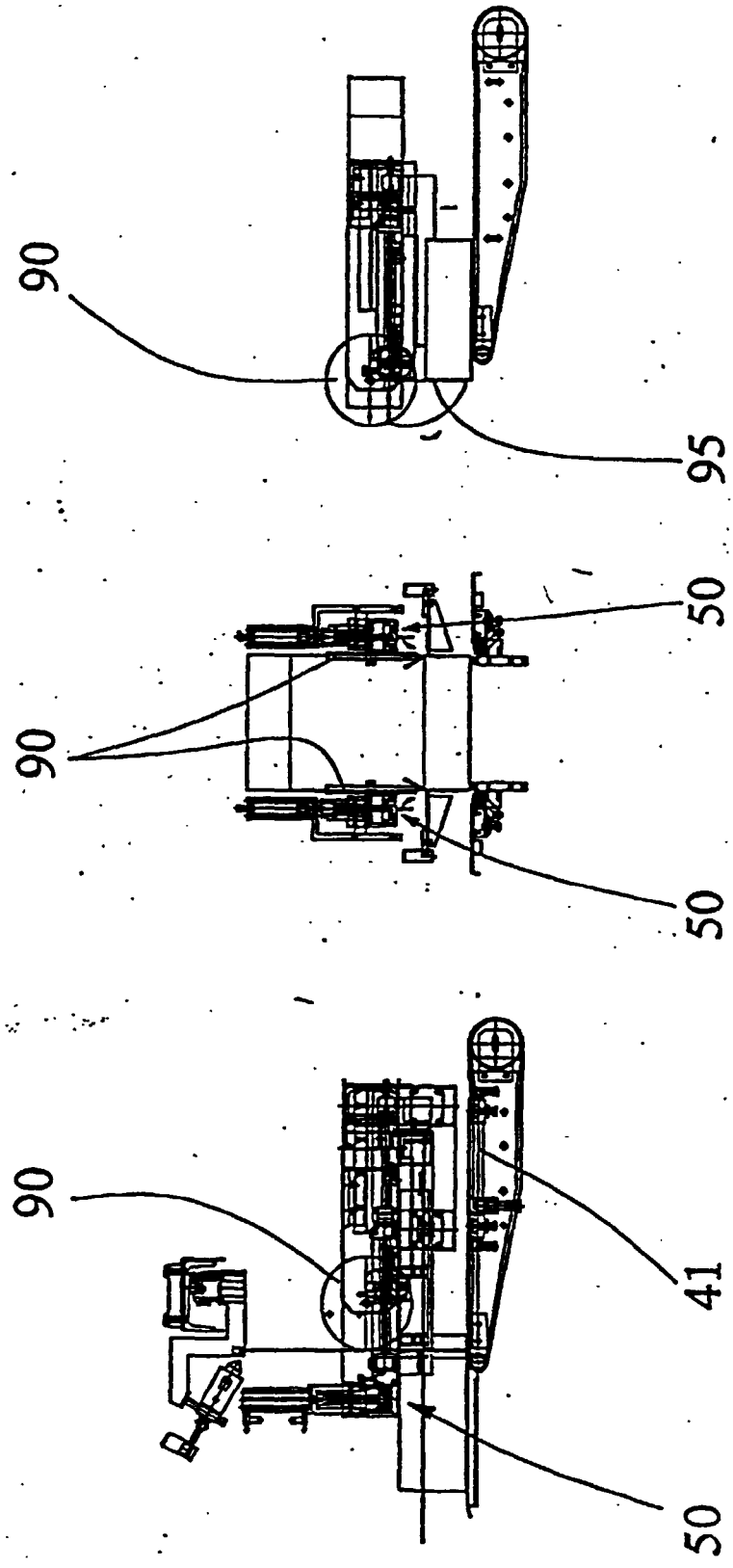

FIG.9C

FIG.9B

FIG.9A

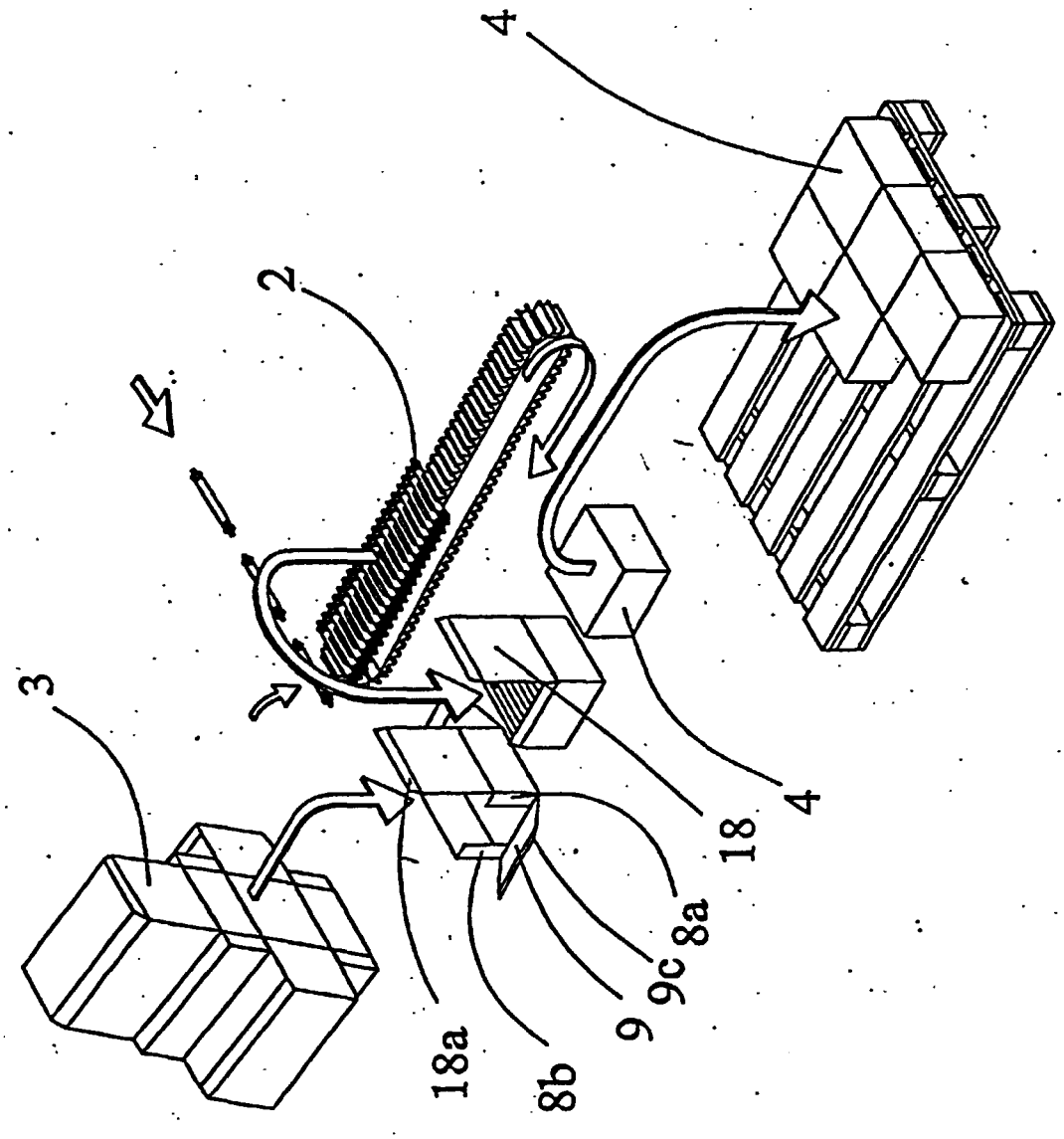

FIG.10

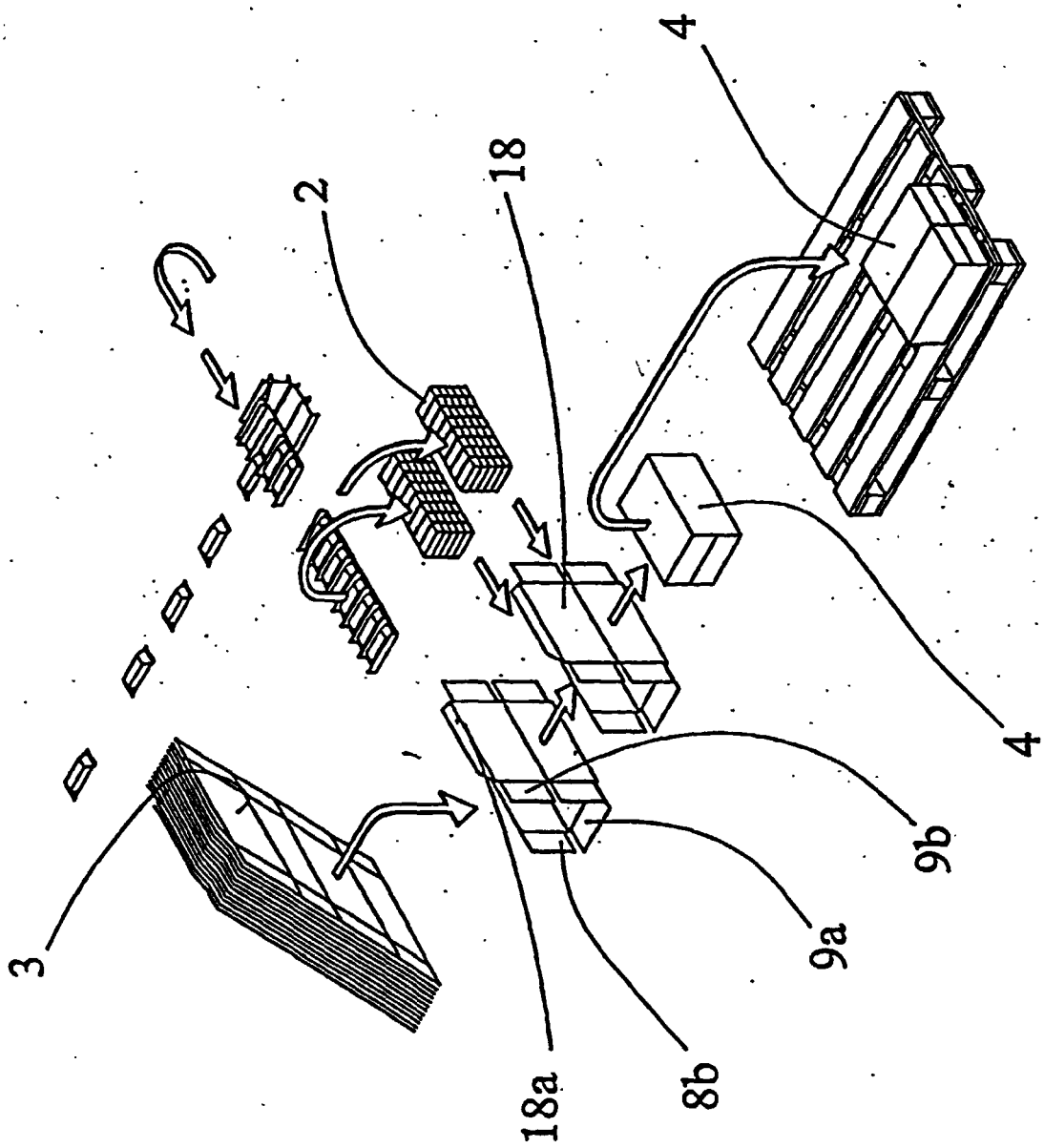

FIG.11

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 12 2800

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	GB 2 240 315 A (FREEMANTLE) 31 July 1991 (1991-07-31) * abstract * * page 2, line 22 - page 3, line 25; figures 1-6 *	1	B65B5/02
A	WO 89 00132 A (WHITE) 12 January 1989 (1989-01-12) * page 9, line 33 - page 11, line 33; figure 2 *	1,3,4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 February 2000	Claeys, H

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 12 2800

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.

18-02-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2240315 A	31-07-1991	NONE	
WO 8900132 A	12-01-1989	AU 606446 B	07-02-1991
		AU 2074988 A	30-01-1989
		NZ 225332 A	21-12-1989

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82