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(54) A machine for packing cartons containing bottles separated by separators

(57) The machine for packing cartons comprises: a mobile rest plane (2) for open cartons; a traverse (3) which is parallel to the mobile rest plane (2), and which is mobile on planes which are parallel and perpendicular to the mobile rest plane (2); means (4) for manipulating opened separators (51) into open cartons and means (5) for manipulating bottles, both of which means (4, 5) are connected to the traverse (3) and are solid in movement there-with; means (6) for stocking and opening the cardboard separators (51), which means (6) are located by the side of the mobile rest plane (2); means (7) for stocking and supplying bottles to the means (5) for manipulating bottles, located by the side of mobile rest plane (2) and aligned with the means (6) for stocking and opening the cardboard separators (51) in a parallel direction to the mobile rest plane (2).

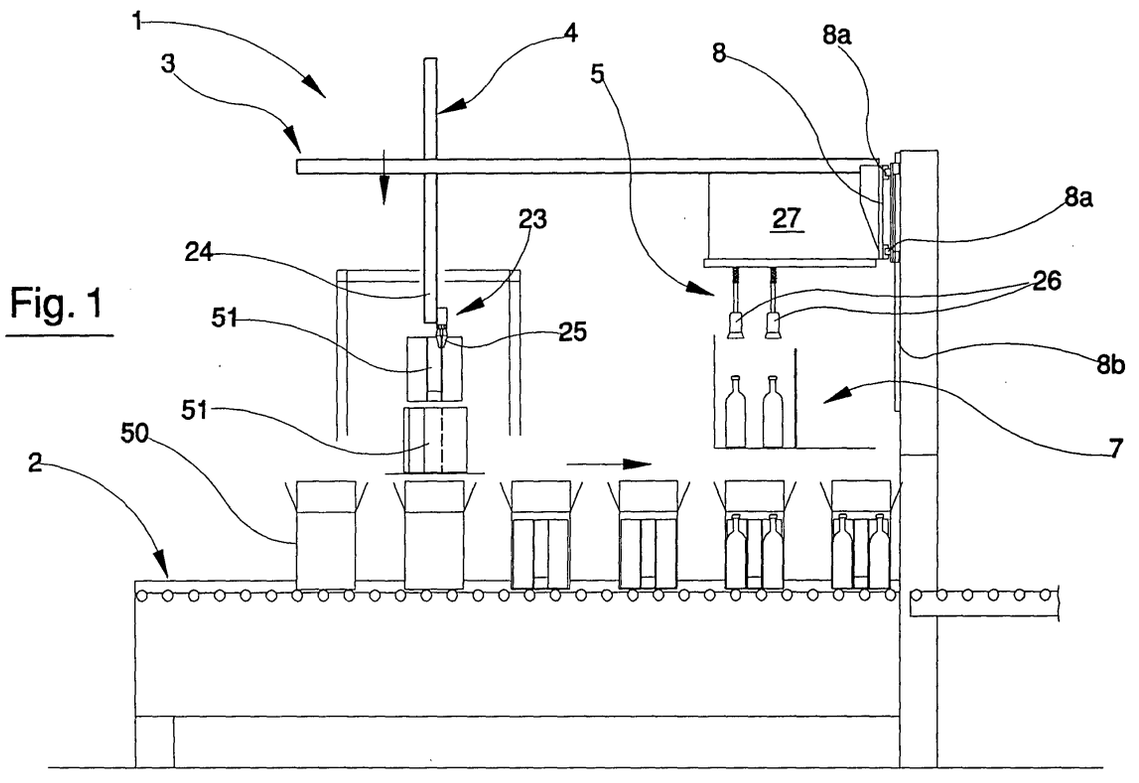

Fig. 1

EP 1 410 995 A1

Description

[0001] The prior art teaches machines for packing bottles in cardboard boxes, known as "cartons" which machines introduce into open cartons a certain number of bottles by picking them up with gripping heads from supply and stocking stations. Where it is necessary to place a cardboard "cell" structure between the bottles, for example, these separators are generally applied manually or by a dedicated machine either before or after the bottles themselves are inserted.

[0002] The main aim of the present invention is to obviate the above-cited drawback by providing a machine for packing bottles in cartons and for interpositioning of separator cells between the bottles themselves, the machine carrying out the bottle and separator insertion operation in parallel on various units of product.

[0003] A first advantage of the machine is that use of an autonomous machine dedicated to the insertion of the separators is rendered superfluous, thus limiting the cost of the plant.

[0004] A second advantage of the machine is that it simplifies the logistical management of the packaging plant, which is served by a single transport system which develops along the various stations.

[0005] A third advantage of the machine is that it simplifies control of the production cycle, as the main stages of the packing process are grouped together and managed by a single unit.

[0006] Further characteristics and advantages of the present invention will better emerge from the detailed description of a machine for packing bottles in cartons with an interpositioning of separators between the bottles which follows, with reference to the figures of the drawings, which are included by way of non-limiting example, and in which:

figure 1 is a first view in longitudinal section of a machine according to the present invention;
figure 2 is a first view in transversal section of the machine of figure 1;
figure 3 is a first view in transversal and partial section of the machine of figure 2, in a first operative configuration;
figure 4 is a second view in transversal and partial section of the machine of figure 2, in a second operative configuration;
figure 5 is a detail of the machine of figure 1;
figure 6 is a view from above of the detail of figure 5 in a first operative configuration;
figure 7 is a view from above of the detail of figure 5 in a second operative configuration.

[0007] With reference to the figures of the drawings, the machine is indicated in its entirety by number 1. The machine comprises a mobile rest plane 2 for open cartons, above which is located a traverse 3 parallel to the plane 2. The traverse 3 is mobile on planes which are parallel to the mobile rest plane 2, between a position which is external and a position which is vertically above the rest plane 2, and is also mobile on planes which are perpendicular to the mobile rest plane 2, alternatively nearing and distancing from the rest plane 2 itself.

[0008] Means 4 for manipulating opened separators and means 5 for manipulating bottles are connected to the traverse 3 and are solid in movement there-with. The machine also comprises means 6 for stocking and opening the cardboard separators 51, which means are located by the side of the mobile rest plane 2, and means 7 for stocking and supplying bottles to the means 5 for manipulating bottles, located by the side of mobile rest plane 2 and more-or-less aligned with the means 6 for stocking and opening the cardboard separators 51 in a parallel direction to the mobile rest plane 2.

[0009] The traverse 3 is connected to a slide 8 which is slidable on a guide 8a arranged transversally above the mobile rest plane 2. The guide 8a is perpendicularly mobile with respect to the mobile rest plane 2 along two parallel uprights 8b. The traverse 3 is mobile between a position vertically above the mobile rest plane 2 and a position vertically above the means 6 for stocking and opening the cardboard separators 51 and the means 7 for stocking and supplying bottles.

[0010] The means 6 for stocking and opening the cardboard separators 51 comprise a second support frame 16 to which a second support plane 17 for closed separators 51 is connected, parallel to the mobile rest plane 2. The separators 51 are arranged lying on an orthogonal plane to the second support plane 17 in a flattened configuration, and are stocked in at least one row, packed up close together. The separators 51, once opened, are "cell-structured", with a plurality of chambers separated by longitudinal walls, parallel to the motion direction of the mobile rest plane 2, and by transversal walls, perpendicular to the longitudinal walls.

[0011] A containment structure 18 for laterally containing the separators 51 is located above the second support plane 17 and is connected to the second support frame 16.

[0012] The means 6 for stocking and opening the cardboard separators 51 further comprise a plurality of suckers 19 for gripping the separators 51, which suckers 19 are partly connected to at least one fixed support arm 20, and partly to at least one mobile support arm 21 rotating about a vertical axis thereof between two mutually-perpendicular positions. The support arms 20 and 21 are mounted on a support 22 which is mobile with respect to the second support frame 16 between a close-up position to the second support plane 17, in which the suckers 19 grip the separators 51, and a removed position from the second support plane 17, in which the opened separators 51 can be reached by the means 4 for manipulating opened separators 51.

[0013] The separator 51 closest in the row to the mobile rest plane 2 is gripped by the suckers 19. The support arms of the suckers 19 are arranged in such a way

that the fixed arm 20 interacts with a longitudinal wall of the separator 51, while the mobile arm 21 interacts with a transversal wall thereof. Once a good grip has been achieved, the mobile arm 21 is rotated about a vertical axis, drawing the transversal walls into a perpendicular position to the longitudinal walls and bringing the separator 51 into its opened, cell-like operative configuration. Once the opening operation is over, or contemporaneously with it, the support 22 on which the support arms 20 and 21 are mounted is translated towards the mobile rest plane 2.

[0014] The means 4 for manipulating opened separators 51 comprise one or more gripping devices 23, connected to respective uprights 24 arranged perpendicular to the mobile rest plane 2 and solidly connected to the traverse 3. The means 4 for manipulating opened separators 51 can be arranged upstream of the means 5 for manipulating bottles with respect to the movement direction of the cartons, or can be arranged downstream of the means 5 for manipulating bottles with respect to the movement direction of the cartons. In the illustrated embodiment the gripping devices 23 respectively comprise at least one pliers 25 with a gripping plane which is perpendicular to the mobile rest plane 2 and which is predisposed to grip and release a wall of a separator 51.

[0015] The means 5 for manipulating bottles comprise a plurality of gripping heads 26 activated by an operator group 27 which is solidly constrained to the traverse 3. The gripping heads 26 grip the bottles at necks thereof.

[0016] The means 7 for stocking and supplying bottles to the means 5 for manipulating bottles comprise a mobile plane 28 for transporting bottles arranged in an upright position to a position in which the bottles can be reached by the gripping heads 26.

[0017] The machine operates as describe herein below.

[0018] As it moves along the mobile rest plane 2 a carton 50 first passes by the means 4 for manipulating opened separators 51. The means 4 for manipulating opened separators 51 hold (by means of the gripping device 23) an opened separator 51 and are in a vertical position above the mobile rest plane 2. The advancement of the carton 50 is stopped below the gripping device 23 and the traverse 3 is brought down so that the separator 51 is inserted into the carton. At this point the gripping device 23 release the separator 51 and the traverse 3 is raised. When the traverse 3 descends the means 5 for manipulating bottles insert a plurality of bottles into a carton in which a separator 51 has already been inserted, releasing the bottles before the upwards movement of the traverse 3 has begun. The cartons 50 are arranged on the mobile rest plane 2 at a stagger so that, when a carton 50 is arranged vertically below the means 4 for manipulating opened separators 51, another carton 50 is vertically below the means 5 for manipulating bottles. Advantageously the separator 51 and bottle 50 insertion operations in the cartons are done at the same time on two different cartons. An opposite operation is also possible, where the carton 50 in its transit along the rest plane 2 first passes by the gripping devices 23 which introduce the bottles, and then pass on to the means 4 for manipulating opened separators 51, which insert the separators 51.

[0019] During a work cycle the traverse 3 follows a C-shaped path, with first a descent after which the gripping device 23 grips a separator 51 which has been opened and arranged in a correct position by the means for stocking and opening the cardboard separators 51. At the same time the gripping heads 26 of the means 5 for manipulating bottles grip a plurality of bottles arranged in a correct position by the means 7 for stocking and supplying bottles. Following the above operations the traverse 3 is raised and translates horizontally to a position which is vertically above the mobile rest plane 2. At this point the traverse 3 descends once more and inserts and releases the separator 51 and the bottles in two cartons 50, after which the traverse 3 is raised and horizontally translated again, bringing the traverse 3 back into the start-cycle position.

Claims

1. A machine for packing cartons containing bottles which cartons are internally separated by separators, **characterised in that** it comprises:

   a mobile rest plane (2) for open cartons;
   a traverse (3) which is parallel to the mobile rest plane (2), and which is mobile on planes which are parallel to the mobile rest plane (2) between a position which is external of the mobile rest plane (2) and a position which is vertically above the mobile rest plane (2), and which is mobile on perpendicular planes to the mobile rest plane (2), alternatively nearing and distancing from the mobile rest plane (2);
   means (4) for manipulating opened separators (51) into open cartons and means (5) for manipulating bottles, both of which means (4, 5) are connected to the traverse (3) and are solid in movement there-with;
   means (6) for stocking and opening the cardboard separators (51), which means (6) are located by the side of the mobile rest plane (2);
   means (7) for stocking and supplying bottles to the means (5) for manipulating bottles, located by the side of mobile rest plane (2) and aligned with the means (6) for stocking and opening the cardboard separators (51) in a parallel direction to the mobile rest plane (2).

2. The machine of claim 1, **characterised in that** the traverse (3) is connected to a slide (8) which is slidable on a guide (8a) arranged transversally above the mobile rest plane (2), the traverse (3) being mo-

bile between a position vertically above the mobile rest plane (2) and a position vertically above the means (6) for stocking and opening the cardboard separators (51) and the means (7) for stocking and supplying bottles; the guide (8a) being perpendicularly mobile with respect to the mobile rest plane (2) along two parallel uprights (8b).

3. The machine of claim 2, **characterised in that** the means (6) for stocking and opening the cardboard separators (51) comprise:

a second support frame (16);
a second support plane (17) for closed separators (51) lying and arranged on a plane which is perpendicular to the second support plane (17), which second support plane (17) is connected to the second support frame (16) and is parallel to the mobile rest plane (2);
a containment structure (18), connected to the second support frame (16), for laterally containing the separators (51) stocked in at least one row;
a plurality of suckers (19) for gripping the separators (51), which suckers (19) are partly connected to at least one fixed support arm (20), and partly to at least one mobile support arm (21) rotating about a vertical axis thereof between two mutually-perpendicular positions, the support arms (20, 21) being mounted on a support (22) which is mobile with respect to the second support frame (16) between a close-up position to the second support plane (17), in which the suckers (19) grip the separators (51), and a removed position from the second support plane (17), in which the opened separators (51) can be reached by the means (4) for manipulating opened separators (51).

4. The machine of claim 3, **characterised in that** the means (4) for manipulating opened separators (51) comprise one or more gripping devices (23), connected to uprights (24) arranged perpendicular to the mobile rest plane (2), the uprights (24) being solidly connected to the traverse (3).

5. The machine of claim 4, **characterised in that** the means (4) for manipulating opened separators (51) are arranged upstream of the means (5) for manipulating bottles with respect to the movement direction of the cartons.

6. The machine of claim 4, **characterised in that** the means (4) for manipulating opened separators (51) are arranged downstream of the means (5) for manipulating bottles with respect to the movement direction of the cartons.

7. The machine of claim 5 or 6, **characterised in that** the gripping devices (23) respectively comprise at least one pliers (25) with a gripping plane which is perpendicular to the mobile rest plane (2) and which is predisposed to grip and release a wall of a separator (51).

8. The machine of claim 7, **characterised in that** the means (5) for manipulating bottles comprise a plurality of gripping heads (26) activated by an operator group (27) which is solidly constrained to the traverse (3); the gripping heads (26) gripping the bottles at necks thereof.

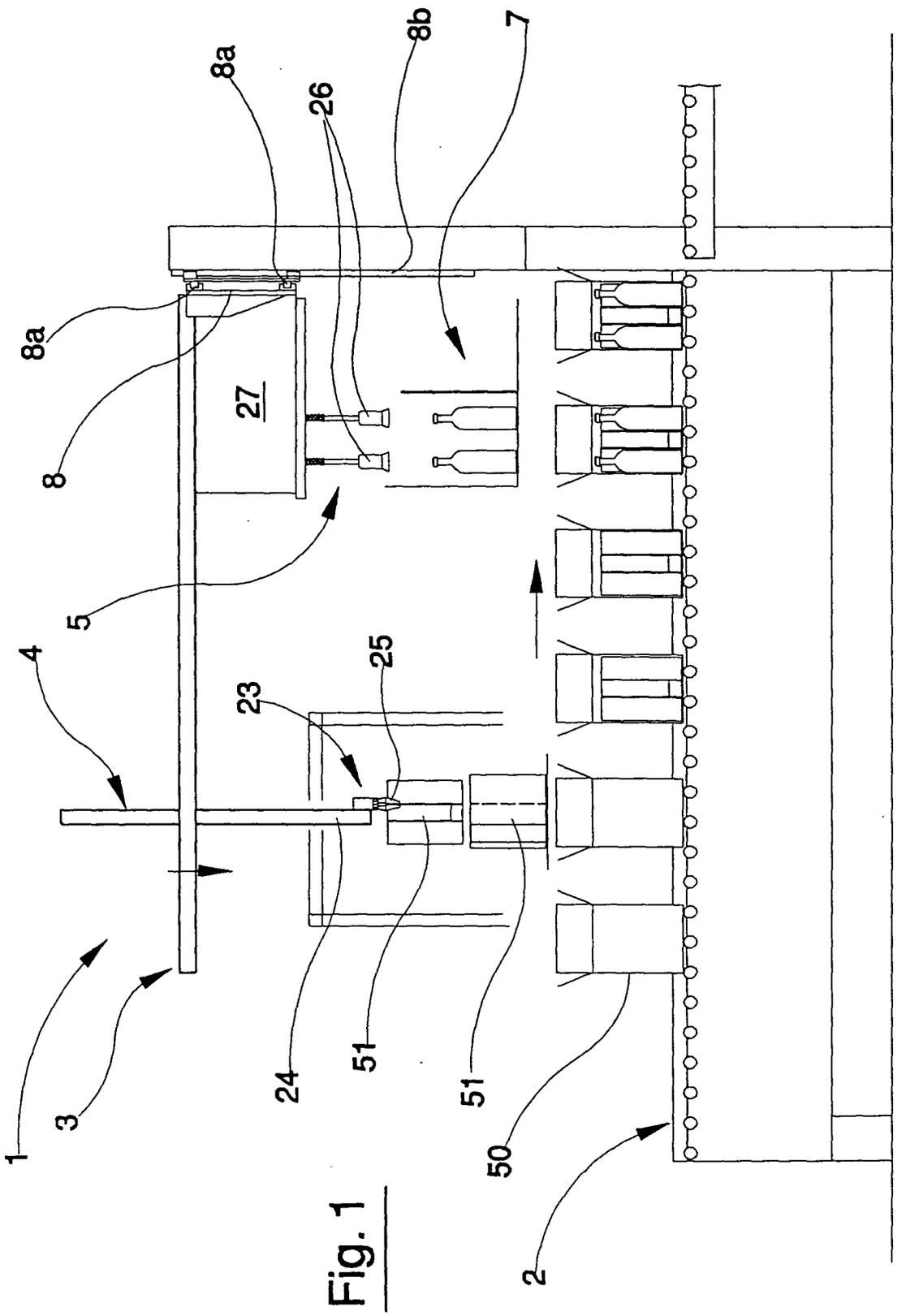

Fig. 1

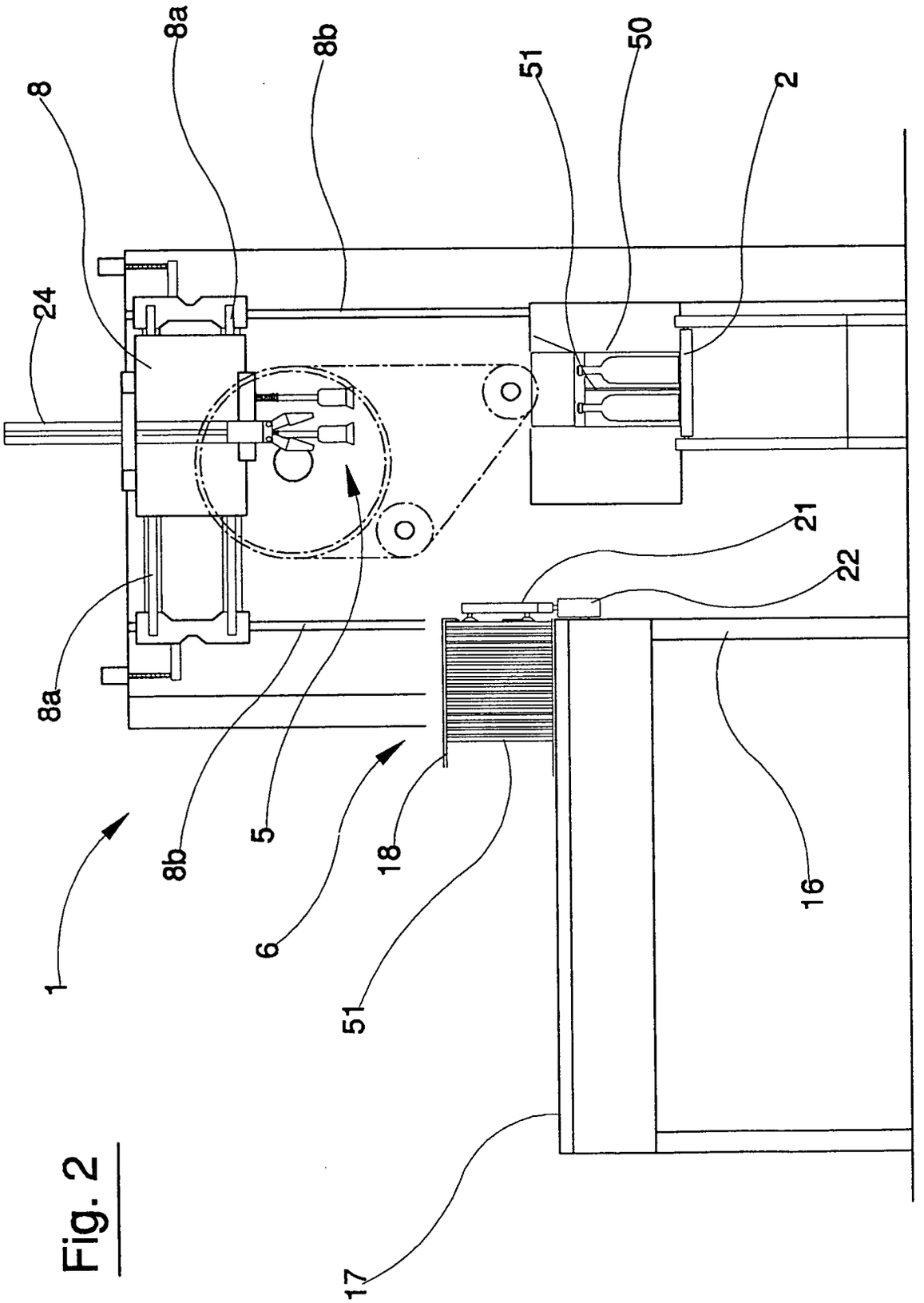

Fig. 2

Fig. 4

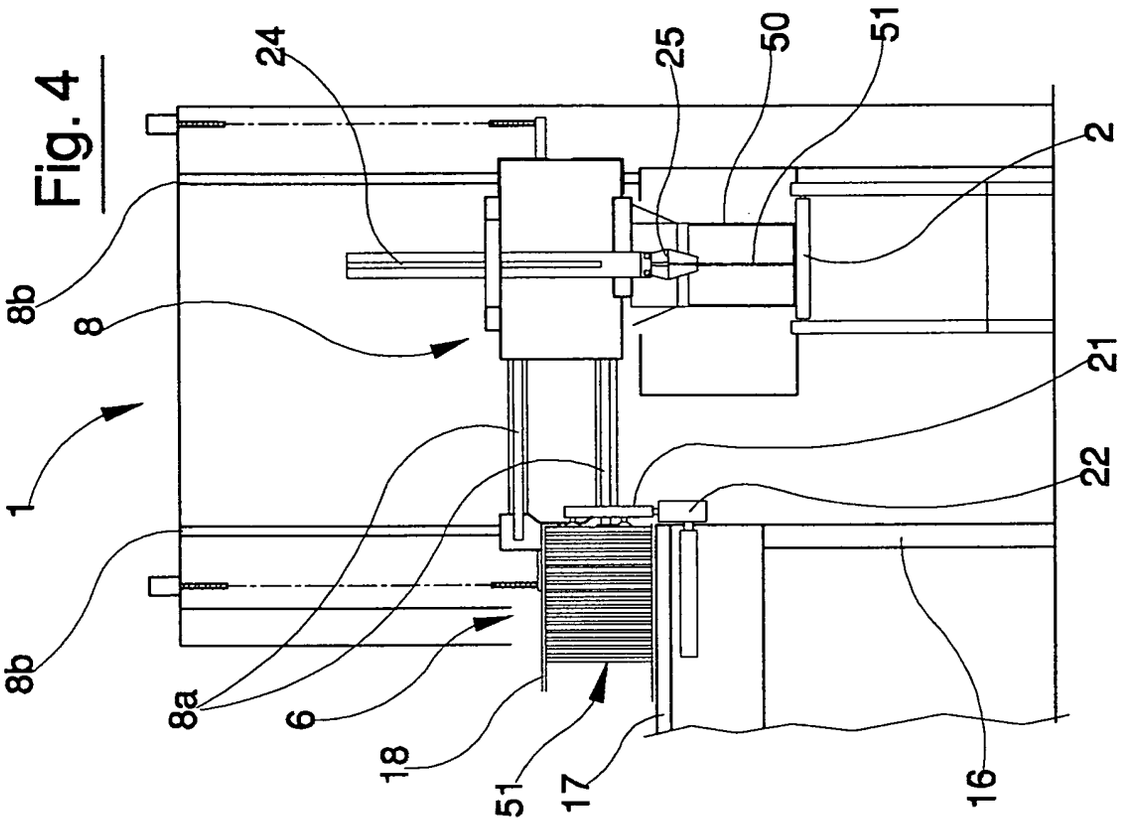
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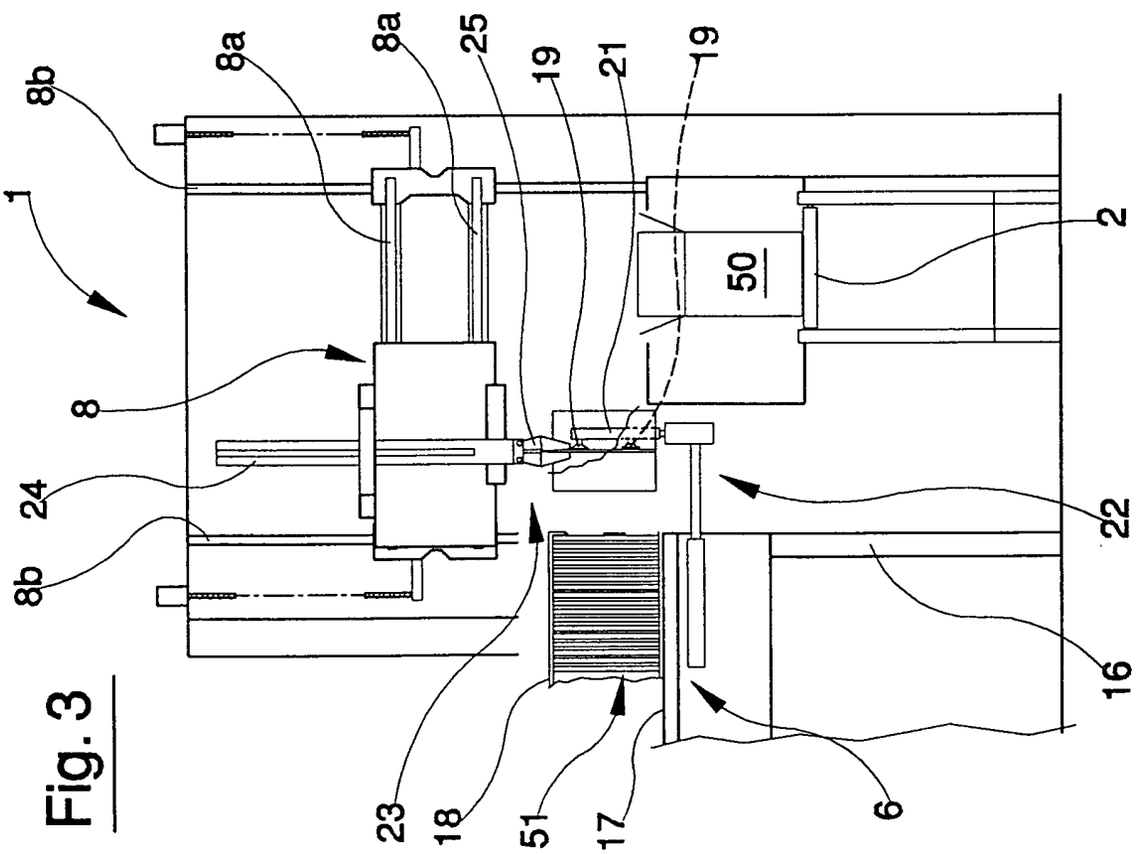
Fig. 3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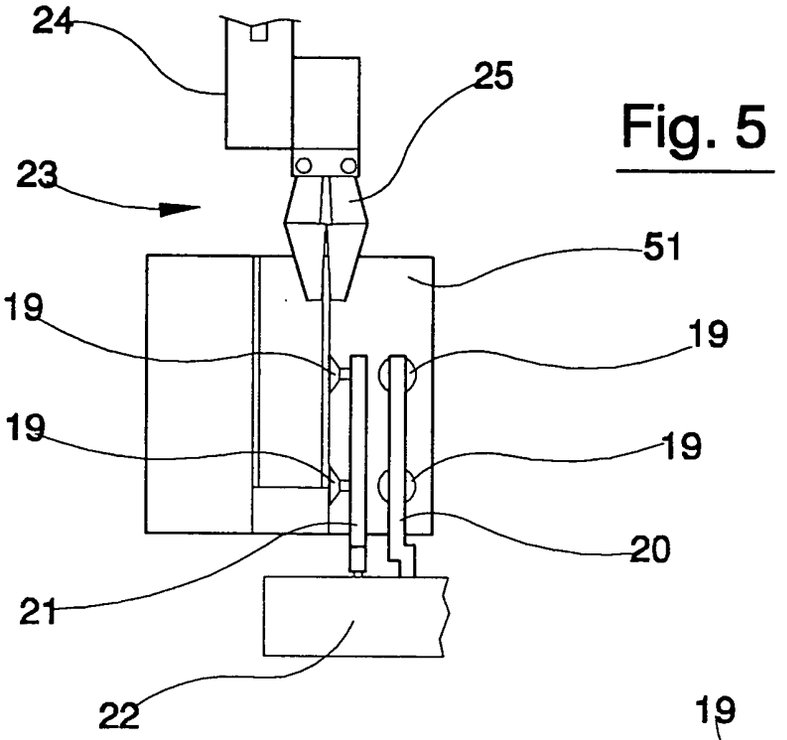

Fig. 5

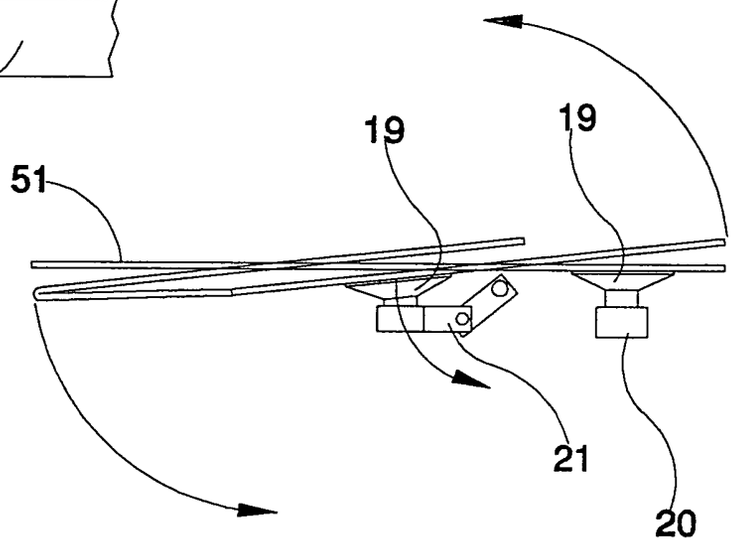

Fig. 6

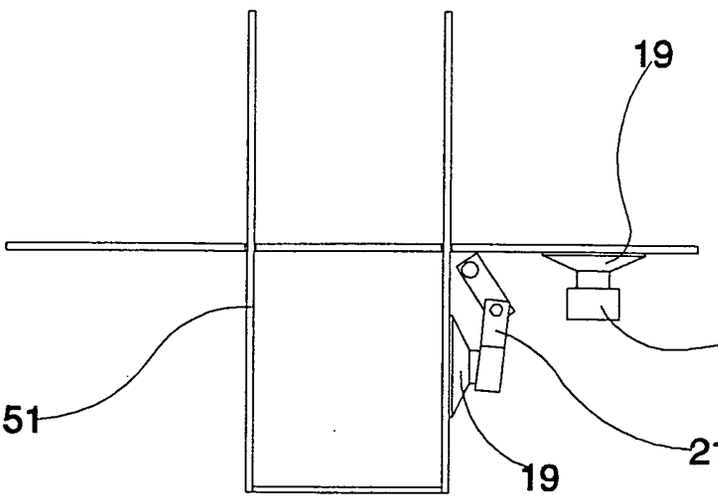

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5556

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65B
B31B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 January 2004	Grentzius, W

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