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

(11) EP 0 798 210 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
01.10.1997 Bulletin 1997/40

(51) Int. Cl.[6]: **B65B 5/06**

(21) Application number: **97200917.9**

(22) Date of filing: **26.03.1997**

(84) Designated Contracting States:
BE DE ES FR IT NL

(30) Priority: **28.03.1996 IT TV960040**

(71) Applicant: **BRETON AUTOMAZIONI Spa**
31039 Riese Pio Xo (Treviso) (IT)

(72) Inventor: **Murarotto, Emilio**
31033 Castelfranco Veneto (Treviso) (IT)

(74) Representative: **Caregaro, Silvio et al**
c/o Saic Brevetti Srl
Via Paris Bordone 9
31100 Treviso (IT)

(54) A method and apparatus for packing non-rigid packs in variable arrangements

(57) In a method and apparatus for packing non-rigid packs (10), first conveyor means (12) cause the packs (10) to advance, spaced apart, in a first direction. The packs (10) are stopped, in the first direction, by stop means (20) associated with the first conveyor means (12), after which the packs (10) are moved in a second direction substantially transverse the first direction and are carried on second conveyor means (26). The latter carry the packs (10), standing up or lying down, to a packing station (28) in which the packs (10) are deposited in the packing containers (20). Means for bringing about the movement of the packs (10) whilst keeping them in the vertical position, and for subsequently laying them down on one side on or the opposite side are associated with the first conveyor means (12).

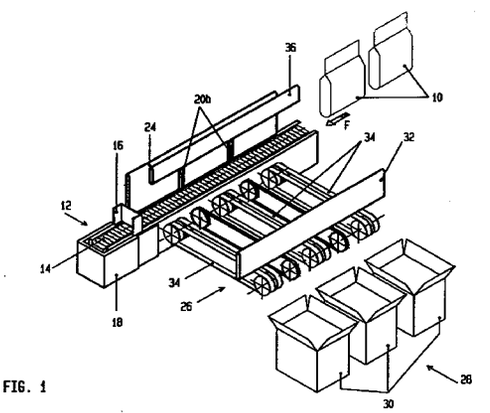

FIG. 1

EP 0 798 210 A1

Description

The subject of the present invention is an apparatus for packing non-rigid packs in easily variable arrangements.

A further subject of the present invention is a method of packing packs of the above-mentioned type.

It is known that non-rigid packs are used increasingly frequently, particularly for powdered products, a typical case being that of detergents, to which specific reference will be made by way of non-limiting example in the present description.

The reasons which explain the increasingly widespread use of packs as defined above is essentially that the production of rigid containers, that is box-like containers, is much more expensive than that of bags. This comment is of a general nature and, as far as the example of detergents is concerned, the practice of buying pondered products packed in cardboard, generally box-like containers, that is, so-called "drums" on a first occasion and, once their contents are finished, subsequently buying a so-called "refill", that is, the above-mentioned non-rigid pack, from which the drum is refilled, is becoming increasingly widespread.

It has been found, however, that, whereas, on the one hand, the packs in question permit a considerable reduction in costs for the producer and hence a corresponding decrease in the price charged to the purchaser, on the other hand, the packing of these packs creates considerable problems.

In fact, the packing of cardboard containers in boxes, that is, in so-called "cartons", either for transportation or for display, presents no particular problems at the level of their handling.

The same cannot be said for non-rigid packs, since their arrangement in the containing boxes has to be varied in dependence on numerous factors such as, for example, the type of product packed, the weight of the pack, the degree of deformability of the pack, and the extent of filling, so that, in short, the best arrangement for the packs in the box which holds them is decided at the time in question.

Before the various possible ways of packing the packs are considered, purely for clarity and uniformity of explanation, the "bottom" of the pack will mean its lower closed end, whereas the term "top or mouth" will mean the upper closed end of the pack which was used for the preliminary filling thereof and in which, in some cases, the handle of the pack is formed.

Of the various possible ways of packing the packs, first of all, that of arranging them all standing up side by side and with their bottoms resting on the base of the carton may be considered.

It is also known for the packs to be arranged lying down in the carton, that is, to be arranged substantially horizontally and placed on top of one another. In some cases, an alternating arrangement for the lying-down position is provided for, that is, with the packs arranged alternately with the top or mouth on one side and the bottom on the opposite side. This is typically the case for detergents. In practice, in the pile of packs, the mouth of one pack is over the bottom of the underlying one. The reason for this particular arrangement is that the pack is bulkier at its bottom and gradually becomes less bud towards the mouth so that, if the packs are arranged as explained above, they are superposed correctly.

For products of other types, this alternating arrangement is not necessary and the packs are piled up all facing the same side.

Another arrangement which is adopted in the packing of packs can be defined as "mixed" since it provides for a series of packs standing up, below and above which there is a pair of packs lying down. All of these various, variable arrangements have created and, up to now, create considerable problems in the packing of packs, particularly in the automation of the packing which, of course, would considerably reduce production costs. As a result, packing currently Involves many manual operations or several packing stations operating in series with one another and separately. Naturally this increases production costs and the space occupied by the plant and often requires operation by skilled personnel.

Moreover, when the dimensions of the packs are changed, it is necessary to make many adjustments and seeings, clearly with increases in idle times and hence in costs.

Apparatus for packing non-rigid packs which eliminates all of the problems currently present in the prior art has now been devised and constitutes the subject of the present invention. More particularly, the innovative structure of the apparatus according to the invention and the means with which it is provided enable the various packs to be prearranged in the desired position for packing, that is, with the packs standing up or lying down in one direction or in the opposite direction, or with the "mixed" arrangement as defined above.

A method of packing packs as defined above, the novel operative steps of which enable the packs to be handled and prearranged in the desired positions as specified above, also forms a subject of the present invention.

One of the principal objects of the present invention is therefore the provision of apparatus and a method for packing non-rigid packs, by virtue of which all of the steps necessary for the packing are fully automated thus excluding the aforementioned manual operation. This is particularly beneficial in terms of a reduction in operating times and in production costs.

Another object of the present invention which cannot be overlooked is the provision of apparatus and a method as indicated above, in which the various operative funtions of the apparatus and operative steps of the respective method are extremely simple and easy to modify so that, as well as having high performance, the apparatus, in particular, is especially versatile.

A subject of the present invention is therefore a

method of packing non-rigid packs, characterized in that it comprises the following operative steps:

a) advancing the packs, spaced apart, in a first direction;
b) stopping the packs in predetermined positions;
c) moving the packs in a second direction substantially transverse the first direction;
d) advancing the packs in the second direction as far as a packing station;
e) picking up the packs and depositing them in the packing containers.

According to a first characteristic of the method according to the invention, in step (a), the packs preferably advance arranged standing up.

According to a further characteristic of the method according to the present invention, during step (d), the packs are supported standing up.

According to another characteristic of the method according to the present invention, between step (c) and step (d), the packs are laid down on one of their sides.

The characteristics just mentioned will be explained precisely and in detail in the following description.

A further subject of the present invention is an apparatus for packing non-rigid packs, characterized in that it comprises first conveyor means for transporting the packs, spaced apart, In a first direction, means for stopping the packs arranged a predetermined distance apart In the first direction, means for thrusting the packs from the first conveyor means to second conveyor means for advancing the packs in a second direction substantially transverse the first, and actuating means for varying the inclination of the thrust means in order to bring the packs to a lying-down position on the second conveyor means.

According to a first characteristic of the apparatus according to the invention, the packs advance on the first conveyor means preferably standing up.

According to a further basic characteristic of the apparatus according to the present invention, once the thrust means have brought the packs from the first conveyor means to the second, they are retracted to allow a subsequent set of packs to arrive on the first conveyor means.

According to a further characteristic of the apparatus according to the present invention, the second conveyor means are activated simultaneously with the retraction of the thrust means, in order to bring the packs, standing up and supported by support means provided on the second conveyor means, to a packing station.

According to another characteristic of the apparatus according to the present invention, the actuating means for varying the inclination of the thrust means are activated before their engagement with the packs.

The aforementioned characteristics of the apparatus according to the invention will also be explained precisely and in detail in the following description.

The characteristics, as well as the advantages, of the method and of the apparatus according to the present invention will become clearer from the following detailed description of a non-limiting embodiment of the apparatus of the invention, the description being given with reference to the appended drawings, in which:

Figure 1 is a schematic, axonometric view showing the apparatus according to the invention,
Figures 2 to 4 are schematic side views showing how the apparatus operates in order to bring the packs to the final packing station standing up in one or more rows,
Figures 5 to 7 are schematic side views showing how the apparatus operates in order to bring the packs to the final packing station lying down on one side,
Figures 8 to 10 are schematic side views showing how the apparatus operates In order to bring the packs to the final packing station lying down on the opposite side.

With reference first of all to Figure 1, the non-rigid packs 10 arrive, aligned and spaced apart, from a supply station, not shown, and proceed, in particular, with their smaller sides arranged at the front, with reference to the direction of advance.

The advance of the packs 10 in the supply station, and particularly their spacing, can be achieved in any known manner, for example, by the arrangement in series of a first and a second conveyor belt, of which the second moves at a faster speed than the first so as to space out the packs 10.

The packs 10 reach the apparatus according to the invention in the direction of the arrow F of Figure 1 which coincides with the first direction of the advance of the packs 10 brought about by means of the first conveyor means, generally indicated 12.

The first conveyor means 12 are constituted, for example, by a known conveyor belt 14 which may be of the type with segments or links and which advances in the direction indicated by the above-mentioned arrow F.

The conveyor belt 14 is advanced by a drive motor, not shown.

As can also be seen in particular from Figure 1, a stationary stop, associated with the conveyor belt 14 at the end of the path which the packs 10 are to follow, is constituted by a substantially channel-shaped wall 16 with the two parallel sides facing in the direction of movement of the packs 10.

More precisely, the stationary wall 16 can stop the first of the packs 10 which is supplied to the conveyor belt 14 whilst the rest are stopped by different stop means, described below.

Clearly, however, the stationary wall 16 may be constituted by stop means of the same type as those provided along the path of the packs 10 and described below.

The embodiment of the apparatus according to the

present invention which is considered by way of example, is arranged for handling and packing successive sets of packs 10 each composed of three packs. Clearly, however, the apparatus according to the invention may be constructed for the successive packing of sets of packs 10 each constituted by a different number of packs.

As stated above, the three packs 10 of each set have to be stopped along the path which they follow on the conveyor belt 14 and for this purpose, the apparatus has, along this path, three stop means, one of which is constituted by the aforementioned stationary wall 16.

Each of the remaining two stop means is constituted, in the embodiment considered by way of example, by a wall 20 which is arranged transverse the direction of advance of the conveyor belt 14 and of which only the front edge, indicated 20b, is visible in Figure 1.

Each of the walls 20 can adopt two operative positions, more precisely, a rest position corresponding to that shown partially in Figure 1, in which it is outside the path of the conveyor belt 14, leaving the packs 10 free to pass, and an advanced position, shown in particular in Figures 2, 3, 5, 6, 8 and 9, to which, owing to the operation of drive means such as, for example, an actuating piston 22 acting on its rear end, it is advanced in order to be disposed across and above the conveyor belt 14 so as to stop one of the packs 10.

Clearly, when the first pack passes, the walls 20 are kept in the retracted, rest position, the first being actuated and brought to the stopping position as soon as the first pack has passed, and the second subsequently being brought to the stopping position as soon as the second pack has passed.

As will be explained in greater detail below, the two walls 20 can be advanced and retracted, since they can pass through suitable slots in a will, generally indicated 24, associated with the conveyor belt 14, to form means for thrusting the packs 10 towards the second conveyor means, generally indicated 26, with which the apparatus according to the invention is provided. The second conveyor means 26 in particular extend in a direction substantially transverse that of the conveyor belt 14.

The wall 24 can adopt various operative positions for the preliminary movement of the packs 10 from the first conveyor means 14 to the second conveyor means 26, for allowing them to advance on the second conveyor means 16 standing up and to be packed as they are or, finally, for laying the packs 10 down on one side, as shown in Figures 5 to 7, or on the opposite side, as shown in Figures 8 to 10. All of these aspects will be explained precisely and in detail below.

A first operative position of the wall 24 is that shown in Figures 2, 5 and 8, and corresponds to a rest condition, since the wall 24 is vertical and, more particularly, is disposed outside the path of the packs 10 on the opposite side of the conveyor belt 14 to that from which the second conveyor means 26 extend. In this condition, the wall 24 is inactive, and the same position, to which it is returned afier it has operated on the packs 10 as shown in Figures 3, 6 and 9, is also shown in Figures 4, 7 and 10.

A second operative position of the wall 24 is that shown in Figure 3, from which it can be seen that the wall has been advanced by a predetermined distance to move the packs 10 to the start of the second conveyor means 26.

In particular, the movement of the wall 24 to the various positions is brought about by its connection, at the rear, to known actuating means, not shown, which bring about its movements. For example, one of the possible means for actuating the movements of the wall 24 is a link device carried by the same framework 18 as the first conveyor belt 14. The link device is suitable, first of all, for bringing the wall 24 from the position of Figure 2 to that of Figure 3, and also for bringing about forward (Figure 6) or rearward (Figure 9) inclination of the wall 24 since the latter is articulated to the frame of the link device. Clearly, however, other equivalent actuating means may be provided for bringing about the above-mentioned movement.

With reference now to Figure 4, it can be seen that the wall 24 has been returned to the retracted, rest position and at this point, the second conveyor means 26 are brought into operation and are advanced in the sense of the arrow F1 of Figure 4 so that the packs 10 disposed thereon are advanced in the same direction. The packs 10 disposed on the conveyor means 26 are therefore advanced towards the final packing station 28 which, as can he seen in Figure 1 in particular, includes three containers or "cartons" 30.

According to one of the characteristics of the apparatus according to the invention, whilst the packs 10 are advanced by the second conveyor means 26, they are supported, from the front end, with reference to the direction of advance, by a support wall 32 so that they arrive at the output of the second conveyor means 26 still standing up.

From this position they are picked up and placed, standing up, in the cartons 30.

The wall 32 for supporting the packs 10 is associated with the second conveyor means 26 in any known manner, for example, is connected thereto by means of pins with which the latter means are provided, and which are fixed to the wall 32.

At the end of the path followed by the packs 10, the wall 32 will be brought to the final position shown by a broken line in Figure 4 and, if the next set of three packs 10 is also to be packed standing up, it will be returned to the initial position shown by a continuous line, again in Figure 4. If on the other hand, it is desired to operate in a manner such as to lay the packs 10 down, the wall 32 will be left in the position shown by continuous lines in Figures 5 to 10 at the output end of the second conveyor means 26.

The way in which the apparatus according to the invention is operated in order to lay the packs 10 down on one side is now described with reference now to Fig-

ures 5 to 7.

Figure 5 again shows the initial position in which the packs 10 are stopped by the walls 20 whilst the wall 24 is in the retracted, rest position in which it does not interfere with the packs 10.

It can then be seen from Figure 6 that, as soon as the wall 24 has been brought to the position corresponding to that of Figure 3, is it simultaneously inclined forwards, with reference to the direction of advance of the packs 10, so as to exert on the packs a thrusting action which causes them to lie down on their front sides.

According to another advantageous aspect of the apparatus according to the invention, this lying-down takes place as a result of the combined effect of the thrust exerted on the packs by the wall 24 and of the friction occurring between the bottoms of the packs and the conveyor means 26. The latter are therefore advantageously constituted by conveyors with flat belts, for example, made of rubber indicated 24, driven by a geared motor unit, not shown. The operation of the latter, in particular, is reversible since, as mentioned above, the support wall 32 has to be movable both forwards and backwards relative to the conveyor belt 14. In this case also, the packs 10, which are lying down, are picked up by suitable gripping means and are deposited, still lying down, in the cartons 30.

The extremely versatile nature of the apparatus according to the invention is clear from the foregoing description. In fact it can pack a pack 10 lying down on the bottom of each of the cartons 30 by operating as shown in Figures 5 to 7 and, in the next step, can pack three packs 10 standing up on top of the pack 10 which is lying down by operating three times consecutively as shown in Figures 2 to 4. Finally, the packing operation can be completed by the arrangement of a further pack 10 lying down on top of the three packs 10 which are standing up, by operating as shown in Figures 5 to 7, or rather in Figures 8 to 10, as explained in detail below.

With reference to these drawings, it can be seen that, again starting from the rest position shown in Figure 8, the wall 24 is advanced towards the second conveyor means 26 and, before it has arrived at the input end of thereof having pushed the packs 10, a "rearward" inclination of the wall 24, substantially symmetrical with that of the previous case, is brought about.

It can be appreciated from Figure 9 that, simultaneously with the aforementioned rearward inclination of the wall 24, an opposing bar 36 has been brought from a raised or rest position shown in Figures 2 to 7, in which it does not engage the packs 10, to a lowered position, shown in Figures 8 to 10, in which it engages the packs 10 and, in particular, comes into contact with a region close to their upper ends.

The combined effect of the rearward inclination of the wall 24 and of the engagement of the opposing bar 36 with the packs 10 is such as to bring about a rearward inclination of the packs, as can be seen, in particular, from Figure 9.

As soon as the packs 10 have been brought to the above-mentioned position, the second conveyor means 26 are activated and, in this case also, are advanced in the direction indicated by the arrow F1 of Figure 9.

By virtue of the friction which exists between the bottoms of the packs 10 and the belts 34 of the second conveyor means 26, the packs 10 are slid downwards on the wall 24 in order to be brought onto the belts 34 of the second conveyor means 26 and to be laid down, as shown in Figure 10, in the opposite direction to that of Figure 7.

In this case also, the packs 10 which are lying down are picked up from the second conveyor means 26 and deposited in the packing cartons 30.

The next set of three packs 10 can be handled in order to arrange all of the packs standing up by operating as shown in Figures 2 to 4, or can be laid down as shown In Figures 5 to 7, or can laid down as shown in Figures 8 to 10. Naturally, the selection will be suggested by the particular packing arrangement desired for the packs 10.

The foregoing description is further confirmation of the versatility of the apparatus according to the invention which enables the packs 10 to be packed in any desired configuration.

In the embodiment of the apparatus according to the Invention described above by way of example, each of the wall 24, the opposing bar 36, and the support wall 32 is a single body so that, together with the first and second conveyor means 12, 26, they provide for each set of three packs 10 to be packed in the cartons 30 in the same manner, as explained in detail above.

An advantageous variant which is not shown in detail since it can be inferred from the appended drawings and which makes the apparatus according to the invention even more versatile, consists in the formation of each of the above-mentioned elements, that is, the wall 24, the bar 36 and the will 32, in three separate portions or segments, each operating on one of the packs of the set of three independently of the others. The packing of the three packs 10 of the set of three considered can thus also be differentiated.

It is interesting to observe that, also in this variant, the characteristics of the apparatus according to the invention of complete automation and hence the elimination of manual operations also remain unchanged.

With regard to the means for picking up the packs 10 from the second conveyor means 26 and for depositing them in the cartons, these means are not shown, since they are known, being constituted by a known robot device provided with an operative arm at the end of which there is a multiple gripper with which the packs 10 are gripped and carried into the cartons 30.

In this connection, although the gripper belongs to the prior art, it is interesting to note that it can adopt a different configuration according to whether the packs 10 are to be packed standing up or lying down.

In the first case, the gripper comprises closable jaws which can be closed, for example, sideways onto

the packs 10 and moved apart to release them.

In order to pick up packs 10 which are lying down, the jaws have gripping arms which can be brought to a working position when necessary and which can grip the packs 10 both sideways and from beneath.

For this purpose, to permit the gripping in question, it should be noted that the distance between the belts 34 of each pair is less than the width of the packs, precisely to allow them to be gripped from below by the arms of the gripper.

Finally, clearly structurally and conceptually equivalent variations and/or modifications may be applied to the method and to the apparatus according to the present invention, without thereby departing from the scope of protection thereof.

Claims

1. A method of packing non-rigid packs, characterized in that it comprises the following operative steps:

   a) advancing the packs (10), spaced apart, in a first direction;
   b) stopping the packs (10) in prodetermined positions:
   c) moving the packs (10) in a second direction substantially transverse the first direction;
   d) advancing the packs (10) in the second direction as far as a packing station (28);
   e) picking up the packs (10) and depositing them in the packing containers (30).

2. A method according to Claim 1, characterized in that, in step a), the packs (10) are arranged standing up.

3. A method according to Claim 1, characterized in that, during step d), the packs (10) are supported standing up.

4. A method according to Claim 1, characterized in that, between step c) and step d), the packs (10) are laid down on one of their sides.

5. A method according to Claim 4, characterized in that the laying-down takes place with the bottoms of the packs (10) disposed at the rear, with reference to the direction of advance of step d).

6. A method according to Claim 4, characterized in that the laying-down takes place with the bottoms of the packs (10) disposed at the front, with reference to the direction of advance of step d).

7. A method according to Claim 5, characterized in that the laying-down takes place as a result of a thrusting action on the packs (10) on the opposite side to that on which they are laid down.

8. A method according to Claim 5, characterized in that the packs (10) are laid down as a result of a combined effect of opposition on their upper ends, from the side facing in the direction of advance of step d), and of entrainment of their bases in the same direction of advice, whilst they are simultaneously caused to lean backwards, relative to the direction of advance of step d), on an inclined support and sliding wall (24).

9. Apparatus for packing non-rigid packs, characterized in that it comprises first conveyor means (12) for transporting the packs (10), spaced apart, in a first direction, means (20, 16) for stopping the packs (10) arranged a predetermined distance apart in the first direction, means (24) for thrusting the packs (10) from the first conveyor means (12) to second conveyor means (26) for advancing the packs (10) in a second direction substantially transverse the first, and actuating means for varying the inclination of the thrust means (24) in order to bring the packs (10) to a lying-down position on the second conveyor means (26).

10. Apparatus according to Claim 9, characterized in that the packs (10) advance on the first conveyor means (12) standing up.

11. Apparatus according to Claim 9, characterized in that once the thrust means (24) have brought the packs (10) from the first conveyor means to the second (12, 26), the thrust means (24) are retracted to allow a subsequent set of packs (10) to arrive on the first conveyor means (12).

12. Apparatus according to Claim 11, characterized in that the second conveyor means (26) are activated simultaneously with the retraction of the thrust means (24), In order to bring the packs, standing up and supported by support means (32) provided on the second conveyor means (26), to a packing station (28).

13. Apparatus according to Claim 9, characterized in that the actuating means for varying the inclination of the thrust means (24) are activated simultaneously with the advance of the thrust means.

14. Apparatus according to Claim 13, characterized in that the actuating means for varying the inclination of the thrust means (24) bring about a forward inclination thereof so as to bring the packs (10) to a lying-down position with their tops in front, with reference to the direction of advance of the packs on the second conveyor means (26).

15. Apparatus according to Claim 13, characterized in that the actuating means for varying the inclination of the thrust means (24) bring about a rearward

inclination thereof, whilst opposing means (36) are brought from a rest position to a position of engagement with the packs (10), and whilst the second conveyor means (26) are simultaneously activated in order to lay the packs down with their bottoms in front, with reference to the direction of advance of the second conveyor means (26).

16. Apparatus according to Claim 9, characterized In that the stop means (20) are constituted by walls which can be moved from a rest position outside the first conveyor means (12) to a working position in which they engage the packs (10), and in which they are arranged transversely above the first conveyor means (12).

17. Apparatus according to Claim 9, characterized in that the thrust means (24) are constituted by at least one wall extending parallel to the first conveyor means (12) and connected to actuating means which cause it to move from an initial rest position outside the first conveyor means (12) to a final position in which the wall has brought the packs to the second conveyor means (26) after passing over the first conveyor means (12).

18. Apparatus according to Claim 15, characterized In that the opposing means (36) are constituted essentially by an opposing bar (36) which extends parallel to the first conveyor means (12) and is movable between a raised or rest position in which it does not engage the packs (10) and a lowered position in which it engages the packs (10) advancing on the second conveyor means (26).

19. Apparatus according to Claim 18, characterized in that the opposing bar (36) engages the upper portions of the packs (10).

20. Apparatus according to Claim 10, characterized in that the means (32) for supporting the packs (10) in the vertical position are constituted by at least one wall (32) disposed transverse the second conveyor means (26) and associated therewith.

21. Apparatus according to Claims 17, 18 and 20, characterized in that each of the wall (24), the opposing bar (36), and the support wall (32) is a single body so that these elements operate simultaneously on a plurality of packs (10) disposed on the first and on the second conveyor means (12, 26).

22. Apparatus according to Claims 17, 18 and 20, characterized in that each of the wall (24), the opposing bar (36), ad the support wall (32) is formed in a number of separate portions or segments equal to the number of packs to be handled, each of the portions or segments operating on one of the packs (10) of the set of packs to be handled, disposed on the first and second conveyor means (12, 26).

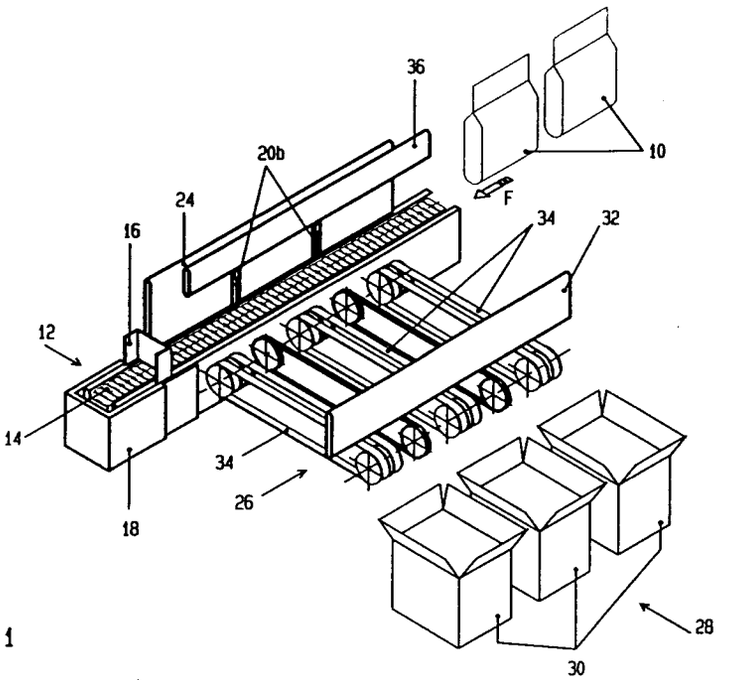

FIG. 1

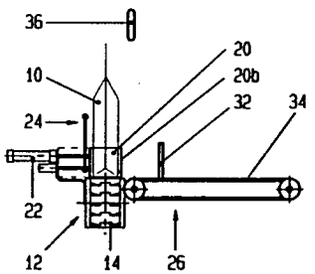

FIG. 2

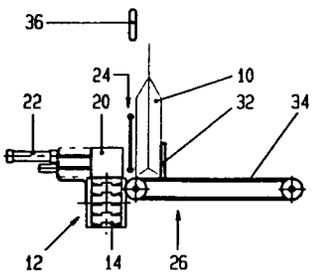

FIG. 3

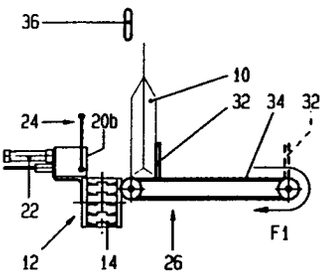

FIG. 4

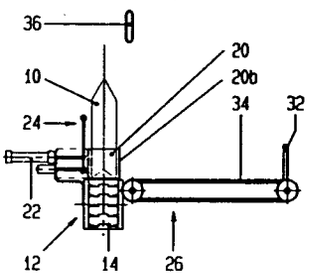

FIG. 5

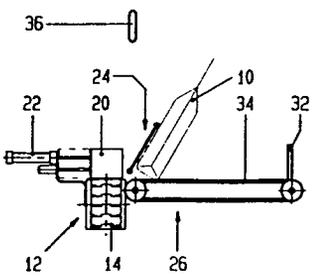

FIG. 6

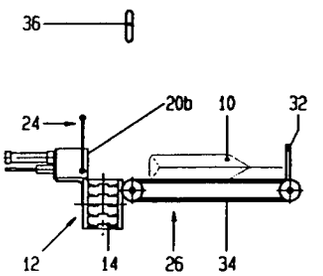

FIG. 7

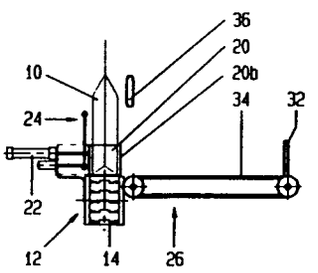

FIG. 8

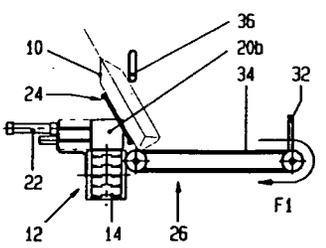

FIG. 9

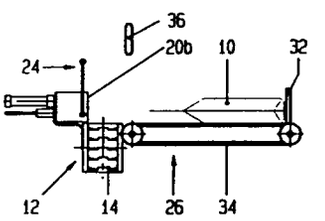

FIG. 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 0917

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.6)
A	EP 0 111 446 A (FLUMS) * page 5, paragraph 3 - page 7, paragraph 1; figure 1 *	1,9	B65B5/06
A	US 3 854 270 A (CLOUD)		
A	US 4 864 801 A (FALLAS)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 June 1997	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)