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(54) Method for packaging articles into containers

(57) A method for packaging articles inside relative containers includes feeding, along respective feeding lines (10,20,30) first, second and third, respectively, a plurality of articles (1) to be packaged, a corresponding plurality of informative sheets (2) and relative containers (3) for containing said articles (1) together with corresponding informative sheets (2). The first, second and third feeding lines (10,20 and 30) are operated independently from each other and in a proper time relation by respective first, second and third actuators (12,22 and 32). The presence and integrity of said articles (1), said informative sheets (2) and containers (3) in said first, second and third feeding lines (10,20 and 30) are checked by respective first, second and third sensors

(15,25 and 35), so that defective articles (1), informative sheets (2) and/or containers (3) detected independently by said first, second and third sensors (15,25 and 35) in said first, second and third feeding lines (10,20 and 30) are ejected, and then respective actuators (12,22 and 32) are operated to change the working conditions of said first, second and third feeding lines (10,20 and 30) independently from each other, so as to restore the correct time relation between these first, second and third feeding lines (10,20 and 30) in the region of means (40) for transferring said articles (1) together with corresponding informative sheets (2) inside said containers (3).

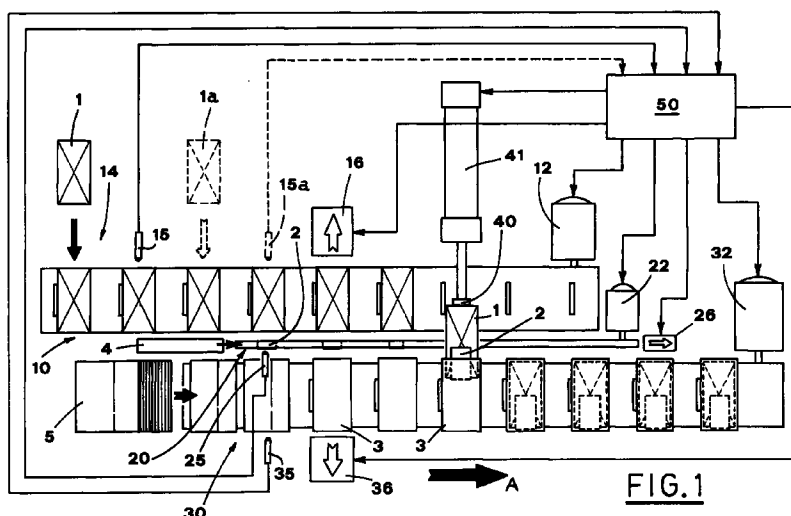


FIG.1

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Description

[0001] The present invention relates to packaging articles into containers.

[0002] Automatic packaging machines have heretofore been provided for packaging articles of different type into containers.

[0003] In particular, known packaging machines automatically introduce one or more articles, e.g. pharmaceuticals and the like, into a case, together with an information sheet.

[0004] The above mentioned machines usually include suitable feeding lines for the articles and the informative sheets to be packaged, as well as for the containers.

[0005] A transferring device for introducing the articles and the informative sheets into the above mentioned containers works along these feeding lines, which are operated e.g. with intermittent motion.

[0006] Moreover, the packaging machines include an ejection station, which automatically rejects defective packages detected by suitable sensor means. The ejection station is usually situated downstream of the station in which the articles and informative sheets are introduced into the relative containers.

[0007] In fact, it is possible that one or more articles to be packaged, or a corresponding informative sheet is missing or a container is defective, and in this case the whole package is rejected.

[0008] One of the biggest problem of the packaging machines is the disposal of rejected packages.

[0009] In fact, due to a defect of the container, very often it is necessary to reject the whole package, even if the articles contained therein are acceptable, and sometime they are expensive.

[0010] On the other hand, usually it is not possible to recover entire articles from the defective packages because of obvious practical reasons and mainly, because of severe rules establishing the controlled disposal of many products, in particular of pharmaceuticals and the like.

[0011] In practice, the rejected packages are moved away downstream of the articles transferring line, along the packaging line and are collected in suitable closed containers, which are opened only by authorized personnel, so that the number of the collected packages is exactly the same as the number of the rejected packages.

[0012] This leads to a considerable economic loss, besides the necessity to dispose the rejected articles, which further increases the producer costs.

[0013] This invention was evolved with the general object of providing a method which resolves the above mentioned problem, allowing to package the articles and corresponding informative sheets inside containers and reject only the really defective part of the package.

[0014] Another object of the present invention is to propose a method which allows to recover the articles

from rejected, partially defective packages.

[0015] Still further object of the present invention is to propose a method which is obtained by a simple and versatile solution.

[0016] The above mentioned objects are obtained in accordance with the contents of the claims.

[0017] The characteristic features and advantages of the present invention will become fully apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

- Figure 1 is a schematic plan view of a packaging machine which carries out the method for packaging articles according to the present invention;
- Figure 2 is a corresponding front view of this packaging machine.

[0018] With reference to the above described figures, reference numeral 1 generally indicates the articles to be packaged, together with corresponding informative sheets 2, inside containers 3.

[0019] The articles 1, informative sheets 2 and the containers 3 are fed, in suitable time relation, along respective first, second and third feeding lines 10, 20 and 30 arranged parallelly and side by side.

[0020] The first, second and third feeding lines 10, 20 and 30 are formed by e.g. belt conveyors 11, 21 and 31, first, second and third, respectively, which are mounted on respective wheels 13, 23 and 33; driving wheels 13a, 23a and 33a are operated independently by respective first, second and third actuators 12, 22 and 32, formed by e.g. stepwise moving motors.

[0021] Known means, that are not shown, supply the articles 1 to the first feeding line 10 in a station 14 situated at the inlet area of the conveyor 11.

[0022] A checking station, provided with a first sensor 15 for verifying correct presence of articles 1, is situated downstream of the articles supply station 14, considering a direction A in which all three feeding lines 10, 20, and 30 move.

[0023] It is possible to set up an additional station, downstream of the checking station equipped with the first sensor 15, for supplying additional articles, indicated with broken line 1a, which are to be joined to the above mentioned articles 1 supplied in the first supply station 14.

[0024] The additional articles 1a are verified by an additional sensor 15a in an additional checking station situated downstream of the supply station.

[0025] Also, an ejection station is situated along the first feeding line 10 and is equipped with a first ejector 16 for articles to be rejected. The ejector 16 is operated when the first and additional sensors 15, 15a send signals corresponding to possible anomalies.

[0026] Downstream of this ejection station, there is a transfer station equipped with a transfer element 40 which acts crosswise to the first feeding line 10 for introducing articles 1 into relative containers 3 carried along

the third feeding line 30.

[0027] The transfer element 40 is operated by a relative actuator 41.

[0028] During transferring, the articles 1 hit related informative sheets 2 which are carried to the transfer station by the second feeding line 20.

[0029] The informative sheets 2 are supplied to the second feeding line 20 by a suitable magazine 4 situated at the inlet of this second feeding line 20.

[0030] The correct presence of the informative sheets 2 on the second feeding line 20 is verified by a second sensor 25, situated in a corresponding informative sheets checking station.

[0031] The defective informative sheets 2, signaled by the second sensor 25, are ejected by a second ejector 26 situated at the outlet of the second feeding line 20.

[0032] The containers 3 are withdrawn from a second magazine 5, which is situated in the inlet area of the third feeding line 30. The containers 3 are kept in a flat configuration inside the magazine 5.

[0033] A withdrawing and erecting device 6, of known type, withdraws and erects single containers 3, subsequently transferred to the third feeding line 30 in proper time relation with feeding of the articles 1 and informative sheets 2.

[0034] The correct presence of the containers 3 on the third feeding line 30 is verified by a third sensor 35 in a container checking station.

[0035] Downstream of this container checking station, there is a third ejection station equipped with a third ejector 36 for ejecting defective containers, operated when the third sensor 35 issues signals corresponding to possible anomalies.

[0036] The signals given out by the sensors 15, 15a, 25 and 35, first, additional, second and third, respectively, are sent to a processing unit 50, which controls the operation of the first, second and third motors 12, 22 and 32 and the first, second and third ejectors 16, 26 and 36.

[0037] According to the method for packaging articles 1 together with informative sheets 2 inside the containers 3, these articles 1, informative sheets 2 and relative containers 3 are orderly fed stepwise by the relative feeding lines 10, 20 and 30, arranged side by side.

[0038] The first, second and third sensors 15, 25 and 35 verify the correct presence of the articles 1, informative sheets 2 and containers 3 on the relative first, second and third feeding lines 10, 20, 30.

[0039] It is to be noted that these first, second and third sensors 15, 25 and 35 do not only check the presence and integrity of the above mentioned articles 1, informative sheets 2 and containers 3, but can also read relative bar codes, so as to verify the correct correspondence of the pieces to be packaged.

[0040] If the packaging machine works normally, after having passed the first, second and third sensors 15, 25 and 35, the articles 1, the corresponding informative sheets 2 and containers 3 are fed at regular intervals to

the transfer station, where the transfer element 40, operated by the actuator 41, introduces each article, or more articles, together with the corresponding informative sheet 2 into the relative container 3.

[0041] Afterwards, the containers 3 with the articles 1 and informative sheets 2 are moved along the third feeding line 30, so as to complete the packaging process.

[0042] If one of the sensors 15, 25 and 35, and possibly 15a, detects an anomaly, e.g. absence of an article along the first feeding line 10, or the presence of a defective informative sheet or container along the second and third feeding lines 20, 30, the processing unit 50, guided by the above mentioned first, second and third sensors 15, 25 and 35, controls the first, second and third ejectors 16, 26 and 36 to selectively eject the defective articles, informative sheets, or containers from the relative first, second and third feeding lines 10, 20 and 30.

[0043] The processing unit 50 selectively operates also respective motors 12, 22 and 32, working independently from the movement of the first, second and third feeding lines 10, 20 and 30, so as to resume the correct time relation of these first, second and third feeding lines 10, 20 and 30 near the element 40 transferring these articles 1 and corresponding informative sheets 2 into the relative containers 3.

[0044] In practice, if one or more articles are missing on the first feeding line 10, the second and third feeding lines are stopped after the informative sheet 2 to be joined to the article 1 and corresponding container 3 have been taken to the transfer station.

[0045] Also the transfer element 40 is stopped, as controlled by the processing unit 50.

[0046] The first feeding line 10 is kept in stepwise movement, so as to move a next article 1 to the transfer station.

[0047] In this way, the correct working conditions of the packaging machine are restored, i.e. the first, second and third feeding lines 10, 20 and 30 work again in correct time relation.

[0048] Likewise, if there are anomalies concerning the informative sheets 2 or containers 3, the correctly working feeding lines are stopped, so as to restore the correct presence of an informative sheet 2 or container 3 in the transfer station.

[0049] All this is possible due to the fact that all the three feeding lines are operated independently from each other by relative first, second and third motors 12, 22 and 32.

[0050] Likewise, defective products are ejected from the three feeding lines 10, 20 and 30 by the corresponding ejectors 16, 26 and 36.

[0051] Consequently, the proposed method allows to package articles and corresponding informative sheets inside relative containers, rejecting not the whole package, but only a part thereof which is really defective.

[0052] This allows to reduce considerably the disposal

of rejected products, because their number is limited to really defective products.

[0053] Moreover, since the entire articles are not rejected, the raw materials are not wasted, which results in further economic advantage.

[0054] Likewise, the materials used for manufacturing informative sheets and containers are not wasted, because only the really defective ones are rejected.

[0055] The described solution refers to a packaging machine equipped with feeding lines, which move in an intermittent way. However, it is possible to use the present method also for packaging machines with feeding lines moving in a continuous way.

[0056] In this case, the correct working time relation between the feeding lines is restored by suitably changing the relative speeds of these lines, e.g. accelerating the speed of the line, where the anomaly has been signaled, after having ejected the defective product.

Claims

1. Method for packaging articles inside related containers, characterized in that it includes:

feeding, along respective feeding lines (10,20,30) first, second and third, respectively, a plurality of articles (1) to be packaged, a corresponding plurality of informative sheets (2) and of relative containers (3) for containing said articles (1) together with corresponding informative sheets (2), said first, second and third feeding lines (10, 20 and 30) being operated independently from each other and in a proper time relation by respective first, second and third actuators (12,22 and 32);
checking the presence and integrity of said articles (1), said informative sheets (2) and containers (3) in said first, second and third feeding lines (10,20 and 30) by respective first, second and third sensors (15,25 and 35);
ejecting defective articles (1), informative sheets (2) and/or containers (3) detected independently by said first, second and third sensors (15,25 and 35) in said first, second and third feeding lines (10,20 and 30);
operating respective actuators (12,22 and 32) to change the working conditions of said first, second and third feeding lines (10,20 and 30) independently from each other, so as to restore the correct time relation between these first, second and third feeding lines (10,20 and 30) in correspondence to means (40) for transferring said articles (1) together with corresponding informative sheets (2) inside said containers (3).

2. Method, according to claim 1, characterized in that said first, second and third feeding lines (10,20 and

30) are operated to move stepwise and in that these of said first, second and third feeding lines (10,20 and 30) which are correctly fed, are stopped, in order to allow the movement of only this of said first, second and third feeding lines (10,20 and 30) in which the anomaly has been signaled, so as to restore the correct time relation.

3. Method, according to claim 1, characterized in that defective articles (1) are ejected by respective first ejector (16) in a station situated upstream of said transfer means (40).
4. Method, according to claim 1, characterized in that defective containers (3) are ejected by respective third ejector (36) in a station situated upstream of said transfer means (40).
5. Method, according to claim 1, characterized in that said first, second and third actuators (12,22 and 32) are controlled by a processing unit (50) guided by said first, second and third sensors (15,25 and 35).
6. Method, according to claim 1, characterized in that said correct time relation is restored by changing the relative mutual speed of said first, second and third feeding lines (10,20 and 30), with said first, second and third feeding lines (10,20 and 30) being operated to move in a continuous way by said first, second and third actuators (12,22 and 32).

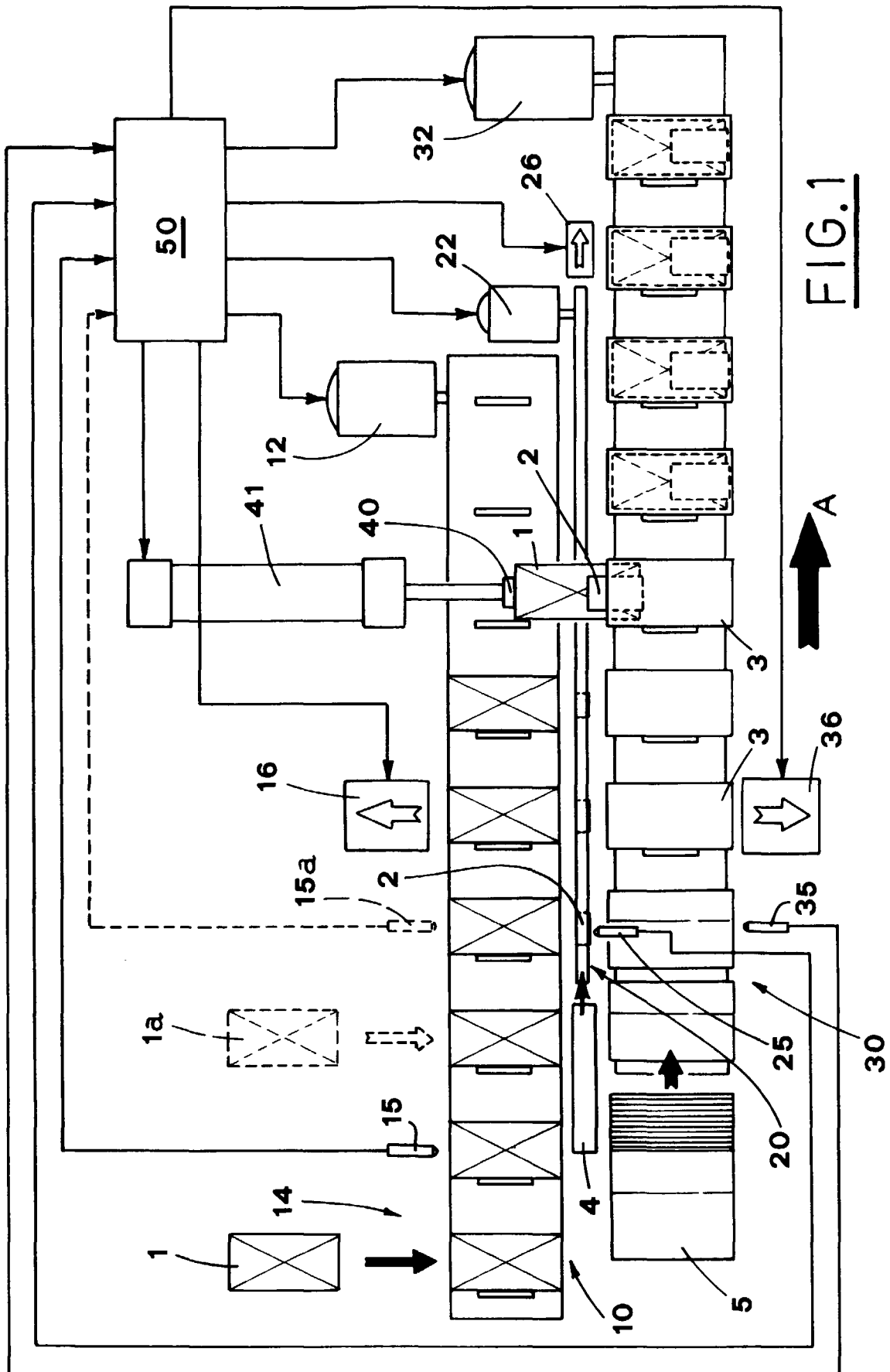
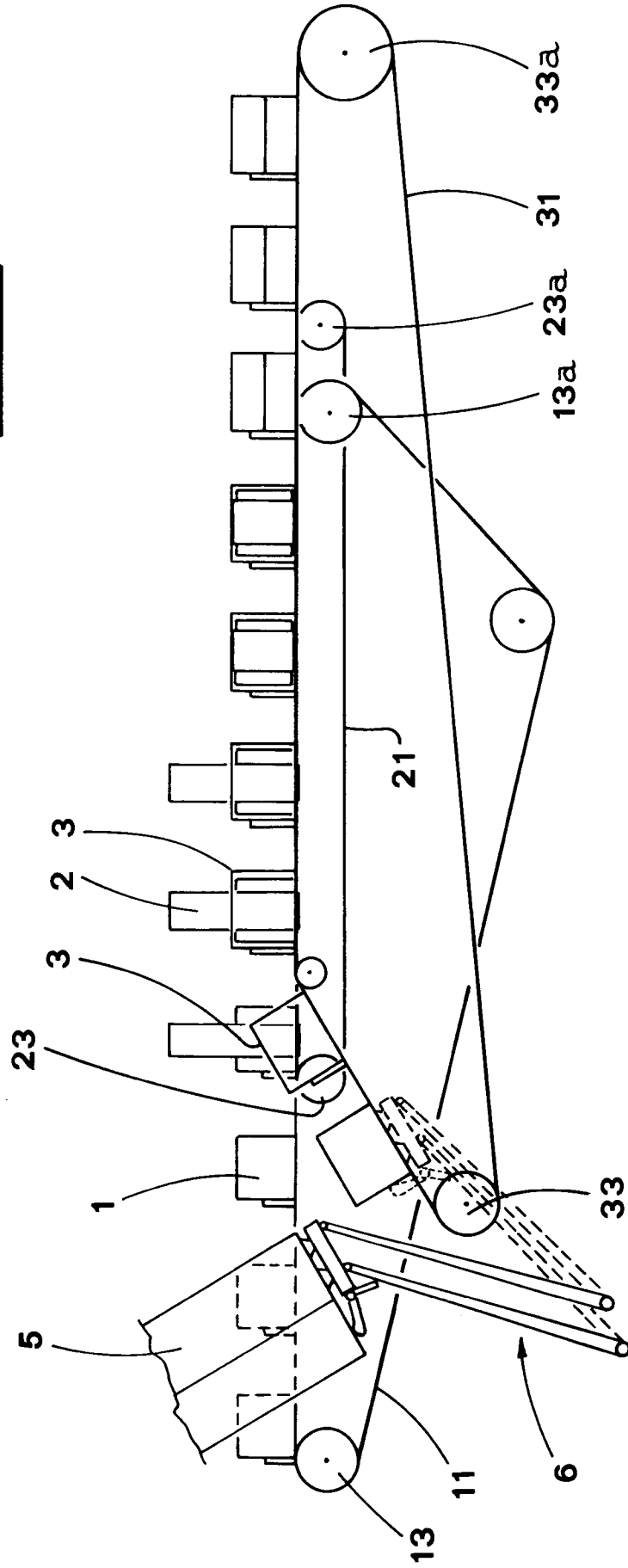


FIG.1

FIG. 2





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EUROPEAN SEARCH REPORT

Application Number
EP 99 10 8663

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 16 August 1999	Examiner Grentzius, W
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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