**Title:** A METHOD AND A DEVICE FOR SORTING RETURNABLE BOTTLES, CANS, RETURNABLE PACKAGES AND THE LIKE

The invention relates to a method and equipment for identifying returned bottles, cans, plastic bottles or other packages (10) and for sorting them on the basis of an identification code, in which method a compensation corresponding to the package is given on the basis of the identification of the returnable package (10). The returnable package (10) is transferred to a measuring station of an identification device (2), at which measuring station is generated a signal corresponding to the shape of the returnable package (10) for the central unit (3) of the device, which compares the measured signal or signals with the preprogrammed signals stored in a memory (8) of the central unit (3) and identifying the shape of different packages. When the package shape corresponds to the shape stored in the memory (8) and programmed therein, a sorter (11) located after the measuring point is activated for transferring the package (10) to its own storage station (A1, A2, A3...) on the basis of the identification data.
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A method and a device for sorting returnable bottles, cans, returnable packages and the like.

The invention relates to a method and a device for sorting returnable bottles, cans, returnable packages and the like.

Sorting solutions are known in prior art, in which a returnable bottle is led from a belt conveyor via different gates to a storage station determined by the sorting. In solutions according to prior art, the one-sidedness of the sorting can be regarded as a disadvantage. The received packages are to be only bottles or only cans or only plastic bottles. Different finishing devices and sorters are thus needed for different packages. This means that the investment costs become high when attempts are made to operate in all receiving sectors. The invention tries to find an improvement on the above-mentioned problem. The applicants have discovered that it is useful to form a finishing equipment, which is capable of sorting returnable bottles, cans, plastic bottles and other packages.

In the inventive method, the package to be returned is placed on a conveyor, which transfers the product to be returned to an identification system, which can be a conventional identifier operating according to a line camera principle and known e.g. of the applicant’s earlier FI patent application 870904.

According to the invention, the conveyor extending from the identification device is provided along the conveyor passage with different stations, at which stations a specified product is transferred away from the main conveyor passage.

In accordance with the invention, it is advantageous to use air jets in the sorting. According to an inventive embodiment of sorting, when a heavy bottle travels along the passage, the jet cannot transfer the bottle away from the passage by means of the air flow, but the bottle travels to the end of the passage and transfers
to its own storage station via a transfer pipe located at this end. If a returned can travels along the passage, a lighter can transfers by a displacement force caused by the air jet away from the conveyer passage to a storage station located at the air jet.

In the first step, the identification device identifies the shape of the package to be returned. On the basis of the shape, the type of the package is determined by comparing the identified shape with the shapes stored in the permanent memory of the central unit of the identification device. If the shape is identified e.g. as a bottle, the bottle transfers directly along the conveyer passage to blowing nozzles towards the end station.

If a bottle of a certain size or of a certain shape is identified, sorting occurs on the basis of the shape, as a pusher, such as a solenoid, pushes the returnable bottle away from the conveyer passage after the identification.

Similarly, an identification of the material of the returnable package can be performed at the identification point. According to the invention, an inductive sensor can be used, which can sense, whether the can is e.g. a steel can or an aluminium can. The desired air nozzle can then be started, whereby the identified can may be transferred to its own storage station by means of a blowing produced via the air nozzle. The number of the air nozzles can correspond to the number of the sorting stations. It is essential in the invention that the returned product is identified at the measuring point and that on the basis of said identification data, the storage station according to the product is activated, e.g. by starting the desired air nozzle.

According to the invention, the first sorting station can be a reject station, in which case the shape of the can has been identified at the measuring point and it has been compared with the shapes stored in the memory register and the weight of the identified shape in the memory register has been compared with the weight
of the returnable can weighed. If the weight exceeds the allowed weight, the first pusher performs the removal of the product from the passage to the reject station or returns it back to the starting point of the conveyor. A line code identification is used, if so desired, along with the shape identification, whereby the package concerned must also have the right line code in addition to the right shape.

The inventive method for identifying and sorting returned bottles, cans or other returned packages is mainly characterized in that in the method the returnable package is transferred to a measuring station of an identification device, at which measuring station is generated a signal corresponding to the shape of the returnable package for the central unit of the device, which compares the measured signal or signals with the preprogrammed signals stored in the memory of the central unit and identifying the shape of different packages, and when the shape of the package corresponds to the shape stored in the memory and programmed therein, a sorter located after the measuring point is activated for transferring the package to its own storage station on the basis of the identification data.

The inventive equipment for identifying and sorting returned products is mainly characterized in that the equipment comprises after the identification device a sorter and storage stations and in connection with each storage station an equipment, by means of which the returned package can be transferred to a storage station related to the package, whereby the equipment comprises between each storage station and the central unit data transmission buses, whereby the equipment comprises the data transmission buses between the devices transferring a product to the storage station and the central unit, whereby at least the profile of the returnable can is identified at the measuring point of the identification device and it is compared with the profile shapes registered in the memory of the central unit, and when the profile of the returnable package corresponds to the shape registered in the memory, the equipment of the storage station related to the returnable package is activated on the basis of a signal data produced by the
central unit, by means of which equipment the returnable package is transferred to the storage station related to the profile shape.

The invention is next described with reference to certain preferred embodiments of the invention shown in the figures of the accompanying drawings, to which the invention is not intended solely to be limited.

Fig. 1A shows schematically as a block diagram representation the inventive method for handling the returned packages.

Fig. 1B shows an equipment solution related to the method of Fig. 1A, which is one of its preferred embodiments.

Fig. 2 shows a principal block diagram of the construction and operation of the inventive package receiving device.

Fig. 3 shows principally and seen from the side the construction of the package identification device related to the package receiving device of Fig. 2.

Fig. 4 shows the equipment of Fig. 3 seen from the top.

Fig. 5 shows the formation of a line photograph of the package to be monitored with the identification device of Fig. 3 and 4.

Fig. 6 shows as an axonometric view the inventive equipment and method and embodiment, in which at least part of the returnable packages are transferred from the storage station to a lower storage station.

Fig. 7 shows schematically the operation of the equipment of Fig. 6.
Fig. 8 shows as a block diagram representation the operation of the equipment of Fig. 6 and 7.

Fig. 1A shows the inventive method and equipment schematically as a block diagram representation. The equipment can separate several different recyclable and disposable packages from each other. The line-code number is shown in Fig. 1A in an area defined by a dashed line.

The sorting device is flexibly connected to the automatic bottle returning device, whereby said automatic device forms a returning centre, which is capable of separating and sorting all current returnable and recyclable packages.

A returnable package 10 is placed on a measuring conveyor 1, whereby an automatic device is activated. The conveyor 1 transfers the package at a constant speed forwards.

The identification of the package 10 occurs so that the weight of the package 10 is first measured, after which the the profile shape is identified. A microprocessor compares the obtained data with a library in its memory, which also contains the correct weight measured for each acceptable profile.

In one embodiment of the invention, a line code reader is provided, which operates along with the profile measurement by separating packages having the same profile shape but e.g. a different return value or supplied by a different manufacturer or by a different bottler from each other.

- If a package is not found in the memory register, it is rejected and transferred away from the conveyor e.g. by means of a solenoid.

- If the package is found in the memory register, but it is too heavy, it is rejected as a full package e.g. by means of a solenoid.
- If the package is found in the memory register, but the line code reader rejects it, the package is removed from the measuring conveyer e.g. by means of a solenoid.

5 If the package is found in the memory register and it has the correct weight and it has been identified e.g. as a glass bottle, it travels along the measuring conveyer e.g. onto a collector table or along a vertical conveyor onto a collector table located at a lower level or to other further treatment.

10 In the following cases, the package has been identified as returnable:

- If the package is a recyclable PET bottle, it is transferred away from the measuring conveyor by means of an air flow or a solenoid.

15 - If the package is a disposable plastic bottle, it is transferred away from the measuring conveyor by means of the air flow.

- If the package is a can, the material of the can is identified by an inductive sensor, and if it is detected that it is made of steel, it is blown away from the measuring conveyor, at a different point than an aluminium can.

- If it is another returnable package, it is blown away from the measuring conveyer by means of the air flow.

25 Measuring the weight of the package occurs as follows: Under the belt of the measuring conveyor is mounted a strain-gauge transducer, by means of which the weight of the package can be measured accurately and reliably. The weight measurement is provided with a self-calibration system.

30 The line code identification is performed by utilizing a line code reader (readers).
The profile identification of the package occurs by means of a line camera/light source system.

The package travels along the measuring conveyor through a measuring line, on one side of which is arranged a line camera and on the other side of which is located a line light source. When the package comes to the measuring line, its outer edges prevent the entry of light into the camera, which stores the shape of the edge curve in the memory and compares the measured profile with an acceptable profile data prestored in the machine memory.

After the package has been identified and found to have an incorrect shape, be too heavy or have an incorrect line code, it is rejected and a reject solenoid is activated. The package travels along the measuring conveyor at a constant speed, which makes the calculative determination of the location data of the package and a correctly-timed solenoid movement possible.

If the package has been identified as a recyclable PET bottle, a solenoid is activated, which is designed for the transfer of these packages. Alternatively, an air flow for transferring the bottle from the conveyor can be used. The location data is obtained as above.

Disposable plastic bottles can be transferred from the conveyor most easily by using an air flow. A correctly timed blowing can be realized as above, or when the processor has identified the bottle as a disposable plastic bottle, a photocell is activated with a certain delay, which activates the blowing when the bottle reaches the location of the photocell.

When the processor has identified the package as a can, both photocells of the can blower are activated with a certain delay. The information whether the can is made of steel or aluminium is obtained from an inductive sensor, deactivates the activity of one photocell according to the material data.
If the package is some other recyclable or returnable package, the operation occurs as in connection with the disposable plastic bottles.

The necessary volume flow of air is achieved e.g. directly from a pneumatic network. The pressure of the network must then be reduced suitable by means of a pressure reducing valve.

The volume flow needed can also be produced e.g. by a radial or axial blower.

The air is divided into different blowing objects by means of channels. Each object has its own closing valve, which can be controlled separately.

After the sorting, the packages and the cans can be e.g. crushed for adjusting the space. Each product must then have its own crushing unit.

All returnable packages can be transferred directly from the measuring conveyor to a lower level along pipes and vertical conveyors. The recyclable packages travel via vertical conveyors onto collector tables on the lower level, and disposable packages travel directly into a reject container reserved for each disposable package and via crushing correspondingly into its own reject container.

After the sorting, the packages can be moved also horizontally.

Fig. 1B shows an embodiment of the inventive device. According to the figure, the equipment first comprises weight measuring means, e.g. a strain-gauge transducer. The conveyor is adapted to transfer a returnable package after the weight measuring point to a profile measuring device. The profile measuring device identifies the profile shape of the possible returnable can and also compares the profile-shape related weight data of the empty can or package with the measured weight data. If the measured weight data corresponds to the weight data related to said profile and stored in the register, the bottle is transferred to a
storage determined by the profile measurement, whereby either a solenoid 16a or
16b or one of the air nozzles 13a, 13b, 13c and 13d is activated. The activation
occurs as the package enters at a solenoid or at one of said nozzles. On the
opposite side of the belt conveyor is located in the embodiment of the figure a
return pipe 14a, 14b...14f, whereby the returned package can be transferred via
a pipe from an upper storage space E₁ to a lower storage space E₂.

An inventive application shown by way of example in Fig. 2 contains a receiving
device for bottles, cans and other such packages, which device comprises a
transfer equipment 1 for transferring returnable packages 10, and identification
device 2 with its data processing unit 3 for identifying and accepting packages
having certain shapes, as well as a registering device 4 for registering accepted
packages. The transfer equipment 1 can be comprised e.g. of one or several belt
conveyors, of a rotatable tray conveyor or in general of any conveyor suitable for
transferring packages. The conveyor can be arranged to transfer packages horizon-
tally and/or possibly vertically, although a horizontal transfer is preferred in
connection with the inventive bottle receiving device. The transfer equipment can
further comprise a feeder for feeding the packages to the transfer device and a
rej ector for removing the packages from the top of the transfer device onto the
floor of the storage space, into a bottle rack, etc.

The identification device 2 preferably comprises a data processing unit 3 with a
memory unit 8 and registering unit 4. The data processing unit 3 is thus provided
with a data file containing the acceptable package shapes, i.e. data about accept-
able package shapes can be entered into the file for comparing the information ob-
tained about the shape of the package to be monitored with the information
corresponding the accepted package shapes. The registering device registers the
quantity of the acceptable packages, possibly their sizes and/or the amount of
money to be compensated or returned.
Fig. 3-4 show as a principal schematic view of an identification device 2, which mainly comprises a stationary illuminator 5 for illuminating the package 10, a detector 6 for inspecting the package and a conveyor 7 for transferring the package past the detector. Said detector is arranged to monitor the package momentarily, periodically, at line-like points as the bottle transfers, transported by the conveyor 7, past the detector such that the line-like inspection points provide information e.g. at the bottle at least about the shape of the neck and upper part of the package, i.e. the detector is arranged to take a so-called line photograph of the bottle.

When taking the line photograph, the detector 6 thus periodically takes line photographs of the package in accordance with Fig. 5, as the conveyor 7 transfers the package past the detector. Line photographs can be taken periodically, i.e. the line density of the photograph can be adjusted as desired according to the accuracy of the information desired. The detector 6 changes the obtained line photograph information into electrical impulses to be led to the data processing unit in a known manner according to Fig. 1.

In connection with the identification of the bottles, it is not necessary to take a line photograph of the entire bottle, but it is generally sufficient to photograph the upper part 10' of the bottle according to Fig. 5, since the characteristic features of the bottle types and models generally appear best at the upper part of the bottle. The lower part 10" of the bottle is thus suitably not photographed.

In Fig. 3-4, the detector 6 is a conventional line camera, which is arranged to photograph the bottle moving past the camera laterally perpendicularly to the direction of the objective of the camera at the upper section of its neck with vertical line photographs at intervals of 1 mm. The identification device is programmed to measure the height of the bottle. If so desired, the detector 6 can be arranged to take horizontal photographs of the bottle, whereby the conveyor 7
is suitably arranged to move the bottle vertically for photographing the bottle at the desired height.

When a line camera is used as the detector 6, certain advantages are obtained, relative e.g. to a laser-based identification device. First of all, the purchase price of a line camera is lower than that of a laser. A line camera does not require service nearly as much as laser devices. A line camera is by operation and construction reliable and it withstands vibrations and other external mechanical stresses. A line camera can consist e.g. of a so-called CCD camera (Charge Coupled Diod) or of a so-called photodiode camera (Self Scanning Array). Furthermore, a line camera can be readily connected to a data processing unit, and the information provided by the line camera, or an electrical line of signals, is suitable to be used, mainly as such, in a data processing unit. In addition, a line camera can be adjusted and timed according to the desired scanning frequency, i.e. to intervals of taking photographs.

Fig. 6 shows axonometrically the inventive equipment and method. The returned bottle, can, milk can or other package 10 is brought to the measuring point of the identification device 2 and the shape of the package 10 to be returned is identified. The identified shape is compared with the shapes stored in the memory 8 of the central unit 3 of the device, and if the shape is identified, a sorter 11 located after the measuring point is activated on the basis of the measurement for a sorting operation, whereby the measured package 10 is removed from the conveyor passage to the desired storage station A₁ or A₂ or A₃... determined on the basis of the measurement. Accordingly, the inventive device measures the product, and on the basis of the measured product, the measurement result is compared with the shapes stored in the memory 8 of the central unit, whereby a receipt of the returned product is given to the person returning the package on the basis of the identified dimensions. The inventive device can thus return any products, since in addition to the
different shapes of bottles, also the different shapes and types of cans as well as the different shapes and types of plastic packages, etc. have been stored in the memory 8 of the central unit 3.

According to Fig. 6, the returned package 10a travels from the measuring point, in the embodiment of Fig. 6, past a continuously operating air nozzle 13a, 13b... towards a discharge pipe 14a at the end of the conveyor, from which the bottle transfers from the upper position E₁ gravitationally to a lower storage station E₂. In contrast, the returnable can 10b shown in Fig. 6 moves aside from the conveyor 15 by means of an air blow caused by the nozzle 13a.

In the embodiment of the figure, the nozzle 13a and/or, 13b and/or 13c and/or 13d can be continuously in operation. In the embodiment of Fig. 6, the second blowing nozzle 13b is located after the first nozzle 13a, and said nozzle 13b is activated, when e.g. the can 10b is returned, which has been identified on the basis of the shape, weight, line code and material in the measuring point at the initial end of the conveyor.

According to Fig. 6, the station adjacent to the measuring point of the conveyor comprises a pusher 16a, by means of which a non-acceptable package is pushed to the reject conveyor or directly to reject space at the storage station A₁.

According to Fig. 6, bottles 10c are removed from the main conveyor 15 also by the pusher 16b before the blowing nozzle. Accordingly, bottles of a certain size and/or type are transferred on the basis of the measurement results to the return pipe 14b at the pusher 16b. A bottle 10c is transferred to a lower floor E₂. The largest bottles are transferred to the pipe 14b at the end of the conveyor. The sorting can thus be performed e.g. only on the basis of a certain bottle size. In another possible embodiment of the invention, bottles that are smaller than a certain bottle diameter or length are transferred via the first pusher to the first return pipe 14b and and to the lower storage station E₁, and all other bottles are
transferred to the return pipe 14a at the end of the conveyor 15 and therethrough to the lower storage station E₁.

Fig. 7 shows schematically the operation of the inventive device on the basis of one of its embodiments. The can 10 is brought to the measuring point, and if the can is e.g. a steel can, an inductive sensor 17 identifies the can and activates the first air nozzle 13a, whereby the can falls into its own storage station A₂. For example the shape of the can and the line code, when needed, have been identified in the measuring point. In the next step, if the inductive sensor 17 does not identify the can as a steel can, but it is e.g. an aluminium can, the second nozzle 13b is immediately activated and the first nozzle 13a is not activated. In this way, steel cans can be sorted from aluminium cans, and the steel can may be transferred to its storage station A₃.

Plastic bottles can be identified already at the measuring points on the basis of the shape and, when needed, the line code of the bottles, and after the identification the third air nozzle 13a is activated, whereby the air nozzle blows the returnable bottle to its own storage station A₄ at the nozzle 13c. Furthermore, milk cans may be identified on the basis of their shape, and when needed, the line, when they have first been measured in the measuring point of the device. After the identification, the last air nozzle 13d is activated and the returnable can is transferred from the conveyor aside to its own storage station A₄.

In connection with the plastic bottles, the plastic bottles that are used for recycling can be returned separately to their own storage station. A separate storage station can thus be located before the nozzles for recycling, to which station a returnable bottle or other package can be pushed by a pusher related to the station or by e.g. an air nozzle.

An ejector 16a before all above-mentioned sorting points can be located on the conveyor for rejected packages. When e.g. a returnable can has been identified on
the basis of its shape, the weight of the can is next identified by a strain-gauge transducer 18, which is located below the conveyor belt of the conveyor 15. If the can weight does not correspond to the weight of an empty can stored in the memory register of the central unit, the ejector is immediately activated in the vicinity of the measuring point.

Fig. 8 shows as a block diagram representation the operation of the inventive device. According to the figure, the shape of the product is identified in the measuring point e.g. in a manner described in the applicant's earlier patent application FI 870904, and said shape is compared with the known shapes stored in the central unit. If the shape is identified, the weight of the identified shape is compared with the weight of an empty package to be identified with the above-mentioned shape stored in the memory 8 of the central register. If the weight corresponds to the weight stored in the memory within a certain tolerance range, the returnable package 10 is accepted and transferred forward from the measuring station 15 by the conveyor. The central unit transmits the information to the sorter 11 corresponding to the shape of the identified package, whereby, as the package enters at the sorter, a sensor, e.g. a photocell 19 and/or an inductive sensor 17, identifies the entry of the package, and e.g. the air nozzle is switched to the blowing state e.g. when a valve device 20a, 20b... shown in Fig. 6 switches into the open position. The conveyor passage V thus comprises along its length different storage stations A₁, A₂... The first station on the conveyor passage can comprise a reject station for full packages and the second station can be a reject station for otherwise non-identified and thereby rejectable packages.

In accordance with the invention, all kinds of packages can be identified and sorted by means of said method and device. The sorting may concern bottles, plastic bottles, cans and also separately steel and aluminium cans and further milk cans and other corresponding packages of a corresponding material. The registering device 4 (in Fig. 2) gives the returning person a compensation for the package e.g. in the form of a receipt, money, or the like.
Claims

1. A method for identifying returned bottles, cans, plastic bottles or other packages (10) and for sorting them on the basis on and identification code, in which method a compensation corresponding to the package is given on the basis of the identification of the returnable package (10), characterized in that in the method the returnable package (10) is transferred to a measuring station of an identification device (2), at which measuring station is generated a signal corresponding to the shape of the returnable package (10) for the central unit (3) of the device, which compares the measured signal or signals with the preprogrammed signals stored in a memory (8) of the central unit (3) and identifying the shape of different packages, and when the package shape corresponds to the shape stored in the memory (8) and programmed therein, a sorter (11) located after the measuring point is activated for transferring the package (10) to its own storage storage station (A_1, A_2, A_3,...) on the basis of the identification data.

2. A method according to Claim 1, characterized in that in the method, the sorter (11) is an air jet, which is activated at least when it is desirable to move the package (10) that has come to the jet (13) away from a conveyor 15) to its own storage station.

3. A method according to any of the preceding Claims for sorting returned products after their identification, characterized in that several adjacent intermediate jets (13a, 13b, 13c,...) are used in the method, whereby the jet is activated on the basis of a command produced by the central unit 3.

4. A method according to the preceding Claim, characterized in that the method, the activation of the nozzle (13) occurs on the basis of a material data produced by an inductive sensor (17), as the inductive sensor (17) identifies the material of the returnable package (10).
5. A method according to any of the preceding Claims, characterized in that in the method, a sorter, e.g. a pusher (16) is fitted in the immediate vicinity of the measuring point, by means of which pusher a non-accepted or full package or a package having an incorrect line code is immediately transferred to rejection or back to the feeding point of the package, if the the weight data or line code data corresponding to the measured and identified profile does not correspond to the weight data or line code data of an empty package (10) related to identified package (10) stored in the memory (8) of the central unit (3).

10 6. A device for identifying and sorting returnable bottles, returnable cans or other returnable packages to a storage station (A₁, A₂, A₃...) corresponding to the package (10), which equipment comprises a transfer equipment (1; 15) for transferring returned packages (10), and identification device (2) with its data processing unit (3) for identifying and accepting packages having certain shapes, as well as a registering device (4) for registering approved packages, which data processing unit (3) comprises a memory register (8) containing the profile data related to packages (10) of a different shape and size, characterized in that the equipment comprises after the identification device (2) a sorter (11) and storage stations (A₁, A₂, A₃...) and in connection with each storage station (A₁, A₂,...) an equipment (13, 16), by means of which the returned package can be transferred to a storage station (A₁, A₂, A₃...) related to the package (10), whereby the equipment comprises between each storage station and the central unit (3) data transmission buses (T), whereby the equipment comprises the data transmission buses (T) between the devices (13, 16) transferring a product to the storage station and the central unit (3), whereby at least the profile of the returnable can (10) is identified at the measuring point of the identification device (2) and it is compared with the profile shapes registered in the memory (8) of the central unit (3), and if the profile of the returnable package (10) corresponds to the shape registered in the memory (8), the equipment (13, 16) of the storage station related to the returnable package (10) is activated on the basis of a signal data produced by the
central unit (3), by means of which equipment (13, 16) the returnable package is transferred to the storage station (A₁, A₂, A₃...) related to the profile shape.

7. An equipment according to Claim 6, characterized in that the equipment comprises at least one blowing nozzle (13, 13b...) producing an air jet, whereby the returned package is transferred to its own storage station by means of the nozzle device (13).

8. An equipment according to Claim 6 or 7, characterized in that the blowing nozzle (13) is fitted to be located on one edge of the conveyor (15) and that the storage station (A) related to the blowing nozzle is fitted to be located on the opposite side of the conveyor (15) than the blowing nozzle (13).

9. An equipment according to any of the preceding Claims 6-8, characterized in that the blowing nozzle (13) comprises in its connection a valve device (20), which opens and closes the blowing, whereby the command concerning the position of the valve is produced by the central unit (3) on the basis of an identified profile data.

10. An equipment according to any of the preceding Claims 6-9, characterized in that the equipment comprises at least two vertical pipes (14a, 14b) in connection with the conveyor, whereby part of the returnable bottles are transferred from the end position of the conveyor (15) via the pipe (14a) to a lower storage station (E₂) and whereby part of the returned bottles (10) are transferred from the side of the conveyor (15) via the pipe (14b) to its own storage station in the lower storage space (E₂), as the pusher (16b) is fitted on the opposite side of the conveyor (15) opposite to the feeding opening of the discharge pipe (14b).
RETURNABLE PACKAGE TO AUTOMATIC DEVICE

WEIGHT MEASUREMENT
LINE CODE IDENTIFICATION
PROFILE MEASUREMENT

WEIGHT IS COMPARED WITH OBTAINED PROFILE DATA AND WITH PROFILE DATA IN LIBRARY

PACKAGE IS REJECTED AND TRANSFERRED AWAY FROM MEASURING CONVEYOR

NO

RETURNABLE PROFILE

YES

FULL

NO

CORRECT LINE CODE

YES

GLASS BOTTLE

YES

TO BE TRANSFERRED FURTHER TREATMENT E.G. ONTO COLLECTOR TABLE/VERTICAL CONVEYOR

NO

PLASTIC BOTTLE

YES

RECYCLABLE BOTTLE

NO

CAN

YES

STEEL CAN

NO

ALUMINIUM CAN

YES

OTHER RETURNABLE PACKAGE

NO

TO BE TRANSFERRED TO FURTHER TREATMENT E.G. ONTO COLLECTOR TABLE (OWN SPACE) VERTICAL CONVEYOR (OWN UNIT)

BOTTLE IS TRANSFERRED TO FURTHER TREATMENT E.G. REJECTION OR OTHER TREATMENT, E.G. CRUSHING

CAN IS TRANSFERRED TO FURTHER TREATMENT E.G. REJECTION OR OTHER TREATMENT, E.G. CRUSHING

CAN IS TRANSFERRED TO FURTHER TREATMENT E.G. REJECTION OR OTHER TREATMENT, E.G. CRUSHING
FIG. 8

- Activation of storage station related to package
- Profile measurement
- Comparison with profiles in memory library
- Receipt (registration)

Components labeled: 2, 13a, 13b, 13c, 13d
INTERNATIONAL SEARCH REPORT

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)  
According to International Patent Classification (IPC) or to both National Classification and IPC  
IPC5: G 07 F 7/06, B 07 C 5/00, 5/36, B 65 G 47/46

II. FIELDS SEARCHED

Minimum Documentation Searched

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Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched

SE, DK, FI, NO classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT

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* Special categories of cited documents:  
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“E” earlier document published on or after the international filing date  
“L” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
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IV. CERTIFICATION

Date of the Actual Completion of the International Search:
3rd October 1991

Date of Mailing of this International Search Report:
1991-10-10

International Searching Authority:
SWEDISH PATENT OFFICE

Signature of Authorized Officer:
BO GUSTAVSSON

Form PCT/ISA/210 (Second sheet) (January 1985)
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ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/FI 91/00190

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 91-08-30. The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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