Arrangement for handling goods labelled with a price code, having an introduction point (12) and a pick-up point (7) and, between these, a conveyor belt (17, 18, 19). At the introduction point there is an arrangement, intended for use by the customer, for reading-off price codes. A further code-reading arrangement (22) on the conveyor belt is designed to automatically detect and read-off the code of an item as it passes by. Along the conveyor belt (17, 18, 19) there are elements for arranging the input goods in a formation suitable for automatic reading-off.
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A DEVICE FOR HANDLING GOODS MARKED WITH A PRICE CODE.

Technical field:
The present invention relates to an arrangement for handling goods labelled with a price code.

Prior art:
As goods generally began to be labelled with a price code which could be read off by a machine, the possibility arose of increasing the degree of automation in the handling of goods at the point of purchase in conjunction with the calculation of the total price in one purchase sequence. Although the reading-off of the optical price code using a data pen reader already entails a certain degree of rationalization, there nevertheless remains a considerable amount of manual work at the checkout. This work has been found to be taxing for staff and has often given rise to occupational injuries.

A proposal for increased automation appears in Swedish Patent Application 8503386-8, Checkrobot Inc., USA. This patent specification describes an arrangement in which the customer, who has approached the arrangement with a basket containing goods, passes the price code on each one of the goods over a code-scanning arrangement. Thereafter, the goods are conveyed onwards to a control arrangement which measures physical data for each item and compares these with corresponding data which, together with the price, have been recorded in the shop computer under the code in question. In this way an automatic check is made of whether the item whose code has been scanned is the same item which the customer sent onwards through the arrangement for collection. A check is also made of whether all the items conveyed onwards.
have been code-scanned.

In this way it is possible to establish whether the customer has made a mistake in the initial handling of the item in the arrangement, for example if he has introduced one item into the code-scanning arrangement but has then allowed another item to be conveyed onwards, or if he has only carried out scanning of one item but sent a number of items onwards. If such errors have been committed, the measured physical data and/or the number do not agree with the data recorded and the item is then prevented from being conveyed onwards to the pick-up point; in the specification it is proposed that it should be returned to the customer. Once all the goods have passed the control arrangement, they can be collected by the customer when payment of the recorded and added total price has been made.

Technical problem:
The arrangement is not satisfactory in certain respects. If any defect in recording occurs in the code-scanning operation, the customer is forced to repeat the latter, which increases the processing time and can also be regarded as psychologically undesirable. Moreover, in addition to the customary work involving centrally recording the code with the relevant price, it is also necessary to measure and/or weigh the item for the purpose of recording its physical data.

Solution:
In the arrangement for handling goods labelled with a price code, there is an introduction point and a pick-up point and, between these, a conveyor belt which is designed to convey goods, put down by a customer at the introduction point, in the direction towards the pick-up point and to allow these to pass a seat for staff. At the introduction point there is an arrangement, intended for the use of the customer, for reading-off of price codes which are preferably optical, this arrangement being
connected to a computer-based calculating arrangement. According to the invention, there is a further code-reading arrangement arranged on the conveyor belt before the seat for the staff and designed to automatically detect the code on an item as it passes by and to read-off this code for recording in the calculating arrangement. Along the conveyor belt between the introduction point and the code-reading arrangement there are elements which are designed to arrange the introduced goods in such a way that they pass the other code-reading arrangement in a specific formation suitable for reading-off.

Advantages:
The present invention provides an arrangement for substantial automation of the handling of goods when checking out from a sales outlet in conjunction with price recording, which arrangement does not have the said disadvantages but nevertheless affords a high degree of reliability in terms of the recording.

Description of figures:
Two embodiments of the invention will be described hereinbelow with reference to the attached drawings, in which

Fig. 1 shows a diagrammatic plan view of a check-out point at which two arrangements designed according to the invention are set up;

Fig. 2 shows a section through the arrangement according to Fig. 1 on a smaller scale, with a series of four plan views illustrating a first instance of a processing sequence;

Fig. 3 shows a series illustrating a second instance;

Fig. 4 shows a series illustrating a third instance;

Fig. 5 shows a series illustrating a fourth instance;

Fig. 6 shows a perspective view of the arrangement;

Fig. 7 shows a second variant in a side view; and

Fig. 8 shows the second variant in a plan view.
Preferred embodiments:
In accordance with Fig. 1, see also Fig. 6, a check-out point 1 has two arrangements 3 and 4 according to the invention. They are set up parallel to each other, in such a way that they form a space 5 between each other. Those ends of the arrangements 3 and 4 directed outwards in Figs. 1 and 6 are referred to hereinbelow as the introduction point 6, and the parts directed towards the left are referred to as the pick-up point 7. At the inner end of the space 5 there is a seat 8 for staff, which seat has in front of it a cash register 9.

The two arrangements 3 and 4 each have at the introduction point a working surface 12 with a code-reader 13. Alongside the latter there is a weighing panel 14. From the working surface 12 there extends a conveyor belt 15 comprising elements for arranging the goods in a conveyor formation.

The conveyor belts 15 are designed with conveyor elements in the form of belt or chain covers in three different sections. First, one section 17 runs from the working surface 12 towards the right-hand end of the arrangements as viewed in Fig. 1. A second section 18 runs transverse to the latter, in the direction towards the space 5. This section 18 in turn connects with a lengthwise section 19 nearest the space 5. This section 19 runs from the end (towards the left in Figs. 1 and 6) into a goods collection panel 20 at each pick-up point 7.

Along each section 17 there is a device in the form of a photosensor arrangement 21 for checking the passage of the goods. Approximately where the sections 18 and 19 meet there is a further code-reader 22.

Fig. 6 shows further details which, however, are of less importance in this context. Thus, the working surface 12 and weighing panel 14 are shown delimited by a border 24, and at each goods area 20 there is a beam 25 for
directing the flow of goods to different positions in the area as new customers are served successively.

The cashier 9 thus sits between the two arrangements 3, 4, and it is assumed that the seat position is such that the cashier can swing around in order to work at either one or the other side. The cash register 9, situated in front of the cashier, has a keyboard for manual keying-in of weight and price details and other data not automatically entered. Furthermore, there are displays for presentation of data and an arrangement for printing-out of receipts, and the like.

In Fig. 1 the direction of the goods is indicated by arrows. The first arrow 26 indicates the direction of the goods on section 17, when the customer has taken them from the trolley and passed them across the working surface 12. An arrow 27 indicates the shifted direction of movement of the goods on section 18. An arrow 28 indicates the direction of the goods on section 19 when moving towards the pick-up point during the price-recording and payment operations.

The sections of the conveyor belt are designed so as to be driven with the upper, conveying part normally running in the direction indicated by the arrows. However, they are controlled by the functioning of various elements in such a way as to be stopped or alternatively reversed counter to the direction of the arrows.

These elements are the two code-readers 13 and 22, which record the respective item codes or, as may also occur, fail to read them. The read-off codes are compared electronically with data input in the central computer of the shop, of which data the price information for each item is the most important for the system. The photo-sensor arrangement 21 is designed to detect the passage of the goods as they are conveyed onwards on section 17 to the subsequent sections 18 and 19. It is also possible
for the cashier to manually control the start-up, stopping and direction of movement of the conveyors.

The object of the arrangement is as follows: when the goods have been introduced by the customer into the arrangement and the customer has carried out the initial operations (manual code-reading, weighing of certain items, and finally placing the goods on section 17) they are conveyed onwards without further handling on the part of the customer until they can be collected at the pick-up point 7. On the way between the introduction point and the pick-up point, the optical code with which the goods are labelled is recorded by means of the reading devices 13 and 22. This is effected by manual handling of the goods at reading device 13, but automatically at 22 as the goods are conveyed past. The arrangements having the function of detecting and reading-off a code in this way are previously known.

However, during the reading-off the goods must pass the reading-off arrangements one by one. If several goods were to be stacked one upon the other or lay close against each other, it could happen that only one item was recorded despite the fact that several were passing the reading-off arrangement.

Even if the goods are conveyed past the reading-off arrangements in a manner favourable for reading-off, and it may be assumed that the customer is requested to ensure that the code labelling is not turned downwards, it can happen that goods are not recorded because they lie unsuitably or quite simply lack a code. It may be preferable for goods which are gathered together by the customer himself and which must be weighed, such as fruit and vegetables, to be weighed and priced at the checkout. Deliberate manipulations may also occur. It is thus possible to assume that certain goods will be recorded as having had their codes incorrectly read. The said control of the conveyor belt is designed for this purpose.
Figures 2-5 show plan views of the corresponding plan view of the arrangement 3 in Fig. 1. Four different instances of goods handling are shown and, in conjunction with this, a description is given below of how the arrangement successively operates in these different instances. This is shown in each figure in a series of four plan views, which successively show the passage of the item through the arrangement. The actual point at which the item is situated in each plan view and which is described hereinbelow is indicated by a circle and reference number 32. In the following description the successive passage is identified by the respective Figure number and First, Second, Third and Fourth plan view, these being counted from the left in the Figures.

Normal, fault-free functioning.

Item with complete code, weighing not necessary:
First plan view: the item 32 is introduced by the customer onto the working surface 12 at the introduction point and is recorded manually by means of the code-reader 13.
Second plan view: after recording, the item is placed on conveyor belt section 17 which moves the item onwards to section 18, which transfers it to section 19.
Third plan view: the item is moved by conveyor belt section 19 past the code-reader 13, and the code is read off a second time.
Fourth plan view: the item passes the cashier and is set down in the goods collection panel at the pick-up point. The cashier has no reason to intervene.

Fig. 3. Assistance from cashier, item must be weighed:
First plan view: the item is placed on the weighing panel by the customer. The fact that this has been done is indicated to the cashier, who checks the item and enters the price per kilo.
Second plan view: when the cashier has indicated that the weighing has been completed, the customer transfers
the item to the conveyor section 17.
Third plan view: when conveyed past the code-reader 22, only the passage is recorded; the price is already recorded during weighing.
Fourth plan view: onward conveying to the pick-up point.

Fig. 4. Article which the customer has not recorded:
First plan view: the customer places the item directly on conveyor section 17 without either recording it with the code-reader 13 or weighing it.
Second plan view: the item passes the photosensor arrangement. This registers the fact that the passage of the item does not correspond to any preceding code-reading or weight-recording.
Third plan view: the direction of movement of the conveyor section 17 is reversed under the action of the control arrangement after the latter has registered the omission of the said code-reading.
Fourth plan view: the item is thus conveyed back to the customer, who must ensure that the code is read-off before the item is handled by the arrangement for collection.

Fig. 5. The recording of the item in code-reader 22 does not correspond with the code-recording carried out by the customer:
First plan view: the customer records by means of the code-reader 13 an item, here designated 33, which is not intended to be fed into the arrangement.
Second plan view: a second item, such as previously designated by 32, is placed on the conveyor section 17.
Third plan view: the item 32 is recorded by the automatic code-reader 22. At this point it is found that it is not the same item which has previously been recorded by the code-reader 13. The conveyor arrangement is then controlled in such a way as to stop the item in front of the cashier. Alternatively, the conveyor arrangement can be designed to reverse the conveying direction to that counter to the arrows shown and to
return the item to the customer, as described in conjunction with Fig. 4.

The installation is advantageously provided with a signal arrangement which indicates acceptance, requirement for renewed reading, and so on.

An important part of the arrangement is the conveyor arrangement and the arrangements for forming the flow of goods in sections 17-19. The unimpaired functioning of the code-reader 22 is in fact to a large extent dependent on how the goods pass by it. Indeed, an arrangement such as this one presupposes a certain contribution on the part of the customer, so that the goods are not unnecessarily stacked too much on each other or arranged in groups or in unsuitable positions. The code-reader 22 shown in the figures is in this case assumed to consist, like the code-reader 13, of an opening in the base under which a scanner operates with scanning of the code in different directions, so that it can be recorded with the item in various turning positions. However, such a system presupposes that the code is turned downwards so that it passes over the said opening. Alternatively, however, the automatic code-reader 22 in particular can be of another type with scanning at a distance of a code which is not directed towards the base. In this respect it is possible to achieve such refined reading-off that the code can be directed in any direction whatsoever, except perhaps downwards, if scanning of the free surfaces is carried out. However, such an advanced system is of course more expensive, and it would be preferable for the code-reading to be designed in such a way that it is only carried out with respect to the underside, which therefore presupposes that the customer lays the item in the appropriate position.

However, this is not sufficient. It is also necessary to ensure that the goods pass one by one. In this case too a certain contribution on the part of the customer may be
presupposed, but it can still happen that the goods group together during conveying. The three conveyor belt sections 17-19 are designed for this purpose, in other words a formation of the goods in a line. As a result of the shift in the direction of movement from section 17 to 18, in fairly favourable cases a row-type formation of the goods is achieved. This is accentuated still further upon the shift in direction at the cross-over from section 18 to 19. In addition, the three sections can be given different speeds, with the speed increasing from section to section in the conveying direction.

The customer generally wishes to pick up the goods at a brisk speed, after which they are carried off by section 17, and the customer thus has a tendency to arrange them close together. Now, if the section 18 runs more quickly than 17, this means that the articles are separated from each other, and greater distances between them can be achieved if the section runs even more quickly. By means of the fact that the sections 17-19 form a U-shape, a sufficiently long conveying path for a good formation is obtained without the arrangement as a whole having to be extended too much for this purpose. The U-shape arrangement also has the advantage that the cashier's seat and the feed-in point for the customer can be positioned alongside each other so that communication can be maintained between the cashier and the customer and, as has been described, the cashier can assist, for example in weighing, but it still ensures a sufficiently long conveying path for the purpose of achieving a formation of the goods.

A variant of the forming arrangement is shown in Figs. 7 and 8. The arrangement which is shown in these figures in a side view and plan view, respectively, replaces the first conveyor belt section 17, as described above. The arrangement shown in Figs. 7 and 8 is thus to be connected to section 18 or, possibly, 19 for onward conveying of the goods in the intended formation for automatic
code-reading and passage past the cashier to the pick-up point.

In the views in Figs. 7 and 8, the input end lies towards the left, and at the very far left the area for the working surface is indicated, here 35, and the code-reader 36. This is followed by the area for conveyor formation of the goods.

An input compartment is formed by the working surface of a conveyor belt 37, which is designed to support the goods on its upper part 38, which runs towards the right in Figs. 7 and 8. The conveyor belt consists of several bands 48 and extends into an area 13 for conveyor formation of the goods and there passes a beam 41 which can be raised and lowered and which is supported by guides 42. The beam 41 has a brush 43 on the underside. This is followed by a band 43 which is transverse to the conveyor belt 37 and stands upright, and which runs around plates on two axles 45 supported by a frame 46. The band 43, like the bands 48, is smooth so that it can slip against a bearing surface. The band 43 is designed to be driven in such a way that its part facing towards the input compartment 12 runs downwards in Fig. 8.

In the above paragraph it is assumed that the bands 48 of the conveyor run in the same direction, towards the right in the figures. However, the arrangement can alternatively be such that the upper bands 48 in Fig. 8 run with their upper conveying part towards the left, and the two remaining bands, the lower bands in the figures, run towards the right. It can be assumed that the band 43 with its drive arrangement is placed on the left-hand side of the beam 44. Its part directed towards the beam will in this case run downwards in Fig. 8.

In the said formation arrangement, the arrangement with the beam 41 which can be raised and lowered is provided with an optical sensor which records the passage of the
goods advanced, so that the beam can be raised and lowered in tempo with the passage of goods of different heights. Along the conveyors there may be sensors which detect whether the goods advanced on the conveyor have a certain distance between them. If the sensor records that the space needs to be increased, servo-mechanisms can be designed to selectively control the speed of the belt sections. If the following belt is driven at a higher speed than the preceding one, the goods deposited by the latter belt are accelerated and separated from the following item in the row, so that the desired space is maintained. The track through the code-reading area is assumed to be designed in such a way that it can be stopped for a brief moment for code-reading, which will take place when the item in question has a favourable position for scanning of the price code. When this position is assumed, it is thus recorded by the sensor for stopping the band. In a corresponding way it can be stopped in a favourable position for manual recording by the cashier if its code cannot be read-off.

A certain formation of the goods can be achieved by means of the different bands 48 having different speeds. In this way it is possible to achieve a turning of the goods and also an onward conveying with spacing between the goods if the bands at the bottom in Fig. 8, which lie outside the upright conveyor with the band 43, are driven at a higher speed than the other bands, which feed the goods onwards to the band 43.

The arrangement in the embodiment according to Fig. 8 operates in the following manner when goods pass through it: when the goods after code-recording are set up on the conveyor belt 37 and the conveying arrangement shown in Figs. 7 and 8 is started up, they are moved forwards towards the beam 41 which is in a lower position. When a sensor situated on the latter detects that an item is approaching the latter, the beam is raised by means of a servo-motor during on-going movement of the conveyor belt.
37. When the beam during its movement touches the upper part of the item, the latter is freed and can pass under the beam by being pulled by the conveyor belt 48. If another item is lying on top of this item it is pushed off by means of the brush and comes onto the conveyor belt after the first item, so that the goods pass successively one by one. In this formation they reach the band 43. As a result of its movement in the sideways direction in relation to the movement of the conveyor belt 40, it moves the goods in turn in the transverse direction on the conveyor belt. By adapting the speed of movement of the conveyor belt 40 with respect to the band 43, and by means of different speeds of the bands 48, it is possible to obtain conveying of a row of goods with spaces between them, as previously described.

This movement path for the goods applies to the first movement direction of the bands 48 described, in other words with the upper parts of all the bands moving the goods towards the right in the figures. If the second formation described is chosen, the goods will be introduced into the introduction compartment on the right (at the top right end in Fig. 8). They are thus conveyed initially towards the left under the beam 41, which carries out its brushing-off function, and towards the band 43, which is thus situated on the left-hand side of the beam 41 with its frame 44. Thereafter they are fed towards the other edge of the introduction compartment by means of the band 43 during the said separation. Since the lower bands 48 in the figures move towards the right, the movement direction is reversed and the goods move towards the right to the following belt. Here too the movement is in a U-shaped track.

In both the cases described, it may be said that the conveyor belt 40 forms two sections, the one made up of the two upper bands 48 in Fig. 8, which carry out the first conveying after positioning in the introduction compartment, and a section section, formed by the lower
bands 48, which carry out the conveying onto the conveyor belt 19 (according to Fig. 1) after the sideways movement by means of the band 43.

In this formation the goods pass to the code-reader 22 where the price code is recorded, preferably with a stoppage of the conveyor belt section 19. There may however be a number of cases where no price code is recorded in the code-reader 22. The goods are then divided by this code-reading arrangement into two groups, those on which the code has been read-off and recorded in the computer to which the arrangement is connected, and those goods for which no price code has been recorded. There is in addition the case in which different readings are obtained in the readers 13 and 22, cf. the description of Fig. 5.

It should be stated that there may be two basic reasons why the code is not read-off in such a way in both code-reading arrangements that the price recording can be carried out by the intended control, which is to be achieved on the one hand by means of a manual and on the other hand by means of an automatic code-reading. A defective reading can either be caused by incorrect handling on the part of the customer, as has been described, by means of the fact that the manual code-reading is omitted or by means of the fact that goods are changed around between the code-reading and onward conveying, or else one or other or both of the code-reading arrangements may fail in its function to detect and record the code. The latter is something which may be presumed to be the result of an intentional act, but the most common reason will probably be that the manual code-reading operation is carried out with insufficient care and/or that the goods have been placed on the conveyor belt in too disorderly a fashion.

In the preceding text, two methods have been indicated in which the apparatus can operate in cases of incorrect
code-reading: the item can be returned by reversing the direction of movement of the conveyor belt for renewed processing by the customer, or it can be stopped at the cashier for completion of the code-recording or, where appropriate, manual return to the customer. In order for the apparatus to function in an effective manner, easing the demands on the staff (it has been assumed here that one cashier will be able to operate two checkouts or perhaps even several), the cases involving manual intervention on the part of the staff for the price-recording must be reduced to the smallest possible number. In order to achieve this, the arrangement can be designed to accept at least a certain number of goods with recordable code-reading in only one of the code-reading arrangements. However, the staff should in some way be made aware of the fact that this is happening, so that they can intervene if it becomes too frequent.

As regards weighing, it should be mentioned that there are a number of alternatives here. There may of course be sales in which weighing is not required. It is also conceivable that weighing can be carried out in such a way that the customer himself has the item labelled with a price code at automatic scales, this price code being based on the item's price per kilo and weight recorded on automatic scales. It is also conceivable for the weighing to be carried out automatically in the arrangement, preferably when passing the code-reading arrangements. In this case it is assumed that the item is packaged in such a way that the code-reading arrangements can record the price per kilo so that, by means of this and the read-off weight, the shop's computer can calculate the price of the item. With solutions of this type, the manual effort can be reduced in comparison with manual weighing, as has been described in connection with Fig. 3.

The flow of goods described is shown as a block diagram in Fig. 4. The broken lines also indicate the path of the recorded price information to the arrangement for
addition of the total cost.

As emerges from the description, the aim of achieving a code-reading and handling of goods in conjunction with the latter, with minimum manual intervention on the part of both the customer and the staff, is achieved by means of the fact that the goods are moved on a conveyor system past contactless code-readers for scanning of the optical code. An advantageous positioning of several arrangements for conveying and code-reading, which allows one cashier to operate two arrangements, has also been indicated.

An important feature of the arrangement is the design of the conveying equipment for arranging the goods and forwarding them in such a way that code-reading can be carried out in a reliable manner with the very minimum of manual intervention and in such a way that the risk of any item not being read-off is kept to a minimum. How this can be achieved has also been indicated in the description.

The arrangement can be varied within the scope of the following patent claims, without thereby departing from the inventive concept as described. Such variants have been mentioned to a certain extent. In this respect it is understood that, in the equipment described, there are many possibilities of controlling the flow of goods by starting and stopping and adjusting the speed of the conveyor belts, and other control of these by means of sensors which detect the flow of goods. Moreover, a number of sensors can be arranged along the conveyor belts for detecting the positions of the conveyed goods.
Patent claims

1. Arrangement for handling goods labelled with a price code, comprising an introduction point (12) and a pick-up point (7) and, between these, a conveyor belt (17, 18, 19) which is designed to convey goods (32), put down at the introduction point by each customer, in the direction towards the pick-up point and to allow these to pass a seat (8) for staff, and at the introduction point there is an arrangement (13), intended for use by the customer, for reading-off price codes which are preferably optical, and which reading-off arrangement is connected to a computer-based calculating arrangement, characterized in that a further code-reading arrangement (22) is arranged on the conveyor belt and before the seat (8) for the said staff as viewed in the said direction of conveying and designed to automatically detect the code on an item as it passes by and to read-off this code for recording in the calculating arrangement, and in that between the introduction point (12) and the code-reading arrangement (22) along the conveyor belt (17, 18, 19) there are elements which are designed to arrange the input goods in such a way that they pass the other code-reading arrangement (22) in a specific formation suitable for reading-off.

2. Arrangement according to patent claim 1, characterized in that a conveyor-control arrangement is designed to be controlled by the code-reading arrangements (13, 22), to move goods (32), whose code has been recorded with a corresponding reading in the two code-reading arrangements, in a flow to the pick-up point (7), while goods, for which non-corresponding codes have been recorded, are brought into a position for manual handling.

3. Arrangement according to patent claim 1 or 2, characterized in that the conveyor-control arrangement is designed not only
- to move each item to the pick-up point in the case
of corresponding reading in the two code-reading
arrangements,
but also:

- to cause the conveyor belt to return the item to the customer for renewed code-reading in the case of recording in the first-mentioned code-reading arrangement being omitted,

- to return the item to the introduction point for renewed, correct code-reading by the customer in the case where different codes have been read off in the two code-reading arrangements, which may indicate replacement of the item between the code-reading carried out by the customer and the item being taken up on the conveyor belt.

4. Arrangement according to patent claim 1, characterized in that, when a reading-off operation in either of the code-reading arrangements (13, 22) is carried out during an input sequence by a customer but does not result in a recordable code-reading, it conveys the respective item to the pick-up point (7) in a predetermined, limited number of cases, but, in the event of further goods being incompletely read-off in this manner in excess of the predetermined number, it conveys these for manual handling.

5. Arrangement according to any one of the preceding patent claims, characterized in that the conveyor-control arrangement is designed to convey goods (32) which have been defined for manual handling either back to the introduction point (12) for renewed manual handling by the customer or to the seat (8) for the staff for manual handling by the latter.

6. Arrangement according to any one of the preceding patent claims, characterized in that the seat (8) for manual handling by staff is designed as a section along the conveying path of the conveyor belt (19), in which section the goods (32) are designed to be stopped if they have been recorded as not having been automatically
code-read, for manual recording and manual re-starting of
the conveyor belt, while the conveyor belt section is
designed to move the goods without interruption to the
pick-up point (7) when they have been recorded as having
been code-read.

7. Arrangement according to any one of the preceding
patent claims, characterized in that the elements of the
conveyor belt (17, 18, 19/37) for forming of the goods
comprises a sideways conveyor belt (18/43) which extends
across a part of the conveyor belt so that goods which
are brought forward and meet the sideways conveyor belt
(18/43) are moved in the sideways direction over to a
second conveyor belt section (19) with separation from
the following item.

8. Arrangement according to patent claim 7, charac-
terized in that the section (19) of the conveyor belt, to
which the sideways conveyor belt (18/43) extends, has the
opposite direction of movement to a conveyor belt section
(17/37) before the sideways conveyor belt, so that the
goods come to run in a U-shaped track, first in one
direction on the first section (17/37), in the transverse
direction thereto as a result of the action of the
sideways conveyor belt (18/43), and to the said section
(19) for onward conveying to the code-reading arrangement
(22).

9. Arrangement according to any one of the preceding
patent claims, characterized in that the conveyor belt,
which is divided into several successive sections (17,
18, 19), is designed for selective control of the convey-
ing speed of the said sections in such a way that the
goods (32) can be slowed down or stopped in certain
sections, while other goods are conveyed onwards at
another speed in other sections, and in such a way that
the goods can be separated at a distance from each other
by means of the fact that they are moved at different
relative speeds in the different sections, preferably
with control by sensors which detect the distance of the goods from each other.

10. Arrangement according to any one of the preceding patent claims, characterized in that at least one section (40) of the conveyor belt is designed with several conveyor bands (48) running parallel to each other, which bands are designed in such a way that they can be controlled at different relative speeds for forming the flow of goods.

11. Arrangement according to any one of the preceding patent claims, characterized in that the elements of the conveyor belt for forming the goods comprise a beam (41) which is arranged above the belt (37) of the same and which can be raised and lowered in tempo with the passage of the goods in such a way that, when an item strikes the beam in a lower position of the latter over the conveyor belt, it is raised and allows the item in question to slide past when the beam has reached its upper edge, while other goods possibly stacked upon the item are pushed off so that only one layer of goods is located on the conveyor belt downstream of the beam.

12. Arrangement according to any one of the preceding patent claims, characterized in that it consists of two arrangements (3, 4) of the type described, which are positioned parallel to each other and in a mirror-image, and with a common post (8) for manual handling in such a position that there is a seat for a person who is to carry out the manual handling and who can therefore operate two flows of goods.

13. Arrangement according to any one of the preceding patent claims, characterized in that along the conveyor path there are a number of sensor units for detecting the positions of the conveyed goods.
### INTERNATIONAL SEARCH REPORT

**International Application No PCT/SE 90/00317**

#### I. CLASSIFICATION OF SUBJECT MATTER

If several classification symbols apply, indicate all.

**IPCs:** G 06 F 15/21, G 07 G 1/12, A 47 F 10/02, B 65 G 47/31

#### II. FIELDS SEARCHED

**Minimum Documentation Searched**

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<td>IPC5</td>
<td>G 06 F, G 07 G, A 47 F, B 65 G, B 07 C</td>
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**Documented 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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<th>Category</th>
<th>Citation of Document with indication, where appropriate, of the relevant passages</th>
<th>Relevant to Claim No.</th>
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<td>A</td>
<td>SE, B, 460314 (CHECKROBOT INC.) 10 January 1986, see the whole document</td>
<td>1-13</td>
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<tr>
<td>A</td>
<td>US, A, 3866739 (T.J. SIKORSKI) 18 February 1975, see the whole document</td>
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<td>A</td>
<td>US, A, 4707251 (J.V. JENKINS ET AL) 17 November 1987, see the whole document</td>
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* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
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- "L" document which may throw doubts on priority claim(s) or which establishes the publication date of another citation or other special reason (as specified)
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- "P" document published prior to the international filing date but later than the priority date claimed

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- "X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step
- "Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "Z" document member of the same patent family

#### IV. CERTIFICATION

**Date of the Actual Completion of the International Search**

9th August 1990

**Date of Mailing of this International Search Report**

1990 -08- 14

International Searching Authority

SWEDISH PATENT OFFICE

Signature of Authorized Officer

JAN SILFVERLING

Form PCT/ISA/218 (second sheet) (January 1995)
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 90-06-27

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