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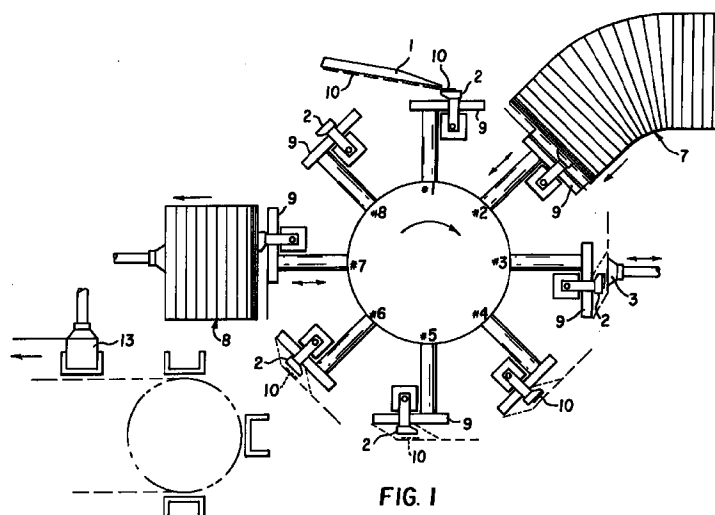
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(54) Rotary mechanism for applying labels to the inside of a carton

(57) A method for applying labels to the inside of containers and a label applicator comprises moving containers around a rotary indexing mechanism, picking up labels (10) with a vacuum head (2) that is part of a station that is affixed to a rotary mechanism moving the

labels at the same speed as that of the moving containers, entering the container where the labels are blown off the applicator heads and onto the inside of the containers.



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Description

This invention relates to a label feeder. More particularly, the invention relates to a label applicator mechanism and method which delivers individual labels to open-ended containers as the containers move through the infeed hopper of cartoning machines.

Label applicators typically apply labels to articles as the articles are presented to the label applicator. Usually, the labels are releasably adhered, in a single column, to an elongated backing strip. The label applicator removes one of the labels from the backing strip and releasably retains it at a labeling station. As the articles to be labeled stop at the removed label, it is applied to the articles. Label applicators of this type are shown, for example, in U.S. Patent Nos. 5,489,360; 2,788,834; 3,576,695; and 4,310,360.

Label applicators of this type, while satisfactory for many applications can introduce delay into an assembly or packaging operation in which labeling must be carried out. For example, time is lost when label insertion through the end of a container, application of the label to the inside of a container and withdrawal of the applicator must occur during the dwell time of process cycle. Also, all three operations must occur at the same station since the tooling would interfere with the motion of the container during the index period of the process cycle.

An additional problem in adding labeling capacity to cartoning machines is accessibility to the containers as they move down through their erection, product loading, flap gluing and discharge areas.

Most labels are applied directly on the outside of the container using direct applications to apply the label to the outside of the carton or container for the goods sold. However, in many applications, for instance in the sale of consumer goods such as a photographic film and like materials to be sold in department stores or discount stores where shoplifting is a major problem, the labels that are adhered to the cartons are treated either electrically or magnetically to register that the carton has been paid for before it left the premises. Thus, counter salespeople will deactivate the labels as they are paid for so that a store's detectors will not be activated in order to prevent theft.

The problem with these labels is that they are still susceptible to theft. In many cases, the labels on the outside of the container can be removed or switched prior to its reaching the cash register. Because of this problem, many department stores and other retailers are asking manufacturers of these goods to put the labels in the inside of the carton or container so they can be read accurately and the label can not be tampered with. This represents a major problem for manufacturers, it is very inconvenient to apply labels to the inside of a carton. To use the processes described above that are used to apply the labels to the outside of the containers will require tedious apparatus and extreme difficulty applying to the inside of containers. It

would be very difficult to do so without stopping or, at least substantially slowing down the packaging process. This results in much higher costs for the product to be sold.

The use of a label applying apparatus to the processing system which can be done expeditiously and at moderately high speeds while applying the labels to the inside of containers without holding up or slowing down the packaging process has heretofore alluded the efforts of those in the industry.

Accordingly it is an object of the present invention to provide a label device which can apply labels at moderately high speed to individual product units on a continuous flow basis.

It is an additional object of the present invention to provide such a device which can apply the label to the inside of the containers and at a speed that is commensurate with the processing speed in many applications.

It is a further object of the present invention to provide a method using this apparatus to label containers in the inside without slowing down the packaging operation.

It is a still further object of the present invention to provide a device and a method for labeling difficult shaped containers with the same mechanism.

Tagging is not normally a process that is done on a cartoning machine. Tagging is generally the last process before the carton is sealed after the product is loaded into it. The present invention provides a method of tagging before the carton is retained/captured in carton buckets on most cartoning machines.

In accordance with these and other objects of the invention, an automatic labeling device is provided for applying the labels to product units. The device consists of a carton conveyor to transport non-erected cartons to a multi-station indexing rotary labeling mechanism. This mechanism partially erects the carton, inserts a pre-dispensed label into the carton and applies the label. The mechanism then discharges the labeled carton, in its flat state, onto another conveyor that feeds the cartons in a conventional manner to the carton infeed area of commercially available cartoning machines.

The mechanism includes multiple stations affixed radially on a center hub. Each station having a carton nest component along with a label applicator component. The label applicator slides in the same direction as the axis of rotation, thus enabling the applicator to travel inside the carton as the carton is indexing around the center axis. This actuation could be accomplished through a pneumatic gland in which ports are opened or closed as the mechanism rotates. This device is integrated with a labeling machine such that a tag or label is dispensed to a vacuum grid which is mounted on the applicator. Since the applicator is linked to the carton nest, a predetermined motion can be executed that will permit the vacuum grid to enter the carton and apply the label. The advantages of this method are: tags or labels can be applied to the inside of cartons while the product

is being packaged; the percentage of product tagged or labeled can be 25, 33, 50 or 100 depending on the request by the customer; packaging of the product is not dependent upon receiving pre-tagged or labeled cartons which could be a scheduling concern; and all product currently requiring tags or labels need not be done manually.

Figure 1 describes the process of dispensing and applying labels to the inside of a carton.

Figure 2 shows the design of a carton nest.

Figure 3 shows a design of the stationary element of a vacuum gland.

For a better understanding of the present invention, together with other and further objects, advantages and capabilities thereof, reference is made to the following detailed description and appended claims in connection with the preceding drawings and description of some aspects of the invention.

Figure 1 shows the process of dispensing labels to the inside of cartons which are moving through an infeed to a cartoning machine in the packaging process. The process of the present invention allows the labeling of the inside of a carton, such as photographic film-containing cartons, while not slowing down or stopping the packaging process. The process consists of applying labels to cartons which are moving cartons through an infeed of a packaging process by i) picking up labels to be applied to said cartons with vacuum heads containing vacuum grids; ii) extending the nest on a rotary mechanism at a load area, picking up cartons from hopper with a vacuum retract nest and semi-erect cartons at the next station; iii) moving said labels on said applicator head by means of pneumatics from outside the carton to inside the carton; iv) blowing the labels onto the inside of the cartons; v) moving the vacuum heads out of the cartons; and vi) extending the nest on the rotary mechanism so that the carton compresses to its flat state while it is placed on the infeed hopper that feeds cartons to a carton load station on the cartoning machines. Generally steps i to vi are repeated and the labels are prepared to be moved at the same speed as the containers.

In Figure 1, the process begins with a label feeder 1 dispensing a tag/label 10 to the vacuum grid (not shown) on the label applicator head 2 during the dwell at station 1.

The mechanism, which has a 50% index 50% dwell motion cycle, extends the carton nest 9, and by means of vacuum, picks up a carton from the carton hopper 7 during the dwell at station 2. Dwell time is when the mechanism is not rotating. Index time is when the mechanism is not at rest, but rotating clockwise. The carton nest is the mechanism consisting of a) a surface or carton picker head where carton vacuum cups reside. The main element of the nest is that it is able to be extended out or retracted in to pick up or push away

cartons and b) a vacuum head with a vacuum grid. This element retains the label after it is dispensed from the label feeder. It is attached to the nest body and is able to be actuated into and away from cartons residing on the surface of vacuum nests. The carton nest holds the carton with vacuum and is activated radially from the center of the mechanism. By activated, it is meant that the device is turned on or off or made to travel in and out. These cartons are in their non-erected state. This means that the 4-sided cartons are collapsed and folded flat at appropriate corners. Cartons are picked up and conveyed by a cartoning machine or carton conveyor generally to cartoner baskets 13 which includes a conveyor for continuously conveying a series of identified product containers in which the product is to be sold. The product is loading into the containers and closed or glued shut on this machine.

During the dwell at station # 3, external suction cups 3 partially erect the carton so the label applicator head 2 may be inserted into the carton.

The label applicator head (vacuum applicator head) is fully inserted into the carton and is in position to apply the label at station 5. The label is applied to the carton by blowing the label off the vacuum grid on the applicator head and onto the carton.

In Figs. 2 and 3, pneumatic gland porting 12 actuates the head in the same direction as the axis of rotation of the multistation indexing rotary labeling mechanism. The automatic gland porting has two elements mating flat surfaces rotating against each other. One stationary element 4 has grooves cut in an arc that faces the other element 5 which rotates. On the non-mating side of the stationary piece, air or vacuum is supplied. Holes are drilled from this supply to the grooved areas. The rotating element has holes in the mating face that lead to devices that need pressurized air or vacuum to function. When the hole in the rotating element travels over the grooved area in the stationary element 4, to flow of air or vacuum from the supply to the device results. This in turn powers the device on the rotating element for the duration of time that the hole is over the groove. When the rotating element is at stop/dwell the supply of air or vacuum may be changed by turning the supply on or off externally.

The label applicator is fully retracted by station 6.

At station 7, the nest extends compressing the labeled carton as it is discharged into the infeed carton hopper 8 of cartoning machines. The infeed hopper is the portion of a cartoning machine where cartons are held ready for dispensing.

The advantages of the apparatus and method are that the labels can be applied to the inside of cartons while the product is being packaged. All product currently requires labels to be applied manually or to stop or slow down the packaging process when the labels are applied. In addition, the packaging of the product is not dependent on receiving prelabeled cartons which causes packaging problems. In addition, a certain per-

centage of product can be labeled rather than all. Thus, the percentage of product labeled using the apparatus and method of this invention could be anywhere from 1% to 100% of products labeled.

The label feeder machine can be conventional commercially available machines.

The labeling machine advances the label 10 and liner upon demand. As the label liner passes over a peel bar the label separates from the liner and is placed on the vacuum grid of the applicator head. The label liner 11 is the label backing strip. It has release agent on the surface so labels may be removed without damage to the adhesive side of the label.

Labeling machines that apply labels to containers are commercially available such as the label application model 2111 by Label-Aire which allows high speed label application up to 1500 linear inches of web liner per minute.

This labeling machine contains microprocessor controls and can handle a wide variety of label sizes and can be moved from one production line to another.

While the invention has been described with particular reference to a preferred embodiment, it will be understood by those skilled in the art the various changes can be made and equivalents may be substituted for elements of the preferred embodiment without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation in material to a teaching of the invention without departing from the essential teachings of the present invention.

Claims

1. Apparatus for applying labels to the inside of product containers as the containers are being fed into a carton loading area on cartoning machines comprising:
 - a carton conveyor which transports non-erected cartons to a loading area;
 - a multi-station indexing rotary labeling mechanism;
 - a vacuum applicator head containing a vacuum grid wherein the head actuates in the same direction as the axis of rotation by means of pneumatic gland porting; the applicator head being capable of being actuated during the dwell or index period of a cycle;
 - a carton nest at each station that holds the carton with vacuum and is actuated radially from the center; and
 - actuated suction cups which semi-erect the carton once it is placed on the nest.
2. The apparatus of claim 1 wherein the applicator contains a plurality of vacuum heads.
3. The apparatus of claim 2 wherein the vacuum heads contain means to blow labels onto the inside of cartons.
4. A process of applying labels to cartons which are moving through an infeed hopper of a packaging process comprising:
 - i.) moving cartons through an infeed of a packaging process and picking up labels to be applied to the cartons with vacuum heads containing vacuum grids;
 - ii.) extending the nest on a rotary mechanism at a load area, picking up cartons from hopper with a vacuum, retract nest and semi-erect cartons at the next station;
 - iii.) moving the labels on the applicator head by means of pneumatics from outside the carton to inside the carton;
 - iv.) blowing the labels onto the inside of the cartons;
 - v.) moving the vacuum heads out of the cartons; and
 - vi.) extending the nest on the rotary mechanism so that the carton compresses to its flat state while it is placed on the infeed hopper that feeds cartons to a carton load station on the cartoning machines.
5. The process of claim 4 wherein steps i to vi are repeated.
6. The process of claim 4 wherein the labels are moved at the same speed as the containers.

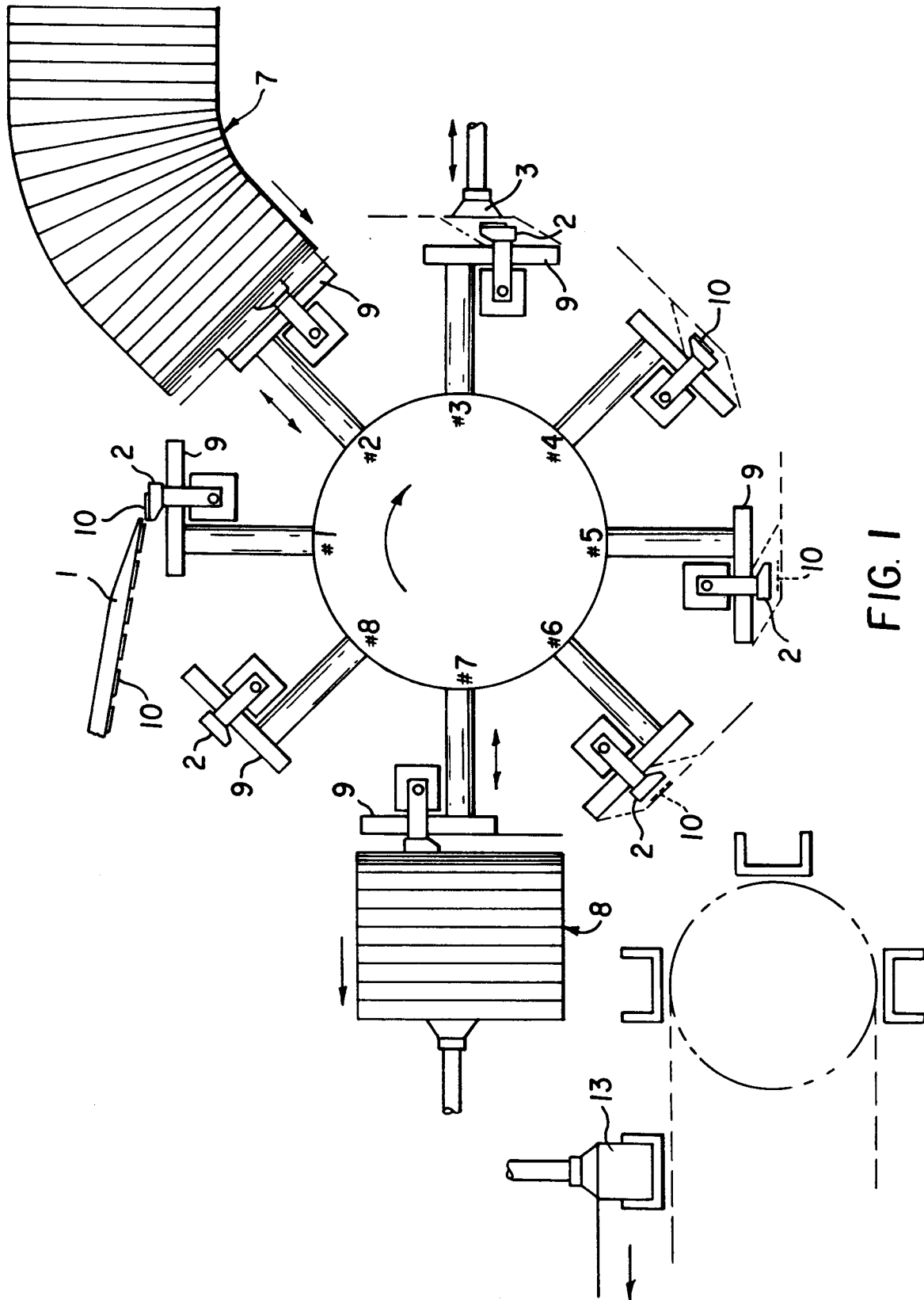


FIG. 1

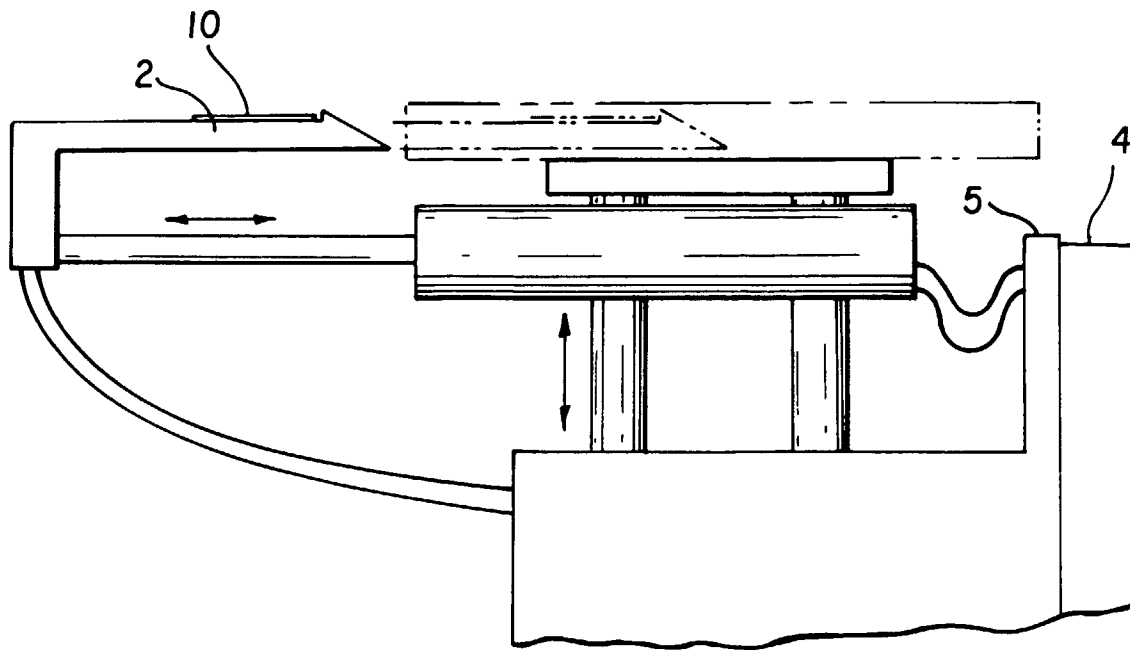


FIG. 2

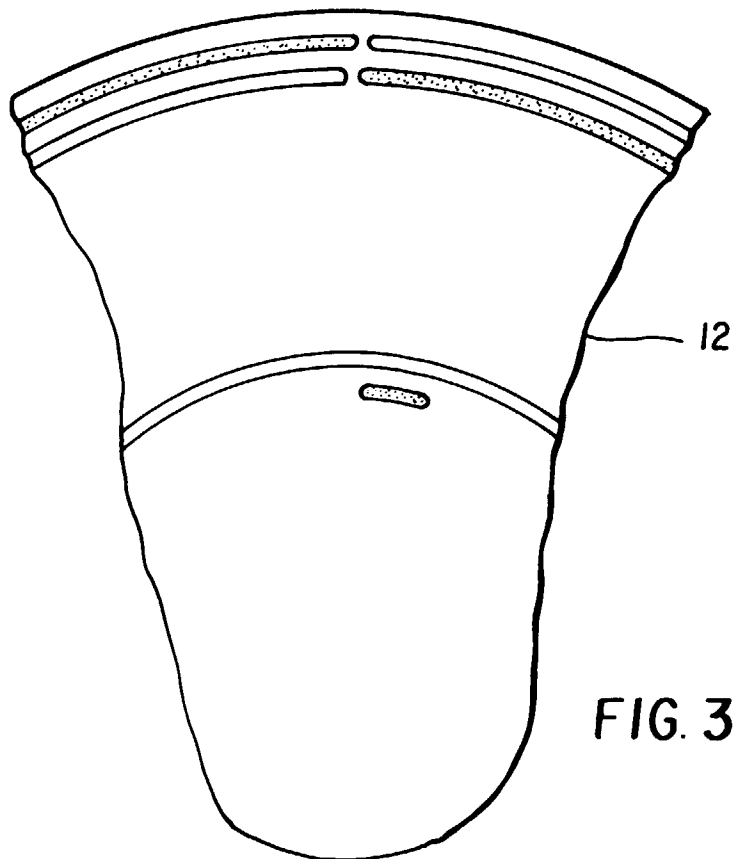


FIG. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 0299

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 4 871 348 A (Y. KONAKA) 3 October 1989 ---		B65C1/02
A	FR 1 347 188 A (CHAUSSES DACQUOISES) 25 March 1964 ---		
A	US 3 841 623 A (C. MCCARTHY ET AL.) 15 October 1974 ---		
A	US 5 081 445 A (P. GILL ET AL.) 14 January 1992 ---		
D,A	US 5 489 360 A (Y. SHIMIZU ET AL.) 6 February 1996 -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65C B65B
Place of search THE HAGUE		Date of completion of the search 25 May 1998	Examiner Smolders, R
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