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(54) **Labeling apparatus for attaching a label onto a predetermined position on articles.**

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Description

BACKGROUND OF THE INVENTION

The present invention relates generally to a labeling system as disclosed in EP-A-0 033 609 and recited in the preamble of claim 1 and more particularly to a labeling system including a means for adjusting a tolerance of labeling position relative to a given area such as bottles in a sequential labeling operation.

A further conventional labeling apparatus for attaching a label to vessels as disclosed in FR-B-1 247 933 includes a vessel positioning mechanism, for example, a screw unit which is mechanically synchronized with the rotation of a labeling drum is provided at a vessel positioning station. The vessel positioning mechanism is operable to provide a constant carrying pitch between the vessels on a conveyor so as to determine a position where a label is attached to the vessel, or a relative labeling position with respect to the drum. The vessels, after being positioned at a given interval, are carried to a labeling station.

At the labeling station, a label magazine provides labels to the labeling drum in sequence. The labels are backed with adhesive by an adhesion roller and then are provisionally affixed to the vessels carried on the conveyor. After labeling, the labeled vessels are fed to a final finishing section and are pressed moderately by a compression unit. This sequential labeling operation is effected by a driver which is mechanically connected to a single driving source provided in the labeling system.

In such a sequential labeling operation, the positioning of vessels with respect to the labeling drum is important. Only when the relative position of the vessel with respect to the labeling head provided on a labeling drum is determined precisely can accurate labeling be provided.

However, in conventional labeling technique, relative position of the vessel with respect to the labeling head is subjected to variance due to shifting or gripping of the vessel with respect to the conveyor or backlash caused by the wear of gears in a drive mechanism for example. As a result, the label is shifted with regard to its intended position on the vessel and when attached thereon, results in the production of non-conforming vessels.

SUMMARY OF THE INVENTION

It is, accordingly, an object of the present invention to provide a labeling apparatus for attaching a label accurately to a given area on articles such as bottles in a sequential labeling operation, and a method therefor.

This object is met by the apparatus defined in claim 1 and by the method defined in claim 6.

Accordingly, the present invention is based on a labeling apparatus for attaching labels onto articles wherein a specific point defined on a label aligns with a predetermined position on an article, which comprises a first means for feeding the articles toward a labeling station at given carrying intervals, a second means, provided at the labeling station, for providing labels to articles at given labeling intervals which corresponds to the given carrying intervals, a third means for determining a relative degree of shift between the predetermined position on an article fed by the first means and the specific point on a label provided by the second means, and a fourth means for adjusting the labeling interval of the second means based on the relative degree of shift so that the specific point on the label corresponds to the predetermined labeling point on the article.

It is characterized in that the second means is a rotary labeling drum having a plurality of labeling heads at regular intervals which respectively dispense labels. The third means includes a photo sensor for sensing an article carried by a conveyor as the first means, and a rotary encoder for detecting the angular position of the rotary labeling drum. The labeling position is defined by the exact coincidence of the specific point on a label provided on the labeling head with the predetermined position on an article at the labeling station. The third means determines a degree of angular displacement of the rotary labeling drum based on a signal output by the rotary encoder after the labeling head passes the labeling point until another article is sensed by the photo sensor to calculate a degree of phase shift of the angular position of the rotary labeling drum from the given labeling interval. The fourth means adjusts the rotation of said labeling rotary drum so as to implement said degree of phase shift.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood from the detailed description given hereinbelow and from the accompanying drawings of the preferred embodiment which are given for explanation and understanding only and are not intended to imply limitation to the invention.

Fig. 1 is a schematic diagram which shows a labeling system according to the present invention.
Fig. 2 is a schematic representation which shows a degree of positional shift of vessels on a conveyer.
Fig. 3 is a schematic view which shows an angular sensor means suitable for box shaped vessels which detects angular misregistration thereof on the conveyer.
Fig. 4 is a schematic view which shows another type of angular sensor means as shown in Fig. 3.
Fig. 5 is an explanatory view which shows an angular and positional relationship between a vessel and a labeling head.
Fig. 6 is a schematic plan view which shows a second embodiment of a vessel carrying mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, particularly to Fig. 1, there is shown a labeling system according to the present invention. This system comprises generally an input screw unit 1 functioning as a positioner for vessels 5, a conveyer 2 for carrying vessels, a labeling station 3 for providing a label to the vessels, and compression units 4 for pressing the label attached to the vessel.

The vessels 5, such as bottles are positioned by the input screw unit 1 at a given interval and are carried on a belt of the conveyer 2 toward the labeling station 3. The labeling station includes a rotary labeling drum 12, labeling heads 15, an adhesion roller unit 16, and a label magazine 8. The rotary labeling drum 12 is rotatably supported by gearing (not shown) disposed beneath the labeling station and is driven by a drive motor 6 through a gear assembly 20 so as to be mechanically synchronized with the rotation of the input screw unit 1 via a main drive shaft 14. The synchronization determines a carrying pitch between the vessels 5 on the conveyer 2 to provide precise sequential labeling. On the circumference of the rotary labeling drum 12, labeling heads are arranged, for example, at six intervals. The label magazine provides a label to the labeling heads in sequence. The adhesion roller unit 16 provides an adhesive onto the reverse surface of the label provided on the head 15. Thereafter, this label is attached to a given area of a vessel 5 carried by the conveyer 2.

Such a sequential labeling operation is effected by the precise synchronization of the input screw unit 1 with the rotary labeling drum 12. The synchronization is however subject to slippage due to shifts in vessel position caused by gripping, or misregistration of the vessel on the conveyer 2 or backlash from the drive caused by wear of gears for example. Therefore, in the labeling system according to the invention, a means for compensating for a degree of shift of the vessel with respect to a head of a rotary labeling drum is provided. This means includes a differential gear 13, a servo motor 7 therefor, a photo sensor 10, and a controller 9. The photo sensor 10 is adapted for sensing the position of a vessel carried on the conveyer and to provide a signal indicative thereof to the controller 9. The controller determines the relative degree of shift between each vessel 5, or a predetermined position defined thereon and a corresponding head of a rotary labeling drum 12. During the labeling operation, the differential gear 13 is driven by a servo motor 7 according to the value of the relative degree of shift. The differential gear 13 is mechanically connected to a gear (not shown) disposed beneath the labeling station 3 via a shaft 22. This gear rotates the rotary labeling drum 12 so as to advance or retard the rotation thereof independent of the drive motor 6 to compensate for any shift in vessel position to maintain accurate label placement. After labeling in the labeling station, the vessel is pressed by a pair of pads at the compression unit 4 to finish the sequential labeling operation

The means further includes a rotary encoder 11. The rotary encoder 11 is installed on the rotary labeling drum 12 so as to monitor an angle of rotation thereof and provides pulse signals of an ″A″, a ″B″, and a ″Z″ phase indicative of the angular position of the drum to the controller 9 (As is well known in the art, a rotary encoder is adapted for providing an A phase pulse signal, a B phase pulse signal, and a Z phase pulse signal. The B phase pulse signal is shifted 90 degrees from the-A phase pulse signal. The Z phase pulse signal is a reference signal which is output every cycle). In the controller 9, an interface circuit (not shown) for the rotary encoder is provided. This circuit detects the leading edges of pulse signals of the A and B phases. The frequencies of these pulse signals are multiplied by four and counted by a sixteen bit downcounter. When the first pulse of the Z phase signal is detected, the CPU is interrupted and the downcounter is reset to ″0″ through the system software. It will be understood that pulse signals output from the rotary encoder are meaningless until the Z phase signal is input to the controller each cycle. Between cycles an indicator provided on a control panel of the controller shows nothing.

The downcounter receives P number of pulse signals for every cycle of the rotary labeling drum 12 and indicates a value within 0 to -(P-1) (0 to -14399). (Thus, since six labeling heads are provided on the rotary labeling drum, the angle between each corresponds to 2400 pulse signals. These 2400 pulse signals correspond to the carrying pitch of the vessels.) When the vessel 5 is carried within a detecting range of the photo sensor 10, the sensor senses the leading edge of the vessel and provides a signal to the controller 9

to interrupt the CPU. At this time, the CPU reads the value of the downcounter and can convert this value into to provide an integer value within 0 to (P-1) (0 to 14339) as the phase angle of the rotary labeling drum 12. Assuming that the integer value is "RE", the phase difference (R) is the degree of displacement of a labeling head past a labeling point defined by the exact coincidence of the labeling head with the predetermined position of the articles at the labeling station. The number of pulses defining R are counted beginning at the labeling point and ending when the photo sensor 10 encounters the leading edge of the next vessel. (as in Fig. 2) This value can be expressed as follows;

R = MOD (RE / P = 14399 / the number of heads on the rotary labeling drum.)

It will be noted that the R is the remainder when RE X a number of heads is divided by P. The value "R" is variable dependent on the degree of shift of the vessel with respect to the head of the rotary labeling drum. However, in view of possible error in the mounting position of the photosensor 10 with regard to labeling position, and tolerances necessary due to the different detected positions of different kinds of vessels, addition of a certain constant value to the R value is practically necessary. Accordingly, if this certain value is "C", the degree of deflection E necessary to align the labeling head 15 with the real position of the oncoming vessel 5 is obtained by the following equation.

$$E = R - C \quad (1)$$

After obtaining the deflection E, the controller 9 provides pulse signals of a number corresponding to the deflection E to the servo motor 7. The relationship between the input pulse signals from the rotary encoder 11 and the output pulse signals to the the servo motor 7 is as follows:

(a number of input pulse signals for one cycle / a number of output pulse signals for one cycle) = (P / Q)

Accordingly, the number of output pulse signals "Y" to the servo motor driving system with respect to the deflection E is as follows:

$$Y = (P / Q) E \quad (2)$$

Thus, the servo motor 7 rotates the labeling drum by an angle corresponding to Y number of pulse signals via the differential gear thereby correcting for the shift of a vessel 5 with respect to the corresponding head of the label holder 15. A sequential correction control for phase shift as described above is repeated every carrying pitch and the labeling is thus effected regularly.

In view of a malfunction of the photo sensor 10, or an abnormal status where a carried vessel passes over the control range of the labeling system, meaning that the output signal Y exceeds the number of pulse signals corresponding to a range of ± 10 (mm), the CPU breaks off outputting the pulse signals at a predetermined tolerance point in order to protect the mechanical system. Taking account of the decrease in the lifespan of the driving system caused by wear thereof due to frequent adjusting operations, preferably, when the deflection E is small, (e.i., the absolute value of the deflection E is within a certain range "M") no adjusting operation is provided.

Further, in view of backlash of the differential gear 13, the following functions may be provided for a higher adjustment. The following formula replaces the above equation (2).

If Yb > 0 and E > 0, then Y = (P / Q) . E
If Yb > 0 and E < 0, then Y = (P / Q) . (E - B)
If Yb < 0 and E > 0, then Y = (P / Q) . (E + B)
If Yb < 0 and E < 0, then Y = (P / Q) . E

Wherein the "Yb" is a number of the output pulse signals at the previous adjusting operation, while the "B" is a value into which backlash as an error due to reversion of the differential gear 13 is converted and is a proper value defined by the type of differential gears employed.

Referring to Figs. 3 and 4, an angle detecting means for detecting an angular position of the vessels, (or the predetermined labeling position thereon) on the conveyer is shown. In sequential labeling operations, angular misregistration of the vessels tends to occur in addition to the above described positional shift on the conveyer. Fig 3 shows a sensor 30 suitable for box shaped vessels. This sensor is comprised of a light

source 32 and a light receiving means 34. The light receiving means includes a plurality of light receiving elements sensitive to the light beam from the light source. When the vessel 5 is carried within detecting range of the sensor 30 with a correct angular position, a light beam propagated from the light source 32 is reflected on a side surface of the vessel at its center and is directed to a predetermined light receiving element of the light receiving means 34. The device 34 provides a signal indicative of the correct angular position to the controller 9. On the other hand, when the vessel 5 is carried with an angular misregistration, the light beam reflected from the surface of the vessel is shifted laterally with respect to the elements on the light receiving means. Thus, the controller 9 can determine the degree of angular displacement of the predetermined position on the vessel in response to the signal output from an element of the light receiving means.

Fig. 4 shows a sensor means 40 suitable for cylindrical vessels. A cylindrical vessel such as a bottle usually has a spot 42 for setting its angular position at a positioning section of the labeling system. The sensor means 40 includes a camera 42 and an image measuring apparatus 46 connected to the controller 9. The camera provides an image signal of the spot on the vessel carried on the conveyer 2 to an image measuring apparatus 46. The sensor means 40 can thereby detect angular misregistration of the vessel on the conveyer 2 and, if present, determine the degree of angular displacement thereof.

Referring to Fig. 5, an angular and positional relationship between the vessel and the labeling head 15 is shown. The shown vessel 5 has been displaced by a distance "x" opposite the carrying direction and is shifted by a "$-\theta$" angle in the clockwise direction. Accordingly, the distance between the center of the labeling head (i.e., a specific point defined on the label provided on the labeling head) and the point of contact "C" or the arc OC is $R\alpha$, while the distance between the center of the vessel and the point of contact C, or the arc LC is $-r(-\theta-\alpha)$. The α is set up as in the following equation.

$$\alpha = \sin^{-1}\{x-(r-z)\sin\theta / (R+r)\}$$

wherein Z is the distance between the predetermined position on the article 5 and the center point thereof. However, the above equation can be considered as the following approximate equation.

$$\alpha = x-(r-z)\theta / (R + r)$$

Thus, the degree of shift of the label, i.e., the deflection "E" is as follows:

$$R\alpha = E + r(-\theta-\alpha)$$

$$E = (R+r)\alpha + r\theta = (R+r)\{x-(r-z)\theta\} / (R+r) + r\theta$$

$$= x + z\theta$$

Wherein the x corresponds to the previous equation (1). Accordingly, from the equation (2), the number of output pulse signals Y is as follows:

$$Y = (P / Q)(x + z\theta)$$

The controller 9 can output Y number of pulse signals to the servo motor 7 to adjust the labeling interval of the labeling drum as necessary so that the specific point on the label aligns with the predetermined position on the vessel.

The labeling system according to the invention, as described above, is adapted for measuring the pitches between vessels carried on a conveyer and/or an angular misregistration of the vessels to calculate a degree of shift between a given labeling area of the vessel and the corresponding labeling head of the labeling drum and for driving a servo motor to adjust the angle of rotation of the rotary labeling drum. However, the present invention is not limited to the above embodiment of a carrying mechanism for vessels. For example, in a rotary type labeling system as shown in Fig. 3, a differential gear may be provided in a driver for a vessel carrying rotary table 17 and the angle of rotation of the table can be controlled to adjust for phase shift between a vessel and a corresponding labeling head.

Claims

1. A labeling apparatus for attaching labels onto articles, wherein a specific point defined on a label aligns with a predetermined position on an article, comprising:

first means (1) for feeding the articles (5) on a conveyor (2) in a carrying direction toward a labeling station (3) at given carrying intervals;

second means provided at said labeling station for providing the labels to articles (5) at given labeling intervals which correspond to the given carrying intervals;

third means including a first sensor (10) for detecting the position of the article (5) on the conveyor (2) with respect to the carrying direction so as to obtain, within a range of one carrying interval before a labeling point, which is defined by the coincidence of the specific point on an article (5) at the labeling station (3), a signal indicative thereof; and

fourth means (7, 9, 13) responsive to the signal from said third means for controlling said second means so that the specific point on a label corresponds to the predetermined position on said article (5) detected by the first sensor (10),

characterized in that

said second means include a rotary labeling drum (12), having a plurality of labeling heads (15) which respectively dispense labels,

said third means further includes a second sensor (11) for detecting angular positions of the labeling heads (15) to provide signals indicative thereof, said third means determining, in response to the signal from the first sensor (10), an angular position of the labeling head (15) which corresponds to the position of the article (5) detected by the first sensor (10) to calculate a degree of phase shift of the angular position of the labeling head (15) from the given labeling interval based on the signal from said second sensor (11),

said fourth means (7, 9, 13) adjusting the rotation of said rotary labeling drum (12) to eliminate the degree of phase shift.

2. An apparatus as set forth in claim 1, characterized in that said first means (1) feeds the articles (5) toward the labeling station (3) at the given carrying intervals with a predetermined angular registration between the articles (5) and the conveyor (2), said third means further including an angular sensor (30, 40) which monitors the articles (5) fed by said first means (1) to detect an angular misregistration of the article (5) with respect to the conveyor (2) to provide a signal indicative thereof, said third means determining a degree of angular displacement between the predetermined position on the article (5) and the specific point on a label provided by said second means based on the signals from the first sensor (10) and the angular sensor (30, 40) for calculating the degree of phase shift of the angular position of the labeling head (15) from the given labeling interval, said fourth means adjusting the rotation of said rotary labeling drum (12) to eliminate the degree of phase shift.

3. An apparatus as set forth in claim 2, characterized in that said third means determines a rotational angle required for the rotary labeling drum (12) in order to eliminate the degree of phase shift to coincide the predetermined position on the article (5) with the specific point on a label, said fourth means adjusting the rotation of said labeling rotary drum (12) by said rotational angle.

4. An apparatus as set forth in claim 2, characterized in that said third means determines the degree of angular displacement (E) based on a relation of ($E = X + z\Theta$), where X is a distance of displacement of an article (5) opposite to the carrying direction at a time when the article (5) contacts the labeling head (15), z is a distance between the predetermined position on the article (5) and the center point thereof and Θ is the angle of angular misregistration.

5. An apparatus as set forth in claim 1, characterized in that said fourth means includes a servo motor (7) which adjusts a rotational angle of the rotary labeling drum (12) via a gearing (13), said fourth means providing a driving signal (Y) having a value, which corresponds to the degree of phase shift, to the servo motor (7) to rotate the rotary labeling drum (12) in an advance direction or a retard direction, said fourth means providing a driving signal (Y) to which a certain value is added in view of backlash due to reversion of the gearing (13).

6. A method for attaching labels onto articles, wherein a specific point defined on the label aligns with a predetermined position on the article, comprising the steps of:

feeding the articles in a carrying direction toward a labeling station at given carrying intervals;

providing the labels to the articles at given labeling intervals which corresponds to the given carrying intervals at the labeling station by means of a labeling device provided at said labeling station;

detecting the position of the article being fed with respect to the carrying direction, and obtaining, within a range of one carrying interval before a labeling point, which is defined by the coincidence of the specific point on an article at the labeling station, a signal indicative thereof; and

controlling said labeling means by means of said signal so that the specific point on a label corresponds to the predetermined position on said article;

characterized in that it further comprises the steps of:

using as a labeling device a labeling drum having a plurality of labeling heads which respectively dispense labels,

detecting the angular positions of the labeling heads to provide signals indicative thereof;

determining, in response to the signal indicative of the position of the article being fed, an angular position of the labeling head which corresponds to the position of the article so detected, and calculating a degree of phase shift of the angular position of the labeling head from the given labeling interval based on the signal indicative of the angular positions of the labeling heads; and

adjusting the rotation of said rotary labeling drum to eliminate the degree of phase shift.

7. A method as set forth in claim 6, in which the articles are fed with a predetermined angular registration with respect to the carrying direction, characterized in that it further comprises the steps of:

monitoring the articles fed to detect an angular misregistration of an article and to provide a signal indicative thereof;

determining a degree of angular displacement between the predetermined position on the article and the specific point on a label provided by said labeling head, based on the signal representative of the position of the article and on the signal representative of the angular misregistration of the article, and calculating the degree of phase shift of the angular position of the labeling head from the given labeling interval; and

adjusting the rotation of said rotary labeling drum to eliminate the degree of phase shift.

8. A method as set forth in claim 7, wherein the rotation of said rotary labeling drum is adjusted by means of a servo motor via a gearing, characterized in that said step of adjusting the rotation of said rotary labeling drum comprises providing to the servo motor a driving signal having a value which corresponds to the degree of phase shift to rotate the rotary labeling drum in an advance direction or a retard direction; and in that a certain value is added to the driving signal in view of backlash due to reversion of the gearing.

Patentansprüche

1. Etikettier-Vorrichtung zum Anbringen von Etiketten an Gegenständen, wobei ein bestimmter, an einem Etikett definierter Punkt mit einer vorbestimmten Position an einem Gegenstand übereinstimmt, und die Vorrichtung enthält:

erstes Mittel (1) zum Zuführen der Gegenstände (5) an einen Förderer (2) in einer Förderrichtung zu einer Etikettier-Station (3) mit bestimmten Förderabständen;

zweites an der Etikettier-Station vorgesehenes Mittel, um die Etiketten den Gegenständen (5) mit bestimmten Etikettier-Abständen zuzuführen, welche den bestimmten Förderabständen entsprechen;

drittes Mittel, das einen ersten Fühler (10) einschließt, zum Erfassen der Position des Gegenstandes (5) an dem Förderer (2) mit Bezug auf die Förderrichtung, um so innerhalb eines Bereiches eines Förderabstandes vor einem Etikettier-Punkt, der durch das Koinzidenz des bestimmten Punktes an einem Gegenstandes (5) an der Etikettier-Station (3) bestimmt ist, ein dafür bezeichnetes Signal zu erhalten; und

viertes Mittel (7, 9, 13), das auf ein Signal von dem dritten Mittel reagiert zum Steuern des zweiten Mittels in der Weise, daß der bestimmte Punkt an einem Etikett der durch den ersten Fühler (10) erfaßten vorbestimmten Position an dem Gegenstand (5) entspricht,

dadurch gekennzeichnet, daß

das zweite Mittel eine drehbare Etikettier-Trommel (12) mit einer Vielzahl von Etikettier-Köpfen (15) enthält, die jeweils Etiketten abgeben,

das dritte Mittel weiter einen zweiten Fühler (11) enthält zum Erfassen von Winkelstellungen der Etikettier-Köpfe (15), um ein dafür bezeichnendes Signal zu schaffen, wobei das dritte Mittel in

Abhängigkeit von dem Signal vom ersten Fühler (10) eine Winkelposition des Etikettier-Kopfes (15) bestimmt, der der Position des durch den ersten Fühler (10) erfaßten Gegenstandes (5) entspricht, um ein Ausmaß von Phasenverschiebung der Winkelposition des Etikettier-Kopfes (15) gegen den vorgegebenen Etikettier-Abstand aufgrund des Signals von dem zweiten Fühler (11) zu errechnen,
wobei das vierte Mittel (7, 9, 13) die Drehung der sich drehenden Etikettier-Trommel (12) nachstellt, um das Phasenverschiebungs-Ausmaß zu beseitigen.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das erste Mittel (1) die Gegenstände (5) der Etikettier-Station (3) mit bestimmten Förderabständen zuführt mit einer vorbestimmten Winkelausrichtung zwischen den Gegenständen (5) und dem Förderer (2), das dritte Mittel weiter einen Winkelfühler (30, 40) enthält, der die durch das erste Mittel (1) zugeführten Gegenstände (5) überwacht zum Erfassen einer Winkel-Fehlausrichtung des Gegenstandes (5) bezüglich des Förderers (2), um ein dafür bezeichnendes Signal zu schaffen, das dritte Mittel ein Ausmaß von Winkelversatz zwischen der vorbestimmten Position an dem Gegenstand (5) und dem bestimmten Punkt an einem durch das zweite Mittel zugeführten Etikett bestimmt aufgrund der Signale von dem ersten Fühler (10) und dem Winkelfühler (30, 40) um das Ausmaß der Phasenverschiebung der Winkelposition des Etikettier-Kopfes (15) gegenüber dem bestimmten Etikettier-Abstand zu errechnen und das vierte Mittel die Drehung der sich drehenden Etikettier-Trommel (12) nachstellt, um das Ausmaß der Phasenverschiebung zu beseitigen.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß das dritte Mittel einen für die drebbare Etikettier-Trommel 812) erforderlichen Drehwinkel bestimmt, um das Ausmaß der Phasenverschiebung zu beseitigen und die vorbestimte Position an dem Gegenstand (5) mit dem bestimmten Punkt an dem Etikett zusammenfallen zu lassen, wobei das vierte Mittel die Drehung der drehbaren Etikettier-Trommel (12) um den Drehwinkel nachstellt.

4. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß das dritte Mittel das Ausmaß des Winkelversatzes (E) aufgrund einer Beziehung ($E = X + z\Theta$) bestimmt, wobei X der Versetzungsabstand eines Gegenstandes (5) entgegengesetzt zur Förderrichtung ist zu einem Zeitpunkt, wenn der Gegenstand (5) den Etikettier-Kopf (15) berührt, z ein Abstand zwischen der vorbestimmten Position an dem Gegenstand und dessen Mittelpunkt ist und Θ die Winkelgröße der Winkel-Fehlausrichtung ist.

5. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das vierte Mittel einen Servomotor (7) enthält, der einen Drehwinkel der drehbaren Etikettier-Trommel (12) über ein Getriebe (13) nachstellt, wobei das vierte Mittel ein Ansteuersignal (Y) mit einem Wert, der dem Ausmaß der Phasenverschiebung entspricht, für den Servomotor (7) schafft, um die drehbare Etikettier-Trommel (12) in Beschleunigungsrichtung oder Verzögerungsrichtung zu drehen, wobei das vierte Mittel ein Ansteuersignal (Y) schafft, zu dem ein bestimmter Wert addiert wird in Hinsicht auf Spiel infolge der Drehungsumkehr des Getriebes (13).

6. Verfahren zum Befestigen von Etiketten an Gegenständen, bei dem ein bestimmter an dem Etikett definierter Punkt mit einer vorbestimmten Position an einem Gegenstand übereinstimmt, mit den Schritten:
die Gegenstände werden in einer Förderrichtung zu einer Etikettier-Station mit bestimmten Förderabständen zugeführt;
die Etiketten werden den Gegenständen mit bestimmten Etikettier-Abständen zugeführt, welche den bestimmten Förderabständen an der Etikettier-Station entsprechen, mittels eines an der Etikettier-Station vorgesehenen Etikettier-Geräts,
die Position des zugeführten Gegenstandes wird bezüglich der Förderrichtung bestimmt und innerhalb eines Bereichs eines Förderabstandes vor einer Etikettier-Stelle, die durch die Koinzidenz des bestimmten Punktes an dem Gegenstand an der Etikettier-Station definiert ist, ein dafür bezeichnendes Signal erhalten; und
das Etikettier-Mittel wird mittels des Signals so gesteuert, daß der bestimmte Punkt an einem Etikett der vorbestimmten Position an dem Gegenstand entspricht;
dadurch gekennzeichnet, daß es weiter die folgenden Schritte enthält:
als Etikettier-Gerät wird eine Etikettier-Trommel mit einer Vielzahl von Etikettier-Köpfen benutzt, die jeweils Etiketten abgeben,
die Winkelpositionen der Etikettier-Köpfe werden erfaßt, um dafür bezeichnende Signale zu schaffen;

es wird in Abhängigkeit von dem für die Position des zugeführten Gegenstandes bezeichnenden Signal eine Winkelposition des Etikettier-Kopfes bestimmt, welche der Position des erfaßten Gegenstandes entspricht, und ein Ausmaß einer Phasenverschiebung der Winkelposition des Etikettier-Kopfes aus dem bestimmten Etikettier-Abstand errechnet aufgrund des für die Winkelpositionen der Etikettier-Köpfe bezeichnenden Signals; und
die Drehung der drehbaren Etikettier-Trommel wird nachgestellt, um das Ausmaß der Phasenverschiebung zu beseitigen.

7. Verfahren nach Anspruch 6, bei dem die Gegenstände mit einer vorbestimmten Winkelausrichtung bezüglich der Förderrichtung zugeführt werden, dadurch gekennzeichnet, daß es weiter die Schritte umfaßt:
die zugeführten Gegenstände werden überwacht, um eine Winkel-Fehlausrichtung eines Gegenstandes zu erfassen und ein dafür bezeichnendes Signal zu schaffen;
ein Ausmaß eines Winkelversatzes zwischen einer vorbestimmten Position an dem Gegenstand und dem bestimmten Punkt an einem durch den Etikettier-Kopf zugeführten Etikett wird aufgrund des für die Position des Gegenstandes repräsentativen Signals und des für die Winkel-Fehlausrichtung des Gegenstandes repräsentativen Signals bestimmt und das Ausmaß der Phasenverschiebung der Winkelposition des Etikettier-Kopfes aus dem bestimmten Etikettier-Abstand errechnet; und
die Drehung der drehbaren Etikettier-Trommel wird nachgestellt, um das Ausmaß der Phasenverschiebung zu beseitigen.

8. Verfahren nach Anspruch 7, bei dem die Drehung der drehbaren Etikettier-Trommel nachgestellt wird mittels eines Servomotors über ein Getriebe, dadurch gekennzeichnet, daß das Nachstellen der Drehung der drehbaren Etikettier-Trommel umfaßt, daß dem Servomotor ein Ansteuersignal zugeführt wird mit einem Wert, der dem Ausmaß der Phasenverschiebung entspricht, um die drehbare Etikettier-Trommel in einer Beschleunigungsrichtung oder einer Verzögerungsrichtung zu drehen; und daß ein bestimmter Wert zu dem Ansteuersignal hinzugefügt wird in Hinsicht auf infolge der Umsteuerung des Getriebes auftretendes Spiel.

Revendications

1. Etiqueteuse pour appliquer des étiquettes sur des articles, dans laquelle un point spécifique défini sur une étiquette est aligné avec une position prédéterminée sur un article, comprenant:
des premiers moyens (1) pour alimenter les articles (5) sur un convoyeur (2) dans une direction de convoyage en direction d'un poste d'étiquetage (3) à des intervalles de convoyage donnés;
des seconds moyens prévus audit poste d'étiquetage pour apposer les étiquettes sur des articles (5) à des intervalles d'étiquetage donnés qui correspondent aux intervalles de convoyage donnés;
des troisièmes moyens comprenant un premier détecteur (10) pour détecter la position de l'article (5) sur le convoyeur (2) par rapport à la direction de convoyage de manière à obtenir, à l'intérieur d'une plage d'un intervalle de convoyage avant un point d'étiquetage, qui est défini par la coïncidence du point spécifique sur un article (5) au poste d'étiquetage (3), un signal indicatif de cette position; et des quatrièmes moyens (7, 9, 13) sensibles au signal desdits troisièmes moyens pour commander lesdits seconds moyens de telle manière que le point spécifique sur une étiquette corresponde à la position prédéterminée sur ledit article (5) détectée par le premier détecteur (10),
caractérisé en ce que
lesdits seconds moyens comprennent un tambour d'étiquetage rotatif (12) doté d'une pluralité de têtes d'étiquetage (15) qui distribuent respectivement des étiquettes,
lesdits troisièmes moyens comprennent en outre un second détecteur (11) pour détecter des positions angulaires des têtes d'étiquetage (15) afin de fournir des signaux indicatifs de ces positions, lesdits troisièmes moyens déterminant, en réponse au signal du premier détecteur (10), une position angulaire de la tête d'étiquetage (15) qui correspond à la position de l'article (5) détecté par le premier détecteur (10) afin de calculer un degré de décalage de phase de la position angulaire de la tête d'étiquetage (15) par rapport à l'intervalle d'étiquetage donné, en se basant sur le signal dudit second détecteur (11),
lesdits quatrièmes moyens (7, 9, 13) ajustant la rotation dudit tambour d'étiquetage rotatif (12) afin d'éliminer le degré de décalage de phase.

2. Appareil selon la revendication 1, caractérisé en ce que lesdits premiers moyens (1) amènent les articles (5) en direction du poste d'étiquetage (3) aux intervalles de convoyage donnés avec une indexation angulaire prédéterminée entre les articles (5) et le convoyeur (12), lesdits troisièmes moyens comprenant en outre un détecteur d'angle (30, 40) qui contrôle les articles (5) amenés par lesdits premiers moyens (1) afin de détecter un défaut d'indexation angulaire de l'article (5) par rapport au convoyeur (2) pour fournir un signal indicatif de ce défaut d'indexation, lesdits troisièmes moyens déterminant un degré de déplacement angulaire entre la position prédéterminée sur l'article (5) et le point spécifique sur une étiquette distribuée par lesdits seconds moyens, en se basant sur les signaux du premier détecteur (10) et du détecteur angulaire (30, 40) pour calculer le degré de décalage de phase de la position angulaire de la tête d'étiquetage (15) par rapport à l'intervalle d'étiquetage donné, lesdits quatrièmes moyens ajustant la rotation dudit tambour d'étiquetage rotatif (12) afin d'éliminer le degré de décalage de phase.

3. Appareil selon la revendication 2, caractérisé en ce que lesdits troisièmes moyens déterminent un angle de rotation nécessaire pour le tambour d'étiquetage rotatif (12) de manière à éliminer le degré de décalage de phase afin de faire coïncider la position prédéterminée sur l'article (5) avec le point spécifique sur une étiquette, lesdits quatrièmes moyens ajustant la rotation dudit tambour d'étiquetage rotatif (12) par ledit angle de rotation.

4. Appareil selon la revendication 2, caractérisé en ce que lesdits troisièmes moyens déterminent le degré de déplacement angulaire (E) en se basant sur une relation $E = X + z\Theta$, où X est une distance de déplacement d'un article (5) à l'opposé de la direction de convoyage à un instant où l'article (5) vient en contact avec la tête d'étiquetage (15), z est une distance entre la position prédéterminée sur l'article (5) et le point central de celui-ci, et Θ est l'angle du défaut d'indexation angulaire.

5. Appareil selon la revendication 1, caractérisé en ce que lesdits quatrièmes moyens comprennent un servomoteur (7) qui ajuste un angle de rotation du tambour d'étiquetage rotatif (12) par l'intermédiaire d'une transmission à engrenages (13), lesdits quatrièmes moyens fournissant au servomoteur (7) un signal d'entraînement (Y), ayant une valeur qui correspond au degré de décalage de phase, afin de faire tourner le tambour d'étiquetage rotatif (12) dans une direction d'avance ou une direction de recul, lesdits quatrièmes moyens fournissant un signal d'entraînement (Y) auquel est additionnée une certaine valeur en raison du jeux mécanique dû à l'inversion de la transmission à engrenages (13).

6. Procédé pour apposer des étiquettes sur des articles, dans lequel un point spécifique défini sur l'étiquette est aligné avec une position prédéterminée sur l'article, comprenant les opérations suivantes:
on alimente les articles dans une direction de convoyage en direction d'un poste d'étiquetage à des intervalles de convoyage donnés;
on applique les étiquettes sur les articles à des intervalles d'étiquetage donnés qui correspondent aux intervalles de convoyage donnés au poste d'étiquetage au moyen d'un dispositif d'étiquetage prévu audit poste d'étiquetage;
on détecte la position de l'article convoyé par rapport à la direction de convoyage, et on obtient, dans la plage d'un intervalle de convoyage avant un point d'étiquetage qui est défini par la coïncidence du point spécifique sur un article au poste d'étiquetage, un signal indicatif de cette position; et
on commande lesdits moyens d'étiquetage à l'aide dudit signal de telle sorte que le point spécifique sur une étiquette corresponde à la position prédéterminée sur ledit article;
caractérisé en ce qu'il comprend en outre les opérations consistant à :
utiliser en tant que dispositif d'étiquetage un tambour d'étiquetage comprenant une pluralité de têtes d'étiquetage qui distribuent respectivement des étiquettes,
on détecte les positions angulaires des têtes d'étiquetage afin de fournir des signaux indicatifs de ces positions;
on détermine, en réponse au signal indicatif de la position de l'article convoyé, une position angulaire de la tête d'étiquetage qui correspond à la position de l'article ainsi détecté, et on calcule un degré de décalage de phase de la position angulaire de la tête d'étiquetage par rapport à l'intervalle d'étiquetage donné, en se basant sur le signal indicatif de la position angulaire de la tête d'étiquetage; et
on ajuste la rotation dudit tambour d'étiquetage rotatif afin d'éliminer le degré de décalage de phase.

7. Procédé selon la revendication (6) dans lequel on amène les articles avec une indexation angulaire prédéterminée par rapport à la direction de convoyage, caractérisé en ce qu'il comprend en outre

l'opération consistant à:
surveiller les articles amenés afin de détecter un défaut d'indexation angulaire d'un article et de fournir un signal indicatif de ce défaut d'indexation angulaire;
on détermine un degré de déplacement angulaire entre la position prédéterminée sur l'article et le point spécifique sur une étiquette distribuée par ladite tête d'étiquetage, en se basant sur le signal représentatif de la position sur l'article et le signal représentatif du défaut d'indexation angulaire de l'article, et on calcule le degré de décalage de phase de la position angulaire de la tête d'étiquetage par rapport à l'intervalle d'étiquetage donné; et
on ajuste la rotation dudit tambour d'étiquetage rotatif afin d'éliminer le degré de décalage de phase.

8. Procédé selon la revendication 7, dans lequel on ajuste la rotation dudit tambour d'étiquetage rotatif au moyen d'un servomoteur par l'intermédiaire d'une transmission à engrenages, caractérisé en ce que ladite opération consistant à ajuster la rotation dudit tambour d'étiquetage rotatif comprend une opération consistant à fournir au servomoteur un signal d'entraînement, ayant une valeur qui correspond au degré de décalage de phase, afin de faire tourner le tambour d'étiquetage rotatif dans une direction d'avance ou une direction de recul; et en ce que l'on ajoute une certaine valeur au signal d'entraînement en raison du jeu mécanique dû à l'inversion de la transmission à engrenages.

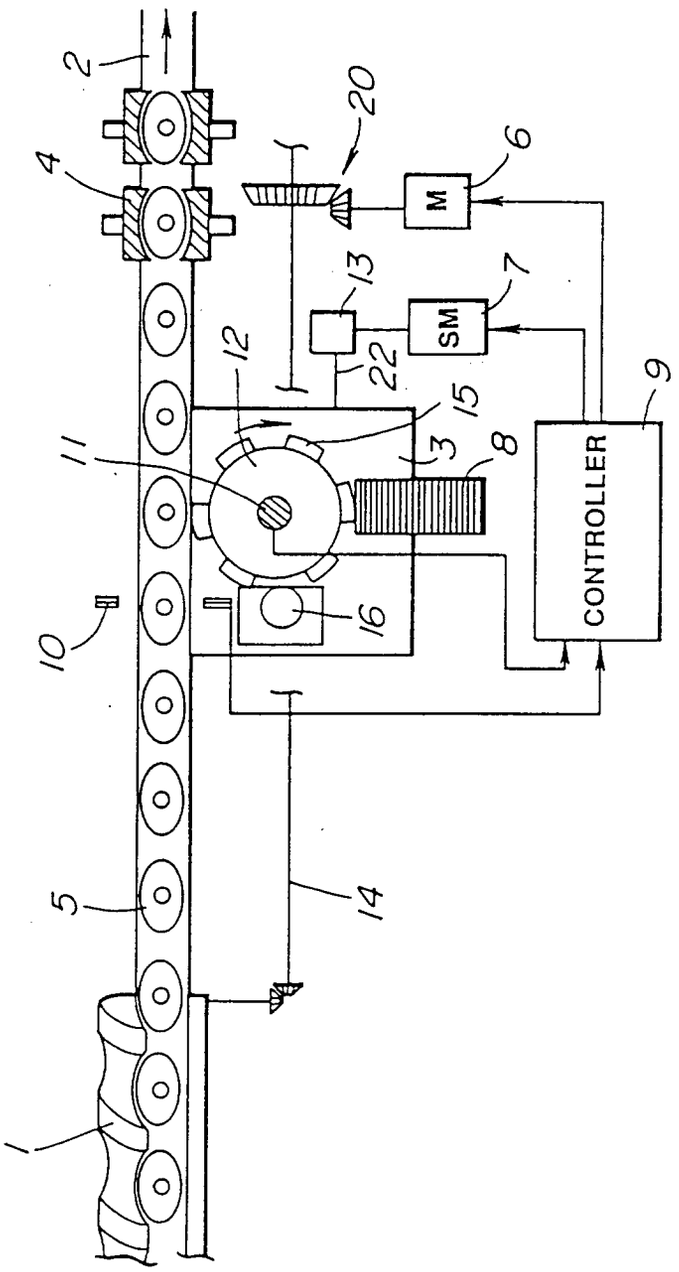


FIG.1

FIG.2

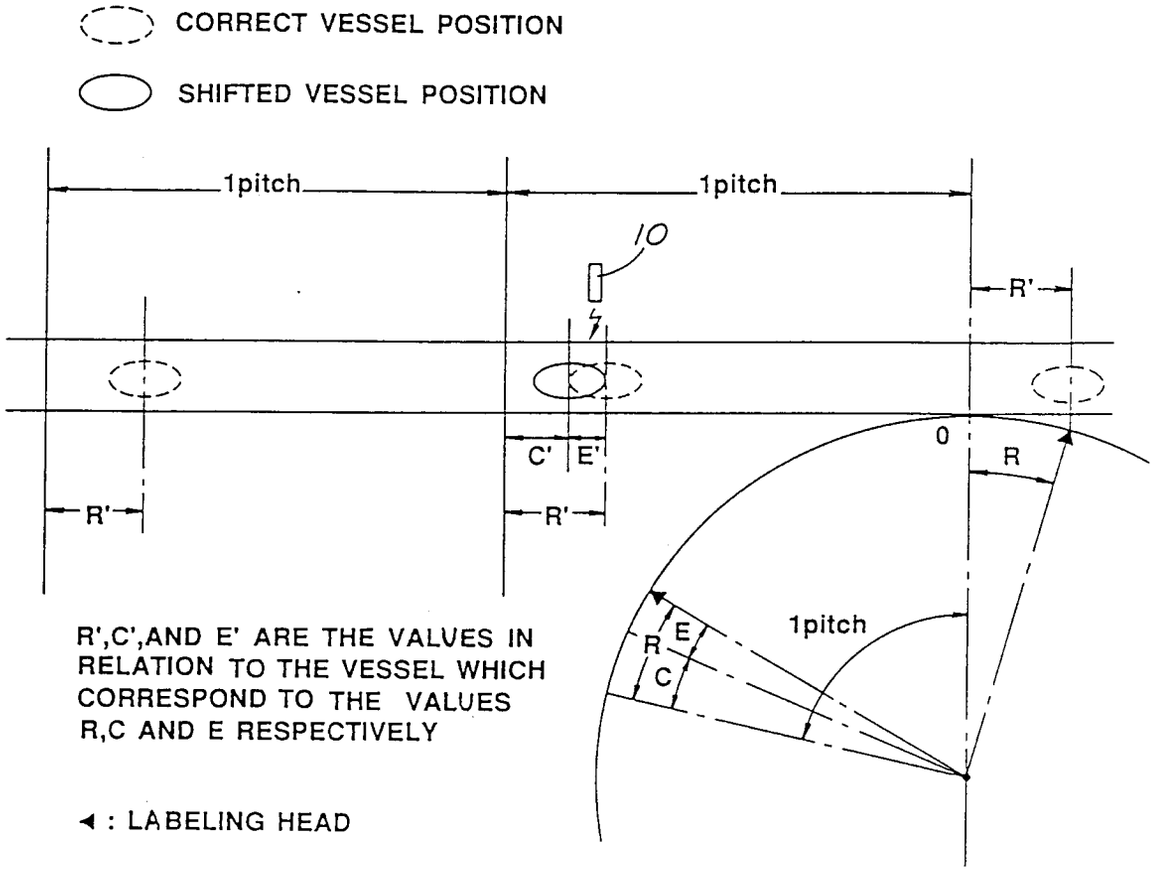

CORRECT VESSEL POSITION
SHIFTED VESSEL POSITION
1pitch
1pitch
10
R'
C'
E'
R'
R'
0
R
1pitch
E
R
C
R',C',AND E' ARE THE VALVES IN RELATION TO THE VESSEL WHICH CORRESPOND TO THE VALUES R,C AND E RESPECTIVELY
◄ : LABELING HEAD

FIG. 3

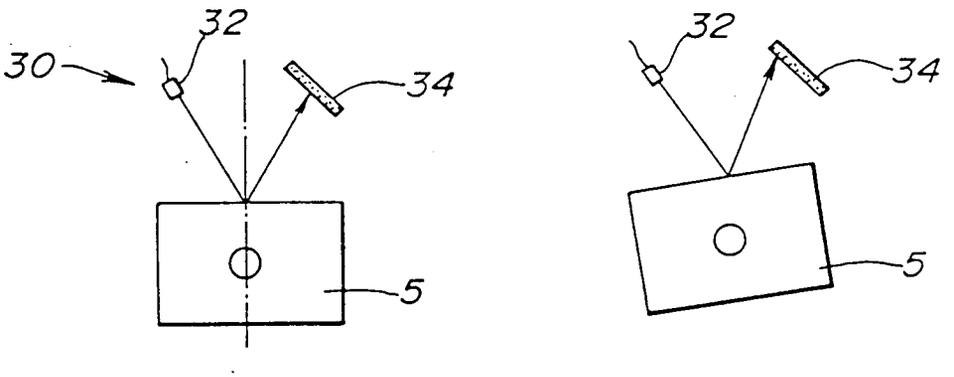


FIG. 4

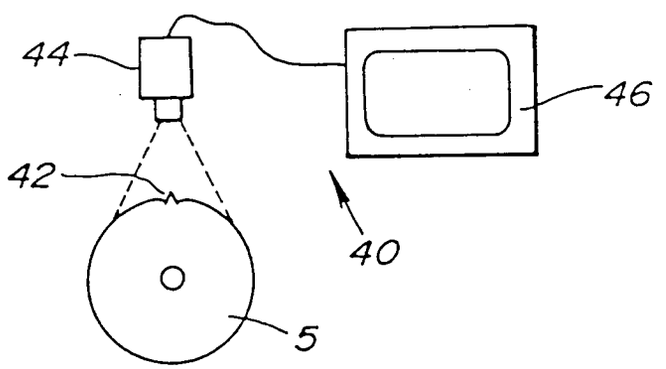
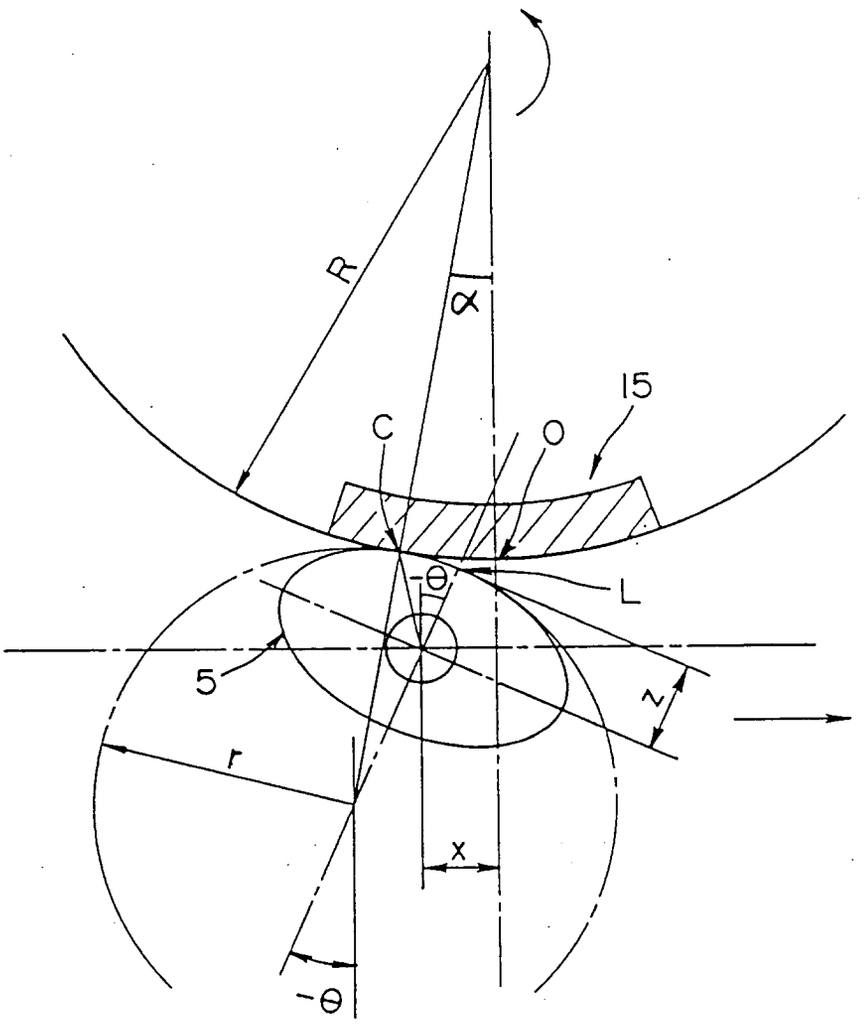


FIG.5



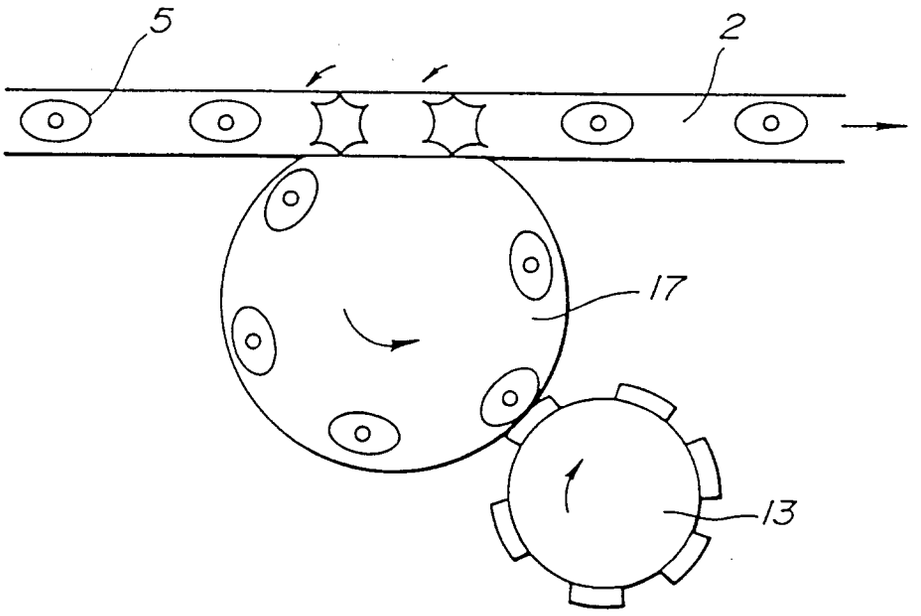


FIG. 6