APPLIKATUR FÜR ANBRINGEN ETIKETTS AUF CYLINDRISCHE ARTIKELN

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The present invention relates to labelling machines in general, and more particularly to a machine for consecutively applying labels to the peripheries of substantially cylindrical articles, such as metallic or non-metallic containers, glass or plastic bottles, ceramic jars, ampoules and the like. Still more particularly, the invention relates to a machine which constitutes an improvement over the labelling machine disclosed in my copending application Serial No. 75,452, filed December 12, 1960, now abandoned.

In my copending application, I disclose an apparatus wherein the transfer and rolling of labels onto the peripheries of cylindrical or otherwise shaped articles take place between a pair of conveyors at least one of which is driven at a variable speed to rotate the articles in a first direction and thereupon in a second direction and to thereby roll the labels into full contact with the peripheries of the articles.

An important object of the present invention is to provide a labelling machine which does not require a variable-speed conveyor, wherein the distance covered by an article during the application and rolling of a label is less than in the apparatus of presently known design, and whose construction is much simpler than the construction of conventional labelling machines.

Another object of the invention is to provide a labelling machine of the just outlined characteristics which is adapted to transfer labels to selected zones of substantially cylindrical articles with utmost accuracy, and wherein the articles may be labelled at very short intervals whereby a large number of articles may be labelled within a short period of time.

A further object of the invention is to provide a machine of the above described type which effectively prevents a folding or tearing of labels prior to or during the transfer of labels onto the cylindrical articles, which requires no attention once the operation is started, and wherein the likelihood of malfunction is substantially reduced owing to utter simplicity of its component parts.

An additional object of the invention is to provide a novel process for the application of labels to the peripheries of nearly or fully cylindrical articles.

With the above and certain other objects in view, the invention resides in the provision of a process for transferring a median portion and for thereupon rolling in two stages the remainder of an adhesive label onto the periphery of a fully or nearly cylindrical article, which comprises the steps of transferring the median portion of the label to the periphery of the article, advancing the article in a predetermined and preferably straight path, rotating the article about its axis in a first direction preferably by engaging the periphery of the article by a pair of parallel conveyors moving in the same direction but at different speeds and by simultaneously holding the label in the path of the article so that the remainder of the label at one side of its median portion is rolled onto the periphery of the article, thereupon rotating the article in the opposite direction preferably by engaging its periphery by a stationary surface and by a moving conveyor and simultaneously holding the label in the path of the article so that the remainder of the label at the opposite side of its median portion is rolled onto the periphery of the article. In accordance with a preferred embodiment of my process, the article is rotated in a first direction between a slower and a faster conveyor and thereupon remains in engagement with the slower conveyor to be simultaneously engaged by a stationary surface which is aligned with the faster conveyor. This insures that a single conveyor cooperates in rotating the article in a first direction and thereupon, together with the stationary surface of a plate-like or otherwise shaped member, in the opposite direction. The angular movements of the article in a first and thereupon in a second direction normally occur through angles of less than 360 degrees, particularly when the article is rotated in the first direction.

In addition to the aforementioned conveyors and guide means, the improved apparatus comprises means for advancing the conveyors at different but preferably constant speeds, means for intermittently delivering labels to one of the conveyors for subsequent transfer to the articles, means for feeding articles into the path between the two conveyors, means for adjusting the position of the articles prior to the transfer of labels thereon, and means for receiving and transporting properly labelled articles from the labelling station.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following detailed description of certain specific embodiments with reference to the accompanying drawings, in which:

FIG. 1 is a schematic top plan view of an apparatus embodying one form of my invention;

FIG. 2 is a fragmentary section taken along the line II—II of FIG. 1, as seen in the direction of arrows;

FIG. 3 is a schematic front elevation view of a two-conveyor assembly and of a slotted guide located between the two conveyors;

FIG. 4 is an enlarged fragmentary top view of the rocking mechanism illustrated in FIG. 1; and

FIG. 5 is a fragmentary section taken along the line V—I of FIG. 4 as seen in the direction of the arrows.

Referring now in greater detail to the drawings, and first to FIG. 1, there is shown an apparatus for applying and rolling adhesive-coated labels onto the peripheries of substantially cylindrical articles, such as sheet-metal containers, bottles, jars made of ceramic or like material, ampoules and others. The apparatus comprises a supporting conveyor 2 whose upper run serves as a support for a series of cylindrical articles 1 and is adapted for advancing the articles in a predetermined preferably straight path in a direction from the left to the right, as viewed in FIG. 1. Adjacent to one side of this path, there is provided a rotary worm 9 whose helices define themselves a spiral groove of concave cross-section which is adapted to receive and to engage a peripheral portion of each consecutively advancing article and to move the article to the right, i.e. in the direction indicated by the arrow 28, by cooperating with a vertical wall 10 which engages the opposite peripheral portion of each container. The means for rotating the worm 9 comprises an electric motor 35, a chain 36 which is driven by a gear 37 on the shaft of the motor 35, a second gear 38 which is driven by the chain 36, a first bevel gear 39 which is coaxially connected with the shaft 40 of the gear 38, and a second bevel gear 41 which meshes with the gear 39 and is coaxially connected with the worm 9. The worm 9 extends to the labelling station which includes a labelling drum 3 cooperating with a roller 4 to support a labelling conveyor 5 having an article-engaging stringer or run 52 extending along the path of the articles as the latter
advance in the direction of the arrow 28. The conveyor 5 is driven in such direction that its run 5a advances in the direction of the arrow 28. The labelling drum 3 is driven by its shaft 3a which is directly coupled with an electric motor 42 (see FIG. 2) through a friction clutch 43 or the like.

Adjacent to and spaced from the run 5a, there is provided a second conveyor 6 whose article-engaging inner stringer or run is parallel with the run 5a and which is trained around a pair of spaced deflecting members here shown as rollers 7, 8. Between the rollers 7 and 8, an intermediate portion of the inner run of the conveyor 6 is deflected away from the path of the articles 1 by a roller 24 which cooperates with two additional rollers 23, 23a so that the conveyor 6, driven by the shaft 7a of the member 7 which rotates in clockwise direction, moves about the roller 7, about the rollers 23, 24, 23a, and toward the roller 8 in that order. It will be noted that the rollers 23, 24, 23a divide the inner run of the conveyor 6 into two aligned sections 6a, 6b the first of which is spaced from and defines with the left-hand portion of the inner run 5a a first space 18 whose left-hand or inner end consecutively receives the articles at the rate of speed determined by the worm 9 which introduces the articles into the space 18 and into contact with the run 5a and with the left-hand section 6a. The recess formed by the rollers 23, 24, 23a between the sections 6a, 6b receives a stationary guide element 21 having a preferred clockwise direction while 6a surface 22 which is aligned with the sections 6a, 6b and which is spaced from and parallel with an intermediate portion of the run 5a so that the surface 22 and the run 5a define between themselves a second space 18a in continuation of the space 18.

The shaft 7a rotates the run 5a at a speed which is less than the speed at which the sections 6a, 6b are driven by the shaft 7a. Consequently, an article 1a already engaged by the run 5a and by the section 6a will rotate in anticlockwise direction which is indicated by the arrow 27 but, once the article 1a is advanced into peripheral contact with the surface 21 of the stationary guide 21 (see the position of the article 1b), the run 5a begins to rotate the article in clockwise direction (arrow 29) because the run 5a advances to the right with respect to the stationary guide 21. Thus, it will be seen that each article is rotated in the anticlockwise direction while it advances through the space 18, and that each article is subsequently rotated in the clockwise direction during its advance through the second space 18a. The second section 6b cooperates with the rightmost portion of the run 5a so that with a so-called filling or finishing conveyor 31 to move an article emerging from the space 18a in a direction to the right and into engagement with a stationary wall 32 which then assists the filling conveyor in moving the article through the remainder of its path in the direction indicated by the arrow 28. After passing through the channel between the conveyor 31 and the wall 32, the properly labelled articles are entrained by the conveyor 2 and advance into a collecting device 30.

The means for transferring an adhesive-coated label 25 onto that portion of the conveyor 5 which is in momentary engagement with the drum 3 is fully described in the aforementioned copending application and will be described only shortly because its exact construction forms no part of the present invention. A supply of labels 11 is stored in a swivellable receptacle 11a whose open end is adjacent to the path described by the arcuate surface of a drum 12 and which is so located for its roll to engage the drum 12 in the direction indicated by the arrow 13 so as to remove from the receptacle 11a the lowermost label 11 during each of its revolutions. Prior to actual engagement with a new label 11, the arcuate surface of the segment 12 is coated with adhesive by contact with an adhesive applying roll 15 which is in peripheral contact with an adhesive transferring roll 14, the latter receiving adhesive from a source in the form of a tank 16. Thus, the exposed underside of the lowermost label 11 is coated with adhesive during its transfer onto the arcuate surface of the segment 12, and the label is thereupon deposited on the conveyor 5 in the well known manner to be subsequently transferred onto the articles in the first space 18. Owing to the fact that the means for delivering labels to the conveyor 5 is a revolving segment, this conveyor receives labels intermittently, that is, one label during each revolution of the segment 12.

The means for driving the conveyor 6 and the segment 12 comprises a gear 44 which is mounted on the shaft 3a of the labelling drum 3. The gear 44 drives a gear 45 which is mounted on the shaft 46 of the segment 12 so that the latter rotates at a speed determined by the ratio of the gears 44, 45.

The gear 44 also meshes with a pinion 47 which meshes with a second pinion 48 and the latter drives a gear 49 on the shaft 7a of the deflecting member 7. It will be seen that a single motor 42 may drive the conveyor 5, the conveyor 6 and the segment 12. The pinions 47, 48 and the gears 44, 49 constitute a transmission which drives the conveyor 6 at a speed higher than the speed of the conveyor rotational speed of the worm 9 which introduces the articles into the space 18 and into contact with the run 5a and with the left-hand section 6a. The recess formed by the rollers 23, 24, 23a between the sections 6a, 6b receives a stationary guide element 21 having a preferred clockwise direction while 6a surface 22 which is aligned with the sections 6a, 6b and which is spaced from and parallel with an intermediate portion of the run 5a so that the surface 22 and the run 5a define between themselves a second space 18a in continuation of the space 18.

It is preferred to extend the section 6a of the conveyor 6 at least slightly to the left of the drum 3 so that an article 1a engaged by the section 6a begins to turn in the anticlockwise direction (arrow 27) even before it reaches the run 5a of the labelling conveyor 5.

FIG. 1 shows a label 25 upon completion of transfer from the conveyor 5 and in a position in which only its median portion 25e adheres to the periphery of an article 1a whose axis of rotation is perpendicular to the direction indicated by the arrow 26 and which is introduced into the space 18 in such a way that the section 6a and the run 5a respectively engage two diametrically opposed sides of its periphery.

The apparatus further comprises a substantially U-shaped carrier lever 17 whose arms are rockably mounted on the ends of the shaft 3a for the labelling drum 3 and which comprises a preferably forked member consisting of a plurality of projecting adjusting elements 19, best shown in FIG. 5, which extend between spaced parallel strips 33 together constituting the conveyor 5. These adjusting elements are fully described in the aforementioned copending application. The configuration of the adjusting elements 19 is such that these projecting adjusting elements return an improperly guided cylindrical article 1 into requisite position in which the latter's vertical axis is parallel with the axis of the drum 3. Their purpose is to arrest and to adjust the position of consecutively introduced cylindrical articles 1 preparatory to the transfer of labels thereto so that a label 25 transferred by the conveyor 5 to say the article 1a is properly placed onto a selected peripheral zone of this article. The projecting adjusting elements 19 are rocked back and forth in a predetermined rhythm to insure that an article which might have been tilted or otherwise shifted from its requisite position will be adjusted before and is held against movement to the right while a label is being transferred thereto. The means for rocking the carrier lever between its full-line position 17 and its broken-line position 17a (FIG. 1) comprises a plate cam 50 which is mounted on the shaft 46 of the segment 12 and which cooperates with an upwardly extending arm 51 of the carrier lever 17 as best seen in FIG. 4. When the cam 50 assumes the position 51a and moves the carrier lever 17 to the position 17a to thereby withdraw the elements 19 from the space 18.

The fulling conveyor 31 is driven by its left-hand roller 52 through a chain or belt 53 which is driven by a sprocket or pulley 54 coaxially secured to the deflecting roller 4.
The operation of the apparatus shown in FIGS. 1 and 2 is as follows:

When an article 1a has been properly adjusted by the elements 19 and thereafter receives the median portion 25c of the label 25, it is already located in the space 18 and begins to revolve in the direction of the arrow 27 because the conveyor run 5a is slower than the section 6a whereby the remainder 25a or edge portion of the label at one side of the median portion 25c is rolled onto the periphery of the article 1a under the action of the slower run 5a which latter holds the label in the path defined by the conveyors 5, 6. The transfer of the label 25 from the conveyor 5 onto the periphery of the article 1a occurs at a time when the label is nearly completely separated from the conveyor, i.e., when only the outer side of the portion 25c is still in contact with the run 5a. The remaining or the other edge portion 25b of the label 25 at the other side of its median portion 25c remains loose until such time when the run 5a and the section 6a advance the article 1a into engagement with the surface 22, i.e., into the second space 18a shown occupied by an article 1b. The article then begins to rotate in the clockwise direction under the action of the run 5a and the latter rolls the remainder 25b at the left-hand side of the median label portion 25c onto the periphery of the article because it holds the label in the path of the articles as the latter advance in the direction of the arrow 28. The operation is then repeated with the next article 1, and so forth.

Articles shown in the channel between the fulling conveyors 31 and the wall 32 are thereupon advanced under the action of the fulling conveyor and are led to the collecting device 30 where they may be placed into boxes, wrapped or processed in any other way.

Since the articles need not be turned through full 360 degrees, they may be very short so that the rolling of labels requires little time and that the articles may be fed to the space 18 at very short intervals (see FIG. 1). The overall length of the machine is much less than the length of known labelling machines, and the output of the machine is higher because the articles may be labelled at extremely short intervals.

It will be noted that the guide 21 actually constitutes a stationary component of the second conveyor 6 by being located between the latter's sections 6a, 6b and by having its surface 22 aligned with these sections. However, it is often advisable to replace the second conveyor 6 by a pair of spaced conveyors 106A, 106B in a manner shown in FIG. 3, and to mount the carrier lever 17 on the shaft of the roll 123 forming part of the conveyor 106A. The article engaging inner run of conveyor 106A is in alignment with the article engaging inner portion of conveyor 106B corresponding, respectively, to conveyor portion 6a and 6b shown in FIG. 1, and is trained around deflecting member 123 for movement therebetween out of alignment with the article engaging portion of conveyor 106B. The stationary guide 121 is formed with a plurality of slots 134 for the adjusting elements 19 so that the latter may extend into the space 18 to consecutively adjust the articles prior to the transfer of labels thereto. The advantage of the construction shown in FIG. 3 is that the labelling conveyor 5 need not consist of spaced strips 33; this might be of importance in the event that the labels are comparatively large and that each portion of a label must be firmly rolled onto the periphery of the respective article while the periphery is in contact with the inner run 5a. Of course, the conveyor 106B may consist of spaced parallel strips because it comes into engagement with an article only after the latter is already provided with a label and after the label is already rolled on the article.

It will be noted that the lever 17 is preferably mounted on that roller 123 which corresponds to the roller 23 shown in FIG. 1, i.e., which is located nearest to the labelling drum 3.

Of course, the apparatus may be turned or tilted through 90 degrees so that the axes of the articles and the conveyors means 5, 6 or 5, 106A—106B is located above the other conveyor means.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic and specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is:

1. An apparatus for applying and rolling adhesive-coated labels onto the peripheries of substantially cylindrical articles, comprising first conveyor means having an article-engaging first run consisting of spaced parallel strips; second conveyor means having an article-engaging second run substantially parallel to and defining with said first run a first space having an inlet end, said first run comprising a portion extending beyond said first space; stationary article-engaging guide means aligned with said second run and defining with said portion a second space in continuation of said first space; means for consecutively introducing the cylindrical articles through said inlet end and into said first space; means comprising a plurality of projecting adjusting elements reciprocable between said strips into and from said first space for adjusting the position of consecutively introduced cylindrical articles onto the transfer of labels thereto; means for advancing said first run at a first speed in a direction from said inlet end toward and along said second space; means for advancing said second run at a speed higher than said first speed and in a direction from said inlet end toward said guide means whereby a cylindrical article introduced into said first space is rotated in a first direction and is simultaneously advanced toward said second space to be rotated by said portion in the opposite direction while advancing along said guide means; and means for delivering labels to one of said conveyor means for transfer to cylindrical articles in said first space whereby a label transferred to a cylindrical article is partially rolled onto the latter in said first space and the remainder of the label is rolled onto the cylindrical article in said second space.

2. An apparatus for applying and rolling adhesive-coated labels onto the peripheries of substantially cylindrical articles, comprising spaced first and second conveyor means having aligned first and second article-engaging runs, respectively, said first conveyor means comprising an endless flexible member, roller means adjacent to said second conveyor means, said endless flexible member being trained around said roller means; stationary guide means located between and having an article-engaging surface aligned with the runs of said first and second conveyor means, said guide means formed with a plurality of slots; third conveyor means having an article engaging third run substantially parallel with said first and second runs, said third run and said first run defining between themselves a first space having an inlet end and said third run defining with said surface a second space in continuation of said first space; means for consecutively introducing the cylindrical articles through said inlet end and into said first space; means comprising a plurality of projecting adjusting elements which are trained around said roller means and which are trained through said slots in the stationary guide means into said first space for adjusting the position of consecutively introduced cylindrical articles preparatory to the transfer of labels thereto; means for advancing said first run at a first speed in a direction from said inlet end toward said guide means; means for advancing said second run
in a direction from said guide means; means for advancing said third run at a speed less than said first speed and in a direction from said inlet end toward and along said second space whereby a cylindrical article introduced into said first space is rotated in a first direction and is advanced toward said second space to be rotated by said third run in the opposite direction while advancing along said surface and is thereupon advanced by said second run; and means for delivering labels to said third run for transfer to cylindrical articles in said first space whereby a label transferred to a cylindrical article is partially rolled onto the latter in said first space and the remainder of the label is rolled onto the cylindrical article in said second space.

References Cited by the Examiner

UNITED STATES PATENTS

Re. 24,097 11/1955 Von Hofe 156—566 XR
1,653,910 12/1927 Meyer-Jagenburg 156—566
2,354,688 8/1944 Kimball et al. 156—453
2,641,377 6/1953 Zander 156—453
2,703,660 3/1955 Von Hofe et al. 156—455 XR
2,886,200 5/1959 Thulke et al. 156—448
2,940,630 6/1960 Carter 156—378 XR

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