

Dec. 30, 1952

K. J. GLANS

2,623,655

METHOD AND ARRANGEMENT FOR CARRYING OUT THE LOCAL SURFACE
TREATMENT OF ARTICLES CONVEYED ON A TRAVELING BELT

Filed Dec. 27, 1951

5 Sheets-Sheet 1

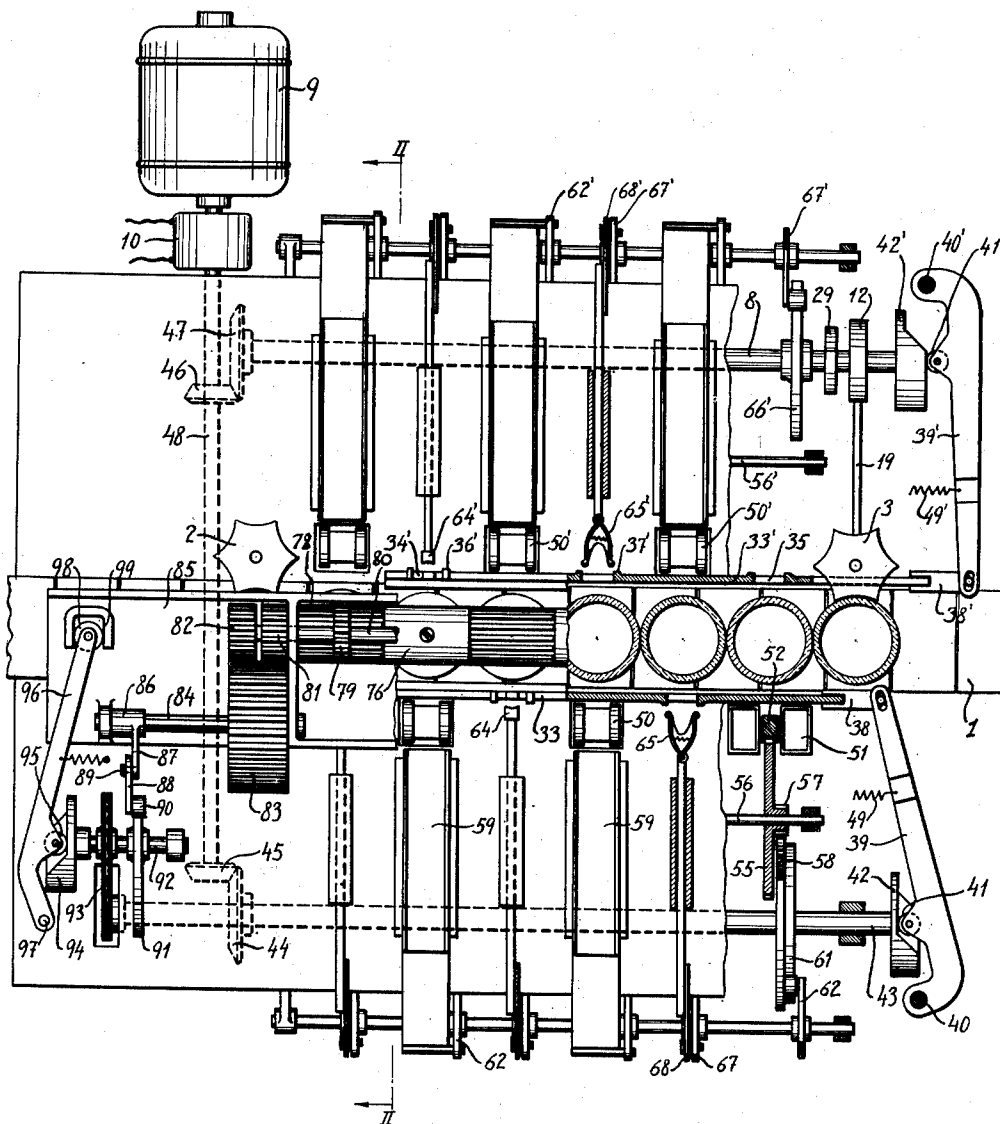


Fig. 1.

INVENTOR

K. J. Glans

BY *Glasgow Downing Keck*

ATTORNEYS

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K. J. GLANS

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5 Sheets-Sheet 2

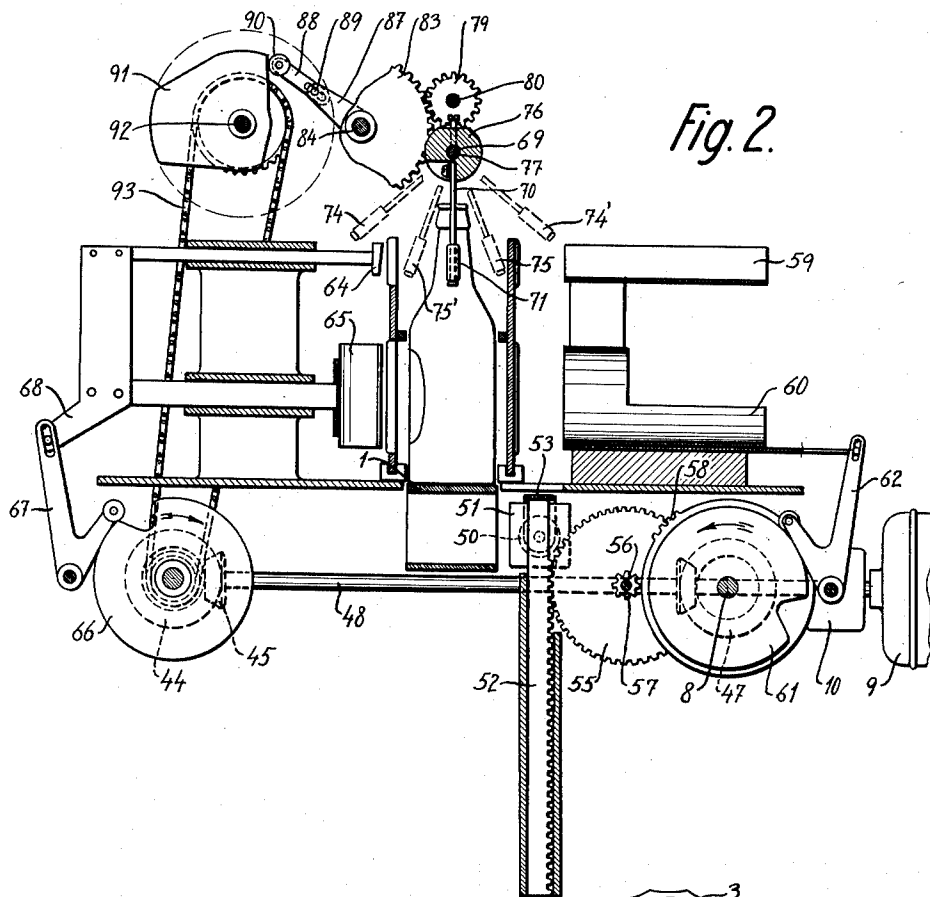


Fig. 2.

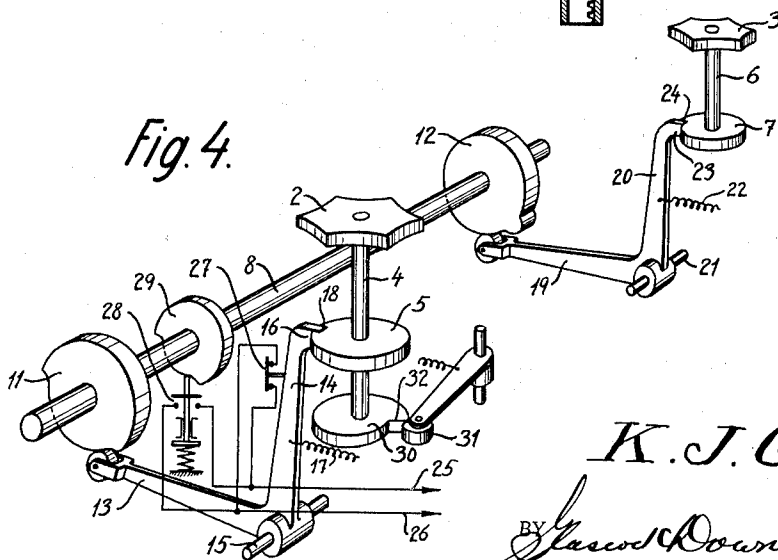


Fig. 4.

INVENTOR

K. J. Glans

BY *James Downing Reeside*
ATTORNEYS

ATTORNEYS

Dec. 30, 1952

K. J. GLANS

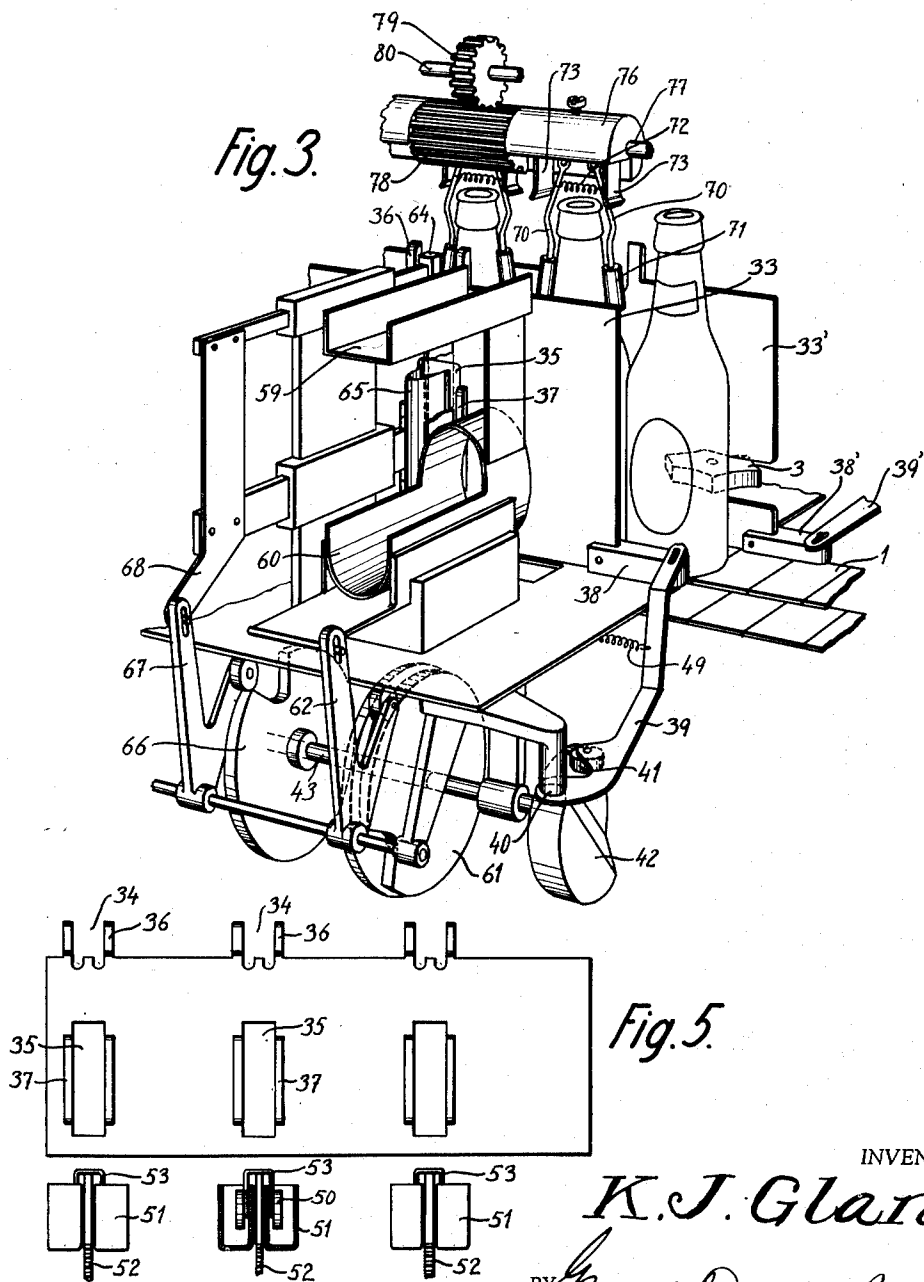
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5 Sheets-Sheet 3



INVENTOR

K. J. Glans

BY *Glans & Downing*
ATTORNEYS

Dec. 30, 1952

K. J. GLANS

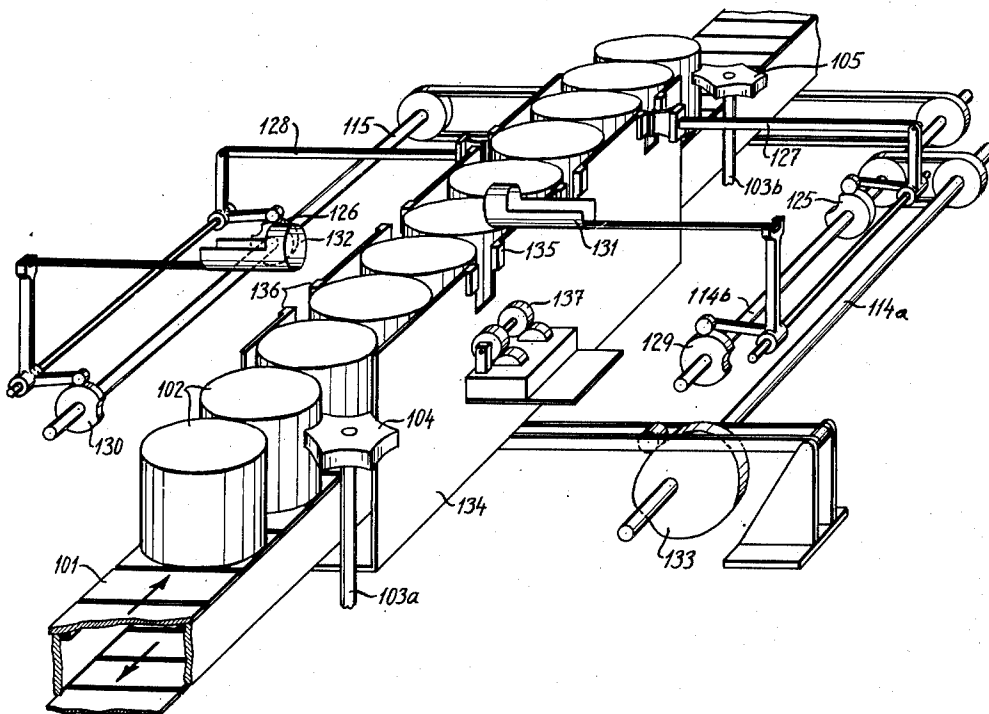
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METHOD AND ARRANGEMENT FOR CARRYING OUT THE LOCAL SURFACE
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Fig. 6.



INVENTOR

K. J. Glans

BY *Glans & Downing*
ATTORNEYS

Dec. 30, 1952

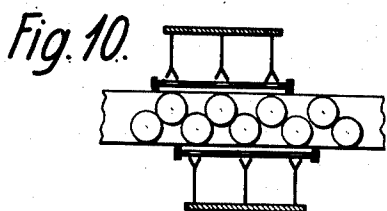
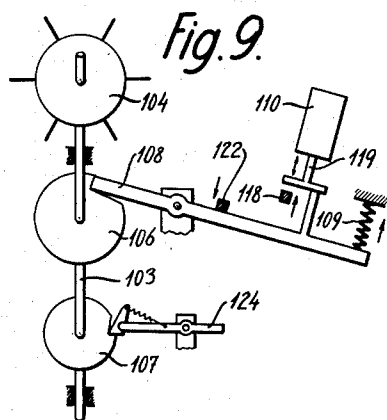
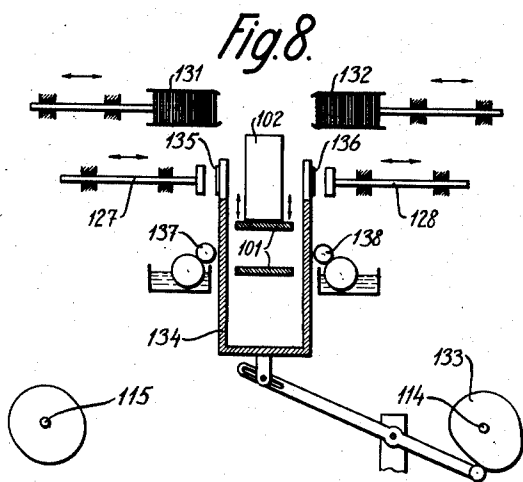
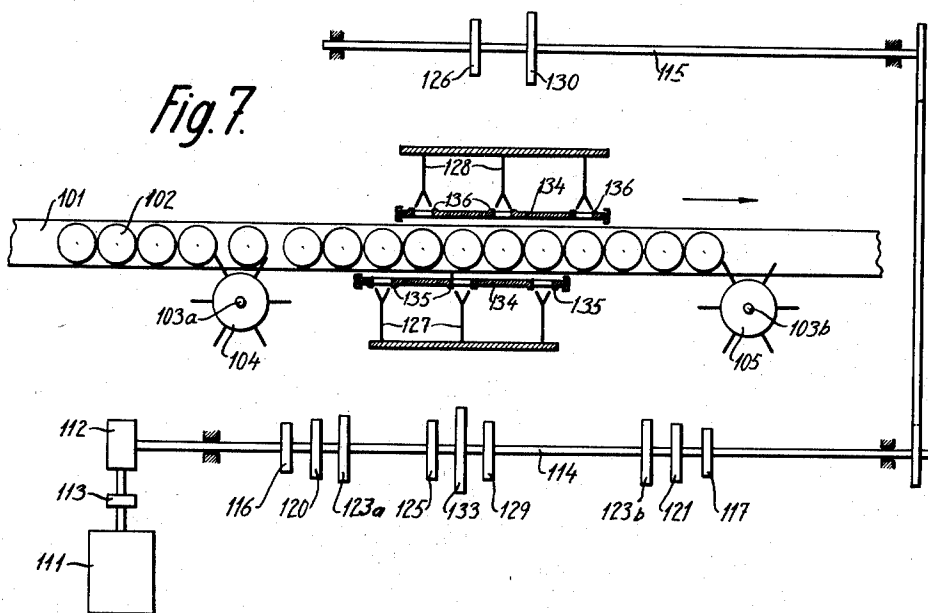
K. J. GLANS

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5 Sheets-Sheet 5



INVENTOR

K. J. Glans

BY *Glasco Downing & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE

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METHOD AND ARRANGEMENT FOR CARRY-
ING OUT THE LOCAL SURFACE TREAT-
MENT OF ARTICLES CONVEYED ON A
TRAVELING BELT

Karl Johan Glans, Stockholm, Sweden

Application December 27, 1951, Serial No. 263,674
In Sweden May 25, 1948

27 Claims. (Cl. 216-57)

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This application is a continuation-in-part of my previous application, Ser. No. 82,132, dated March 18, 1949, now abandoned, relating to a method and arrangement for carrying out the local surface treatment of articles conveyed on a travelling belt.

The present invention relates specifically to apparatus for applying labels to bottles. However, some of the basic principles on which the apparatus is built have a very wide range of application, and therefore the inventive principle advanced is intended to cover the entire field of marking and labelling whether applied to bottles, tins, boxes or other articles. Furthermore, the inventive concept must be regarded as broadly applicable to the entire range of apparatus for local surface treatment of different kinds such as coating, engraving and the like.

In apparatus of the kind referred to, where a large number of uniform articles are to be subjected to a local surface treatment, it is the customary practice to provide a surface treatment station constructed with the necessary means for effecting the surface treatment and in some cases with means for preliminarily conditioning the apparatus for the surface treatment operation, as well as suitable conveying means for moving the articles to and past the surface treatment station.

In such machines, there must of course be a coordination between the supply of articles to the surface treatment station and the operation of the surface treatment means and the preliminary conditioning means, if any, so that there will always be articles present in the prescribed surface treatment positions when the surface treatment means are caused to operate.

This coordination is ordinarily obtained by constructing the conveyor with means to positively hold the articles in definite positions relative thereto, and synchronizing the intermittent operation of the conveyor and that of the surface treatment means so that the conveyor will be stationary in a predetermined position when the surface treatment means operate. However, in many installations where apparatuses of the kind in question are used, there may occur stoppages or irregularities in the supply of articles from preceding work stations to the surface treatment station. It is therefore necessary either to take precautions to secure a continuous flow of articles to the surface treatment station, which is frequently a rather impractical and expensive solution, or to provide means at the surface treatment station for testing whether articles are

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present in the prescribed positions on the conveyor. Now, if it is desired to construct the apparatus for simultaneously surface treating a plurality of articles, the situation may arise that there are articles present in some of the prescribed positions and not in others, and consequently, it will be necessary to provide individual testing means for each of the positions and means for individually controlling the surface treatment means associated with the various positions from the said individual testing means. This involves complicated and expensive constructions and necessitates a relatively wide spacing of the articles at the surface treatment station, and this again means that an apparatus of given dimensions will have a relatively small capacity.

It is an object of the invention to solve the general problem of coordinating the operation of the surface treatment means of an apparatus of the character referred to and the supply of articles to the surface treatment station along new principles, whereby the difficulties arising from stoppages and irregularities in the supply of articles are entirely eliminated, and the apparatus can be constructed with relatively small dimensions to handle a relatively large number of articles per hour.

With this object in view, use is made, according to the invention, of a belt conveyor that does not positively hold the articles but is capable of sliding away under the articles when the latter are stopped by an abutment at the discharge end of the apparatus, whereby the articles are accumulated in closely packed formation at the surface treatment station gradually as they arrive on the conveyor. At the surface treatment station, checking means are provided for counting the number of articles thus supplied and to permit simultaneous operation of the surface treatment means on all the articles thus accumulated when these have reached the prescribed number, whereupon the articles that have been surface treated are checked out of the surface treatment station, and a new batch is checked in gradually as they arrive on the conveyor. If preliminary conditioning means are provided at the surface treatment station, these will preferably be permitted to perform their function during the checking in and out of the articles so that the surface treatment means proper may operate without delay as soon as the prescribed number of articles have been supplied to the surface treatment station.

In an apparatus constructed in accordance with the invention, there will never be gaps in the

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batch of articles present at the surface treatment station at the moment the surface treatment is effected and there is therefore no necessity of providing individual testing means. Accordingly, the mechanical construction of the surface treatment means and their controlling means may be simple. Moreover, since the articles are kept closely pressed against one another at the surface treatment station, the latter will occupy the minimum possible space in the direction of travel of the conveyor. There will never be any parts running idle in the apparatus, and there will be no necessity of watching the supply of articles to the apparatus. The apparatus will always be capable of immediately surface treating the articles as fast as they are carried to the surface treatment station by the conveyor, and it will easily be seen that the apparatus may be constructed to operate at very high speed. Moreover, it will be easy to coordinate the apparatus with other treatment stations, because the supply of articles to the apparatus is not critical as regards uniformity and regularity. Other advantages of the apparatus according to the invention will be apparent as the description proceeds.

In its specific application to article labelling apparatus, it is another object of the invention to devise an apparatus in which the necessary amount of movement of the essential movable parts is reduced to a minimum with a view to increasing the durability and reliability of the machine as well as the permissible speed of operation.

A further object of the invention is to construct a labelling apparatus capable of simultaneously labelling a relatively large number of articles, if desired, at two or more different levels at a time, an example of this being the simultaneous application of neck and body labels to bottles.

A still further object of the invention is to devise an article labelling apparatus capable of reliably and neatly applying labels required to extend around a substantial portion of the circumference of articles to be labelled.

With these and other objects in view, which will be apparent as the description proceeds, the invention consists in the novel constructions, arrangements and combinations of parts which will now be described in detail with reference to two particular embodiments of the invention and will thereafter be set forth in their general aspect in the appended claims.

Reference will now be made to the accompanying drawings in which

Figure 1 shows one form of the novel article labelling apparatus in plan view,

Figure 2 is a sectional view along the line II—II of Figure 1,

Figure 3 illustrates one end of the apparatus in perspective view,

Figure 4 is a detached view of the checking means of the apparatus and the means interlocking same with the main control shaft,

Figure 5 is a view of a label transfer frame with appurtenant adhesive applying means as viewed from one side of the apparatus,

Figure 6 is a perspective view of a modified form of an article labelling apparatus according to the invention,

Figure 7 is a diagrammatic plan view of same,

Figure 8 is a diagrammatic cross section of same,

Figure 9 is a diagrammatic representation of a slightly modified form of the checking means of an apparatus according to the invention, and

Figure 10 is a diagrammatic partial plan view

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of a modification of the general arrangement of the surface treatment station where the articles are arranged in zig-zag formation.

All the forms of the apparatus according to the invention shown in the drawing are intended for the labelling of bottles. More particularly the apparatus of Figures 1 to 5, to which reference will first be had, is intended for applying labels to both the body and the neck of bottles, but it will be understood that similar apparatus could also be used with advantage for the labelling of other articles whether these are to be provided with one label only, as in the apparatus illustrated, or with two or possibly more than two labels.

All the operating parts of the apparatus illustrated in Figures 1 to 5 are effective at a labelling station occupying a zone of a continuously moving conveyor on which the bottles to be labelled are carried and may be supplied to the labelling station from a preceding work station such as a filling and capping machine. Likewise, the conveyor may carry the labelled bottles from the discharge end of the labelling station to a subsequent work station such as an apparatus for further treatment of the bottles or for packaging the bottles into boxes or the like.

For the purposes of description, the apparatus may be divided into different parts, namely, (1) the labelling station as such, (2) the means for checking in and out the bottles, (3) the preliminary conditioning means for bringing labels into position in front of the bottles to be labelled, (4) the labelling means for transferring the labels from the said positions to the surface of the bottles, and (5) the label sweeping means for sweeping the neck labels snugly around part of the circumference of the bottle necks. These various parts of the apparatus will now be separately described in the order mentioned.

1. The labelling station

In the drawing, 1 is a continuously moving conveyor on which the bottles to be labelled are carried, and 2 and 3 are star wheels projecting into the path of movement of the bottles carried on the conveyor. The work station as such may be defined as the section of the conveyor between the star wheels 2 and 3. Supposing for the time being that the star wheel 3 is locked against rotation, it will be seen that the star wheel 3 forms in effect a stop means at the discharge end of the labelling station causing any bottles admitted by star wheel 2 to accumulate in closely packed formation at the work station gradually as they arrive on the conveyor, it being observed that the latter is constructed without dogs or other projections and with an upper surface smooth enough to be capable of sliding away under the bottles detained by the star wheel 3. Since the bottles are in this manner held closely pressed against one another, it will be seen that the bottles thus accumulated at the work station will assume predetermined positions either exactly in line with one another or in zig-zag formation depending on the spacing of the lateral guiding means provided on both sides of the conveyor. These lateral guiding means may be constructed in various ways. In the embodiment shown, such lateral guiding means are formed by the lateral transfer frames to be described hereinafter.

2. Means for checking in and out the bottles

The constructional arrangement of these means are best seen from Figure 4, which again shows the two star wheels 2 and 3. The star wheel 2

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is mounted on a vertical spindle 4 carrying a locking disc 5. Similarly, the star wheel 3 is mounted on a vertical spindle 6 carrying a locking disc 7. There is a shaft 8 extending parallel to the path of movement of the conveyor 1 and serving as the main control shaft of the apparatus. The shaft 8 is coupled to a prime mover such as an electric motor 9 through an electrically operated coupling or clutch 10.

The shaft 8 is provided with a cam 11 for co-operating with the locking disc 5 of the star wheel 2 and also with a cam 12 for co-operating with the locking disc 7 of the star wheel 3. Thus, between the former cam 11 and the locking disc 5 there is interposed a double-armed lever 13, 14 fulcrumed at 15 and having one arm 13 in engagement with the cam 11 while being provided at the end of its other arm 14 with a nose 16 engaging with the circumference of the locking disc 5. A spring 17 tends to urge the arm 13 and the nose 16 into engagement with the cam 11 and the locking disc 5 respectively at all times. The locking disc 5 is substantially circular, but is provided at one point of its circumference with a notch 18 into which the nose 16 may engage.

Similarly, a double-armed lever 19, 20 fulcrumed at 21 is interposed between the cam 12 and the locking disc 7 and is provided with a biasing spring 22, the arm 20 having a nose engageable with the circumference of the locking disc 7. The locking disc 7 might have substantially the same shape as the locking disc 5, but in the embodiment illustrated it is shown as being substantially spirally shaped, thus forming a radial stop edge 24 at one point of its circumference.

An electric control circuit for the coupling or clutch 10 comprises conductors 25 and 26 to which are connected two switches 27 and 28 in parallel. The former switch 27 is controlled by the lever arm 14 in such a manner as to be opened when that arm moves to the right, while the latter switch 28 is controlled by a cam 29 on the main control shaft 8 so as to be closed by a downward movement over a predetermined part of each revolution of the main control shaft.

The operation of the checking means is as follows:

When the parts are in the positions illustrated, it will be seen that both the star wheels 2 and 3 are locked against rotation, and consequently no checking in or checking out of bottles can take place.

Since the switch 27 is closed, the control circuit of the electric coupling or clutch is energized, and consequently the main control shaft 8 is driven by the prime mover 9. As will be explained later, the main control shaft serves during the major part of one revolution to operate first the said preliminary conditioning means and then the labelling means.

Now, the cams 11, 12 and 29 are so shaped that upon completion of the labelling operation, the cam 29 is effective to close the switch 28, and the cams 11 and 12 are thereafter effective to lift the noses 16 and 24 out of engagement with the locking discs 5 and 7 respectively. The star wheels 2 and 3 are thereby permitted to check in and out the bottles carried by the conveyor 1. Moreover, since the switch 28 was closed prior to the opening of the switch 27 owing to the movement of the lever arm 14, the main control shaft continues to rotate. Now, the cams 11 and 12 are so shaped that upon further rotation of the shaft 8 through a certain angle, the cams

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11 and 12 will again permit the double-armed levers 13, 14 and 19, 20 to move towards the positions indicated in the drawing. However, at this time the locking discs 5 and 7 have already been rotated through a certain angle by the engagement of the bottles with the star wheels 2 and 3, and the noses 16 and 23 therefore do not come into engagement with the notch 18 and the stop edge 24 respectively. Consequently, the star wheels are free to continue rotation until they have performed a full revolution. When this has taken place, the noses 16 and 23 will again snap into engagement with the notch 18 and the stop edge 24 respectively, thus stopping further rotation of the star wheels.

At this time it will be seen that the star wheels have checked in and out a predetermined number of bottles, in the embodiment shown six bottles since the star wheels are constructed as 6-armed stars.

As mentioned, the main control shaft 8 at the same time continues to rotate, and the cam 29 is so shaped that during this rotation the switch 28 remains closed until the operation of the preliminary conditioning means has been completed. At this time and prior to the commencement of the labelling operation, also controlled by the main control shaft, the switch 28 is opened so that the main control shaft can now only continue to rotate if the switch 27 has been closed at that time.

It will thus be seen that by the means described there has been established an interlocking of the checking means, the preliminary conditioning means and the labelling means, and to further illustrate the nature of this interlocking, two different cases will be briefly considered.

Suppose first that the bottles are supplied to the apparatus at a speed such that, starting from the moment where the star wheels 2 and 3 are released to permit checking in and out of the predetermined number of bottles while the main control shaft 8 continues to rotate, the star wheels have completed their operation to check in and out the prescribed number of bottles before the main control shaft 8 has rotated through the angle required for the preliminary conditioning operation. In that case, the shaft 8 will simply continue to rotate to perform the labelling operation because the switch 27 has been closed before the switch 28 was opened so that there will not be any interruption of the rotation of the shaft 8.

Suppose on the other hand, that for some reason there is a delay in the supply of bottles to the apparatus so that the star wheel 2 has not yet performed a full revolution, when the control shaft 8 has rotated through the angle required for the operation of the preliminary conditioning means, though of course the star wheel 3, which is not in any way coupled to the star wheel 2, may have performed a full revolution by the engagement of the bottles that were present in the apparatus at the latest labelling operation. In this case, the shaft 8 ceases to rotate upon completion of the preliminary conditioning operation, because at that time the switch 28 is opened and the switch 27 has not yet been closed. Consequently, there is not performed any labelling operation until the star wheel 2 has checked in the prescribed number of bottles and the switch 27 has thereby been closed to energize the coupling or clutch 10.

Thus, it will be seen that while the bottles are being checked in and out, the apparatus per-

forms all the necessary preparatory operations to be immediately ready for the labelling operation, but the latter operation is not initiated until the apparatus has been filled with bottles as checked by the star wheel 2. It will easily be seen that in this manner there is obtained the minimum possible waste of time resulting from delay in the supply of bottles.

In the example shown, the shaft 4 of the star wheel 2 is provided with a further disc 30 engaged by a spring biased roller 31 and having its circumference so shaped, that in the illustrated position of the star wheel 2 the roller 31 is located at the peak of a relatively steeply inclined edge portion 32 of the circumference. The result of this is that the moment the star wheel 2 is released by disengagement of the nose 16 from the notch 18, the roller 31 in cooperation with the edge portion 32 will tend to rotate the star wheel 2 through a small angle. This is intended to take care of the situation where the star wheel 2 is not caused to rotate by the engagement of bottles, for example, if there is a shortage in the supply of bottles or because the conveyor 1 is stopped for some reason. In that case, if the disc 30 and roller 31 were not provided, the nose 16 might conceivably snap back into the notch 18 before the star wheel 2 had had any opportunity of commencing rotation, and this would result in complete stoppage of the apparatus and some disorder in the operation when the apparatus would be restarted again, for example, by manually disengaging the nose 16 from the notch 18. However, owing to the disc 30 and the roller 31 at the occurrence of such a situation is positively prevented, because the nose 16 is prevented from reengaging the notch 18 until the star wheel 2 has made a full revolution by the engagement of bottles supplied to the apparatus.

A similar arrangement may also be made with respect to the star wheel 3, though in the case of this star wheel the arrangement would be less important, because there will never be a shortage of bottles at the star wheel 3 at the moment when the nose 23 is disengaged from the stop edge 24 so that the only reason for failure of the star wheel 3 to initiate rotation would be stoppage of the conveyor exactly at the critical time.

3. Preliminary conditioning means

These are the means serving to bring labels in position immediately in front of the bottles to be labelled preparatory to the actual labelling operation. In the embodiment shown, Figures 1, 3 and 5, the preliminary conditioning means comprise a pair of label transfer frames 33 and 33' extending parallel to and at opposite sides of the path of movement of the conveyor 1. The two label transfer frames are exactly similar, and the same holds good of the parts immediately co-operating therewith, and consequently only one of the label transfer frames and the parts immediately co-operating therewith will be described in detail, it being observed that also the reference characters in the drawing are the same except for the addition of a prime to the reference characters having to do with the label transfer frame 33'.

The label transfer frame 33 is best seen in Figure 5, and it will be seen that it is provided with two horizontal rows of so-called labelling openings, namely, an upper row of labelling openings 34 provided at the top edge of the label transfer frame 33, and a lower row of labelling

openings 35. The openings 34 of the upper row are upwardly open which is convenient with a view to the operation of the label sweeping elements to be mentioned later, but is not essential in all cases. The labelling openings 35 of the lower row are respectively situated vertically below the upper labelling openings 34. The horizontal spacing of the sets of labelling openings 34, 35 is equal to the spacing of alternate bottles in labelling positions at the labelling station. In the example shown there are three sets of labelling openings in each label transfer frame corresponding to a number of six bottles to be checked in and out in each operating cycle and to be simultaneously labelled in each full operation of the apparatus.

Each labelling opening 34 is provided at its vertical edges with raised edge portions 36, and similarly, each labelling opening 35 is provided at its vertical edges with raised edge portions 37. The raised edge portions 36 and 37 are intended to serve as temporary label seats in a manner to be described hereinafter.

The two label transfer frames are mounted for sliding movement longitudinally of the conveyor and each is connected by means of a connection rod 38, 38' respectively to levers 39, 39' fulcrumed at 40, 40' and each carrying a roller 41, 41' engaging a cam 42, 42' on respective shafts 43, 43', the latter being the same as the main control shaft hereinbefore described with reference to Figure 4, while the shaft 43 is coupled to the shaft 8 for rotation synchronously therewith by means of bevel gear sets 44, 45 and 46, 47 and a transmission shaft 48. Each lever 39, 39' is biased by means of a spring 49, 49' serving to keep the rollers 41, 41' constantly in engagement with the cams 42, 42'.

By means of the arrangement described, each label transfer frame is displaceable longitudinally of the conveyor between two positions which will in the following be referred to as the first and the second position respectively.

The first position is that in which the final labelling operation is to be performed. In this position the label transfer frame 33 is located with its labelling openings laterally opposite every second out of a batch of bottles in the previously mentioned predetermined positions at the labelling station, while the label transfer frame 33' is located with its labelling openings laterally opposite the remaining ones of the same batch of articles. From this first position the label transfer frame 33 is movable to the right, as viewed in Figure 1, to its second position, while the label transfer frame 33' is movable to the left, as viewed in Figure 1, to its second position. When the label transfer frames are in their second positions an adhesive is first applied to the raised edge portions 36, 37 by means of rollers 50, which are caused to run up and down along said raised edge portions 37, 36. The rollers 50 receive adhesive from adhesive tanks 51, provided at the bottom of the apparatus. The said movement of the rollers 50 is caused by means of a rack 52 provided at its top with a cross bar 53 carrying the rollers 50, said rack engaging with a gear wheel 55 on a shaft 56 also carrying a gear wheel 57 arranged for engagement with a toothed sector 58 on the shaft 43, or 8, during a small fraction of one revolution of the latter. If desired, the shaft 56 may be common to all the sets of adhesive rollers at each side of the apparatus.

While the label transfer frames remain in their

second positions, labels are now applied across the labelling openings from upper label hoppers 59 containing a supply of neck labels and lower label hoppers 60 containing a supply of body labels. For each set of labelling openings 34 and 35 there is provided one upper and one lower label hopper, and these are combined to form a unit movable towards the label transfer frame in question under the control of a cam 61 on the shaft 43, or 8, by means of a double-armed lever 62. The cams 61 are so constructed that all hoppers are simultaneously moved towards the label transfer frames immediately upon completion of the up and down travel of the rollers 50, and then back again, whereby a label is applied across each of the labelling openings 34 and 35, the labels being seated in this position on the raised edge portions 36 and 37 by means of the adhesive previously applied thereto.

When labels have thus been applied across the labelling openings 34, 35, the label transfer frames are returned to their respective first positions by the engagement of the rollers 41, 41' with the cams 42, 42', and the preliminary conditioning operation is over. The various cams are so constructed that this preliminary conditioning operation is completed in somewhat more than one half of the revolution of the main control shaft 8.

4. Labelling means

The labelling means comprise for each of the bottles to be simultaneously labelled an upper ram 64 and a lower ram 65 both mounted for sliding movement in a horizontal direction, transversely of the conveyor and operable to perform a movement in a direction towards the bottles and back again under the control of a cam 66 on the shaft 43 at one side of the apparatus or shaft 8 at the other side of the apparatus, by means of a double-armed lever 67 and a connection rod 68. The rams 64 and 65 are located directly in front of the labelling openings 34 and 35 in the first positions of the label transfer frames 33, 33', and the cams 66 are so constructed that the described movement of the rams are performed during the part of the revolution of the main control shaft 8 where the label transfer frames 33 and 33' are in their respective first positions. By the described movement of the rams, the labels are transferred in known manner from across the labelling openings 34 and 35 to the surfaces of the bottles located directly behind the labelling openings. In this manner three out of the pre-supposed batch of six bottles are labelled from one side of the apparatus, while the remaining three bottles are labelled from the other side of the apparatus, the bottles being thus alternately labelled from one side and the other.

The lower rams 65 may be constructed in known manner so that the body labels are finally applied to the bodies of the bottles by the described horizontal movement of the rams. The same might be the case with the upper rams 64, but it has been found convenient to construct the apparatus with special label sweeping elements for sweeping the neck labels snugly around a relatively large part of the bottle necks. Of course a similar arrangement might also be adopted for the body labels, and likewise it is to be understood that in the case of articles other than bottles the labelling means may be suitably rearranged to suit the needs in each particular case.

The label sweeping elements used in the particular form of the apparatus shown will now be described in further detail.

5. The label sweeping elements

For each labelling position there is provided a label sweeping element serving to sweep the neck label snugly around a relatively large part of the circumference of the neck of the bottle considered. All the label sweeping elements are mounted for rotation about a horizontal axis 69 extending longitudinally of the apparatus and located vertically above the batch of bottles to be simultaneously labelled.

Each label sweeping element comprises two legs 70 extending substantially perpendicular to the said common axis 69 and located in positions such that upon rotation of the label sweeping element in question about the said common axis 69, the lower ends of the legs 70 will engage the neck of a bottle in labelling position and run across opposite surface portions of the bottle neck to sweep the neck label snugly around the latter, after the label has been provisionally applied to the neck and pressed against the latter along a middle zone by the action of the upper ram 64 effective in the label position in question.

At their lower ends serving to perform the described sweeping operation the legs 70 are provided with freely rotatable sleeves 71. The legs 70 are connected with one another by means of a biasing spring 72, and moreover the legs are engaged on their outer sides by leaf springs 73. In this manner, when the label sweeping element is arranged to follow immediately after the ram 64, the roller 71 will engage the label immediately adjacent the ram 64 on both sides thereof, while the label is still kept pressed against the bottle neck by the ram 64, and upon further rotation of the label sweeping element the rollers 71 will exert on the label a pressure travelling gradually from the middle zone of the label, where the latter is acted upon by the ram 64, in both directions along the surface of the bottle neck whereby the label is rolled or swept snugly around the bottle neck. Owing to the biasing of the legs 70 towards one another the rollers 71 will be kept pressed against the bottle neck over a very large portion of the circumference of the latter so that in this manner labels may be securely fitted around a large portion of this circumference.

To perform its sweeping operation, each sweeping element may perform a rotation from a position 74, 74', as indicated in dotted lines in Figure 2, where the sweeping element is located behind the ram 64 with which it cooperates, to a position 75, 75', beyond the vertical longitudinal middle plane of the apparatus, the position 75 being likewise indicated in dotted line in Figure 2. Seeing now that the rams are operated alternately from one and the other side of the apparatus, also the sweeping elements must be so arranged that in the sweeping operation every second sweeping element rotates from one side of the apparatus to the other while the remaining sweeping elements rotate in the reverse direction. The sweeping operations might conceivably be performed by continued rotation of the sweeping elements in opposite directions, but it has been found more convenient to arrange for the sweeping elements to perform an oscillating movement about the axis 69. Moreover, it has been found convenient, though not necessary, to make such arrangements that the sweeping elements do not have to perform an idle return movement but are effective during both of their rotary strokes, whereby obviously the necessary amount of

movement of the sweeping elements is very considerably reduced.

The means for moving the sweeping elements in this manner and for co-ordinating their movements with the movements of the other parts of the apparatus will now be described in further detail.

As will be seen from the drawing, every second of the sweeping elements comprises a hub 76 rigidly secured to a shaft 77 extending longitudinally of the apparatus and having its axis coincident with the common axis of the rotation 69 referred to above. The remaining label sweeping elements are similarly provided with hubs 78, but the latter are mounted for free rotation on the shaft 77 and are constructed as gear wheels respectively meshing with gear wheels 79 on a shaft 80 extending parallel to and vertically above the shaft 77. At one end of the shafts 77 and 80 there are provided gear wheels 81 and 82 respectively, both meshing with a gear wheel 83 on a shaft 84. The shafts 77, 80 and 84 are mounted in a carriage 85 slidable in the longitudinal direction of the apparatus. Slidably, but non-rotatably mounted on the shaft 84 is a sleeve 86 provided with an extending arm 87, 88, which consists of two parts 87 and 88 rigidly but adjustably secured to one another by means of a bolt 89 passed through holes of the parts 87 and 88, at least one of which holes is elongated. The part 88 of the arm 87, 88 carries a roller 90 engaging with a cam 91 on a shaft 92 which is coupled to the main control shaft 8 (or the shaft 43) by transmission means such as a chain drive 93 so as to rotate synchronously with the main control shaft, but at half of the speed of the latter. The shaft 92 further carries a cam 94 engaged by a roller 95 on an arm 96 pivoted at 97 and carrying at its free end a roller 98 engaged between transverse guides 99 mounted on the carriage 85.

The operation is as follows: During one half revolution of the shaft 92, corresponding to a full revolution of the main control shaft 8, the carriage 85 is in the position shown in the drawing, and the cam 91 is so constructed that at the appropriate time a rotary motion is imparted to the shaft 84 by the cooperation of the roller 90 and the cam 91. By the engagement of the gear wheels 81 and 82 with the gear wheel 83, the shafts 77 and 80 are now simultaneously rotated through a suitable angle. The sweeping elements rigidly secured to the shaft 77 are thereby rotated in the same direction as the latter to perform their sweeping operation, while the label sweeping elements loosely mounted on the shaft 77 are similarly caused by their engagement with the gear wheels 79 on the shaft 80 to perform a rotary movement through the same angle in the opposite direction.

The cam 91 may suitably be so constructed that the sweeping elements are thereby caused to perform a first movement from the position 74 to the position 75, or inversely, starting from the other side from a starting position 74' symmetrical to the position 74 to a position 75' symmetrical to the position 75, and then to remain stationary for some time. Of course, since a sweeping element which has thus arrived at the position 75 is supposed in the next sweeping operation to start from the position 74', it must sooner or later proceed to the last named position, and it might, if desired, do that at once, if the label transfer frames are constructed to admit such further movement of the label sweeping elements at this time, but the label transfer

frames would then have to await the completion of this final phase of the movement of the label sweeping elements before starting their travel to their second positions, and it is therefore preferred to defer the final phase of the movement of the label sweeping elements from the position 75, 75' to the position 74', 74 until a time where the label transfer frames have to be stationary for other reasons and there is ample time for completing the movement of the label sweeping elements. The cam 91 is therefore constructed, in the embodiment shown, to keep the label sweeping elements stationary in the position 75, 75' until the label transfer frames have been moved to their second positions. At this time, there will be a labelling opening 34 directly in front of each of the label sweeping elements, and the label sweeping elements may, therefore, now proceed through these labelling openings, the cam 91 being so constructed that the label sweeping elements have passed well outside said openings before the arrival of the adhesive rollers 50 onto the raised edge portions 36 of the labelling openings 34.

At this time, the shaft 92 has made approximately one half revolution. On continued rotation of this shaft, the carriage 85 is longitudinally displaced through a distance corresponding to the spacing of the articles in the labelling positions by the engagement of the roller 90 with the cam 94, and each of the label sweeping elements is thereafter ready to perform a label sweeping operation from the opposite side of the apparatus in a labelling position where also the other parts of the labelling means are effective from that side of the apparatus. This reversed label sweeping operation takes place during the other half of the revolution of the shaft 92 in a manner exactly similar to that described.

It will be understood that in order to make the label sweeping elements effective during both of their rotary strokes as described, the label sweeping elements must be provided in a number one higher than the number of bottles to be labelled, e. g. in the example shown, there must be provided seven label sweeping elements, and of these each of the two outermost label sweeping elements will be idle during its movement in one direction.

The adjustable connection between the parts 87 and 88 of the arm 87, 88 permits an adjustment to be made both of the amplitude and of the phase of the movement of the label sweeping elements.

Cooperation of the different parts of the apparatus

The cooperation of the different parts of the machine will easily be understood from the analysis of the individual parts given above, but will for the sake of clarity be briefly summarized in the following, starting from the point of the operating cycle, where the rams 64 and 65 have been moved forth and back to apply the labels to the bottles, and the label sweeping elements have performed the first phase of their movement from the positions 74, 74' to the positions 75, 75'.

1. The cam 29 closes the switch 28.
2. The cams 11 and 12 release the star wheels 2 and 3, so that the latter become effective to check in and out the predetermined number of the bottles supplied by the continuously moving conveyor 1. At the same time, the switch 27 is

opened but the main control shaft 8 continues to rotate because the switch 28 remains closed.

3. The label transfer frames 33 and 33' are displaced from their first to their second positions.

4. The label sweeping elements are moved from the positions 75, 75' to the positions 74', 74, and the adhesive rollers 50 are moved up and down along the raised edge portions 36, 37 of the labelling openings 34, 35.

5. The label hoppers 59 and 60 are moved forth and back to apply labels across the label openings 34 and 35.

6. The label transfer frames 33, 33' are returned to their first positions, and the carriage 85 is displaced through a distance equal to the spacing of the articles in the labelling positions, though of course this movement of the carriage 85 might have been initiated at a somewhat earlier time, if desired.

7. The cam 29 opens the switch 28.

8. The main control shaft 8 is thereby stopped unless the star wheels 2 and 3 have already checked in and out the prescribed number of bottles. If that is not the case, the main control shaft remains stationary until the prescribed number of bottles have been checked in and out, and is then started again by closure of the switch 27.

9. On continued rotation of the main control shaft 1, the rams 64 and 65 are moved back and forth to apply the labels from across the labelling openings to the surfaces of the bottles, and the label sweeping elements are moved from the positions 74, 74' to the positions 75, 75'.

10. The same cycle is repeated with the only difference that the movement of the label sweeping elements and of the carriage 85 are in the reverse directions.

Reference will now be had to the apparatus illustrated in Figures 6 to 8. As far as the co-ordination of the supply of bottles and the operation of the various mechanisms at the surface treatment station is concerned, this apparatus is substantially identical with that of Figures 1 to 5, and the checking and interlocking system of Figure 4 might be used with the apparatus of Figures 6 to 8 without modification. Since, however, a slightly modified form of that system is diagrammatically indicated in Figure 9, reference will be had to that figure in explaining the construction and operation of the apparatus of Figures 6 to 8.

In Figures 6 to 9, 101 is a continuously moving belt conveyor on which the article 102 to be labelled, such as bottles, cans, and the like, are moved forward, 103a and 103b are two vertical spindles, each carrying a star wheel 104 and 105 respectively, a locking disc 106, and a disc 107 with a ratchet device to be mentioned hereinafter. Ratchet arms 108 are held pressed against the locking discs 106 by means of springs 109. Each of the arms 108 actuates an electric contact 110. An electric motor 111, by means of a worm gear 112 and a magnetic coupling 113, drives two horizontal shafts 114 and 115 in synchronism with one another. Instead of a single shaft 114 as illustrated in Figure 7, such shaft corresponding to the main control shaft 8 of Figures 1 to 5, there may be provided two shafts 114a and 114b coupled to one another for synchronous rotation as illustrated in Figure 6. For all practical purposes the two shafts 114a and 114b of Figure 6 may be regarded as forming different parts of a single shaft, and in the follow-

ing description, reference will therefore be made to one shaft 114 only as corresponding to the diagrammatic illustration of Figure 7.

This shaft 114 carries two cams 116 and 117 which by means of levers 118, Figure 9, can actuate the contacts 110 and are constructed and adjusted relative to the shaft 114 in such a manner that the contact 110 will always be in closed position with the exception of a short interval covering the time from immediately before to immediately after the time at which the final step of applying the labels is effected. The contacts 110 are interposed in series in an operating circuit of the magnetic coupling 113, and both contacts 110 must be closed in order to permit the transmission of drive to the shafts 114 and 115.

It will be remembered that operation of the contacts 110 may be caused not only by the levers 118 controlled from the cams 116 and 117 on the shaft 114, but also from the levers 108.

The shaft 114 also carries two other cams 120 and 121 which operate two levers 122 which in turn actuate the ratchet arms 108 and are so constructed that the ratchet arms 108 are raised from their locking position very shortly after completion of the label applying step.

Moreover, the shaft 114 carries cams 123a, 123b which by means of levers 124, Fig. 3, and ratchet teeth of the discs 107 turn the spindles 103a, 103b through a small angle so that the ratchet arms 108 cannot fall back into the locking position.

The shaft 114 and the shaft 115 carry cams 125 and 126 which in a suitable position produce a horizontal reciprocating movement of rams 127 and 128 serving to apply the labels to the bottles, and also cams 129, 130 serving to produce a corresponding movement of label magazines 131, 132. Finally, the shaft 114 carries a cam 133 serving to move a label transfer frame 134 up and down. In this embodiment, the label transfer frame or label holder is constructed as a U-shaped member provided at both sides of the path of the articles with label seats 135, 136 which by the vertical movement of the label holder 134 are first covered with adhesive by means of adhesive rollers 137, 138 and are then moved up to the level of the label magazines 131, 132 to receive labels by the forward movement of the latter, whereafter the label transfer frame stops for a moment with the label seats directly in front of the rams 127, 128, which then apply the labels to the bottles.

The operation is as follows:

The belt 101 moves continuously and carries the articles forward so that the latter constantly press against the star wheels 104, 105. After the rams 127, 128 have applied the labels, the lever 122 raises the ratchet arms 108 and then the levers 24 are actuated by the cams 23a and 23b to turn the toothed discs 107 and thereby the spindles 103a, 103b of the star wheels 104, 105 through a small angle such that the ratchet arms 108 cannot move into locking position on the discs 106. The star wheels 104, 105 are now free to rotate and are caused by the bottles to perform one full revolution whereby six bottles are checked in and out by the star wheel 104 and the star wheel 105 respectively. Upon completion of this checking in and checking out movement of the star wheels the latter are again stopped by the ratchet arms 108.

While the star wheels are rotating as described, the ratchet arms 108 cannot hold the contact 110 in closed position, but this is done

by the arms 118, so that the magnetic coupling 113 is engaged and drive is therefore transmitted to the shafts 114, 115. The label holder 134 controlled by the cam 133 will consequently first move down by its own weight so that the label seats 135, 136 reach the level of the adhesive rollers 137, 138 which apply adhesive to the seats 135, 136. The frame 134 then moves up until the seats 135, 136 are aligned with the label magazines 131, 132 and momentarily stops in that position whereupon a label is applied to each label seat by horizontal movement of the label magazines. The holder 134 now moves down so that the seats 135, 136 are aligned with the rams 127, 128 and are stopped in this position, and at the same time the levers 118 are lowered so that they can no longer hold the contacts 119 closed. Consequently, if at this time the star wheels have not performed a full revolution to permit the ratchet arms 108 to move back to the position shown in Figure 9, the coupling 113 will be disengaged and the shafts 114 and 115 will stop rotating. However, as soon as the star wheels have performed a full revolution and have thereby checked in and out the prescribed number of articles, the ratchet arms 108 will close the contacts 119 to re-start the shaft 114.

During continued rotation of the shaft 114 the rams 127 and 128 transfer the labels from the label seats 135, 136 to the articles and the operating cycle of the whole machine is thereby completed.

It will be noted that as far as the star wheel arrangement is concerned, the alternative operation of the contacts 119 from the star wheels and from the shaft 114 is the exact equivalent of alternative operation of the two parallel connected contacts 27, 28 from the star wheel 4 and the main control shaft 3 in Figure 4, and likewise the lever 124 of Figure 9 is the exact equivalent of the spring biased roller 131 of Figure 4.

Figure 10 illustrates a modified form of the surface treatment station in which the walls between which the bottles are accumulated are spaced apart at a distance greater than the diameter of the bottles so that the latter, when pressed together owing to the continuous movement of the conveyor, will assume a zig-zag configuration whereby the total length of the labelling station is reduced and each bottle will present a larger free surface to the labelling means.

It will thus be seen that there has been provided, according to the invention, a novel apparatus adapted to carry out the labelling of bottles or other articles at a very high speed and with a very high efficiency as compared with existing apparatus for the same purpose, and it has been found possible according to the invention to construct an apparatus of a certain capacity with so small overall dimensions that it takes up only about one half, or even less than one half of the space occupied by an apparatus of known type for the same capacity.

Some of the factors accounting for these advantages can be briefly summarized as follows:

Since the bottles are kept pressed against one another during the labelling operation, the mechanism necessary for the labelling operation has obviously been compacted to the minimum possible extension in the direction of travel of the bottles. Nevertheless, there has been reserved ample space for the various parts of the mechanism by the fact that every second bottle is labelled from one side and the remaining bottles from the other side of the apparatus.

There are no parts of the machine running idle in the case of absence of bottles to be labelled because the apparatus remains stationary awaiting a complete filling with bottles.

On the other hand, the apparatus makes all the necessary preparations for the labelling operation while the bottles are being checked in and out, so that it is immediately ready to perform the labelling operation as soon as the apparatus has been filled with bottles. Thus, if the bottles are continuously supplied, they do not have to wait in the labelling apparatus but are disposed of practically instantaneously.

There are a minimum of movable parts in the apparatus because many of the movable parts are common to a plurality of labelling positions.

The various mechanisms have been carefully so selected that the movements of the parts are so small as possible, thus permitting the operating cycle to be carried out in the shortest possible time. From this point of view it has been found that the horizontal movable label transfer frames of Figures 1 to 5 advantageous over the vertically movable label holder of Figures 6 to 8 because the latter requires a total amount of movement considerably in excess of that necessary when using the horizontally slidable label transfer frames according to Figures 1 to 5.

The apparatus of Figures 1 to 5 is capable of applying labels to the bottles or articles in two or more positions vertically above one another, which would at least be considerably more difficult when using vertically movable label transfer frames as in Figures 6 to 8.

The additional application of the upper labels, such as neck labels, and the careful sweeping of the latter around the articles do not in any way slow down the operation of the apparatus of Figures 1 to 5, because these operations are carried out at times where other necessary operations are going on.

Still further advantages of the invention will be easily apparent to those skilled in the art.

I claim:

1. Apparatus for effecting local surface treatment of articles comprising a surface treatment station, a continuously moving conveyor traversing said station and upon which articles to be treated are conveyed through and past said station, said station including spaced walls respectively on opposite sides of the conveyor, surface treating means at said station including means operable to preliminarily condition said surface treating means, means adjacent the work station and independent of said conveyor and engageable by the articles carried thereon and operable to stop movement of a predetermined number of articles relative to the conveyor so that the predetermined number of articles remain stationary at the work station while the conveyor continues to move, said surface treatment means being operable upon the predetermined number of articles simultaneously, means for actuating said surface treating means, means for actuating said preliminarily conditioning means, drive means for both said actuating means, control means for the drive means for both said actuating means including means responsive to the means engageable by the articles controlling the drive of said actuating means so that the preliminarily conditioning means are operable while the articles are moving and the surface treatment means are actuated when the predetermined number of articles is stationary at the work station.

2. Apparatus as defined in and by claim 1 in

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which the conveyor is wider than the diameter of the articles, longitudinally extending guide means disposed at the work station adjacent opposite edges of the conveyor, said articles stopping between the said guide means, said guide means being spaced apart a distance in excess of the diameter of the articles to be treated an amount sufficient to accommodate a predetermined number of articles in zig-zag formation so that the distance encompassed by the sum of the diameter of the articles stopped adjacent the guide means is greater than the longitudinal extent of said means.

3. An apparatus as defined in and by claim 1 in which the means independent of said conveyor and engageable by the articles comprise star wheels respectively disposed adjacent the feed and discharge end of said surface treatment station, a locking disc movable with each star wheel, the star wheels being engageable with the articles moving on the conveyor, said control means including means cooperable with said locking disc to stop the same and thereby the star wheels whereby a predetermined number of articles are stopped between the star wheels, means responsive to the rotation of the star wheels for preventing operation of the means for actuating said surface treatment means until the predetermined number of articles have passed the wheel adjacent the feed end of the station, and thereafter permitting, such operation so that said surface treatment means are actuated during the interval at which the predetermined number of articles are stationary on the conveyor between the star wheels and further feeding of additional articles is prevented by the star wheel adjacent the feed end of the conveyor being stationary, and said preliminary conditioning means being operable when the said additional articles are being fed into the station.

4. An apparatus as defined in and by claim 3 in which the means cooperable with each locking disc for stopping the same comprise a ratchet arm and spring means normally urging the arm in contact with the disc, said locking disc having a locking surface engageable by said ratchet arm to prevent rotation of the wheel.

5. An apparatus for effecting local surface treatment of articles comprising a local surface treatment station, a continuously moving conveyor traversing said station and upon which articles to be treated are conveyed through and past the station, said station including spaced walls disposed respectively on opposite sides of the conveyor and extending longitudinally thereof, surface treating means at said station including means operable to preliminarily condition said surface treating means, star wheels disposed respectively adjacent the feed and discharge ends of said walls, said star wheels being engageable by the articles carried thereon and rotated thereby, a locking disc rotatable with each star wheel, a ratchet arm cooperable with each locking disc, spring means normally holding each ratchet arm pressed against each disc, each disc having a locking surface engageable with said arm after a predetermined arc of travel to effect stoppage of the star wheels, so that the star wheels determine the positioning of a predetermined number of articles between the opposite ends of the said walls and upon cessation of movement of the star wheels said predetermined number of articles are stopped between the walls while the conveyor continues to move

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so that the articles are pressed against one another, means for actuating said surface treating means and means for actuating the preliminary conditioning means, drive means for both said actuating means including an electric motor and a shaft driven thereby, an electrically controlled coupling interposed between the motor and shaft, at least one switch controlling said coupling, said switch in the closed position transmitting drive to the actuating means for said surface treating means, at least one of said ratchet arms controlling said switch and operable upon engagement with the locking surface on the locking disc to close said switch whereby the surface treating means operate during the interval at which the articles are stationary on the conveyor, means controlled by said shaft for removing said ratchet arm from locking engagement upon completion of the operation of said surface treatment means, and also for controlling the means actuating the preliminary conditioning means so that the same are operable during the feeding in movement of a predetermined number articles.

6. An apparatus as defined in and by claim 5 in which the actuating means for the preliminary conditioning means and the surface treatment means comprise levers and cams driven by said shaft and in which additional cam and lever means constitute the means for actuating said ratchet arms.

7. An apparatus for the local surface treatment of articles comprising a surface treatment station, a continuously moving conveyor traversing said station and upon which articles to be surface treated are conveyed through and past said station, means adjacent the surface treatment station and independent of said conveyor and engageable by the articles thereon to perform a checking movement as a result of the forward movement of the articles and controllable to permit checking in of a predetermined number of articles to the surface treatment station and checking out of a corresponding number of articles therefrom and then to stop further passage of the articles through the surface treatment station awaiting a further control so that a number of articles equal to said predetermined number remain stationary at the surface treatment station and are kept pressed closely against one another owing to the continued movement of the conveyor so as to assume predetermined positions in the surface treatment station, surface treatment means at said surface treatment station engageable simultaneously with the surface of a number of articles equal to said predetermined number to effect treatment thereof, drive means for said surface treatment means independent of the supply of articles to said station, and means for so interlocking operation of said checking means and said surface treatment means, that each becomes operable only upon completion of operation of the other.

8. An apparatus as in claim 7 and further comprising preliminary conditioning means to prepare for operation of said surface treatment means, said preliminary conditioning means being drivable independent of the supply of articles to said surface treatment station and being included in said interlocking control in such a manner that said preliminary conditioning means is free to operate while articles are being checked in and out, and said surface treatment means are operable only upon completion both of the operation of said preliminary conditioning means

and of the operation of said article engageable means to check in and out the prescribed number of articles.

9. An apparatus as in claim 7 in which said surface treatment means are operative from opposite sides on alternate articles.

10. Apparatus for the local surface treatment of articles comprising a surface treatment station, a continuously moving conveyor traversing said station and upon which articles to be treated are conveyed through and past said station, supply and discharge checking means adjacent the supply and discharge end respectively of the surface treatment station and independent of said conveyor and engageable by the articles carried thereon to perform a checking movement as a result of the forward movement of such articles, stop means for blocking movement of said checking means upon completion of a checking cycle to check in and out a predetermined number of articles respectively and momentarily disengageable to permit initiation of a new checking cycle, surface treatment means at said station constructed to act simultaneously on a number of articles equal to said predetermined number, preliminary conditioning means to prepare for operation of said surface treatment means, cyclically operable control means for said preliminary conditioning means, said surface treatment means and said stop means, drive means for said control means, said control means having means associated therewith for causing operation of said preliminary conditioning means over a first interval of its cycle, for causing interruption of its own drive at a point of its cycle following said first interval, for causing operation of said surface treatment means over a second interval of its cycle following said point, for momentarily causing disengagement of said stop means at a point of its cycle following said second interval, and for re-establishing its own drive at a point of its cycle between the two points already referred to, and means associated with said supply checking means and operative in the blocked position of such means to establish the drive of said control means bypassing the interruption caused by the control means itself.

11. Apparatus for the local surface treatment of articles comprising a surface treatment station, a continuously moving conveyor traversing said station and upon which articles to be treated are conveyed through and past said station, a first star wheel adjacent the supply end of the surface treatment station, a second star wheel adjacent the discharge end of the surface treatment station, each star wheel being mounted on a vertical spindle rotatably mounted at one side of said conveyor in a position such that said star wheels are engageable by articles carried on the conveyor to be thereby rotated in synchronism with the forward movement of the articles, a locking disc on the spindle of each star wheel, stop means engageable with each locking disc at one point of the circumference thereof to block the respective star wheel against rotation, surface treatment means at said station constructed to act on a plurality of articles simultaneously, preliminary conditioning means to prepare for operation of said surface treatment means, a main control shaft, drive means for said main control shaft, means associated with said main control shaft for causing operation of said preliminary conditioning means over a first angular zone of one full revolution thereof, for causing its own drive to be interrupted at a point of the revolu-

tion following said first angular zone, for causing operation of said surface treatment means over a second angular zone following said point, for momentarily causing disengagement of said stop means from both of said locking discs at a point of the revolution following said second angular zone, and for reestablishing its own drive at a point between the two points already referred to, and means associated with the stop means of said first star wheel and operative in the engaged position of such stop means to establish the drive of said main control shaft by-passing the interruption caused by the main control shaft itself.

12. An apparatus as in claim 11, and further comprising means for rotating said star wheel through a small angle upon disengagement of said stop means from said locking discs.

13. An apparatus for the labelling of articles comprising a labelling station, a continuously moving conveyor traversing said station and upon which articles to be labelled are conveyed through and past said station, means adjacent the labelling station and independent of said conveyor and engageable by the articles carried thereon and controllable to permit checking in of a predetermined number of articles to the labelling station and checking out of a corresponding number of articles therefrom and then to stop further passage of the articles through the labelling station awaiting a further control so that a number of articles equal to said predetermined number remain stationary at the labelling station and are kept pressed closely against one another owing to the continued movement of the conveyor so as to assume predetermined positions in the labelling station, a label transfer frame arranged at said labelling station and extending parallel to and at one side of the path of movement of said conveyor, said label transfer frame being provided with labelling openings at a horizontal spacing corresponding to that of articles in said predetermined positions, preliminary conditioning means for first horizontally moving said label transfer frame parallel to the direction of movement of said conveyor from a first position with said labelling openings laterally opposite articles in said predetermined positions to a second position horizontally spaced from said first position, then applying labels across said labelling openings, and then returning said label transfer frame to said first position, labelling means for transferring the labels thus applied from across said labelling openings to the surfaces of articles to be labelled, drive means for said preliminary conditioning means and said labelling means independent of the supply of articles to said labelling station, and means for so interlocking operation of said article engageable means, said labelling means and said preliminary conditioning means that said article engageable means are controllable to permit checking in and out of the predetermined number of articles, and said preliminary conditioning means are operable only upon completion of the operation of said labelling means, and said labelling means are operable only upon completion both of the operation of said preliminary conditioning means and of the operation of said article engageable means to check in and out the predetermined number of articles.

14. An apparatus for the labelling of articles comprising a labelling station, means for moving a succession of articles along a horizontal path through said labelling station and for temporarily stopping a batch of articles in predeter-

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mined positions at said labelling station, a label transfer frame arranged at said labelling station and extending parallel to and at one side of the path of movement of the articles, said label transfer frame being provided with labelling openings at a horizontal spacing corresponding to that of articles in said predetermined positions, means for horizontally moving said label transfer frame parallel to the direction of movement of the articles between a first position with said labelling openings laterally opposite articles in said predetermined positions, and a second position horizontally spaced from said first position, means for applying labels across said labelling openings, while said label transfer frame is in its said second position, and means for transferring the labels thus applied from across said labelling openings to the surfaces of articles to be labelled while said label transfer frame is in its said first position.

15. An apparatus for the labelling of articles comprising a labelling station, means for moving a succession of articles along a horizontal path through said labelling station and for temporarily stopping a batch of articles in predetermined positions at said labelling station, a label transfer frame arranged at said labelling station and extending parallel to and at one side of the path of movement of the articles, said label transfer frame being provided with labelling openings at a horizontal spacing corresponding to that of articles in said predetermined positions, means for horizontally moving said label transfer frame parallel to the direction of movement of the articles between a first position with said labelling openings laterally opposite articles in said predetermined positions, and a second position horizontally spaced from said first position, vertically movable means for applying adhesive to the edges of said labelling openings, means movable in a horizontal direction perpendicular to the path of movement of the articles for subsequently pressing labels against the thus prepared edges of the labelling openings to cause the labels to be temporarily seated thereacross, said vertically movable means and said horizontally movable means being operable while the label transfer frame is in its said second position, and means movable transversely of the path of movement of the articles for transferring the labels from across said labelling openings to the surfaces of articles to be labelled while said labelling frame is in its said first position.

16. An apparatus as in claim 15 in which said labelling openings are constructed with vertically extending raised edge portions to receive the adhesive, and said means for applying adhesive to the edges of the labelling openings comprise adhesive transfer rollers operable to run vertically along said raised edge portions.

17. An apparatus for the labelling of articles comprising a labelling station, means for moving a succession of articles along a horizontal path through said labelling station and for temporarily stopping a batch of articles in predetermined positions at said labelling station, a label transfer frame arranged at said labelling station and extending parallel to and at one side of the path of movement of the articles, said label transfer frame being provided adjacent its top with labelling openings at a horizontal spacing corresponding to that of articles in said predetermined positions, means for horizontally moving said label transfer frame parallel to the direction of movement of the articles between a first position

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with said labelling openings laterally opposite articles in said predetermined positions, and a second position horizontally spaced from said first position, means for applying labels across said labelling openings, while said label transfer frame is in its said second position, means movable in a horizontal direction perpendicular to the direction of movement of the articles for provisionally transferring the labels from across said labelling openings to the articles and for pressing the labels against the articles along a middle zone, and, for each of said labelling openings a label sweeping element mounted for rotation about a horizontal axis parallel to the direction of movement of the articles and located vertically above an article in one of said predetermined positions, each label sweeping element having two legs in positions to sweep opposite surface portions of an article in such predetermined position upon rotation of the label sweeping element, said legs being spring biased in a direction towards one another and being provided with freely rotatable sleeves at the portions of same serving to sweep the article.

18. An apparatus as defined in and by claim 17 in which said label transfer frame is provided with a second row of labelling openings respectively located vertically below said labelling openings adjacent the top of the label transfer frame, the apparatus further comprising means for applying labels across said labelling openings of the second row while said label transfer frame is in its said second position, and means for transferring the labels thus applied from across said labelling openings of the second row to the surfaces of articles to be labelled while said label transfer frame is in its said first position.

19. An apparatus for the labelling of articles comprising a labelling station, a continuously moving conveyor traversing said station and upon which articles to be labelled are conveyed through and past said station, stop means at the discharge end of the labelling station for barring movement of the articles carried by the conveyor, thereby causing the articles to be accumulated in closely packed formation and in predetermined positions at said labelling station gradually as they arrive on the conveyor, checking means for checking in and out a predetermined number of articles to and from the labelling station respectively, a pair of label transfer frames arranged at said labelling station and extending parallel to and at opposite sides of the path of movement of said conveyor, each of said label transfer frames being provided with labelling openings at a horizontal spacing corresponding to that of alternate articles in said predetermined positions, preliminary conditioning means for first synchronously moving both of said label transfer frames in a horizontal direction parallel to the direction of movement of said conveyor from respective first positions in which the labelling openings of one label transfer frame are located laterally opposite every second out of a batch of articles in said predetermined positions, while the labelling openings of the other label transfer frame are located laterally opposite the remaining ones of the same batch of articles, to respective second positions respectively horizontally spaced from said first positions, then applying labels across said labelling openings, and then synchronously returning both of said label transfer frames to their respective first positions, labelling means operative from opposite sides of the path of movement of the conveyor

for transferring the labels thus applied from across said labelling openings to the surfaces of the articles to be labelled, driving means for said preliminary conditioning means and said labelling means independent of the supply of articles to said labelling station, and means for so interlocking operation of said checking means, said labelling means, and said preliminary conditioning means that said checking means are operable to check in and out the predetermined number of articles, and said preliminary conditioning means are operable only upon completion of the operation of said labelling means, and said labelling means are operable only upon completion both of the operation of said preliminary conditioning means and of the operation of said checking means to check in and out the predetermined number of articles.

20. An apparatus for the labelling of articles comprising a labelling station, means for moving a succession of articles along a horizontal path through said labelling station and for temporarily stopping a batch of articles in predetermined positions at said labelling station, a pair of label transfer frames arranged at said labelling station and extending parallel to and at opposite sides of the path of movement of the articles, each of said label transfer frames being provided with labelling openings at a horizontal spacing corresponding to that of alternate articles in said predetermined positions, means for synchronously moving both of said label transfer frames in a horizontal direction parallel to the direction of movement of the articles between respective first positions in which the labelling openings of one label transfer frame are located laterally opposite every second out of a batch of articles in said predetermined positions while the labelling openings of the other label transfer frame are located laterally opposite the remaining ones of the same batch of articles, and respective second positions respectively horizontally spaced from said first positions, means for applying labels across said labelling openings while said label transfer frames are in their respective second positions, and means operative from opposite sides of the path of movement of the articles for transferring the labels thus applied from across said labelling openings to the surfaces of the articles to be labelled while said label transfer frames are in their respective first positions.

21. An apparatus as in claim 20 in which said label transfer frames are movable in opposite directions from their respective first positions to their respective second positions.

22. An apparatus for the labelling of articles comprising a labelling station, means for moving a succession of articles along a horizontal path through said labelling station and for temporarily stopping a batch of articles in predetermined positions at said labelling station, a pair of label transfer frames arranged at said labelling station and extending parallel to and at opposite sides of the path of movement of the articles, each of said label transfer frames being provided adjacent its top with labelling openings at a horizontal spacing corresponding to that of alternate articles in said predetermined positions, means for synchronously moving both of said label transfer frames in a horizontal direction parallel to the direction of movement of the articles between respective first positions in which the labelling openings of one label transfer frame are located laterally opposite every second out of a

batch of articles in said predetermined positions while the labelling openings of the other label transfer frame are located laterally opposite the remaining ones of the same batch of articles, and respective second positions respectively horizontally spaced from said first positions, means for applying labels across said labelling openings while said label transfer frames are in their respective second positions, and means operative from opposite sides of the path of movement of the articles for transferring the labels thus applied from across said labelling openings to the surfaces of the articles to be labelled while said label transfer frames are in their respective first positions, said last named means including a series of label sweeping elements spaced along and rotatable about a common horizontal axis extending longitudinally of the path of movement of the articles and located vertically above a batch of articles in said predetermined positions, said label sweeping elements being arranged at a spacing along said horizontal axis equal to that of successive articles in said predetermined positions, each of said elements having two legs spring biased towards one another and carrying freely rotatable sleeves in positions to sweep opposite surface portions of an article upon rotation of the respective element, the apparatus further comprising means for simultaneously rotating every second of said label sweeping elements in one direction and the remaining label sweeping elements in the opposite direction to perform a label sweeping operation.

23. An apparatus as in claim 22 in which said label sweeping elements are provided in a number one higher than the number of articles to be simultaneously labelled and are combined to form a unit displaceable longitudinally of the path of movement of the articles, the apparatus comprising means for thus displacing said unit alternately one way and the other through a distance equal to the spacing of articles in said predetermined positions in the intervals between successive sweeping operations.

24. An apparatus as in claim 22 in which each of said label transfer frames is provided with a second row of labelling openings respectively located vertically below said labelling openings adjacent the top of the label transfer frames, the apparatus further comprising means for applying labels across said labelling openings of the second rows while said label transfer frames are in their respective second positions, and means for transferring the labels thus applied from across said labelling openings of the second rows to the surfaces of articles to be labelled, while said label transfer frames are in their respective first positions.

25. A machine for labelling articles comprising in combination a continuously moving conveyor movable in a predetermined path and upon which articles to be labelled are transported, a labelling station traversed by said conveyor including a vertically reciprocable label holder having spaced side walls respectively adjacent opposite edges of the conveyor and between which the articles pass, star wheels each respectively disposed adjacent the feed and discharge ends of said label holder, the teeth on said wheels projecting into the path of movement of the articles and engageable thereby so that the wheels are rotated as the articles pass, said star wheels determining the number of articles positionable between the opposite ends of said label holder, said label holder having notches in the upper mar-

ginal edges thereof alignable with articles positioned on the conveyor between the opposite ends of the label holder, means for stopping the star wheels from rotation whereby a predetermined number of articles are pressed into contact with one another by the continued movement of the conveyor and stopped in the positions alignable with the notches, said walls having means thereon adapted to receive adhesive adjacent the marginal edges of the notches, adhesive applying means contactable by said last mentioned means in the reciprocatory movement of the label holder, a label magazine disposed in vertical alignment with the path of movement of each of the notches and reciprocatory in a path transverse to the movement of the label holder, label applying rams reciprocatory in a path of movement transverse with respect to the path of movement of the label holder and across the path of movement of the notches, actuating means for reciprocating the label holder, the label magazines and the rams, and control means responsive to the movement of the star wheels including cams controlling all said actuating means whereby the label holder moves past the adhesive applying means to receive adhesive, then past the label magazines while the latter are moving toward the label holder in timed relation to impress labels on the adhesive on the label holder while the articles are moving between the walls of the label holder, and upon cessation of the rotation of the star wheel and stoppage of the articles said label holder being in position with the notches transversely aligned with the respective articles, said rams move towards the notches and displace the labels with the adhesive thereon from the label holder onto the articles.

26. An apparatus as defined in and by claim 25 and including a drive shaft rotating all said cams, an electric motor operating said shaft, an electrically controlled coupling interposed between said motor and shaft, switch means con-

trolling said coupling, the means for stopping rotation of the star wheels comprising locking discs, each having a locking surface thereon, ratchet arms spring pressed against the discs and engageable by the locking surface, said ratchet arms in locking position actuating said switch means to complete the drive to the shaft for driving said cams, a cam rotated by said shaft for momentarily disengaging said ratchet arms, and additional means including a cam rotated by said drive shaft for actuating said switch to close the same and complete the drive during the whole of the revolution of said drive shaft with the exception of an interval beginning shortly before operation of said rams and ending before disengagement of said ratchet arms.

27. An apparatus as defined in and by claim 25 wherein the walls of said label holder are spaced apart a distance in excess of the diameter of the articles to be treated an amount sufficient to accommodate articles in zig-zag formation between the respective ends of the label holder and wherein the notches and label magazines and label applying means are disposed in alternate relation on opposite sides of the label holder so that the labels are applied on alternate articles on opposite sides of the label holder.

KARL JOHAN GLANS.

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