

Dec. 8, 1970

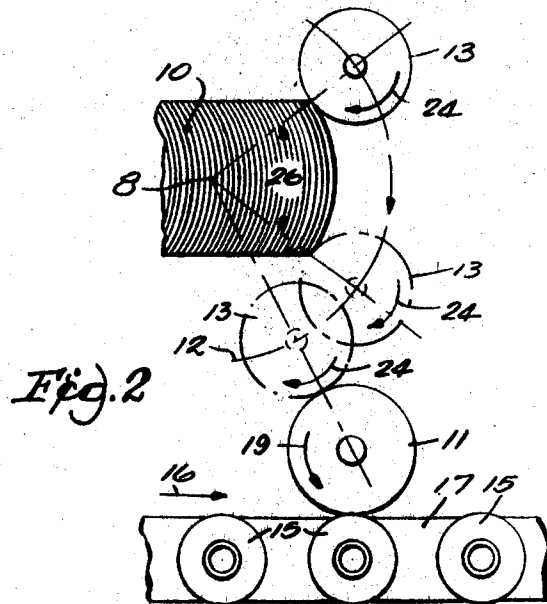
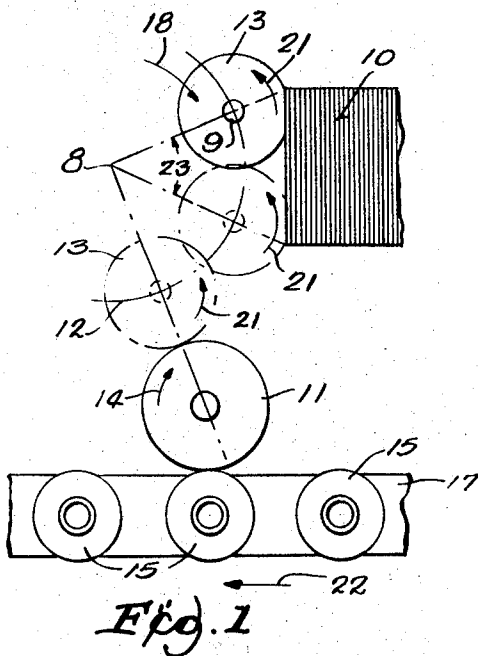
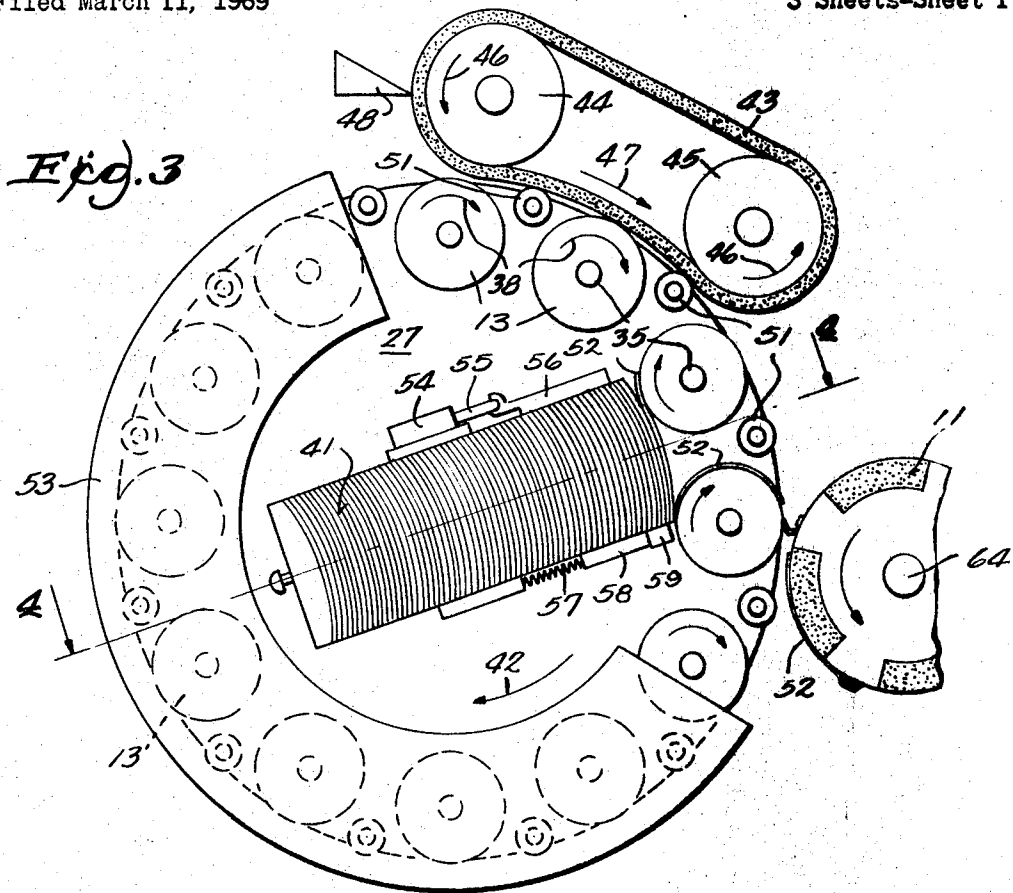
K. DULLINGER ET AL

3,546,048

LABELING AND TRANSFERRING DEVICE

Filed March 11, 1969

3 Sheets-Sheet 1



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Fig. 4

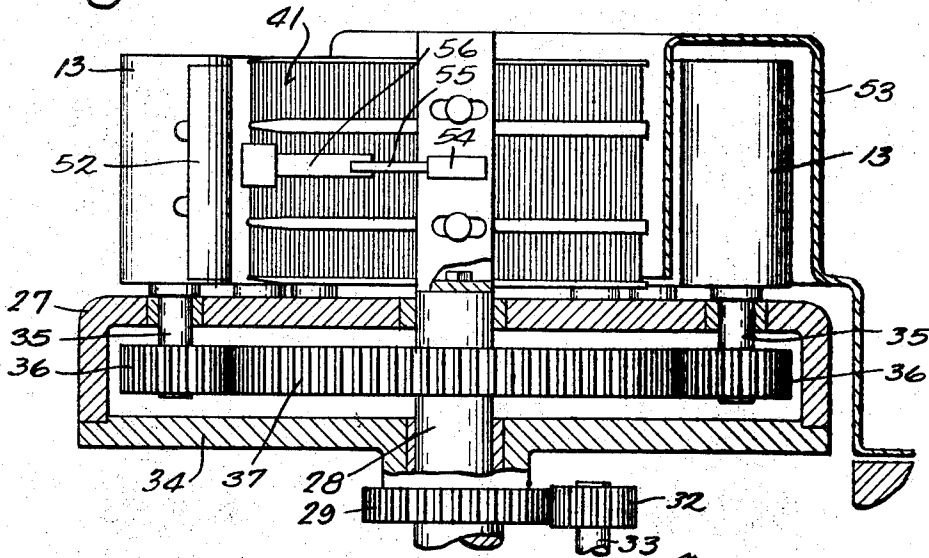
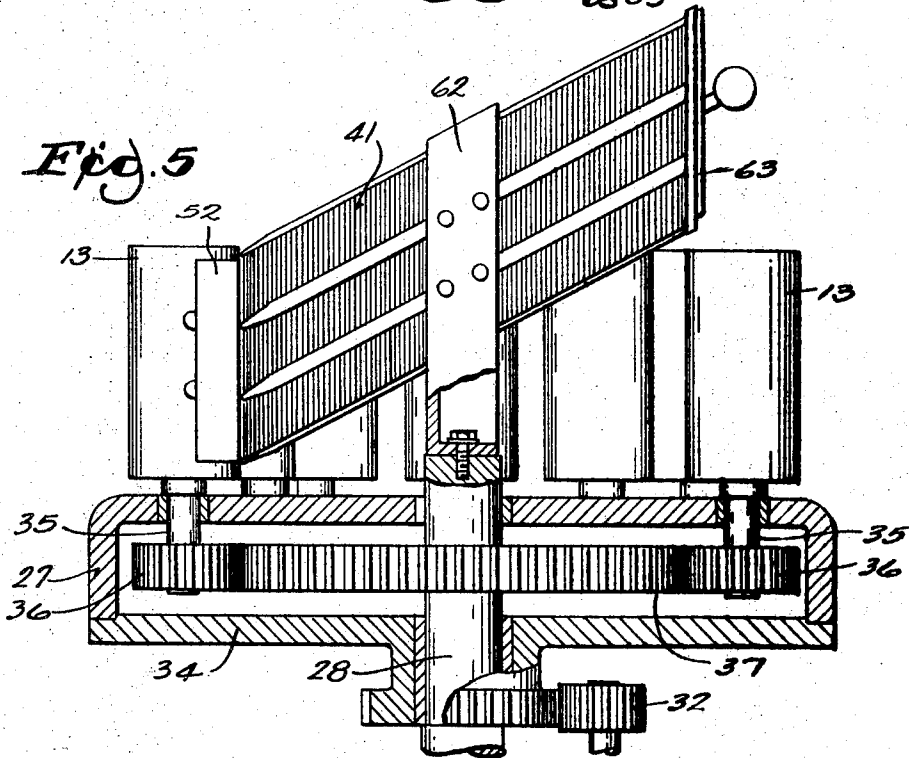


Fig. 5



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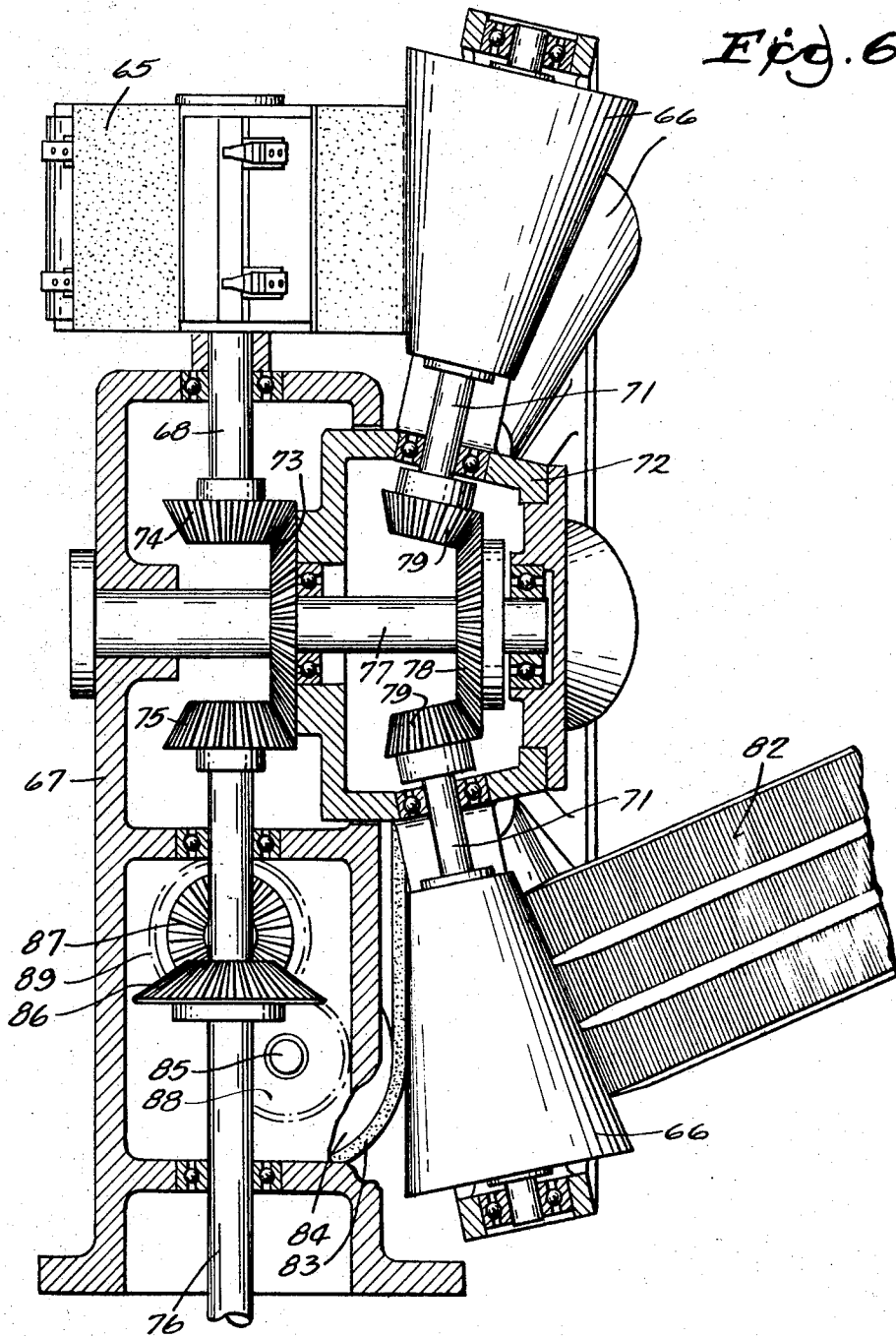
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LABELING AND TRANSFERRING DEVICE

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3 Sheets-Sheet 3



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3,546,048

LABELING AND TRANSFERRING DEVICE
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Filed Mar. 11, 1969, Ser. No. 806,083
Claims priority, application Germany, Mar. 21, 1968, 1,761,014

Int. Cl. B65c 9/08, 9/20

U.S. Cl. 156—571

11 Claims

ABSTRACT OF THE DISCLOSURE

This disclosure relates to an automatic labeling machine having a label magazine, a rotary labeling cylinder for applying labels to containers, and a label transfer mechanism for transferring labels from the magazine to the rotary labeling cylinder. The transfer mechanism comprises a series of rotary label transfer shoes or rollers and a rotating shoe carrier on which the shoes orbit past the magazine and the labeling cylinder to sequentially roll over the foremost label in the magazine to pick said foremost label out of the magazine and roll past the rotary labeling cylinder in the course of transferring the label thereto. The labeling cylinder and magazine are disposed on opposite sides of the orbit whereby the shoes rotate about their axes in the same direction when passing the magazine and the labeling cylinder.

BACKGROUND OF THE INVENTION

Other automatic labeling machines over which the present invention improves have the label magazine on the same side of the rotating shoe carrier orbit as the rotary labeling cylinder. The magazine generally has no movement in the direction of shoe carrier rotary movement. The labeling cylinder rotates, in some instances, in the same rotary direction as the shoe carrier and in other instances, counter thereto. To match the surface speed of the shoe with both the stationary magazine and the rotating labeling cylinder, these other machines typically provide mechanism for changing the speed of rotation of the rotating shoe rollers in the orbit space between the label magazine and the rotary labeling cylinder. Where the labeling cylinder rotates counter to the rotation of the shoe carrier, it is further necessary to reverse the rotation of the shoe rollers between the label magazine and the labeling cylinder. In such other machines, considerable auxiliary equipment is necessary to effectuate these variations in speed and/or direction of rotation of the shoes. Moreover, these variations are attended by considerable noise and irregular jarring operation of the label transfer mechanism. The mass and momentum of the shoes resist such variations. The problem is magnified inasmuch as there are a plurality of transfer shoes, the speed of rotation of which must be repeatedly accelerated and decelerated in the course of their orbiting movement past the magazine and the label applying cylinder. The foregoing circumstances necessarily limit the speed of operation of such other machines.

However, modern day labeling machines are called upon to operate at the highest possible speed for economic reasons. The problems aforesaid are intensified as machine speeds are increased to meet industrial demands.

SUMMARY OF THE INVENTION

In accordance with the present invention, the position of the magazine with respect to the orbit of the carrier on which the transfer shoes are mounted is reversed as compared to the prior art machines. This places the magazine on the opposite side of the orbit from the label ap-

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plying cylinder. In a machine in which the labeling cylinder rotates counter to the rotation of the shoe carrier, this repositioning of the magazine makes it possible to match the surface speed of the shoe to the magazine and the labeling cylinder without need for any variation whatever in the speed of shoe rotation. This improvement eliminates all of the mechanism heretofore necessary for varying the speed and/or direction of shoe rotation, and substantially eliminates the jarring and noise which characterize operation of other machines, and facilitates attainment of high speed operation.

Moreover, by placing the magazine on the inside of the circle orbit of the transfer shoes, the extraction rate of the labels from the magazine is reduced, thus further reducing label transfer problems as between the label magazine and the shoes.

Other objects, features, and advantages of the invention will appear from the following disclosure.

DESCRIPTION OF DRAWINGS

FIG. 1 is a diagrammatic view illustrating one form of machine over which the present invention is an improvement.

FIG. 2 is a diagrammatic view illustrating the invention.

FIG. 3 is a plan view, somewhat diagrammatic, of labeling apparatus embodying the present invention.

FIG. 4 is a cross section taken along the line 4—4 of FIG. 3.

FIG. 5 is a view similar to FIG. 4, but showing a modified embodiment in which the label magazine is disposed at an incline.

FIG. 6 is a cross section taken through a modified embodiment.

DESCRIPTION OF PREFERRED EMBODIMENTS

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. The scope of the invention is defined in the claims appended hereto.

FIG. 1 illustrates another form of labeling machine in which the label magazine 10 and label applying cylinder 11 are disposed on the same side of the circular orbit 12 of the rotary label transfer shoes or rollers 13. The label magazine 10 is relatively stationary and the label applying cylinder 11 rotates at relatively high speed clockwise in the direction of arrow 14. Cylinder 11 applies labels to containers 15 moving in the direction of arrow 22 on conveyor 17.

The shoes or rollers 13 are mounted for rotation about their own axes 9 on a rotating shoe carrier such as carrier 27 shown in FIGS. 3, 4, and 5. The carrier rotates clockwise about its axis 8, in the direction of arrow 18 to move the shoes 13 on their orbit 12.

In order to match the surface speed of the shoes 13 to the labels in magazine 10, the shoes 13 are rotated counterclockwise in the direction of arrows 21 as they pass the magazine 10. Thus the shoes 13 roll across the front of the magazine with no relative orbital movement between the contacting surface of the shoe 13 and the label. The shoes 13 may be provided with suction nozzles to pick the foremost label out of the magazine, or the shoe surface may be treated with glue or the like for this purpose, as indicated in FIG. 3.

Inasmuch as conveyor 17 is moving at relatively high speed in the direction of arrow 22, label applying cylinder 11 must rotate at correspondingly high speed clockwise in the direction of arrow 14, thus to smoothly transfer labels to the containers 15. Accordingly, it is necessary to accelerate the speed of rotation of shoes 13 in the di-

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rection of arrow 21 between their position where they leave the magazine 10 and their position when they transfer the label to the label applying cylinder 11. Accordingly, mechanism not illustrated in FIG. 1 is required to accelerate the shoes to bring their surface speed to match with the surface speed of the labeling cylinder 11. Thereafter, such mechanism must decelerate the shoes to match with the stationary label magazine. This has the disadvantages previously mentioned.

Moreover, the included angle 23 between the beginning and end of the label extracting operation of the shoe 13 with respect to magazine 10 is relatively small. Accordingly, the time span for removing the label from the magazine 10 is very short, and the label extraction rate must be high. This introduces problems of smoothness of label extraction with possible faults in this procedure.

In accordance with the present invention, and as is diagrammatically shown in FIG. 2, the magazine 10 (of the same width as in FIG. 1) is on the inside of the circle orbit 12 (of the same size as in FIG. 1) on which the shoe carrier turns the shoes 13 past the magazine 10 to the label applying cylinder 11. In this view cylinder 11 rotates counterclockwise in the direction of arrow 19 and container travels in the direction of arrow 16. The shoes 13 constantly rotate clockwise in the direction of arrow 24 and at the same speed at all points on their orbit 12. The direction and speed of shoe rotation is matched to the stationary label in magazine 10. Adjacent magazine 10, the surface speed of the shoe cancels the orbiting speed of the shoe carrier so the shoe surface walks or rolls over the foremost label. Adjacent labeling cylinder 11, the surface speed of the shoe adds to the orbiting speed of the carrier, thus to match the high speed of the cylinder 11. Accordingly, the direction and speed of rotation of shoes 13 is not changed in orbiting from the magazine 10 to the label cylinder 11. The various speeds of the parts are so adjusted as to match the speed of rotation of the label cylinder 11 for perfect transfer of the labels to the containers 15 on the conveyor 17. With the speeds of the various parts so adjusted, there is no need for any acceleration or deceleration of the shoes 13, there is no jarring and no noise, and the operation is smooth and uninterrupted.

Moreover, the included angle 26 between the beginning and end of the label extraction operation from magazine 10 is greater than included angle 23 of FIG. 1. Accordingly, a greater time span is allowed for extraction of the label from the magazine. This reduces the rate of label extraction and minimizes the problems associated with high speed extraction.

Moreover, the natural tendency of the labels in magazine 10 is to curve outwardly, as shown in FIG. 2. This is because they are held in the magazine only at their edges. The exposed label surface is curvilinearly aligned on the path of the shoe orbit.

FIGS. 3 and 4 illustrate a practical structural embodiment of the principal illustrated in FIG. 2. The labeling cylinder 11 typically has the construction shown in the prior U.S. patent application of Karl Dullinger, Ser. No. 663,289 filed Aug. 25, 1967. The label transfer members or shoes 13 are mounted on a shoe carrier 27. The carrier 27 is journaled to rotate about a fixed axle 28. Carrier 27 has a bottom disk 34, also journaled on axle 28. Disk 34 is provided with a gear 29 which meshes with a pinion 32 on drive shaft 33.

Each shoe or roller 13 is mounted on carrier 27 for rotation on its own shaft 35, the lower end of which is provided with a planet gear 36 which meshes with a stationary sun gear 37 fast to axle 28. Accordingly, as the shoe carrier 27 turns clockwise in the direction of arrow 42, thus to orbit the shoes 13 on a circular path, the shoes 13 will rotate clockwise on shafts 35 in the direction of arrows 38, as shown in FIG. 3.

The label magazine 41 is mounted on the inside of the circular orbit of shoes 13 and will cooperate with the shoes 13 as they orbit past the magazine in the manner

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illustrated in FIG. 2 and as hereinbefore explained. FIG. 3 also illustrates a gluing belt 43 which is mounted on end rollers 44, 45 which rotate in the direction of arrows 46, thus to drive the inside run of the belt 43 in the same direction of the shoe orbit and in the direction of arrow 47. Glue is applied to the belt 43 by other mechanism and is doctored by blade 48. The belt 43 is sufficiently long to insure contact of the belt with the shoes over a substantial part of the orbit of the shoes. The shoe carrier 27 may be further provided with idler rollers 51 which press against the belt 43 and help shape the inside run of the belt 43 to the orbit on which the shoes 13 travel.

As successive shoes 13 orbit past the magazine 41, successive foremost labels 52 will be picked up by the shoes 13 and without change of speed or direction of rotation of the shoes 13, are transferred to the labeling cylinder 11, as illustrated.

The major part of the orbit of the shoes 13 around the sides and rear of magazine 41 is desirably covered by a guard cover 53 to shield the labels in the magazine from the glue coated shoes 13. Cover 53 also acts as a safety guard for personnel refilling labels into the magazine. Cover 53 has particular utility when the label magazine 41 is disposed inside the orbit of the shoes 13 and substantially on the diameter of the orbit circle, as shown in FIG. 3.

The magazine 41 is desirably provided with retracting mechanism 54, such as a solenoid or fluid cylinder, which is coupled by links 55, 56 to the magazine and by which the magazine may be retracted automatically by mechanism which senses the absence of a container 15 on the conveyor 17. The magazine is returned under the pressure of a compression spring 57 which seats stop bracket 58 against buffer stop 59 when the magazine is in its fully advanced position.

FIG. 5 illustrates an embodiment in which the magazine 41 is mounted on bracket 62 to elevate the rear end 63 of the magazine, thus to facilitate loading fresh labels into the magazine, notwithstanding its confined position inside the orbit of the shoes 13.

In the embodiment of FIGS. 3-5, the axle 28 about which the shoe carrier 27 orbits is substantially parallel to the shaft 64 on which the label applying cylinder 11 is mounted. As viewed from the top in FIG. 3, the circular orbit of the shoes 13 is in the same plane as the circular path of rotation of the labeling cylinder 11.

FIG. 6 shows a modified embodiment in which the label transfer shoes 66 have an orbit which is transverse to the plane of rotation of the labeling cylinder 65. There is a frame 67 on which the shaft 68 for the labeling cylinder 65 is mounted. The shoes 66 are in the form of truncated cones, each being mounted on a shaft 71 supported in a shoe carrier 72 rotatable on the axis of bevel gear 73 which meshes with bevel gears 74, 75. Gear 75 receives power from the power input shaft 76. Fixed axle 77 is provided with a bevel gear 78. Shafts 71 of the cone-shaped transfer shoes 66 are provided with meshing bevel gears 79. As carrier 72 turns on axle 77, the shoes 66 will turn on their own shafts 71 at an appropriate surface speed to match the peripheral speed of the labeling cylinder 65.

Label magazine 82 is mounted at an appropriate angle to match the tapered surface of the shoes 66. Accordingly, in this embodiment, as well as in prior embodiments, the magazine 82 is disposed on the opposite side of the orbit of the shoes 66 from the labeling cylinder 65.

As in the previously described embodiment, there is also a gluing belt 83 mounted on a pair of rollers, one of which is shown at 84 and which has shaft 85 driven from bevel gear set 86, 87. Shaft 85 has a gear 88 meshing with a gear 89 on the same shaft as bevel gear 87.

The conical shape of the shoes 66 accommodates the transverse axes of the orbit of the shoe carrier 72 and the plane of rotation of the labeling cylinder 65 for smooth successive transfer of labels from the magazine 82

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to the shoes 66 and thence to the labeling cylinder 65. In the course of this transfer there is no change in speed or direction of rotation of the shoes 66.

We claim:

1. In an automatic labeling machine having a label magazine, a rotary labeling cylinder for applying to containers and a label transfer mechanism for transferring labels from the magazine to the rotary labeling cylinder, said transfer mechanism comprising a series of rotary label transfer shoes and a rotating shoe carrier on which the shoes orbit past the magazine and labeling cylinder to sequentially roll over the foremost label in the magazine to pick said foremost label out of the magazine and roll past the rotary labeling cylinder in the course of transferring the said label thereto, the improvement in which the labeling cylinder and magazine are disposed on opposite sides of said orbit whereby the shoes rotate about their axes in the same direction when passing the magazine and the labeling cylinder.

2. The invention of claim 1 in which the magazine is disposed inside said orbit and the labeling cylinder is outside said orbit.

3. The invention of claim 1 in which there is also a gluing mechanism on the same side of the orbit as the labeling cylinder, said gluing mechanism having a gluing mechanism having a gluing surface moving in the same direction as the orbit of the transfer shoes.

4. The invention of claim 1 in which the transfer shoes rotate about their own axes at substantially the same rate throughout said orbit.

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5. The invention of claim 2 in which the magazine is inclined with respect to the plane of the orbit, to facilitate loading labels thereinto.

6. The invention of claim 1 in which the labeling cylinder and shoe carriers rotate on substantially parallel axes.

7. The invention of claim 1 in which the labeling cylinder and shoe carrier rotate on transverse axes.

8. The invention of claim 7 in which the shoes comprise cones.

9. The invention of claim 2 in which there is a protective cover over a portion of said orbit.

10. The invention of claim 2 in which labels in the magazine curve outwardly with their exposed surface aligned curvilinearly on the shoe orbit.

11. The invention of claim 1 in which the shoe carrier and shoes both rotate in the same direction and the labeling cylinder rotates counter thereto.

References Cited

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BENJAMINE A. BORCHELT, Primary Examiner

J. M. HANLEY, Assistant Examiner

U.S. Cl. X.R.

156—568; 271—41

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,546,048 Dated December 8, 1970

Inventor(s) Karl Dullinger and Norbert Jorss

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, Line 17, "inventoin" should read---
--invention--

Column 3, Line 51, "showw" should read--shown--

Column 5, Line 6, "labels" should be inserted
after the word applying

Signed and sealed this 23rd day of March 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patent