

[54] **DEVICE FOR FEEDING LABELS INTO LABELING MACHINES**

[72] Inventor: **Erich Eder**, Neutraubling, Germany
[73] Assignee: **Hermann Kronseder**, Neutraubling, Germany
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[51] Int. Cl.**B65h 3/06, B32b 31/00**
[58] Field of Search.....**271/47, 56, 57, 12, 33, 28, 271/29, 5, 36; 156/364, 571, 485**

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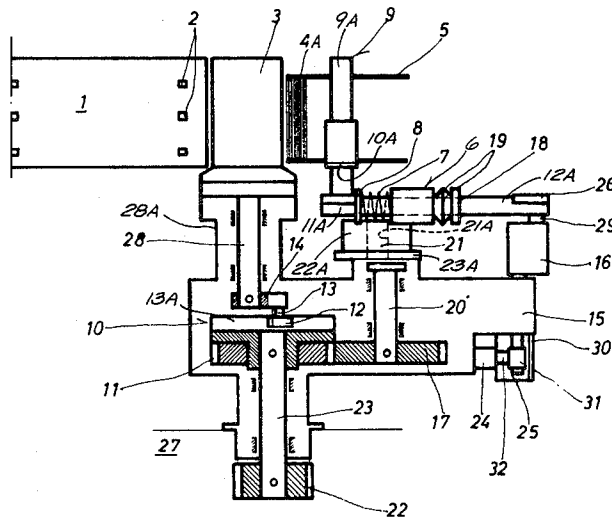
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Primary Examiner—Richard E. Aegerter
Attorney—Wheeler, House and Wheeler

[57] **ABSTRACT**

An integrated assembly of apparatus for feeding labels to a container labeling machine includes a variable speed label-transfer roller which rotates at a slow speed when picking up a label and a higher speed when transferring the label to a label turret, and a label magazine which is advanced in a tangential path toward the transfer roller and retracted clear of the path by a guide which is yieldably connected to the label magazine and rotated by a crank. When a container is not present in the feed path to the label turret, the movement of the label magazine toward the transfer roller is prevented by a blocking arm which is actuated by a rotary solenoid. The yieldable connection between the guide and the label magazine affords relative movement between the guide and the label magazine when the magazine is blocked and the guide continues to rotate.

11 Claims, 7 Drawing Figures



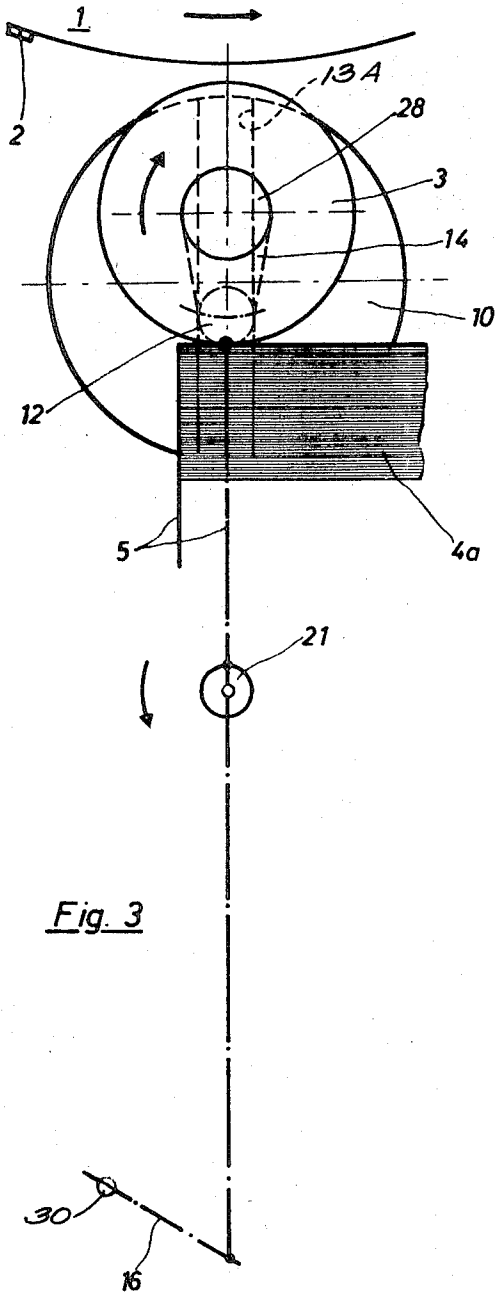


Fig. 3

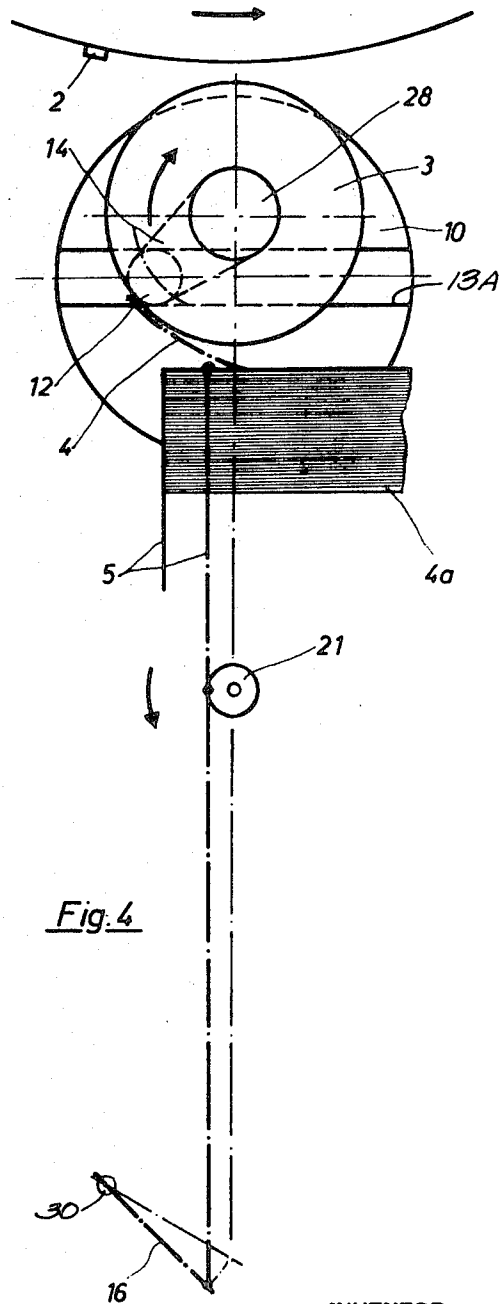


Fig. 4

INVENTOR

ERICH EDER

By
Wheeler, Wheeler, House & Clemency
ATTORNEY

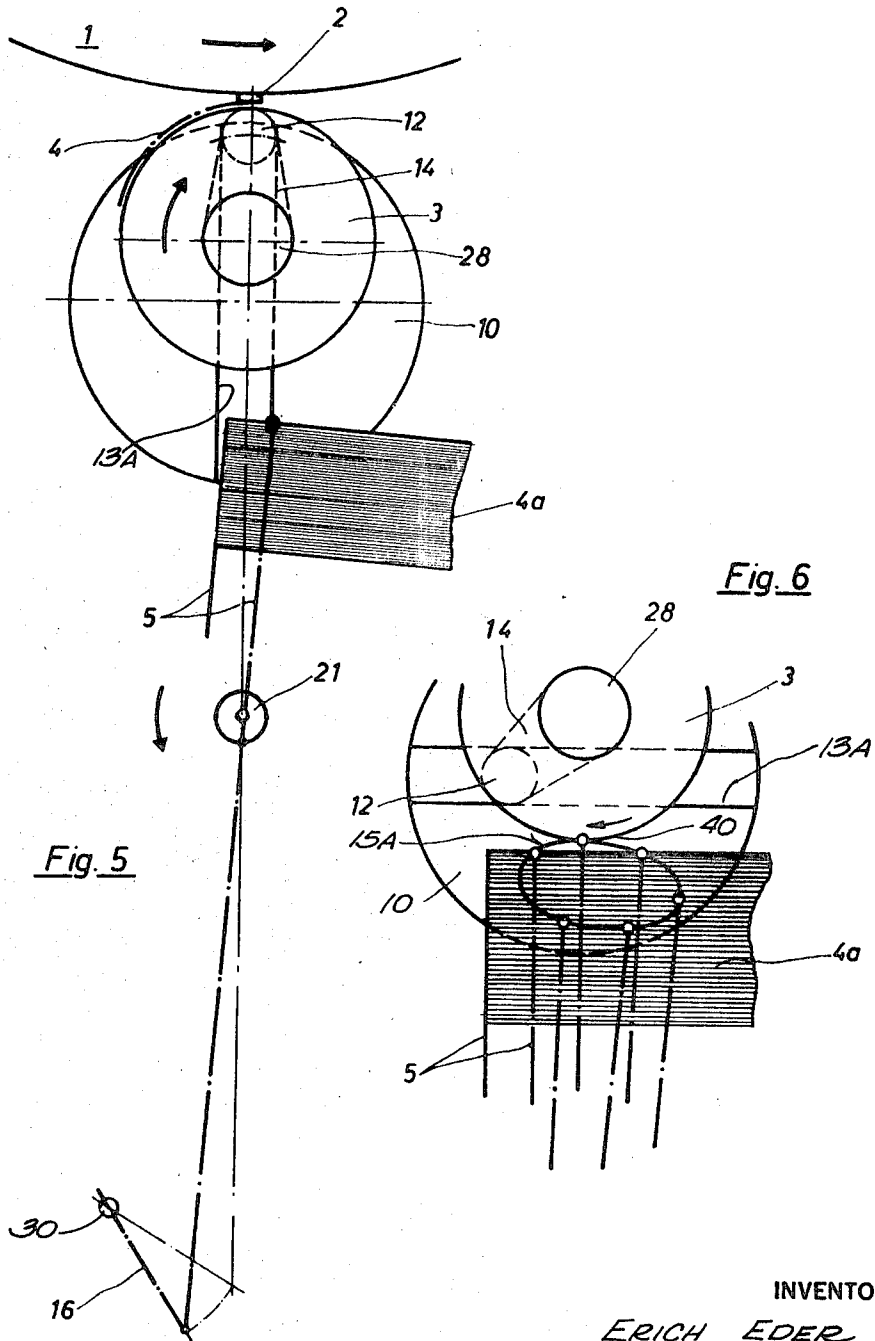
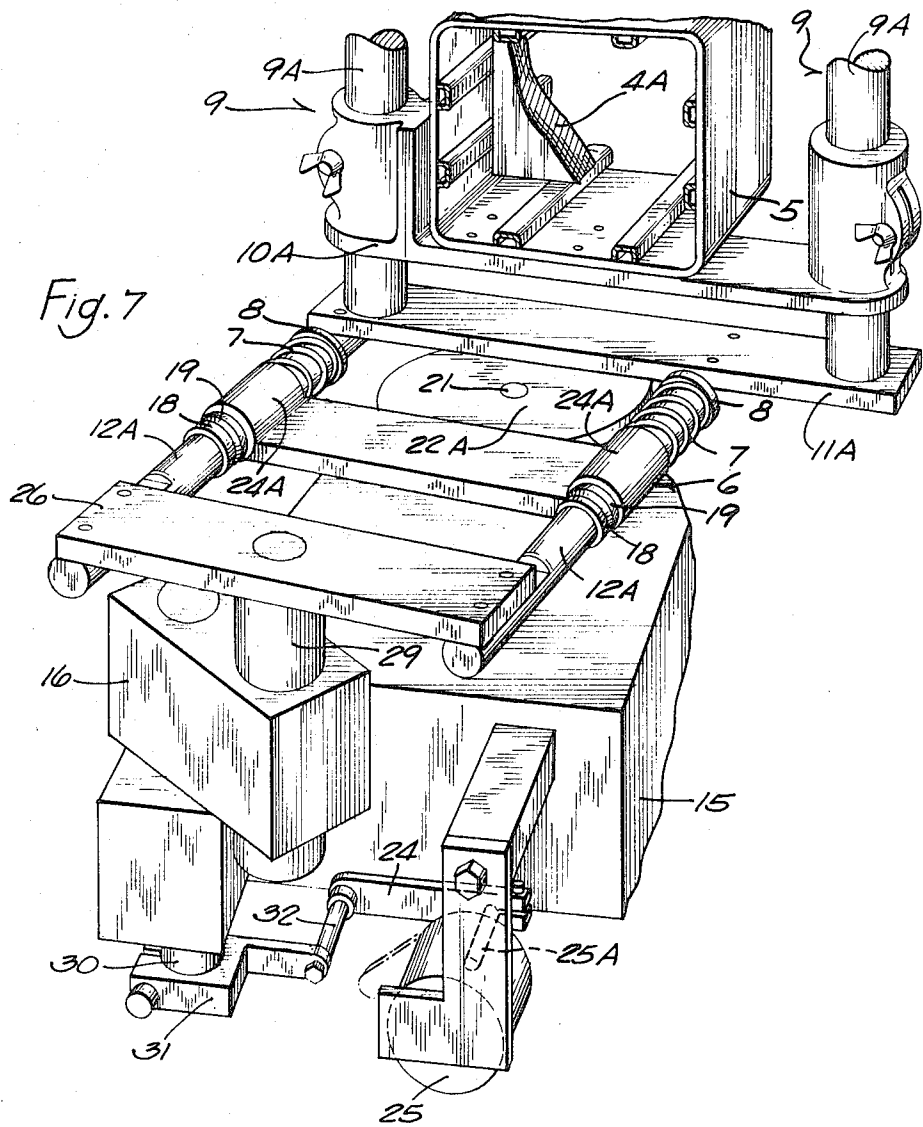


Fig. 5

Fig. 6

INVENTOR
ERICH EDER
By
Wheeler, Wheeler, Housa & Clemency
ATTORNEYS



INVENTOR
ERICH EDER
By
Wheeler, Wheeler, House & Clemency
ATTORNEYS

DEVICE FOR FEEDING LABELS INTO LABELING MACHINES

BACKGROUND OF INVENTION

The invention relates to labeling machines of the type disclosed in assignee's copending application Ser. No 700,578 now U.S. Pat. No. 3,537,934 issued Nov. 3, 1970.

Prior art labeling apparatus typically includes a transfer roller for transferring labels from the label magazine to the label turret. The transfer roller desirably has the same surface speed as the peripheral speed of the label turret when a label is transferred from the transfer roller to the turret to thus provide a smooth transfer of the label. Various arrangements are also employed to prevent the transfer of a label to the suction roller when a bottle is missing in the feed path to the label turret.

In one prior art device, a glued transfer roller is employed and the label magazine is shuttled toward and away from the transfer roller by a rotating crank. If a bottle is missing, the crank is turned out of its working position by a magnet which is actuated by bottle switches located in the bottle feed path. In this device, the speed of the transfer roller and thus the speed of the label turret is limited by the speed at which the label magazine can be shuttled back and forth and the speed at which the motion of the label magazine can be stopped and started.

A second type of prior art label feed device uses a suction roller to transfer labels from the label magazine to the label turret. When a bottle is missing, the suction is released and a label is not picked up from the magazine. This feed device has proved unsatisfactory because of maintenance problems with the control for switching on and off of the suction. Furthermore, since the labels always contact the suction roller, the labels sometimes fall from the magazine when the suction is turned off.

A third label feed device employs a glued, label-transfer roller which shuttles back and forth and is also driven at a variable speed. A fourth label feed device utilizes a suction roller rather than a glued transfer roller and a cam disc swings the label magazine back and forth. These later devices are quite bulky since they require separate drive mechanisms for the transfer roller and the label magazine and the substantial masses of the separate transfer roller and label magazine assemblies prevent the rapid movements required for high output labeling machines. Moreover, the substantial space requirements of these label feed devices limits the number of label magazines that can be arranged around the label turret.

SUMMARY OF INVENTION

The invention provides a label feed device in which a transfer roller and label magazine are supported in unitary assembly on the same housing and driven by the same input shaft. The compact size of the assembly permits as many as four of the devices to be arranged around a label turret, whereas, only as many as three prior art label feed devices could be arranged around a label turret.

The label feed device of the invention eliminates the problems associated with swiftly accelerating and decelerating the masses of the transfer roller and label magazine by utilizing a transfer roller which is rotated at a variable rate during each revolution about a fixed or stationary axis.

To smoothly transfer labels to the transfer roller with the labels moving in the same direction as the contacting surface of the transfer roller, the label magazine and a label magazine support are orbited in a tangential path toward the transfer roller and then away from the transfer roller on an offset path to clear the transfer roller by an arrangement which includes two spaced horizontal posts on the label magazine support which are slidably received in spaced bores in a guide. The rear ends of the posts are interconnected by a plate which is pivotably connected to the housing by a link and a vertical post. The guide is supported on the housing and has an aperture which receives a crank driven by The input shaft. The

guide thus moves in an orbital path under the influence of the crank. Springs arranged around the posts and located between the guide, and stops on the magazine support together with the posts, transmit the motion of the guide to the magazine. The pivoted connection of the ends of the horizontal posts to the housing causes the label magazine to move in an oblong or generally elliptical path rather than the circular path of the crank.

The invention also provides an arrangement to interrupt movement of the label magazine toward the transfer roller to prevent transfer of a label to the transfer roller if a container is absent in the feed path to the label turret. A rotary solenoid is energized by a limit switch to move a blocking arm in a position to limit forward movement of the magazine support and prevent contact of the labels with the transfer roller. When forward movement of the magazine is prevented, the guide continues to rotate and the springs between the label magazine and guide gently yield to afford relative movement between the magazine and guide with the horizontal posts reciprocating in the guide bores.

The label feed apparatus of the invention provides a compact, stationary assembly in which only the label magazine and magazine support are oscillated. The blocking arrangement is quickly actuated to interrupt forward travel of The magazine when a bottle is missing to thus afford a high speed labeling operation.

Further objects and advantages of the invention will become apparent from the following disclosure.

DRAWINGS

FIG. 1 is a diagrammatic side view in fragmentary section of label feed apparatus in accordance with the invention.

FIG. 2 is a diagrammatic plan view of the apparatus shown in FIG. 1.

FIG. 3 is an enlarged schematic plan view showing the position of the label magazine and the suction roller at the moment the suction nozzle contacts and picks up the label.

FIG. 4 is a schematic view similar to FIG. 3 showing the label in the course of being withdrawn from the magazine for delivery to the label turret.

FIG. 5 is a schematic view similar to FIG. 3 showing the transfer of a label to the label turret.

FIG. 6 is a diagrammatic view showing the elliptical path of the labels in the label magazine.

FIG. 7 is an enlarged fragmentary end perspective view of the apparatus shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

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 structures.

In the drawings, FIG. 1 discloses a label turret 1 which has a plurality of circumferentially arranged suction nozzles 2 adapted to carry labels to a bottle onrolling station (not shown). The label feed apparatus of the invention includes a transfer roller 3. As disclosed, the transfer roller is provided with a plurality of suction nozzles (not shown). Alternatively, the transfer roller can be a glued roller. The suction roller 3 is fixedly secured to a shaft 28 which is journaled for rotation about a stationary axis in an aperture in a boss 28A, on a housing 15 which is supported on a machine table 27.

Means are provided for rotating the suction roller 3 at a variable or differential rate of rotation during each revolution. In the disclosed construction, the means includes a drive shaft or input shaft 23 rotatably supported on the housing 15 and offset from the shaft 28. The means also includes a drive sprocket 22 which is connectable to a motor (not shown) and a drive disc or plate 10 provided with an upwardly open slot 13A, which receives a follower or crank roller 12 which is rotatably mounted on a crank 14, which is fixedly secured to the shaft 28. The shafts 28 and 23 and the crank 14 and plate

10 are arranged so that the roller 3 has a peripheral or surface speed approximating the surface speed of the label turret 1 when a label 4 is transferred from the suction roller 3 to the label turret 1 and a slower surface speed as a label 4 is picked up by the suction roller 3 as hereinafter described.

Labels 4 are in a stack 4A in a label magazine 5. The magazine 5 is supported by a label magazine support 9 which includes two spaced vertical posts 9A interconnected by upper and lower cross-plates 10A and 11A.

The invention also provides means for moving the label magazine 5 in an orbital or generally elliptical path toward and away from the suction roller 3 in timed sequence with rotation of the suction roller 3, so that the exposed label 4 in the magazine 5 is in a position touching the suction roller 3 as the suction roller 3 is rotating at its lowest peripheral speed. As disclosed, the means comprises a shaft 20 (FIG. 1) rotatably supported in the housing 15 and a gear 17 which is in mesh with a gear 11 fixed to the shaft 23. The shaft 20 is provided with an upwardly projecting eccentric shaft or crank 21 which is received in an aperture 21A in a hub 22A of a guide 6. The hub 22A is supported on a plate or pedestal 23A which extends upwardly from the housing 15. The guide 6 includes a pair of spaced blocks or bosses 24A interconnected by a web and having through apertures or bores 6A.

Means are provided for yieldably connecting the guide 6 to the label magazine support 9. As disclosed, the means includes two spaced horizontal posts 12A (FIGS. 2, 7) which are connected to the plate 11A and extend rearwardly from the plate 11A. The posts 12A are slidably and reciprocally received in the bores 6A and are interconnected at their ends by a plate 26. The posts 12A are provided with springs or washers 19 and stops 18 which are threaded on posts 12A. Springs 7 are arranged around the posts 12A and located between bosses 24A and stops 8 on the posts 12A.

Means are also provided for pivotally connecting the posts 12A to the housing 15. In the disclosed construction, the means comprises a rod 29 (FIG. 7) which is pivotally connected to a link or block 16. The block 16 is fixedly connected to a vertical shaft 30 which is rotatably supported in an aperture in the housing 15. When the shaft 20 rotates, the crank 21 causes an orbital movement of the guide 6. The motion of the guide is transmitted to the label magazine 5 through the posts 12A and the springs 7. The articulated or pivoted connection of the posts 12A to the housing through rod 29 and the link 16, causes the label magazine 5 to orbit on an oblong circular or generally elliptical path 15A, as shown in FIG. 6.

The invention also provides means for limiting the movement of the label magazine 5 toward the suction roller 3 when the bottle train is interrupted by a missing bottle in the feed path to the onrolling station. In the disclosed construction, the means comprises a rotary solenoid 25 (FIG. 7) which has an armature 25A connected to a blocking arm 24. An arm 31 is fixed to shaft 30 and provided with an extension or a buffer 32. When a bottle is missing, a limit switch (not shown), located in the feed path, is actuated to energize the electromagnet in the rotary solenoid 25 to swing the arm 24 into the position shown in full lines in FIG. 7, blocking movement of arm 31 and thus forward movement of the magazine 5 toward the suction roller 3. Although, movement of the magazine 5 is blocked, the guide 6 continues to rotate in response to continued rotation of the crank 21 and the posts 12A of the magazine support 9 reciprocate in the bores 6A as the springs 7 gently yield to afford relative movement between the guide 6 and the label magazine support 9. When the next bottle appears in the feed path to the label turret 1, the limit switch in the feed path is opened and the solenoid 25 is deenergized releasing the arm 24 which is swung by gravity or spring biasing to the position shown in broken lines in FIG. 7. With the arm 24 out of the blocking position, the label magazine 5 follows the unimpeded elliptical path shown in FIG. 6.

FIGS. 3, 4 and 5 show three different positions of the label magazine 5 during the transfer sequence of a label from the

magazine 5 to the label turret 1. In FIG. 3, the surface of the suction roller is contacting the outermost label in the magazine 5 at a point intermediate the ends of the label. The magazine 5 is at the closest point to the roller 3 in its elliptical path as indicated by the dot designated 40 in FIG. 6. The roller 12 is also at its innermost radial position in the slot to provide a low speed for the suction roller 3 which is also at a speed lower than the tangential speed of the label in the label magazine.

In FIG. 4, a label 4 has been withdrawn from the label magazine 5 and the crank 21 has rotated 90° from the position in FIG. 3 pivoting the link 16 through a small arc. The plate 10 and slot 13A have moved 90° from the FIG. 3 position. The suction roller 3 is accelerating as the roller 12 moves radially outwardly in slot 13A. The labels 4A are moving away from the suction roller 3 at this stage of the transfer sequence.

FIG. 5 shows the transfer of a label 4 to the suction nozzles 2 on the label turret. The plate 10 has rotated 90° from the FIG. 4 position. The roller 12 is in its radially outermost position to provide the suction roller 3 with its highest peripheral or circumferential speed, a speed which is approximately the same as the speed of the periphery of the label turret 1.

Although in the disclosed construction the label magazine 5 orbits to and fro in a generally elliptical path, any orbital motion including a tangential movement in a direction common with the direction of rotation of the transfer roller and a return movement offset from the tangential movement is within the purview of the invention.

What is claimed is:

1. Label feed apparatus for supplying labels to a label turret, said apparatus comprising a housing, a transfer roller rotatably supported on said housing for rotation about a stationary axis, a label magazine, a label magazine support connected to said magazine, a guide, means for connecting said guide to said support to transmit motion of said guide to said label magazine, means for rotating said transfer roller at a variable rate of rotation during each revolution with the periphery of said transfer roller rotating at generally the same peripheral speed as the label turret when a label is transferred from said transfer roller to the label turret and at a lower rate of speed when said transfer roller is receiving a label from said label magazine, means for moving said guide in an orbital path to move said label magazine on a tangential path in the same direction and in sequence with said transfer roller so that when said transfer roller is rotating at said lower rate of rotation, said magazine smoothly transfers a label to said transfer roller and for moving said label magazine and support in a return path offset from the tangential path, and means for limiting movement of said label magazine toward said transfer roller to prevent transfer of a label to said transfer roller.

2. Label feed apparatus in accordance with claim 1 wherein, said means for moving said guide in an orbital path to move said label magazine in a tangential path in sequence with the transfer roller and in a return path offset from the tangential path comprises a shaft rotatably supported in said housing, a crank on said shaft, an aperture in said guide for receiving said crank, and wherein said means connecting said guide to said magazine support is yieldable to afford relative movement of said guide when movement of said label magazine is limited.

3. Label feed apparatus in accordance with claim 2 wherein, said means for yieldably connecting said guide to said magazine support comprises two spaced horizontally extending posts on said label support, spaced apertures in said guide for reciprocally receiving said posts and springs arranged around said posts and located between said label magazine support and said guide to transmit the motion of said guide to said support, and means for connecting said posts to said housing.

4. Label feed apparatus in accordance with claim 3 wherein, said means for connecting said posts to said housing comprises a plate connected to said posts, a link pivotally connected at one end to said posts and a second shaft fixedly secured to said link and rotatably supported in said housing.

5. Label feed apparatus in accordance with claim 4 wherein, said means for limiting movement of said label magazine toward said transfer roller comprises an arm fixed to said second shaft, a rotary solenoid with an armature, and means for energizing said solenoid to swing said blocking arm into a position preventing movement of said arm on said second shaft when a bottle is missing in the feed path.

6. Labeling apparatus comprising a label turret, a unitary label feed assembly including a stationary housing, a transfer roller rotatably supported on said housing for rotation about a fixed axis with the periphery of said transfer roller at a fixed distance from said turret, a label magazine, means on said housing for moving said label magazine relative to said housing and in an orbital path when required to transfer the forward label in said magazine to said transfer roller at a point in said orbital path when a label is not required, and means for rotating said transfer roller at a variable rate of rotation during each revolution with the periphery of said transfer roller rotating at a low speed when contacting a label and at a higher rate of speed when the label is transferred to said label turret.

7. Label feed apparatus comprising a housing, a transfer roller rotatably supported on said housing, a label magazine, a label magazine support having two spaced horizontally extending posts, a plate connecting the ends of said posts, a guide having spaced apertures for reciprocally receiving said posts, biasing means arranged around said posts and located between said guide and said label support, a pedestal on said housing for supporting said guide, a crank connected to said guide, linking means connecting said plate to said housing and means for rotating said crank to rotate said guide and oscillate said label magazine in a tangential path toward and in an offset path away from said transfer roller.

8. Label feed apparatus in accordance with claim 7 including means to limit movement of said label magazine toward said transfer roller, with said biasing means yieldably affording reciprocation of said posts in said apertures in said guide as said guide is rotated by said crank when movement of said label magazine is limited.

9. Label feed apparatus for supplying labels to a label turret, said apparatus comprising a label transfer roller, a label magazine, a first part fixedly connected to said magazine, a second part, yieldable motion transmitting means connecting said first and second parts, means for moving said second part to afford movement of said magazine in an orbital path with an advancing portion of said path proximate said transfer roller for transferring a label to said roller and a return portion offset from said advancing portion, and means operable to limit movement of said first part and said magazine in said orbital path to prevent transfer of a label to the turret and cause movement of said second part relative to said first part as said motion transmitting means yield.

10. Apparatus in accordance with claim 9 including a housing with a pedestal, a crank extending through said pedestal and wherein said second part includes a hub for receiving said crank and supporting said first and second parts on said pedestal, and a link connecting said first part to said housing to cause orbital movement of said magazine in an elliptical path.

11. Label feed apparatus for supplying labels to a turret comprising, a housing, a label transfer roller rotatably supported on said housing, a label magazine, a crank rotatably supported on said housing, a label support connected to said label magazine, a guide having a hub and an aperture in said hub for receiving said crank, means for yieldably connecting said guide to said label magazine support, said hub supporting said label magazine and said label magazine support on said housing for movement in a orbital path upon rotation of said crank for transferring labels to said transfer roller, a link having one end pivotally connected to said label support remote from said hub and the other end pivotally connected to said housing to cause movement of said magazine in said orbital path, and means operable to limit movement of said label support and said magazine toward said transfer roller to prevent transfer of a label to said turret when a container is absent from the feed path to the label turret and cause movement of said guide relative to said support as said means connecting said guide to said support yields upon rotation of said crank.

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